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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 System Provisioning System Copy 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>2.7</td>
<td>2018-01-15</td>
<td>Updated version for Software Provisioning Manager 1.0 SP22 (SL Toolset 1.0 SP22)</td>
</tr>
</tbody>
</table>

- **New Features**:
  - Installer Log Files Improvements, documented in: *New Features, Useful Information about the Installer, Troubleshooting with the Installer*
  - New section *Splitting Off an ABAP Central Services Instance from an Central Instance* has been added.

- **New Features** section restructured:
  - As of SP22, a dedicated subsection for each new SP has been created. New features below SP22 remain in a common table.

- The Java SDT GUI - which was in the SP21 version still available in parallel to the SL Common GUI - has been deprecated with SP22. As of SP22, SL Common GUI is the only available installer GUI:
  - 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*).
  - The Java SDT GUI-specific information was removed from the common installer sections: *Running the Installer, Useful Information About the Installer, Interrupted Process*
<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Updated version for Software Provisioning Manager 1.0 SP21 (SL Toolset 1.0 SP21)</strong></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 Media Required for Performing the Export.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>◦ Support of Oracle 12.2., documented in: New Features</td>
</tr>
<tr>
<td>2.6</td>
<td>2017-09-11</td>
<td><strong>Updated version for Software Provisioning Manager 1.0 SP20 (SL Toolset 1.0 SP20)</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• New Features:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>◦ 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</td>
</tr>
<tr>
<td></td>
<td></td>
<td>◦ Cleanup of operating system users, documented in: SAP System Parameters, Creating Operating System Users and Groups</td>
</tr>
<tr>
<td></td>
<td></td>
<td>◦ Refresh database content using a database backup enabled for all databases, documented in: Copying the Database Only - Refresh Database Content.</td>
</tr>
<tr>
<td>Version</td>
<td>Date</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| 2.4     | 2017-02-06 | Updated version for Software Provisioning Manager 1.0 SP19 (SL Toolset 1.0 SP19)  
• New Features:  
  Verification of the integrity of data units in Software Provisioning Manager, documented in: Downloading the Software Provisioning Manager Archive |
| 2.3     | 2016-10-07 | Updated version for Software Provisioning Manager 1.0 SP18 (SL Toolset 1.0 SP18) |
| 2.2     | 2016-06-06 | Updated version for Software Provisioning Manager 1.0 SP17 (SL Toolset 1.0 SP17) |
| 2.1     | 2016-02-15 | Updated version for Software Provisioning Manager 1.0 SP10 (SL Toolset 1.0 SP16) |
| 2.01    | 2015-10-12 | Updated version for Software Provisioning Manager 1.0 SP09 (SL Toolset 1.0 SP15) |
| 2.0     | 2015-10-12 | Updated version for Software Provisioning Manager 1.0 SP09 (SL Toolset 1.0 SP15) |
| 1.9     | 2015-09-14 | Updated version for Software Provisioning Manager 1.0 SP09 (SL Toolset 1.0 SP14) |
| 1.8     | 2015-04-27 | Updated version for Software Provisioning Manager 1.0 SP08 (SL Toolset 1.0 SP13) |
| 1.7     | 2014-11-24 | Updated version for Software Provisioning Manager 1.0 SP07 (SL Toolset 1.0 SP12) |
| 1.6     | 2014-07-07 | Updated version for Software Provisioning Manager 1.0 SP06 (SL Toolset 1.0 SP11) |
| 1.5     | 2014-03-17 | Updated version for Software Provisioning Manager 1.0 SP05 (SL Toolset 1.0 SP10) |
| 1.4     | 2014-03-05 | Updated Version |

System Copy for SAP Systems Based on the Application Server Dual-Stack (ABAP+Java) of SAP NetWeaver 7.0 to 7.03 on UNIX
<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3</td>
<td>2013-11-22</td>
<td>Updated version</td>
</tr>
<tr>
<td>1.2</td>
<td>2013-10-28</td>
<td>Updated version</td>
</tr>
<tr>
<td>1.1</td>
<td>2013-08-19</td>
<td>Updated version</td>
</tr>
<tr>
<td>1.0</td>
<td>2013-07-17</td>
<td>Initial version</td>
</tr>
</tbody>
</table>
1 Introduction

1.1 Homogeneous and Heterogeneous System Copy

This document describes how to perform a homogeneous or heterogeneous system copy of an SAP system based on SAP NetWeaver 7.0 (including Enhancement Packages) Dual-Stack (ABAP+Java) with source operating system UNIX, using 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.

The following target databases are supported:

- IBM Db2 for Linux, UNIX, and Windows
- IBM Db2 for z/OS
- SAP MaxDB
- Oracle
- MS SQL Server
- SAP ASE

You can use either database-specific methods or database-independent methods.

For a detailed list of SAP system products and releases covered by this guide, see SAP Note 1738258. For information about supported operating system and database platforms, see the Product Availability Matrix at http://support.sap.com/pam.

**Note**

Not all SAP NetWeaver releases or SAP Business Suite applications that are available in Software Provisioning Manager 1.0 and are described in this guide might have been released already. Always check SAP Note 1680045 to ensure that the system copy options you want to perform are already supported.

**Note**

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

- **Software Provisioning Manager 1.0**
  
  Software provisioning manager is the successor of the product- and release-specific delivery of provisioning tools, such as SAPinst. Before you perform an installation or system copy, we recommend that you always download the latest version of the software provisioning manager, which is part of the Software Logistics Toolset ("SL Toolset" for short). This way, you automatically get the latest SAPinst version including latest fixes in the tool and supported processes. For more information about software provisioning manager as well as products and releases supported by it, see SAP Note [1680045](#). SAPinst has therefore been renamed to software provisioning manager 1.0 ("installer" for short) in this documentation. However, the term “SAPinst” is still used in:
  - Texts and screen elements in the software provisioning manager ("installer") GUI
  - Naming of executables, for example sapinst
  - Naming of command line parameters, for example SAPINST_USE_HOSTNAME
  - Operating system user groups, for example additional group sapinst

  In the following, we generally refer to software provisioning manager 1.0 as the “installer”. We only use the term “software provisioning manager” if this is required for technical reasons.

- **System Copy**
  
  Duplication of an SAP system. The SAP system ID and certain other SAP parameters might be changed in a copy. When you perform a system copy, the tool installs all the instances again, but it uses a copy of the source system database to set up the database.

  The following use cases are possible:
  - **Initial System Copy**
    The tool newly installs all the instances of a source system, but it uses a copy of the source system database to set up the database in the target system.
  - **Refresh**
    Overwriting of an already existing target system with the database content from a source system. The refresh use case is not supported using the software provisioning manager.

- **Homogeneous System Copy**
  
  During the system copy, you use the same operating system and database platform as the original system.

- **Heterogeneous System Copy**
  
  During the system copy, you change either the operating system or the database system, or both. Heterogeneous system copy is a synonym for migration.

- **Source System and Target System**
  
  The SAP system containing the original database is called the source system and the system to which the database copy is to be imported is called the target system. Their SAP system names are abbreviated to SOURCE_SAPSID and TARGET_SAPSID. The terms source database and target database are also used in this description.

- **Database Copy**
  
  Database-dependent part of the system copy.

- **Placeholders**
  
  Placeholders such as `<SAPSID>` are used in commands. They are used in the same way as in the SAP system installation documentation. You must replace them with the values valid for your site. The following additional placeholders are used:
Table 2:

<table>
<thead>
<tr>
<th>Placeholder</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;SAPSID&gt;</td>
<td>SAP system ID</td>
</tr>
<tr>
<td>&lt;S_HOST&gt;</td>
<td>System name of the source host (command <code>hostname</code>)</td>
</tr>
<tr>
<td>&lt;T_HOST&gt;</td>
<td>System name of the target host (command <code>hostname</code>)</td>
</tr>
<tr>
<td>&lt;S_SAPSID&gt;</td>
<td>SAP system ID <code>&lt;SAPSID&gt;</code> of the source system</td>
</tr>
<tr>
<td>&lt;T_SAPSID&gt;</td>
<td>SAP system ID <code>&lt;SAPSID&gt;</code> of the target system</td>
</tr>
<tr>
<td>&lt;S_DBSID&gt;</td>
<td>Database ID <code>&lt;DBSID&gt;</code> of the source system</td>
</tr>
<tr>
<td>&lt;T_DBSID&gt;</td>
<td>Database ID <code>&lt;DBSID&gt;</code> of the target system</td>
</tr>
<tr>
<td>&lt;OS&gt;</td>
<td>Operating system name within a path</td>
</tr>
<tr>
<td>&lt;DB&gt;</td>
<td>Database name within a path</td>
</tr>
<tr>
<td>&lt;Technology&gt;</td>
<td>ABAP, Java, or ABAP+Java</td>
</tr>
</tbody>
</table>

Note

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

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

1.3 New Features

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

Make sure that you also read the Release Notes for your SAP product at https://help.sap.com/

New Features - Software Provisioning Manager 1.0 SP22 [page 14]

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 14]

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.
1.3.1 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 3:

<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 <strong>before</strong> a product has been selected on the Welcome screen. For more information, see Useful Information About the Installer [page 60] and Troubleshooting with the Installer [page 65].</td>
</tr>
</tbody>
</table>

1.3.2 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 4:

<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 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. For more information, see Preparing the Media Required for Performing the Export [page 40] and Running the Installer [page 56].</td>
<td>Software Provisioning Manager 1.0 SP21 (SL Toolset 1.0 SP21)</td>
</tr>
<tr>
<td>Support of Oracle Database Vault</td>
<td>Oracle Database Vault 12c has been certified for SAP products that are based on SAP NetWeaver technology. You can now copy an SAP system with Oracle Database 12c and configure Oracle Database Vault in the database of the target system. Oracle Database Vault is supported for all system copy methods [page 21] described in this documentation. For more information, see Implementing Oracle Database Vault with the Installer [page 186].</td>
<td>Software Provisioning Manager 1.0 SP21 (SL Toolset 1.0 SP21)</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
<td>Availability</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Support of Oracle 12.2</td>
<td>Software Provisioning Manager (the “installer”) now supports system copy for SAP systems with Oracle 12.2.</td>
<td>Software Provisioning Manager 1.0 SP21 (SL Tool-set 1.0 SP21)</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 new SAPUI5-based graphical user interface (GUI) “SL Common GUI”. For more information, see Useful Information About the Installer [page 60]. Running the Installer [page 56].</td>
<td>Software Provisioning Manager 1.0 SP20 (SL Tool-set 1.0 SP20)</td>
</tr>
<tr>
<td>Cleanup of Operating System Users</td>
<td>You can now specify during the Define Parameters phase that the operating system users are to be removed from group sapinst after the execution of the installer has completed.</td>
<td>Software Provisioning Manager 1.0 SP20 (SL Tool-set 1.0 SP20)</td>
</tr>
<tr>
<td>Verification of Integrity of Data Units in Software Provisioning Manager</td>
<td>The integrity of data units extracted from the Software Provisioning Manager archive is verified. For more information, see Downloading and Extracting the Software Provisioning Manager 1.0 Archive [page 41]. In addition, check SAP Note 1680045 whether additional information is available.</td>
<td>Software Provisioning Manager 1.0 SP19 (SL Tool-set 1.0 SP19)</td>
</tr>
<tr>
<td>Adjust instanceID of an SAP Java System</td>
<td>An inconsistency of the instanceID parameter is caused by using an unsupported procedure to create or maintain the system. When instanceID is not consistent, future running of software logistics scenarios, such as system copy, system rename, dual-stack split, upgrade, and so on might fail. The option Adjust instanceID for a Java System helps you to overcome this. It is available in Software Provisioning Manager as option Software Life-Cycle Options Additional Preparation Options Adjust instanceID for a Java System. For more information, see Verifying and Adjusting the instanceID of an AS Java Instance [page 193].</td>
<td>Software Provisioning Manager 1.0 SP10 (SL Tool-set 1.0 SP16)</td>
</tr>
<tr>
<td>Diagnostics Agent</td>
<td>The Diagnostics Agent is no longer installed automatically with the SAP system. The Install Diagnostics Agent check box on the Install Diagnostics Agent screen is no longer available. You now have to install the Diagnostics Agent always separately. We recommend that you install it prior to the installation of your SAP system(s). For more information, see the Diagnostics Agent Installation Strategy attached to SAP Note 1365123, to SAP Note 1833501, and to SAP Note 1858920 and the attached Diagnostics Agent Setup Guide.</td>
<td>Software Provisioning Manager 1.0 SP10 (SL Tool-set 1.0 SP16)</td>
</tr>
<tr>
<td>Executing R3szchk in Parallel</td>
<td>Oracle, IBM Db2 for z/OS: You can now execute R3szchk in parallel. Using this feature you can improve the runtime of the export.</td>
<td>Software Provisioning Manager 1.0 SP08 (SL Tool-set 1.0 SP13)</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
<td>Availability</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Support of Oracle 12 database</td>
<td>You can now perform all Software Provisioning Manager 1.0 tasks (installation, system copy, system rename, dual-stack split) for SAP systems with the Oracle 12 database.</td>
<td>Software Provisioning Manager 1.0 SP08 (SL Toolset 1.0 SP13)</td>
</tr>
<tr>
<td>Feedback Evaluation Form available in the Software Provisioning Manager:</td>
<td>SAP SE’s aim is to provide fast and efficient procedures. To evaluate the procedure you just carried out, we need information generated by the tool during process execution and your experience with the tool itself. A new evaluation form contains a simple questionnaire and XML data generated during the procedure. Port 4239 is used for displaying the feedback evaluation form. For more information, see the Prerequisites section in Running the Installer [page 56].</td>
<td>Software Provisioning Manager 1.0 SP07 (SL Toolset 1.0 SP12)</td>
</tr>
<tr>
<td>Installation option ASCS Instance available for central and distributed system installation</td>
<td>You can also choose to install the ABAP central services instance (ASCS instance) when installing a central system or distributed system based on SAP NetWeaver dual-stack (ABAP + Java). So far this was only possible for high-availability systems.</td>
<td>Software Provisioning Manager 1.0 SP05 (SL Toolset 1.0 SP11)</td>
</tr>
</tbody>
</table>

### 1.4 Accessing the SAP Library

The references to the SAP NetWeaver Library documentation in this guide always refer to the following on the SAP Help Portal:

- **SAP NetWeaver 7.0:**
  
  [http://help.sap.com/nw70](http://help.sap.com/nw70) ➔ **Application Help ➔ SAP NetWeaver by Key Capability**

- **SAP NetWeaver 7.0 including Enhancement Package 1:**
  

- **SAP NetWeaver 7.0 including Enhancement Package 2:**
  

- **SAP NetWeaver 7.0 including Enhancement Package 3:**
  

### 1.5 Constraints

- Only perform a system copy if you have experience in copying systems and thorough knowledge of the operating system, the database, the ABAP Dictionary, and the Java Dictionary. Only perform a heterogeneous system copy (of a production, development, or test (QA) system) if you are a certified system support consultant or a certified SAP Technical Consultant.
The target system installation consists of both the target database and target instance/application server installations. For the scenarios below, the following holds:

- Refreshing the database is not supported. Refreshing the database means that only the database is loaded with the content of a database of a different system. Since no migration controller is invoked in this scenario, this is not supported.
- Option Generic Installation Options Refresh Database Content is not supported for dual-stack systems.
- Copying only the database is not supported.
- Copying only the central instance of a system having dialog instances - that means the dialog instances are preserved in the target system - is not supported. The migration controller deletes all dialog instances in the database, so the system is not complete any longer. Make sure that the export is consistent with the database. For example, the system must not be online during the period between when you start exporting the source central instance and when you install the target central instance.
- Reinstalling the central instance using option Central Instance in the Target System Installation folder without the database is not supported. The migration controller deletes all dialog instances in the database, so the system is not complete any longer. This might even cause additional problems. For more information, see SAP Note 966752.

- IBM Db2 for Linux, UNIX, and Windows only:
  - The option Deferred Table Creation is not supported for load-based system copies for SAP systems that are not based on SAP NetWeaver 7.0 EHP 1 or higher.

- System copy is not supported for the Diagnostics Agent.
  For more information and guidance see the Diagnostics Agent Maintenance Procedures article at http://wiki.scn.sap.com/wiki/x/n4efFg.

- When your system is a dual-stack system and you perform a system copy, your source system is copied to the target system as a whole. This means, it is neither possible to exclude a single stack from the system copy nor to copy a separate stack only.

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

- SAP Solution Manager only: As of Support Release 4, your SAP Solution Manager 7.0 system must be a dual-stack system if you want to perform a system copy. If required, install a Java Add-In to your existing ABAP system before you start the export.

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

- This documentation does not describe the following:
  - How to export and import a database with the installation tools for reorganization purposes. Use the appropriate tools for database reorganization, as SAP does not support this installation option.
  - How to copy data from non-SAP systems to SAP systems based on SAP NetWeaver Application Server. This documentation only describes how to copy data from one SAP system to another SAP system.
  - How to perform a duplication of a SAP system on the same host without changing the SAP system ID.
  - How to perform a system refresh using the tool.
- If you have made modifications in your development system and want to copy your quality assurance or production system onto the development system, see SAP Note 130906.
If you want to convert a non-Unicode system to a Unicode system or perform the system copy of a Unicode system, see SAP Note 551344.

For the development of Java applications, we strongly recommend that you follow the rules mentioned below. Otherwise, we cannot guarantee that you can copy your Java engine later with the SAP tools to change your underlying operating system and/or database system.

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

Access to archived files from the target system without a dedicated archive migration project is only supported in the following cases:

- The system copy is done to provide a source system for nonproductive purposes, for read-only access to the previously archived data from the target system (no reloading), and you do not store archive files using ArchiveLink/CMS.
  
  You can either copy all archive files to file systems that are not shared between the source and the target system, or you arrange network access for appropriate archive file sharing.

- The system copy is done to replace a productive system with a new productive system (for example, hardware migration), assuming that the target system did not exist before and the operation of the source system is discontinued after the system copy.

  You must not change the system ID during system copy, but arrange for file access and/or ArchiveLink/CMS connectivity.

### Note

**Only valid for SAP NetWeaver Business Warehouse:**

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

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

- **Dos and Don’ts for system copy:**
  - **Do:**
    - Save configuration data and runtime data in the Java database only. If saving this data to the file system level is unavoidable, you must use the Software Deployment Manager (SDM) to save the data.
    - Follow the Open SQL standard.
    - Make sure that all communication runs through the database pool.
  - **Don’t:**
    - Save any system and infrastructure-specific data in business objects. Use a pointer to the central storage of such information, for example:
      - SAP SystemID and SID (SAPSID=SID=system name)
      - Host name
      - IP addresses
      - Services and ports
      - Logical destinations and logical system names
○ Other technical infrastructure names
○ Use file system persistency.
○ Set up dependencies between Java and ABAP.
○ Try to copy the Java part of an ABAP+Java system to a Java standalone system or vice versa.

- If you have implemented a federated portal network (FPN) across multiple SAP NetWeaver systems, see SAP Note 1080080 before starting the system copy.
2 Planning

This section describes how to plan your system copy.

2.1 Before You Start

- The SAP OS/DB Migration Check prepares you in an optimal way for a successful migration and supports smooth continued operations on the new platform. The OS/DB Migration Check is mandatory, if you are going to migrate a productive system.
  For more information, see https://support.sap.com/support-programs-services/services/os-db-migration.html. In addition to the information contained on this page, check the SAP OS/DB Migration Planning Guide that is available in the Media Library.

- Before you start the system copy, you must read the documentation that is referenced in the following:
  - Read the following SAP Notes for up-to-date information on system copy and corrections to the system copy documentation:
    - SAP Note 1680045 – Release Note for Software Provisioning Manager 1.0
    - SAP Note 1738258 – System Copy of Systems Based on SAP NetWeaver
      Make sure that you have the most recent version of the SAP Notes, which you can find at: http://service.sap.com/notes.
  - Guides for the target system installation
    This system copy guide describes only the source system export in full detail. As for the installation of the target system, this system copy guide describes only the system copy-specific steps in section Setting Up the Target System [page 70], but refers for all steps that are identical with a new system installation to the appropriate operating system and database-specific installation guide available at http://support.sap.com/sltoolset.
  - SAP system landscape copy:
    - Best Practice document SAP System Landscape Copy for SAP NetWeaver and SAP Solutions at: https://support.sap.com/esacademy.
    - SAP Note 885343 – SAP System Landscape Copy
    - SAP Note 1990240 – Support of mixed landscapes (Unicode and Non-Unicode)
  - SAP Note 82478 – SAP System OS/DB Migration
  - If you encounter problems during the system copy, create a customer message using the application area BC-INS-MIG.
2.2 Use Cases for System Copy

You can apply the system copy for the following:

- Setting up system landscapes (where the SAP systems have different SAPSIDs).
- Providing systems for testing, demonstration, training, and standby.
  To create these systems you can either perform an initial system copy or use a database export to overwrite the database of an already existing target system (refresh use case).
  Depending on the purpose of the system, it might be advisable to use the same SAP system ID, even though this prevents you from including the system in a system group for transports.

  Note
  - Oracle only: You cannot create standby systems with a system copy.
  - You should perform system copy in a test system first. This way you can identify customer-specific problems that might result from modifications.

- Changing the operating system, the database, or both.
  You can use different operating system releases or database releases for the source and target systems, but the SAP system release of the source and target systems must be the same.
- Changing the hardware.

2.3 System Copy Methods

You can choose between the following system copy methods:

- The database-independent procedure using SAP tools.
  Use this method if database-specific methods are either not available or not suitable. For more information, see Database-Independent System Copy [page 43].

- The database-specific procedure using tools provided by the database vendor
  Some database vendors offer specific tools for copying a database. These tools allow you to:
  - Restore a backup of one database (source database) in another one (target database) (backup method)
  - Unload the source database and load the data into the target database
  For more information, see Database-Specific System Copy [page 75].

System Copy for SAP Systems Based on the Application Server Dual-Stack (ABAP+Java) of SAP NetWeaver 7.0 to 7.03 on UNIX
These methods are not supported for all database systems. Refer to the following table to check which copy methods are available for your database system:

Table 5:

<table>
<thead>
<tr>
<th>Database</th>
<th>Available Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP MaxDB</td>
<td>Use one of the following:</td>
</tr>
</tbody>
</table>
|                               | • System copy procedure on UNIX using R3load for the ABAP part and Jload for the Java part  
|                               |   For more information, see System Copy Procedure [page 44].                     |
|                               | • System copy procedure for a **homogeneous** system copy only                    |
|                               |   For more information, see SAP MaxDB-specific procedure [page 91].               |
| IBM Db2 for Linux, UNIX, and Windows | Use one of the following:                                                         |
|                               | • System copy procedure using R3load for the ABAP part and Jload for the Java part  |
|                               |   For more information, see System Copy Procedure [page 44].                     |
|                               | • Backup of IBM Db2 for Linux, UNIX, and Windows                                  |
|                               |   For more information, see IBM Db2 for Linux, UNIX, and Windows Specific Procedures [page 94]. |
| IBM Db2 for z/OS              | Use one of the following:                                                         |
|                               | • System copy procedure on UNIX using R3load for the ABAP part and Jload for the Java part  
|                               |   For more information, see System Copy Procedure [page 44].                     |
|                               | • **Additional Information:**                                                     |
|                               |   ○ For more information about the IBM Db2 for z/OS specific procedure for a **homogeneous** system copy only, see the .PDF attachment to SAP Note 680746. |
|                               |   ○ When R3ta is used to split tables, DELETE with WHERE is not performed if import errors occur in the target system.  
|                               |   For more information, see SAP Note 778729.                                      |
| Oracle                       | Use one of the following:                                                         |
|                               | • System copy procedure on UNIX using R3load for the ABAP part and Jload for the Java part  
|                               |   For more information, see System Copy Procedure [page 44].                     |
|                               | • R3load method with Export/Import Monitors                                       |
|                               |   For more information, see R3load Procedures Using the Migration Monitor [page 137]. |
|                               | • Jload method with Export/Import Monitors                                        |
|                               |   For more information, see Jload Procedures Using the Java Migration Monitor [page 163]. |
|                               | • Oracle-specific procedure for a **homogeneous** system copy only                 |
|                               |   For more information, see Oracle-Specific Procedure [page 77].                 |
Database | Available Methods
--- | ---
SAP ASE | Use one of the following:

- System copy procedure on UNIX using R3load for the ABAP part and Jload for the Java part
  For more information, see System Copy Procedure [page 44].
- R3load method with Export/Import Monitors
  For more information, see R3load Procedures Using the Migration Monitor [page 137].
- Jload method with Export/Import Monitors
  For more information, see Jload Procedures Using the Java Migration Monitor [page 163].
- Homogeneous system copy only: Backup/Restore or Detach/Attach method
  For more information, see SAP ASE Server-Specific Procedure [page 104].

Note
Before you start the system copy procedure, implement SAP Note 1612437.

- Development Infrastructure (DI) only:
  For the migration of SAP NetWeaver Development Infrastructure (NWDI) components you can apply either “Copy” or “Move”.
  - **Copy**
    “Copy” is supported only by Design Time Repository (DTR). After a copy, both the source DTR and target DTR can be used productively in parallel. However, Component Build Service (CBS) and Change Management Service (CMS) do not support such a copy.
  - **Move**
    “Move” is supported by all NWDI components – DTR, CBS, and CMS. After a move, the source system can no longer be used – that is, only the target is active after the move has been performed.

### 2.4 Creating a System Copy Plan

Create a plan to perform the system copy.

**Procedure**

1. When copying a system that contains production data, choose the moment for the copy carefully. This could be a month-end or year-end closing.
2. Consider the downtime of the source system (for preparations and copying) when planning the system copy.
3. Consider a test run.
   Perform a test run of the system copy. You can use the time taken by the test run to calculate the system downtime:
If you want your target system to replace your source system, try to perform a complete test run. This means that the entire database is exported from the source system, transferred to the target system, and imported there. System downtime is approximately equal to the total test time (that is, time for export, transport, and import).

If you do not want to replace your source system, a partial test run (export of the entire database or parts of it) can be sufficient to calculate the system downtime. The source system is only down for the time of the export. Calculating the system downtime is particularly important for very large databases (VLDB) or when tapes are being used. The test run is also to determine the amount of export data. Choose the best data transfer method (for example, FTP or tape). We recommend that you only perform read/write actions on local file systems.

4. Define a schedule for the test migration and the final migration.

2.5 Basic Planning Aspects and Parameters

Support of Mixed Landscapes (Unicode and Non-Unicode)

If your system landscape is mixed with Unicode and Non-Unicode systems, or if you have third party software in your system landscape which does not support Unicode at all, check SAP Note 1990240 for potential support restrictions.

Using NFS-Mounted File Systems

Note that the overall performance of the system copy depends on all links in the chain, starting from the performance of the source database to the following:

- Performance of the server on which the export is executed
- File system to which the export data is written
- Target side that reads from the export medium and imports it into the target database

You have to make sure that all aspects are configured for optimal performance. For recommendations on NFS configuration, see SAP Note 2093132.

**Note**

If you want to use NFS for the system copy export, make sure that you create secure file share permissions. Be aware that the communication protocol for NFS needs to be a safe one, for example SSFS.

SAP System Copy on Oracle Solaris with Oracle Database

For more information about copying SAP Systems on Oracle Solaris with Oracle database, see SAP Note 1848918.
Configuration Analysis and Hardware Configuration

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

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

Choosing an SAP system ID

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

Make sure that your SAP system ID:

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

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

Once the installation is completed and the SAP system copy has been imported, you will require a new license key for the target system. The license key of the source system is not valid for this system. For more information about ordering and installing the SAP license, see the SAP Library for your release at:

Table 6:

<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver 7.0 including EHP1</td>
<td><a href="http://help.sap.com/nw701">http://help.sap.com/nw701</a> Application Help Function-Oriented View &lt;Language&gt;</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP2</td>
<td><a href="http://help.sap.com/nw702">http://help.sap.com/nw702</a> Application Help Function-Oriented View &lt;Language&gt;</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP3</td>
<td><a href="http://help.sap.com/nw703">http://help.sap.com/nw703</a> Application Help Function-Oriented View &lt;Language&gt;</td>
</tr>
</tbody>
</table>

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

Archiving files

Data that has been archived in the source system (data that does not reside in the database but was moved to a different storage location using SAP Archive Management) must be made accessible in the target system. Adapt the file residence information in the target system. For more information, see the SAP Library for your release at:

Table 7:

<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver 7.0</td>
<td><a href="http://help.sap.com/nw70">http://help.sap.com/nw70</a> Application Help Function-Oriented View &lt;Language&gt;</td>
</tr>
<tr>
<td>SAP NetWeaver Release</td>
<td>Location</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP1</td>
<td><a href="http://help.sap.com/nw701%5C(%5C)">http://help.sap.com/nw701\(\)</a> Application Help (&lt;\text{Language}&gt;) Solution Life Cycle Management by Key Capability Data Archiving</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP2</td>
<td><a href="http://help.sap.com/nw702%5C(%5C)">http://help.sap.com/nw702\(\)</a> Application Help (&lt;\text{Language}&gt;) Solution Life Cycle Management by Key Capability Data Archiving</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP3</td>
<td><a href="http://help.sap.com/nw703%5C(%5C)">http://help.sap.com/nw703\(\)</a> Application Help (&lt;\text{Language}&gt;) Solution Life Cycle Management by Key Capability Data Archiving</td>
</tr>
</tbody>
</table>

Access to archive files is platform-independent.

Special Prerequisites for SAP NetWeaver Business Warehouse (SAP NetWeaver BW) and IBM Db2 for Linux, UNIX, and Windows (IBM Db2) 10.5 and higher

For special prerequisites and required procedures for SAP NetWeaver BW and IBM Db2, including the implementation of DB2 BLU acceleration, see the appendix of the database administration guide SAP Business Warehouse on IBM DB2 for Linux, UNIX, and Windows: Administration Tasks. To access this guide, use the SAP NetWeaver Guide Finder: In the I want to column select Operate my system, in the My Database column, select IBM Db2 for Linux, UNIX, and Windows.

2.6 System Copy and Migration Optimization

This section lists several methods that you can use to optimize the standard system copy procedure.

More information about system copy optimizations can be found in the document System Copy and Migration - Optimization at https://archive.sap.com/documents/docs/DOC-14257 and in SAP Note 1875778.

Related Information

Database Tuning [page 28]
Sorted Versus Unsorted Unload [page 30]
Package Splitting [page 30]
2.6.1 Database Tuning

This is just a list of database parameters which could help you to tune your database. This list is not meant to give you detailed recommendations about the parameter settings.

Database Tuning Measures – IBM Db2 for z/OS

Create indexes deferred.

Database Tuning Measures – IBM Db2 for Linux, UNIX, and Windows

Refer to the documentation *DB2 Optimization Techniques for SAP Database Migration And Unicode Conversion* available at: [http://www.redbooks.ibm.com/abstracts/sg247774.html](http://www.redbooks.ibm.com/abstracts/sg247774.html)

Database Tuning Measures – Oracle

- Refer to SAP Note [936441](http://www.sap.com) regarding Oracle settings for R3load based system copy.
- Enlarge the number and size of redo logs experiences from other pilot projects by adding 4 additional redo logs of 100 MB each.
- Enlarge the number of db writers.
- Enlarge temporary tablespace `PSAPTEMP (~20-30 GB)`.
- Increase `sort_area_size` or use `pga_*` parameters.
- Increase `PSAPROLL (~20 GB)`.

---

Table Splitting [page 31]
R3load Options [page 33]
Migration Monitor [page 34]
Distribution Monitor [page 34]
Defining the Unload/Load Order [page 34]
Database-Specific Central Notes [page 35]
**Database Tuning Measures – SAP MaxDB**

- You can find general documentation about tuning measures of the current SAP MaxDB release at:

  **Table 8:**

<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
</table>
  Function Oriented View  
  English  
  SAP NetWeaver by Key Capability  
  Database Administration  
  Database Administration for MaxDB  
  MaxDB  
  Basic Information  
  Concepts of the Database System  
  Performance |
  Function Oriented View  
  English  
  SAP NetWeaver by Key Capability  
  Database Administration  
  Database Administration for MaxDB  
  MaxDB  
  Basic Information  
  Concepts of the Database System  
  Performance |
  Function Oriented View  
  English  
  SAP NetWeaver by Key Capability  
  Database Administration  
  Database Administration for MaxDB  
  MaxDB  
  Basic Information  
  Concepts of the Database System  
  Performance |
  Function Oriented View  
  English  
  SAP NetWeaver by Key Capability  
  Database Administration  
  Database Administration for MaxDB  
  MaxDB  
  Basic Information  
  Concepts of the Database System  
  Performance |

- Increase the parameter `CACHE_SIZE` to the maximum available size of main memory. Add the unused main memory of non-running Application Server components to the database cache.
- Increase the parameter `MAXCPU` to the maximum available number of processors to which the database system can distribute user tasks.

**Database Tuning Measures – SAP ASE**

Refer to [SAP Note 1722359](http://help.sap.com/nw70) for recommendations on how to size and tune the SAP ASE database in an SAP NetWeaver or SAP Business Suite environment.
2.6.2 Sorted Versus Unsorted Unload

During a system copy, you can perform the data export either “sorted” or “unsorted”.

The default setting is Use Unsorted Unload, unless your target database is SAP MaxDB. SAP recommends that you stick to this default value. Only if your target database is MaxDB, make sure that the Use Unsorted Unload option is deselected.

If the Use Unsorted Unload option is chosen, R3load makes use of the unsorted export feature as much as possible.

2.6.3 Package Splitting

It might be possible that some packages take long time to be exported due to the fact they contain much data. In such situations it is worth to split the package by using the Package Splitter. An example of the improvement when performing a split can be seen in the figure below:

The installer by default applies Package/STR Splitting. The installer prepares and runs the Package Splitter.

You can split the default packages EXPORT.XML and IMPORT.XML into several smaller and equal sized packages using the Java Splitter tool.
2.6.4 Table Splitting

It might be possible that specific tables take long time to be exported due to the fact they contain much data. In such situations it is worth to split the table by using the Table Splitter. An example of the improvement when performing a split can be seen in the figure below:

For copying large ABAP tables, the tool `R3ta` or - depending on the kernel version - `SAPuptool` has been developed to automatically generate `WHERE` conditions, with which a subset of table data can be accessed. These `WHERE` conditions are integrated into the `R3load TSK` files. Using `WHERE` conditions may not be optimal for every database management system and therefore has to be considered carefully.

For copying large Java tables, you can use the `Java Splitter` tool.

For more information, see `Package and Table Splitting for Java Tables` [page 180].

Availability

You can use table splitting for ABAP systems with SAP kernel 6.40 or higher.
SAPuptool is available for table splitting with SAP kernel version 7.40 or higher. It is supported for both Unicode and non-Unicode source system and for both Unicode and non-Unicode target systems. The installer automatically selects the corresponding tool depending on the kernel version.

**Advantages**

- Large tables are processed in many small packages. If the export or import of a table aborts with an error, only the processing of the package with the error has to be repeated instead of (un)loading the complete table once again.
- The export and import of one table can be performed in parallel by starting several R3load processes to work on some packages in parallel.

**Disadvantages**

- If the parallel processing is not optimal or if the single packages are processed serial, the complete processing time for one table may increase when using WHERE conditions.
- The creation and evaluation of WHERE conditions is an iterating process which requires some experience and some detailed database knowledge. Many manual steps have to be performed.
- Under certain conditions it is recommended to create additional temporary indexes on the column used in the WHERE condition. Depending on the database, this may not be feasible during productive operation (time consuming, table locking, ...).

**Known Problems**

The sorting order may be different on non-Unicode source system and Unicode target system. This may lead to problems when deleting parts of table data during restart. If the import of one package aborted with an error, you therefore have to delete all data from this table and reload them all again.

**Attention**

- As the usage of WHERE conditions requires a lot of experience and many manual steps and because there are still some problems not yet solved, we cannot release this feature generally.
- You may use the feature WHERE conditions and the R3ta or - depending on the kernel version - the SAPuptool and in many cases it will work without problems, but if you run into problems, you cannot claim for support or an immediate fix of the problem. Nevertheless, we welcome any feedback which helps us to improve the tools.
- The generated WHERE conditions should not cover more than one column. If R3ta calculated conditions with more columns, run the tool again with different row-count parameters.
If you decide to create WHERE conditions manually (without the R3ta or - depending on the kernel version - the SAPuptool), you must be aware of the fact, that a badly chosen WHERE condition can increase the total table processing time a lot. In addition, the consultant takes over the responsibility for the completeness of the data!

You can often reduce the export time of a table which is processed with WHERE conditions if you create a (temporary) additional index on the column used within the WHERE condition.

**Caution**

This may not be possible on databases that need exclusive access on the table when creating an index.

Database-Specific Information about Table Splitting

Oracle: SAP Note [1043380](Efficient Table Splitting for Oracle Databases)

Related Information

Preparing the Table Split [page 49]
Package and Table Splitting for Java Tables [page 180]
R3load Options [page 33]

2.6.5 R3load Options

This section provides information about available R3load options.

You can use the following R3load options:

- **R3load option** -fast or -loadprocedure fast.
- **R3load socket option:**
  
  You can use the socket option, if your R3load has at least patch level 73 (compile date: 12.01.2008)
- **Several R3load processes can be launched in parallel to export the packages.** However, at a certain point, increasing the number of processes will not help with the performance and has the opposite effect. There is no direct way to determine the optimal number of processes. A rule of thumb though is to use 3 times the number of available CPUs. If you want to find the optimal value, you can perform tests in similar environments, such as in a DEV system.

- **IBM Db2 for Linux, UNIX, and Windows:** For more information, see [SAP Note 1058437](DB6: R3load options for compact installation)
- **Oracle:** For more information, see [SAP Note 1045847](Oracle Direct Path Load Support in R3load)
2.6.6 Migration Monitor

The Migration Monitor is a tool which helps you to perform and control the unload and load process during the system copy procedure. The Migration Monitor is integrated into the Software Provisioning Manager (the “installer” for short), but it is also possible to use the monitor for copying older releases by starting it manually. The Java Migration Monitor is a tool that helps you to perform and control the unload and load process for the Java stack during the system copy procedure.

The Migration Monitor
- creates R3load command files
- triggers the creation of R3load task files if required
- starts the R3load processes to unload the data
- transfers packages from the source to the target host if required
- starts the R3load processes to load the data as soon as a package is available
- informs the person performing the system copy in case of errors

More Information

For more information, see:
- R3load Procedures Using the Migration Monitor [page 137]
- Jload Procedures Using the Java Migration Monitor [page 163]
- SAP Note 784118 (System Copy Tools for ABAP Systems)

2.6.7 Distribution Monitor

You can use the Distribution Monitor to speed up Unicode Conversion by distributing the R3load workload to multiple machines.

For more information, see SAP Note 855772.

2.6.8 Defining the Unload/Load Order

The installer presents a dialog on which you can choose among the following options how to process the packages:
- In alphabetical order
- In custom order
- According to their size (largest first, only for import)

The Migration Monitor has a property orderBy to specify the order of processing packages.
2.6.9 Database-Specific Central Notes

For some databases there are central SAP Notes where you can find information about how to optimize system copy and migration.

- For more information about MS SQL Server-specific migration optimization options, see SAP Note 1054852 (Recommendations for migration to MS SQL Server).
- For more information about SAP ASE-specific migration optimization options, see SAP Note 1680803 (Migration to SAP Sybase ASE - Best Practice).

Related Information

System Copy and Migration Optimization [page 27]
3 Preparations

Before you start the system copy, you must perform the following preparation steps.

3.1 General Technical Preparations

To make a consistent copy of the database, you need to prepare the source system and perform some subsequent actions on the target system, before you start a system copy. This is not necessary when performing a test run.

Context

The following describes the required preparations.

For more information about SAP system administration, see the SAP Library for your release at:

<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver 7.0 including enhancement package 1</td>
<td><a href="http://help.sap.com/nw701">http://help.sap.com/nw701</a></td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including enhancement package 2</td>
<td><a href="http://help.sap.com/nw702">http://help.sap.com/nw702</a></td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including enhancement package 3</td>
<td><a href="http://help.sap.com/nw703">http://help.sap.com/nw703</a></td>
</tr>
</tbody>
</table>
**Procedure**

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

2. No canceled or pending update requests should be in the system. Check this by choosing **Tools > Administration > Monitor > Update** (transaction SM13).

   If canceled or pending updates exist, you must update these again or delete them from all clients. You can find out whether canceled or pending updates exist by checking if table VBDATA contains any entries.

   Find the canceled or open updates as follows:
   b. Delete the default values for the client, user, and time.
   c. Choose all update requests.

   If canceled or pending records exist, you must update these again or delete them. Check whether this action was successful using transaction SE16 for table VBDATA.

3. Set all released jobs from **Released** to **Scheduled** **Tools > CCMS > Background Processing > Jobs - Overview and Administration** (transaction SM37)

   You also need to do this for jobs that must run periodically (see SAP Note 16083). Select all jobs (include **start after event**) as follows:
   | Job | Released | Scheduled |

4. Adapt the operation mode timetable to make sure that no switching of operating modes takes place while a system is being copied as follows: **Tools > CCMS > Configuration > Operation mode calendar** (transaction SM63)

5. Write down the logical system names of all clients:
   a. If you plan to overwrite an existing system with a system copy, make sure you write down the logical system names of all clients in the system that will be overwritten (transaction SCC4).
   Since the logical system names will be overwritten, in the event of differences, you must change them back to their original names (as they existed in the system that is overwritten) in the follow-on actions after the system copy.
   b. If you create a new system with a system copy (for example, create an upgrade test system), make sure that the logical naming strategy for this new system is consistent with your existing logical system naming convention. If you are still planning your BI (formerly BW) system landscape, see SAP Note 184447.
   c. If your system copy is used to replace hardware for the DB server, migrate to a different database system or operating system (that is, source system for the copy is the same as the copy target), no changes to logical system names are required.

6. Before performing the source system export, make sure that you do the following:
   a. Delete QCM tables from your source system:
      1. **Before** you delete the QCM tables, ensure the following:
         - The tables are consistent – no restart log or conversion procedure termination must be displayed.

2. Choose ➤ Extras ➤ Invalid temp. table ➤
   All QCM tables that can be deleted are displayed.

3. Mark the tables and delete them.

4. Run report RS_SCRP_D020S_CLEAN to check if there are invalid entries in tables D020S and DYNPSOURCE. If invalid entries are detected, remove them before running the export. See also SAP Note 870601.

5. If your source system is not a new installation but is an upgrade from an SAP system with a release level earlier than SAP NetWeaver 2004s, you must adjust the directory structure before you start the export. To do so, apply SAP Note 1104735.

6. SAP NetWeaver Development Infrastructure (DI) only: If your SAP system is of usage type Development Infrastructure (DI) then this system can only be moved, but not be copied. This means that it is possible to migrate such a system from one host to another but it is not possible to keep both systems active after the migration. If you want to move an SAP system with usage type Development Infrastructure (DI), make sure that the following prerequisites are met:
   ○ The users and passwords created in the source system are valid in the target system (for example, they use the same UME).
   ○ Check in (or revert) all open activities (of all users) in the SAP NetWeaver Developer Studio by using the Design Time Repository perspective (DTR perspective).
   ○ Remove all existing development configurations from the SAP NetWeaver Developer Studio.
   ○ Verify in the DTR Web UI that there are no pending entries in the NameReservation queue. To check this, go to http://<dtrhost>:<port>/dtr/sysconfig/support/NameReservationList and check that there are no entries with the state PRELIMINARY, FINALIZE_PENDING or REVERT_PENDING in the queue.

   If there are entries with the state FINALIZE_PENDING or REVERT_PENDING you have to wait for the next run of the name reservation background task in the DTR server that ends these entries. This background task runs normally every 15 minutes.

   To check the frequency of this background task you can have a look at http://<dtrhost>:<port>/dtr/sysconfig/scheduled_tasks.html and check the value Periodicity for the task ProcessNameReservationsTask. Since precondition for a successful execution of this background task, the name server must be configured in the DTR server (http://<dtrhost>:<port>/dtr/system-tools/administration/NameServerConfiguration. There should be no entries with the state PRELIMINARY in the name reservation queue since they only occur if there are open activities (which should not be the case if you followed the previous steps).
   ○ Stop all applications of the Development Infrastructure (DI) on the source system.

7. Oracle Database only: If your source system has Oracle Database Vault, make sure that you have read section Implementing Oracle Database Vault with the Installer [page 186].

8. Oracle Database only: Before performing System Copy from any database to Oracle, check the contents of the TAORA and IAORA database tables and ensure that the entries are consistent.

   You can use the upgrade-specific SAP Note 541542 as a reference to check for the correct entries of the table. If there are any inconsistencies, they must be corrected on the source system before performing the export.

   If there are inconsistent entries, system copy import fails with an error due to wrong tablespace names for TABARTs USER and USER1 in the Oracle specific tables TAORA and IAORA on the source system. These
tables are not checked for consistency on the source system if the source database is not Oracle. This inconsistency in the source system is caused due to the usage of both old and new tablespace layout on the source system.

11. **SAP NetWeaver 7.0 EHP2 and higher only**: If you want to use the Java Migration Monitor, make sure that the `JAVA_MIGMON_ENABLED` environment variable is set to "true" on both the source and the target systems.

12. **FI customers**: You can perform an additional consistency check by running the job `SAPF190` before copying the source system, as well as after copying the target system, and then compare the results. Make sure that no customer data is changed in the meantime.

You can do this as follows: Accounting > Financial Accounting > General ledger > Periodic Processing > Closing > Check/count > Comparison

13. **FI customers**: You can further check consistency by running the jobs listed below before copying the source system, as well as after copying the target system, and then compare the results. Make sure that no customer data is changed in the meantime.

<table>
<thead>
<tr>
<th>Caution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make sure that no customer data is changed in the meantime.</td>
</tr>
</tbody>
</table>

- RFUMSV00 (tax on sales/purchases)
- RAGITT01 (asset history sheet)
- RAZUGA01 (asset acquisitions)
- RAABGA01 (fixed asset retirements)

14. **BI customers**: If you want to perform a system landscape copy for SAP NetWeaver BW, apply SAP Note 886102.

15. **CO customers**: You can perform an additional consistency check by running the report group `1SIP` before copying the source system, as well as after copying the target system, and then compare the results. Make sure that no customer data is changed in the meantime.

<table>
<thead>
<tr>
<th>Caution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisites for an export:</td>
</tr>
<tr>
<td>Before performing an export, make sure that no incremental conversion is in progress.</td>
</tr>
</tbody>
</table>

To test if an incremental conversion is in progress, run transaction `ICNV`. If there are any table entries in table `TICNV`, an incremental conversion is in progress. In this case, you have the following options:

1. Defer the migration until the incremental conversion has finished.
2. Try to finish the incremental conversion by performing the following steps:

<table>
<thead>
<tr>
<th>Prerequisites for an export:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before performing an export, make sure that no incremental conversion is in progress.</td>
</tr>
</tbody>
</table>

If the tables are in state For conversion or in state Done, delete the entries by choosing Control > Delete Entry.

If the tables are in any other state, you have to finish the incremental conversion. Choose Assistant and proceed according to the online documentation.
**Caution**

**Heterogeneous System Copy only:**

Before you start the export of your source system, make sure that the tables `TATGPC` and `TATGPCA` are empty. To do so, use your database utility and delete the contents of these tables with the following statements:

```
DELETE from TATGPC
DELETE from TATGPCA
```

Normally both tables are empty. If you do not delete the contents of these tables, you will encounter problems while importing the data to your target system because of non NULL capable fields in these tables.

16. If you use the Integration Repository and Directory, make sure that you apply SAP Note 1345600 to avoid any database inconsistencies.

17. **IBM Db2 for Linux, UNIX, and Windows only:** `JSizeCheck` requires monitoring functions that are no longer available as of IBM Db2 for Linux, UNIX, and Windows version 10.5 by default. Before you start a Java export, you have to create these monitoring functions as follows:
   a. Log on as user `db2<dbsid>`.
   b. Execute the following command:
      ```
      db2updv<DB2 version> -r -d <DBSID> -u db2<dbsid> -p <password>
      ```

   **Note**

   The name of the `db2updv...` tool changes with each DB2 version. For example, for DB2 10.5 or 11.1, you need to use `db2updv105` or `db2updv111`, respectively.

18. Make sure that you update the CIM data model in the system landscape directory (SLD) of the source system as described in SAP Note 669669. Otherwise you might get an error during the target system installation (see SAP Note 1840394).

### 3.2 Preparing the Media Required for Performing the Export

For performing the **export on the source system**, you only need to download and extract the Software Provisioning Manager 1.0 archive which contains the installer as such.

For the media required for performing the **target system installation**, refer to section `Preparing the installation Media` in the installation guide for your operating system platform and database at [https://help.sap.com/sitoolset](https://help.sap.com/sitoolset). (see also Installing the Target System [page 71]).
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.

Related Information

Downloading and Extracting the Software Provisioning Manager 1.0 Archive [page 41]

3.2.1 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. 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”.
   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:
      ```bash
      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 70SWPM10SP<Support_Package_Number>_<Version_Number>.SAR archive by executing the following command:

```bash
Note
Check SAP Notes 2178665 and 1680045 whether additional information is available.

/<Path to SAPCAR>/sapcar -tvVf <Path to Download Directory>/
70SWPM10SP<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:

```bash
/<Path to SAPCAR>/sapcar -xvf <Path to Download Directory>/
70SWPM10SP<Support_Package_Number>_<Version_Number>.SAR <Path to Unpack Directory>
```

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

**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 Database Independent System Copy

You can use the installer to export and import your Java database content, file system, and all configuration in a database-independent format. It uses both the R3load tool and the Jload tool.

**R3load** generates a database export of all SAP objects that are defined in the ABAP Dictionary, including the configuration and components in the file system.

**Jload**

> Note

Make sure that you have the most recent version of the R3load tool, which you can download from [https://launchpad.support.sap.com/#/softwarecenter/](https://launchpad.support.sap.com/#/softwarecenter/).

## Constraints

### R3load and Jload Restrictions

- generates a database export of all SAP objects that are defined in the ABAP Dictionary (R3load) or Java Dictionary (Jload). Other objects are not exported by the installer.
- For a consistent database export, no transactions on export-relevant database objects are allowed during the export. Otherwise, the export has to be restarted. Therefore, we recommend that you shut down the SAP system (excluding the database!) for the export. The database must still be running.
- **R3load only**: Changes to database objects that cannot be maintained in the ABAP Dictionary (transaction SE14), such as the distribution of tables over several tablespaces or dbspaces, are lost after the system copy.
- **R3load only**: Indexes longer than 18 characters are not allowed on the database to be exported.

### Splitting STR Files

- During the standard system copy process, all tables of the SAP system are grouped into packages, whereby all tables with the same data class belong to the same package. The processing unit for one unload/load process is a package. The packages usually differ in the number and size of contained tables, resulting in varying unload/load runtimes. The overall runtime can be reduced by creating packages of the same size, that is, creating packages with a similar processing time. You can achieve this by splitting the default packages (one package per data class) into more smaller pieces.
- There are several ways to split packages. For a detailed description of the options, refer to the F1 help about the parameters prompted on the Split STR Files screen while running the installer to export the database. The options can be used separately or – when using the new Java based splitting tool – together.
- “Splitting of STR Files” is part of the “Advanced Export Parameters” and is enabled by default. Using the splitting tool parameters selected by the installer is a good starting point if you select the splitting option and you have not performed any tests yet.
Caution

If you want to split STR files by the size based option, you must first create the EXT files for the target database system. You can find the EXT files in your export dump directory, subdirectory DB/<DBTYPE>, for example DB/ORACLE.

If you do not have EXT files, then you can only split by providing tables via input file.

Process Flow

Proceed as described in System Copy Procedure [page 44].

4.1 System Copy Procedure

This section describes the system copy procedure using R3load and Jload.

Prerequisites

Specify an empty directory with sufficient disk space for the export dump on the host where you want to perform the export. Make sure that this directory does not contain any files from any previous system copy exports. If you cancelled a system copy export and want to perform the export again, make sure that you remove all files from the previously cancelled export before you start the export from scratch.

Process Flow on the Source System (Export)

When performing the export, the installer creates a migration export media which contains the data of the exported system, and which you use to install the target system.

Follow the sequence of steps described in the process flows below for a:

- Central system
  - Central system – Performing the Export on the Source System
  - Central system – Setting Up the Target System
- Distributed system or high-availability system
  - Distributed system or high-availability system – Performing the Export on the Source System
  - Distributed system or high-availability system – Setting Up the Target System
Central System – Performing the Export on the Source System

To perform the export for a central system, you need to proceed as follows on the central system host:

1. **Heterogeneous system copy**: Generate the migration key at https://support.sap.com/migrationkey. Enter the installation number of your source system when prompted.
2. Perform the export on the central system host:
   1. Make sure that the QCM tables are deleted from your system.
      For more information, see General Technical Preparations [page 36].
   2. Generate DDL statements.
      For more information, see Generating DDL Statements [page 48].
   3. Prepare the system for table splitting (optional).
      For more information, see Preparing the Table Split [page 49].
   4. You run the installer [page 56] to prepare the source system for the export.
      On the Welcome screen, choose the Export Preparation option.

   **Note**
   You must run this option if you want to perform export processes in parallel with import processes during the system copy. Otherwise this step is optional.

5. You run the installer [page 56] to export the database instance and the central instance.
   On the Welcome screen, choose the option Database and Central Instance Export.
   For more information, see Running the Installer to Perform the Export [page 56].

   **Note**
   If R3load processes fail due to an error, solve the problem and perform a restart.
   For more information, see Restarting R3load Processes [page 68].

   **Caution**
   If your database instance is running on HP PA-Risc, you must proceed as described in SAP Note 884452.

6. If you want to perform Table Comparison with Software Update Manager (SUM) [page 170] table comparison with the Software Update Manager (SUM), proceed as follows:
   1. Stop all instances of the source system once the export has completed.
   2. Run table comparison [page 172] for the source system.
   3. You can restart the instances of the source system.

Central System – Setting Up the Target System

Use the installer to set up the target system and import the database files that you have exported from the source system.
Perform the following steps on the central system host:

1. Prepare the central system host for the installation of your target system as described in the installation guide.
2. If you have already prepared the export (for more information, see Preparing Parallel Export and Import [page 51]) on the source system because you want to perform export processes in parallel to import processes, and if you use the FTP Exchange option during the export (transfer type FTP on the SAP System > Data Transfer Parameters for Export screen and communication type Exchange Directory on the SAP System > Communication Parameters for Export screen), make sure that you have transferred the files, which were generated in the preparation step for parallel export and import on the source system.
3. Transfer the export files [page 70] to the central system target host.
4. Install the target system [page 71].
5. If required install additional dialog instances on dialog instance hosts as described in the installation guide.

Distributed System or High-Availability System – Performing the Export on the Source System

To perform the export for a distributed system or a high-availability-system, you need to proceed as follows:

1. Heterogeneous system copy only: Generate the migration key at https://support.sap.com/migrationkey. Enter the installation number of your source system when prompted.
2. Perform the export on the database instance host:
   1. Make sure that the QCM tables are deleted from your system. For more information, see General Technical Preparations [page 36].
   2. Generate DDL statements. For more information, see Generating DDL statements [page 48].
   3. You run the installer [page 56] to prepare the source system for the export. On the Welcome screen, choose the Export Preparation option.

   i Note
   You must run this option if you want to perform export processes in parallel with import processes during the system copy. Otherwise this step is optional.

4. Prepare the system for table splitting (optional). For more information, see Preparing the Table Split [page 49].
5. You run the installer [page 56] to export the database instance. On the Welcome screen, choose the option Database Instance Export.
For more information, see Running the Installer to Perform the Export [page 56].

**Note**
If R3load processes fail due to an error, solve the problem and perform a restart.
For more information, see Restarting R3load Processes [page 68].

**Caution**
If your database instance is running on HP PA-Risc, you must proceed as described in SAP Note 884452.

3. Perform the export on the central instance host:
   You run the installer to export the central instance. For more information, see Running the Installer to Perform the Export [page 56].
   On the Welcome screen, choose the option Central Instance Export.

4. If you want to perform Table Comparison with Software Update Manager (SUM) [page 170] table comparison with the Software Update Manager (SUM), proceed as follows:
   1. Stop all instances of the source system once the export has completed.
   2. Run table comparison [page 172] for the source system.
   3. You can restart the instances of the source system.

**Distributed System or High-Availability System – Setting Up the Target System**

Use the installer to set up the target system and import the database files that you have exported from the source system.

**Note**
This system copy guide describes only the source system export in full detail. As for the installation of the target system, this system copy guide describes only the system copy-specific steps in section Setting Up the Target System [page 70], but refers for all steps that are identical with a new system installation to the appropriate operating system and database-specific installation guide available at http://support.sap.com/sltoolset.

In the following, we refer to this guide as “installation guide”.

Perform the following steps on the relevant installation hosts of your target system:

1. Prepare the ASCS instance host, the SCS instance host, the database instance host, and the central instance host for the installation of the corresponding instances of your target system as described in the installation guide.
2. Install the SCS instance for the target system as described in the installation guide.
3. Install the ASCS instance for the target system as described in the installation guide.
4. Perform the following steps on the database instance host:
   - If you have already prepared the export (for more information, see Preparing Parallel Export and Import [page 51]) on the source system because you want to perform export processes in parallel
to import processes, and if you use the FTP Exchange option during the export (transfer type FTP on the SAP System > Data Transfer Parameters for Export screen and communication type Exchange Directory on the SAP System > Communication Parameters for Export screen), make sure that you have transferred the files, which were generated in the preparation step for parallel export and import on the source system.

- Transfer the export files [page 70] to the central instance target host.
- Install the database instance of the target system. For more information, see Installing the Target System [page 71].

5. On the central instance host, install the central instance of the target system.
6. If required, install additional dialog instances on the dialog instance hosts as described in the installation guide.

4.1.1 Generating DDL Statements

To migrate nonstandard database objects, you need to generate DDL statements using the ABAP report SMIGR_CREATE_DDL.

Context

You must perform this procedure before starting the installer.

⚠️ Caution

**BI Java only:** You must ensure that no further changes (such as, activations, data loads to cubes, or field changes) are executed in the SAP NetWeaver Business Intelligence system after you have called the SMIGR_CREATE_DDL report and before you export the data.

For additional database-specific information, see SAP Note 888210.

Procedure

1. Log on to the system as a system administrator in a productive client.
2. Call transaction SE38 and run the program SMIGR_CREATE_DDL.
3. Select the target database. Depending on the database manufacturer, you might need to select the database version. The value help supports you in selecting the database version. You should only enter a database version that is available in the value help.
4. Select Unicode Migration if you also wish to perform a Unicode system copy (from Unicode to Unicode) or a Unicode conversion (from non-Unicode to Unicode).
5. Specify an empty working directory to which the files generated by the report are to be written.
6. If required, you can restrict the generation of DDL statements to specific table types or individual tables.
7. Execute the program.

The DDL statements are generated and written to the specified directory. From there, the installer copies them to the `<Export_Dump_Directory>/ABAP/DB` export directory.

If you copy the SQL files directly to the export directory, make sure that they have read access.

⚠️ Caution

If no database-specific objects exist in the database, no SQL files will be generated. As long as the report terminates with status `successfully`, this is not an error.

ℹ️ Note

Ensure that the user `<sapsid>adm` of the source system has write access and the user `<sapsid>adm` of the target system has read access to the directory with the generated SQL files.

### 4.1.2 Preparing the Table Split

The `R3ta` tool processes large tables. Instead of exporting/importing one table with one `R3load` process, the table is processed in, for example, 10 entities.

#### Prerequisites

- For the following databases, we recommend that you create an index on the column listed in the `hints` file for the table you want to split before starting `R3ta`:
  - Db2 for z/OS (Only create a temporary index if you want to perform an unsorted unload.)
  - Oracle

For more information, see the paragraph **Creating a Temporary Index**.

#### Context

Each entity can be processed by different `R3load` processes. The advantages of splitting the tables are:

- Large tables are processed in smaller packages. If the export or import of a table aborts with an error, only the processing of the package where the error occurred has to be repeated and not for the complete table.
- The export and import of one table can be performed in parallel by starting several `R3load` processes to work on some packages in parallel.
- The export and import has to be performed with the Migration Monitor when the table splitting feature is used. For more information about the Migration Monitor, see `R3load Procedures Using the Migration Monitor` [page 137].
Parallel data export of a table is supported by all database platforms but parallel data import is not. If the target database platform does not support the parallel data import, the migration monitor has to be configured so that the data import processes the packages sequentially. For more information, see Processing Split Tables.

Restrictions
- Only tables that are described in the SAP dictionary can be split.
- The following tables cannot be split:
  - DDNTF
  - DDNTF_CONV_UC
  - DDNTT
  - DDNTT_CONV_UC
  - DDLOG (is never copied, but created empty in the target system)

Procedure

1. Create a file that contains lines of the form `<table>%<nr_of_splits>` for all tables to be split.

   **Oracle PL/SQL splitter only:** Use the form `<table>%<nr_of_splits>;<rowid_or_column>`. For more information about the Oracle PL/SQL splitter, see SAP Note 1043380.

   **Caution**
   - The tables listed in this file have to appear in alphabetical order.
   - This file must not contain empty lines.

2. Start the installer as described in Running the Installer to Perform the Export [page 56].

3. On the Welcome screen, choose `Product > Software Life-Cycle Options > System Copy > Database > Source System Export > System Variant > Based on Technical Stack > Table Splitting Preparation`.

4. Follow the instructions on the installer screens and enter the requested parameters, including the `<SAPSID>`, the file that contains the split information, the export directory, and the number of parallel R3ta jobs.

   **Caution**
   The specified path to the export directory must not contain blanks!

5. 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 table split.

6. To start the table split, choose Start.

   Now the *.WHR files and the whr.txt file are created in the export directory.

   **Caution**
   When doing a code page conversion (non-Unicode → Unicode: 4102 ↔ 4103), make sure not to use a `WHERE` condition with the PAGENO column included. If the PAGENO column is included in the `WHERE`
condition, repeat the table splitting – either with different splitting parameters or by defining a suitable column for this table using the `R3ta_hints.txt`.

7. Check in the export directory `<Export_Dump_Directory>/ABAP/DATA` if `*.WHR` files have been created for all tables that are to be split.
   - If no `*.WHR` files could be produced for some of these tables, create fewer packages for these tables:
     1. Create a new, empty installation directory.
     3. Run the `Prepare Table Splitting` service again and provide an input file that contains only the missing tables with a lower number of packages for each defined table.
   - If the `*.WHR` files have been created for the missing tables, merge these results with the results from the first `Prepare Table Splitting` run:

8. If required, create the temporary index on the tables of the source system to be split.
   - Oracle only: This is not required if you export the database using the Oracle-specific method with the Oracle PL/SQL splitter.
     For more information, see the paragraph `Creating a Temporary Index`.

### 4.1.3 Preparing Parallel Export and Import

If you want to perform export processes in parallel to import processes, you have to prepare the source system for the export.

#### Context

The preparation includes the following steps that are required to set up the target database:

- Creating the export directory structure
- Calculating the size of the target database
- Creating database size file `DBSIZE.XML`

#### Caution

Parallel export and import without `Export Preparation` is not supported. If you do not prepare the export, you have to wait for the export results before you can start with the target system setup.
Procedure

1. Run the installer to perform the Export Preparation.
   This step calculates the size of the target system and generates the DBSIZE.XML that is required to set up the target system.
   For more information, see Exporting the Source System Using the Installer [page 52].

2. Share or transfer the complete export directory with its structure and the generated DBSIZE.XML file to the target host.
   If you transfer the export directory instead of sharing it, make sure that you transfer it while you are processing the Database Instance Export option, after you have stopped the source system and before you proceed with the export procedure.
   For more information, see Exporting the Source System Using the Installer [page 52] and Transferring the Export Files to the Target Host [page 70].

Related Information

About the Migration Monitor [page 137]
About the Java Migration Monitor [page 163]

4.1.4 Exporting the Source System

Here you can find information about how to run the installer to perform the export on the source system.
For more information about the overall sequence of steps required for exporting the source system, see System Copy Procedure [page 44].

Related Information

Prerequisites for Running the Installer [page 53]
Running the Installer [page 56]
Restarting R3load Processes [page 68]
4.1.4.1  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 60].

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

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

- Check the value of the environment variable `TEMP`, `TMP`, or `TMPDIR`:

<table>
<thead>
<tr>
<th>Shell Used</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bourne shell (sh)</td>
<td><code>TEMP=&lt;Directory&gt;</code></td>
</tr>
<tr>
<td></td>
<td><code>export TEMP</code></td>
</tr>
<tr>
<td>C shell (csh)</td>
<td><code>setenv TEMP &lt;Directory&gt;</code></td>
</tr>
<tr>
<td>Korn shell (ksh)</td>
<td><code>export TEMP=&lt;Directory&gt;</code></td>
</tr>
</tbody>
</table>

  - Make sure that your operating system does not delete the contents of the temporary directory `/tmp` or the contents of the directories to which the variable `TEMP`, `TMP`, or `TMPDIR` points – for example, by using a `crontab` entry.
  - Make sure that you have at least 60 MB of free space in the installer directory for each installer option. In addition, you need 200 MB free space for the installer executables. If you cannot provide 200 MB free space in the temporary directory, you can set one of the environment variables `TEMP`, `TMP`, or `TMPDIR` to another directory with 200 MB free space for the installer executables.
  - Make sure that the temporary directory has the permissions `777`.

- Make sure that `umask` is set to `022` for the user with `root` permissions that you want to use for running the installer.
  As this user, enter the following command: `umask 022`
Only valid for ‘Platform’: AIX

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

End of ‘Platform’: AIX

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

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

Caution

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

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

Example

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

Table 11:

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

Using sh or ksh shell, the output of command `ulimit -a` needs to be at least as follows:

Example

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

Table 12:

<table>
<thead>
<tr>
<th>Output sh</th>
<th>Output ksh</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>cpu time (seconds)</td>
<td>cpu time (seconds)</td>
<td>unlimited</td>
</tr>
</tbody>
</table>
Make sure that the following ports are not used by other processes:

- Port 4237 is used by default as HTTPS port for communication between the installer and the SL Common GUI. If this port cannot be used, you can assign a free port number by executing `sapinst` with the following command line parameter:
  
  ```bash
  SAPINST_HTTPS_PORT=<Free Port Number>
  ```

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

- Specify an empty directory with sufficient disk space for the export dump on the host where you want to perform the export. Make sure that this directory does not contain any files from any previous system copy exports. If you cancelled a system copy export and want to perform the export again, make sure that you remove all files from the previously cancelled export before you start the export from scratch.

- Make sure that you shut down all SAP Application Servers before the export. The database must still be running. Otherwise, the target system might be inconsistent.

- Before starting the export, make sure that you have at least the same amount of disk space available in `/<sapmnt>/<SAPSID>/<Instance_Name>/SDM/program` as is used in `/<sapmnt>/<SAPSID>/<Instance_Name>/SDM/root/origin`. During the export, some archives are written to the program subdirectories and the installer aborts if there is not enough space.
4.1.4.2 Running the Installer

This section describes how to run the installer to perform the export for system copy.

Prerequisites

For more information, see Prerequisites for Running the Installer [page 53].

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 60].

Procedure

1. Log on to the host where you want to run the installer.

   Make sure that you log on as a user with root permissions.

   Caution
   
   Make sure that this user has not set any environment variables for a different SAP system or database.

   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 the credentials of a user with root permissions on the host where the installer is to perform the export, you can specify another operating system user for authentication purposes. You do this using the SAPINST_REMOTE_ACCESS_USER parameter when starting the sapinst executable from the command line. You have to confirm that the user is a trusted one. For more information, see SAP Note 1745524.

2. Make the required media available.

   For more information, see Preparing the Media Required for Performing the Export [page 40].
Recommendation

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

Note

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

End of ‘Platform’: Oracle Solaris

3. Start the installer as follows:

Open a command prompt and enter the following command:

```
/=<Path_To_Unpack_Directory>/sapinst
```

The installer GUI starts automatically by displaying the Welcome screen.

Note

If you want to use a virtual host name, start the installer with the installer property SAPINST_USE_HOSTNAME as follows:

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

Caution

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

4. The installer is starting up.

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

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

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

If you have a supported web browser (see Prerequisites for Running the Installer [page 53]) installed on the host where you run the installer, you can open this URL directly in the shell. Otherwise open the URL in a supported web browser that runs on another device.

The SL Common GUI opens in the browser by displaying the Welcome screen.
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 \( \mathbb{Product} \) \( \mathbb{Software Life-cycle Options} \) \( \mathbb{System Copy} \) \( \mathbb{Database} \) \( \mathbb{Source System Export} \) \( \mathbb{Distribution Option} \) Based on AS ABAP and AS Java. Select the corresponding system copy option from the tree structure according to the sequence of the process flow for the database-independent system copy procedure [page 43].

Do not perform these steps if you use a database-specific method (see Database-Specific System Copy [page 75]).

6. Choose Next.

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

7. Follow the instructions in the installer input screens and enter the required parameters.

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.

IBM Db2 for Linux, UNIX, and Windows only: When you are asked for the security administrator, enter a user that has DB2 SECADM authorities. By default, \( \text{db2}<\text{dbsid source}> \) has these authorities.

Oracle Database only: If your source system has Oracle Database Vault, consider the additional information in section Implementing Oracle Database Vault with the Installer [page 186].

Caution

The signature of media is checked automatically during the Define Parameters phase while processing the Media Browser screens.

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.
8. 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 export procedure.

9. To start the execution, choose Next.

The installer starts the export and displays its progress of the system copy export during the processing phase.

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

   **Note**
   
   If there are errors with the installer extraction process, you can find the log file dev_selfex.out in the temporary directory.

   **Recommendation**

   Keep all installer directories until you are sure that the system, including all instances, is completely and correctly installed. Once the system is completely and correctly installed, make a copy of the installer directories with all their contents. Save the copy to a physically separate medium, such as a medium or a USB drive that is separate from your installation hosts.

   This might be useful for analyzing any issues that might occur later when using the system. For security reasons, do **not** keep the installer directories on hosts where you processed it, but make sure that you delete them after saving them separately.

11. If you copied installation media to your hard disk, you can delete these files when the installer has successfully completed.

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

   `<User_Home>/sapinst/`

13. For security reasons, we recommend that you remove the operating system users from the group sapinst after you have completed the installation.

   **Note**

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

**Related Information**

Useful Information About the Installer [page 60]
Interrupted Processing of the Installer [page 62]
4.1.4.3 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.

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

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

Interrupted Processing during the Export Process
If the export process aborts during the \textit{Execute Service} phase (for example, due to a hardware failure, such as power outage, operating system crash, file system full), you have to repeat the export of the complete package.

Using the Step State Editor (SAP Support Experts Only)
This section describes how to use the Step State Editor available in the installer.

4.1.4.3.1 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 “\textit{SL Common GUI of the Software Provisioning Manager}” - “\textit{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 \texttt{sapinst} executable - which is part of Software Provisioning Manager - running on the installation host using the standard protocol HTTPS.
    - For the SL Common GUI the installer provides a pre-generated URL at the bottom of the shell from which you are running the installer. If you have a supported web browser installed on the host where you run the installer, you can start the SL Common GUI directly from this URL. Otherwise, open a web browser supported by the SL Common GUI on any device and run the URL from there.
    - For more information about supported web browsers see Prerequisites for Running the Installer [page 53].
    - If you need to run the \textit{SL Common GUI} in \textit{accessibility mode}, apply the standard accessibility functions of your web browser.

- As soon as you have started the \texttt{sapinst} executable, the installer creates a \texttt{.sapinst} directory underneath the \texttt{/home/<User>} directory where it keeps its log files. \texttt{<User>} is the user with which you have started the installer.
After you have reached the **Welcome** screen and selected the relevant installer option for the SAP system to be exported, the installer creates a directory `sapinst_instdir` where it keeps its log files, and which is located directly below the temporary directory. The installer finds the temporary directory by checking the value of the TEMP, TMP, or TMPDIR environment variable. If no value is set for these variables, the installer uses `/tmp` by default.

All log files which have been stored so far in the `.sapinst` folder are moved to the `sapinst_instdir` directory as soon as the latter has been created.

If you want the `sapinst_instdir` directory to be created in another directory than `/tmp`, set the environment variable TEMP, TMP, or TMPDIR to this directory before you start the installer.

<table>
<thead>
<tr>
<th>Shell Used</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bourne shell (sh)</td>
<td><code>TEMP=&lt;Directory&gt;</code></td>
</tr>
<tr>
<td></td>
<td><code>export TEMP</code></td>
</tr>
<tr>
<td>C shell (csh)</td>
<td><code>setenv TEMP &lt;Directory&gt;</code></td>
</tr>
<tr>
<td>Korn shell (ksh)</td>
<td><code>export TEMP=&lt;Directory&gt;</code></td>
</tr>
</tbody>
</table>

**Caution**

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

**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 the environment variables TEMP, TMP, or TMPDIR. 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, start the installer as described above with command line parameter `-p`:
  ```bash```
  ./sapinst -p
  ```bash```
- If you want to perform the export in unattended mode, see SAP Note 2230669, which describes an improved procedure using `inifile.params`. 
Before starting the export, make sure that you have at least the same amount of disk space available in `/sapmnt/<SAPSID>/<Instance_Name>/<SAPSID>/program` as is used in `/sapmnt/<SAPSID>/<Instance_Name>/<SAPSID>/root/origin`. During the export, some archives are written to the program subdirectories and the tool aborts if there is not enough space.

If required, stop the installer by choosing the **Cancel** button.

**Note**
If you need to terminate the installer, press `Ctrl + C`.

### 4.1.4.3.2 Interrupted Processing of the Installer

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

**Context**

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

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

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

**Caution**

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

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

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 56].
2. Make sure that the media required for the export are still available.

For more information, see *Preparing the Media Required for Performing the Export* [page 40].

**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.

**Note**

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

End of ‘Platform': Oracle Solaris
3. Restart the installer from the directory to which you unpacked the Software Provisioning Manager archive by executing the following command:

```bash
<Path_To_Unpack_Directory>/sapinst
```

4. The installer is restarting.

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

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

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

   If you have a supported web browser (see Prerequisites for Running the Installer [page 53]) installed on the host where you run the installer, you can open this URL directly in the shell. Otherwise open the URL in a supported web browser that runs on another device.

   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 15:

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform a new run</td>
<td>The installer does not continue the interrupted export for system copy 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;<em>&lt;Year&gt;</em>&lt;Hours&gt;_ &lt;Minutes&gt;_&lt;Seconds&gt;</td>
</tr>
<tr>
<td></td>
<td>Example</td>
</tr>
<tr>
<td></td>
<td>log_01_Oct_2016_13_47_56</td>
</tr>
<tr>
<td>Note</td>
<td>All actions taken by the export for system copy before you stopped it (such as creating directories or users) are not revoked.</td>
</tr>
<tr>
<td>Caution</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>Continue with the existing one</td>
<td>The installer continues the interrupted export for system copy from the point of failure.</td>
</tr>
</tbody>
</table>

4.1.4.3.3 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 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 system to be exported.
     If you need to access the log files before you have done this selection, you can find them in the .sapinst directory underneath the /home/<User> directory, where <User> is the user which you used to start the installer.
     For more information, see Useful Information About the Installer [page 60].
     ○ To check the log and trace files of the installer GUI for errors, go to the directory <User_Home>/.sapinst/
     ○ Then continue by choosing Retry.
     ○ If required, abort the installer by choosing Cancel in the tool menu and restart the installer. For more information, see Interrupted Processing of the Installer [page 62].
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.

4.1.4.3.4 Troubleshooting during the Export Process

If the export process aborts during the Execute Service phase (for example, due to a hardware failure, such as power outage, operating system crash, file system full), you have to repeat the export of the complete package.

Procedure

- System Copy – export (common issues)
  a. Remove the <Package>.<nnn> dump files, the <Package>.TOC file, and the <Package>.log file.
  b. Make sure that all tables in the <Package>*.TSK* file have the status flag xeq or err set.
  c. Repeat the export of the complete package.
- System Copy – export on UNIX (especially for upgraded systems)
  Symptom:
  Processes started under the OS users <sapsid>adm or ora<dbsid> cannot create or open files in the installer directory.
Reason:
Only members of the sapinst UNIX group can access the installer directory. This group is created by the installer as of SAP NetWeaver 7.1.

Solution:
a. Manually associate <sapsid>adm and ora< dbsid> OS users with sapinst group if this association is missing.
b. Verify the /etc/group file and check if the sapinst group exists and OS users are members of this group.
c. If the sapinst group does not exist yet, start the installer. The installer creates this group during startup before the product catalog list is displayed.
d. Edit /etc/group file and associate OS users with sapinst group.
e. Continue with the export.

4.1.4.3.5 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 53].

Procedure

1. Start the installer from the command line as described in Running the Installer [page 56] 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.

## 4.1.4.4 Restarting R3load Processes

You can restart failed or canceled R3load processes while the Migration Monitor is still running.

### Context

The state files `export_state.properties` and `import_state.properties` (see Output Files [page 160]) allow package states to be manually updated to restart failed R3load processes.

### Example

If package processing failed and the package state has the value “–”, the state can be set to “0” and processing of the package is restarted.

If you want to restart failed or canceled R3load processes that are using the socket option, R3load processes that process the same package must not be running.

### Procedure

- **Restarting R3load Processes Without Using the Socket Option**
  a. To restart package processing, set the package state from “–” to “0”.
  b. To skip package processing, set the package state from “0” or “–” to “+”. (This is not recommended, because it can cause inconsistent data files or database content.)
  c. If the package is currently being processed (the package state is “?”), then any manual modifications to the package state are ignored.
• Restarting R3load Processes Using the Socket Option
  a. Make sure that no related R3load processes (export or import) are running. For example, if you want to restart an R3load export process and the corresponding import process that processes the same package is still running, cancel it or wait until it has finished.
  b. There are four possible situations where an R3load restart may be required. Proceed as required:
     ○ If both the import and the export are completed successfully, there is nothing to do.
     ○ If the export was completed successfully, but the import is canceled with errors, proceed as follows:
       ○ If the export was successful but the import was canceled when creating the index or the primary key, set the status for export_state.properties from “+” to “0”.
       ○ If the export was completed successfully but the import was canceled when loading the table content, set the status for export_state.properties from “+” to “0” and for the export TSK file from “ok” to “err”.
     ○ If both the export and the import are canceled with errors, proceed as follows:
       ○ If the errors in export and import relate to the same table, there is nothing to do.
       ○ If the errors relate to different tables, set the status of the first object with errors in both the export and the import TSK file to “err” and in the export_state.properties and import_state.properties files to “−”.
  c. Restart the installer or the Migration Monitor to proceed with the system copy.

---

Table 16:

<table>
<thead>
<tr>
<th>Export TSK File</th>
<th>Import TSK File</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table Name</td>
<td>Status</td>
</tr>
<tr>
<td>TAB_1</td>
<td>ok</td>
</tr>
<tr>
<td>TAB_2</td>
<td>err</td>
</tr>
<tr>
<td>TAB_3</td>
<td>xeq</td>
</tr>
<tr>
<td>TAB_4</td>
<td>xeq</td>
</tr>
</tbody>
</table>

The first object with errors here is TAB_2 (export). This means that in the import TSK file the status for TAB_2 must be set from “ok” to “err”. The entry in the export_state.properties and import_state.properties files also must be set from “−” to “+”.

○ If the import is completed successfully but the export was canceled with errors, you can set the status in the export_state.properties from “−” to “+”.

c. Restart the installer or the Migration Monitor to proceed with the system copy.
4.1.5 Setting Up the Target System

Related Information

Transferring the Export Files to the Target Host [page 70]
Installing the Target System [page 71]

4.1.5.1 Transferring the Export Files to the Target Host

This section describes how to transfer the complete export directory with its structure and the generated DBSIZE.XML file to the target host.

Context

As an alternative, you can also share the complete export directory so that it can be accessed from the target host.

Procedure

1. On the target host, create a directory `<EXPDIR>` with sufficient space for the database export files available.

   **Caution**

   Do not create this directory under the installation directory or another directory that contains installation information (such as the installation media or other export files).

   Otherwise, the installer does not ask you to specify the export directory and automatically chooses one that you may not want to use. In this case, the installer does not display the export directory and you cannot change it.

2. Transfer all files and directories (recursively) that are located on the source host in the migration export directory `<EXPDIR>` from the source host to the target host. You can choose one of the following methods:

   ○ Use the migration monitor with the file transfer protocol (FTP) copy option.

   **Note**

   Make sure that you use binary mode for transferring the files.
○ Copy the export dump directory manually to the target host.
○ The export dump directory can be shared and thus made accessible on the target host (network share).

3. Check the permissions of the transferred files on the target host. All files have to be accessible for user <sapsid>adm of the target system.

Note
If your source system is a distributed system, the files created by the export of the central instance and the files created by the export of the database instance have to be located in the same <EXPDIR> directory for the installation of the target system.

If you have not exported into the same <EXPDIR> already, then you have to merge the two <EXPDIR> directories from the central instance export and from the database instance export before starting the target system installation.

Make sure you use the SOURCE.PROPERTIES file from the central instance export when merging the two export folders.

4.1.5.2 Installing the Target System

This section describes how to set up the target system using the installer.

Prerequisites

There is enough free space on the target system for the database load. To find out the size of the export and the sizes of the tablespaces or dbspaces that will be created, look at the file DBSIZE.XML, which is located in the following directory:

Windows: <DRIVE>:\<EXPDIR>\DB\<DATABASE>
UNIX, IBM i: <EXPDIR>/DB/<DATABASE>

SAP MaxDB only: If the database platform of your target system is SAP MaxDB, you must reserve at least two times the amount of space specified in the DBSIZE.XML file. During the import, monitor the remaining free space in the database using the SAP MaxDB administration tools Database Manager or Database Studio and increase it if required.

Note
If the database software has already been unpacked or installed, or if the database already exists, the installer recognizes this automatically and skips the related steps.
Procedure

1. Prepare the target system host as described in the installation guide for the operating system and database platform intended for the target system. You can find this installation guide at:

   [http://support.sap.com/slitoolset > Area System Provisioning > Guide for Installation of Systems Based on SAP NetWeaver 7.0 / 7.0 EHPs]

   **i** **Note**

   **IBM DB2 for Linux, UNIX and Windows only:**

   Make sure that you read the information provided in section Setup of Database Layout in the installation documentation.

2. Start the installer as described in the installation guide for the operating system and database platform intended for the target system.

   **Caution**

   If you plan to use Advanced Configuration options during the SAP System Database Import, make sure you have installed the most current version of the installer to avoid performance problems during the dialog phase. You can find the latest version of the installer on the SAP Service Marketplace.

3. On the Welcome screen, navigate to the following folder according to the requirements of your target system:

   ![Folder Path](Product > Software Life-Cycle Options > System Copy > Database > Target System Installation > System_Variant > Based on Technical Stack)

4. Run the installation options required for your system copy in the sequence they are listed in the specific folder and according to process flow in Setting Up the Target System Using the Installer [page 70].

5. To install the target system, follow the instructions in the installer input screens (Define Parameters phase) and enter the required parameters.

   **Caution**

   **Heterogeneous system copy:** When installing the database instance, you either have to choose parameter mode Custom or have to check the SAP System > Database Import dialog on the summary screen and then revise this dialog. Only then appears the dialog screen where you can enter the migration key, which is required for a heterogeneous system copy. If you forget to revise this dialog setting during the dialog phase, the installer will abort in the processing phase when checking the migration key and will ask you for a valid migration key.

   **i** **Note**

   **Oracle Database only:** If your source system has Oracle Database Vault, consider the additional information in section Implementing Oracle Database Vault with the Installer [page 186].

   ○ If you want to perform export processes in parallel to import processes and you have prepared the export, you must choose Custom on the Parameter Mode > Default Settings screen.

   ○ On the SAP System > General Parameters screen, as default, the Unicode System option is selected.
You can only deselect this option if you perform the system copy for a non-Unicode SAP system that has been upgraded to the current SAP NetWeaver release.

- On the SAP System > Database screen, choose the option Standard System Copy/Migration (load-based): The SAP data dump from the migration export media that was created during the export is loaded into the newly installed SAP system database.
- When the installer prompts for the migration export, enter the path to the export directory <EXPDIR>.
- If you perform a heterogeneous system copy, enter the migration key on the SAP System > Database Import screen.
- If you want to perform export processes in parallel to import processes and you have prepared the export, you must select Parallel Export and Import on the SAP System > Database Import screen.

**Caution**

IBM DB2 for Linux, UNIX and Windows only:

- Make sure that you take the information about automatic storage that is provided in the Running the Installer section in the appropriate installation guide into consideration.
- The option Deferred Table Creation is not supported for load-based system copies for SAP systems that are not based on SAP NetWeaver 7.0 or higher.
- Do not create the installation directory (for example, sapinst_instdir) under the following directories:
  - UNIX, IBM i: /usr/sap/<SAPSID>
  - Windows: \usr\sap\<SAPSID>
  - UNIX, IBM i: /sapmnt/<SAPSID>
  - Windows: \sapmnt\<SAPSID>
- If you perform a Unicode conversion, the data import into the target system might abort because of missing space in the database tablespace or dbspace. Enlarge the database or database container, in which the DYNPSOURCE table will be created in the target database. The required size for the table will be 15 times larger than in the non-Unicode source system.

6. Complete the installation as described in the installation documentation for your SAP component.

- If you have to restart failed R3load processes, see Restarting R3load Processes [page 68].
- You can use the Migration Checker tools to ensure that the import has been performed successfully. The package checker and the object checker automatically check that the import has started and that all objects have been imported. In addition, you can use the table checker tool to verify that the number of rows that have been exported is equal to the number of rows in the database by using the table of content (TOC) files. For more information about the table checker, see SAP Note 2009651. For more information about all these checks see the Migration Checker User Guide. It is contained in the MIGCHECK.SAR archive as MigrationChecker.pdf and is available in the following directory of the installer:
  - UNIX, IBM i only: <Path_To_Unpack_Directory>/COMMON/INSTALL/MIGCHECK.SAR
  - Windows only: <Path_To_Unpack_Directory>\COMMON\INSTALL\MIGCHECK.SAR
- As an alternative to the table checker, you can perform Table Comparison with Software Update Manager (SUM) [page 170].
  Proceed as follows:
  1. Make sure that the central instance is not started after the import has finished successfully.
  2. Run table comparison [page 172] for the target system.
3. Start the instances of the target system.
5 Database-Specific System Copy

The following sections describe the database-specific methods for the system copy.

Process

Follow the sequence of steps described in the process flows below for a:

- Central System
- Distributed System
- High Availability System

Central System

Process Flow on the Source System (Export)

**Note**

When performing the export, the installer creates a migration export media which contains the data of the exported system, and which you use to install the target system.

**Caution**

Before starting the export of the Java stack make sure that you stop the system:

- Offline backup: Stop the entire system. The database must still be running.
- Online backup: Only stop the Software Deployment Manager (SDM).

1. **Oracle only**: Generate the control file structure for the target database [page 81].
2. **Oracle only**: If required, create an offline backup of the source database [page 89].
3. **Run the installer [page 56]** to create the export directory structure with labels and to archive SDM and application-specific file system content.
   In the installer, choose the option that corresponds to your database, SAP system, and technology, and then **Database and Central Instance Export**.

**Example**

Choose

- **SAP NetWeaver including <Enhancement Package>**
- **Software Life-Cycle Options**
- **System Copy**
- **<Database>**
- **Source System Export**
- **Central System**
- **Based on AS ABAP and AS Java**
- **Database and Central Instance Export**
Process Flow on the Target System

Note
For the target system installation, you use the installation guide for your target operating system and database, available at [http://support.sap.com/sltoolset](http://support.sap.com/sltoolset) > System Provisioning > Installation Option of Software Provisioning Manager > Installation Guides - Application Server Systems. In the following we refer to this documentation as “installation guide”.

1. **Oracle only:** You prepare the target system [page 85]:
   1. Follow the instructions on the installer screens until the installer requests you to install the database software and to perform the database backup/restore.
   2. Create the database file system (if it does not yet exist).
   3. Install the database software.
2. To complete the system copy, you perform the follow-up activities [page 106].

Distributed System or High Availability System

Process Flow on the Source System (Export)

Note
When performing the export, the installer creates a migration export media which contains the data of the exported system, and which you use to install the target system.

Caution
Before starting the export of the Java stack make sure that you stop the system:

- Offline backup: Stop the entire system. The database must still be running.
- Online backup: Only stop the Software Deployment Manager (SDM).

1. **Oracle only:** On the database instance host of the source system, generate the control file structure for the target database [page 81].
2. **Oracle only:** If required, on the database instance host, create an offline backup of the source database [page 89].
3. On the central instance host, run the installer [page 56] to create the export directory structure with labels and to archive SDM and application-specific file system content.
   In the installer, choose the option that corresponds to your database, SAP system, and technology, and then **Central Instance Export**.

Example
Choose > SAP NetWeaver including <Enhancement Package> > Software Life-Cycle Options > System Copy > <Database> > Source System Export > Distributed System > Based on AS ABAP and AS Java > Central Instance Export
Process Flow on the Target System

Note

For the target system installation, you use the installation guide for your target operating system and database, available at http://support.sap.com/slitoolset System Provisioning Installation Option of Software Provisioning Manager Installation Guides - Application Server Systems. In the following we refer to this documentation as “installation guide”.

1. **Oracle only**: You prepare the target system [page 85]:
   1. On the database instance host, start the installer as described in the installation guide and follow the instructions on the installer screens until the installer requests you to install the database software and to perform the database backup/restore.
   2. On the database instance host, create the database file system (if not yet existing).
   3. On the database instance host, install the database software.
2. To complete the system copy, you perform the follow-up activities [page 106].

5.1 **Oracle-Specific Procedure**

**Purpose**

In an SAP system environment, you can create a homogeneous copy of an Oracle database by copying database files. This method is suitable for creating an exact copy of an existing database. The source of the copy can be an online or offline backup, or the file system of your source host.

You use the installer for the installation on the target system host as described in the installation documentation for your SAP component. Only the installer steps for setting up and loading the database steps are different.

**Advantages**

- You can use existing offline backups (provided that redo logs were cleaned up with forced log switches).
- This method is faster than the R3load and Jload method.

**Disadvantages**

- Offline backup/copy of database files in a heterogeneous environment is not possible because the hardware of the source and target systems must be binary-compatible.
- Source system host and target system host must be different.
- You must shut down the SAP system and the database during offline backup/copy of database files.
You cannot change the database schema and the tablespace names.

Prerequisites

- You must use the same Oracle release and patch level for your database in the source and target system.
- The source and target systems must run on different hosts for security reasons.
- The source and target systems must be binary compatible.

i Note
You can also perform a system copy from 32-bit systems to 64-bit systems and the other way around (same operating system assumed) even if source and target system are not binary compatible.

- If your source system uses the US7ASCII character set, you must choose this character set when installing the target system. The installer prompts for the character set during the installation (key: Database Character Set). The installation default is WE8DEC or UTF8 for Unicode systems. To find out the character set used by the source system, connect to the source database as user `sap<schemaid>` or `sapr3` with sqlplus and enter: `SELECT * FROM V$NLS_PARAMETERS;`
- If your source system has Oracle Database Vault, consider the additional information in section Implementing Oracle Database Vault with the Installer [page 186].

Oracle Storage-Based System Copy Methods Available in the Installer

You can choose between the following methods:

- Database already recovered, continue with database-specific post activities
  You have already performed backup/restore with Oracle-specific methods. In this case, the installer does not need to perform the backup/restore. You just have to ensure that the restored Oracle database on your target system is up and running.
- Performing Online or Offline Recovery with saphostctrl [page 79]
- Using a CONTROL.SQL File Created by the ORABRCOPY Tool [page 81]

Related Information

Database-Specific System Copy [page 75]
5.1.1 Performing Online or Offline Recovery with “saphostctrl”

This section describes how to perform a recovery using saphostctrl.

For the offline recovery method, we recommend that you shut down the database. Alternatively, the software provisioning manager (the “installer” for short) can also make an instance recovery of the database if it has not been shut down before the copy process.

For the online recovery method, you have to set the database to a backup mode and the backup control files and the Oracle archives will be copied to an existing shared directory.

A “shared directory” can be any directory path which the source system and the target system can access. The archives and also the init<SID>.ora files from the source system will be saved in this directory.

Restrictions

You cannot change the database schemas SAP<SchemaId> and SAP<SchemaId>DB. There is no “move” schema.

The <DBSID> can be changed because the rename process is able to create new control files with a new <DBSID>.

The <SAPSID> can be also changed.

Related Information

Performing Online Recovery [page 79]
Performing Offline Recovery [page 80]

5.1.1.1 Performing Online Recovery

For the online recovery method, you have to proceed as follows.

Procedure

1. You can set the source database to a backup mode using the following command:

   `saphostctrl -function PrepareDatabaseCopy -dbname <DBSID> -dbtype ora -dbconfdir <shared_directory> -copymethod Online -timeout -1`

2. Back up the data files, for example using image copy or snapshot technology.
3. After the database backup has finished, you have to set the database back to a normal mode using the following command:

   `saphostctrl -function FinalizeDatabaseCopy -dbname <DBSID> -dbtype ora -dbconfdir <shared_directory> -copymethod Online -timeout -1`

4. Start the target system installation and follow the instructions on the installer screens.

   Start the target system installation as described in the Installation Guide - Installation of SAP Systems Based on the Application Server ABAP of SAP NetWeaver 7.0 to 7.03 on UNIX: Oracle at https://support.sap.com/sltoolset/

5. On the Performing Oracle Storage Based System Copy screen, select option Online or Offline Recovery Method with saphostctrl

### 5.1.1.2 Performing Offline Recovery

For the offline recovery method, you have to proceed as follows.

**Procedure**

1. Shut down the source database.
2. Back up the data files, for example using image copy or snapshot technology.
3. Start the target system installation and follow the instructions on the installer screens.

   Start the target system installation as described in the Installation Guide - Installation of SAP Systems Based on the Application Server ABAP of SAP NetWeaver 7.0 to 7.03 on UNIX: Oracle at https://support.sap.com/sltoolset/

4. On the Performing Oracle Storage Based System Copy screen, select option Online or Offline Recovery Method with saphostctrl.

5. Leave the dialog field of the `<shared_directory>` empty while performing an offline recovery while no additional files from the source system are needed.
6. When the installer stops for database restore, copy all saved files to the target System.

   Make sure that you also copy the source `init<SID>.ora` file

### 5.1.2 Using a CONTROL.SQL File Created by the ORABRCOPY Tool
Related Information

Generating the Control File Structure [page 81]
Preparing the Target System (Oracle) [page 85]
Restoring Database Files on the Target System [page 87]
Restoring the Database Files on the Target System with BR*Tools [page 88]

5.1.2.1 Generating the Control File Structure

Use

The OraBRCopy Java tool writes a file CONTROL.SQL to the current working directory, which can be used without further adaptations on the target system.

For more information about command line options and output files of the OraBRCopy tool, see Additional Information about the OraBRCopy Tool [page 191].

Prerequisites

Recommendation

We recommend that you shut down the SAP system before you perform the following steps. The database must still be running.

Procedure

1. Create an installation directory <INSTDIR> with permissions 777 on the source system.
2. Copy the ORABRCOPY.SAR archive from the directory to which you unpacked the SWPM10SP<Support_Package_Number>_<Version_Number>.SAR file and extract it using SAPCAR. You can find the archive in the following directory:
   <Path_To_Unpack_Directory>/COMMON/INSTALL/ORA/ORABRCOPY.SAR
3. Make sure that all redo log groups are archived
4. Start the OraBRCopy tool as an OS user with Oracle DBA privileges:
   ○ user ora<dbsid>
   ○ user <sapsid>adm
5. Execute the ora_br_copy.sh script in one of the following ways:
   ○ If you perform an offline manual copy, enter the following commands:
     ./ora_br_copy.sh -generateFiles -forceLogSwitches -targetSid <TARGET_DBSID> -password <system_password> -listenerPort <listener_port>
The tool creates the files `CONTROL.SQL`, `CONTROL.TRC` and `init<targetSID>.ora` in your installation directory, shuts down and restarts the database and performs the required log switches.

- If you perform an offline or online backup using BR*Tools, enter the following commands:

  ```sh
  ./ora_br_copy.sh -generateFiles -targetSid <TARGET_DBSID> -password <system_password> -listenerPort <listener_port>
  ```

**i Note**

During the online backup, the database must be up and running. To ensure this, this command must not contain the parameter `-forceLogSwitches`.

The tool creates the files `CONTROL.SQL`, `CONTROL.TRC` and `init<targetSID>.ora` in your installation directory, and performs the required log switches.

**i Note**

If an error occurs, check the log file:

```
<INSTDIR>/ora.brcopy.log
```

6. Verify and, if necessary, update the `CONTROL.SQL` control file using the `CONTROL.TRC` trace file as follows.

**Example**

In the following example, entries of `CONTROL.SQL` written in bold should be compared and changed according to the trace file:

```sql
REM
====================================================================
REM CONTROL.SQL
REM
REM SAP AG Walldorf
REM Systeme, Anwendungen und Produkte in der Datenverarbeitung
REM
REM (C) Copyright SAP AG 2004
REM
REM Generated at:
REM Fri Sep 17 08:33:25 CEST 2005
REM for target system NEW
REM on
REM Windows 2000 5.0 x86
CONNECT / AS SYSDBA
STARTUP NOMOUNT
```
CREATE CONTROLFILE REUSE
SET DATABASE "NEW"
RESETLOGS
ARCHIVELOG
MAXLOGFILES 255
MAXLOGMEMBERS 3
MAXDATAFILES 1022
MAXINSTANCES 50
MAXLOGHISTORY 1134
LOGFILE
GROUP 1 (  
'/oracle/NEW/origlogA/log_g11m1.dbf',
'/oracle/NEW/mirrlogA/log_g11m2.dbf'
) SIZE 50M,
GROUP 2 (  
'/oracle/NEW/origlogB/log_g12m1.dbf',
'/oracle/NEW/mirrlogB/log_g12m2.dbf'
) SIZE 50M,
GROUP 3 (  
'/oracle/NEW/origlogA/log_g13m1.dbf',
'/oracle/NEW/mirrlogA/log_g13m2.dbf'
) SIZE 50M,
GROUP 4 (  
'/oracle/NEW/origlogB/log_g14m1.dbf',
'/oracle/NEW/mirrlogB/log_g14m2.dbf'
) SIZE 50M
DATAFILE
'/oracle/NEW/sapdata1/system_1/system.data1',
'/oracle/NEW/sapdata3/ims_1/ims.data1',
'/oracle/NEW/sapdata3/ims_2/ims.data2',
'/oracle/NEW/sapdata3/ims_3/ims.data3',
'/oracle/NEW/sapdata3/ims_4/ims.data4',
'/oracle/NEW/sapdata4/ims_5/ims.data5',
Note

In the above example, entries and values of CONTROL.SQL written in bold should be compared to the trace file.

Changes to be made

1. If you want to migrate your database from 32-bit to 64-bit or vice versa, add the following lines at the bottom of the CONTROL.SQL file:
   
   ```sql
   shutdown immediate
   startup upgrade
   spool utlrp.log
   @?/rdbms/admin/utlrp.sql
   spool off
   shutdown immediate
   startup
   spool utlrp.log
   ```
@?/rdbms/admin/utlrp.sql
spool off
exit

2. **MAXLOGFILES** 255

   ... The numbers must be greater than or equal to the corresponding numbers in the trace file.

3. **GROUP 1** {  
   '/oracle/NEW/origlogA/LOG_G11M1.DBF',  
   '/oracle/NEW/MIRRLOGA/LOG_G11M2.DBF'
   } SIZE 50M,
   Group 2 {  
   ... The sizes of the respective groups must be equal to the sizes of the corresponding groups in the trace file.

4. '/oracle/NEW/sapdata1/SYSTEM_1/SYSTEM.DATA1',  
   '/oracle/NEW/sapdata3/ims_1/ims.DATA1',  
   ... '/oracle/NEW/sapdata1/ims700_1/ims700.DATA1'  
   ... The count of the data files must be equal to the count of the corresponding data files in the trace file.

5. **ALTER TABLESPACE** PSAPTEMP **ADD TEMPFILE**  
   '/oracle/NEW/sapdata3/temp_1/temp.DATA1'  
   **SIZE** 350M **REUSE** AUTOEXTEND OFF;  
   ... The size must be equal to the corresponding size in the trace file.

6. The number of rows with **ALTER TABLESPACE** must be equal to the number of corresponding rows in the trace file.

5.1.2.2 **Preparing the Target System (Oracle)**

This section describes how to prepare the target system for Oracle-specific system copy.

**Prerequisites**

Make sure that sapdata<n> file systems on the target system host are large enough.

**Procedure**

1. Install the target SAP system with the installer as described in the installation documentation for your SAP solution.

   **Caution**

   When you perform a system copy with the Oracle backup/restore method, you cannot change the database schema and the table space names of the new target system. When installing the target
central instance, database instance, or dialog instance make sure that you enter the correct database schema names (which are the database schema name of the source system). The schema names of the source and target system must be identical.

a. On the Welcome screen, choose <SAP Product> ➤ Software Life-Cycle Options ➤ System Copy ➤ <Database> ➤ Target System Installation ➤ <System Variant> ➪ .
b. When the installer prompts for the installation type, choose Homogeneous System Copy (Backup/Restore).
c. Proceed until the installer stops to restore the database files on the target system.

The following message is displayed:

SAPinst now stops the installation. Please proceed as follows:...

2. If necessary, extract the Oracle stage archives manually and install the Oracle Software as described in the installation documentation for your SAP solution.

3. If they do not exist, create the following directories on the target system:
   - /oracle/<TARGET_DBSID>/mirrlog<x>
   - /oracle/<TARGET_DBSID>/origlog<x>
   - /oracle/<TARGET_DBSID>/sapdata<x>
   - /oracle/<TARGET_DBSID>/sapreorg
   - /oracle/<TARGET_DBSID>/saparch
   - /oracle/<TARGET_DBSID>/oraarch
   - /oracle/<TARGET_DBSID>/saptrace
   - /oracle/<TARGET_DBSID>/saptrace/background
   - /oracle/<TARGET_DBSID>/saptrace/usertrace
   - /oracle/<TARGET_DBSID>/origlogA/cntrl
   - /oracle/<TARGET_DBSID>/saparch/cntrl
   - /oracle/<TARGET_DBSID>/sapcheck

4. Make sure that the following directories are empty (except the subdirectory saparch/cntrl):
   - /oracle/<TARGET_DBSID>/saparch
   - /oracle/<TARGET_DBSID>/oraarch

5. All directories must be owned by the software owner oracle:oinstall (default for Oracle 12c) of the target database or ora<target_dbsid>:dba (default for Oracle 11g and Oracle 10).

   To do this, enter the following command:

   **Oracle 12c:** chown -R oracle:oinstall <directory>
   **Oracle 11g and Oracle 10:** chown -R ora<target_dbsid>:dba <directory>

6. Restore the database files on the target system either manually (see Restoring Database Files on the Target System Manually [page 87]) or with BR*T ools (see Restoring the Database Files on the Target System with BR*T ools [page 88]), then proceed with the installer.
5.1.2.3 Restoring Database Files on the Target System

Use

⚠️ Caution

If you do not use an offline backup, but copy the database files directly from the source to the target system host, make sure that you shut down the database on the source system before you copy the listed files from the source to the target directories.

Procedure

1. Copy the following files from the source to the target system host by copying the listed files from the source directories to the target directories. For more information, see Creating an Offline Backup Manually [page 89].

<table>
<thead>
<tr>
<th>Source and Target Directory</th>
<th>Files</th>
</tr>
</thead>
<tbody>
<tr>
<td>/oracle/&lt;DBSID&gt;/sapdata&lt;x&gt;</td>
<td>All files</td>
</tr>
<tr>
<td>/oracle/&lt;DBSID&gt;/origlog&lt;x&gt;</td>
<td>All files</td>
</tr>
<tr>
<td>/oracle/&lt;DBSID&gt;/mirrlog&lt;x&gt;</td>
<td>All files</td>
</tr>
</tbody>
</table>

Source: <INSTDIR>  
Target: <SAPINST_INSTDIR>

Source: <INSTDIR>  
Target: /oracle/<DBSID>/<DB_VERSION>_<BIT>/dbs

CONTROL.SQL

init<TARGET_DBSID>.ora

2. After you have copied the database files, make sure that the files on the source and target system are not located in different directories or drives. If required, make the corresponding changes in the files control.sql and the init<TARGET_DBSID>.ora.

3. Verify that the created directories and copied files have the owner ora<target_dbsid>, belong to the group dba, and have the permissions 740.

4. Make sure that the control files are not restored. If necessary, remove them.

The file names are specified by the control_files parameter of the init<TARGET_DBSID>.ora file.
5.1.2.4 Restoring the Database Files on the Target System with BR*Tools

1. Copy the following files from the source system host to the target system host by copying manually the listed files from the source directories to the target directories.

   Table 18: Source and Target Directories on UNIX

<table>
<thead>
<tr>
<th>Source and Target Directory</th>
<th>Files</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source: &lt;INSTDIR&gt;</td>
<td>CONTROL.SQL</td>
</tr>
<tr>
<td>Target: &lt;SAPINST_INSTDIR&gt;</td>
<td></td>
</tr>
</tbody>
</table>

| Source: <INSTDIR>          | init<TARGET_DBSID>.ora |
| Target: /oracle/<DBSID>/   |                      |
| <DB_VERSION>_<BIT>/dbs     |                      |

2. Call the restore and recovery function of BR*Tools.
   For more information about the required steps and prerequisites, see SAP Note 1003028. The main prerequisite is that the corresponding BR*Tools logs (BRBACKUP detailed and summary log, BRARCHIVE summary log) are copied manually from the source to the target system. In addition, the postprocessing steps mentioned in this SAP Note are performed automatically by the installer.

   SAP Note 1003028 also comprises information about executing restore and recovery under the control of BRRECOVER and the exact syntax of BRRECOVER (see section Homogeneous Database Copy).

   For more information about BR*Tools, see the SAP Library for your release at:

   Table 19:

<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
</table>
3. Shut down the Oracle database instance as follows:

```sql
sqlplus /nolog
connect / as sysdba
shutdown immediate
exit
```

5.1.3 Creating a Backup

Create a backup if required. Choose between the following possibilities: Performing an offline backup manually or an offline or online backup with BR*Tools.

Related Information

- Creating an Offline Backup Manually [page 89]
- Creating an Offline or Online Backup with BR*Tools [page 90]

5.1.3.1 Creating an Offline Backup Manually

There are different possibilities to prepare the actual transfer of the database files:

- If you have an up-to-date offline backup, you can use it (provided that redo logs were cleaned up with forced log switches).
If you want to transport the database file (for example, on tape) or if you have to perform the database shutdown at a certain time, stop the database (normal shutdown) and perform a complete offline backup. You can use the trace file CONTROL.TRC created by OraBrCOPY to determine the file system trees that have to be saved.

You stop the database (normal shutdown) and copy the database files when the actual transfer to the target system takes place. You do not have to perform any preparations for the actual transfer now. Proceed with the next step.

**Note**

If you choose this manual offline backup method, you also have to restore the database files on the target system manually. For more information, see Restoring Database Files on the Target System Manually [page 87].

### 5.1.3.2 Creating an Offline or Online Backup with BR*Tools

**Use**

You can use any backup strategy supported by BR*Tools as the basis for a system copy: offline or online, with or without BACKINT, with or without RMAN, complete or incremental, and so on. The backup strategy must simply be valid for restore and recovery. This means that a complete restore and recovery of the source database must be possible. In addition for BACKINT and RMAN, the external backup tools must be configured so that a restore is possible on the target host.

**Procedure**

Proceed as described in the SAP Library for your release at:

Table 20:

<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver Release</td>
<td>Location</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP1</td>
<td><a href="http://help.sap.com/nw701">Application Help</a></td>
</tr>
<tr>
<td></td>
<td>Function-Oriented View &lt;Language&gt;</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP2</td>
<td><a href="http://help.sap.com/nw702">Application Help</a></td>
</tr>
<tr>
<td></td>
<td>Function-Oriented View &lt;Language&gt;</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP3</td>
<td><a href="http://help.sap.com/nw703">Application Help</a></td>
</tr>
<tr>
<td></td>
<td>Function-Oriented View &lt;Language&gt;</td>
</tr>
</tbody>
</table>

**Note**

If you choose a backup method with BR*Tools, you also have to restore the database files on the target system with BR*Tools. For more information, see Restoring the Database Files on the Target System with BR*Tools [page 88].

### 5.2 SAP MaxDB-Specific Procedure

In an SAP system environment, you can create a homogeneous copy of an SAP MaxDB database by using the backup and restore method. This method is suitable for creating an exact copy of an existing database. The source of the copy is a complete data backup of your source database.

**Prerequisites**

- Byte order – little-endian or big-endian
You can use the backup and restore method to copy systems with the same byte order. That is, you can copy a system based on little-endian to another system based on little-endian. You can also copy a system based on big-endian to another system based on big-endian. Check SAP Note 552464 to find out which processor and operating system combination uses which byte order.

- Data backup
  You perform the complete data backup of your source database.

- Recovery tool (manual restore)
  You are using the SAP MaxDB Database Manager (DBMGUI) version 7.5.0 Build 12 or above. For more information, see:
  Alternatively, you can use Database Studio. For more information, see:
  http://maxdb.sap.com/doc/7_7/default.htm

- Database Software
  The database software on the target host must have the same version as the software on the source host. The build number of the software version on the target host must be greater than or equal to the version on the source host.

- Size of the data on the target system
  The size of the target system must be greater than the used space on the source system. You can find the size of the used pages on the source system as follows:
  dbmcli --d <database_name> --u <dbm_user>,<password> --n <database_server> --u SQL sap<sid>,<password> sql_execute 'SELECT USEDPERM FROM SERVERDBSTATISTICS'
  The result of this query is the amount of used space, expressed as the number of 8 KB pages. To get the used space in MB, divide this value by 128. When the installer prompts you, configure the database data volumes according to this value.

**Context**

The installer is used for installation on the target system host as described in the installation documentation for your SAP solution at http://support.sap.com/sitoolset > System Provisioning > Installation Option. In the installer, you select the backup and restore method as the database installation method.

This description is not valid for the liveCache system copy.

⚠️ Caution

Make sure that you know the password of the database system administrator (SUPERDBA) from the source system before you start the procedure below. Otherwise, you cannot access the database contents on the target system.

You must also know the name of the SQL database schema on the source system, SAP<SAPSID> – for example, SAPR3.

You can perform this procedure in the following ways:

- Manual restore
  The installer stops before the database instance initialization and asks you to perform the restore on the target database. After you have performed restore and post-restore activities, you can continue the installation in the installer.
• Automatic restore
  The installer performs the restore to import the data into the target system.
  In this scenario, you have to use a single file as the backup medium for the whole backup. The restore can use any SAP MaxDB backup, as long as it is a single file.

  Note
  The minimum size of the database is calculated from the size of the backup file.

Advantages
• You can use existing offline backups.
• This method is faster than the database-independent method using R3load or Jload [page 43].

Disadvantage
You can only copy between systems with the same byte order.

Perform the following steps on the target system:

Procedure

1. To import the target system, start the installer as follows and then follow the prompts:

   \(<Product>\) > Software Life-Cycle Options > System Copy > Target System Installation > \(<System\) Variant> \(

2. In the Select the database copy method screen, select Homogeneous System Copy.
3. In the MaxDB Backup Template screen, choose one of the following, Manual Restore, or Restore by Software Provisioning Manager:
   ○ Manual restore
     In the execution phase, you are prompted to do the following:
     1. Start the data recovery wizard from DBMGUI
        1. Register your database instance in the DBMGUI
        2. Check the database instance in the admin state.
        3. Choose Recovery > Recovery with Initialization ...
        4. In type of recovery, select Restore a medium.
        5. Specify the backup medium.
        6. Start the restore procedure.

   Note
   The recovery wizard does not start the recovery immediately. It initializes the database instance first. It takes some time for the database server to format the database volumes.

2. After the restore, check the state of the target database instance. Change the database state to online if it is not already in online state.
3. Delete the entries from the following tables to make sure that information about the backup history for update statistics in the Computing Center Management System (CCMS) from the old system does not appear in the new system:

- CNHIST
- CNREPT
- CNMEDIA
- DBSTATHADA
- DBSTAIHADA
- DBSTATIADA
- DBSTATTADA
- SDBAADAUPD

4. Continue with the installer or restart it if you stopped it during the recovery.

   - **Restore by the Installer**
     Enter the following information:
     - **Template name**
     - **Device/file**
     - **Wait for backup**

4. After installation is completed, maintain the database connection for CCMS.

   For more information, see SAP Note 588515.

---

### 5.3 IBM Db2 for Linux, UNIX, and Windows-Specific Procedures

The database-specific procedure for the creation of a system copy is based on a restore of an existing online or offline backup. Therefore, this method is also referred to as backup/restore procedure. Since a Db2 backup can be used cross-platform within certain limitations (see below), this method is not limited to the homogenous system copy only.

**i Note**

This backup/restore procedure described here only works using the installer. System copy using native Db2 backup/restore procedures **without** the installer are **not** supported for SAP systems.

**Prerequisites**

- It must be possible to restore the backup of the source system on the platform of the target system.
- If errors occur when restoring the backup on the target system, the complete restore must be repeated.

**Context**

An SAP system copy with a Db2 database can be also created if more advanced techniques like file system snapshots are available. The necessary procedure in this case is called database relocation. The database relocation procedure differs significantly from the backup/restore procedure and is not described in this guide.

For more information, see the *Database Administration Guide: SAP on IBM Db2 for Linux, UNIX, and Windows*, section `db2inidb Option: as snapshot`.
The installer is used for installation on the target system host as described in the installation documentation for your SAP component. Before starting the installer on the target system make sure that all prerequisites for the SAP system installation are met. Especially, make sure that the relevant file systems are available. For more information, see the appropriate installation guide at http://support.sap.com/sltoolset

In the ABAP system, only the installer steps for setting up and loading the database are replaced by a database restore.

You also have to run an export for the Java Engine to archive SDM and application-specific file system content.

Advantages of the Backup Method

- You can use existing online and offline backups.
- Using the backup method is faster than the database-independent method [page 43].

Disadvantages of the Backup Method

- You cannot change the name of the database schema. The name of the database schema of the target system is the same as that of the source system. However, you can change the name of the connect user during the Define Parameters phase of the target system installation.
- You cannot copy an individual MCO component to another system. You can only copy the complete system.

Procedure

1. You perform an online or offline backup.

   **Note**

   If you use an online backup to copy your system, a roll forward of your database is required after the database restore on the target system. As a prerequisite, the respective database logs must be accessible. We therefore recommend that you include the necessary log files in the backup image. To do so, use the include logs option of the BACKUP DATABASE command. Logs are by default included in an online backup.

   **Note**

   To export the database content for Java, you can also use the database-specific method (backup/restore).

   During the dialog phase, the installer asks you in the Database Export dialog box to specify the system copy method. If you want to use the backup/restore method, choose Use database-specific tools.

2. To create the export directory structure with labels and to archive SDM and application-specific file system content, you also have to run the installer.

   On the Welcome screen, choose <Product> Software Life-Cycle Options System Copy IBM Db2 for Linux, UNIX, and Windows Source System Export <System_Variant> Based on <Technical_Stack>
Perform the installation options in the given sequence and follow the instructions on the installer dialogs.

3. To create a target system, run the installer on the target system host by choosing the following on the Welcome screen:

   - <Product>
   - Software Life-Cycle Options
   - System Copy
   - IBM Db2 for Linux, UNIX, and Windows
   - Target System Installation
   - <System_Variant>
   - Based on <Technical_Stack>

   Perform the installation options in the given sequence and follow the instructions on the installer dialogs. The installer prompts you to perform the database restore during the installation phase.

   **Caution**

   Be aware of the following constraints when using the backup method for a homogeneous system copy:
   - You cannot change the name of the database schema, during the dialog phase make sure that you enter the database schema exactly as on your source system.
   - The tablespace names remain the same during the database restore. However, you can change them after the installation.
   - If you want to change the name or the location of the Db2 container on the target system, you have to adapt the Db2 container paths or names in the redirected restore script and then perform a redirected restore. For more information, see the documentation Database Administration Guide: SAP on IBM Db2 for Linux, UNIX, and Windows, section Usage of Tool brdb6brt.

4. Multi-Partition Database Environments only: Add database partitions

   If you copy a system with multiple database partitions, the target system must have the same number of partitions as the source system.

5. Restore your database.

   To restore your database, you can choose between one of the following options:
   - Simple database restore
     To perform a database restore, use the Db2 RESTORE command. For more information, see the IBM Db2 documentation Db2 Command Reference.
   - Redirected restore
     This is the recommended method. Redirected restore allows you to change the name or the location of the Db2 container. To perform a redirected restore, you use the Db2 RESTORE DATABASE command with the REDIRECT GENERATE SCRIPT option.
     Alternatively, you can use the tool brdb6brt that retrieves a database backup and creates a CLP script to restore this backup image. Since brdb6brt needs to connect to the source system, the source system must be available. For more information about how to use the tool brdb6brt, see Redirected Restore Using brdb6brt in the Database Administration Guide: SAP on IBM Db2 for Linux, UNIX, and Windows.
     If you have used an online backup, you have to make sure that you have access to the log files that were created during the online backup. You also have to perform a roll forward operation to bring the database into a consistent state.

   You can now continue with the installation.
6. To adhere to the SAP standard naming conventions for tablespaces, we recommend that you consider renaming the tablespaces after the installation to reflect the new system name. To rename a single tablespace, enter the following command:

```
db2 rename tablespace <old_name> to <new_name>
```

**Example**

```
db2 rename tablespace <SAPSID_SOURCE>#STABD to <SAPSID_TARGET>#STABD
```

If you use the **deferred table creation** function, you also have to execute the following command for each renamed tablespace using the `db6util` tool:

```
db6util -rtvt <SAPSID_SOURCE>=%<SAPSID_TARGET>%
```

For more information, see SAP Note [1227165](https://support.sap.com).

**Caution**

Make sure that you use an up-to-date version of the `db6util` tool. You require at least a version that supports the option `-rtvt`. To check the command options of the `db6util` tool, enter the following command:

```
db6util -h
```

In addition, you have to update the tablespace names in tables TSDB6, IADB6, and TADB6. To rename all tablespaces in the respective tables according to the standard naming conventions, use the following commands:

- For table TSDB6, enter the following SQL command:

  ```sql
  update <connect_user_name>.tsdb6 set tabspace = ' '<SAPSID_TARGET>'#'||
  substr(tabspace,5,length(tabspace)-4),indspace=' '<SAPSID_TARGET>'#'||
  substr(indspace,5,length(indspace)-4)
  ```

- For table IADB6, enter the following SQL command:

  ```sql
  update <connect_user_name>.iadb6 set tabspace = ' '<SAPSID_TARGET>'#'||
  substr(tabspace,5,length(tabspace)-4)
  ```

- For table TADB6, enter the following SQL command:

  ```sql
  update <connect_user_name>.tadb6 set tabspace = ' '<SAPSID_TARGET>'#'||
  substr(tabspace,5,length(tabspace)-4)
  ```

**Next Steps**

After the installation on the target system, do the following:

- If you performed a redirected restore, check all settings of the database manager and database configuration parameters. Specifically, make sure that the following configuration parameters point to the correct path:

  - DIAGPATH (DBM)
  - JDK_PATH (DBM)
  - DFTDBPATH (DBM)
5.4 IBM Db2 for z/OS Specific Procedures

In an SAP system environment, you can create a homogeneous system copy of a DB2 database using the offline system copy method.

Prerequisites

The following prerequisites must be fulfilled to use this method:

- The permissions of the source and target systems must be completely separate. The source system must not be able to use the resources of the target system, and the target system must not be able to use the resources of the source system.
- RACF authorization for the target DB2 subsystem is complete.
- Source and target systems must work with DB2 managed objects.
- Procedures of the source and the target system are defined in the DB2 PROCLIB.
- Source and target systems have appropriate entries in the APF list.
- Volumes of the source and target systems are managed by SMS.
- At first source and target systems run with the same DB2 service level. After copying the source system to a target system, you can migrate or upgrade both systems to a higher service level.

Context

This document assumes that the database schema of your SAP system is SAPR3. If you employ a different schema, adapt the references to SAPR3 in the following SQL statements and jobs to reflect the actual schema name.

The following section describes an offline system copy method for SAP systems on IBM Db2 for z/OS.

Advantage of the Offline System Copy Method

This method is faster than the database-independent method [page 43].
Restriction of the Offline System Copy Method

At the moment, you cannot copy an individual MCOD component to another system. You can only copy the complete system.

**Note**

The offline system copy must be performed by an experienced database administrator.

You can find an adapted procedure for an online system copy in the IBM documentation *High Availability for SAP on zSeries Using Autonomic Computing Technologies*.

Process Flow of the Main Steps in this Procedure

The following sections contain the detailed steps involved in the homogeneous system copy procedure for Db2 for z/OS.

The offline system copy can be divided into the following steps:

### Procedure

1. **Step 1: Check the Source System and Stop it after Successful Check** [page 99]
2. **Step 2: Consider DB2 Procedures of the Target System** [page 100]
3. **Step 3: Delete All Obsolete Objects of the Target System** [page 101]
4. **Step 4: Copy All Objects of the Source System into the Target System** [page 101]
5. **Step 5: Add All DB2 Subsystem Libraries to a PARMLIB Containing Definitions Required for APF** [page 101]
6. **Step 6: Alter the BSDS of the Target System** [page 102]
7. **Step 7: Change Entries of logcopy Data Sets in the BSDS of the Target System** [page 102]
8. **Step 8: Customize DB2 Modules Using DSNTIJUZ** [page 102]
9. **Step 9: Configure the Distributed Data Facility (DDF)** [page 102]
10. **Step 10: Start the Target System Using ACCESS(MAINT)** [page 103]
11. **Step 11: Update the DB2 Catalog Using CATMAINT UPDATE VCAT SWITCH** [page 103]
12. **Step 12: Stop and Restart the Target System** [page 103]
13. **Step 13: Create DSNTEP2 and DSNTEP4 Load Modules for the Target System** [page 103]
14. **Step 14: Alter All WLM Environments of Stored Procedures** [page 104]
15. **Step 15: Perform Post-Offline System Copy Actions (Optional)** [page 104]

### 5.4.1 Step 1: Check the Source System and Stop it after Successful Check

1. Check the source system for active threads using the following DB2 command: `DIS THD(*)`
   - If there are active threads, stop all applications running against the source system.
2. Check the source system for authorized utilities using the following DB2 command: `DIS UTIL(*)`
The command shows the status of all utility jobs known to DB2. You should get the following message: NO AUTHORIZED UTILITY FOUND FOR UTILID = *

If there are utilities, wait for their successful completion or terminate them.

3. Ensure that all DB2 objects of the source system are started in RW mode.

   You can check this using the following DB2 command: DISPLAY DATABASE(*) SPACENAM(*) RES

   The command displays all databases, table spaces, or indexes in a restricted status.

   You should get the following message: NO DATABASES FOUND

   In all other cases do not proceed. We recommend that you repair all databases, table spaces, or indexes identified as restricted. For more information, see the command reference of Db2 for z/OS.

4. The source system must be stopped and restarted now in ACCESS (MAINT).

   ACCESS (MAINT) prohibits access to any authorization IDs other than SYSADM, SYSOPR and SECADM.

5. Later in this workflow all WLM ENVIRONMENTS of DB2 procedures must be altered in the target system.

   Identify all created procedures and WLM ENVIRONMENTS with the following SQL statement:

   ```sql
   select 'ALTER PROCEDURE ' || SCHEMA || '.' || NAME || ' WLM ENVIRONMENT ' || WLM_ENVIRONMENT || ';' from sysibm.sysroutines;
   ```

   The result of this query should look like the following:

   ```sql
   ALTER PROCEDURE DSNADM."ADMIN_TASK_LIST" WLM ENVIRONMENT D990_GENERAL;
   ALTER PROCEDURE DSNADM."ADMIN_TASK_OUTPUT" WLM ENVIRONMENT D990_GENERAL;
   ALTER PROCEDURE DSNADM."ADMIN_TASK_STATUS" WLM ENVIRONMENT D990_GENERAL;
   ALTER PROCEDURE SYSPROC."DSNACICS" WLM ENVIRONMENT D128_GENERAL;
   ```

   Keep the results of this query in a safe place.

6. Stop the source system again.

7. After the source system has completely terminated, print the contents of all source system bootstrap datasets using utility DSNJU004.

   Carefully save the output. The values of START RBA and END RBA of all logcopy datasets are needed later in this workflow.

   **Caution**

   Do not start the source system until all objects (bootstrap datasets, LOGCOPY, VSAM clusters and so on) are copied into the target system. Otherwise the target system might be highly inconsistent. Therefore it is strongly recommended to prevent the source system from being started until step 4 [page 101] of this process flow has been completed successfully.

### 5.4.2 Step 2: Consider DB2 Procedures of the Target System

Consider the following cases:

- Homogeneous system copy of the source system is provided in an existing target system. In this case you can skip step 2.
5.4.3 Step 3: Delete All Obsolete Objects of the Target System

Consider the following cases:

● Homogeneous system copy of the source system is provided in a target system that already exists. In this case delete all obsolete bootstrap datasets, logcopy datasets, archives, VSAM clusters. Ensure that all obsolete objects of the target system are deleted.

● Homogeneous system copy of the source system is provided in a non-existing target system. In this case you can skip step 3. All necessary datasets are copied from the source system in step 4 [page 101] of this process flow.

5.4.4 Step 4: Copy All Objects of the Source System into the Target System

1. Ensure that the source system is still stopped. Otherwise bootstrap datasets, logcopy datasets, VSAM clusters are allocated by the source system and cannot be copied.

2. Customize and run a job using, for example, program ADRDSSU. Use ADRSSU parameter RENUNC to rename all objects to reflect the high-level qualifiers of the target system.

3. Now you can restart the source system without any risk of inconsistency in the target system.

5.4.5 Step 5: Add All DB2 Subsystem Libraries to a PARMLIB Containing Definitions Required for APF

Consider the following cases:

● The target system was already up and running in the past, so that all definitions required for authorized program facility (APF) already exist. In this case you can skip step 5.

● The target system was never up and running. In this case add all definitions required for APF to an appropriate PARMLIB and set APF. Otherwise the target system cannot be started.
5.4.6 Step 6: Alter the BSDS of the Target System

Change VSAMCAT in the bootstrap data sets (BSDS) of the target system. Use the DSNJU003 utility in DB2 with parameter NEWCAT VSAMCAT to reflect the new VSAMCAT high-level qualifier.

Repeat this step for each data sharing member BSDS of data sharing systems.

5.4.7 Step 7: Change Entries of logcopy Data Sets in the BSDS of the Target System

Use DB2 utility DSNJU003 to delete obsolete and invalid DSNAME entries using the DELETE DSNAME parameter. In the same job you can define the name of the new logcopy data sets with the NEWLOG DSNAME parameter. Carefully customize the STARTRBA and ENDRBA parameters using the values of the source system.

Repeat this step for each data sharing member BSDS of data sharing systems.

5.4.8 Step 8: Customize DB2 Modules Using DSNTIJUZ

For the target system you have to customize the DB2 data-only load module DSNHMCID, the application defaults load module (DSNHDECP), and the subsystem parameter module using DSNTIJUZ.

At least change the following parameters:

- The name of the libraries identified in STEPLIB, SYSLIB
- SYSIMOD DD statements
- The ADMTPROC parameter, if the administrative task scheduler is used
- The CATALOG parameter
- The FCCOPYDDN parameter
- The IRLMPRC parameter
- The IRLMSID parameter
- The ARCPFX1 and ARCPFX2 parameters, if the target system is to run with archiving.
  
  If the target system is to run without archiving, identified by parameter OFFLOAD=NO, the ARCPFX2 / ARCPFX2 parameters must not be changed. However, for security reasons it is recommended to run the target system with archiving.

Other parameters of the target system can be modified as requested by the owner of the subsystem.

Repeat this step for each data sharing member BSDS of data sharing systems.

5.4.9 Step 9: Configure the Distributed Data Facility (DDF)

Use the DSNJU003 stand-alone utility to change the bootstrap data sets (BSDS). Adjust LOCATION, LUNAME, PORT, and RESPORT considering the new Distributed Data Facility (DDF) environment.
Repeat this step for each data sharing member BDS of data sharing systems.

5.4.10 **Step 10: Start the Target System Using ACCESS(MAINT)**

You must be able to start the target system with ACCESS (MAINT), otherwise the CATMAINT utility fails in the next step [page 103] of this process flow.

If the target system does not start successfully, do **not** proceed with Step 11: Update the DB2 Catalog Using CATMAINT UPDATE VCAT SWITCH [page 103].

For data sharing systems, start the first member and continue with Step 11: Update the DB2 Catalog Using CATMAINT UPDATE VCAT SWITCH [page 103].

5.4.11 **Step 11: Update the DB2 Catalog Using CATMAINT UPDATE VCAT SWITCH**

Use the CATMAINT utility with option VCAT SWITCH to provide the new high-level qualifier of the target system in the DB2 catalog.

For data sharing systems, run this step with the first started member.

5.4.12 **Step 12: Stop and Restart the Target System**

Stop and restart the target system.

When the target system is restarted, you have to check the SYSLOG carefully for normal completion.

⚠️ **Caution**

Do not proceed with the next step [page 103] if problems occur while the target system is being stopped or restarted.

5.4.13 **Step 13: Create DSNTEP2 and DSNTEP4 Load Modules for the Target System**

Create, test, and run the DSNTEP2 and DSNTEP4 load modules. To be able to do this, you have to customize and run DSNTEJ1L.
5.4.14 Step 14: Alter All WLM Environments of Stored Procedures

Use

In step 1 [page 99] of this process flow, you ran a query to prepare all ALTER PROCEDURE statements for the target system.

Now you have to customize the result of the query by changing the WLM ENVIRONMENT value for the WLM ENVIRONMENT names of the target system.

Procedure

1. Ensure that the APPLICATION ENVIRONMENT NAMES and the appropriate PROCEDURE NAMES exist in the DB2 PROCLIB and that the APPLICATION ENVS are activated.
2. Run all ALTER PROCEDURE commands in the target system using the DSNTEP2 program.

5.4.15 Step 15: Perform Post-Offline System Copy Actions (Optional)

1. As all GRANTS of the source system are still valid, check them using SPUFI by executing the following command: SELECT * FROM SYSIBM.SYSUERAUTH;
   Maintain this table according to your needs.
2. Grant new users or revoke obsolete users.
3. If required, change the user authorizations of the target system.
   The DB2 catalog still contains the authorizations of the source system.

5.5 SAP ASE Server-Specific Procedure

This section describes how to perform a homogeneous system copy of a SAP ASE database by using the load database dump method, or the attach database device method in an SAP environment. The installer supports both methods.

Prerequisites

Before you start the system copy procedure, implement SAP Note 1612437.
Context

The `load database dump` method and the `attach database device` method have the following advantages compared to the R3load method:

- You can use an existing backup.
- You can copy the complete database software and database devices (all files below `/sybase/<DBSID>/`) to the target system and use this copy to create the target system.
- These methods are faster than the database-independent method [page 43].

For more information about system copy with SAP ASE as target database, see SAP Note 1697542.

Procedure

1. Provide the database files required for the target system setup using one of the following ways:
   - Suspend write operations to the database devices of the source system database together with the creation of a database manifest file (using SAP ASE command `quiesce database <DBSID>_tag hold <DBSID> for external dump to <manifest_file>`), copy all necessary files to the target system, and enable the write operation again (using SAP ASE command `quiesce database <DBSID>_tag release`).
   - Create a backup (SAP ASE command `dump database`).
2. Copy the files to the target system.
3. Run the installer to install the target system by choosing the following on the Welcome screen:

   ![Product] ➤ Software Life-Cycle Options ➤ System Copy ➤ <Database> ➤ Target System Installation ➤ <System Variant> ➤ Based on <Technical Stack>

   ![Note]
   - Choose the installation services in exactly the order they appear. For more information, see the SAP ASE installation guide for your SAP NetWeaver-based system at: [http://support.sap.com/slitoolset](http://support.sap.com/slitoolset) ➤ System Provisioning ➤ Installation Option.
   - On the installer screen `SAP SystemDatabase`, make sure that you select Homogeneous System Copy (SAP ASE-specific: Attach database device or Load database dump).
   - The installer asks you if you want to use either an already existing SAP ASE installation on the target system or the database software from the installation media.
   - Depending on the method chosen, you have to enter either the path to the database dump files or the location of the database manifest file. The installer tries to find the database devices mentioned in the manifest file automatically, otherwise it asks for the files during the installer execution phase.
6 Follow-Up Activities

To finish the system copy of your SAP system, perform the follow-up activities described in the following sections.

**Note**

The Java engine is not started automatically. After the target system has been installed and the follow-up activities have been performed, you have to start the Java engine manually.

**Related Information**

Performing Follow-Up Activities in the Source System [page 107]
Performing Follow-Up Activities in the Target System [page 108]
7 Performing Follow-Up Activities in the Source System

This section describes the steps that you have to perform in the source system to finish the system copy.

Procedure

1. If you canceled or scheduled released jobs and jobs that must run periodically before you started the copy procedure, reschedule these jobs (transaction SM37).
2. Using CCMS, adapt your operation mode timetable to the original status (transaction SM37).
8 Performing Follow-Up Activities in the Target System

You have to perform the following follow-up activities in the target system.

**Note**

Before you start the Java engine after the system copy, apply [SAP Note 831812](https://support.sap.com/note/831812) and if necessary, change the Java VM parameters as described in [SAP Note 723909](https://support.sap.com/note/723909).

**Related Information**

- Installing the License Key [page 108]
- SAP Solution Manager: Connection Between SLD and LMDB [page 109]
- Performing Follow-Up Activities for ABAP [page 110]
- Performing Follow-Up Activities for Java [page 117]
- Checking the Database Parameters for IBM Db2 for Linux, UNIX, and Windows [page 132]
- Performing Jobhead Correction after Homogeneous System Copy [page 133]

### 8.1 Installing the License Key

Once the installation of the target system is completed and the SAP system copy has been imported, you have to install a new SAP license key.

You must install a **permanent** SAP license. 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.
- **Before** installing the license key, make sure that [SAP Note 831812](https://support.sap.com/note/831812) is applied.
For more information about ordering and installing the SAP license, see the SAP Library for your release at:

Table 21:

<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver 7.0</td>
<td><a href="http://help.sap.com/nw70">http://help.sap.com/nw70</a> Application Help SAP NetWeaver by Key Capability Solution Life Cycle Management SAP Licenses</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP1</td>
<td><a href="http://help.sap.com/nw701">http://help.sap.com/nw701</a> Application Help SAP NetWeaver by Key Capability Solution Life Cycle Management SAP Licenses</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP2</td>
<td><a href="http://help.sap.com/nw702">http://help.sap.com/nw702</a> Application Help SAP NetWeaver by Key Capability Solution Life Cycle Management SAP Licenses</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP3</td>
<td><a href="http://help.sap.com/nw703">http://help.sap.com/nw703</a> Application Help SAP NetWeaver by Key Capability Solution Life Cycle Management SAP Licenses</td>
</tr>
</tbody>
</table>

More Information

For more information about SAP license keys, see http://service.sap.com/licensekey.

8.2 SAP Solution Manager: Connection Between SLD and LMDB

- Consider the following if you move parts of a system, for example the database, or the complete system to new hardware:
  - Each change in the host name generates new elements in the system landscape directory (SLD) which can result in system duplicates.
  - SAP recommends using stable (virtual) host names which remain constant over time, in the system profiles. SAP Note 1052122 lists the profile parameters evaluated by the SLD Data Suppliers for the host names.
- If you omitted to use virtual host names at installation time or if you cannot use virtual host names now, the SLD offers a possibility to prevent the creation of system duplicates. For more information, see SAP Note 1727294.
- If you cannot apply SAP Note 1727294 to the SLD, and if you already found a duplicate registration for the system in the SLD, refer to SAP Note 1694004 for guidance how to clean up such inconsistencies. SAP Note 1747926 describes the cleanup procedure for older SLD releases.
● If you want to copy an SAP Solution Manager system with a filled Landscape Management Database (LMDB), see SAP Note 1797014.

● If you want to create a new synchronization connection between the Landscape Management Database (LMDB) and the System Landscape Directory (SLD), see SAP Note 1699142.

● If you want to delete a synchronization connection between two SLD systems or between an SLD system and LMDB, see SAP Note 1770691.

8.3 Performing Follow-Up Activities for ABAP

Perform the following activities for the ABAP system.

Related Information

Activities at Operating System Level [page 110]
Activities at Database Level [page 111]

8.3.1 Activities at Operating System Level

This section includes the adaptations that you have to make at operating system level in your target system.

Procedure

1. Adapt the configuration files at operating system level to meet network and SAP requirements.
2. Adapt additional SAP software components (for example, RFC, CPIC, SAP ArchiveLink) if required.
3. Adapt additional non-SAP software components (for example, archiving systems, monitoring tools, job schedulers) if required.
4. Adapt backup programs (for example, BRBACKUP, BRARCHIVE, BACKINT) if required.
5. Adapt non-SAP directories, file systems, NFS mounts, and so on, if required.
6. Check the SAP parameters of the default and instance profiles.
7. Check your UNIX shell files for special entries.
8. Check crontab or AT jobs.
9. Check operating system files (for example, .netrc, .rhosts).
10. Check operating system printers.
11. If the spool requests are stored at file system level, you must copy the subdirectories with the spool files to the new global directory. For more information, see SAP Note 20176.
12. **Oracle Database only:** Adapt the database profiles `init<SAPSID>.ora`, `init<SAPSID>.dba`, and `init<SAPSID>.sap`.

### 8.3.2 Activities at Database Level

This section includes the adaptations that you have to make at database level in your target system.

**Procedure**

1. Before starting the SAP system, make sure that the logging mechanism of the database is active.
2. Check the parameters in the database profiles.
3. **Oracle Database only:** Perform the following steps:
   a. Delete all entries from the following tables:
      - `DBSTATHORA`, `DBSTAIHORA`, `DBSTATIORA`, `DBSTATTORA`.
   b. Delete the user `OPS$<SOURCE_SAPSID>ADM`.
   c. If you changed the `<DBSID>` during the system copy, we recommend that you adapt the `global_name` parameter by using the following SQL command:
      ```sql
      alter database rename global_name to <NEW_DBSID>;
      ```
      If the parameter does not exist on your system, ignore this step.
4. Run report `RSSDBTCMCLEANUP` in the following cases:
   - You copied a system using SAP MaxDB in both the source system and the target system.
   - You copied a system and changed the database platform from SAP MaxDB to a different database platform.
   For more information, see SAP Note 1179714.
5. **Oracle Database only** If you have chosen to enable Oracle Database Vault, make sure that you perform the required configuration steps. For more information, see Implementing Oracle Database Vault with the Installer [page 186].

### 8.3.3 Activities at SAP System Level

This section includes the adaptations that you have to make at SAP system level in your target system.

**Note**

You can use ABAP post-copy automation (PCA) to automatically perform follow-up activities at system level. ABAP post-copy automation (PCA) provides task lists with a predefined sequence of configuration tasks to configure extensive technical scenarios automatically. For more information, see SAP Note 1614266.
To be able to use PCA, you must install the license for SAP Landscape Virtualization Management Enterprise Edition. For more information, see SAP Note 1912110.

**Procedure**

1. If you performed a Unicode conversion using as target system ID the same `<SAPSID>` as the source system ID and the (local or NIS-mounted) operating system users of the target system still have the environment of the operating system users of the source system, you need to update the user environment for the operating system users of the target system as follows:

   Update the `PATH` variable so that it points to the platform-specific directory for Unicode.

   **Example**

   Update the `PATH` value `/usr/sap/<SAPSID>/SYS/exe/nuc/linuxx86_64` to `/usr/sap/<SAPSID>/SYS/exe/uc/linuxx86_64`

2. Run an installation check: `Administration > System administration > Administration > Installation Check (transaction SM28)`.

3. Configure the Transport Management System (transaction STMS).

   **Note**

   If you changed the `<SAPSID>` during the system copy, all open transport, repair, and customizing requests that have not been released in the source system will be released automatically. If you did not change the `<SAPSID>`, open requests will not be released automatically.

4. Adapt the transport parameters and transport routes in the Transport Management System (TMS) as follows:
   
   a. Call transaction STMS.
   
   b. To adapt the transport parameters, choose `Overview > Systems <your system> Transport Tool`.
   
   c. To adapt the transport routes, choose `Overview > Transport Routes`.

5. Delete all entries from the following tables: ALCONSEG, ALSYSTEMS, DBSNP, MONI, OSMON, PAHI, SDBAD, SDBAR, SDBAP, SDBAR (transaction SE11).

6. Delete canceled and finished jobs.

   Execute ABAP program RSBTCDEL, marking the field `delete with forced mode`: `Tools > ABAP Workbench > ABAP Editor` (transaction SE38).

7. Adapt all jobs needed in the target system:
   
   a. Copy the old jobs.
   
   b. Modify the new jobs.
   
   c. Delete the old jobs.

8. Check the consistency of the *Temporary Sequential Objects (TemSe)* and spool requests.
Call transaction SP12 or choose ➤ SAP Menu ➤ Tools ➤ CCMS ➤ Print ➤ TemSe Administration ➤ and run report RSP01043. For more information, see SAP Notes 980658 and 484008.

9. Adapt the definition of the printers to meet the new system requirements:
   - Device types and character set definitions
   - Spool servers
   - Output management systems (OMS)

10. Delete entries in table DDLOG for buffer synchronization.

11. Synchronize the buffers as described in SAP Note 36283 and adapt the client information for the logical system.


13. If you have performed a system copy with R3load, you must set up the trusted and trusting RFC relationships again.


15. Check the ABAP Secure Store [page 115].

16. Create new operation modes and remove old ones:
   a. Create new operation modes and instance definitions.
   b. Maintain the time table using the new operation modes.
   c. Delete the old operation modes and old instance definitions.

17. Adapt the operation mode time tables (CCMS): ➤ Administration ➤ CCMS ➤ Configuration ➤ Operation mode calendar ➤ (transaction SM63).

18. Adapt the instances and profiles (CCMS): ➤ Administration ➤ CCMS ➤ Configuration ➤ OP modes/instances ➤ (transaction R204).

19. Define or remove the SAP system users and revise the authorizations of the system users: ➤ Tools ➤ Administration ➤ User maintenance ➤ Users ➤ (transaction SU01).

20. Run transaction SE14 to delete all entries from tables TPFET and TPFHT. These contain information about changes made to the profile of your source system.

   IBM DB2 i: Use the commands CLRPFM R3<SAPSID>DATA/TPFET and CLRPFM R3<SAPSID>DATA/TPFHT.

21. Adapt other CCMS settings (for example, alert thresholds, reorganization parameters of CCMS table MONI) if required.

22. Delete all entries from table TLOCK, which holds the repair requests from your system.

23. Make data archived in the source system (data that does not reside in the database but was moved to a different storage location using SAP Archive Management) accessible in the target system. Adapt the file residence information in the target system. For more information, see the ➤ SAP Online Documentation (SAP Web Application Server ➤ System Administration ➤ Application Data Archiving and Reorganization) ➤.

24. Redefine database actions (backup, update statistics, and so on) if you have used the DBA calendar in the source system (transaction DB13).

25. Check the logon groups and the assignment of the application servers to the logon groups (transaction SMLG). If required, create new logon groups and assign the new application servers to these logon groups.
26. Check the connection to SAPNet – R/3 Frontend (transaction OSS1).
27. Check self-defined external commands (transaction SM69).
28. Check entries of the following tables in all relevant systems:
   - TXCOM (transaction SM54)
   - THOST (transaction SM55)
29. Check the logical system names. For more information, see Preparations [page 36]. If you need to change logical system names in the system that results from the copy, change the logical system names at this time, as described in SAP Notes 103228 and 544509. Follow your corporate naming strategy for logical systems when making this change.
   - BW customers: If you have copied an SAP NetWeaver BW system, see SAP Note 325525.
30. For every client in your SAP system check the detail settings (client role, changes and transports for client-dependent objects, changes for client-independent objects, protection level, restrictions) (transaction SCC4).
31. Check if you can delete clients that are no longer used in the target system (transaction SCC5).
32. Check the contexts and segments of remote application servers for the SAP Monitoring Infrastructure if required (transaction RZ21).
33. Configure the domain controller in the Transport Management System (TMS) by using transaction STMS.
34. Post-processing for customer objects:
   - If customer objects are not original in the new system, modify the corresponding entries in table TADIR.
   - If you encounter problems modifying a customer development class using transaction SMTS or SM31, try using the option Validate (ENTER) instead of the option Save to save your changes.
35. ABAP Program Loads
   The ABAP loads are platform-dependent programs that are generated during runtime and stored in database tables. They are not exported when you use the R3load procedure to copy your SAP system. The ABAP loads are generated in the target system when they are first used. This might, however, reduce production system performance. To avoid this, you can use transaction SGEN to generate the missing loads.
   - Load generation requires a large amount of system resources. Therefore, it makes sense to schedule the generation job to run overnight.
   - For a detailed description of the features, see the online documentation in transaction SGEN by choosing Information on the SAP Load Generator, or in the Job Monitor by choosing Job Monitor.
36. If you changed the database management system (for example, IBM i to MaxDB) when copying the system, you have to start program RS_BW_POST_MIGRATION in the background with variant SAP&POSTMGRDB. If you did not change the database management system when copying the system, you have to start program RS_BW_POST_MIGRATION in the background by using variant SAP&POSTMGR. Program RS_BW_POST_MIGRATION performs necessary modifications on database-specific objects (mainly BW objects).

**Note**

You are required to perform the step independently of whether your target system is an SAP NetWeaver BW system or not.
Relevant for IBM Db2 for Linux, UNIX, and Windows (IBM Db2) version 10.5 and higher only: If you want to implement DB2 BLU Acceleration on your migrated SAP NetWeaver BW system, also follow the instructions in the appendix of the database administration guide SAP Business Warehouse on IBM Db2 for Linux, UNIX, and Windows: Administration Tasks, available at https://help.sap.com/viewer/db6_admin.

Related Information

Checking the ABAP Secure Store [page 115]

8.3.3.1 Checking the ABAP Secure Store

You check the ABAP Secure Store as follows.

Procedure

1. Start transaction SECSTORE.
2. Choose Check Entries and Execute.
3. Filter the result by error messages:
   ○ If you see at least one error message of type SECSTORE 030 ("Incorrect global key for entry ..."), proceed as follows:
      1. Restore a legacy key-file that was used in the source system.
         You can find information about this process in the SAP Library for your release at:

         Table 22:

<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver 7.0</td>
<td><a href="http://help.sap.com/nw70">http://help.sap.com/nw70</a> Application Help</td>
</tr>
<tr>
<td></td>
<td>SAP NetWeaver by Key Capability Security</td>
</tr>
<tr>
<td></td>
<td>System Security System Security for SAP</td>
</tr>
<tr>
<td></td>
<td>NetWeaver AS ABAP Only Secure Storage (ABAP)</td>
</tr>
<tr>
<td></td>
<td>Importing Keys after a System Copy</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including enhancement package 1</td>
<td><a href="http://help.sap.com/nw701">http://help.sap.com/nw701</a> Application Help</td>
</tr>
<tr>
<td></td>
<td>SAP NetWeaver by Key Capability Security</td>
</tr>
<tr>
<td></td>
<td>System Security System Security for SAP</td>
</tr>
<tr>
<td></td>
<td>NetWeaver AS ABAP Only Secure Storage (ABAP)</td>
</tr>
<tr>
<td></td>
<td>Importing Keys after a System Copy</td>
</tr>
</tbody>
</table>
2. Repeat the check.
   ○ If you see at least one error message of type **SECSTORE 031** ("System-dependent data for entry ... changed: ..."), you must perform a record migration. You can find information about this process in **SAP Note 816861**.

### 8.3.4 Checking the Target System

The following actions are suitable for checking the consistency of the target system.

**Procedure**

1. Perform an initial consistency check (transaction SM28).
2. Check the system log on all application servers (transaction SM21). In case of warnings, see **SAP Note 43434**.
3. Check the consistency of the database (transaction DB02).
4. Perform a server check (transaction SM51).
5. Test transactions frequently used by the customer.
6. FI customers: Run the job **SAPF190** (accounting reconciliation) and compare the results to those gained on the source system before the system copy (Financial Accounting > General ledger > Periodic Processing > Closing > Check/count > Comparison).
7. FI customers: Run the jobs **RFUMSV00** (tax on sales/purchases), **RAGITT01** (asset history sheet), **RAZUGA01** (asset acquisitions), and **RAABGA01** (fixed asset retirements) and compare the results to those gained on the source system before the system copy.
8. CO customers: Run the report group **1S1P** and compare the results to those gained on the source system before the system copy.
8.3.5 Replacing the PSEs in the Target System

Replace all existing PSEs in the target systems with new ones, which contain the new system’s information. Proceed as follows:

Procedure

1. In your ABAP system, call transaction STRUT.
2. Proceed as described in the documentation Creating or Replacing a PSE in the SAP Library at: help.sap.com/nw70 SAP NetWeaver 7.0 Library (including Enhancement Package 2) English SAP NetWeaver Library > SAP NetWeaver by Key Capability > Security > System Security > System Security for SAP NetWeaver AS ABAP only > Trust Manager

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Since replacing a PSE will remove all of the previously used certificates, also import all necessary trusted certificates into the new PSE’s certificate list. (Check the old PSE’s certificate list.) Distribute the new PSE’s public-key certificate to the systems where it will be used.</td>
</tr>
<tr>
<td>- Make sure the new PSE contains the new system ID.</td>
</tr>
<tr>
<td>- Note the naming conventions to use for each PSE. The naming conventions are usually specified by the Certification Authority (CA) where you obtain the certificate, however, the type of PSE also has some restrictions, for example, for the SSL server PSE, the CN part of the Distinguished Name must be the host name used to access the server. For the system PSE, we recommend using the SID as the CN part. Therefore, make sure that the Distinguished Name used for the PSE conforms with the naming convention that applies.</td>
</tr>
</tbody>
</table>

8.4 Performing Follow-Up Activities for ABAP

8.5 Performing Follow-Up Activities for Java

Depending on the usage types or software units contained in your target system, you have to perform general and usage type or software unit-specific configuration steps.

Related Information

Usage Type or Software Unit-Specific Follow-Up Activities [page 122]
8.5.1 Activities at Database Level

This section includes the adaptations that you have to make at database level in your target system.

Procedure

Oracle Database only If you have chosen to enable Oracle Database Vault, make sure that you perform the required configuration steps. For more information, see Implementing Oracle Database Vault with the Installer [page 186].

8.6 General Follow-Up Activities

This section contains general follow-up activities for SAP systems based on AS Java.

Note

You can use Java post-copy automation (PCA) to perform general follow-up activities automatically. Java post-copy automation (PCA) provides task lists with a predefined sequence of configuration tasks to configure extensive technical scenarios automatically. For more information, see SAP Note 1807150. To be able to use PCA, you must install the license for SAP Landscape Virtualization Management Enterprise Edition. For more information, see SAP Note 1912110.

Related Information

Configuration Steps for the SAP Java Connector [page 119]
Generating Public-Key Certificates [page 119]
8.6.1 Configuration Steps for the SAP Java Connector

You need to perform these post-installation steps for a copied Java system that includes a component that has to connect to an ABAP back end using the SAP Java Connector (SAP JCo), for example SAP NetWeaver Business Warehouse or SAP NetWeaver Portal.

Procedure

1. Log on to the Visual Administrator as an administrator.
2. On the launch path on the left, choose Cluster ➤ Server <server name> ➤ Services ➤ JCo RFC Provider ➤
3. On the right, choose Runtime and select the RFC destination that you use for the connection to the back end.
4. Maintain the required parameters for the RFC destination and repository.
5. Remove the old JCo-destination that was copied from the source system.
6. Restart the Java server and the component.

8.6.2 Generating Public-Key Certificates

Reconfiguring the Public-Key Certificates

After system copy, the public key certificates are wrong on the target system. You need to reconfigure them as described in the SAP Library for your release at:

Table 23:

<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver Release</td>
<td>Location</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------</td>
</tr>
</tbody>
</table>
Importing the Public-Key Certificates

You also need to import this public-key certificate on any systems that are to accept logon tickets from the AS Java system. For more information, see the SAP Library for your release at:

Table 24:

<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
</table>
8.7 Usage Type or Software Unit-Specific Follow-Up Activities

This section includes the steps that you have to perform for specific usage types or software units.

Related Information

Process Integration (PI) [page 122]
Mobile Infrastructure (MI) [page 131]

8.7.1 Process Integration (PI)

Note

This section is not relevant for SAP NetWeaver 7.0 including EHP3.

This section contains the follow-up activities for usage type PI.

The following changes reflect exactly the regular configuration steps for usage type PI. For more detailed instructions about how to change the values, see the SAP Library for your release at:

Table 25:

<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver 7.0</td>
<td><a href="http://help.sap.com/nw70">http://help.sap.com/nw70</a>  [Configuration and</td>
</tr>
<tr>
<td></td>
<td>Deployment Information]  [Technology Consultant’s Guide]  [Business</td>
</tr>
<tr>
<td></td>
<td>Process Management]  [Configuration of Usage]  [Type Process Integration (PI)]</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP1</td>
<td><a href="http://help.sap.com/nw701">http://help.sap.com/nw701</a> [Configuration and</td>
</tr>
<tr>
<td></td>
<td>Deployment Information]  [Technology Consultant’s Guide]  [Business</td>
</tr>
<tr>
<td></td>
<td>Process Management]  [Configuration of Usage]  [Type Process Integration (PI)]</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP2</td>
<td><a href="http://help.sap.com/nw702">http://help.sap.com/nw702</a> [Configuration and</td>
</tr>
<tr>
<td></td>
<td>Deployment Information]  [Technology Consultant’s Guide]  [Business</td>
</tr>
<tr>
<td></td>
<td>Process Management]  [Configuration of Usage]  [Type Process Integration (PI)]</td>
</tr>
</tbody>
</table>
**Note**

To perform readiness checks, see SAP Note 817920.

---

**Related Information**

- System Landscape Directory [page 123]
- PI: Integration Server [page 123]
- PI: Changes in the Exchange Profile [page 125]
- PI: Refresh Caches [page 127]
- PI: Switching Addresses [page 128]
- PI: Connection Checks [page 131]

---

### 8.7.1 System Landscape Directory

For information on how to perform the following tasks, see the SAP library for your release at:

http://help.sap.com/nw70

The respective sections are stated below.

- **Maintain server settings in the SLD:**
  - Change the value for the object server.
  - For more information, see the section *Configuring Server and Persistence Parameters*.

- **Configure the SLD Bridge:**
  - Change the value for the Gateway server as well as for the Gateway service.
  - For more information, see to the section *Configuring the SLD Bridge*.

---

### 8.7.2 PI: Integration Server

You have to perform some follow-up activities for the PI integration server.

**Procedure**

1. **Maintain the logical system:**
   - Call transaction SCC4 to maintain the logical system information.
2. Maintain the technical system and the business system for the Integration Server:
   In the SLD, maintain a product for the technical system. Create a business system for the Integration Server and maintain the logical system information.

3. Create RFC destinations in the ABAP environment:
   Call transaction SM59, navigate to destination INTEGRATION_DIRECTORY_HMI, and change the value for the target host as well as for the HTTP port number.

4. Maintain RFC destination in the ABAP and Java environment:
   For the following connections, change the value for the Gateway host as well as for the Gateway service on the ABAP side and in the Visual Administrator. In the Visual Administrator, also change the value for the application host name and the system number and the corresponding values in following properties which contain this host name and system number:
   - J2EE_SYSNUMBER
   - J2EE_SYSTEM
   - J2EE_HTTP_PORT
   - BACKEND_SYSTEM
   - BACKEND_SYSNUMBER
   - BACKEND_SID
   - P4PORT

Change the value for the Gateway host, as well as for the Gateway service on the ABAP side, and the value for the PI host in the Visual Administrator for the following connections:

Table 26:

<table>
<thead>
<tr>
<th>Connection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI_RUNTIME_JCOSERVER</td>
<td>Used to connect the ABAP part to the Java part of the Integration Server</td>
</tr>
<tr>
<td>LCRSAPRFC</td>
<td>Used to connect the Integration Server to the SLD.</td>
</tr>
<tr>
<td>SAPSLDAPI</td>
<td></td>
</tr>
</tbody>
</table>

5. Create HTTP destination pmistore in the Java environment:
   Change the value for the host and port number in the destination URL.

6. Maintain the pipeline to the Integration Server:
   Change the pipeline to the Integration Server by running transaction SXMB_ADM.

7. Maintain prefix numbers for Workflow and Organizational Management:
   Call transaction SWF_XI_CUSTOMIZING, select Maintain Definition Environment ➔ Maintain Prefix Numbers ➔ and choose Perform Automatic Workflow Customizing (F9).

8. Refresh host name buffer:
   After you have maintained the required RFC destinations, the host name buffer needs to be reset. Call transaction SM51 and choose Goto ➔ Host Name Buffer ➔ Reset ➔ Entire System ➔
8.7.1.3 PI: Changes in the Exchange Profile

1. Maintain server settings for the exchange profile connection:
   Change the value for the host name as well as for the instance number.

   **Caution**

   It is essential that you change the connection for the following steps of this section. Without adjusting the connection parameters, all changes in this section affect the exchange profile of the source system.

2. Change all parameters pointing to the source system:
   The following parameters contain the host name for the connection of components. All parameters pointing to the source system must be changed to reference the target system.
   For more information about parameters, see the SAP Library for your release at:

   **Table 27:**
<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver 7.0</td>
<td><a href="http://help.sap.com/nw70/Configuration">http://help.sap.com/nw70/Configuration</a> and Deployment Information</td>
</tr>
<tr>
<td></td>
<td>Business Process Management Usage Type Process Integration (PI) Exchange Profile Parameters</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP1</td>
<td><a href="http://help.sap.com/nw701/Configuration">http://help.sap.com/nw701/Configuration</a> and Deployment Information</td>
</tr>
<tr>
<td></td>
<td>Business Process Management Usage Type Process Integration (PI) Exchange Profile Parameters</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP2</td>
<td><a href="http://help.sap.com/nw702/Configuration">http://help.sap.com/nw702/Configuration</a> and Deployment Information</td>
</tr>
<tr>
<td></td>
<td>Business Process Management Usage Type Process Integration (PI) Exchange Profile Parameters</td>
</tr>
</tbody>
</table>

   **Table 28:**
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>com.sap.aii.connect.cr.name</td>
<td>Contains the host name of the component repository server.</td>
</tr>
<tr>
<td>com.sap.aii.connect.cr.httpport</td>
<td>Contains the HTTP port number of the component repository server.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>com.sap.aii.connect.directory.name</td>
<td>Contains the host name of the directory server.</td>
</tr>
<tr>
<td>com.sap.aii.connect.directory.httpport</td>
<td>Contains the HTTP port number of the directory server.</td>
</tr>
<tr>
<td>com.sap.aii.connect.directory.httpsport</td>
<td>Contains the HTTPS port number of the directory server.</td>
</tr>
<tr>
<td>com.sap.aii.connect.directory.rmiport</td>
<td>Contains the RMI port number of the directory server.</td>
</tr>
<tr>
<td>com.sap.aii.connect.integrationserver.name</td>
<td>Contains the host name of the Integration Server.</td>
</tr>
<tr>
<td>com.sap.aii.connect.integrationserver.httpport</td>
<td>Contains the HTTP port of the Java EE Engine of the Integration Server. Used by the XI integration directory to connect to the XI runtime.</td>
</tr>
<tr>
<td>com.sap.aii.connect.integrationserver.httpsport</td>
<td>Contains the HTTPS port of the Java EE Engine of the Integration Server. Used by the XI integration directory to connect to the XI runtime.</td>
</tr>
<tr>
<td>com.sap.aii.connect.integrationserver.r3.sysnr</td>
<td>R3 system number of the SAP NetWeaver Application Server on which the Integration Server runs.</td>
</tr>
<tr>
<td>com.sap.aii.connect.integrationserver.r3.httpport</td>
<td>Contains the HTTP port number of the Integration Server.</td>
</tr>
<tr>
<td>com.sap.aii.connect.landscape.name</td>
<td>Contains the host name of the landscape directory server.</td>
</tr>
<tr>
<td>com.sap.aii.connect.landscape.httpport</td>
<td>Contains the HTTP port number of the landscape directory server.</td>
</tr>
<tr>
<td>com.sap.aii.connect.landscape.httpsport</td>
<td>Contains the HTTPS port number of the landscape directory server.</td>
</tr>
<tr>
<td>com.sap.aii.connect.repository.name</td>
<td>Contains the host name of the repository server.</td>
</tr>
<tr>
<td>com.sap.aii.connect.repository.httpport</td>
<td>Contains the HTTP port number of the repository server.</td>
</tr>
<tr>
<td>com.sap.aii.connect.repository.httpsport</td>
<td>Contains the HTTPS port number of the repository server.</td>
</tr>
<tr>
<td>com.sap.aii.connect.repository.rmiport</td>
<td>Contains the RMI port number of the repository server.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>com.sap.aii.connect.rwb.name</td>
<td>Contains the host name of the Runtime Workbench (RWB).</td>
</tr>
<tr>
<td>com.sap.aii.connect.rwb.r3.sysnr</td>
<td>R3 system number of the SAP NetWeaver Application Server on which the Runtime Workbench runs.</td>
</tr>
<tr>
<td>com.sap.aii.connect.rwb.httpport</td>
<td>Contains the HTTP port number of the Runtime Workbench.</td>
</tr>
<tr>
<td>com.sap.aii.connect.rwb.httpsport</td>
<td>Contains the HTTP port number of the Runtime Workbench.</td>
</tr>
<tr>
<td>com.sap.aii.ib.server.connect.webas.r3.ashost</td>
<td>Connection from Java stack to ABAP stack of the SAP NetWeaver Application Server.</td>
</tr>
<tr>
<td>com.sap.aii.ib.server.connect.webas.r3.sysnr</td>
<td>Connection from Java stack to ABAP stack of the SAP NetWeaver Application Server.</td>
</tr>
<tr>
<td>com.sap.aii.rwb.server.centralmonitoring.r3.ashost</td>
<td>Application server of the SAP NetWeaver Application Server on which the central PMI, the central CCMS, and the central alert server run.</td>
</tr>
<tr>
<td>com.sap.aii.rwb.server.centralmonitoring.r3.sysnr</td>
<td>System number of the SAP NetWeaver Application Server on which the central PMI, the CCMS, and the alert server run.</td>
</tr>
<tr>
<td>com.sap.aii.rwb.server.centralmonitoring.httpport</td>
<td>HTTP port of the SAP NetWeaver Application Server (ABAP part) on which the central PMI, the CCMS, and the alert server run.</td>
</tr>
</tbody>
</table>

### 8.7.1.4 PI: Refresh Caches

1. **Restart the Java engine:**
   To initialize exchange profile caches and SLD caches, restart the Java engine.

2. **Refresh the CPACache:**
   Since the restart of the Java server only leads to a delta cache refresh for the CPACache, a full CPACache refresh must be enforced by executing the following URL:
   \[ \text{http://<host>:<Java-Port>/CPACache/refresh?mode=full} \]

   **Note**
   To call the CPACache refresh URL, you have to enter user **PIDIRUSER** and the corresponding password you entered during the installation.

3. **Refresh the XI Cache:**
   Refresh the XI Cache by running transaction **SXI_CACHE**.
8.71.5  PI: Switching Addresses

The newly installed target integration server resides at a new network address. If you want to reconnect business systems, you have to make address changes at several locations to account for this change.

The following actions are performed automatically:

- Communication from the target integration server to business systems is set due to copying BI content, which contains the communication channels for these business systems.

The following sections contain a detailed description of all necessary manual address changes.

Connecting Business Systems to the SLD of the Target System

Business systems with an integration engine require a connection to the SLD server of the target system to obtain their name from the SLD. The business system name is used in the header of the message sent to the Integration Server. The connection to the SLD is established by creating an RFC destination (as described below) and calling a registered server program, which is defined on the Java EE JRFC engine of the Integration Server. The server program is called with the HTTP address as a parameter that is maintained with transaction SLDAPICUST.

i  Note

For more information about performing the individual tasks, see the configuration information for PI in the SAP Library for your release at:

Table 29:

<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
</table>
1. Use transaction SLDAPICUST in the business system to define the SLD access data. This data consists of the host and port of the SLD as well as a user (PIAPPLUSER) and password. You can use the entries that you maintained on your Integration Server.

2. Change all RFC destinations on your business system. They use the same registered server program, which is defined as part of the JRFC engine settings of the Java engine on the SLD host. This means that all business systems can use the same server program ID (SAPSLDAPI_UNICODE or SAPSLDAPI_NONUNICODE) for their RFC destinations LCRSAPRFC and SAPSLDAPI.

3. You must also change the RFC destinations in:
   - all business systems (enter the new integration server and, if necessary, adjust the roles)
   - all technical adapters
   - file SLDaccessor.properties in directory /tech_adapter/BaseConfiguration

4. Enter the gateways in file etc/services.

5. For Unicode business systems (program ID SAPSLDAPI_UNICODE), the Unicode indicator is set in the JRFC engine settings. For non-Unicode business systems (program ID SAPSLDAPI_NONUNICODE), the Unicode indicator is not set.

### Maintaining System Connections and Destinations

If the host name and port of your Integration Server have changed after the system copy, you have to maintain the destinations and connections if you want to reconnect Integration Engines and adapters. For more information about how to perform the individual tasks, see the configuration information for PI in the SAP Library for your release at:

Table 30:
<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
</table>


The respective sections are stated below.

- **Update the HTTP destinations:**
  Update the HTTP destination that points from the integration engines (business systems) to the PI Integration Server. For more information, see the section *Configuration of Business Systems with an Integration Engine* in the configuration information.

- **Optional: Update the destinations to integration server for receiver preidentification:**
  In the integration engine, update RFC destination `AI_INTEGRATION_SERVER`. For more information, see the section *Configuration of Business Systems with an Integration Engine* in the configuration information.

- **Optional: Update the destinations to integration server for maintenance of value mapping table:**
  In the integration engine, update RFC destination `AI_INTEGRATION_SERVER`. For more information, see the section *Configuration of Business Systems with an Integration Engine* in the configuration information.

- **Reintegrate business systems using the IDoc adapter of the source system:**
  In the sending system, update the RFC destination to the integration server. For more information, see the section *Integration of Business Systems Integration Using the IDoc Adapter* in the configuration information.

- **If you made the configuration settings Maintain Services for the integration server in transaction SICF, make sure these settings are also maintained in the newly installed target system.**

For the following steps, see the *SAP Library* for your release at:

**Table 31:**

<table>
<thead>
<tr>
<th>SAP NetWeaver Release</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver 7.0</td>
<td><a href="http://help.sap.com/nw70">http://help.sap.com/nw70</a> ➤ Application Help ➤ Function-Oriented View &lt;Language&gt; ➤ Process Integration by Key Capability ➤ SAP NetWeaver Exchange Infrastructure ➤ Runtime ➤ Connectivity</td>
</tr>
</tbody>
</table>

| SAP NetWeaver 7.0 including EHP1 | http://help.sap.com/nw701 ➤ Application Help ➤ Function-Oriented View <Language> ➤ Process Integration by Key Capability ➤ SAP NetWeaver Exchange Infrastructure ➤ Runtime ➤ Connectivity |
8.7.1.6 PI: Connection Checks

1. Checks in SLDCHECK:
   Call transaction SLDCHECK on the Integration Server.

2. Checks in SPROXY:
   1. Call transaction SPROXY.
   2. On the Enterprise Services Browser tab page, choose the Information push button
   3. Select Connection to ESR to receive a check list for setting up a connection to the Enterprise Services Repository.

8.7.2 Mobile Infrastructure (MI)

Related Information

MI: Clean Up the Target System [page 132]
8.7.2.1 MI: Clean Up the Target System

Use

After the system copy, the download links for the mobile component's installation files still point from the target system's ABAP server component to the source system's Java EE server component.

Procedure

1. In the SAP NetWeaver Mobile Administrator, navigate to Deployment Configuration.
2. To redeploy all mobile components via the SDM, choose Update deployed SDAs/SCAs that have any version.

8.8 Checking the Database Parameters for IBM Db2 for Linux, UNIX, and Windows

Use

Note

This section is only valid if your database is IBM Db2 for Linux, UNIX, and Windows.

After installation has completed, make sure that you check the parameters of the database configuration and the database manager configuration. A check of the database parameters ensures that your database parameters conform with the latest SAP recommendations where necessary and are adapted to your needs.

Procedure

You can check the parameters of the database in one of the following ways:

- Compare the current parameters of your database with the parameters as they are recommended for SAP systems in the following SAP Notes:

<table>
<thead>
<tr>
<th>Database Version</th>
<th>Corresponding SAP Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM Db2 V9.7</td>
<td>1329179</td>
</tr>
<tr>
<td>Database Version</td>
<td>Corresponding SAP Note</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>IBM Db2 10.1</td>
<td>1692571</td>
</tr>
<tr>
<td>IBM Db2 10.5</td>
<td>1851832</td>
</tr>
<tr>
<td>IBM Db2 11.1</td>
<td>2303771</td>
</tr>
</tbody>
</table>

- Use the DBA Cockpit to compare the current parameters with the standard parameters. In the DBA Cockpit (transaction `DBACOCKPIT`), on the Database tab page, choose **Configuration > Parameter Check**.

**Note**

The parameter check in the DBA Cockpit is available as of SAP Basis 7.00 with enhancement package 2 and support package 6. For more information about the parameter check, see the Database Administration Guide: Database Administration Using the DBA Cockpit – IBM Db2 for Linux, UNIX, and Windows listed in Online Information from SAP [page 196].

### 8.9 Performing Jobhead Correction after Homogeneous System Copy

This topic is only valid for 'Platform': z/OS

**Use**

**Note**

This section is only relevant for customers using CCMS to monitor their SAP systems.

After copying your system, the CCMS jobhead still points to the former database SSID. To complete the homogeneous system copy, the SSID needs to be set to the target system.

**Caution**

Only experienced users should use this utility.
Procedure

To set the SSID to the target system:
1. Call transaction DBACOCKPIT.
2. Choose Configuration Homogeneous System Copy: Jobhead Correction
3. Modify the necessary data.

![Image of DBA Cockpit Configuration Jobhead Correction](image)

**Figure 1: Homogeneous System Copy Jobhead Correction**

This screen allows you to copy all jobheads from D6Y0 to ABCD. By default, the original jobheads of D6Y0 will be removed. You can keep the original jobheads by selecting the check box.

The JCL job card (SAP term: Jobhead) of a JCL job determines for example the user, under which the JCL job is executed, or the message class. JCL jobs are used to LINKEDIT and BIND SAPCL and to retrieve the BACKUP SYSTEM Utility History. DB13 is able to create and upload JCL jobs for RUNSTAS, REORG and COPY.

The jobheads are stored in table DB2JOB and SSID as part of the jobhead key. The key is:

```
JOBNAME=JOBHEAD_<SID>
```

You can edit the jobhead in DBA Cockpit Configuration Job Profile/DBA Cockpit Jobs Jobs Profile.

After performing a system copy (typically the database SSID changes) you need to copy or rename the jobheads to the new database SSID. If you skip this action, a default jobhead is used. The jobheads of the system copy source system are not used.
In case of DB2 data sharing, you need to proceed this action for each data sharing member.

In case, that you do not use functionality which is based on JCL jobs, you can skip this action completely.
9  Additional Information

Related Information

R3load Procedures Using the Migration Monitor [page 136]
Jload Procedures Using the Java Migration Monitor [page 163]
Analysis of the Export and Import Times [page 170]
Table Comparison with Software Update Manager [page 170]
Using the Package Splitter [page 174]
Package and Table Splitting for Java Tables [page 180]
Database Instance Installation on Oracle Automatic Storage Management [page 190]
Additional Information about the OraBRCopy Tool [page 191]
Online Information from SAP [page 196]

9.1  R3load Procedures Using the Migration Monitor

Related Information

About the Migration Monitor [page 137]
Configuration [page 138]
Assigning DDL Files to Packages [page 151]
Defining Groups of Packages [page 152]
Processing Split Tables [page 152]
Starting the Migration Monitor [page 154]
Using the migmonCtrl Add-On for the Export [page 159]
Output Files [page 160]
Installing the Target System Using the Migration Monitor [page 161]
9.1.1 About the Migration Monitor

This section lists the functions and features of the Migration Monitor.

Purpose

The Migration Monitor does the following:

- Creates R3load command files
- Creates R3load task files if required
- Starts R3load processes to unload the data
- Transfers packages from source to target host if required
- Starts R3load processes to load data as soon as a package is available
- Informs the person performing the system copy in the event of errors

The Migration Monitor is integrated in the Software Provisioning Manager (the “installer” for short), but it is also possible to start the Migration Monitor manually with the corresponding option in the software provisioning manager. To do this, you require a properties file.

⚠️ Caution

For all SAP systems based on SAP NetWeaver 7.0 and higher, you can use the socket option without restrictions.

For more information about how to start the Migration Monitor manually, see Starting the Migration Monitor [page 154].

When you start the Migration Monitor manually:

- You can adjust any parameters according to the Migration Monitor User’s Guide user guide
- You gain flexibility – for example, you can repeat, test and abort runs of the Migration Monitor
- The process becomes more complex since it requires many additional manual activities
- The properties file has to be created manually

👉 Recommendation

Reuse an existing properties file from previous runs of software provisioning manager as template

Tool

The tool is located in the MIGMON.SAR SAPCAR archive. The archive file contains the following:

- Scripts:
  - export_monitor.sh / export_monitor.bat
  - import_monitor.sh / import_monitor.bat

System Copy for SAP Systems Based on the Application Server Dual-Stack (ABAP+Java) of SAP NetWeaver 7.0 to 7.03 on UNIX

Additional Information
Prerequisites

The correct directory structure for R3load dump files must exist on both the source and target hosts.

9.1.2 Configuration

The following options can be specified using the property file or using the command line. Command line parameters take precedence over parameters specified in the property file. Options are case-sensitive, that is, options that are not recognized are ignored.

Help

With the following command line options, the tool displays all parameters available: -help, -?

Version

With the following command line option, the tool displays version information: -version
## General Options

**Table 33: General Options**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>monitorTimeout</td>
<td>Monitor timeout in seconds</td>
<td>During a timeout, the monitor thread sleeps and does not analyze any files or analyze its processing state. The default timeout value is 30 seconds.</td>
</tr>
</tbody>
</table>

**Table 34: E-Mail Options**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>mailServer</td>
<td>SMTP server</td>
<td>Server name or IP address of the company SMTP server</td>
</tr>
<tr>
<td>mailFrom</td>
<td>“From” e-mail address</td>
<td>-</td>
</tr>
<tr>
<td>mailTo</td>
<td>“To” e-mail address</td>
<td>Can contain an address list separated by “;” or blanks.</td>
</tr>
</tbody>
</table>

**Table 35: Additional Options**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Name</th>
</tr>
</thead>
</table>
| bg   | Enables background mode | **Takes effect only as command line option**  
If the tool is running in background mode, the UNIX shell windows or Windows command prompt can be closed after startup. |
| secure | Enables secure mode | **Takes effect only as command line option**  
If the tool is running in secure mode, command line parameters (for example, passwords) are hidden for Java processes. Secure mode implicitly enables background mode. |
| trace | Trace level | Possible values:  
all, off, 1 (error), 2 (warning), 3 (info), 4 (config, default), 5, 6, 7 (trace) |

---

*Note*  
Use this mode if you have to specify passwords on the command line.
# Export Monitor – Options

Table 36: Export Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>installDir</td>
<td>Installation directory</td>
<td>Directory where the installation tool (software provisioning manager 1.0, R3SETUP) is started. If you run the Migration Monitor without using the installation tools, the installation directory is the directory where the R3load TSK and log files are written.</td>
</tr>
<tr>
<td>exportDirs</td>
<td>List of export directories</td>
<td>Separator on Windows: &quot;:&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Separator on UNIX, IBM i: &quot;::&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The exportDirs parameter points to the directory where the R3load dump files are written. In the exportDirs directory, the subdirectories DATA, DB, and DB/&lt;TARGET_DBTYPE&gt; (for example, DB/ORA must exist.</td>
</tr>
<tr>
<td>client</td>
<td>Client operating mode</td>
<td>Running in client mode means that the Migration Monitor runs parallel to standard installer export process and transfers the exported dump files to the import server.</td>
</tr>
<tr>
<td>server</td>
<td>Server operating mode</td>
<td>Running in server mode means that the Migration Monitor creates R3load TSK files (if necessary), R3load cmd files, and starts the R3load processes.</td>
</tr>
</tbody>
</table>

All options below are for **server mode**. The import monitor always runs in server mode. If you want to run the export monitor in server mode, specify the `server` parameter in the properties file of the export monitor.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>orderBy</td>
<td>Package order</td>
<td>Can be the name or path of the file that contains package names. If the option value is omitted, package order is not determined.</td>
</tr>
<tr>
<td>ddlFile</td>
<td>DDL control file</td>
<td>Path or filename of DDL control file</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The default is DDL&lt;DBTYPE&gt;.TPL.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If the filename is used without a path, the DDL control file from the export DB subdirectory is used.</td>
</tr>
<tr>
<td>ddlMap</td>
<td>DDL mapping file</td>
<td>File with mapping between DDL files and package names</td>
</tr>
<tr>
<td>r3loadExe</td>
<td>Path of the R3load executable</td>
<td>Optional; default is R3load. If only the name of the R3load executable is available, the JVM looks for the R3load executable using operating system-specific process search rules.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
<td>Comment</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>tskFiles</td>
<td>yes to create files; no to skip</td>
<td>Up to and including version 4.6, this must be set to no; as of version 4.7 set to yes. If the R3load task files * . TSK already exist, the monitor does not overwrite them.</td>
</tr>
<tr>
<td>dataCodepage</td>
<td>Code page for data files</td>
<td>See SAP Note 552464. Possible values: 4102, 4103, 1100</td>
</tr>
<tr>
<td>taskArgs</td>
<td>Additional R3load arguments for the TASK phase</td>
<td>Appended to the R3load command line Options already set by the monitor: -ctf; -l</td>
</tr>
<tr>
<td>loadArgs</td>
<td>Additional R3load arguments for the LOAD phase</td>
<td>Appended to the R3load command line. Options already set by the monitor: -e; -datacodepage; -l; -p; -r; -socket (if the socket option is specified); -c (if the omit argument is specified and task files are not used, that is, the value of the tskFiles option is no).</td>
</tr>
<tr>
<td>jobNum</td>
<td>Number of parallel export jobs, default: 1</td>
<td>Any positive number The value can be changed dynamically at runtime.</td>
</tr>
<tr>
<td>decluster</td>
<td>Default value is false</td>
<td>Possible values: true or false If this option is true, the Migration Monitor calls R3load with option -decluster.</td>
</tr>
<tr>
<td>firstExportSAPNTAB</td>
<td>Default value is false</td>
<td>Possible values: true or false If this option is true, the Migration Monitor first exports the SAPNTAB package in single thread mode.</td>
</tr>
<tr>
<td>onlyProcessOrderBy</td>
<td>If set to true only the jobs from file configured with orderBy are processed.</td>
<td></td>
</tr>
</tbody>
</table>

Table 37: Network Exchange Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>net</td>
<td>Network operating mode</td>
<td>Exported dump files must be visible on the import host to use this mode.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
<td>Comment</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>netExchangeDir</td>
<td>Network exchange directory</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Caution</strong></td>
</tr>
<tr>
<td></td>
<td>Clean up the netExchangeDir before starting a new export.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Used for communication between the export and import monitors. Must be writable for the export monitor and readable for the import monitor. The export monitor writes a <code>&lt;Package&gt;.SGN</code> file to the network exchange directory as a signal to the import monitor that the package has been exported successfully and that the import can be started.</td>
<td></td>
</tr>
</tbody>
</table>

Table 38: FTP Exchange Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ftp</td>
<td>FTP operating mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exported dump files are transferred automatically from the source host (directory <code>exportDirs</code>) to the target host (directory <code>importDirs</code>) using FTP.</td>
<td></td>
</tr>
<tr>
<td>ftpHost</td>
<td>Remote FTP host</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Name or IP address of the import server.</td>
<td></td>
</tr>
<tr>
<td>ftpUser</td>
<td>Name of the remote FTP user</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The FTP user specified here should be <code>&lt;sapsid&gt;adm</code> to make sure that the package files can be read during the import (which is started as <code>&lt;sapsid&gt;adm</code>).</td>
<td></td>
</tr>
<tr>
<td>ftpPassword</td>
<td>Password of the remote FTP user</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Caution</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Security risk.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For more information, see the <code>secure</code> parameter in section Additional Options.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 39: Export Socket Host

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>socket</td>
<td>Socket operating mode</td>
<td>R3load does not write dump files to the file system but the export and import work through the socket connection.</td>
</tr>
<tr>
<td>host</td>
<td>Remote import host</td>
<td>Name or IP address of the import host.</td>
</tr>
<tr>
<td>port</td>
<td>Host port number</td>
<td>Must be the same as the port number on the import host. Any free port on the import host from 1024 to 65535.</td>
</tr>
</tbody>
</table>

### Table 40: FTP Copy Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ftpCopy</td>
<td>FTP copy operating mode</td>
<td>Used as a separate program call for migration with sockets if no share directory is used. All files produced by R31ct1 and R3szchk are transferred from the source to the target host using FTP.</td>
</tr>
</tbody>
</table>
### Export Options for the “migmonCtrl” Add-On

The migmonCtrl add-on was developed to improve the performance of the export by offering new export strategies.

These are the following:

- **“export by size”**
  - The *.EXT files are used.
- **“export by runtime”**

The information is taken from the migration time analyzer output file `export_time.txt`. If you also did an import already, you can add the `import_time.txt` file as well. The additional options are added to the `export_monitor_cmd.properties` file.

#### Table 41:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>migmonCtrl</td>
<td>Enabling the add-on</td>
<td>-</td>
</tr>
</tbody>
</table>

Any other option is ignored by the export monitor.
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>orderBy</td>
<td>File with package order</td>
<td>If <code>migmonCtrl</code> is set, the file is created dynamically. It still has the same format as the <code>order_by</code> file, which you can create manually. If it is created by the add-on, the file has two groups called <code>LARGE</code> and <code>SMALL</code>. Depending on the sort order (size or runtime), the packages are listed from biggest/longest to smallest/shortest in group <code>LARGE</code> and from smallest to biggest in group <code>SMALL</code>. Therefore the biggest and smallest packages are exported together. This ensures that the biggest tables are exported right from the beginning but also that input is provided to the import side by exporting the smallest table.</td>
</tr>
<tr>
<td>jobNumLarge</td>
<td>Amount of jobs set in group <code>LARGE</code></td>
<td>The number can be changed during runtime.</td>
</tr>
<tr>
<td>jobNumSmall</td>
<td>Amount of jobs set in group <code>SMALL</code></td>
<td>The number can be changed during runtime.</td>
</tr>
<tr>
<td>customSortOrderFile</td>
<td>-</td>
<td>If certain jobs need to be exported right from the start, they can be configured in this file.</td>
</tr>
<tr>
<td>extFileDir</td>
<td>Absolute path of <code>EXT</code> files generated by <code>R3szchk</code></td>
<td>Mandatory if the export is to be sorted by size</td>
</tr>
</tbody>
</table>

Table 42: Export by Size

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>exportTimeFile</td>
<td>Absolute path of file <code>export_time.txt</code> created by <code>migtime.jar</code></td>
<td>Mandatory if the export is to be sorted by runtime</td>
</tr>
</tbody>
</table>

Table 43: Export by Runtime
### Package Filter Files

With package filter files you can distribute the export over several servers. To use this feature you have to create the filter files first. This requires a separate run of the migration monitor. For this you can temporarily add the following options to the `export_monitor_cmd.properties` file or simply add them to the command line.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>createPackageFilter</code></td>
<td>Needs to be set to create package filter files.</td>
<td></td>
</tr>
<tr>
<td><code>excludePackage</code></td>
<td>Comma separated string</td>
<td>Packages that must not be included in the filter file</td>
</tr>
<tr>
<td><code>outputFile</code></td>
<td><code>package_list_%hostName%.txt</code></td>
<td>Location and name of result files</td>
</tr>
<tr>
<td><code>hostNames</code></td>
<td>Comma separated string</td>
<td>The names are only used for the file name: <code>&lt;outputFile&gt;_&lt;hostName&gt;.txt</code></td>
</tr>
</tbody>
</table>
### Mandatory Options for the Export Monitor

- **Client mode:**
  
  ```
  installDir, exportDirs, one of the options ftp, net (and their related parameters)
  ```

- **Server mode:**
  
  ```
  installDir, exportDirs, tskFiles, one of the options ftp, net, socket (and their related parameters)
  ```

- **FTP copy:**
  
  ```
  exportDirs, ftpHost, ftpUser, ftpExportDirs, ftpExchangeDir
  ```

**Note**

The value of the `dbType` option is determined automatically in the shell script or batch files from the `dbms_type` environment variable.

### Import Monitor – Options

**Table 46: Import Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>installDir</code></td>
<td>Installation directory</td>
<td>The installation directory is the directory in which the installation tools (software provisioning manager 1.0, R3SETUP) are started. When you run the Migration Monitor without using the installation tools, the installation directory is the directory where the <code>R3load TSK</code> and log files are created.</td>
</tr>
</tbody>
</table>

*System Copy for SAP Systems Based on the Application Server Dual-Stack (ABAP+Java) of SAP NetWeaver 7.0 to 7.03 on UNIX*

*Additional Information*
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
</table>
| importDirs | List of import directories   | Separator on Windows: “;”  
Separator on UNIX, IBM i: “:”  
The importDirs parameter points to the directory where the R3load dump files are written. In the importDirs directory, the subdirectories DATA, DB, and DB/<TARGET_DBTYPE> (for example, DB/ORA) must exist. |
| orderBy    | Package order                | This option is used only if the import monitor works without the export monitor in standalone mode, that is, all export dump files are available on the import host before the import monitor is started.  
Values can be:  
- name: Load packages in alphabetical order  
- size: Load packages starting with the largest one or a path of the file that contains the package names  
If the option is omitted then the package order is not defined. |
| ddlFile    | DDL control file             | Path or file name of DDL control file  
The default is DDL<DBTYPE>.TPL. If the file name is used without path, the DDL control file from the export DB subdirectory is used. |
| ddlMap     | DDL mapping file             | File with mapping between DDL files and package names |
| r3loadExe  | Path of the R3load executable | Optional; default is R3load.  
If only the name of the R3load executable is available, the JVM looks for the R3load executable using operating system-specific search rules for the process. |
| tskFiles   | yes to create task files; no to skip | Before version 4.6, this must be set to no.  
Starting from version 4.7, it must be set to yes.  
If the R3load task files *.TSK already exist, the monitor does not overwrite them. |
| extFiles   | yes to include EXT files; no to skip them | Add EXT file entries to cmd files.  
If the EXT files cannot be found in the DB/<TARGET_DBTYPE> import dump subdirectory, the package processing is aborted. |
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>dbCodepage</td>
<td>Database code page for the target database</td>
<td>See SAP Note <a href="https://support.sap.com">552464</a>. Possible values are: 4102, 4103, 1100</td>
</tr>
<tr>
<td>migrationKey</td>
<td>Migration key</td>
<td></td>
</tr>
<tr>
<td>omit</td>
<td>R3load omit value</td>
<td>Can contain only DTPIV letters.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-o D: omit data; do not load data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-o T: omit tables; do not create tables</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-o P: omit primary keys; do not create primary keys</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-o I: omit indexes; do not create indexes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-o V: omit views; do not create views</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If you want to combine several omit options, list these options without blank (for example, -o TV).</td>
</tr>
<tr>
<td>taskArgs</td>
<td>Additional R3load arguments for the TASK phase</td>
<td>Appended to the R3load command line</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The following options are already set by the monitor:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-ctf; -l; -o (if the omit argument is specified).</td>
</tr>
<tr>
<td>loadArgs</td>
<td>Additional R3load arguments for the LOAD phase</td>
<td>Appended to the R3load command line</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The following options are already used by the monitor:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-i; -dbcodepage; -l; -p; -k; -r; -socket (if the socket option is specified);</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-o (if the omit argument is specified and task files are not used, that is, the value of tskFiles option is no).</td>
</tr>
<tr>
<td>jobNum</td>
<td>Number of parallel import jobs; the default is 1.</td>
<td>Any positive number; 0 for an unlimited number of jobs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You can change the value dynamically at runtime.</td>
</tr>
<tr>
<td>decluster (use this option only for target dbType = HDB)</td>
<td>false</td>
<td>Possible values: true or false</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If this option is true – migmon calls R3load with option – decluster.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
<td>Comment</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-------------</td>
<td>---------</td>
</tr>
<tr>
<td>ignorePackageSizeCalculation</td>
<td>Default is false</td>
<td>Possible values: true or false</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use this option if you see performance issue in the time before starting the first import jobs. The first task of the Migration Monitor is to collect all packages that are mentioned in the table line for the importDirs parameter. In this first step, called CollectPackages, the Migration Monitor also calculates the package size. If the packages are spread over many mounted locations this can take some time. To improve the performance of the CollectPackages step, set this option to true. Later the packages are imported without following “size ordering” of packages. Use this option only if there is a big delay during the start of the first import jobs.</td>
</tr>
<tr>
<td>collectLogicalPackages</td>
<td>Default is false</td>
<td>Possible values: true or false Import Migration Monitor is extended with this option for processing “logical” packages. To one standard package corresponds either one STR or one WHR file (for example, SAPAPPL1.STR, REPOSRC-1.WHR). To one “logical” package corresponds either one STR.logical or one WHR.logical file (for example SAPCLU4.STR.logical, SAPCDCLS-1.WHR.logical). The logical packages are located in the same directory where the standard packages are located, for example importDirs/ABAP/DATA. Set this option to true if an import is running on SAP HANA database (HDB) and an export was run with the decluster=true option.</td>
</tr>
</tbody>
</table>

Table 47: Import Exchange Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>exchangeDir</td>
<td>Exchange directory</td>
<td>If this option is not set, the monitor runs in standalone mode, that is, without the export monitor. All the export dump files or the SAP export media from the installation kit must be available on the import host and be specified with the importDirs parameter (for example, in the properties file). If there is an old export_statistics.properties file (for example, from a previous export run), remove this file.</td>
</tr>
</tbody>
</table>
Table 48: Import Socket Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>socket</td>
<td>Socket operating mode</td>
<td>-</td>
</tr>
<tr>
<td>port</td>
<td>Server port number</td>
<td>Any free port from 1024 to 65535.</td>
</tr>
</tbody>
</table>

Any other option is ignored by the import monitor.

Mandatory Options for Import Monitor

- Server mode (default):
  `installDir, importDirs, tskFiles, extFiles, one of the options exchangeDir or socket (and their related parameters)`
- Standalone mode:
  `installDir, importDirs, tskFiles, extFiles`
- IBM i-specific:
  `loadArgs= -nojournal`

**Note**
The value of the `dbType` option is determined automatically in the shell script or batch files from the `dbms_type` environment variable.

9.1.3 Assigning DDL Files to Packages

**Use**

It is possible to use several different `DDL*.TPL` templates during the export or import. The assignment of a specific DDL file to a single package is done within a simple text file, which then has to be specified using the `ddlMap` option within the properties file of the Migration Monitor. Packages not listed in the DDL mapping file use the default DDL control file.

**Example**

DDL Mapping File

```plaintext
# DDL mapping file ddl_mapping.txt
# !!! line with [GROUP_NAME] can be skipped
# used for documentation purposes only [SORTED UNLOAD]
DDL file for sorted unload ddlFile = /export_dump/ABAP/DB/ORA/DDLORA.TPL
# package names SAPAPP0 SAPAPP1 SAPSDIC [UNSORTED UNLOAD] DDL file for unsorted unload ddlFile = ./
DDLORA_LRG.TPL # table names TABLE_A TABLE_B TABLE_C
```
9.1.4 Defining Groups of Packages

Use

The “package group” feature is an enhancement to defining a package order. By defining groups, you can for example prevent certain packages being executed in parallel and you can define how many large tables are exported or imported at the same time. In addition, you can specify different values for the parameters jobNum and taskArgs or loadArgs for each package. Package groups can be defined in the same text file in which the package order can be defined (see parameter orderBy). The previous package order format is also fully supported.

A group starts with any arbitrary name in brackets and ends when the next group starts.

If package groups are defined, the maximum number of parallel R3load jobs is the sum of jobNum of all packages. All packages without a package group will be assigned to a “default group” with the number of jobs that was defined in the properties file of the Migration Monitor.

⚠️ Caution

Package groups defined with the orderBy parameter ignore the SAPVIEW and SAP0000 packages.

Example

Package Order File with Group

```
# custom package order # package names SAPAPPL0 SAPAPPL1 SAPAPPL2 # package group [ SEQUENTIAL GROUP ] jobNum = 1 # table names TABLE_A TABLE_B TABLE_C
```

9.1.5 Processing Split Tables

If tables have been split during the export, ensure before the import starts that the table exists (only once) and that the primary key and the indexes are created (only once) before or after (as defined in the DDL template) the table data has been imported. These tasks are automatically synchronized by the Migration Monitor.

Context

WHR files are part of the package and have to be copied to the DATA export subdirectory to make sure that the same WHR file is used for the export and import of the corresponding package.

The following database platforms do not support parallel data import:

- IBM Db2 for Linux, UNIX, and Windows

You can ensure this by using the Defining Groups of Packages [page 152] feature.
Example

The target database does not support parallel data import. This example is valid for all database platforms:

During the export you have split the table `MY_FIRST_TABLE` into 3 packages and `MY_SECOND_TABLE` into 5 packages. Now you want to run a maximum of 10 R3load processes for parallel data import.

Create the file `inputFile.txt` with the following content:

```plaintext
[ MY_FIRST_TABLE ]
jobNum = 1
MY_FIRST_TABLE-1
MY_FIRST_TABLE-2
MY_FIRST_TABLE-3

[ MY_SECOND_TABLE ]
jobNum = 1
MY_SECOND_TABLE-1
MY_SECOND_TABLE-2
MY_SECOND_TABLE-3
MY_SECOND_TABLE-4
MY_SECOND_TABLE-5
```

In this file, you can also define the processing order of packages or you can assign DDL files to packages.

The `inputFile.txt` file has to be specified as a value for the Migration Monitor parameter `orderBy`.

An R3load job is started for every group (`MY_FIRST_TABLE` and `MY_SECOND_TABLE`). The number of parallel R3load jobs is the total of the number of R3load jobs of each group plus the number of R3load jobs defined for the default group (which is made up of all packages without an explicit group name) defined by the parameter `jobNum`.

In this example, the parameter `jobNum` in the `import_monitor_cmd.properties` file has to be set to 8 to ensure that no more than 10 R3load processes run in parallel.

Procedure

Re-Starting the Import of a Split Table Package

If the import of a package fails, the rows that belong to this package have to be deleted using the `WHERE` condition assigned to this package before the data import is started again. The deletion with a `WHERE` clause can be very time-consuming. Therefore, it is faster to delete all rows of the corresponding table manually and re-import all packages instead.

Only if the number of failed packages is low and a lot of the packages for this table have completed successfully, it might be faster to perform the automatic restart which includes the execution of a `DELETE` with `WHERE` for each failed package.
The following steps describe the procedure in detail:

1. Identify the reason for the failure of the import of the packages.
2. Manually delete all rows of the table for which the import of one or more packages failed.
3. Remove the TSK files of all packages that import data into this table (\textit{\textless \textit{table name}\textgreater \_TPI.TSK}). Do not remove the TSK files that create either the table or the indexes for this table.
4. Adapt the file \texttt{import\_state.properties} in the installation directory. Replace the status “+” of all packages for the corresponding table that had been imported successfully and has to be re-imported by “0”.
   For more information, see \textit{Restarting R3load Processes [page 68]}.
5. Restart the import.

### 9.1.6 Starting the Migration Monitor

#### Use

The Migration Monitor has to be started on the \textbf{source database host} (export monitor) and on the \textbf{target database host} (import monitor).

You can start it using one of the following methods:

- The UNIX shell scripts \texttt{export\_monitor.sh} / \texttt{import\_monitor.sh}
- The Windows batch files \texttt{export\_monitor.bat} / \texttt{import\_monitor.bat}
- As part of the export / import procedure of \textit{software provisioning manager 1.0}

You can specify options in the command line or in the export or import property files, as described in \textit{Configuration [page 138]}. The names of the property files are \texttt{export\_monitor\_cmd.properties} and \texttt{import\_monitor\_cmd.properties}. Templates for these files are included in the application archive and must be located in the current user’s working directory.

Any options specified in the command line take precedence over the corresponding options in the application property file. Options are case-sensitive, that is, options that are not recognized are ignored.

#### Prerequisites

- Make sure that the export dump directory and its subdirectory exist as described in the following table:

<table>
<thead>
<tr>
<th>Directory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{&lt;export dump dir&gt;/DATA}</td>
<td>Contains the STR files generated by R3ldctl</td>
</tr>
<tr>
<td>\texttt{&lt;export dump dir&gt;/DB}</td>
<td>Contains the DDL&lt;DBTYPE&gt;.TPL files generated by R3ldctl</td>
</tr>
</tbody>
</table>
### Directory

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;export dump dir&gt;/DB/&lt;DBTYPE&gt;</td>
</tr>
<tr>
<td>Contains the EXT files generated by R3szchk (optional)</td>
</tr>
</tbody>
</table>

- Make sure that the export dump directory can be accessed from the target host, either using a shared directory (local to the export host) or by using Migration Monitor’s FTP feature.

## Procedure

1. **Start the tool in one of the following ways:**
   - Use the following commands depending on your operating system:
     - UNIX shell scripts
       - export_monitor.sh / import_monitor.sh
     - Windows batch files
       - export_monitor.bat / import_monitor.bat
     - IBM i-specific
       1. Set the environment variable `PASE_THREAD_ATTACH` to “Y” using:
          ```bash
          ADDENVVAR PASE_THREAD_ATTACH 'Y'
          ```
       2. Run the command:
          ```bash
          CALL QP2TERM
          ```
       3. ./export_monitor.sh ./import_monitor.sh
   - Automatically as part of the installer export and import procedure
   - Manually within the installer:
     1. On the Parameter Mode Default Settings installer screen, choose Custom.
     2. On the SAP System Export for Target System screen, select Start Migration Monitor Manually.
     3. The installer stops and asks you to start the Migration Monitor manually and to continue with the installer as soon as the Migration Monitor has finished successfully.

### Note

If you use FTP access and security is required, start the Migration Monitor in secure mode to prevent seeing the FTP password in the command line parameter string or in the property file (for example, on UNIX or IBM i: ./export_monitor_secure.sh -ftpPassword <password>).

For more information about FTP, see [FTP Exchange Options](#) and [FTP Copy Options](#) in Configuration [page 138](#).

2. **Close the shell window or command processor.** The monitor process runs in the background.
3. **Specify options as required in one of the following ways:**
   - In the command line:
     Specify the option in the format: `-optionName optionValue`
   - In the application property file:
     Add an option as a new line in the format: `optionName=optionValue`
Example

Command line for UNIX or IBM i:

./export_monitor.sh –ftp
./export_monitor.sh –ftpCopy
./export_monitor.sh –socket –host <import_server> –port 5000

Example

Command line for Windows cmd.exe:

export_monitor.bat –net
export_monitor.bat –socket

4. Use monitor*.log and *.console.log files to check the monitor processing state.

Example

export_monitor_cmd.properties file with export options:

# Export Monitor options
# Operating mode: ftp | net
#net
ftp
#
# Common options
#
# List of export directories, separator on Windows ; on UNIX,IBM i:
exportDirs=C:\TEMP\export_dump
# SAPinst start directory
installDir=C:\install\start
# Monitor timeout in seconds
monitorTimeout=30
#
# FTP options
#
# Remote FTP host
ftpHost=server
# Name of remote FTP user
ftpUser=sysadm
# Password of remote FTP user
ftpPassword=password
# List of remote FTP directories for export dump, separator : or ;
ftpExportDirs=/install_dir/export_dump
# Remote FTP exchange directory
ftpExchangeDir=/install_dir/exchange
# Number of parallel FTP jobs
ftpJobNum=3
#
# E-mail options
#
# SMTP server
mailServer=sap-ag.de
# "From" email address
mailFrom@mail@sap.com
# "To" email address
mailTo@mail@sap.com mail@yahoo.com

Example

import_monitor_cmd.properties file with import options:

# Import Monitor options
#
# Common options
#
# List of import directories, separator on Windows ; on UNIX,IBM i:
importDirs=/install_dir/export_dump
# SAPinst start directory
installDir=/install_dir/start
# Exchange directory
exchangeDir=/install_dir/exchange
# Generation of task files: yes | no
tskFiles=yes
# Inclusion of extent files: yes | no
extFiles=yes

# Monitor timeout in seconds
monitorTimeout=30

# R3load options

# DB code page for the target database
dbCodepage=1100

# Migration key
migrationKey=

# Additional R3load arguments for TASK phase
taskArgs=

# Additional R3load arguments for LOAD phase
loadArgs=

# Number of parallel import jobs
jobNum=3

# E-mail options

# SMTP server
mailServer=sap-ag.de

# "From" email address
mailFrom@mail@sap.com

# "To" email address
mailTo@mail@sap.com mail@yahoo.com

---

**Processing Steps of a System Copy (Oracle only)**

With the settings in the property file listed in the examples above and an Oracle database as source and target database, the following prerequisites must be fulfilled. In our example, the export host is a Windows host and the import host is a UNIX host:

- The following directories must exist on the **export host** (parameter: exportDirs):
  - `c:\temp\export_dump\ABAP\DATA`
  - `c:\temp\export_dump\ABAP\DB`
  - `c:\temp\export_dump\ABAP\DB\ORA`
The c:\temp\export_dump\ABAP\DATA directory must contain the STR files generated by R3ldctl.
The c:\temp\export_dump\ABAP\DB directory must contain the DDL<DBTYPE>.TPL files generated by R3ldctl.
The c:\temp\export_dump\ABAP\DB\ORA directory must contain the EXT files generated by R3szchk.

- The following directories must exist on the import host (parameter: importDirs):
  - /install_dir/export_dump/ABAP/DATA
  - /install_dir/export_dump/ABAP/DB
  - /install_dir/export_dump/ABAP/DB/ORA

The following steps are performed during a system copy:

1. The export monitor writes the R3load dump files and the TOC files to the directory c:\temp\export_dump\ABAP\DATA.
2. The R3load log files, cmd files, and TSK files (if required) are located in the directory c:\<install_dir>\start (installDir parameter). The export itself is not done by the export monitor, as the monitor is running in client mode (server parameter is not set).
3. When a package has been exported successfully, the export monitor transfers all files belonging to that package (TOC, STR, EXT, 001, and so on) to the target host (ftpHost parameter) to the corresponding subdirectories of the directory /<install_dir>/export_dump (ftpExportDirs parameter) as user <sapsid>adm (ftpUser parameter) with password (ftpPassword parameter).
4. When the package files have been completely transferred to the server, the export monitor writes a <package>.SGN signal file to the /<install_dir>/exchange directory (ftpExchangeDir parameter) to notify the import monitor that it can start importing this package.
5. The import monitor starts to import a package as soon as the <package>.SGN file is found in the /<install_dir>/exchange (exchangeDir parameter) directory.
6. The R3load log files, cmd files, and TSK files (if required) are located in the directory /<install_dir>/start (installDir parameter).
7. The DDLORA.TPL file must be copied to the /<install_dir>/start directory (installDir parameter) before you start the import monitor.

### 9.1.7 Using the “migmonCtrl” Add-On for the Export

The add-on can be activated by starting the Migration Monitor with the following scripts and programs:

- The UNIX shell scripts dyn_control_export_monitor.sh
- As part of the export procedure of the software provisioning manager

UNIX – example for the export_monitor_cmd.properties file using sort by size:

```
system Copy for SAP Systems Based on the Application Server Dual-Stack (ABAP+Java) of
SAP NetWeaver 7.0 to 7.03 on UNIX
```

```
system Copy for SAP Systems Based on the Application Server Dual-Stack (ABAP+Java) of
SAP NetWeaver 7.0 to 7.03 on UNIX
```
Example for a command line call to create package filter files:

```
./dyn_control_export_monitor.sh -createPackageFilter -outputFile package_list_%hostName%.txt -hostNames plx101,plx110
```

UNIX – example for an `export_monitor_cmd.properties` file when using a package filter and parallel export/import:

```
server
dbType=ORA
exportDirs=/sapdb/exportDvD_741/ABAP
installDir=/home/emroot/
export_plx110
orderBy=/home/emroot/export_plx110/order_by.txt
ddlFile=DDLORA_LRG.TPL
r3loadExe=/usr/sap/QO1/D01/exe/R3load
tskFiles=yes
dataCodepage=4103
jobNum=10
monitorTimeout=10
loadArgs=-continue_on_error
trace=all
dcluster=true
migmonCtrl
jobNumLarge=10
jobNumSmall=10
extFileDir=/sapdb/exportDvD_741/ABAP
packageFilter=/sapdb/exportDvD_741/ABAP/DB/HDB/package_filter_plx110.txt
onlyProcessOrderBy=true
importTop=5
importTimeFile=./import_time.txt
```

9.1.8 Output Files

**Export**
- `export_monitor.log`
- `export_state.properties`
- `ExportMonitor.console.log`

**Import**
- `import_monitor.log`
- `import_state.properties`
- `ImportMonitor.console.log`

migmonCtrl add-on
Both the export and import state files contain package state lines such as `SAPUSER=+`.

The format of state lines is `<PACKAGE>=<STATE>`. Possible values for state are listed in the following table:

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Package export/import not yet started</td>
</tr>
<tr>
<td>?</td>
<td>Package export/import in progress</td>
</tr>
<tr>
<td>-</td>
<td>Package export/import finished with errors</td>
</tr>
<tr>
<td>+</td>
<td>Package export/import finished successfully</td>
</tr>
</tbody>
</table>

If any ftp or net exchange options are used, then the export state file might contain a second `<STATE>` column that refers to the state of the package transfer.

Then the export state file contains package state lines such as `SAPUSER=++`.

The format of state lines is `<PACKAGE>=<STATE>`. Possible values for state are listed in the following table:

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Package export not yet started</td>
</tr>
<tr>
<td>?</td>
<td>Package export in progress</td>
</tr>
<tr>
<td>-</td>
<td>Package export finished with errors</td>
</tr>
<tr>
<td>+0</td>
<td>Package export finished successfully; package transfer not yet started</td>
</tr>
<tr>
<td>+?</td>
<td>Package transfer in progress</td>
</tr>
<tr>
<td>+-</td>
<td>Package transfer finished with errors</td>
</tr>
<tr>
<td>++</td>
<td>Package transfer finished successfully</td>
</tr>
</tbody>
</table>

### 9.1.9 Installing the Target System Using the Migration Monitor

#### Use

This section describes the steps that you have to perform to install the target system using the Migration Monitor.
Prerequisites

Make sure there is enough free space on the target system for the database load. To find out the size of the export and the sizes of the tablespaces or dbspaces that are created, look at the file `DBSIZE.XML` located in the directory `<DRIVE>:\<EXPDIR>\DB\<DATABASE>` (Windows) or `<EXPDIR>/DB/<DATABASE>` (UNIX).

Procedure

1. If you want to start the installation of the target host using the Migration Monitor, make sure that at least the dump directory with the following files is accessible on the target host and that it contains the correct data before you start the installer:
   - `<dump dir>/LABEL.ASC`
   - `<dump dir>/DB/<DBTYPE>/DBSIZE.XML`
   - `<dump dir>/DB/DDLORA.TPL`
   If the dump directory is not shared on the target host, copy the files from the source system to the target system as soon as they have been created on the source host using the (export) Migration Monitor’s FTP copy options.
2. Start the installer as described in the installation documentation for your SAP component.
3. To install the target system, follow the instructions in the installer input dialogs and enter the required parameters as far as the ABAP System > Database screen. On this screen, choose Standard System Copy/Migration (R3load-Based).
4. Select the Use Migration Monitor option.

   **Note**
   
   If you need more information about input parameters, position the cursor on the field of the required parameter and press F1.

5. When the installer displays the CD browser window and asks for the Export Migration CD, enter the path to the export directory `<EXPDIR>`.
6. Continue as described in the installation documentation for your SAP component until a dialog box appears that states:
   
   If the export has been started on the source system and the export monitor is running, you can now start the data load by starting the import monitor.
7. Check that the prerequisites in the dialog box are fulfilled by your system. If so, start the Migration Monitor.
8. Complete the installation as described in the installation documentation for your SAP solution.

**Caution**

If you have to restart the import after an error, just restart the installer. The import is continued with the table that was not imported successfully.
9.2 Jload Procedures Using the Java Migration Monitor

Related Information

About the Java Migration Monitor [page 163]
Configuration for Using the Java Migration Monitor [page 164]
Starting the Java Migration Monitor [page 166]
Output Files of the Java Migration Monitor [page 168]
Restarting Jload Processes [page 169]

9.2.1 About the Java Migration Monitor

Note

The Java Migration Monitor tool is available only for systems based on SAP NetWeaver 7.0 EHP2 and higher.

The Java Migration Monitor is a tool that helps you to perform and control the unload and load process during the system copy procedure.

The Java Migration Monitor performs the following steps:

- Starting the Jload processes to load or unload the data according to the requirements of the user
- Informing the person performing the system copy in case of errors

Note

Some features described in this documentation might be not available in the JMigmon tool if you do not use the most current version of the tool

Tool

The tool is part of the CORETOOL*.SCA archive and consists of the following:

- User Guide
  - JMmigrationMonitor.pdf
  - Located:
    /usr/sap/<SAPSID>/SYS/global/sltools
- Scripts
  - jmingon_export.sh / jmingon_export.bat
  - jmingon_import.sh / jmingon_import.bat
  - Located:
    /usr/sap/<SAPSID>/SYS/global/sltools
- jar archive
  - jmigmon.jar
  - Located:
    /usr/sap/<SAPSID>/SYS/global/sltools/sharedlib
- Property files
  - export.jmigmon.properties
  - import.jmigmon.properties
  - Located:
    /usr/sap/<SAPSID>/SYS/global/sltools

Prerequisites

- The JRE version must be at least 1.4.1.
- JAVA_HOME environment variable must point to the JRE directory.
- The correct directory structure for Jload dump files must exist on both the source and target hosts

9.2.2 Configuration for Using the Java Migration Monitor

Note

The Java Migration Monitor tool is available only for systems based on SAP NetWeaver 7.0 EHP2 and higher.

The following options can be provided via the property file or via command line. Command line parameters take precedence over parameters specified in the property file.

Help

The tool displays the available parameters, if you call it with one of the following command line options:

- -help
- -?

Version Information

With the following command line option, the tool displays version information: -version.
General Options

Table 52:

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>mode</td>
<td>Java Migration Monitor mode: import or export</td>
<td>Only available as command line option</td>
</tr>
<tr>
<td>sid</td>
<td>SAP system ID</td>
<td>SAP system ID</td>
</tr>
<tr>
<td>dsn</td>
<td>Data source name</td>
<td>Specifies the data source name and is registered in the SecureStore; usually jdbc/pool/ &lt;SAPSID&gt;</td>
</tr>
<tr>
<td>ssProps</td>
<td>Path to the SecureStore properties file</td>
<td>On Windows: local drive or UNC path</td>
</tr>
<tr>
<td>ssKey</td>
<td>Path to the SecureStore key file</td>
<td>On Windows: local drive or UNC path</td>
</tr>
<tr>
<td>exportDirs</td>
<td>Export directories path</td>
<td>Specifies the path or paths for exported data and triggers the export functionality. Separator on Windows: &quot;;&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>importDirs</td>
<td>Import directories path</td>
<td>Specifies the path or paths for imported data and triggers the import functionality. Separator on Windows: &quot;;&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>orderBy</td>
<td>Package order</td>
<td>This can be the name or path of the file that contains package names. If the option value is omitted the package order is not determined.</td>
</tr>
<tr>
<td>jobNum</td>
<td>Number of parallel export jobs</td>
<td>Default is 3.</td>
</tr>
<tr>
<td>monitorTimeout</td>
<td>Monitor time-out in seconds</td>
<td>Default is 30 seconds.</td>
</tr>
<tr>
<td>disableStatistics</td>
<td>Enables statistics logging</td>
<td>Disables statistics logging for each Jload process: Therefore Jload does not collect statistics data that could later be displayed by the time analyzer.</td>
</tr>
</tbody>
</table>

Additional Options (all optional)
9.2.3 Starting the Java Migration Monitor

Use

**Note**
The Java Migration Monitor tool is available only for systems based on SAP NetWeaver 7.0 EHP2 and higher.

You can start the tool using one of the following:

- The UNIX shell scripts `jexport_monitor.sh` / `jimport_monitor.sh`
- As part of the export / import procedure of the software provisioning manager

The application allows you to specify options in the command line or in the export or import property files. The names of the property files are `export.jmigmon.properties` and `import.jmigmon.properties`.

Any options specified in the command line take precedence over the corresponding options in the application property file. Options are case-sensitive; any options that are not recognized are ignored. To specify an option:

- In the command line, enter `-<optionName> <optionValue>`
- In the application property file, insert the new line `<optionName>=<optionValue>`

Prerequisites

**Note**
We recommend that you create a certain directory and start the tool from there, because the Java Migration Monitor produces log and trace files in the current working directory.

Before you run the Java Migration Monitor, set the following environment variables:

- `SLTOOLS_HOME`
  Set this variable to the following directory:
  UNIX, IBM: `/sapmnt/<SAPSID>/global/sltools/sharedlib`
SLTOOLS_SECURITY_HOME
Set this variable to the directory, which contains the iaik_jce.jar file.
The default directory is:
UNIX, IBM: /<sapmnt>/<SAPSID>/global/security/lib/tools
SLTOOLS_DBDRIVER_HOME
Set this variable to the directory, which contains the database driver.

Example
For MaxDB on Windows: <Drive>:\sapdb\programs\runtime\jar

Procedure

Start the Java Migration Monitor as user <sapsid>adm by executing one of the following from the command line:

- ./jmigmon_export.sh -<optionName> <optionValue>
- ./jmigmon_import.sh -<optionName> <optionValue>

Example
./jmigmon_export.sh -sid CE3 -dsn jdbc/pool/CE3 -ssProps /sapmnt/global/security/data/SecStore.properties -ssKey /sapmnt/global/security/data/SecStore.key -exportDirs /JPKGCTL

Start the monitor and then close the shell window or command processor. The monitor process runs in the background. Use the monitor *.log and *.console.log files to check monitor processing state.

Result

What happens during the export or import:

During the import the tool starts a search in the directories specified by the -importDirs parameter for packages in XML format and puts them into a working queue.

Next it starts a number (specified by the -jobNum parameter) of parallel Jload importing tasks, taking tasks from the working queue until the queue is empty.

During the export the tool starts a search in the directories specified by the -exportDirs parameter for packages in XML format and puts them in a working queue.

Then it starts exporting all the packages containing metadata one after another (not in parallel) while removing them from the queue. The tool then starts a number (specified by the -jobNum parameter) of parallel Jload export tasks, taking tasks from the working queue until the queue is empty.
Example

export.jmigmon.properties file with export options

```properties
# jmigmon mode: import or export mode = export # number of parallel export jobs, default is 3
# jobNum = 1 # <SAPSID> of the system sid = CE3 # name of datasource registered in system's SecureStore; usually jdbc/pool/<SAPSID>
# dsn = jdbc/pool/CE3 # path of the SecureStore properties file ssProps = D:\usr\sap\CE3\SYS\global\security\data\SecStore.properties # path of the SecureStore key file ssKey = D:\usr\sap\CE3\SYS\global\security\data\SecStore.key # list of export directories exportDirs = D:\JPKGCTL # monitor timeout in seconds, default is 30
monitorTimeout = 30
```

import_monitor.properties file with import options

```properties
# jmigmon mode: import or export mode = export # number of parallel export jobs, default is 3
# jobNum = 1 # <SAPSID> of the system sid = CE3 # name of datasource registered in system's SecureStore; usually jdbc/pool/<SAPSID>
# dsn = jdbc/pool/CE3 # path of the SecureStore properties file ssProps = D:\usr\sap\CE3\SYS\global\security\data\SecStore.properties # path of the SecureStore key file ssKey = D:\usr\sap\CE3\SYS\global\security\data\SecStore.key # list of import directories importDirs = D:\export\unpacked\JAVA\JDMF # monitor timeout in seconds, default is 30
monitorTimeout = 30
```

9.2.4 Output Files of the Java Migration Monitor

Note

The Java Migration Monitor tool is available only for systems based on SAP NetWeaver 7.0 EHP2 and higher.

Export

- export.state.properties
- <PACKAGE>.xml.log

Import

- import.state.properties
- <PACKAGE>.xml.log

Both the export and import state files contain package state lines such as the following:

SAPUSER=+
Format of lines is `<PACKAGE>=<STATE>`. The following table shows the possible values for state:

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Package export/import not yet started.</td>
</tr>
<tr>
<td>?</td>
<td>Package export/import in progress.</td>
</tr>
<tr>
<td>-</td>
<td>Package export/import finished with errors.</td>
</tr>
<tr>
<td>+</td>
<td>Package export/import finished successfully.</td>
</tr>
</tbody>
</table>

### 9.2.5 Restarting Jload Processes

#### Use

---

**Note**

The Java Migration Monitor tool is available only for systems based on SAP NetWeaver 7.0 EHP2 and higher.

The state file allows package states to be manually updated to restart failed Jload processes.

---

**Example**

If package processing failed and the package state has the value “–”, the state can be set to “0” and processing of the package will be started again.

---

#### Procedure

- To restart package processing, set the package state from “–” to “0”.
- To skip package processing, set the package state from “0” or “–” to “+”.

---

**Caution**

This is not recommended because it can cause inconsistent data files or database content.

- If the package is currently being processed (the package state is “?”) then any manual modifications of the package state are ignored.
9.3 Analysis of the Export and Import Times

You can reduce the runtimes by splitting the packages in question or extracting long-running tables from the packages.

- You can use the MIGTIME.SAR archive to analyze the runtimes of the individual ABAP packages. It is contained in the <OS>/COMMON/INSTALL directory of the 70SWPM10SP<Support_Package_Number>_<Version_Number>.SAR archive. It is unpacked to the installation directory using SAPCAR and contains documentation in addition to the tools.
- If your SAP system is based on SAP NetWeaver 7.0 EHP2 and higher, you can use the jmigtime.jar archive to analyze the runtimes of the individual Java packages. The tool is part of the CORETOOL*.SCA archive and consists of the following:
  - User Guide
    - JavaTimeAnalyzer.pdf
    - Located: <Drive>:\usr\sap\<SAPSID>\SYS\global\sltools
      /usr/sap/<SAPSID>/SYS/global/sltools
  - Scripts
    - jexport_time.sh / jexport_time.bat
    - jimport_time.sh / jimport_time.bat
    - jtime_join.sh / jtime_join.bat
    - Located: <Drive>:\usr\sap\<SAPSID>\SYS\global\sltools
      /usr/sap/<SAPSID>/SYS/global/sltools
  - jar archive
    - jmigtime.jar
    - Located: <Drive>:\usr\sap\<SAPSID>\SYS\global\sltools\sharedlib
      /usr/sap/<SAPSID>/SYS/global/sltools/sharedlib
  - Property files
    - export.jmigtime.properties
    - import.jmigtime.properties
    - Located: <Drive>:\usr\sap\<SAPSID>\SYS\global\sltools
      /usr/sap/<SAPSID>/SYS/global/sltools

9.4 Table Comparison with Software Update Manager

This section describes how to compare table contents using the Software Update Manager 1.0 (SUM) tool during a system copy project.

We call this functionality “Table Comparison with SUM”. The tool only needs access to the database, so you can run it regardless of whether the ABAP system is running or not. The “Table Comparison with SUM” functionality is available as of Software Update Manager (SUM) 1.0 SP11.
9.4.1 Modes of the Table Comparison Tool

You can run the table comparison tool either in “single” or “twin” mode.

The tool has the following modes of operation:

- **In “single” mode**, the tool only accesses the SAP database of the current system it is running on. This is supported for all database types supported by SAP. In this mode, the tool generates checksums for the selected user or for all SAP tables. The tool reports the directory containing the checksums at the end. This directory must then be transferred to the target host. There the tool must be run again in “single” mode and must have read/write access to the previously generated checksum directory. It uses them as a reference and generates the corresponding checksums for the target database. Any discrepancy found is reported. Checksums are only generated for ranges of rows, so the granularity of reported checksum differences is rather “coarse”.

  “Single” mode means that you run the Table Comparison Tool with SUM separately and twice: Single mode corresponds to the SUM options **Generate Export Checksums** (to be executed on the source system) and **Generate Import Checksums** (to be executed on the target system).

  1. You execute SUM option **Generate Export Checksums** on the **source system** to create the checksums.
  2. You execute SUM option **Generate Import Checksums** on the **target system** to verify the checksums by comparing them with the content of the tables in the target database.

- **“Twin” mode** is by default **unavailable** in a regular system copy because you cannot connect simultaneously from one application server to both the source and the target database system. Therefore we recommend using “single” mode.

9.4.2 Restrictions

This section describes the cases when you cannot use Table Comparison with SUM.

You can only use Table Comparison with SUM:

- If both the source system and the target system use the same endian type. For details on the endian type of an SAP system, see SAP Note 552464.
- If there has been no Unicode Conversion, that is no change from Non-Unicode to Unicode.
9.4.3 Using the Table Comparison Tool

This section describes how to use the Table Comparison Tool.

Prerequisites

- Make sure that you run Table Comparison before the central instance on the target system is started for the first time. Otherwise the comparison might return wrong results because table content was already updated when the instance was started.
- The database of the system for which you want to use the tool is up and running. Make sure that R3trans -x works.
- You have downloaded the Table Comparison tool as described in SAP Note Central Note · Software Update Manager 1.0 SP<Latest_Number> at https://support.sap.com/sftoolset System Maintenance.
- We strongly recommend that you do not perform productive operations while you apply table comparison with the Software Update Manager (SUM): Since the tool generates checksums, changing table contents might lead to incorrect results if you apply the tool while the system is running.
- Make sure that you have installed the latest version of the SAP Host Agent. For more information, see SAP Note 1031096 and the SAP Library [page 16] for your release at:

  Note

Navigate to the SAP Help Portal page for the SAP NetWeaver release your SAP product is based on as described in section SAP Library [page 16] and then continue the navigation as described below.

- Make sure that you have configured SUM so that it works together with the SAP Host Agent:
  1. Log on as user root and call the SUMSTART script as follows:
     <SUM_Directory>/abap/SUMSTART confighostagent
     If you are working with symbolic links for the SUM directory, you need to call the SUMSTART script with the logical path information.
  2. Restart the SAP Host Agent using the following command:
     <HOSTAGENT_Directory>/exe/saphostexec -restart

Procedure

1. Log on as user<sapsid>adm.
2. Unpack the SUM archive by executing the following commands:

```bash
mkdir <SUM_Directory>

cd <SUM_Directory>

SAPCAR -xvf SUM.SAR
```

**Example**

```bash
mkdir /usr/sap/put

cd /usr/sap/put

SAPCAR -xvf SUM.SAR
```

3. Proceed as follows to start SUM using the SAP Host Agent:

   a. Open a browser window and enter the following URL in the address bar:

   ```text
   ```

   **Note**
   
   - 1129 is the https port of the SAP Host Agent.
   - Use http instead of https if SSL is not configured. In this case, the URL you have to enter looks as follows:

   ```text
   ```

   b. A dialog box appears in which you enter as user name the <sapsid>adm and the password.

   After logon, the SAP Host Agent starts SUM by calling the SAPup executable in the background.

   From a technical point of view, the SAPup executable is started twice, as can be seen from the process list:

   - One entry with `gt=httpchannel` represents SAPup handling the requests coming from SAP Host Agent.
   - The second SAPup with parameter `guiconnect` is triggering tools such as R3trans, tp, or R3load.

   SUM starts with the SAPUI5-based user interface.

   The initial screen is displayed.

4. On the initial screen, you can choose between the following options, which both work in “single” mode:

   - **Generating export checksums**
     This is the option for checking tables in the source system.
   - **Generating import checksums**
     This is the option for checking tables in the target system.

   You cannot use the option for direct table content check for system copy purposes.

5. You can specify the tables for which you want to compare content on the source and target system:

   - **Compare all tables**
     When you decide to perform a full comparison, it is strongly recommended to exclude some tables where the content is changed during a regular system copy. Otherwise the verification for these tables fails. Create a file in the directory `<SUM_DIR>/abap/bin` before you run the export.
Name this file EUCLONEDEFS>Add.LST and enter the following content:

```
DDNTT nocontent ignrcrdiffs
REPOLOAD nocontent ignrcrdiffs
```

The list of tables to be ignored in the comparison check can be modified according to individual requirements, for example, if it is clear that the table has been changed on the target system and the difference is expected. It is also possible to run the check on the target system without the modification. If an error is raised on the two tables mentioned above, you can ignore the comparison check differences and continue SUM in the dialog.

- Provide a list of tables
  - If you only want to check a selected number of tables, provide an input file like this:

  ```bash
  $ cat /tmp/CRCTableList.lst
  # Tables to be checked
  TAORA
  IAORA
  ```

  Enter the full path to this file in the input field provided.

6. If no error occurs, you are informed that the tool has generated the checksum in the specified directory.
   a. You can now move the directory to a host that has access to your target database.
   b. Rerun the tool on the target system with option `Generate Target Checksums`. Before you rerun the tool, make sure that the central instance is stopped.

   This time you have to provide the path to this directory in the **Table List** field.

7. Verify the result of the table comparison. If the differences in the table contents of the source and target system are inconsistent, and you cannot explain the differences - for example, due to changes in the target system during the table comparison check on the source system - open an incident on component BC-INS-MIG.

**Related Information**

Table Comparison with Software Update Manager [page 170]

**9.5 Using the Package Splitter**

Here you find information what you can do with the Package Splitter tool.

You can use the Package Splitter tool for splitting the following:

- STR/EXT files
- STR files
- WHR files

The tool is located in the `SPLIT.SAR` archive in the `/<OS>/COMMON/INSTALL` folder in the directory structure of software provisioning manager 1.0.

Content of the archive file:

- `split.jar`
Related Information

Configuration [page 175]
Starting the Package Splitter [page 178]
Executing the STR Splitter and the WHERE Splitter [page 179]
Output Files [page 179]

9.5.1 Configuration

Here you find information about command line options of the Package Splitter tool.

Help

The tool displays the available parameters, if you call it with one of the following command line options:

- `-help`
- `-?`

Version

The tool will display the version information (release branch and build date), if you call it with the following command line option:

- `-version`

STR Splitter Options

Table 55:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
</table>
| strDirs| List of STR file directories | Separator on Windows: `;`
<pre><code>                           | Separator on UNIX: `:`    |
</code></pre>
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
</table>
| extDirs    | List of EXT file directories | Separator on Windows: ;  
                      |   Separator on UNIX: :                                                   |
| outputDir  | Output directory          | If missing, then the directories that contain the corresponding STR/EXT  
                      |   files are used.                                                        |
| top        | Maximum number of tables   | Largest N tables are extracted from the packages.                        |
| tableLimit | Table size limit in MB     | All tables larger than tableLimit are extracted from packages.            |
| packageLimit | Package size limit in MB | All packages larger than packageLimit are split into packages smaller than this  
                      |   limit.                                                                |
| tableFile  | File with the table names that are to be extracted | All tables from the file are extracted from the packages. This file must contain the table names on separate lines (one name on each line). |
| maxNumberOfTables | • Integer value  
                    |   • Maximum number of tables in the package     | Split the packages as keep the maximum number of tables in package.  
                      |                                                                 |

**Example**

maxNumberOfTables=500

This parameter is with higher priority

### WHERE Splitter Options

**Table 56:**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>whereDir</td>
<td>WHERE file directory</td>
<td>Directory with WHR files.</td>
</tr>
</tbody>
</table>
| strDirs    | List of STR file directories | Separator on Windows: ;  
<pre><code>                  |   Separator on UNIX: :                                                   |
</code></pre>
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>outputDir</td>
<td>Output directory</td>
<td>If missing, then the directory that contains the corresponding WHR files is used.</td>
</tr>
<tr>
<td>whereLimit</td>
<td>Maximum number of WHERE clauses</td>
<td>All WHR files that have more than whereLimit WHERE clauses are split into WHR files with whereLimit WHERE clauses.</td>
</tr>
<tr>
<td>whereFiles</td>
<td>Whitespace separated list of WHR files</td>
<td>Names of WHR files to be split. WHR files should exist in WHERE file directory.</td>
</tr>
</tbody>
</table>

### Trace Option

**Table 57:**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>trace</td>
<td>Trace level</td>
<td>Possible values: all, off, 1 (error), 2 (warning), 3 (info), 4 (config, default), 5, 6, 7 (trace)</td>
</tr>
</tbody>
</table>

### Mandatory Options

- Splitting STR and EXT files:
  strDirs, extDirs, top and/or tableLimit and/or packageLimit and/or tableFile
- Splitting STR files:
  strDirs, tableFile
- Splitting WHR files:
  whereDir, whereLimit

### Related Information

**Using the Package Splitter [page 174]**
9.5.2 Starting the Package Splitter

Here you find information about how to start the Package Splitter tool.

You can start the Package Splitter tool using one of the following:

- UNIX shell script `str_splitter.sh` / `where_splitter.sh`
- As part of the export procedure (STR Splitter) in the installer

The application allows you to specify options in the command line and/or in the application property file. The name of the property file is `package_splitter_cmd.properties`.

Any options specified in the command line take precedence over the corresponding options in the application property file. Options are case-sensitive; any options that are not recognized are ignored. To specify an option:

- in the command line, enter `-optionName optionValue`
- in the application property file, insert the new line `optionName=optionValue`

### STR Splitter

Example of a command line for a UNIX terminal:

```
./str_splitter.sh -strDirs /export_dump/DATA -extDirs /export_dump/DB/ORA -outputDir /split_output -top 20 -tableLimit 50 -packageLimit 200 -trace all
```

### WHERE Splitter

You can start the tool using the UNIX shell script `where_splitter.sh`.

Example of a command line for a UNIX terminal:

```
./where_splitter.sh -whereDir /r3a_dir -strDirs /export_dump/DATA -outputDir /split_output -whereLimit 5 -trace all
```

Related Information

Using the Package Splitter [page 174]
9.5.3 Executing the STR Splitter and the WHERE Splitter

Proceed as described in this section to execute the STR Splitter / WHERE Splitter.

Procedure

1. Prepare the properties file `package_splitter_cmd.properties` (optional).
2. Start the Package Splitter tool using the shell script or batch file.
3. Analyze the screen output and log file.

Related Information

Using the Package Splitter [page 174]

9.5.4 Output Files

Here you find information about the output files of the Package Splitter tool.

STR Splitter

- Newly split STR/EXT files
- Original backup of STR/EXT files (* .STR.old/* .EXT .old)
- SAPSTR. LST file
- str_splitter. log
- PackageSplitter. console. log

WHERE Splitter

- Newly split WHR files
- Original backup of WHR files (* .WHR. old)
- SAPSTR. LST file
- where_splitter. log
- PackageSplitter. console. log
### STR Splitter Notes

*SAP0000* and *SAPVIEW* packages are never modified by the splitter. *SAPNTAB* package is always created and contains 5 predefined tables:

- SVERS
- DDNTF
- DDNTF_CONV_UC
- DDNTT
- DDNTT_CONV_UC

### Integration

Before you start to split files, we strongly recommend that you back up your original STR/EXT or WHR files in separate backup directories. These backup files can be used later to try other splitting options. If the output directory is specified, then the newly split files are generated in this directory; otherwise they are generated in the directories where the corresponding original files are located.

The original backup files (backup name is `<file_name>.old`) are always located in the same directories where the corresponding original files are located.

### Related Information

*Using the Package Splitter [page 174]*

### 9.6 Package and Table Splitting for Java Tables

#### Purpose

The Java Splitter offers the following possibilities:

- Splitting the default packages `EXPORT.XML` and `IMPORT.XML` into several smaller and equal sized packages:
- Extracting large tables into packages of their own
- Splitting large tables into several smaller and equal sized packages (table splitting)

The tool provides the corresponding split packages for export and import. Package splitting and table splitting can be used combined or separately.
Tool

The tool archive consists of the following:

- User Guide
  - JSplitterUserGuide.pdf
  - Located: /sapmnt/<SAPSID>/global/sltools
- Scripts for starting the tool standalone
  - jsplitter.sh, jsplitter.bat
  - Located: /sapmnt/<SAPSID>/global/sltools
- jar archive
  - sdt_jcopy_jpkgctl.jar
  - Located: /sapmnt/<SAPSID>/global/sltools/sharedlib

9.6.1 Configuration for Using the Java Splitter

The following options can be provided via the property file or via command line. Command line parameters take precedence over parameters specified in the property file.

Note

To get the complete list of supported options run java com.sap.inst.<tool> -help

Help

With the following command line option, the tool displays all parameters available:

-help
General Options

Table 58: General Splitting Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>-sec</td>
<td>List of SAP system ID and data source name[, SecureStore property file, SecureStore key file][, SecureStore key phrase]</td>
<td>Note: This option is mandatory. Separator on Windows: &quot;&quot;; Separator on UNIX, IBM i: &quot;&quot;.</td>
</tr>
<tr>
<td>-dataDir</td>
<td>Output data directory</td>
<td>Note: This option is mandatory. If this option is missing, the split rules are taken from the command line arguments.</td>
</tr>
<tr>
<td>-log</td>
<td>Log file with program output messages and errors</td>
<td>Default log file name is JPkgClt.console.log. In addition, a trace file (JPkgCtl.trc) with detailed process descriptions, errors, and messages is generated.</td>
</tr>
<tr>
<td>-help</td>
<td>Prints help options for the parameters and their usage</td>
<td>non</td>
</tr>
</tbody>
</table>

Mandatory General Options

The following splitting options are mandatory for both package and table splitting:

```
  sid, dsn, ssProps, ssKey, dataDir
```

Package Splitting Options

Table 59: Package Splitting Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>-split</td>
<td>Size of the splitted package with tables</td>
<td>Size can be a number of bytes (for example, 1048576, 200M, 8G, and so on)</td>
</tr>
</tbody>
</table>

Additional Mandatory Option for Package Splitting

Splitting option: `split`
## Table Splitting Options

### Table 60: Table Splitting Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>-splitrulesfile</td>
<td>Files that contains key fields for each table</td>
<td>Syntax:</td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>&lt;TABLE_NAME&gt;:&lt;NUMBER_OF_PACKAGES_FOR_SPLITTING&gt;:&lt;[TABLE_KEY_FOR_SPLITTING]&gt;</code></td>
</tr>
<tr>
<td>-tablesplit</td>
<td>Rules for splitting each table</td>
<td>Syntax:</td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>&lt;TABLE_NAME&gt;:&lt;NUMBER_OF_PACKAGES_FOR_SPLITTING&gt;:&lt;[TABLE_KEY_FOR_SPLITTING]&gt;</code></td>
</tr>
<tr>
<td>-checksplitrules</td>
<td>Checks the syntax of the splitrulesfile. It expects a file as an argument.</td>
<td>Syntax:</td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>&lt;TABLE_NAME&gt;:&lt;NUMBER_OF_PACKAGES_FOR_SPLITTING&gt;:&lt;[TABLE_KEY_FOR_SPLITTING]&gt;</code></td>
</tr>
</tbody>
</table>

### Example

```
J2EE_CONFIG:2:
J2EE_CONFIGENTRY:4:CID
BC_COMPVERS:
2:COMPID;HASHNUMBER;COMPONENTTYPE;SUBSYSTEM
```

### Caution

When configuring table splitting for a table without primary key (such as `J2EE_CONFIGENTRY`), you have to provide a value for parameter `<COLUMN_TO_BE_USED_FOR_SPLITTING>`. If the table to be split has a primary key (PK), this parameter is optional.

### Additional Mandatory Options for Table Splitting

Splitting options: `splitrulesfile, tablesplit`

### Example

```
JSplitter_cmd.properties:
#
# Table Splitting options
#
```

Additional Information

System Copy for SAP Systems Based on the Application Server Dual-Stack (ABAP+Java) of SAP NetWeaver 7.0 to 7.03 on UNIX

PUBLIC 183
# Common options

# List of SAPSID, data source name[,SecureStore property file, SecureStore key file][,SecureStore key phrase]
-sec=CE1, jdbc/pool/CE1,/usr/sap/CE1/SYS/global/security/data/
  SecStore.properties, /usr/sap/CE1/SYS/global/security/data/SecStore.key

# Size of the split package with tables
-splt=200M

# Output data directory
-dataDir=/jsplitter_export_dir

# File that contains key fields for each table with the following syntax:
<TABLE_NAME>;<NUMBER_OF_PACKAGES_FOR_SPLITTING>;[TABLE_KEY_FOR_SPLITTING>
-splitrulesfile=/jsplitter_export_dir/splitrulesfile.txt

# Log file with program output messages and errors
-log=

# Check splitrulesfile syntax
-checksplitrules=/jsplitter_export_dir/splitrulesfile.txt

## 9.6.2 Starting the Java Splitter

This section describes how to start the Java splitter.

### Prerequisites

Before you run the table splitter, set the following environment variables:

- **SLTOOLS_HOME**
  Set this variable to the following directory:
  /sapmnt/<SAPSID>/global/sltools/sharedlib

- **SLTOOLS_SECURITY_HOME**
  Set this variable to the directory, which contains the iaik_jce.jar file.
  The default directory is:
  /sapmnt/<SAPSID>/global/security/lib/tools

- **SLTOOLS_DBDRIVER_HOME**
  Set this variable to the directory, which contains the database driver.

---

### Example

For MaxDB on Windows: `<Drive>:\sapdb\programs\runtime\jar`
Context

Recommendation

We recommend to create a certain directory for splitting and start the tools from there, because the splitter produces log and trace files in the current working directory.

The application allows you to specify options in the command line or in the application property file. The name of the property file is JSplitter_cmd.properties.

Any options specified in the command line take precedence over the corresponding options in the application property file. Options are case-sensitive; any options that are not recognized are ignored.

Note

To check the splitting processing state, use the splitter *.trc and *.console.log files.

Procedure

1. Start the table splitter as user <sapsid>adm using the following shell script:
   
   jsplitter.sh

2. Specify options as required in one of the following ways -optionName optionValue.
   
   - Command line:
     Specify the option in the format -optionName optionValue
   - Property file:
     Add an option as a new line in the format optionName=optionValue

   Note

   If you use an invalid option or you enter -help, the available options for starting the tool are displayed.

Example

Command line

./jsplitter.sh -tablesplit BC_COMPVERS:2 -tablesplit J2EE_CONFIG:4:CID;PATHHASH -tablesplit J2EE_CONFIGENTRY:4:CID

9.6.3 Output Files of the Java Splitter

Here you find an overview of the log, trace, result, and metadata files of the Java splitter.

- JPkgCtl.console.log
  Default log file of splitter tool
The installer supports Oracle Database Vault. This section provides information about implementing Oracle Database Vault (DV) with the installer.

**Prerequisites**

- Your Oracle database version must be 12.1 or higher.
- Check the prerequisites, restrictions, and patch requirements as listed in SAP Note [2218115](https://support.sap.com).

**Context**

For [Database Independent System Copy][page 43], the installer prompts whether DV is to be installed.

For the [Oracle-Specific Procedure][page 77] the DV is already installed in the source database and must be first disabled to complete the scenario and can then be enabled before the scenario is completed.

DV requires the following additional users:

- `secadmin`
- `secacctmgr`

These users are created by the installer.

For more information about Oracle Database Vault, see the Oracle Database documentation referred to in SAP Note [2218115](https://support.sap.com).
Procedure

1. Start the installer and choose the export option for your system variant as described in Running the Installer [page 56].
2. During the target system installation, on the Oracle Database screen where you are prompted to enter the required Oracle database parameters, mark the Install Oracle Database Vault checkbox.
3. During the target system installation, on the Database Accounts for Oracle Database Vault screen, specify the following:
   ○ Provide the passwords for the Oracle Database Vault user accounts secadmin and secacctmgr which are to be created by the installer.
   ○ If you want to be enabled after the installation has completed, mark the Enable Oracle Database Vault checkbox.

Next Steps

Configure Oracle Database Vault as described in SAP Note 2218115.$\text{\textless}\text{\textgreater}$

9.8 IBM Db2 for Linux, UNIX, and Windows Database

Enabling Recoverability of the IBM Db2 for Linux, UNIX, and Windows Database [page 187]

Online Information from IBM [page 189]

9.8.1 Enabling Recoverability of the IBM Db2 for Linux, UNIX, and Windows Database

Use

⚠️ Caution

This section applies only to your database. You only have to perform the steps outlined in this section once – even if you install multiple SAP systems into one database.

Roll forward recovery enables you to recover lost data due to media failure, such as hard disk failure, and applies log file information (log journal) against the restored database. These log files contain the changes made to the database since the last backup.

⚠️ Caution

A production system must run in log retention mode.
If a system is not running in log retention mode, all changes applied to the database since the last complete backup are lost in the event of a disk failure.

In log retention mode, the log files remain in the log directory (log_dir). To archive the log files, you can use Db2’s own log file management solution. For more information, see the documentation Database Administration Guide for SAP on IBM Db2 for Linux, UNIX, and Windows.

Procedure

1. Log on to the database server as user db2<dbsid>.
2. To activate log retention mode and to specify the log archiving method, set configuration parameter LOGARCHMETH1 to one of the following options:
   - LOGRETAI N
     No log archiving takes place. Log files remain in the log directory.
   - DISK:<log_archive_path>
     Log files are archived to a disk location. You can archive them to tape using the Db2 tape manager (db2tapemgr) at a later point in time.
   - TSM:<TSM_management_class>
     Log files are archived to Tivoli Storage Management (TSM)
   - USEREXIT
     For downward compatibility with the former user exit concept, you can specify value USEREXIT for parameter LOGARCHMETH1.
   - VENDOR:<path_to_vendor_lib>
     Log files are archived to a library that is provided by your vendor storage management.

To set configuration parameter LOGARCHMETH1 for your preferred archiving method, enter the following command:

db2 update db cfg for <dbsid> using LOGARCHMETH1 <log_archiving_method>

For more information, see the documentation Database Administration Guide for SAP on IBM Db2 for Linux, UNIX, and Windows.

3. To activate the settings, restart the database. The database is now in backup pending mode. You need to take an offline backup before you can continue.
4. To start the offline backup for a single-partitioned database, enter the following command:

   db2 backup db <dbsid> to <device>

Example

For example, to perform an offline backup of database C11 to tapes in devices rmt0 and rmt1, enter the following command:

db2 backup database C11 to /dev/rmt0, /dev/rmt1

Note

On a multipartitioned database, you must activate log retention mode on all database partitions. In addition, you also have to perform an offline backup for all database partitions.

For more information about how to start a Db2 backup, see the IBM Db2 online documentation.
More Information

- *Database Administration Guide for SAP on IBM Db2 for Linux, UNIX, and Windows* (see Online Information from SAP [page 196])
- For direct access to online information about Db2 that is provided by IBM, see Online Information from IBM [page 189].
- For access to more documentation for SAP systems on IBM Db2 for Linux, UNIX, and Windows, see Online Information from SAP [page 196].

9.8.2 Online Information from IBM

You can use the following IBM Knowledge Center welcome page as a starting point to all kinds of documentation for your IBM Db2 for Linux, UNIX, and Windows version: http://www.ibm.com/support/knowledgecenter/en/SSEPGG

The following tables provide direct links to IBM Db2 online documentation and manuals, listed by database version:

<table>
<thead>
<tr>
<th>Table 61: IBM Db2 Knowledge Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database Version</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>IBM Db2 10.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 62: IBM Manuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database Version</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>IBM Db2 10.5</td>
</tr>
<tr>
<td>IBM Db2 10.1</td>
</tr>
</tbody>
</table>
9.9 Oracle Database

Database Instance Installation on Oracle Automatic Storage Management [page 190]
This section provides information on the installation of a database instance on an Oracle Automatic Storage Management (ASM).

Additional Information about the OraBRCopy Tool [page 191]

9.9.1 Database Instance Installation on Oracle Automatic Storage Management

This section provides information on the installation of a database instance on an Oracle Automatic Storage Management (ASM).

Software provisioning manager performs the following steps that differ from the general installation on non-ASM systems:

- It creates the oracle user and the additional Oracle groups oinstall, asmdba, asmadmin, and asmoper.
- It installs the correct user environment for the oracle and <sapsid>adm users.

Prerequisites

- You must have installed the Oracle GRID software. This software ensures that ASM can be used.
- You must have created the following Oracle disk groups:
  - +DATA, +<DBNAME>_DATA or +DATA_<DBMACHINENAME> for all data files, online redo logs (first copy), and control file (first copy).
  - +ARCH, +<DBNAME>_ARCH for control file (second copy) and archive redo logs (not for engineered systems such as Exadata or SuperCluster).
  - +RECO, +<DBNAME>_RECO or +RECO_<DBMACHINENAME> for control file (third copy), online redo log (second copy), RMAN backups and fast recovery area.
  - +OLOG, +MLOG for redo log file are optional for larger systems (not for engineered systems such as Exadata or SuperCluster).

More Information

For more information, see SAP on Oracle Automatic Storage Management (ASM).
9.9.2 Additional Information about the “OraBRCopy” Tool

Related Information

Configuration [page 191]
Output Files [page 193]

9.9.2.1 Configuration

Help

The tool displays the available parameters, if you call it with one of the following command line options:

- `-help`
- `-?`

Version

The tool will display the version information (release branch and build date), if you call it with the following command line option:

- `-version`

Application Options

Table 63:

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>oracleHome</td>
<td>Oracle home directory</td>
<td>Determined automatically in script/batch files from the ORACLE_HOME environment variable</td>
</tr>
<tr>
<td>sourceSid</td>
<td>Source database SID</td>
<td>Determined automatically in script/batch files from the ORACLE_SID environment variable</td>
</tr>
<tr>
<td>targetSid</td>
<td>Target database SID</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Description</td>
<td>Comment</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>listenerPort</td>
<td>Listener port number</td>
<td>Mutually exclusive with tnsAlias. Can be found in the listener.ora file of the source database.</td>
</tr>
<tr>
<td>tnsAlias</td>
<td>Oracle TNS alias</td>
<td>Mutually exclusive with listenerPort. Can be found in the tnsnames.ora file of the source database.</td>
</tr>
<tr>
<td>password</td>
<td>Password of SYSTEM database user</td>
<td></td>
</tr>
<tr>
<td>generateFiles</td>
<td></td>
<td>Generates control/trace and init&lt;TARGET_DBSID&gt;.ora files.</td>
</tr>
<tr>
<td>forceLogSwitches</td>
<td></td>
<td>Forces log switches. If this option is specified then Oracle database will be stopped during the tool execution.</td>
</tr>
</tbody>
</table>

**Additional Options**

Table 64:

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>bg</td>
<td>Enables background mode</td>
<td><strong>Note</strong> Takes effect only as command line option. If the tool is running in the background mode, the UNIX shell window or Windows command prompt can be closed after startup.</td>
</tr>
<tr>
<td>secure</td>
<td>Enables secure mode</td>
<td><strong>Note</strong> Takes effect only as command line option. If the tool is running in the secure mode, command line parameters (ex. passwords) will be hidden for java process. The secure mode implicitly enables background mode.</td>
</tr>
</tbody>
</table>
### Trace Level

**Name**: trace  
**Description**: Trace level  
**Comment**: Possible values: all, off, 1 (error), 2 (warning), 3 (info), 4 (config, default), 5, 6, 7 (trace)

### Mandatory Options

- Generate files mode
  
  `generateFiles, targetSid, password, listenerPort` or `tnsAlias`

- Force log switches mode
  
  `forceLogSwitches, password, listenerPort` or `tnsAlias`

### 9.9.2.2 Output Files

- `CONTROL.SQL`
- `CONTROL.TRC`
- `init<TARGET_DBSID>.ora`
- `ora_br_copy.log`
- `OraBRCopy.console.log`

### 9.10 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](image)

  An error like the following occurs during the upgrade of a Java system based on SAP NetWeaver 7.0x:

  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 (7OSWPM*.SAR) fails due to incorrect parameter instanceID.

  ![Example](image)

  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:
Software Life-Cycle Options ▶ Additional Preparation Options ▶ Adjust instanceID of an AS Java Instance

Caution

If the AS Java instance uses a virtual host name, start the installer with the installer property SAPINST_USE_HOSTNAME as follows:

```bash
./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](https://support.sap.com/product/SAPINST_USE_HOSTNAME=False).
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 including EHP1:</td>
<td><a href="https://help.sap.com/viewer/p/SAP_NETWEAVER">SAP NetWeaver 7.0 Including Enhancement Package</a></td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP2:</td>
<td><a href="https://help.sap.com/viewer/p/SAP_NETWEAVER">SAP NetWeaver by Key Capability</a></td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including EHP3:</td>
<td><a href="https://help.sap.com/viewer/p/SAP_NETWEAVER">Information Integration: Key Areas</a></td>
</tr>
<tr>
<td></td>
<td><a href="https://help.sap.com/viewer/p/SAP_NETWEAVER">Knowledge Management Administration Guide</a></td>
</tr>
<tr>
<td></td>
<td><a href="https://help.sap.com/viewer/p/SAP_NETWEAVER">Minimal Configuration for Knowledge Management</a></td>
</tr>
<tr>
<td></td>
<td><a href="https://help.sap.com/viewer/p/SAP_NETWEAVER">Cluster Only: Assigning Tasks to Nodes</a></td>
</tr>
</tbody>
</table>

Table 65:

Related Information

Running the Installer [page 56]
## 9.11 Online Information from SAP

More information is available online as follows:

<table>
<thead>
<tr>
<th>Title</th>
<th>Internet Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running an SAP System on IBM Db2 <code>&lt;Version&gt;</code> with the Db2 pureScale Feature</td>
<td>IBM Db2 10.5: <a href="https://help.sap.com/viewer/db6_purescale_10_5">https://help.sap.com/viewer/db6_purescale_10_5</a> (PDF version <a href="https://help.sap.com/viewer/db6_purescale_10_5">here</a>)&lt;br&gt;IBM Db2 10.1: <a href="https://help.sap.com/viewer/db6_purescale_10_1">https://help.sap.com/viewer/db6_purescale_10_1</a> (PDF version <a href="https://help.sap.com/viewer/db6_purescale_10_1">here</a>)</td>
</tr>
<tr>
<td>Database Administration Using the DBA Cockpit: IBM DB2 for Linux, UNIX, and Windows</td>
<td><a href="https://help.sap.com/viewer/db6_dbacockpit">https://help.sap.com/viewer/db6_dbacockpit</a> (English)&lt;br&gt;<a href="https://help.sap.com/viewer/db6_dbacockpit_de">https://help.sap.com/viewer/db6_dbacockpit_de</a> (German)&lt;br&gt;Also available in PDF format in English and German</td>
</tr>
<tr>
<td>Database Administration Guide for SAP on IBM Db2 for z/OS</td>
<td><a href="https://help.sap.com/viewer/db2_administration_guide">https://help.sap.com/viewer/db2_administration_guide</a></td>
</tr>
<tr>
<td>SAP on Db2 for z/OS Community</td>
<td><a href="https://www.sap.com/community/topic/db2-for-zos.html">https://www.sap.com/community/topic/db2-for-zos.html</a></td>
</tr>
</tbody>
</table>
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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.

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