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Upgrade to Oracle Database 19c UNIX

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1 Document History

i Note

Before you start the implementation, make sure you have the latest version of this document, which is available at https://help.sap.com/viewer/ora_upgr_unix_19c.

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

Version	Date	Description
1.0	2019-12-19	Initial Version for 19c

2 Introduction

This documentation describes how to upgrade the Oracle database for the SAP system on the **UNIX** operating system to Oracle Database 19c:

The upgrade path depends on your current Oracle database version:

- If you are currently running 11.2.0.4, 12.1.0.2, or 12.2.0.1, you can upgrade directly to 19c.
- If you are running an Oracle database release 11.2.0.3 or earlier, a direct upgrade to 19c is not supported.

Oracle supports the manual database upgrade and the upgrade with the Database Upgrade Assistant (DBUA). In this document only, the recommended upgrade procedure with DBUA is described.

⚠ Caution

SAP products running with SAP BASIS 7.00 and above, and SAP kernel release 7.21 EXT and above, are certified for Oracle Database 19c.

Implementation Considerations

- For more information about implementation considerations, including the most important SAP Notes for the upgrade, see [Planning \[page 8\]](#).
- Be sure to read the relevant SAP Notes before beginning the upgrade. These notes contain the most recent information about the upgrade, as well as corrections to the documentation. You can find the most recent version of the SAP Notes at <http://support.sap.com/notes>.
- You use the tools Oracle Universal Installer (OUI), MOPatch, Opatch, Oracle SQL*Plus, and Oracle Database Upgrade Assistant (DBUA) to perform the upgrade.

Naming Conventions

Name	Meaning
<DBSID>	Name of the SAP / Oracle database
<SAPSID>	SAP system name
<ora_swo>	Name of the operating system account for the Oracle database software owner. The name of the software owner is either <code>ora<dbsid></code> or <code>oracle</code> , depending on whether your user concept is SAP Classic or Oracle Standard. For more information, see SAP Note 1915323 .

Name	Meaning
<ora_dba>	Name of the operating system account for the Oracle database administrator. For more information about user concepts, see 1915323 .
<New_Oracle_Home>	Name / path of the new Oracle home with the new Oracle database release
<Old_Oracle_Home>	Name / path of the current Oracle home before the database is upgraded to the new release
<IHRDBMS>	Installation Oracle Home e.g. /oracle/<DBSID>/19.0.0
<OHRDBMS>	Runtime Oracle Home e.g. /oracle/<DBSID>/19

2.1 SAP Notes for the Oracle Database Upgrade

Make sure that you read the following SAP Notes:

Number	Title
2817074	Oracle Database 19c: Integration in SAP environment
2799920	Patches for 19c: Database
2800001	Upgrading to Oracle Database 19c
279900	Central Technical Note for Oracle Database 19c
2660017	Oracle Database 19c Installation on Unix
2599248	Oracle 19c: No unzip utility delivered in \$ORACLE_HOME/bin
2540847	SAP Guides for Oracle Database Upgrade
2800021	Oracle Database Upgrade with Grid Infrastructure (12.2)
2470718	Oracle Database Parameters (12.2)
2087004	BR*Tools support for Oracle 12c
1915314	Removing Oracle Homes (Uninstalling Oracle Database Software)
1598594	BR*Tools Configuration for Oracle installation using user "oracle"
1521371	Setting of ORACLE_BASE in SAP environments

Number	Title
1027012	MOPatch – Install Multiple Oracle Patches in One Run
839182	Oracle patch installation with OPatch
819829	Oracle Instant Client Installation and Configuration on Unix or Linux

2.2 More Support Information

You can find more information as follows:

Description	Internet Address
Oracle database software, including patches - at SAP Support Portal	https://launchpad.support.sap.com/#/softwarecenter/database Oracle
SAP Notes - at SAP Support Portal	http://support.sap.com/notes
Resources for SAP systems on the Oracle database - at SAP on Oracle Community	https://www.sap.com/community/topic/oracle.html
SAP Software Distribution Center - at SAP Support Portal	http://support.sap.com/swdc
SAP Database Administration for Oracle Databases - at SAP on Oracle Community	https://www.sap.com/community/topic/oracle.html Oracle DBA Overview Getting Started SAP Database Guide: Oracle

3 Planning

→ Recommendation

Before the production upgrade, make sure that you perform a test upgrade on your backup system.

1. You [identify the supported upgrade path \[page 8\]](#).
2. You [check the original version of your database \[page 8\]](#).
3. You [check the hardware and software requirements \[page 9\]](#).
4. You [use the Oracle upgrade checklist for production use \[page 9\]](#).

3.1 Identifying the Supported Upgrade Path

To upgrade directly to Oracle Database 19c, your source release must be Oracle Database 11g Release 2 (11.2.0.4), Oracle Database 12c Release 1 (12.1.0.2) or Oracle Database 18c Release 2 (12.2.0.1).

If you are running another Oracle database release, a direct upgrade to 19c is not supported.

For more information, see SAP Note [2800001](#).

3.2 Checking the Original Version of Your Database

Use

You can check the original version of the database you want to upgrade and, if necessary, obtain more information.

Process

To check the original version of your database, enter these commands from the environment of the source database as the appropriate database user:

```
SQL> select version from v$instance;
```


3.3 Checking Hardware and Software Requirements

Use

You need to check that you meet the hardware and software requirements for running the new Oracle release, including the kernel parameters and shell limits.

Procedure

1. Check the complete list of hardware and software requirements for every platform included in the Oracle documentation, which you can find in chapter *Installation Checklist* in the Oracle Database Installation Guide 19c for your platform, available at <https://docs.oracle.com/en/database/oracle/oracle-database/19/install-and-upgrade.html> .
The hardware and software requirements are also checked in detail during the software installation phase. You can access the complete Oracle documentation as a member of the Oracle Technology Network (OTN).
2. Check the Oracle-recommended kernel parameters and shell limits for your operating system with Oracle Database 19c. The kernel parameters and shell limits are also checked in detail during the software installation phase.
These are only **recommendations** from Oracle for optimizing the system performance in production environments. If the recommended settings are not suitable for your system you must tune the kernel parameters accordingly.
You can obtain the recommended shell limits and kernel parameters from the relevant Oracle database **installation** guide for your operating system at: <https://docs.oracle.com/en/database/oracle/oracle-database/19/install-and-upgrade.html>
3. If you are upgrading to Oracle Database 12c or 19c with the operating system SUSE Linux Enterprise Server (SLES) 12, see SAP Note [1984787](#).

3.4 SAP Specific Prerequisites

Use

You need to check the following items before starting the SAP system for production use of your upgraded system.

Prerequisites

As of Oracle Database 12c Release 1, SAP supports the user concepts SAP Classic and Oracle Standard, as described in SAP Note [1915323](#). You need to decide which user concept you want to deploy.

Procedure

→ Recommendation

To reduce the complexity of the database upgrade and to reduce database downtime to a minimum, we strongly recommend you to perform the steps below where indicated **before** starting the actual [Oracle Database Upgrade \[page 13\]](#).

1. Specify your user concept and, if necessary, perform user migration (you can perform this step before starting the actual database upgrade):
 - If you decide on user concept Oracle Standard, migrate the Oracle software owner from `ora<dbSID>` to `Oracle` as part of the upgrade preparation, as described in SAP Note [1915317](#).
 - If you decide to stay with user concept SAP Classic, no user migration is needed. However, you can switch to the user concept Oracle Standard at any time after the upgrade if required.
2. Install the Oracle database software of the new release, including the recommended patches. For more information, see [Installation of Oracle Database Software \[page 14\]](#).
3. Install the version of the Oracle instant client that is currently recommended for Oracle 19c, which you can find in SAP Note [819829](#). For more information, see [Updating the Oracle Instant Client \[page 22\]](#).
4. Update BR*Tools to the version recommended for Oracle Database 19c, which is BR*Tools 7.40. For more information, see [Updating BR*Tools \[page 22\]](#).
When upgrading from Oracle 11g to 19c, you can perform this step **before** starting the actual database upgrade.
5. Make sure that you have installed the appropriate SAP kernel and that you have a supported version of your operating system. In addition, make sure that you have installed the required support packages for the SAP kernel supported for Oracle Database 19c. For AS Java or AS ABAP+Java, see also SAP Note [2632000](#).
For more information, check the SAP requirements for your application or product in the Product Availability Matrix (PAM) at <http://support.sap.com/pam>.
SAP products running with SAP BASIS 7.00 and above, and SAP kernel release 7.21 EXT and above, are certified for Oracle Database 19c.
SAP products running on Oracle Database 19c must use Oracle clients of version 12.1.0.2 V3 or higher, 12.2.0.1 or 19c.
6. Configure secure storage in file system (SSFS) for ABAP, otherwise the SAP system cannot start because it cannot connect to the database. In addition, consider the dependencies on the SAP kernel version. For more information, see [Configuring Secure Storage in File System \[page 11\]](#).
When upgrading from Oracle 11g to 19c, you can perform this step **before** starting the actual database upgrade.

4 Preparation

You must complete the following preparations:

1. You [download the software required for the upgrade \[page 12\]](#).
2. You [configure Secure Storage in File System \(SSFS\) \[page 11\]](#).
3. You [migrate to the Oracle Database Software Owner Oracle \[page 12\]](#)
4. You [install the Oracle database software \[page 14\]](#).

4.1 Configuring Secure Storage in File System

Use

For an ABAP or dual-stack (ABAP+Java) system running on Oracle 19c, you must configure Secure Storage in File System (SSFS), otherwise the SAP system cannot start. If you are currently running Oracle version 11g, you can configure SSFS in advance to avoid extra effort during or after the database upgrade.

Prerequisites

For SSFS, you require at least SAP kernel 7.20 patch 210 (non-Unicode) or patch 98 and DBSL patch 102 or higher. However, for Oracle 19c, you require a higher minimum SAP kernel, as described in [Upgrade Checklist for Production Use \[page 9\]](#).

Procedure

1. Follow the procedure described in SAP Notes [1639578](#) and [1622837](#), which describe the configuration of SSFS in detail.
2. Check that the environment variables from SSFS have been changed in the `.sapenv*` files in the home directory of OS user `<sapsid>adm`.

4.2 Downloading the Software for the Upgrade

Use

You need to download various software packages to perform the upgrade.

Procedure


1. Download the new Oracle Database software including server software, client software and required patches from:

<https://launchpad.support.sap.com/#/softwarecenter/database>  Database and Database Patches 
Oracle 

2. Download the latest version of the DBATOOLS (BR*Tools) at:


<http://support.sap.com/swdc> 


BR*Tools supports Oracle Database Release 19c, as of release 7.40 (Patch Level 35 or higher).

For more information, see SAP Note [2763733](#) .

4.3 Migrating to the Oracle Database Software Owner Oracle


Use

As of Oracle Database 19c, SAP supports the user concepts SAP Classic and Oracle Standard, as described in SAP Note [1915323](#) .

- If you decide on Oracle Standard, migrate the Oracle software owner from `ora<dbSID>` to `oracle` as part of the upgrade preparation, as described in SAP Note [1915317](#) .
- If you decide to stay with SAP Classic, no user migration is needed.

For more information, see SAP Notes [1915323](#)  and [1915317](#) .

Procedure

1. Migrate the Oracle database software owner following the description in SAP Note [1915317](#) , using the tools attached to the note.

5 Oracle Database Upgrade

For the Oracle database upgrade, see the *Upgrading to Oracle Database 19c* SAP Note [2800001](#).

6 Installation of Oracle Database Software

As part of the preparations, you install the Oracle Database 19c software.

Process Flow

1. You [back up the central Oracle inventory \[page 14\]](#).
2. You [install the new Oracle database 19c software \[page 15\]](#).
3. You [install the current SAP bundle patch \[page 16\]](#).

6.1 Backing Up the Central Oracle Inventory

Use

Before you install the new Oracle database patch set software, we recommend that you back up the central Oracle inventory.

Procedure

1. If the Oracle inventory exists, check its location by looking at the entry in one of the following files:
 - For example, AIX, HP-UX, Solaris SPARC: `/var/opt/oracle/oraInst.loc`
 - For example, Linux: `/etc/oraInst.loc`

The location is shown as follows:

```
inventory_loc=<Path_to_Oracle_Inventory>
```

2. Make a backup of your existing Oracle inventory by entering the following commands:

```
cd <Path_to_Oracle_Inventory>
```

```
cd ..
```

```
cp -r oraInventory oraInventory.<Date>.SAVE
```

Alternatively, you can enter the following command:

```
zip -r oraInventory.zip oraInventory
```

6.2 Installing the New Oracle Database Software

Proceed as follows to install the new Oracle database software.

Prerequisites

A graphical user interface (GUI), for example `x11`, is required for the Oracle database software installation with `runInstaller`. For more information, see the documentation of your operating system.

In order to extract the Oracle home image file and later Oracle SAP Bundle Patches (SBPs), the utility “unzip” must be installed on the system. This utility is a prerequisite for the installation of Oracle Database 19c.

Unzip utility version 6.00 or later is required. For more information, see SAP Note [2599248](#).

Context

The file format and the installation procedure has been changed for Oracle 19c.

For more information about how to install Oracle Database 19c software, see SAP Note [2660017](#).

Procedure

1. Log on as the Oracle database software owner `<ora_swo>`.
2. Make sure that the `DISPLAY` (for dialog mode) is set in the environment.
3. Set environment (Bourne Shell) `export DB_SID=<DBSID>`.
4. Start the OUI with the Oracle database software owner user `<ora_swo>` as follows:

```
<Media>/<OS>/db_home/SAP/RUNINSTALLER
```

For more information on further options, see SAP Note [2660017](#).

5. To exit the OUI, choose `Close` and confirm the dialog box that appears.

In the event of error during the software installation, see the troubleshooting information in SAP Note [1915299](#).

6.3 Installing the Current SAP Bundle Patch






After the installation of the Oracle Database software, you need to install the current (that is, the latest) SAP bundle patch (SBP) into the new Oracle home.

Prerequisites

1. Changing the Oracle Home
 - With MOPatch, you install the SAP Bundle Patch (SBP) into the Oracle Home. This updates the Oracle home software to the new SAP Bundle Patch (SBP).
 - You must perform this step before you create or upgrade the database.
2. Changing the Database
 - The database must be adapted to the new SBP by performing certain SBP post-installation tasks (`catsbp`) and by adapting database parameters.
 - The step must be done after the database has been upgraded. For detailed instructions see the `SBP README` file.

Check the following SAP Notes to find a cross-reference to the current SAP Note with the list of required patches to be installed.

SAP Notes

Number	Titel
2799920 	Patches for 19c: Database
2799930 	Patches for 19c: Grid Infrastructure
2799940 	Patches for 19c: Exadata / SuperCluster
2799969 	Patches for 19c: Oracle Database Appliance
2799970 	Patches for 19c: Oracle Exadata Cloud Service

You must install the SBP using the Oracle tool MOPatch. The Database Upgrade without SBP is not supported.

Procedure

1. Download the required patches.
2. Log on as the Oracle database software owner `<ora_swo>`.
3. Install the SBP into the new Oracle home according to the instructions in the SBP README file.

7 Post-Upgrade Steps

After the Oracle database upgrade, you need to perform the steps described here.

1. You [update oratab \[page 17\]](#).
2. You [check the symbolic link for the runtime Oracle home \[page 18\]](#).
3. You [adapt the environment of the <sapsid>adm user \[page 18\]](#).
4. You [update the SQL*Net configuration files \[page 19\]](#).
5. You [start the database listener \[page 19\]](#).
6. You [start the database instance \[page 20\]](#).
7. You [perform the post-installation steps for the SAP bundle patch \[page 21\]](#).
8. You [perform post-upgrade tasks \[page 24\]](#).
9. You [check the database parameters \[page 21\]](#).
10. You [update the Oracle Instant Client \[page 22\]](#).
11. You [update BR*Tools executables \[page 22\]](#).
12. You [Updating Database Statistics \[page 24\]](#).
13. You [back up the database \[page 25\]](#).
14. If required and not yet done, [update the SAP executables \[page 25\]](#).
15. If not yet done, [configure the Secure Storage in the File System \(SSFS\) \[page 11\]](#).
16. For systems with Java components – AS Java or AS ABAP+Java – [update the JDBC driver references \[page 26\]](#).
17. You [restart the SAP system \[page 27\]](#).
18. If not already done, you migrate from software owner ora<dbSID> to software owner Oracle, as described in [Migrating to the Oracle Database Software Owner Oracle \[page 12\]](#).
19. You [deinstall the old Oracle Home \[page 28\]](#).
20. You follow the instructions in SAP Note [2157904](#). Otherwise you might run into Oracle error ORA-39726 (Unsupported add / drop column operation on compressed tables) when adding additional fields to a table. This might occur when you import Support Packages or when you manually add fields in transaction SE11.
21. You make sure that you have installed the required support packages for the SAP kernel supported for Oracle 19c. For AS Java or AS ABAP+Java, see also SAP Note [2632000](#).

i Note

Make sure that you have installed the required SAP Bundle Patch. For more information, see [Installing the Required SAP Bundle Patch \[page 16\]](#).

7.1 Updating oratab

1. After the database upgrade, change the entry in `/etc/oratab` or `/var/opt/oracle/oratab` so that it now looks as follows:

```
<DBSID>:/oracle/<DBSID>/19:N
```

For more information, see SAP Note [2660027](#).

7.2 Checking the Symbolic Link for Runtime Oracle Home

Use

By default, when you install the Oracle database software with `RUNINSTALLER`, the symbolic link `/oracle/<DBSID>/19` is created by `RUNINSTALLER`.

Procedure

1. Change to the required directory:
`cd /oracle/<DBSID>`
2. Check that the following symbolic link exists:
`ls -l /oracle/<DBSID>/19`
3. If this link does not exist, create a symbolic link to the relative path of the new Oracle home:
`cd /oracle/<DBSID>`
`ln -s 19.0.0 19`

7.3 Adapting the Environment of the <sapsid>adm user and ora<dbsid> user

Use

You have to change the environment of user `<sapsid>adm` for SAP application servers that are installed on the Oracle database server. You need to make sure that the changes you made to the Oracle user environment are permanently stored in the profiles `.dbenv_hostname.csh`, `.dbenv_hostname.sh`, `.dbenv.csh`, and `.dbenv.sh`.

Procedure

1. Log on as user `<sapsid>adm` and adapt the variables listed below in the `.dbenv*` files.
2. Change the `ORACLE_HOME` values from `<Old_Oracle_Home>` to `<New_Oracle_Home>`.
3. Set `ORACLE_BASE` to the new Oracle base `/oracle/<DBSID>`.
4. Adapt the `PATH` variable so that it no longer contains references to the old Oracle home.

5. After you have made these changes login as `<sapsid>adm` and check the environment with:

```
$ env | grep ORACLE_HOME
```

```
$ env | grep ORACLE_BASE
```

```
$ env | grep PATH (this should no longer contain a reference to older database versions)
```

i Note

Make sure that the environment does not contain any variables that still refer to the old database release.

6. Repeat the steps 1 to 5 for `ora<sid>`.

7.4 Updating the SQL*Net Configuration Files

Use

You need to check/adapt the SQL*Net files that are located in the directory `<Oracle_Home>/network/admin` and in the directory (server) pointed to by the environment variable `TNS_ADMIN` (client), for example, under `/usr/sap/<SID>/SYS/profile/oracle`.

i Note

DBUA modifies the `SQLNET` profiles in the directory `<Oracle_Home>/network/admin`.

Procedure

Follow the description in SAP Note [2800001](#)  Step: *Checking SQL*Net Files in <NEW_ORACLE_HOME>*

7.5 Starting the Database Listener

Use

You need to restart the Oracle database listener.

Procedure

1. Log on as follows:
 - User concept SAP Classic
Log on as ora<dbSID>.
 - User concept Oracle Standard
Log on as ora<dbSID> or as oracle.
For more information, see SAP Note [1915317](#).
2. ○ If the listener was not migrated by DBUA:
Stop listener if still running from <OLD_ORACLE_HOME>
Start listener from <NEW_ORACLE_HOME>
 - After the upgrade with DBUA the database instance is running from the new Oracle Home, but with <IHRDBMS> instead of <OHRDBMS>.

Restart the listener from the new environment:

```
lsnrctl status <listener name>
lsnrctl stop <listener name>
lsnrctl start <listener name>
lsnrctl status <listener name>
```

7.6 Starting the Database Instance

Use

You need to restart the Oracle database instance as it is running from new Oracle Home /oracle/<DBSID>/19.0.0 (installation Oracle Home IHRDBMS) instead of /oracle/<DBSID>/122 (runtime Oracle Home OHRDBMS).

Procedure

1. Log on as the Oracle database administrator <ora_dba>.
2. Stop the database from <IHRDBMS>:

```
setenv ORACLE_HOME /oracle/<DBSID>/19.0.0
sqlplus / as sysdba
SQL> shutdown immediate
SQL> quit
```
3. Start the database from <OHRDBMS>:

```
setenv ORACLE_HOME /oracle/<DBSID>/19
sqlplus / as sysdba
startup
```
4. Verify from which <ORACLE_HOME> the database was started with `$grep "ORACLE_HOME:" <alert.log>`.

7.7 Performing SAP Bundle Patch Post-Installation Steps

Use

You have installed an SAP bundle patch (SBP) before you upgraded to the new Oracle Release. Now you need to run the SBP post-installation steps.

Procedure

1. Run the SBP post-installation instructions as described in the README of the SBP that is installed in the new Oracle home.

7.8 Performing Post-Upgrade Checks

Use

You run the SAP-specific database post-upgrade check scripts.

i Note

You always execute these post-upgrade scripts as Oracle database administrator `<ora_dba>`. We recommend that you use `<sapsid>adm` since for these users the Oracle environment is already set. If you use Oracle software owner `oracle` for this task, you must first set the environment, as described in SAP Note [2800001](#).

Procedure

1. Run the Post-Upgrade Status Tool, the post-upgrade scripts and to check the compatible parameter. For more information, see *SAP Database Upgrade Steps (3)* in SAP Note [2800001](#).

7.9 Checking and Updating the Database Parameters

After the database upgrade, you need to check and set the database parameters, as described in SAP Note [2470718](#). You might need to change the settings of existing parameters, delete parameters, or add new parameters. Check SAP Note [1171650](#) to see whether an automated script for Oracle 19c is already

available. This helps you check whether your SAP system complies with the database parameter recommendations at any given point in time.

7.10 Updating the Oracle Instant Client

Use

After the upgrade, you need to check whether you must install a newer version of the Oracle instant client.

For more information on the recommended versions, see the Product Availability Matrix (PAM) at <http://support.sap.com/pam> and SAP Note [819829](#). A mixture of different Oracle instant client versions on different SAP application servers running in the same SAP system is not supported.

7.11 Updating BR*Tools Executables

Use

You update BR*Tools to the latest release, with the latest patch level. For more information, see SAP Notes [2763733](#), [12741](#), and [1598594](#).

i Note

You can also update BR*Tools as described here during the preparation phase.

Prerequisites

As of Oracle Database 12c Release 1, the configuration of BR*Tools has changed in comparison to earlier Oracle versions. The BR*Tools profile is now located in the `$SAPDATA_HOME/sapprof` directory.

For more information, see SAP Notes [2763733](#) and [2799900](#).

You should therefore configure the BR*Tools according to the new BR*Tools configuration default.

The new `sapprof` directory in `$SAPDATA_HOME` contains the following files:

- `init<DBSID>.sap`: BR*Tools profile
- `init<DBSID>.utl`: backup utility parameter file (backint profile, if it exists)
- `init<DBSID>.ora`: transparent copy of Oracle database profile

Procedure

1. Download the most current version of BR*Tools from <http://support.sap.com/swdc> **Software Downloads** **Support Packages and Patches** **Browse Download Catalog** **Additional Components** **SAP Kernel** **SAP KERNEL <platform>** **SAP KERNEL <version>** **<Platform>** **ORACLE** **DBATLxxx.SAR**, following the descriptions in SAP Notes [2087004](#) and [12741](#) and adapt the permissions as described in SAP Note [1598594](#).
2. Create the `sapprof` directory in `$$SAPDATA_HOME`:

```
$ mkdir -p $$SAPDATA_HOME/sapprof
```
3. Copy the files `init<DBSID>.sap` and if it exists `init<DBSID>.utl` (from `<OLD_ORACLE_HOME>`), and `init<DBSID>.ora` (from `<NEW_ORACLE_HOME>`) to the `sapprof` directory.
4. Replace the file `init<DBSID>.ora` in the `$$ORACLE_HOME/dbs` directory with a profile that contains only the `spfile` parameter.

❁ Example

```
spfile = $$ORACLE_HOME/dbs/spfile<DBSID>.ora
```

5. Delete the files `init<DBSID>.sap` and `init<DBSID>.utl` (if they exist) from directory `$$ORACLE_HOME/dbs`.
6. Update the parameters `util_par_file` / `util_par_file_arch` in `init<DBSID>.sap`, if necessary (that is, if they refer to path `$$ORACLE_HOME/dbs`).

❁ Example

```
Replace util_par_file = $$ORACLE_HOME/dbs/init<DBSID>.utl with  
util_par_file = $$SAPDATA_HOME/sapprof/init<DBSID>.utl.
```

For non-ASM installations, the spfile `spfile<DBSID>.ora` remains in the directory `$$ORACLE_HOME/dbs` by default whereas in ASM installations, it is located on an ASM disk.

⚠ Caution

If `$$ORACLE_HOME/dbs` already contains an `init<DBSID>.ora` that contains only the parameter `spfile`, create an empty `init<DBSID>.ora` in the `sapprof` directory with the relevant authorizations. This file is automatically updated by an upcoming operation with an SAP BR*Tools program.

❁ Example

The resulting permissions are as follows:

- File permissions for software owner `oracle` (Oracle Standard user concept):

```
drwxrwxr-x 2 oracle oinstall 4096 May 31 17:30 sapprof  
-rw-rw-r-- 1 oracle oinstall 1274 May 31 17:30 init<DBSID>.ora  
-rw-rw-r-- 1 oracle oinstall 26534 May 31 17:30 init<DBSID>.sap
```
- File permissions for software owner `ora<dbsid>` (SAP Classic user concept)

```
drwxrwxr-x 2 or<dbsid> dba 4096 May 31 17:30 sapprof  
-rw-rw-r-- 1 ora<dbsid> dba 1274 May 31 17:30 init<DBSID>.ora  
-rw-rw-r-- 1 ora<dbsid> dba 26534 May 31 17:30 init<DBSID>.sap
```

7. Only valid for 'Platform': AIX
For AIX 6.1 or higher, enter the settings for all BR executables for AIX RBAC (Role-Based Access Control), as described in SAP Note [1598594](#).
Enter the settings for the following paths:
- o /usr/sap/<SID>/SYS/exe/run
 - o /sapmnt/<SID>/exe
 - o /sapmnt/<SID>/exe/uc|nuc/platform
- End of 'Platform': AIX

7.12 Updating Database Statistics

Use

You need to perform this task as <sapsid>adm.

Procedure

i Note

When you use SecureStore for the BR*Tools, replace the `-u /` in the brconnect commands below with `-u //`.

For example, use `brconnect -u // -c -f stats -t system_stats` instead of `brconnect -u / -c -f stats -t system_stats`

1. Gather Oracle optimizer statistics by executing the following commands as the administration user <sapsid>adm:

```
brconnect -u / -c -f stats -t system_stats
brconnect -u / -c -f stats -t oradict_stats
```

i Note

You can perform this step later if required.

2. Update the Oracle database statistics with BRCONNECT as follows:

```
brconnect -u / -c -f stats -t all -f collect -p 4
```

For more information about update statistics, see the documentation *SAP Database Guide: Oracle* at: <http://scn.sap.com/community/oracle> ► [SAP ON ORACLE KNOWLEDGE CENTER](#) ► [SAP Documentation](#) ►

i Note

You can perform this step later if required.

7.13 Backing Up the Database

Use

After the upgrade, you need to back up your Oracle database.

⚠ Caution

You risk losing data if you do not back up your database.

Procedure

Perform a full database backup.

♣ Example

You can enter a command like the following to perform a full database backup:

```
brbackup -u / -type offline -mode all -device disk -compress yes -language E
```

7.14 Updating the SAP Executables

Use

If you are not running a SAP kernel supported for Oracle 19c yet, you need to update the SAP executables to the latest SAP kernel supported for Oracle 19c. This is a task for the `<sapsid>adm`.

Procedure

For supported SAP kernels 7.21 EXT, 722_EXT, 749 and 753 see the procedure in SAP Note [2083594](#).

⚠ Caution

In an MCO system, you have to update the executables of **all** SAP systems connecting to the database.

7.15 Updating the JDBC Driver References

This topic is only valid for 'Technology': Dual Stack (ABAP+Java), Java

Use

If you have an SAP system with Java components, you have to change the JDBC driver references after you have upgraded the database client software. Otherwise, the J2EE Engine cannot start because the driver references still point to the old Oracle client software home.

i Note

You only need to perform this procedure if the major version of your Oracle client software has changed.

If your SAP software is version 7.0 or below, follow SAP Note [867976](#) to change the JDBC driver references in the J2EE engine. For Oracle 12c, `DB_URL` has not changed

If your SAP software is version 7.1 or higher, change the reference to the JDBC driver in the instance profile as described below.

Prerequisites

- Secure storage in file system (SSFS) is enabled and configured
- SAP can connect to the database through the SSFS connect mechanism

Procedure

1. Change to the correct directory containing the file `<SAPSID>_J<Instance_Number>_<Host>`.
2. Open the file with your text editor and search for property `j2ee/dbdriver`.
3. Replace the old driver **location** with the new one:
for Oracle Client 121:
`/oracle/client/12x/instantclient/<Java_Class_Archive>.jar`
for Oracle Client 122:
`/oracle/client/122/instantclient/<Java_Class_Archive>.jar`
for Oracle Client 19c:
`/oracle/client/19/instantclient/<Java_Class_Archive>.jar`

⚠ Caution

Do **not** change the file `<Java_Class_Archive>.jar`, which is one of the following:

- `ojdbc14.jar`

- `ojdbc6.jar`
- `ojdbc7.jar`
- `ojdbc8.jar`

End of 'Technology': Dual Stack (ABAP+Java), Java

7.16 Starting the SAP System

Use

You need to restart the SAP system.

Prerequisites

- The supported SAP kernel for Oracle 19c is installed.
- Secure storage in file system (SSFS) is configured.
- The switch to user `oracle` has been made (not necessary for user concept 'SAP Classic').
- The latest BR*Tools 7.40 are installed and configured.
- The recommended Oracle client software is installed.
- The environment has been adapted for the Oracle administration users such as `<sapsid>adm`.

Procedure

1. Log on as `<sid>adm`.
2. For SAP installations with an ABAP application server, enter this command to check whether R3trans can connect to the database:

```
R3trans -d
```

iNote

Connecting to the database with `R3trans -d` only works successfully if SSFS is already configured. For more information, see SAP Notes [1639578](#) and [1622837](#).

3. Start the SAP system:

```
startsap
```

You can also use `sapcontrol`.
4. Check the new Oracle version using SAP transaction ST04.
For Java systems check it with `http://<Hostname>:5<nr>` ► *System Information* ► *logon as Administrator* ► *Database* ►.

7.17 Deinstalling the Old Oracle Home

Use

Once the database is running correctly, it is recommended to deinstall the old Oracle Home to prevent accidental usage of the old binaries.

To delete the old Oracle Home, see SAP Note [1915314](#).

Procedure



Follow the procedure in the above SAP Note to deinstall the old Oracle Home directory.

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