ORACLE
DATABASE APPLIANCE

Using SAP NetWeaver with Oracle Database Appliance Software 12.1.2.6.0

Key Guidelines

ORACLE WHITE PAPER | MARCH 2016

ORACLE

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Disclaimer

Oracle Database Appliance Software 12.1.2.6.0 on Oracle Database Appliance X5-2 models do not support 11.2 databases for SAP environments due to some constraints. Please note earlier versions of Oracle Database Appliance models are unaffected and this disclaimer is solely applicable to X5-2 models only.

Oracle MOS Note 888888.1 dictates that databases on Oracle Database Appliance Software 12.1.2.6.0 on X5-2 models have to run on ACFS; however SAP and Oracle Database Appliance engineering worked together and do support Oracle databases for SAP on classic ASM diskgroup layouts.

Introduction

This document explains all the necessary steps to setup an SAP system using an Oracle Database Appliance Software 12.1.2.6.0 and later.

Note: This paper is for Oracle Database Appliance Software 12.1.2.6.0 and later releases.

All SAP products and solutions based on SAP NetWeaver Technology using a minimum SAP NetWeaver Version 7.0 are both certified and supported to be used with the Oracle Database Appliance. As an excerpt from SAP Note 2133079, SAP products such as SAP ERP 6.0, SAP BW 7.0 and later, SAP CRM 7.0, SAP SRM 7.0, SAP SCM 7.0 or SAP solutions such as SAP Banking Services version 6.0 and later can be used with the Oracle Database Appliance. Additional SAP products like:

- SAP NetWeaver MDM 7.1 SP12 and later
- Reporting Data Source of SAP Business Objects BI 4.0 (minimum SP10) and BI 4.1 (minimum SP04)
- Repository,source and target databases for SAP Data Services 4.2 (minimum SP 03)

can also be used with the Oracle Database Appliance.

The Oracle Database Appliance Software provides the following capabilities to an SAP environment:

- Highly available active-active clustered database server for SAP Applications
- Complete clustering solution for SAP High Availability Resources such as Application Server Central Services for both ABAP and JAVA stack (ASCS, SCS)
- Highly available file server for SAP required shared file systems such as /sapmnt and /usr/sap/trans.

The Oracle Database Appliance Software cannot be used to run SAP application instances. SAP application instances have to run on separate hosts and connect via network against the database(s) on the Oracle Database Appliance. In SAP terminology this is called a three tier architecture. This flexible three tier architecture allows any supported combination of hardware and operating systems running the SAP instances to be used with the Oracle Database Appliance, e.g. we can run or keep existing SAP Application servers on any supported platform connected to the Oracle Database Appliance. This flexibility allows an easy introduction of the Oracle Database Appliance in existing SAP environments as the SAP application layer remains unchanged.

The only SAP components which are supported to run on the Oracle Database Appliance Software are the SAP database administration tools (BR*Tools), SAP Application Server Central Services (ASCS, SCS), the SAP Enqueue Replication Server (ERS) and various SAP agents. This paper describes the SAP specific deployment and configuration on the Oracle Database Appliance with the Oracle components and their versions, SAP specific database requirements, information on how to install SAP required database patches for the Oracle Database Appliance Software and suggestions for the implementation of shared file systems for SAP installations.

Whilst both bare and virtualized deployments are possible on the Oracle Database Appliance this document illustrates the bare metal deployment as the virtualized deployment is not certified in an SAP environment.

Oracle Database Appliance version	OS release	End User Bundle version	Grid Infrastructure version	Database version
12.1.2.6.0	Oracle Linux 6.7	12.1.2.6.0	12.1.2.0.2+	12.1.2.0.2+ RAC 12.1.2.0.2+ Single Instance
12.1.2.6.0	Oracle Linux 6.7	12.1.2.6.0	12.1.2.0.2+	11.2.0.4.x+ RAC* 11.2.0.4.x+ Single Instance* * Not on X5-2 models

Please check the respective whitepaper on SCN for earlier versions of the Oracle Database Appliance.

When using SAP applications with the Oracle Database Appliance you can run Oracle Real Application Clusters 12c or 11gR2, or, Oracle Database 12c or 11gR2. Oracle Real Application Clusters One Node is not supported with SAP products and therefore cannot be used.

SAP Note 2290084 will be updated on a regular basis to reflect any changes on using SAP Applications with the Oracle Database Appliance.

Overall this document complements the existing Oracle Database Appliance documentation [1] and therefore it is assumed that the reader is familiar with the Oracle Database Appliance documentation.

To understand the requirements and steps outlined in this document it is necessary that the reader is also familiar with the SAP specific support notes and white papers on Oracle RAC [2] and Oracle ASM and HA capabilities [3].

SAP support notes [4] are available from the SAP Service Marketplace for authorized users.

Mixed Grid Infrastructure and RDBMS Versions

Starting with Grid Infrastructure (GI) version 12.1.0.2 it is now supported to run a certain mix of GI and RDBMS for SAP databases. With GI 12.1.0.2 Oracle supports to run RDBMS 11.2.0.4 and/or RDBMS 12.1.0.2 for SAP databases. Detailed information is being provided in SAP Notes 1677978 and 527843. Please remember the constraint for X5-2 models.

Oracle Database Appliance Software Installation Overview

To set up your Oracle Database Appliance Software for an SAP database, we follow below major steps:

1. Re-image the Oracle Database Appliance if needed

If the Oracle Database Appliance is delivered with a factory image of version less than 12.1.2.6.0, one has to re-image the Oracle Database Appliance with the OS ISO Image 12.1.2.6.0 or later. Download the ISO image following the links in Oracle Support Note 888888.1 and install it according to the instructions in the Oracle Database Appliance documentation.

2. Install the Oracle Database Appliance Bundle Patch

Install the Oracle Database Appliance Bundle Patch corresponding to the Oracle Database Appliance ISO image you installed in the first step (12.1.2.6.0 or later). It is recommended to install the Oracle Database Appliance Bundle Patch even after re-imaging the Oracle Database Appliance with an ISO image in Step 1 as the Oracle Database Appliance Bundle Patch may contain firmware patches that are not installed by the ISO image. Download the Oracle Database Appliance Bundle Patch following the links in Oracle Support Note 888888.1 and install it according to the instructions in the Oracle Database Application documentation.

3. Install and deploy the Oracle Database Appliance End User Bundle

Install the Oracle Database Appliance End User Bundle corresponding to your Oracle Database Appliance version and start the database deployment. Download the Oracle Database Appliance End User Bundle following the links in Oracle Support Note 888888.1. Install and deploy the end user bundle according to the instructions in section "Oracle Database Appliance for SAP Deployment" of this white paper.

4. Rollback DB PSU

This step aims for a faster installation of the SAPDBBundlePatch later on. Please follow chapter “Rolling back initial DB PSU”.

5. Use SWPM to prepare the Oracle Database Appliance for an SAP database

Run the SAP Software Provisioning Manager (SWPM) as described in section "SAP Software Provisioning Manager on Oracle Database Appliance" of this white paper to create SAP-specific OS users, create SAP-specific directories, and other preparations of the Oracle Database Appliance for an SAP database.

6. ASCS Instance installation

Before moving on creating a database instance SAP requires to have an Application Server ABAP Central Services instance. We perform this installation in high availability mode. Follow chapter “SWPM: ASCS Instance installation”

7. Create an SAP database instance

Run SWPM as described in section "Using SWPM on the Oracle Database Appliance" to create a new SAP database instance. This database instance will use the Oracle database software deployed by the Oracle Database Appliance End User Bundle in Step 3.

8. Install the latest SAP Bundle Patch for the Oracle Database Appliance

It is required that any database instance has the latest SAP-recommended Oracle Grid Infrastructure and database patches installed. Download the latest SAP Bundle Patch for the Oracle Database Appliance following the instructions in SAP Note 2145651 and install it according to the instructions in section "Installation of the SAP Bundle Patch for ODA" of this white paper.

9. Post installation considerations.

ASM Disk Groups for SAP Databases

The default ASM Disk Groups provided by the Oracle Database Appliance should be used for all SAP databases. For SAP production databases a redundancy level of high should be used to achieve the highest level of protection against any type of storage failure. Other SAP databases used for development, test and QA may use a normal ASM redundancy level.

In line with the standard Oracle Database Appliance setup you should use the ASM disk Groups “+DATA”, “+REDO” and “+RECO”. The DATA Group should contain all data files, control files, spfiles, OCR and voting disks. The RECO Group should contain temporary files, archive logs, flashback files, backups and a mirrored controlfile copy. The REDO Group should contain all non-multiplexed redo log files.

When storing more than one SAP database (e.g. SAP ERP database and SAP BW database or, SAP ERP database with an SAP CRM database or, multiple SAP ERP databases) on the Oracle Database Appliance all files of each of these SAP databases should follow the above recommendation and all be stored in the DATA , REDO and RECO disk groups.

For performance and throughput reasons it is recommended for each SAP database to have two control files, one in the DATA disk group and the other in the RECO disk group. Non-multiplexed online redo log files shall be stored in the REDO disk group. The REDO disk group is formed entirely by SSDs. Standard SAP installations use three control files in the database, thus it can be suggested to remove one control file from the spfile or init.ora. Standard SAP installations also create two members for each online redo log file. On the Oracle Database Appliance it is therefore possible to remove one member of each online redo log file for each redo thread. Three control files and multiplexed online redo log files are not needed on the Oracle Database Appliance as the control files and the online redo log files are stored in the DATA, RECO and REDO disk groups which already provide triple mirroring for each file at the Oracle ASM level due to the redundancy level of high.

Clustering Solution for SAP HA on Oracle Database Appliance

If you plan to implement SAP High Availability Resources such as Central Services for the SAP ABAP stack(ASCS, ERS), SAP JAVA stack(SCS, ERS) and/or SAP WebDispatcher SAPCTL is the tool of choice.

A detailed guide how to implement ASCS and ERS on Oracle Database Appliance is provided in SAP Note 1877857 at install time. Once installed this requires configuration against Oracle CRS using SAPCTL. Consult SAP Note 1496927 for download and guidance on SAPCTL. This document takes care of implementing ASCS + ERS high availability using SAPCTL.

SAP NetWeaver Products on the Oracle Database Appliance

SAP NetWeaver integration points are split between the parts that are certified to run on the Oracle Database appliance itself on one hand, and on other hand for those hosts that form the SAP application servers. Consequently we have to choose a certification that satisfies both database and host operation system requirements, which is SAP NetWeaver 7.41 (or higher) 64-bit Unicode.

Non-local software deployments need to run SAP Kernel Release 7.21 EXT or higher.

SAP NetWeaver products will be delivered with SAP Kernel Release 7.21 EXT and higher or with SAP NetWeaver 7.0 and higher. More related information can be found in SAP Notes 2290084, 1760737 and 1973403. Information leading entity is the SAP Product Availability Matrix, SAP PAM.

Character Set Requirements for SAP Databases

Fresh installations of SAP NetWeaver 7.x systems or higher provide Unicode support only. For an SAP Unicode installation it is required that both the character set and the national character set in the database is set to UTF8. SAP SWPM will take care about the character set and automatically choose the right one. With the current Oracle Database Appliance version one can decide whether a default database should be created or not. For SAP the recommendation is not to create a default database and bypass the step “Database Information”.

Non-Unicode SAP Installations

Existing non-Unicode SAP installations can be used with the Oracle Database Appliance. It is required for these non-Unicode installations that the character and national character set of the migrated databases from existing systems to the Oracle Database Appliance remain as in the original system.

It is mandatory that the SAP application of such a non-Unicode SAP installation runs on an operating system which supports the non-Unicode runtime requirements of SAP. The Product Availability Matrix (PAM) of SAP (http://www.service.sap.com/PAM) should be checked for valid operating system support for non-Unicode SAP installations.

In the case of non-Unicode installations it is highly recommended not to change the hardware nor operating system for the SAP application layer. Only the existing database server and storage layer should be changed to the Oracle Database Appliance.

Note: In the case of non-Unicode SAP installations you cannot run the SAP Central Services on the Oracle Database Appliance.

Shared File Systems in SAP Environments

In an SAP environment it is common that all SAP Application Servers have access to a shared file system (/sapmnt, /usr/sap/trans, ..) which stores the SAP kernels, profiles, trace files and provide the global SAP transport directory. Typical SAP installations implement such a shared file system using a NAS appliance, a cluster file system or via an NFS exported file system from the database server. Highest availability can be achieved via a cluster file system or, the NFS sourcing location is protected by special configurations like HA-NFS in order to avoid a single point of failure within the SAP environment.

If you already run an existing shared file system solution in your SAP environment not using an NFS exported file system from the database server it is recommended to keep this solution when moving to the Oracle Database Appliance.

The deployment phase of the Oracle Database Appliance offers the creation and configuration of a Cloud File System. This file system is based on Oracle's Advanced Cluster File System (ACFS) and can be used for /sapmnt on all application servers, if it is getting NFS exported from the database server. Post-deployment one can add additional file systems like /usr/sap/trans and others using the Advanced Storage Management Configuration Assistant (asmca).

In case of Oracle DataGuard deployments – and topographic switchover or failover scenarios ACFS based filesystems won’t fail over.

Oracle Database Appliance Node as an NFS Server

This is best described in Oracle MOS Note:1934030.1 ODA (Oracle Database Appliance): HowTo export ACFS (cloudfs) using HANFS.

Oracle Database Appliance Node as an NFS Client

This scenario is applicable to environments where /sapmnt is being consumed from a 3rd party and not part of the Oracle Database Appliance setup. We demonstrate here the nfs mount exported from sapstore to the local mountpoint /path/to/mountpoint.

Ensure that required packages are around, if not, install them.

```
[root@lsoda01]# rpm -qa | grep "nfs\|rpcbind"
rpcbind-0.2.0-11.el6.x86_64
nfs-utils-1.2.3-54.el6.x86_64
nfs-utils-lib-1.1.5-9.el6.x86_64
```

Create local mountpoint, check/start rpc service, mount, verify:

```
[root@lsoda01]# mkdir -p /path/to/mountpoint
[root@lsoda01]# chmod 755 /path/to/mountpoint
[root@lsoda01]# showmount -e sapstore
Export list for sapstore:
/export/Oracle_Data (everyone)
/export/Oracle_Home (everyone)
[root@lsoda01]# service rpcbind status ; service rpcbind start
Starting rpcbind: [ OK ]
[root@lsoda01]# mount sapstore:/export/Oracle_Home /path/to/mountpoint
[root@lsoda01]# mount

..

sapstore:/export/Oracle_Home on /path/to/mountpoint type nfs
(rw,vers=4,addr=10.17.30.74,clientaddr=10.20.91.105)
```

Oracle Database Appliance Software for SAP Deployment

This section describes the deployment of the Oracle Database Appliance Software End User Bundle for SAP. The deployment typically installs the Oracle Grid and RDBMS software and creates an Oracle Grid instance and an Oracle database. With Oracle Database Appliance Software version 12.1.2.6.0 we bypass the create database step, we deploy the RDBMS software only.

The deployment consists of two major pieces. The first piece is the pre-installation part, where all necessary customer specific parameters are collected and stored into a configuration file. The second part of the installation uses the information from the freshly created configuration file and kicks off 24 automated installation steps.

Before you start the deployment of the Oracle Database Appliance end user bundle ensure that you have the latest Oracle Database Appliance Bundle Patch installed. Review above section "Oracle Database Appliance Installation Overview" for more details. OAKEndUserBundle* files come as different file names when downloaded from MOS.

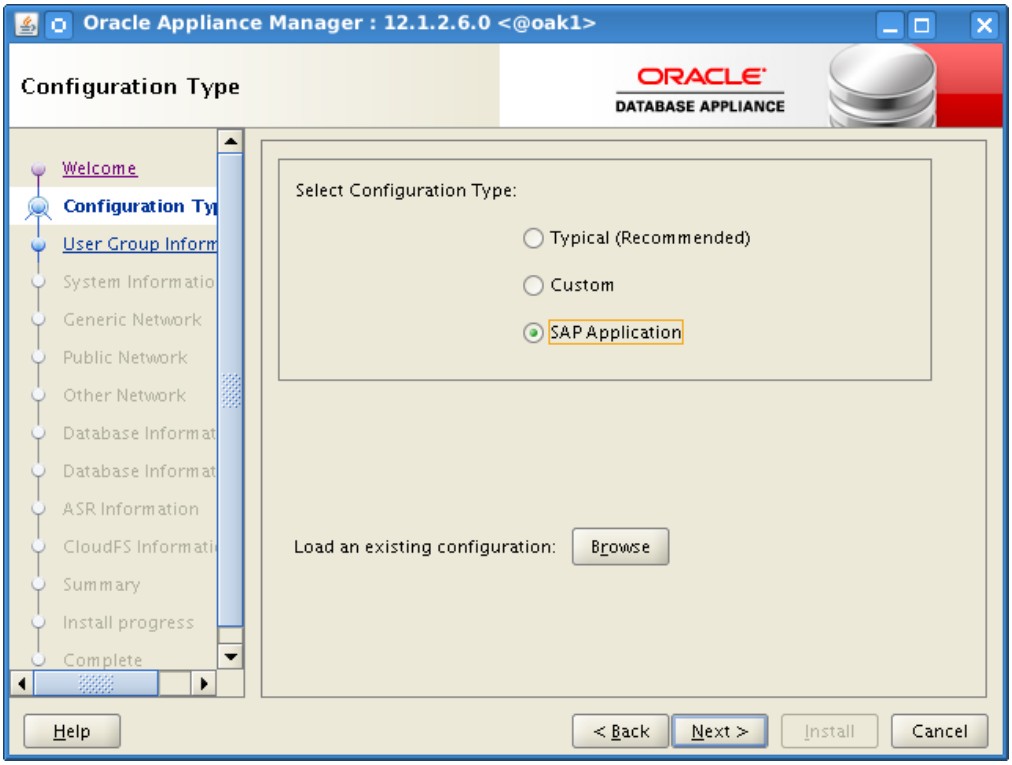
The next pages show a step by step deployment. We're using the –advance switch for "oakcli deploy".

Login as user root on the first node

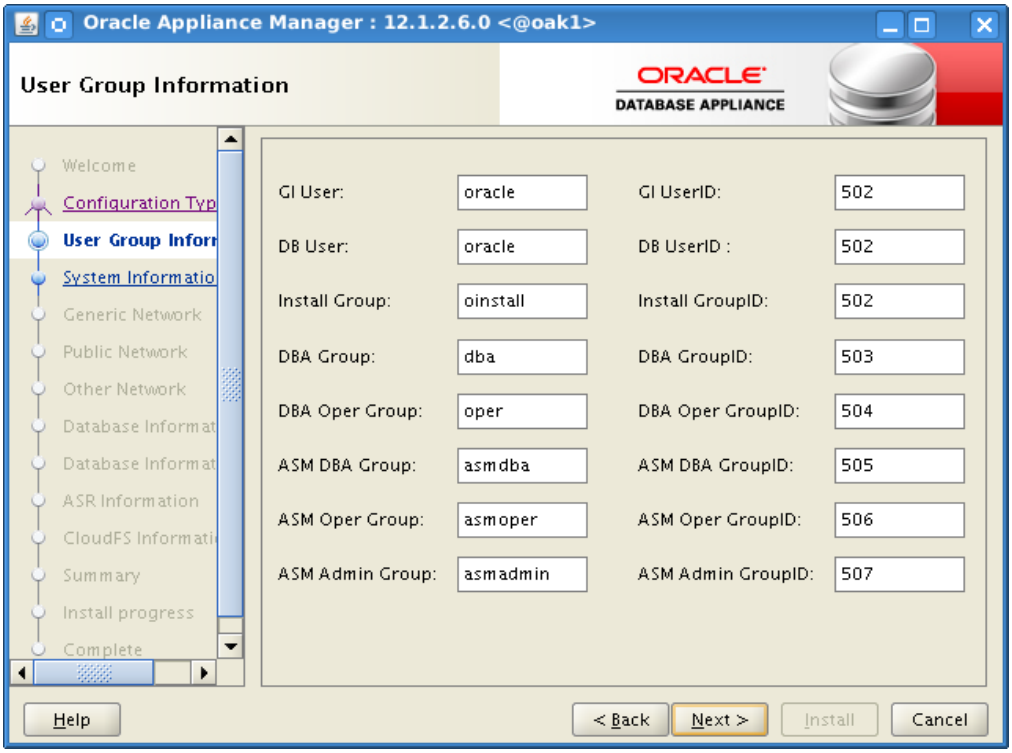
- `cd /tmp ; mv /path/to/OAKEndUserBundle_*of2.zip /tmp`
- `oakcli unpack -package /tmp/OAKEndUserBundle_1of2.zip`
- `oakcli unpack -package /tmp/OAKEndUserBundle_2of2.zip`

Repeat above commands on the second node.

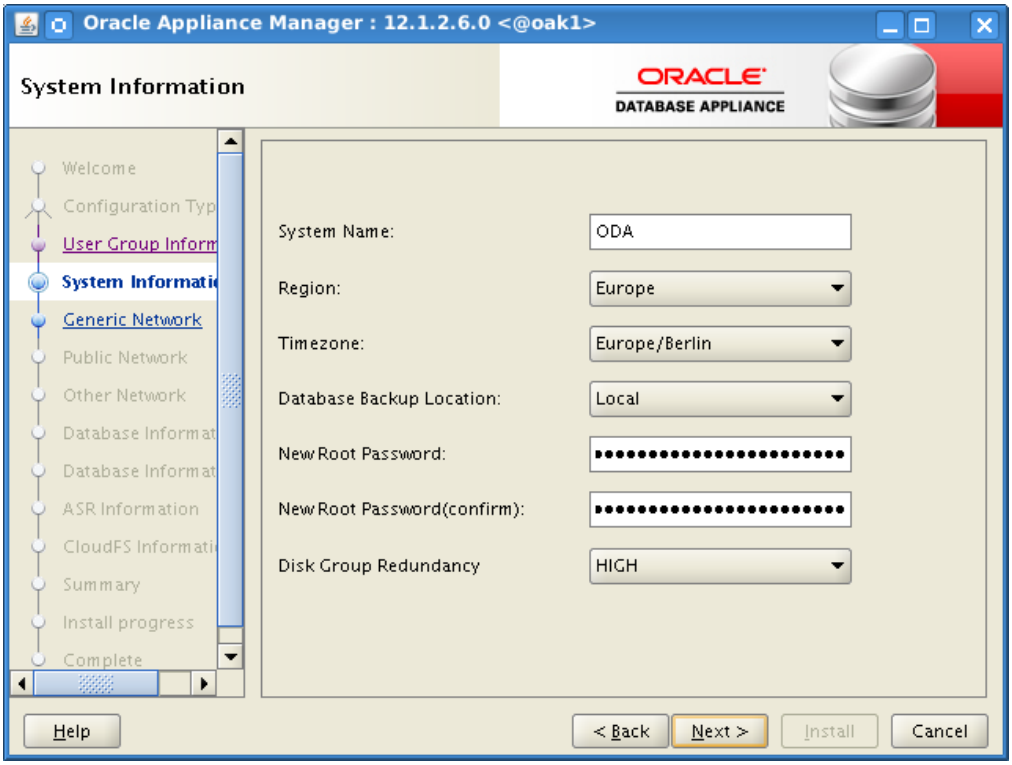
When finished run following command on the first node: `/opt/oracle/oak/bin/oakcli deploy –advance`



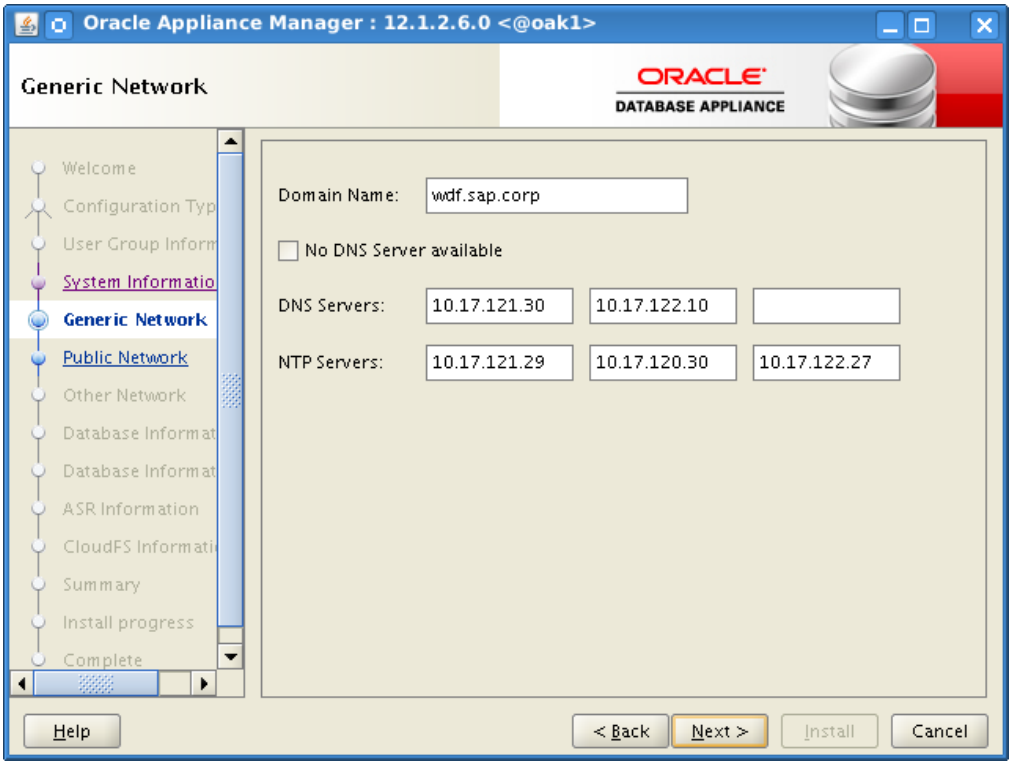
In case you've got an existing config file uploaded to the first net interface, "Browse" and locate the file. If not, select "SAP Application", click Next.

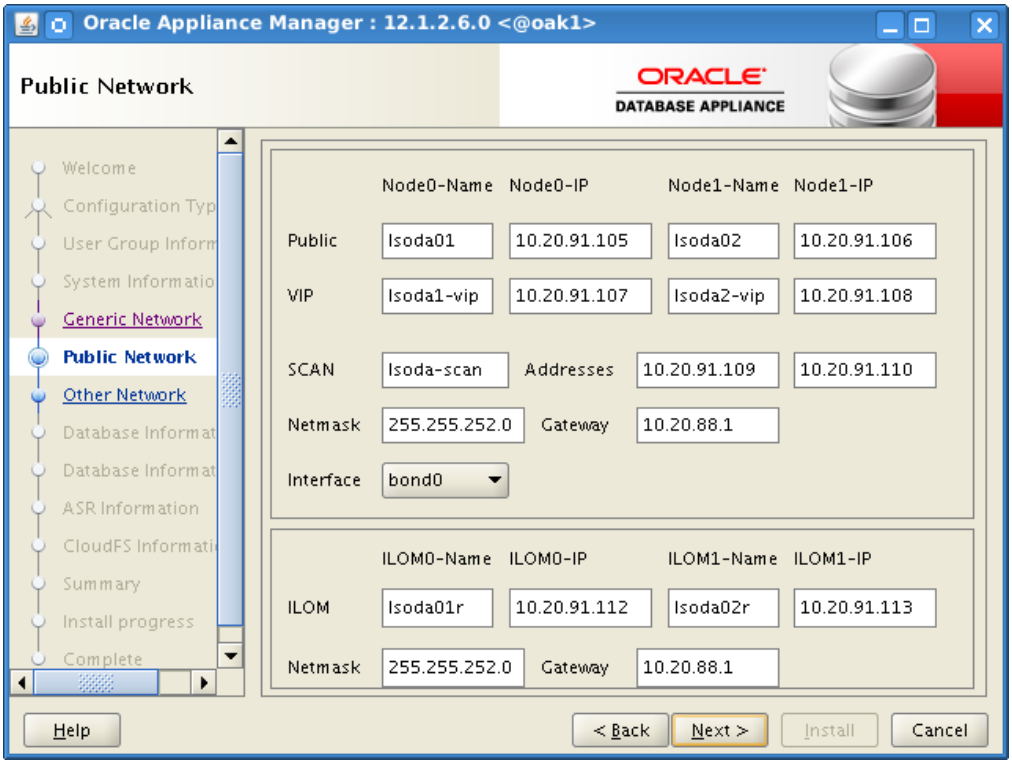


Set the user id and group id according to your environment. SAP defines the GI user and the DB user as oracle, the Install Group is oinstall, DBA Group is dba, DBA Oper Group is oper, ASM DBA Group is asmdba, ASM Oper Group is asmoper and ASM Admin Group is asmadmin.



Set System name and other main parameters, Help button provides assistance if needed. Oracle OS user + root will have identical passwords after deployment.


Oracle Appliance Manager : 12.1.2.6.0 <@oak1>
Generic Network
ORACLE
DATABASE APPLIANCE
Welcome
Configuration Typ
User Group Inform
System Informatio
Generic Network
Public Network
Other Network
Database Informat
Database Informat
ASR Information
CloudFS Informati
Summary
Install progress
Complete
Domain Name:
wdf.sap.corp
No DNS Server available
DNS Servers:
10.17.121.30
10.17.122.10
NTP Servers:
10.17.121.29
10.17.120.30
10.17.122.27
Help
< Back
Next >
Install
Cancel


Oracle Appliance Manager : 12.1.2.6.0 <@oak1>
Public Network
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DATABASE APPLIANCE
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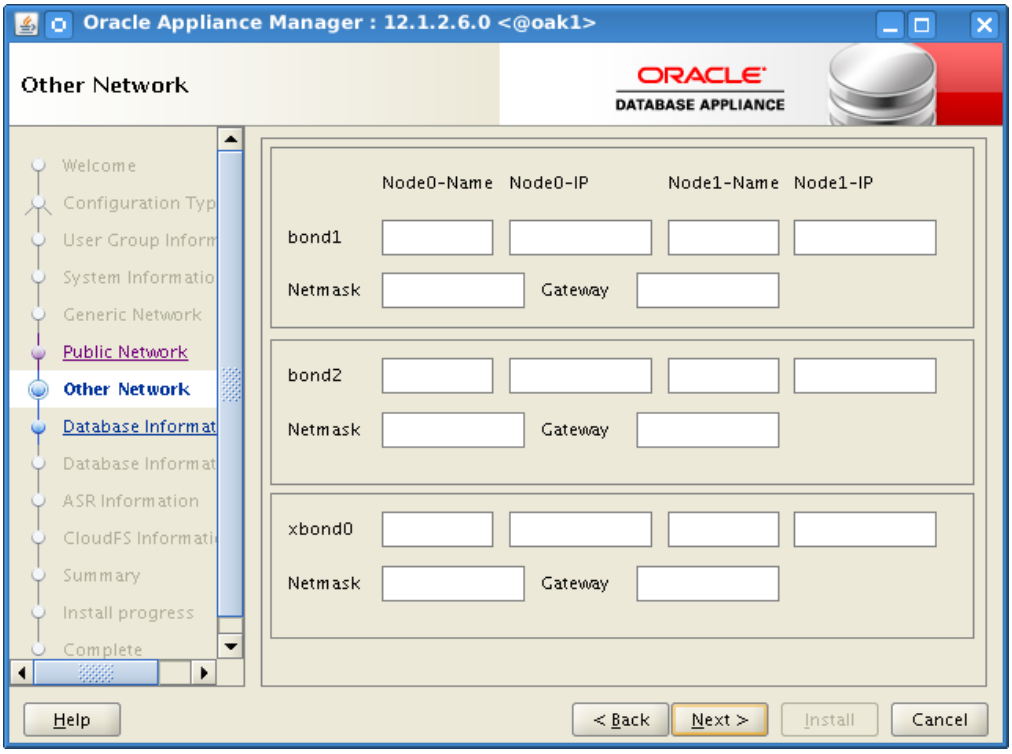
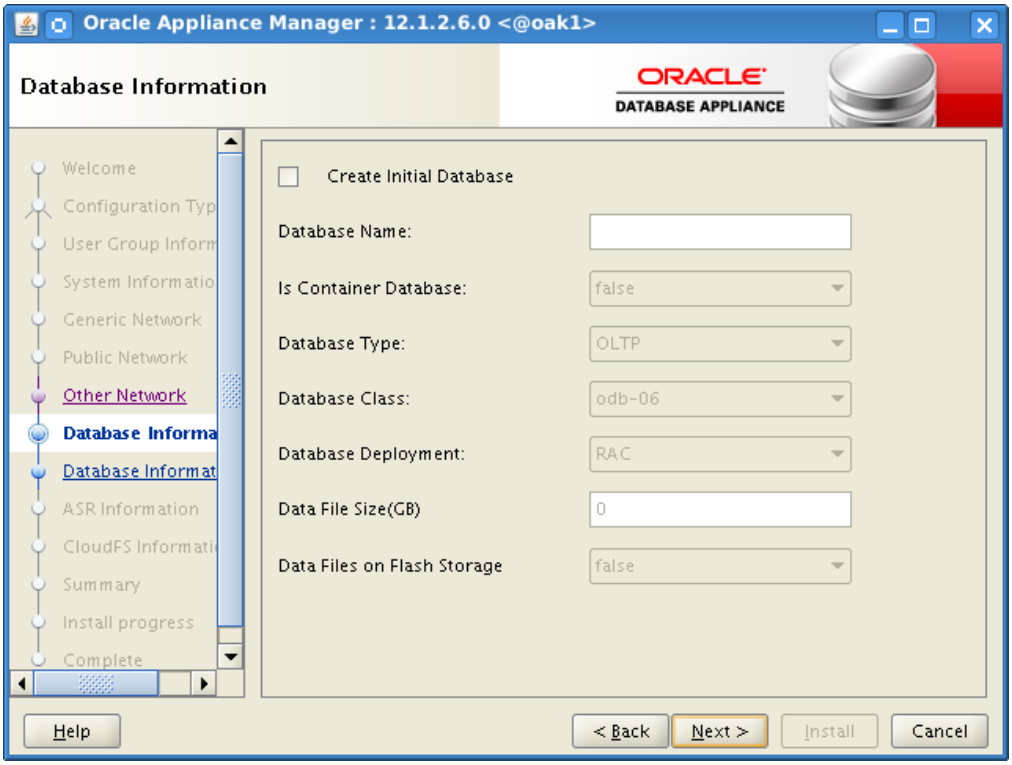
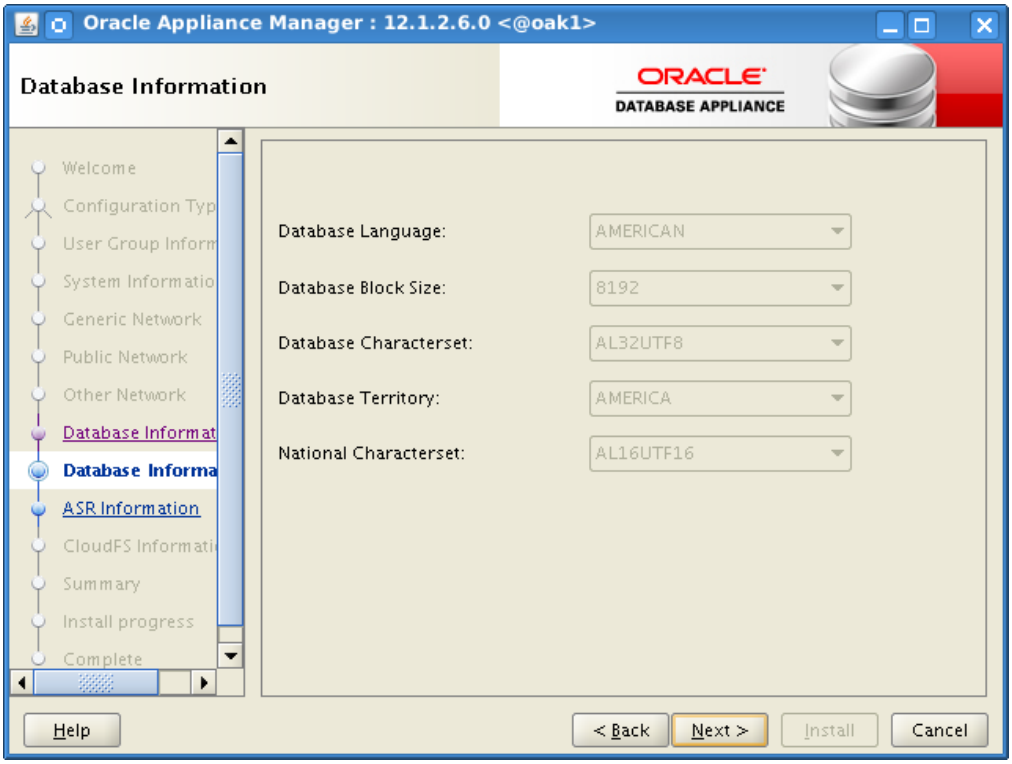
Configuration Typ
User Group Inform
System Informatio
Generic Network
Public Network
Other Network
Database Informat
Database Informat
ASR Information
CloudFS Informati
Summary
Install progress
Complete
Node0-Name
Node0-IP
Node1-Name
Node1-IP
Public
lsoda01
10.20.91.105
lsoda02
10.20.91.106
VIP
lsoda1-vip
10.20.91.107
lsoda2-vip
10.20.91.108
SCAN
lsoda-scan
Addresses
10.20.91.109
10.20.91.110
Netmask
255.255.252.0
Gateway
10.20.88.1
Interface
bond0
ILOM0-Name
ILOM0-IP
ILOM1-Name
ILOM1-IP
ILOM
lsoda01r
10.20.91.112
lsoda02r
10.20.91.113
Netmask
255.255.252.0
Gateway
10.20.88.1
Help
< Back
Next >
Install
Cancel

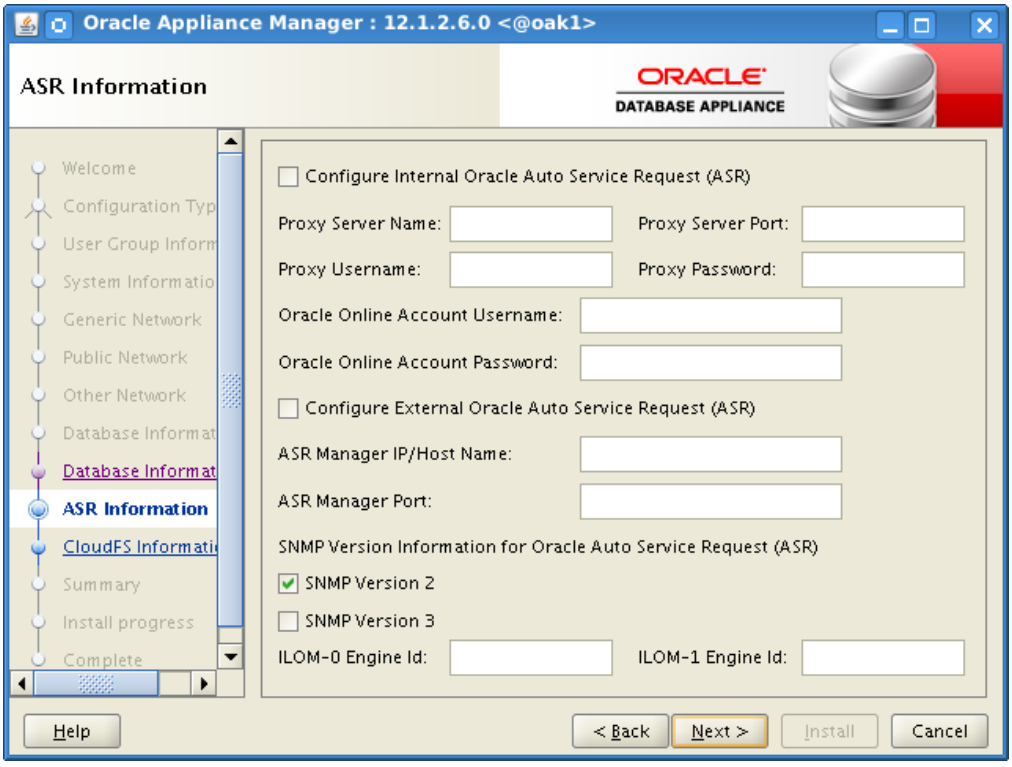


Oracle Database Appliance secondary network support.



SAP SWPM will be used to create the database. Therefore this step will be skipped.




Oracle Appliance Manager : 12.1.2.6.0 <@oak1>
ASR Information
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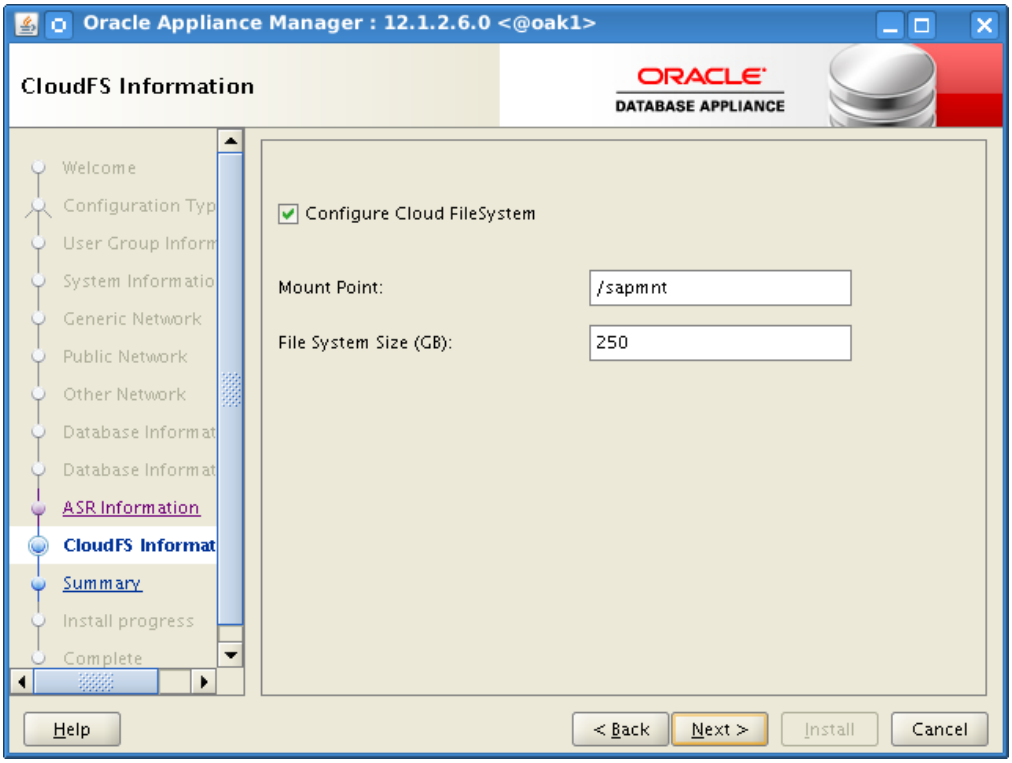
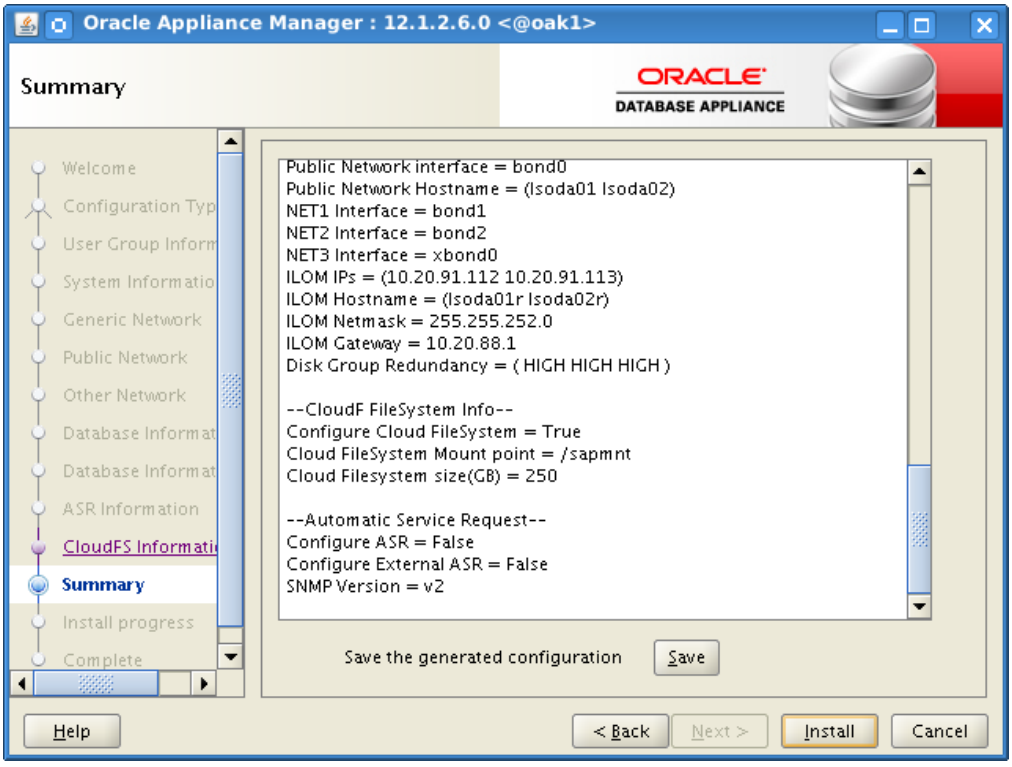
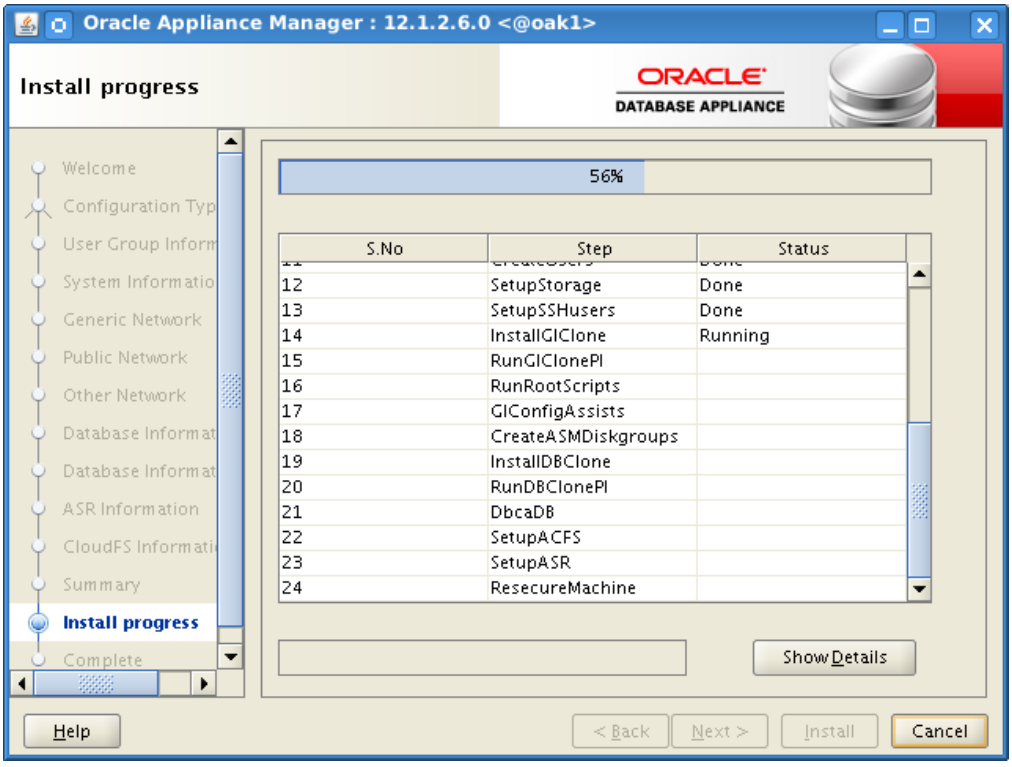
System Informatio
Generic Network
Public Network
Other Network
Database Informat
Database Informat
ASR Information
CloudFS Informati
Summary
Install progress
Complete
Configure Internal Oracle Auto Service Request (ASR)
Proxy Server Name:
Proxy Server Port:
Proxy Username:
Proxy Password:
Oracle Online Account Username:
Oracle Online Account Password:
Configure External Oracle Auto Service Request (ASR)
ASR Manager IP/Host Name:
ASR Manager Port:
SNMP Version Information for Oracle Auto Service Request (ASR)
SNMP Version 2
SNMP Version 3
ILOM-0 Engine Id:
ILOM-1 Engine Id:
Help
< Back
Next >
Install
Cancel



In case one plans to use Oracle Database Appliance to provide /sapmnt use this screen to setup an Oracle CloudFS/ACFS file system.



Consider saving the generated configuration and copy the generated config file to a place outside of the device – you may need it on subsequent deployments. Then press the “Install” button.


Oracle Appliance Manager : 12.1.2.6.0 <@oak1>
Install progress
ORACLE
DATABASE APPLIANCE
Welcome
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User Group Inform
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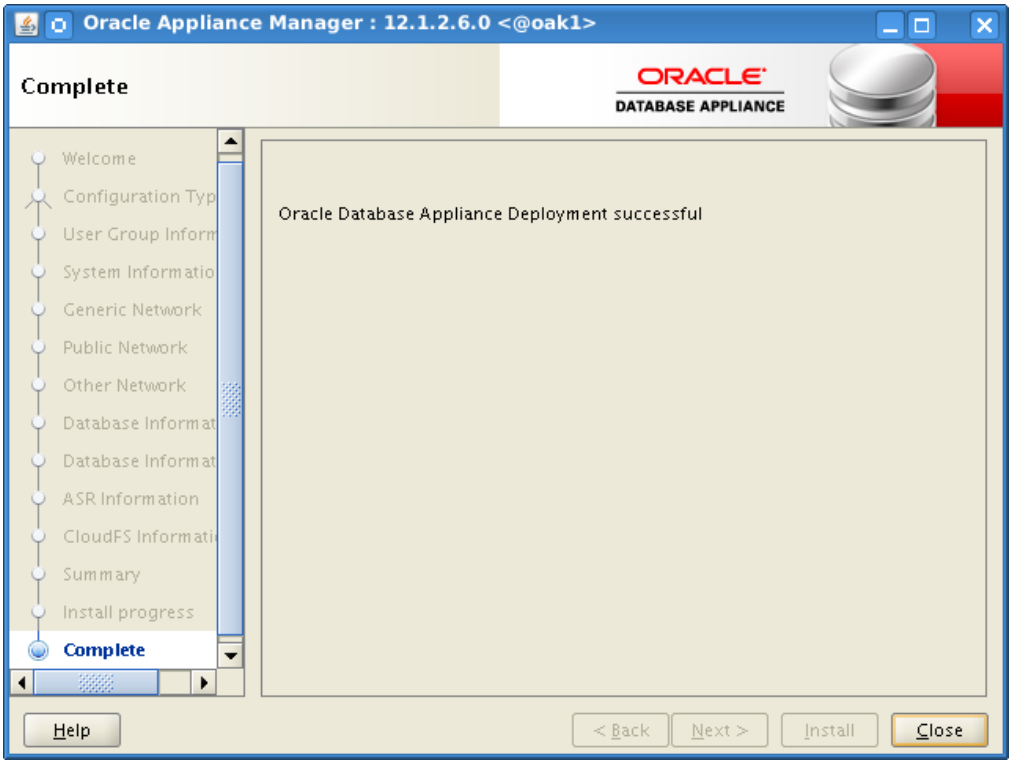
Public Network
Other Network
Database Informat
Database Informat
ASR Information
CloudFS Informati
Summary
Install progress
Complete
56%
S.No
Step
Status
12 SetupStorage Done
13 SetupSSHusers Done
14 InstallGIClone Running
15 RunGIClonePl
16 RunRootScripts
17 GIConfigAssists
18 CreateASMDiskgroups
19 InstallDBClone
20 RunDBClonePl
21 DbcaDB
22 SetupACFS
23 SetupASR
24 ResecureMachine
Show Details
Help
< Back
Next >
Install
Cancel


Oracle Appliance Manager : 12.1.2.6.0 <@oak1>
Complete
ORACLE
DATABASE APPLIANCE
Welcome
Configuration Typ
User Group Inform
System Informatio
Generic Network
Public Network
Other Network
Database Informat
Database Informat
ASR Information
CloudFS Informati
Summary
Install progress
Complete
Oracle Database Appliance Deployment successful
Help
< Back
Next >
Install
Close

Incomplete or Unsuccessful deployments – please check Oracle Note:1409835.1 ODA (Oracle Database Appliance): Deployment & Cleanup Steps.

At this stage X5-2 deployments have to verify and potentially correct ASM diskgroup compatibility settings as follows:

Login as user Oracle using the client of your choice. As these are shared disks it's a one-time task.

```
[oracle@lsoda01 ]$ . oraenv
+ASM1
[oracle@lsoda01 ]$ asmcmd lsattr -lm | egrep "Name|compatible"
```

If that output would report any non 12.1 output, run following commands for each diskgroup:

```
[oracle@lsoda01 ]$ sqlplus "/ as sysasm"
SQL> alter diskgroup <DG> set attribute 'compatible.asm'='12.1.0.2';
SQL> alter diskgroup <DG> set attribute 'compatible.advm'='12.1.0.2';
SQL> alter diskgroup <DG> set attribute 'compatible.rdbms'='12.1.0.2';
```

This is an irreversible change. Thus, no 11.2.x databases beyond this point for X5-2's.

Rolling back initial DB PSU

We roll back *Oracle Patch 21948354 - Database Patch Set Update 12.1.0.2.160119 (Includes CPUJan2016)* from all ORACLE_HOMEs per host.

Perform following steps per host:

```
su - oracle
export SBPFUSER=/sbin/fuser
export OHGRID=/u01/app/12.1.0.2/grid
export IHRDBMS=/u01/app/oracle/product/12.1.0.2/dbhome_1
export ORACLE_HOME=$IHRDBMS
echo $ORACLE_HOME (verification)
$ORACLE_HOME/OPatch/opatch rollback -id 21948354 -local -all_subpatches
```

As there is no database associated to this ORACLE_HOME, no further script has to run. Keep in mind copy+pasting above commands may fail due to document to terminal character incompatibility.

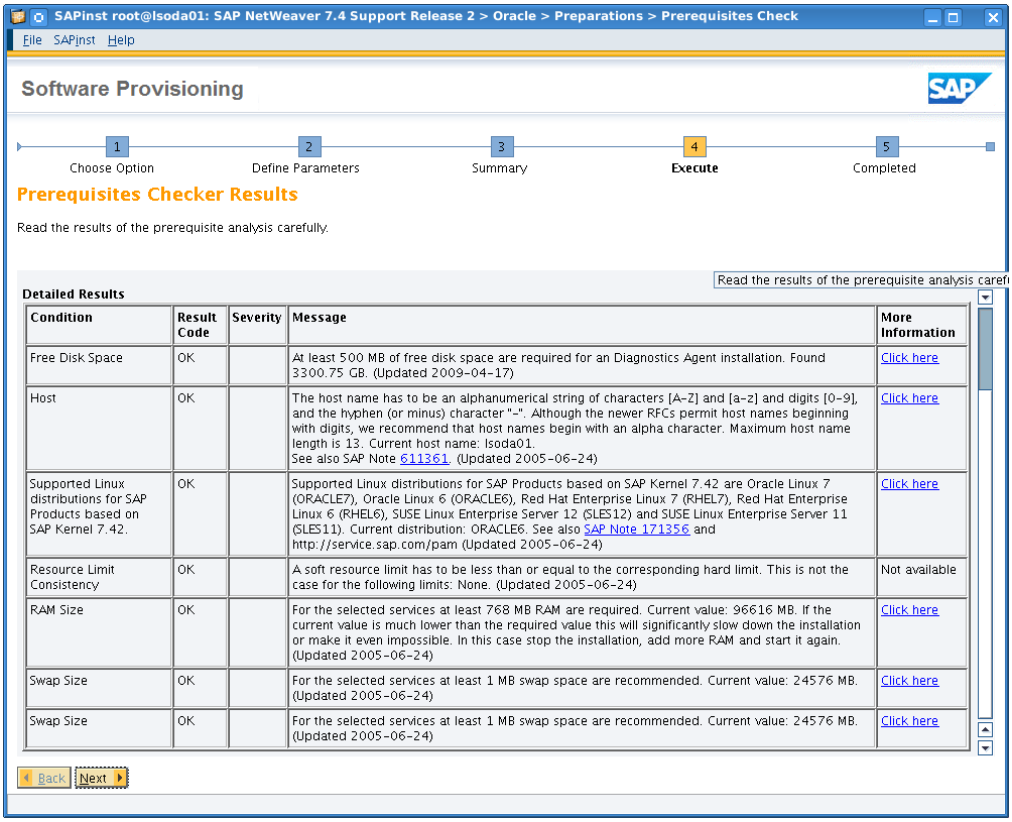
Next is the GI home – we borrow these steps from the SAP Bundle Patch for Oracle Database Appliance, Section 3, "SAP Bundle Patch deinstallation" – execute these on both hosts as well:

```
su root -c "$SBPFUSER $IHRDBMS/bin/oracle"
su root -c "/sbin/acfsutil info fs -o mountpoints | xargs $SBPFUSER -mu"
su root -c "$OHGRID/crs/install/rootcrs.pl -prepatch -nonrolling"

env ORACLE_HOME=$OHGRID $OHGRID/OPatch/opatch rollback -id 21948354 -silent -local -
all_subpatches
su root -c "$OHGRID/rdbms/install/rootadd_rdbms.sh"
su root -c "$OHGRID/crs/install/rootcrs.pl -postpatch -nonrolling"
..
..
Oracle Clusterware active version on the cluster is [12.1.0.2.0]. The cluster
upgrade state is [NORMAL]. The cluster active patch level is [964513507].
```

SAP Software Provisioning Manager on Oracle Database Appliance

The next pages show the Oracle Database Appliance related steps from an SAP Software Provisioning Manager 1.0 perspective. Hence we refer throughout this document this as SWPM. It is recommended to start SWPM with a TMP variable set to /usr/sap/tmp which allows easier post-install cleanup. We start SWPM with the step "RAC/ASM/Database Instance Preparation" to create SAP-specific OS users, create SAP-specific directories and other preparations for an SAP database. This preparation step is required for both nodes of the Oracle Database Appliance. It is however recommended to perform a general prerequisite check per host – SWPM Navigation is visible via the window title.



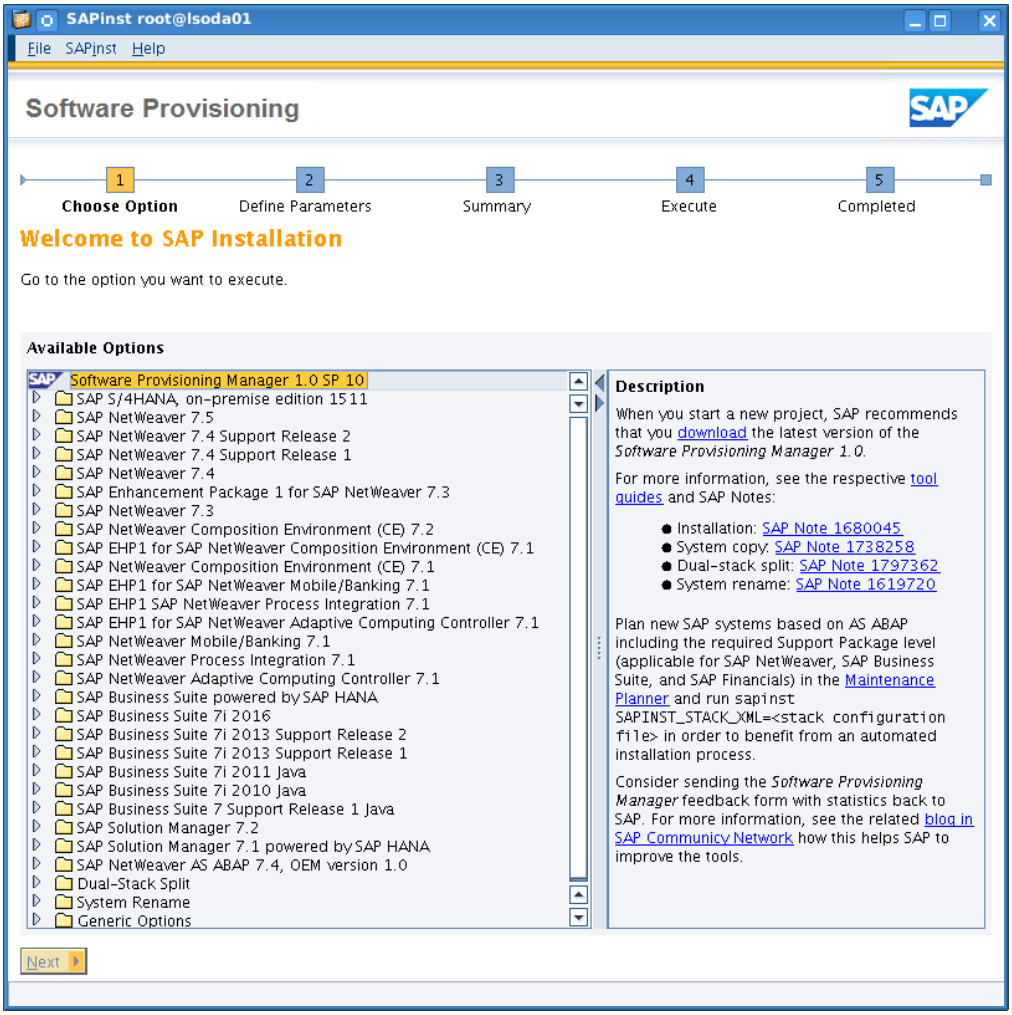
Following slides illustrate an SAP Netweaver 7.40 SR2 installation using SWPM SP10. SWPM is available via the SLToolset. See SAP Note 1680045 for details on SWPM.

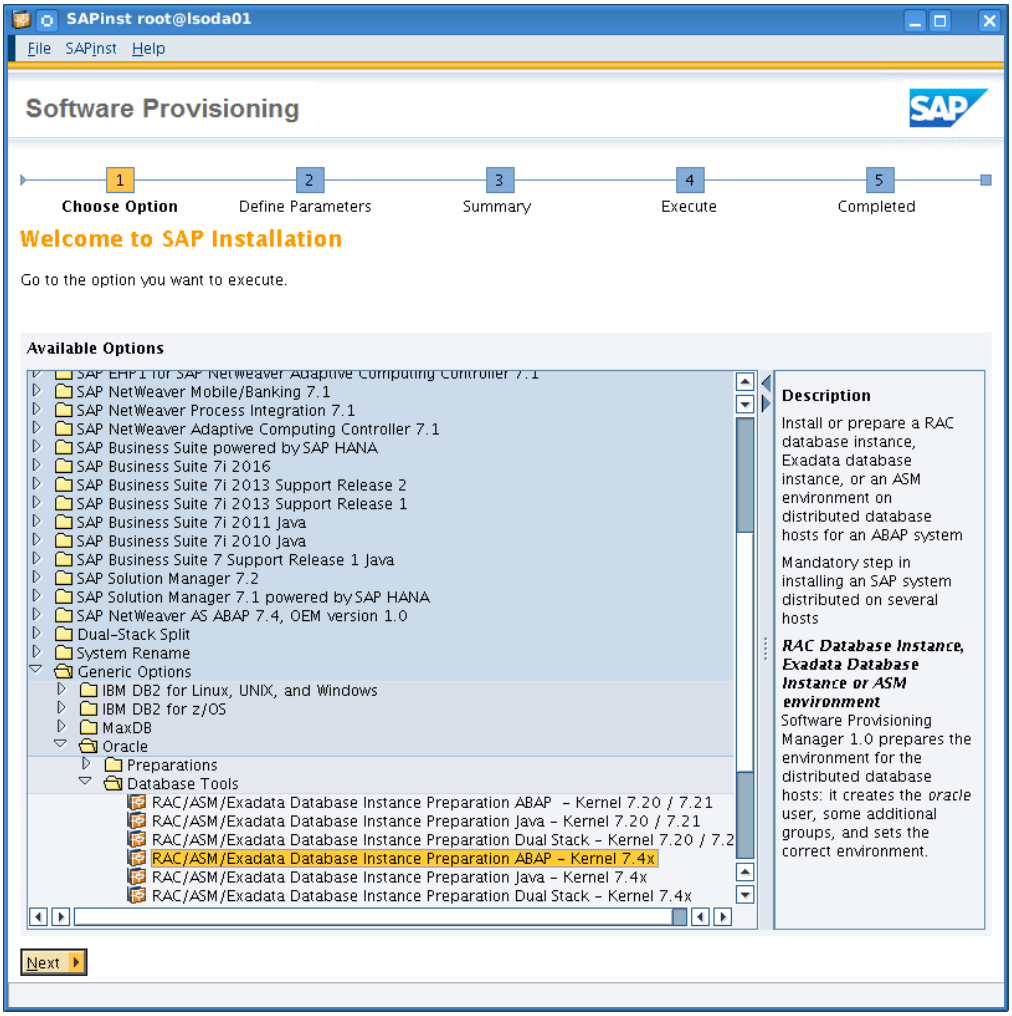
Database Instance Preparation consists of

- SAP Kernel independent and database dependent parts of the SAP Kernel installation
- BR*Tools installation as a portion of the database dependent part
- Oracle Instant Client installation
- SAP Hostagent installation
- SAP users and groups creation
- Preparation of the environment for running the SAP database on Oracle ASM with RAC

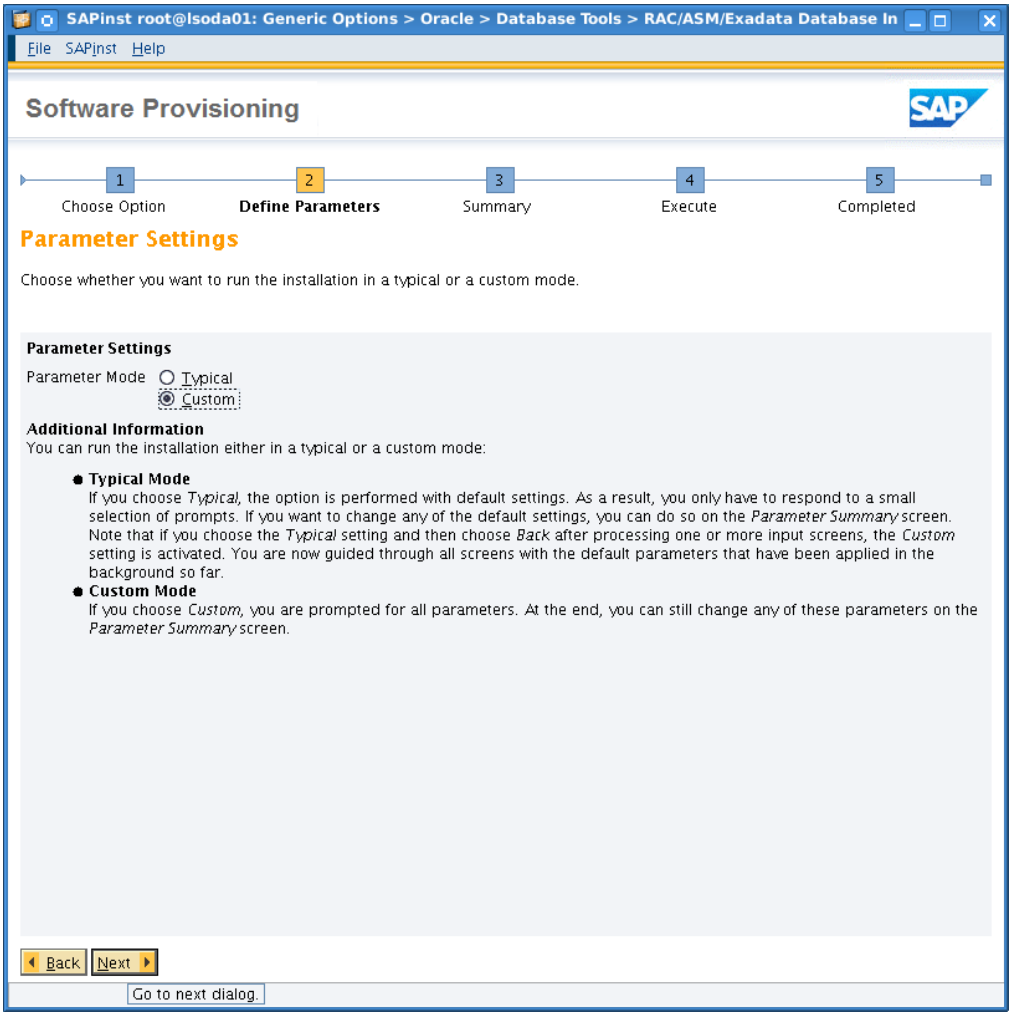
Keep following media handy:

- SAP NetWeaver 7.40 SR2 OS dependent kernel
- Oracle Client 12c

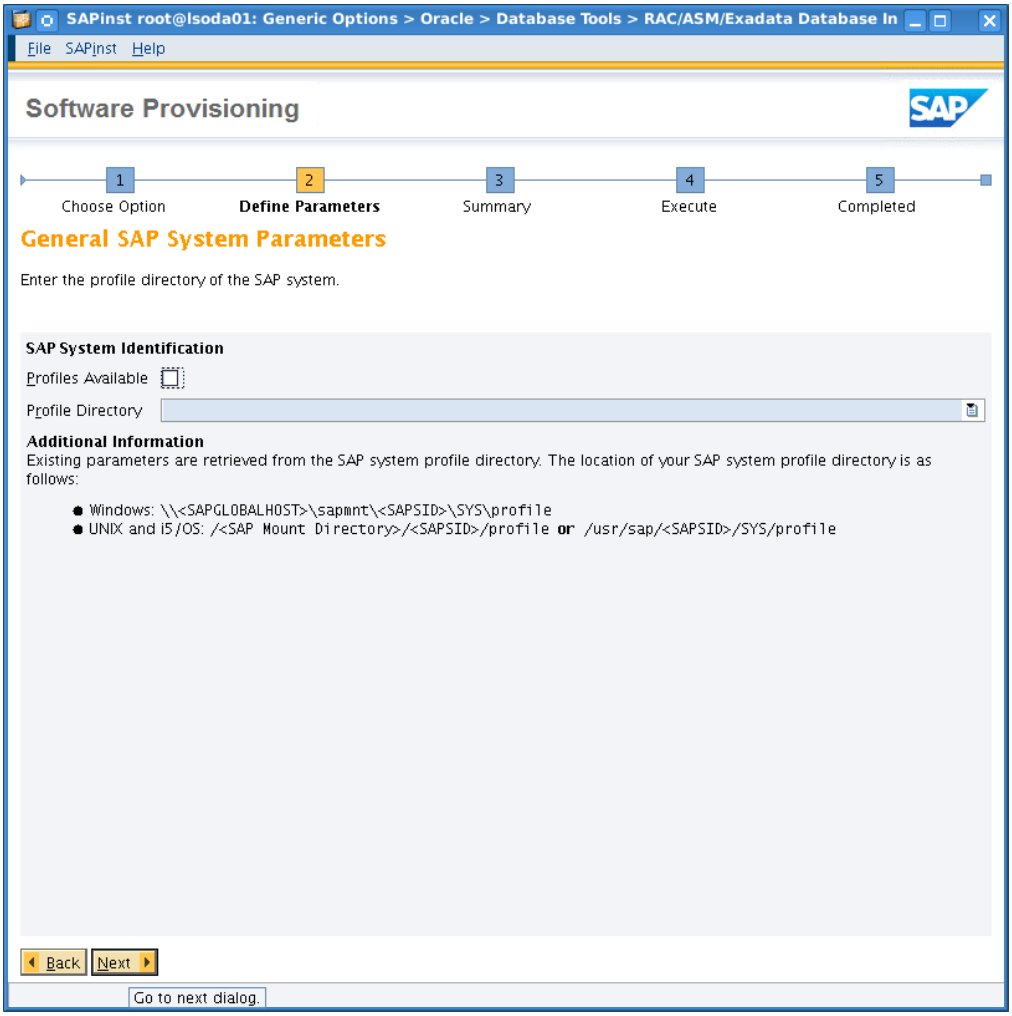




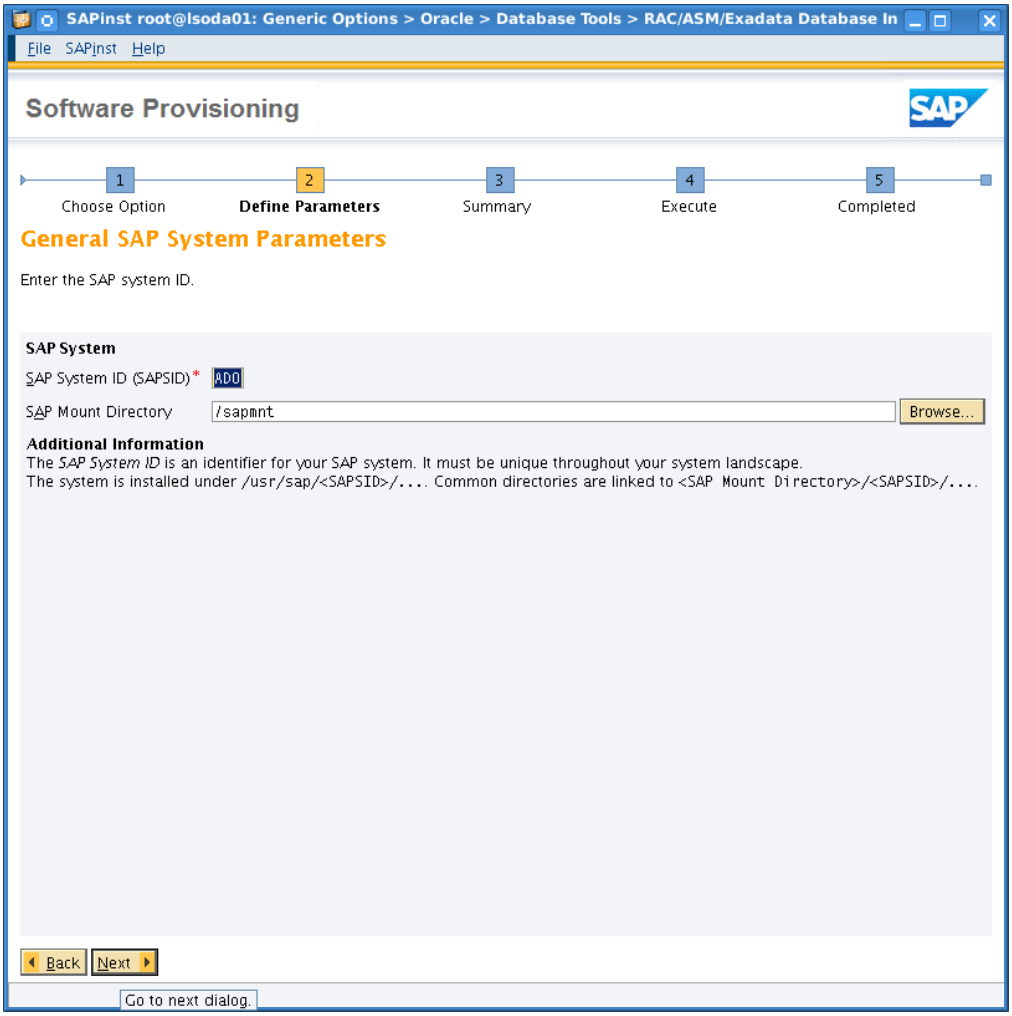
From Generic Options drill down to Oracle, Database Tools, RAC/ASM/Exadata Database Instance Preparation ABAP – Kernel 7.4.x. Kernel version and stack need to match subsequent SAP NetWeaver product selection.



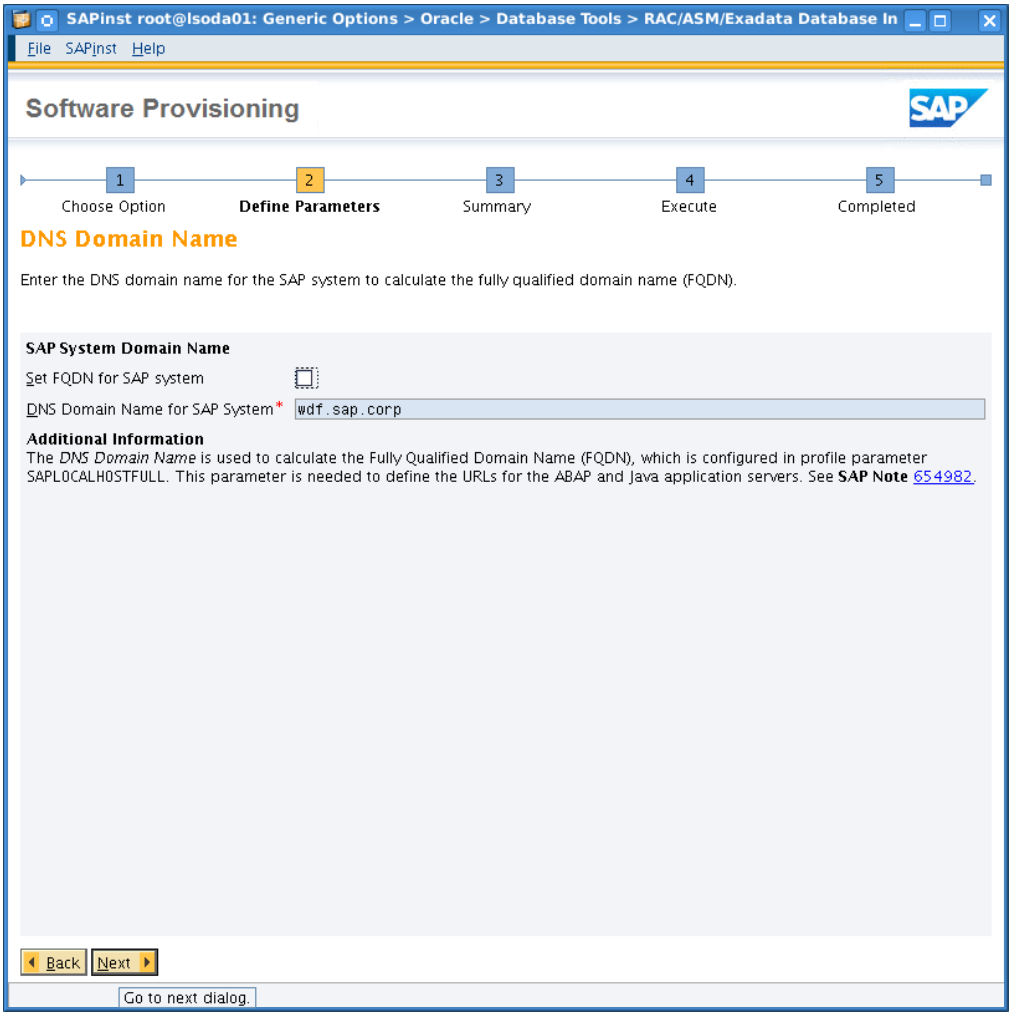
Select Custom Mode.

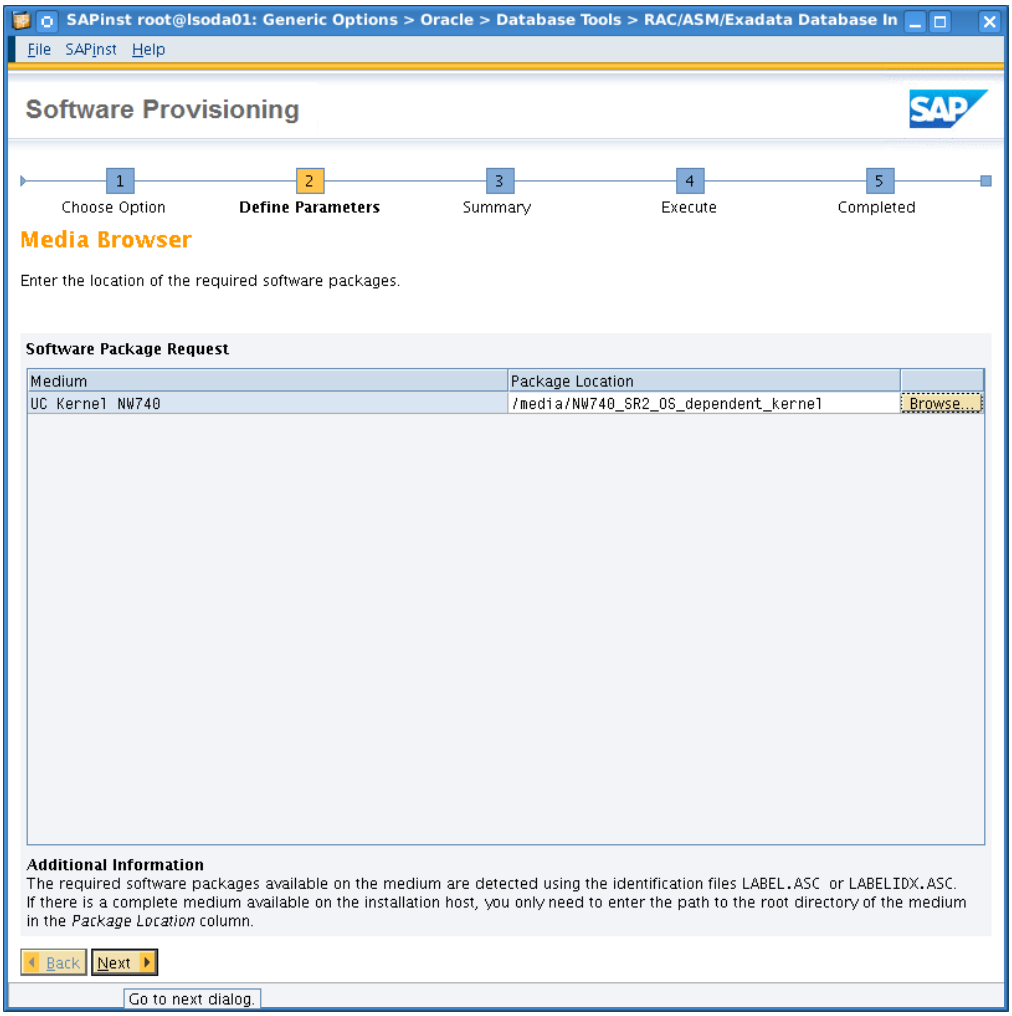


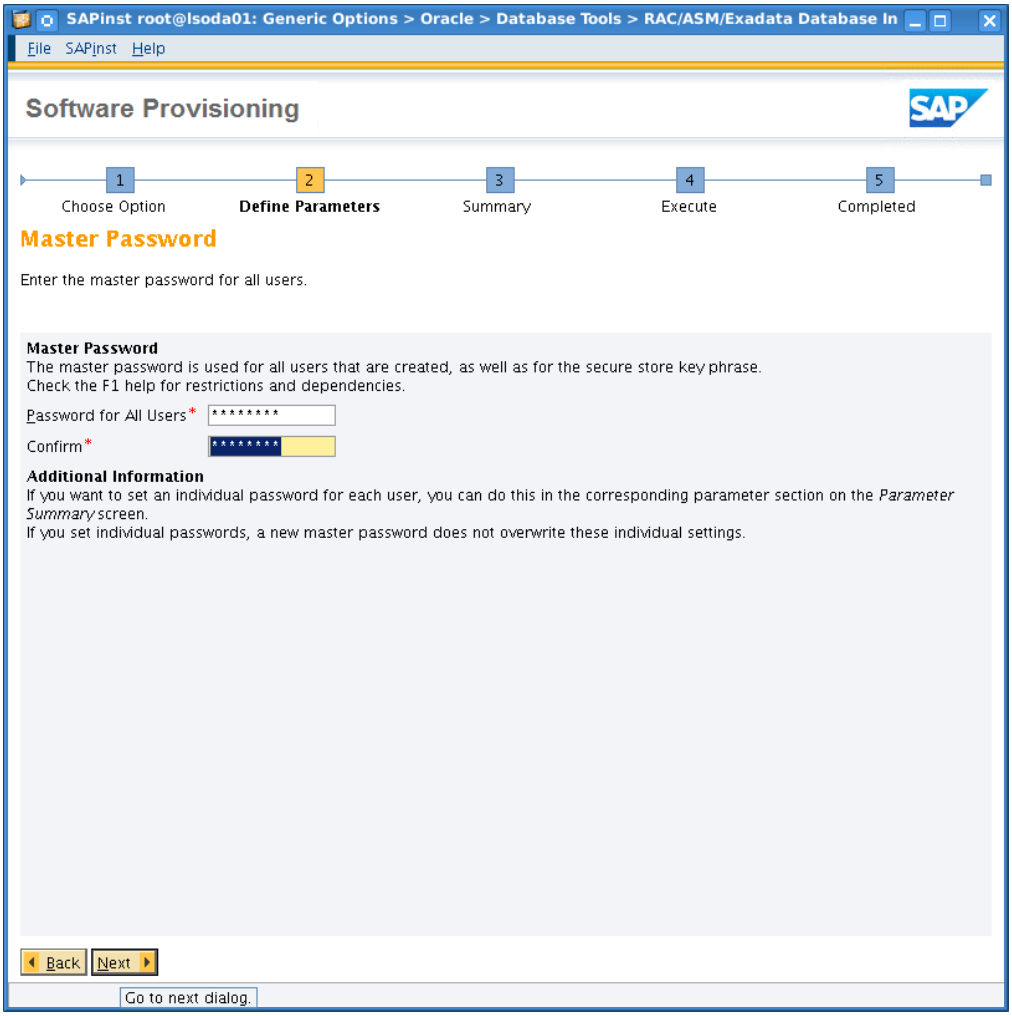
Deselect “Profiles are available”, fresh installations don’t offer SAP profiles.

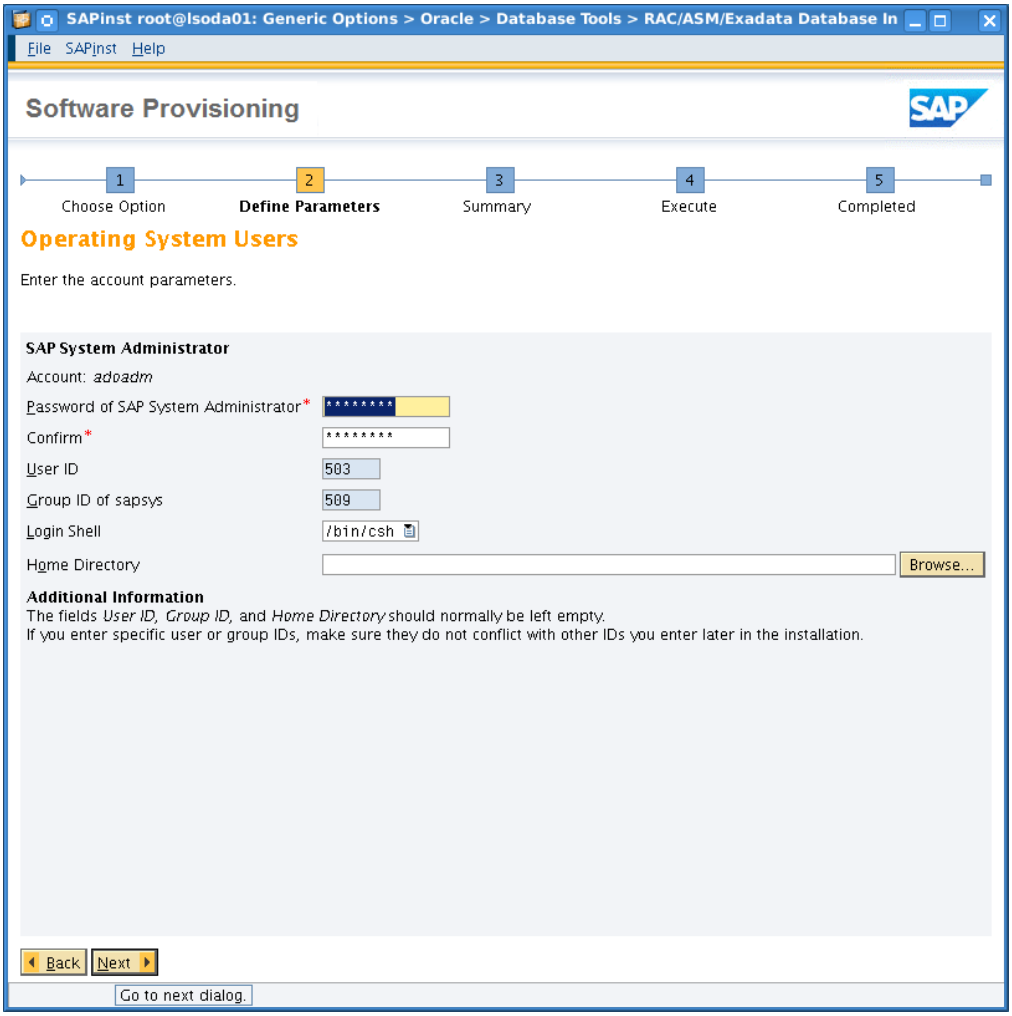


Set the SAP system ID; we choose ADO here for both SAP SID and Oracle SID. The mountpoint /sapmnt has been created earlier via the Oracle Appliance Manager setup.

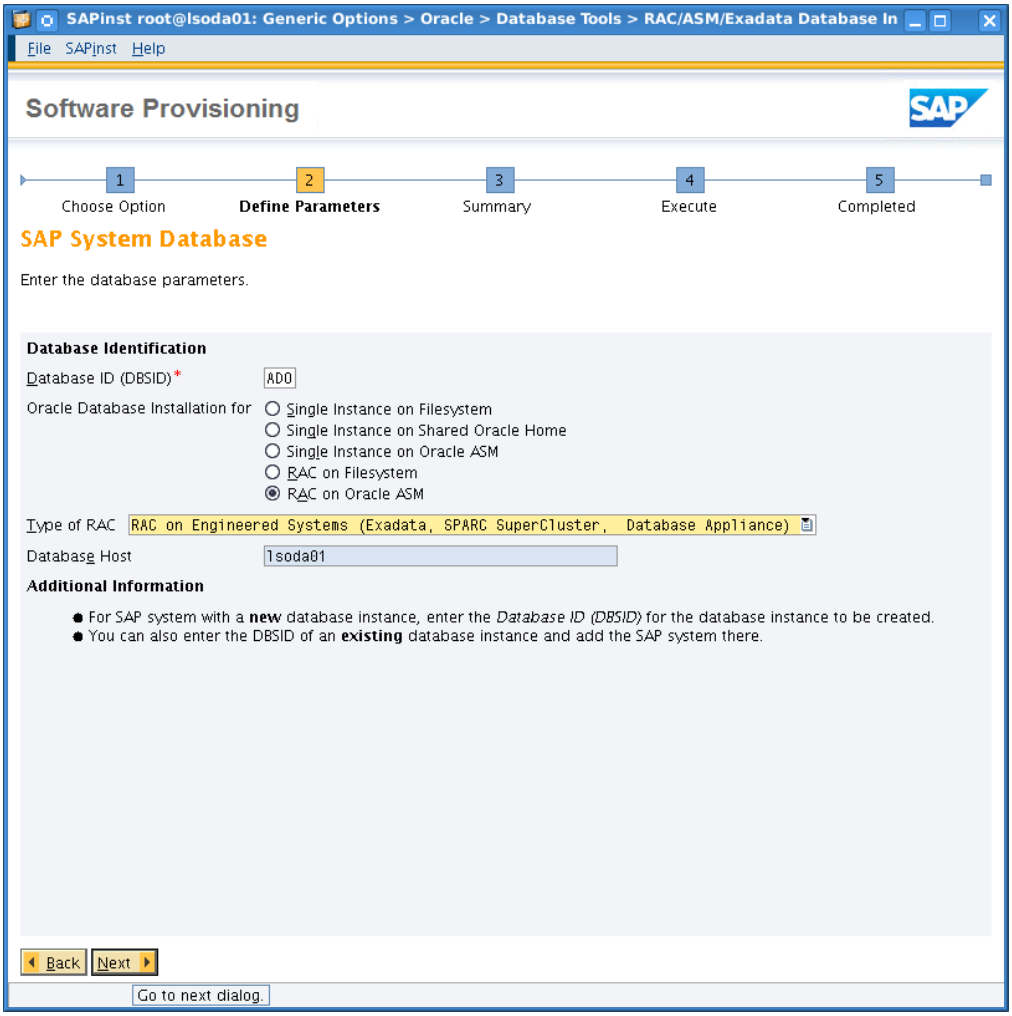

SAPinst root@lsoda01: Generic Options > Oracle > Database Tools > RAC/ASM/Exadata Database In
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
DNS Domain Name
Enter the DNS domain name for the SAP system to calculate the fully qualified domain name (FQDN).
SAP System Domain Name
Set FQDN for SAP system
DNS Domain Name for SAP System *
wdf.sap.corp
Additional Information
The DNS Domain Name is used to calculate the Fully Qualified Domain Name (FQDN), which is configured in profile parameter SAPLOCALHOSTFULL. This parameter is needed to define the URLs for the ABAP and Java application servers. See SAP Note 654982.
Back
Next
Go to next dialog.


SAPinst root@lsoda01: Generic Options > Oracle > Database Tools > RAC/ASM/Exadata Database In
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Media Browser
Enter the location of the required software packages.
Software Package Request
Medium
Package Location
UC Kernel NW740
/media/NW740_SR2_OS_dependent_kernel
Browse...
Additional Information
The required software packages available on the medium are detected using the identification files LABEL.ASC or LABELIDX.ASC.
If there is a complete medium available on the installation host, you only need to enter the path to the root directory of the medium in the Package Location column.
Back
Next
Go to next dialog.

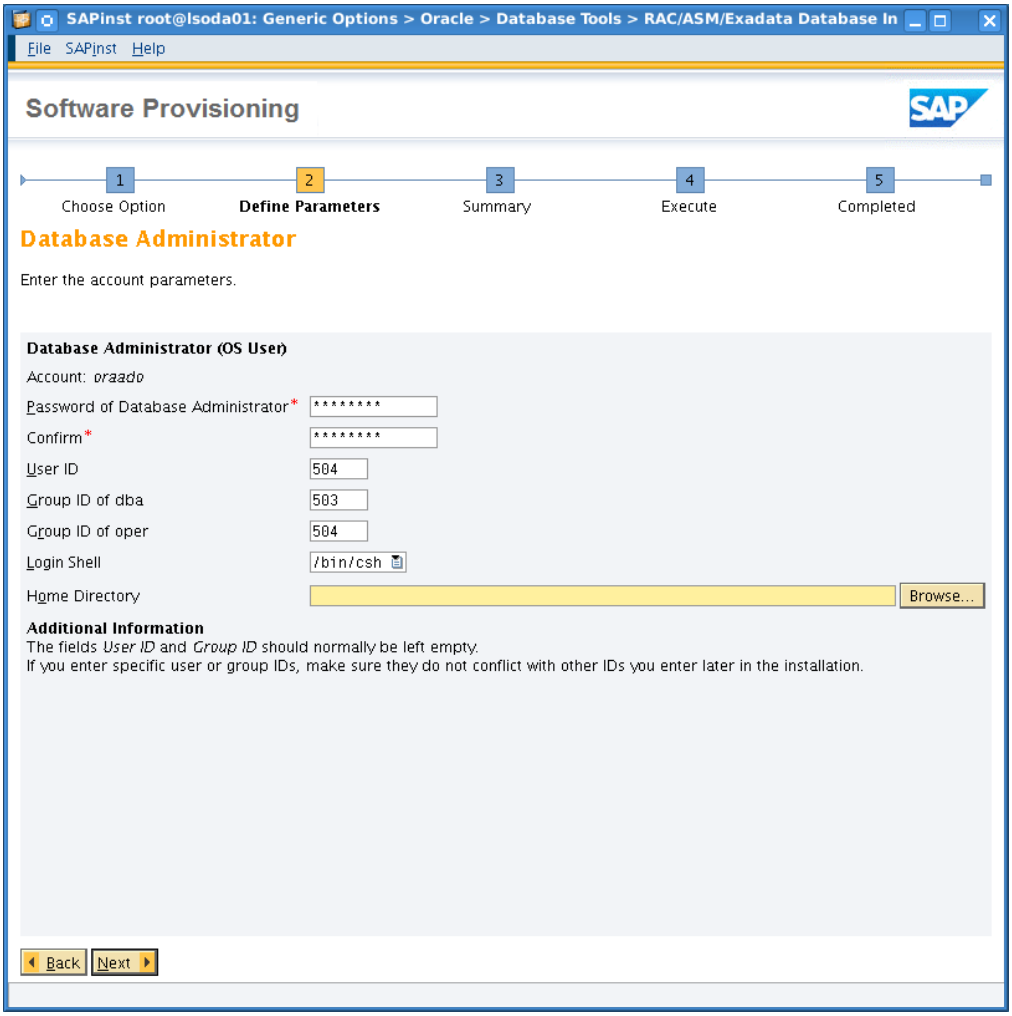

SAPinst root@lsoda01: Generic Options > Oracle > Database Tools > RAC/ASM/Exadata Database In
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Master Password
Enter the master password for all users.
Master Password
The master password is used for all users that are created, as well as for the secure store key phrase.
Check the F1 help for restrictions and dependencies.
Password for All Users*
Confirm*
Additional Information
If you want to set an individual password for each user, you can do this in the corresponding parameter section on the Parameter Summary screen.
If you set individual passwords, a new master password does not overwrite these individual settings.
Back
Next
Go to next dialog.

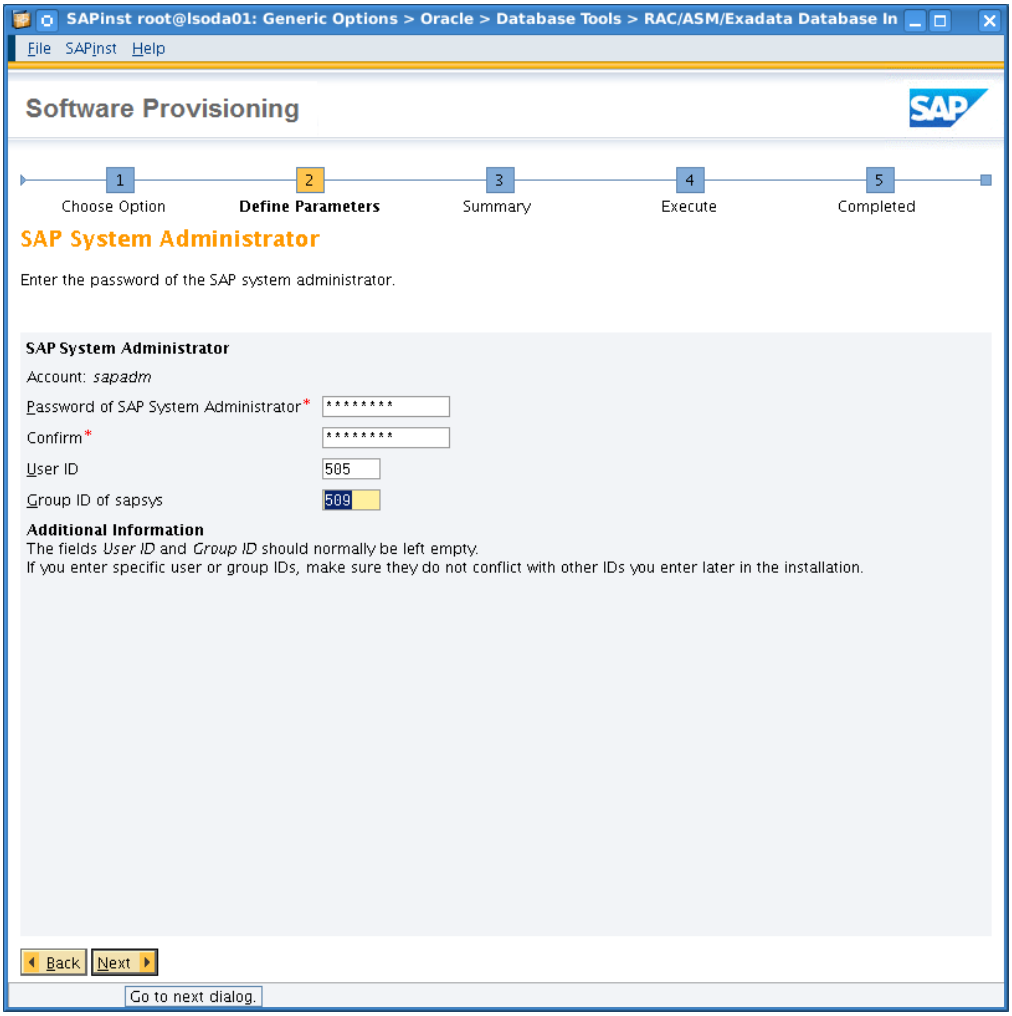


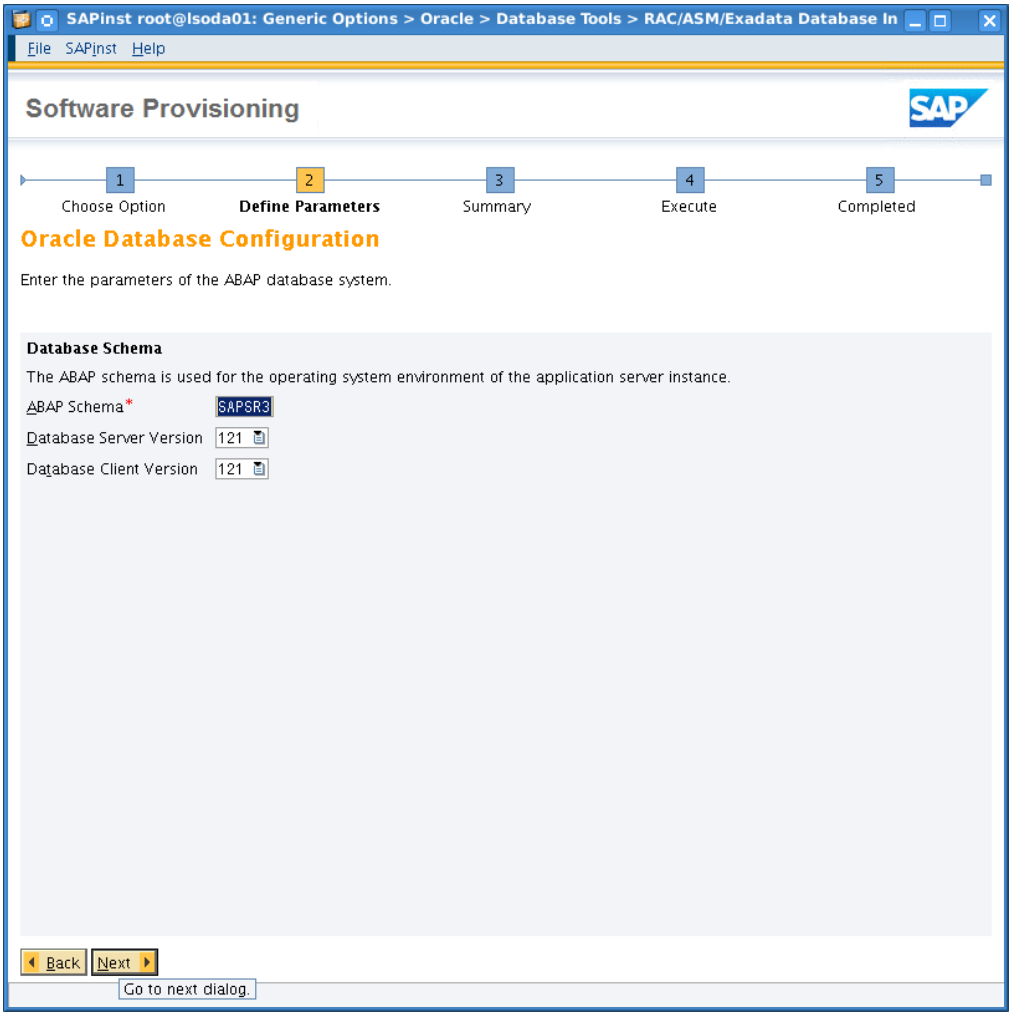
User IDs, Group IDs shall be carefully selected. Blank items will cause SPWM to choose default values.

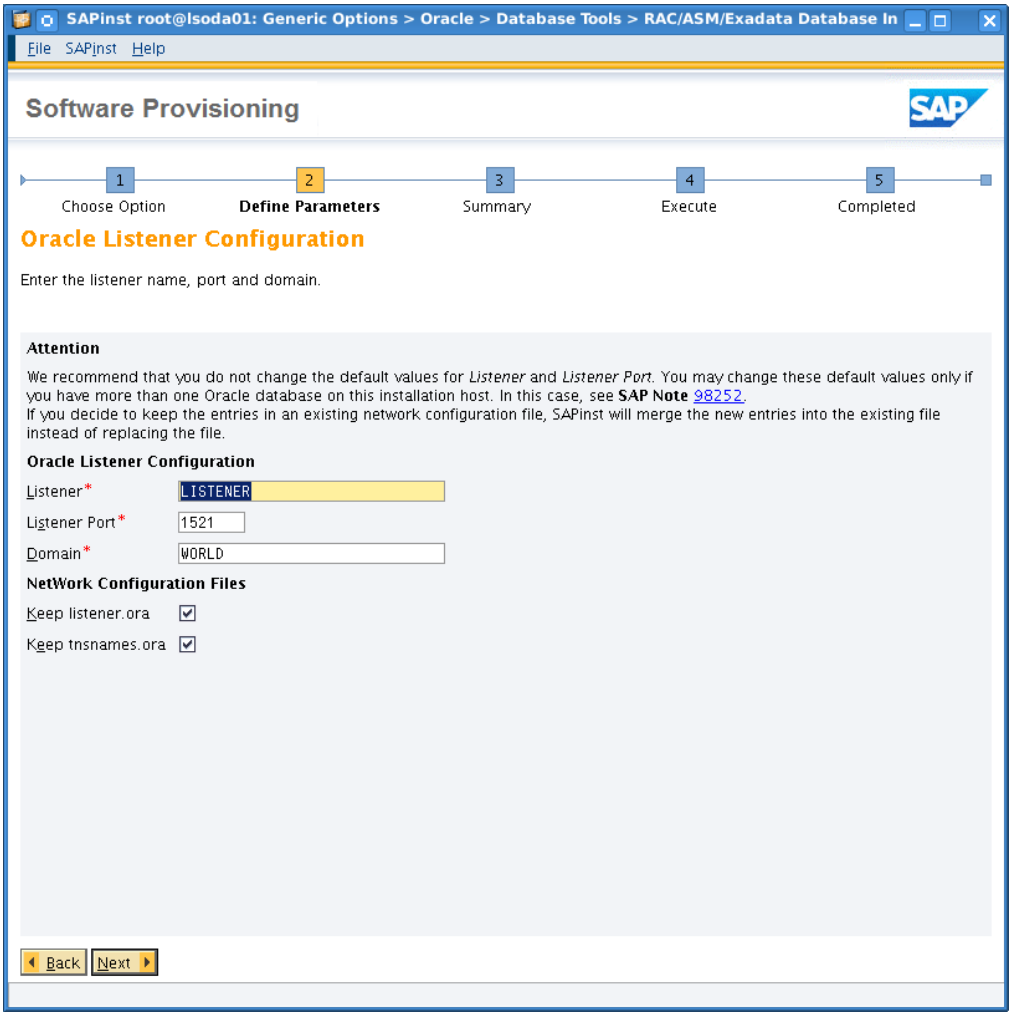


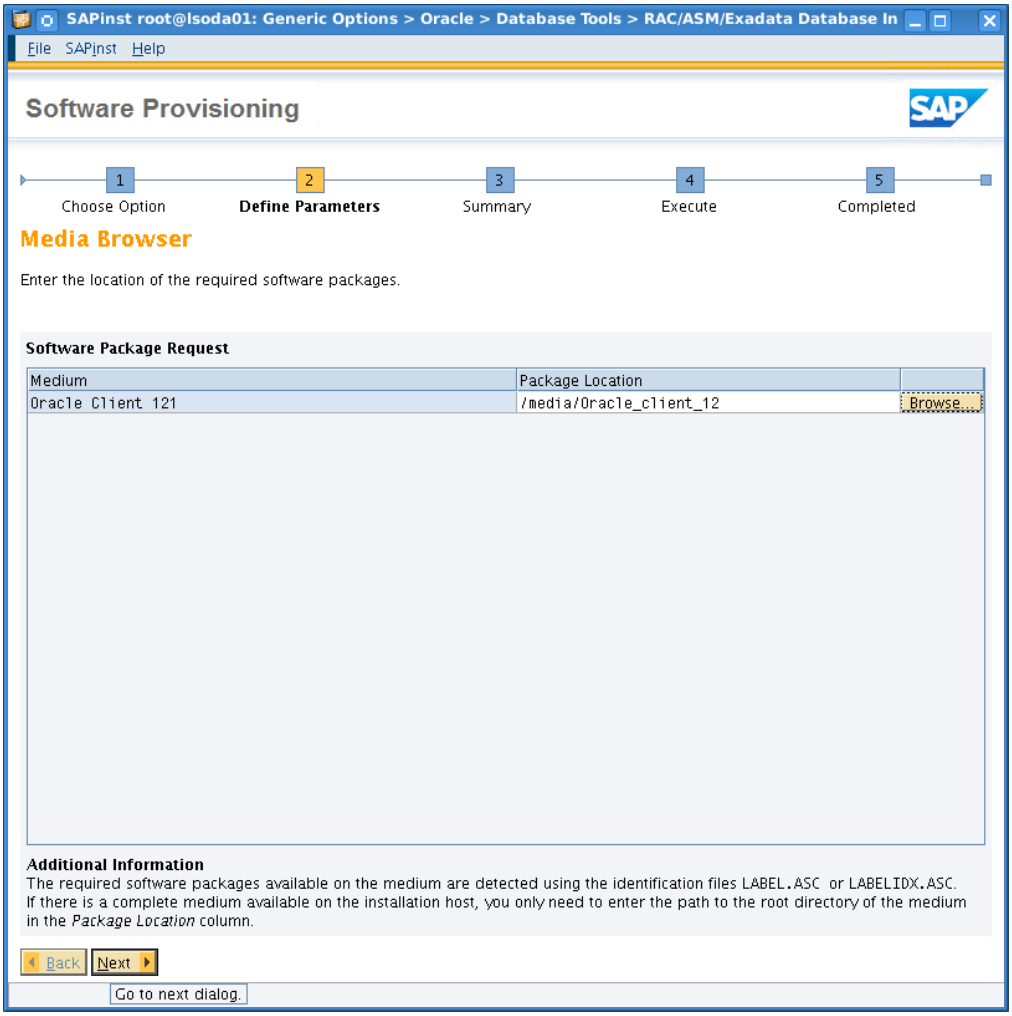
Set the Oracle SID. Select RAC on Oracle ASM, “type” becomes “RAC on Engineered Systems”.

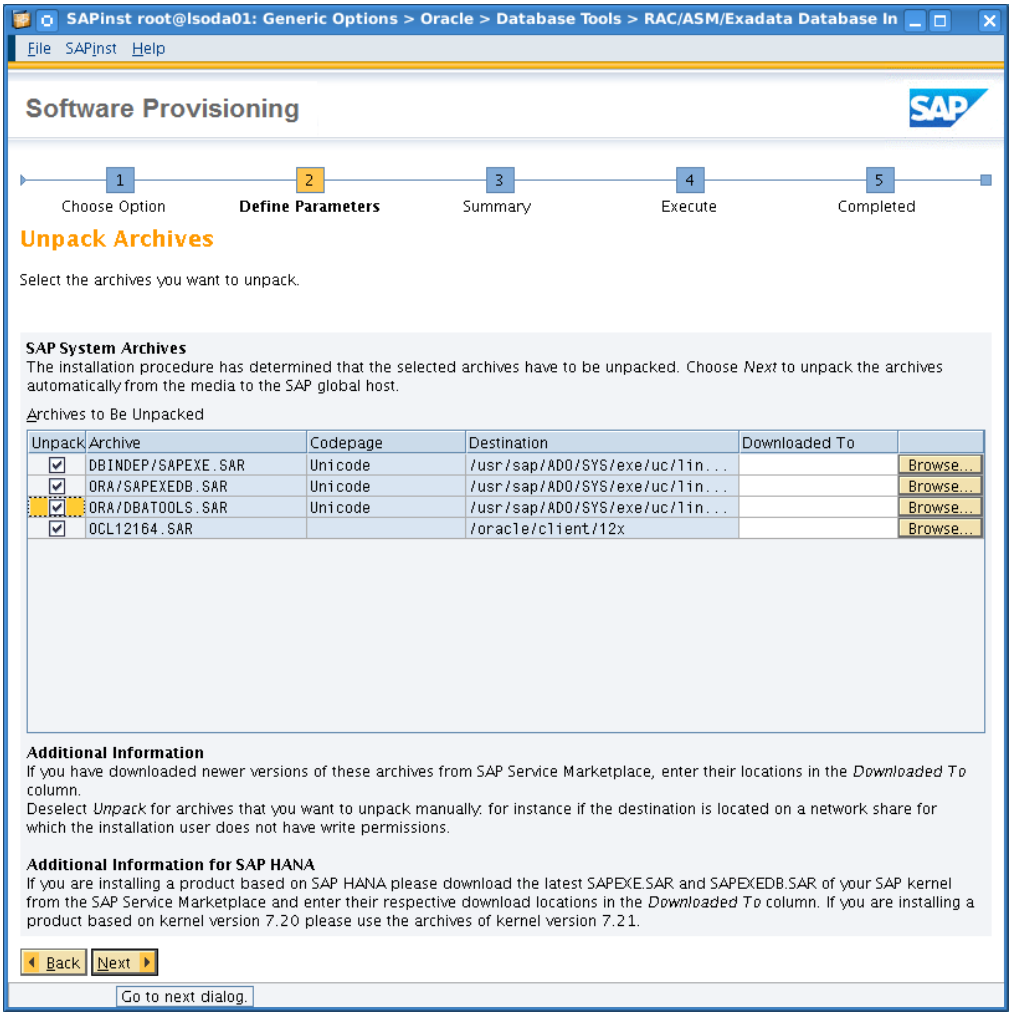

SAPinst root@lsoda01: Generic Options > Oracle > Database Tools > RAC/ASM/Exadata Database In
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Database Administrator
Enter the account parameters.
Database Administrator (OS User)
Account: oraadb
Password of Database Administrator*
Confirm*
User ID 504
Group ID of dba 503
Group ID of oper 504
Login Shell /bin/csh
Home Directory
Browse...
Additional Information
The fields User ID and Group ID should normally be left empty.
If you enter specific user or group IDs, make sure they do not conflict with other IDs you enter later in the installation.
Back
Next

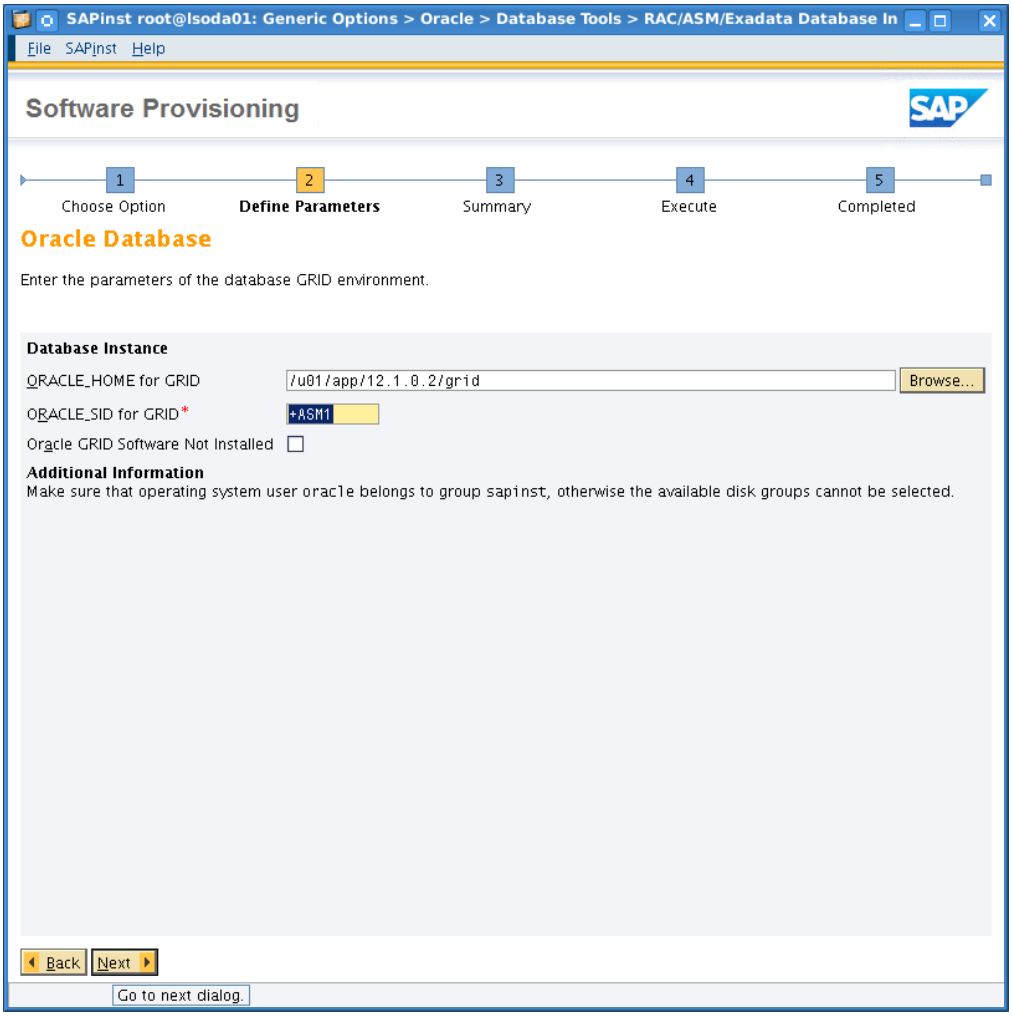

SAPinst root@lsoda01: Generic Options > Oracle > Database Tools > RAC/ASM/Exadata Database In
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
SAP System Administrator
Enter the password of the SAP system administrator.
SAP System Administrator
Account: sapadm
Password of SAP System Administrator*
Confirm*
User ID
505
Group ID of sapsys
509
Additional Information
The fields User ID and Group ID should normally be left empty.
If you enter specific user or group IDs, make sure they do not conflict with other IDs you enter later in the installation.
Back
Next
Go to next dialog.


SAPinst root@lsoda01: Generic Options > Oracle > Database Tools > RAC/ASM/Exadata Database In
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Oracle Database Configuration
Enter the parameters of the ABAP database system.
Database Schema
The ABAP schema is used for the operating system environment of the application server instance.
ABAP Schema*
SAPSR3
Database Server Version
121
Database Client Version
121
Back
Next
Go to next dialog.

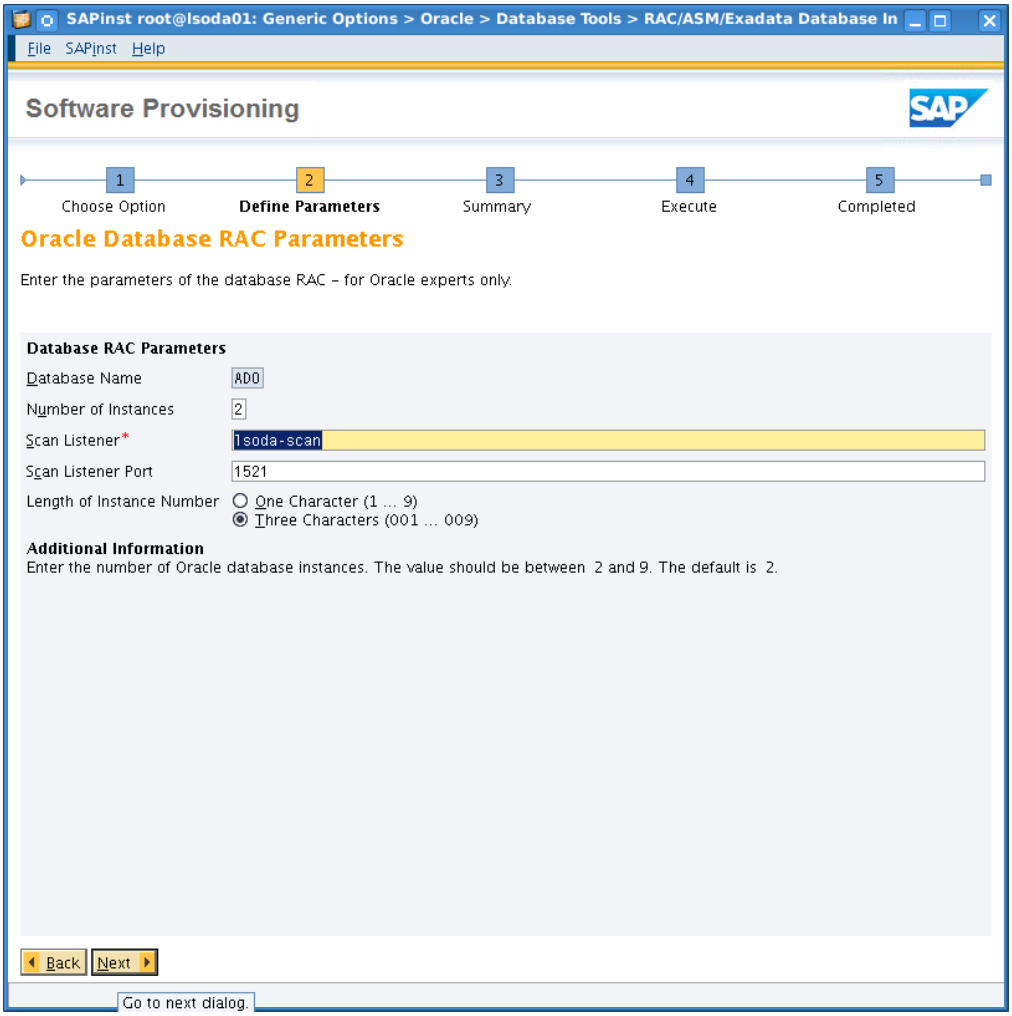

SAPinst root@lsoda01: Generic Options > Oracle > Database Tools > RAC/ASM/Exadata Database In
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Oracle Listener Configuration
Enter the listener name, port and domain.
Attention
We recommend that you do not change the default values for Listener and Listener Port. You may change these default values only if you have more than one Oracle database on this installation host. In this case, see SAP Note 98252.
If you decide to keep the entries in an existing network configuration file, SAPinst will merge the new entries into the existing file instead of replacing the file.
Oracle Listener Configuration
Listener*
LISTENER
Listener Port*
1521
Domain*
WORLD
NetWork Configuration Files
Keep listener.ora
Keep tnsnames.ora
Back
Next

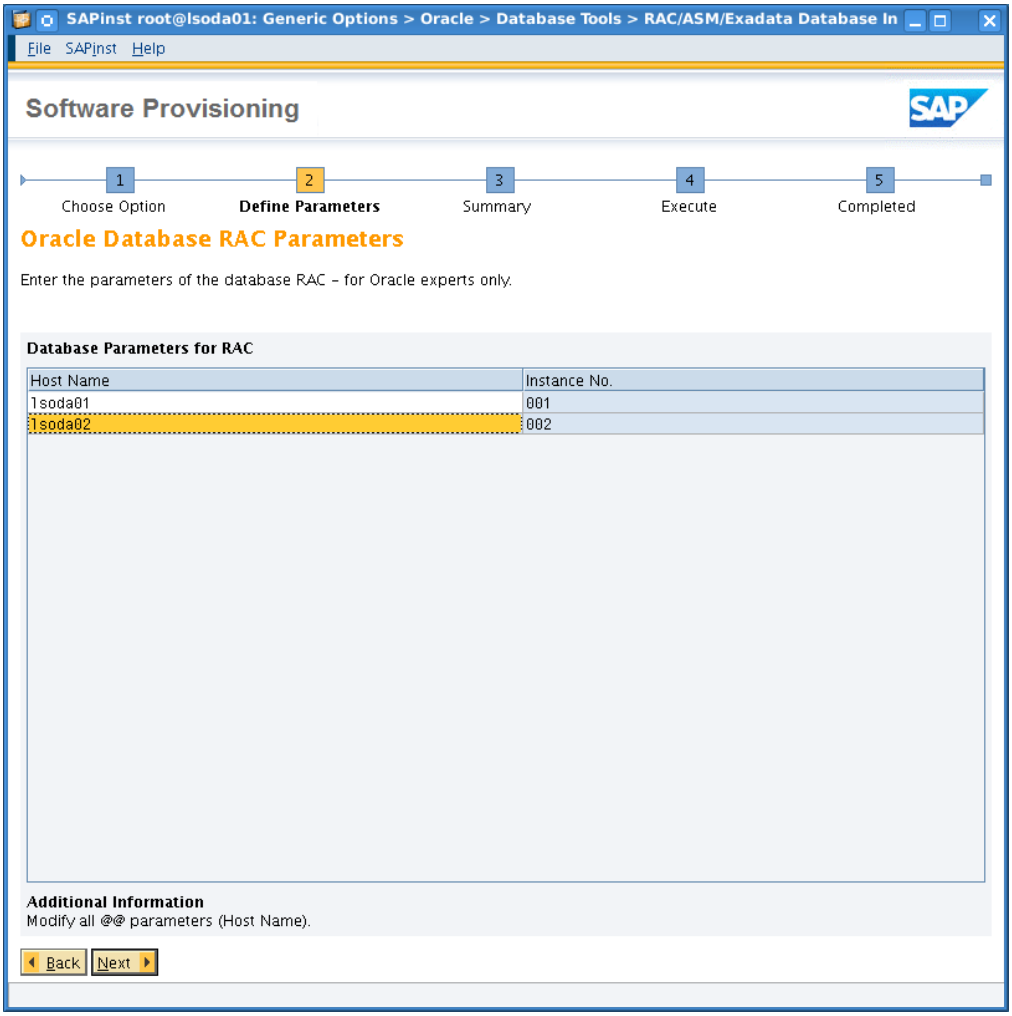

SAPinst root@lsoda01: Generic Options > Oracle > Database Tools > RAC/ASM/Exadata Database In
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Media Browser
Enter the location of the required software packages.
Software Package Request
Medium
Package Location
Oracle Client 121
/media/Oracle_client_12
Browse
Additional Information
The required software packages available on the medium are detected using the identification files LABEL.ASC or LABELIDX.ASC.
If there is a complete medium available on the installation host, you only need to enter the path to the root directory of the medium in the Package Location column.
Back
Next
Go to next dialog.


SAPinst root@lsoda01: Generic Options > Oracle > Database Tools > RAC/ASM/Exadata Database In
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Unpack Archives
Select the archives you want to unpack.
SAP System Archives
The installation procedure has determined that the selected archives have to be unpacked. Choose Next to unpack the archives automatically from the media to the SAP global host.
Archives to Be Unpacked
Unpack Archive Codepage Destination Downloaded To
DBINDEP/SAPEXE.SAR Unicode /usr/sap/ADO/SYS/exe/uc/lin... Browse...
ORA/SAPEXEDB.SAR Unicode /usr/sap/ADO/SYS/exe/uc/lin... Browse...
ORA/DBATOOLS.SAR Unicode /usr/sap/ADO/SYS/exe/uc/lin... Browse...
OCL12164.SAR /oracle/client/12x Browse...
Additional Information
If you have downloaded newer versions of these archives from SAP Service Marketplace, enter their locations in the Downloaded To column.
Deselect Unpack for archives that you want to unpack manually: for instance if the destination is located on a network share for which the installation user does not have write permissions.
Additional Information for SAP HANA
If you are installing a product based on SAP HANA please download the latest SAPEXE.SAR and SAPEXEDB.SAR of your SAP kernel from the SAP Service Marketplace and enter their respective download locations in the Downloaded To column. If you are installing a product based on kernel version 7.20 please use the archives of kernel version 7.21.
Back
Next
Go to next dialog.



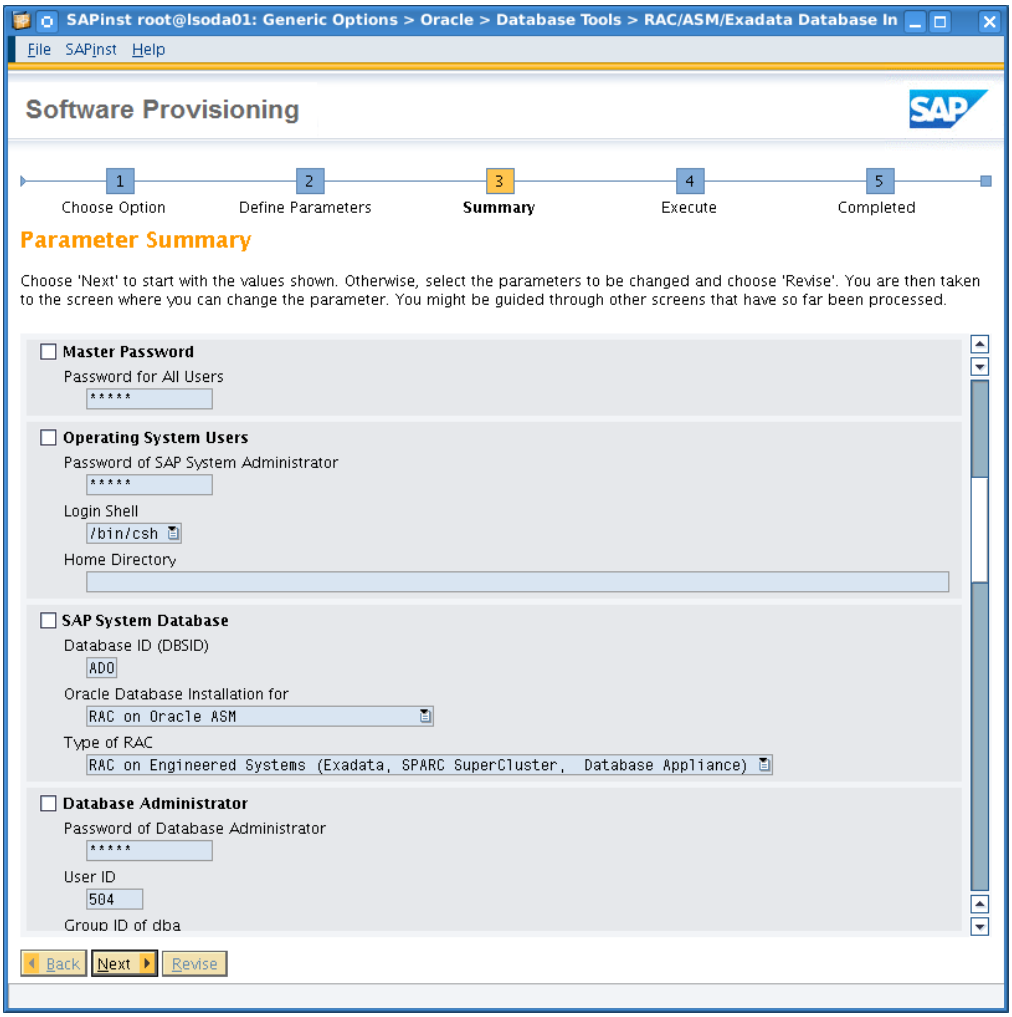
Set the ORACLE_HOME for GRID and the ASM instance according to actual values having deployed earlier via Oracle Appliance Manager setup.

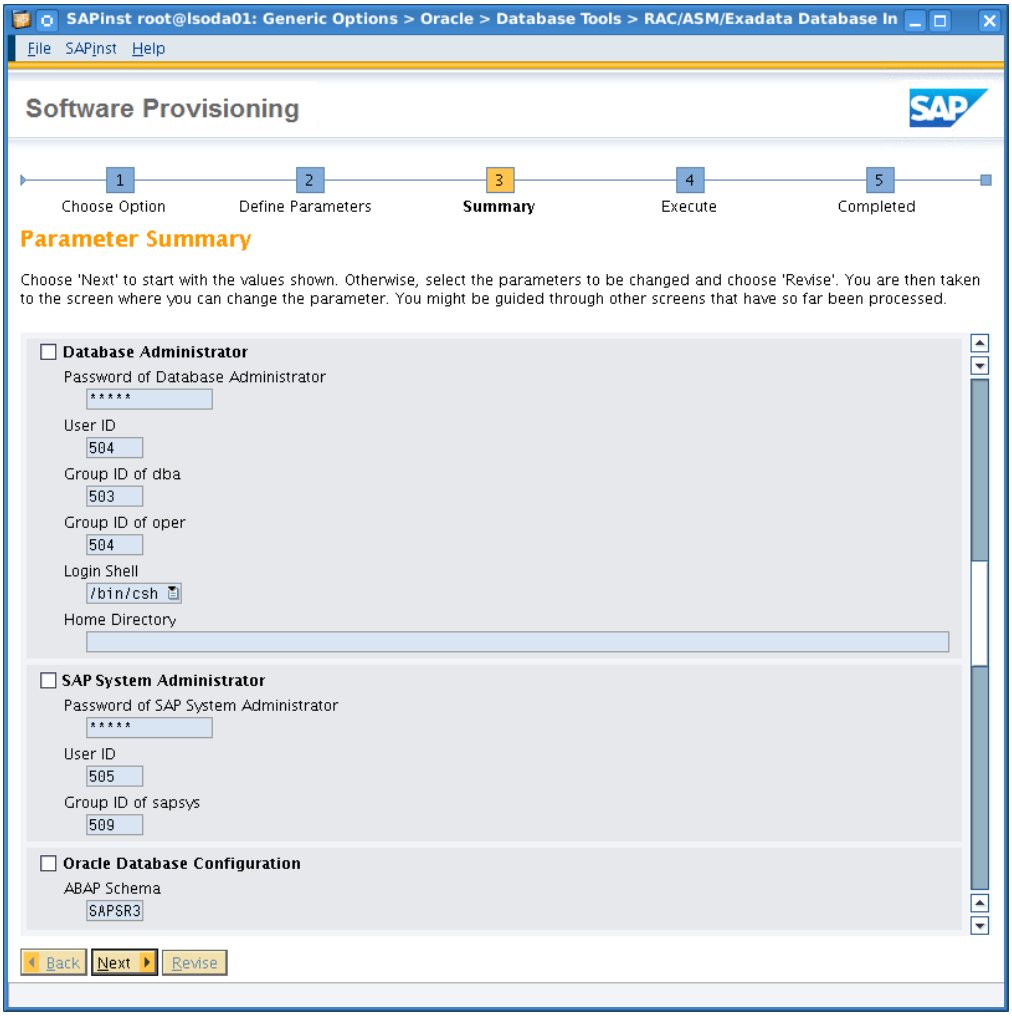

SAPinst root@lsoda01: Generic Options > Oracle > Database Tools > RAC/ASM/Exadata Database In
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Oracle Database RAC Parameters
Enter the parameters of the database RAC – for Oracle experts only.
Database RAC Parameters
Database Name ADO
Number of Instances 2
Scan Listener* lsoda-scan
Scan Listener Port 1521
Length of Instance Number One Character (1 ... 9)
Three Characters (001 ... 009)
Additional Information
Enter the number of Oracle database instances. The value should be between 2 and 9. The default is 2.
Back Next
Go to next dialog.

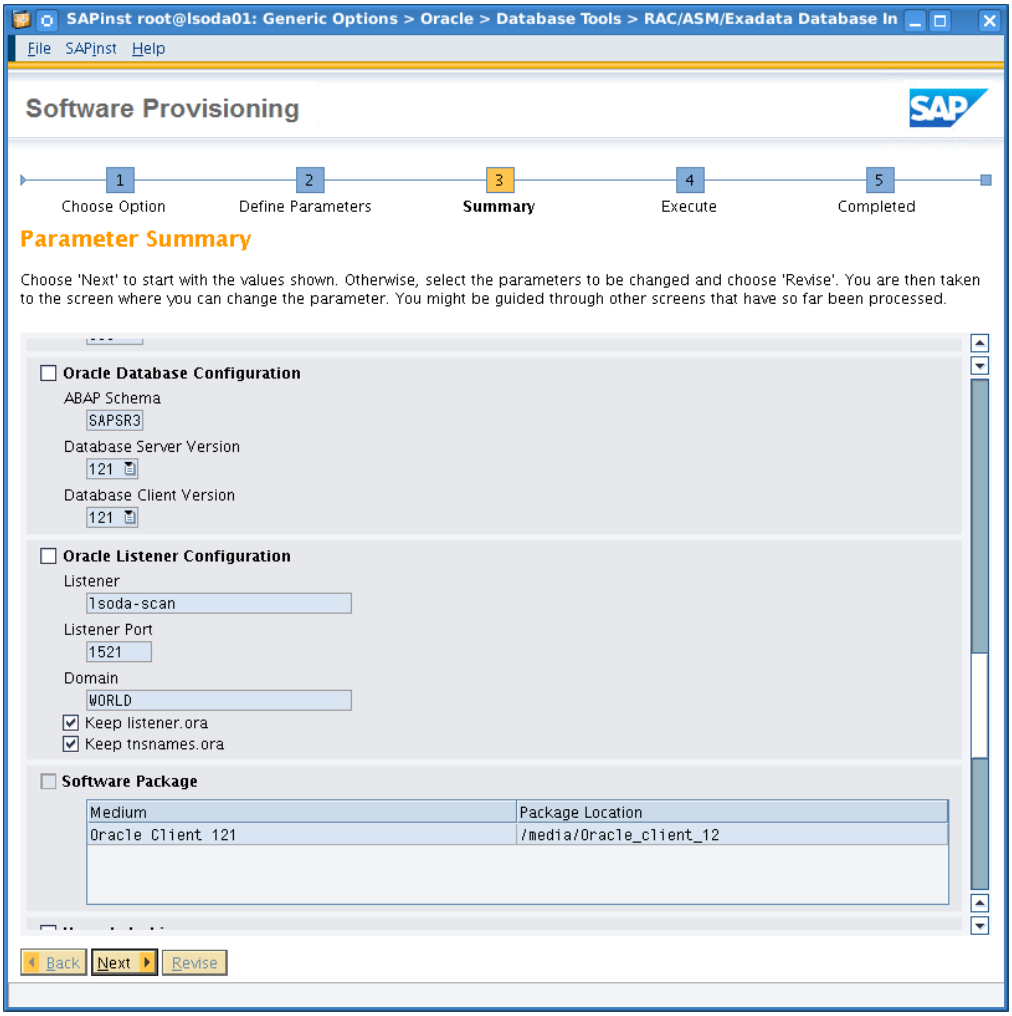


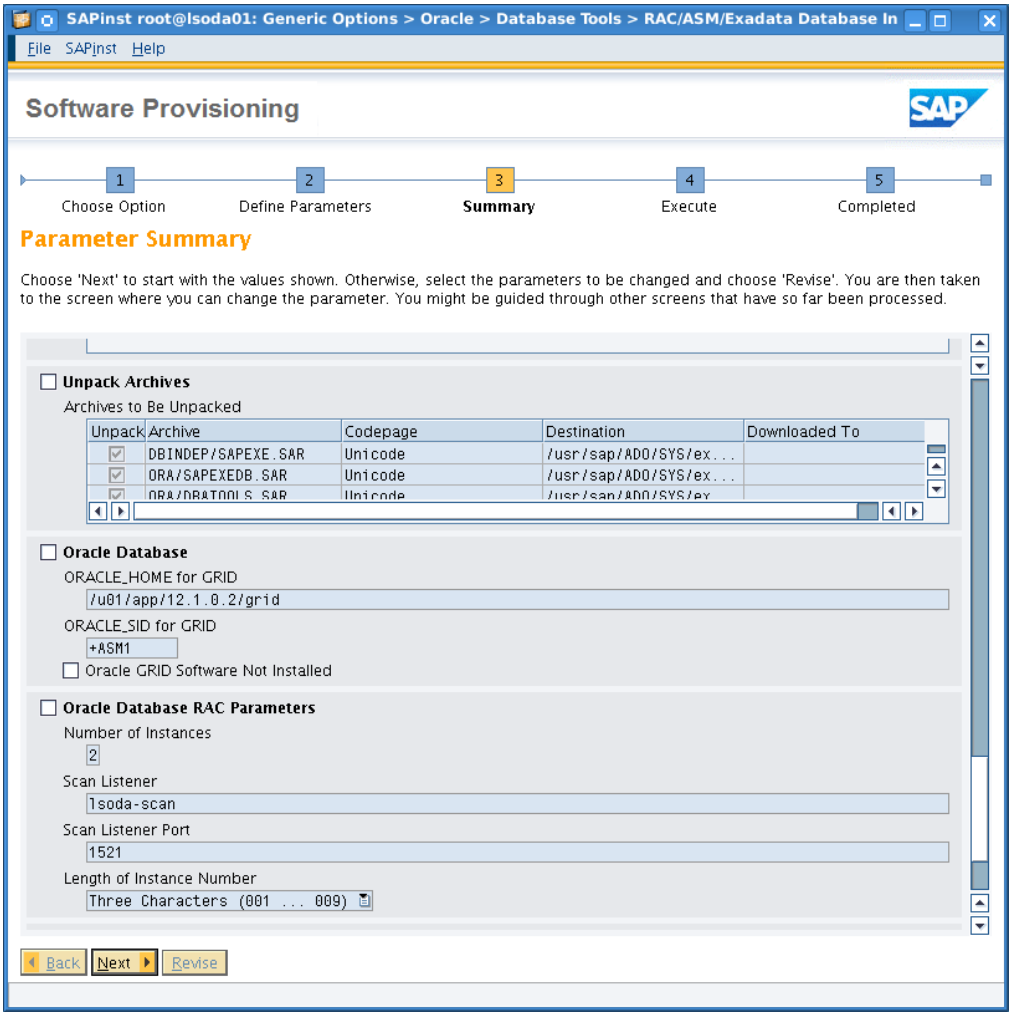
Here we need to ensure that actual hostnames fit to Oracle Instance ID's. Thus, on lsoda01 we run instance 001 whereas we run on lsoda02 instance 002.

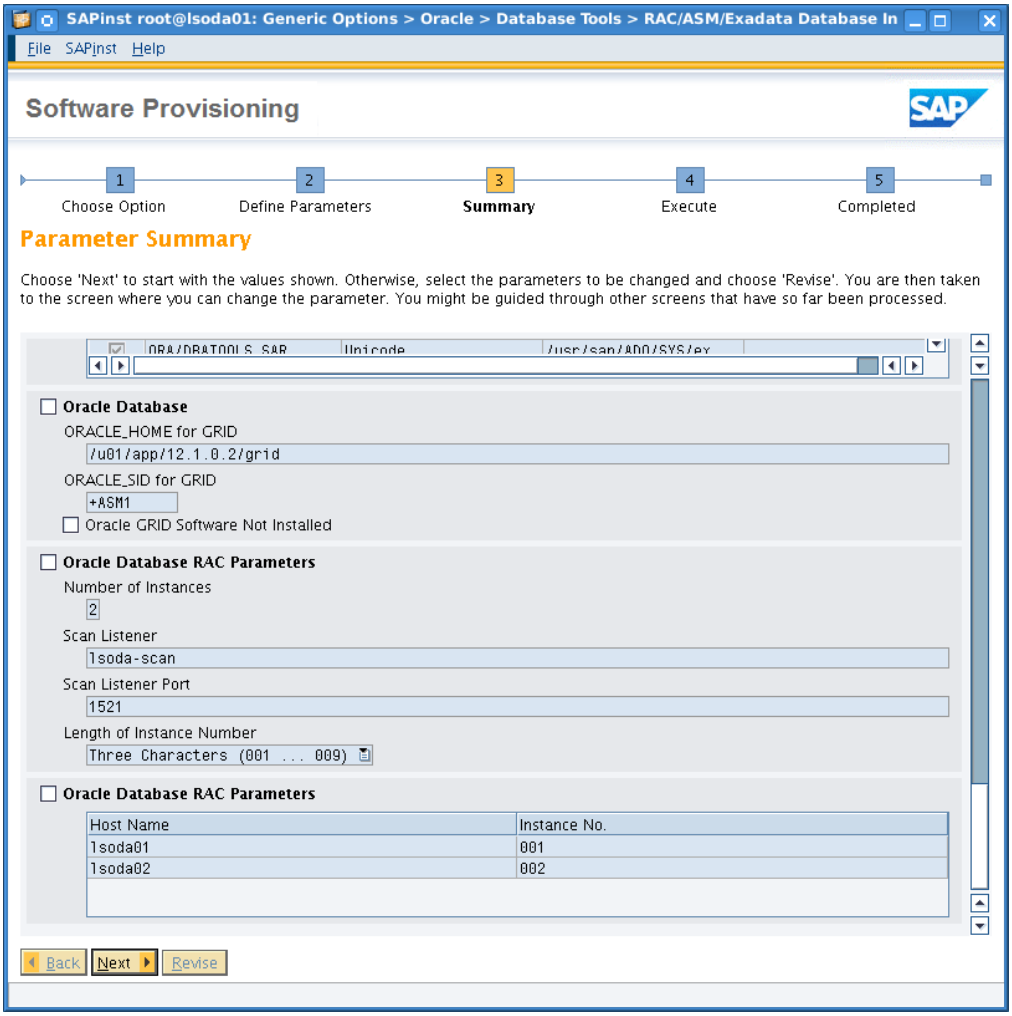
Next 5 screenshots show the full install review screens; please check carefully and if needed revise. Portions of screens distinguish by the vertical scrollbar.



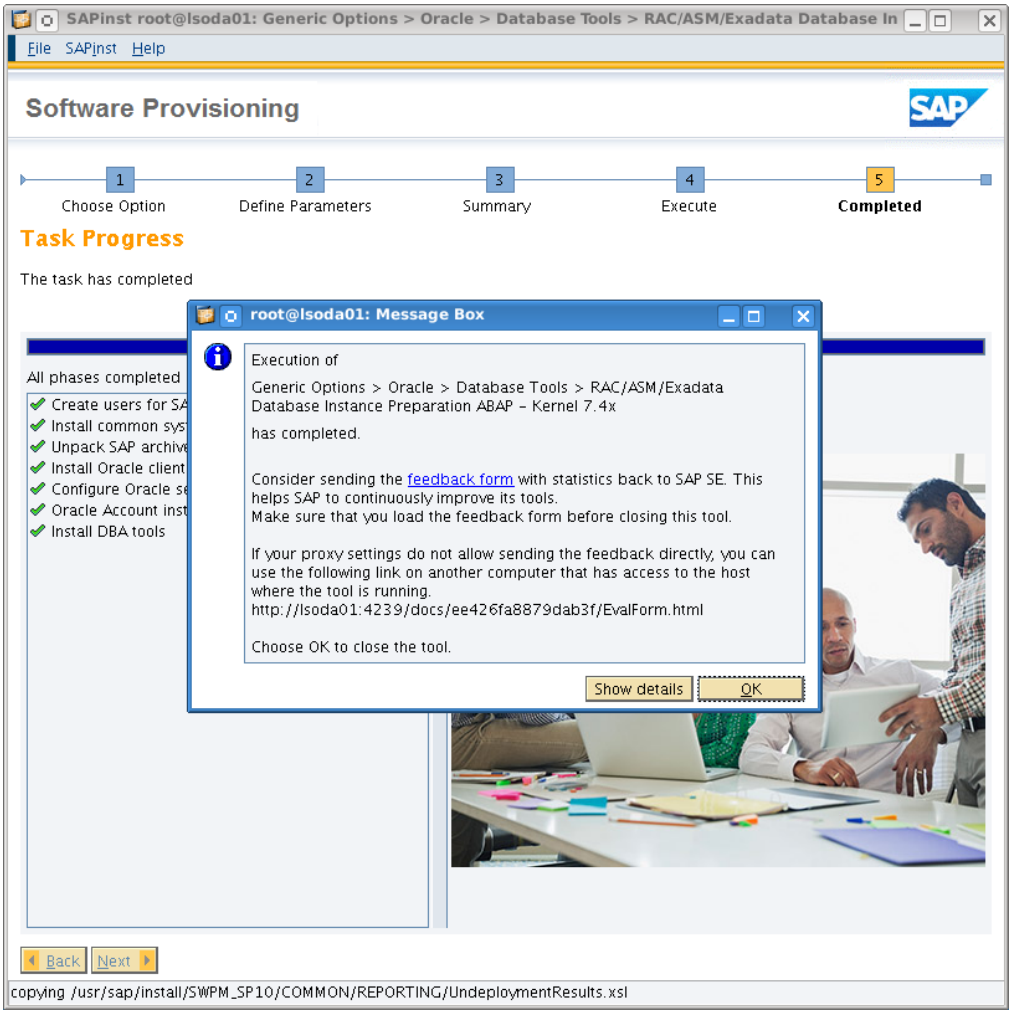

SAPinst root@lsoda01: Generic Options > Oracle > Database Tools > RAC/ASM/Exadata Database In
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Parameter Summary
Choose 'Next' to start with the values shown. Otherwise, select the parameters to be changed and choose 'Revise'. You are then taken to the screen where you can change the parameter. You might be guided through other screens that have so far been processed.
Database Administrator
Password of Database Administrator
*****
User ID
504
Group ID of dba
503
Group ID of oper
504
Login Shell
/bin/csh
Home Directory
SAP System Administrator
Password of SAP System Administrator
*****
User ID
505
Group ID of sapsys
509
Oracle Database Configuration
ABAP Schema
SAPSR3
Back
Next
Revise


SAPinst root@lsoda01: Generic Options > Oracle > Database Tools > RAC/ASM/Exadata Database In
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Parameter Summary
Choose 'Next' to start with the values shown. Otherwise, select the parameters to be changed and choose 'Revise'. You are then taken to the screen where you can change the parameter. You might be guided through other screens that have so far been processed.
Oracle Database Configuration
ABAP Schema
SAPSR3
Database Server Version
121
Database Client Version
121
Oracle Listener Configuration
Listener
lsoda-scan
Listener Port
1521
Domain
WORLD
Keep listener.ora
Keep tnsnames.ora
Software Package
Medium
Package Location
Oracle Client 121
/media/Oracle_client_12
Back
Next
Revise


SAPinst root@lsoda01: Generic Options > Oracle > Database Tools > RAC/ASM/Exadata Database In
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Parameter Summary
Choose 'Next' to start with the values shown. Otherwise, select the parameters to be changed and choose 'Revise'. You are then taken to the screen where you can change the parameter. You might be guided through other screens that have so far been processed.
Unpack Archives
Archives to Be Unpacked
Unpack
Archive
Codepage
Destination
Downloaded To
DBINDEP/SAPEXE.SAR
Unicode
/usr/sap/ADO/SYS/ex...
ORA/SAPEXEDB.SAR
Unicode
/usr/sap/ADO/SYS/ex...
Oracle Database
ORACLE_HOME for GRID
/u01/app/12.1.0.2/grid
ORACLE_SID for GRID
+ASM1
Oracle GRID Software Not Installed
Oracle Database RAC Parameters
Number of Instances
2
Scan Listener
lsoda-scan
Scan Listener Port
1521
Length of Instance Number
Three Characters (001 ... 009)
Back
Next
Revise


SAPinst root@lsoda01: Generic Options > Oracle > Database Tools > RAC/ASM/Exadata Database In
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Parameter Summary
Choose 'Next' to start with the values shown. Otherwise, select the parameters to be changed and choose 'Revise'. You are then taken to the screen where you can change the parameter. You might be guided through other screens that have so far been processed.
Oracle Database
ORACLE_HOME for GRID
/u01/app/12.1.0.2/grid
ORACLE_SID for GRID
+ASM1
Oracle GRID Software Not Installed
Oracle Database RAC Parameters
Number of Instances
2
Scan Listener
lsoda-scan
Scan Listener Port
1521
Length of Instance Number
Three Characters (001 ... 009)
Oracle Database RAC Parameters
Host Name
Instance No.
lsoda01
001
lsoda02
002
Back
Next
Revise

Install complete window.



Repeat this step "Database Instance Preparation" on the second node. Note we still do not have an SAP database installation yet even when completed preparations on both hosts. Covered in the next steps.

SWPM: ASCS Instance installation

Before we can move on and create a database instance SAP requires to have a Application Server ABAP Central Services instance. For later HA awareness of the ASCS Instance we follow SAP Note 1877857. HA aware ASCS installations need to be on a shared location, namely /usr/sap/<SAPSID>, here we consume /sapmnt for this, and put this under /sapmnt/share from the first host. Ideally you'd use a separate ACFS or other shared filesystem.

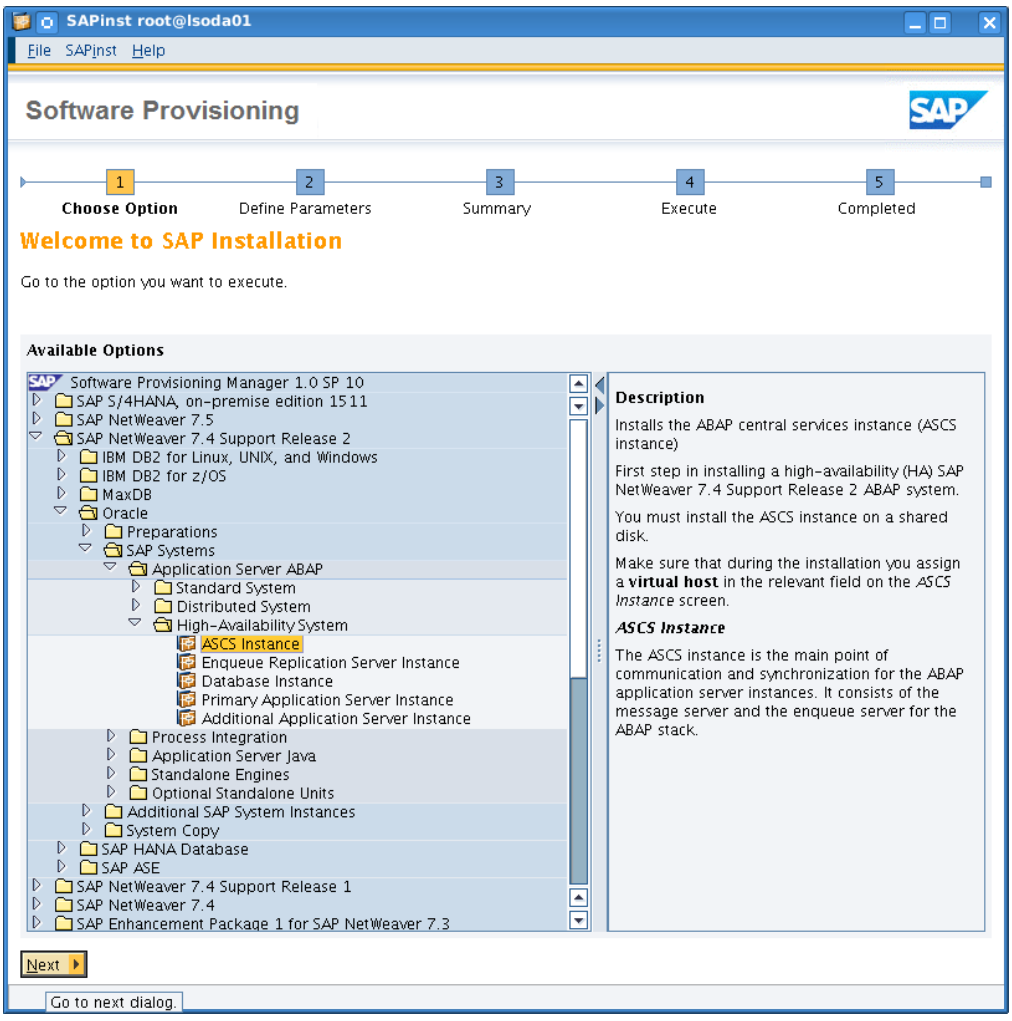
```
# mkdir -p /sapmnt/share ; cd /usr/sap ; tar cvf ADO.tar ADO
# cp ADO.tar /sapmnt/share ; cd /sapmnt/share ; tar xvf ADO.tar
# cd /usr/sap ; rm ADO.tar ; mv ADO was.ADOlocal
# ln -s /sapmnt/share/ADO ADO ; chown adoadm:sapsys ADO
```

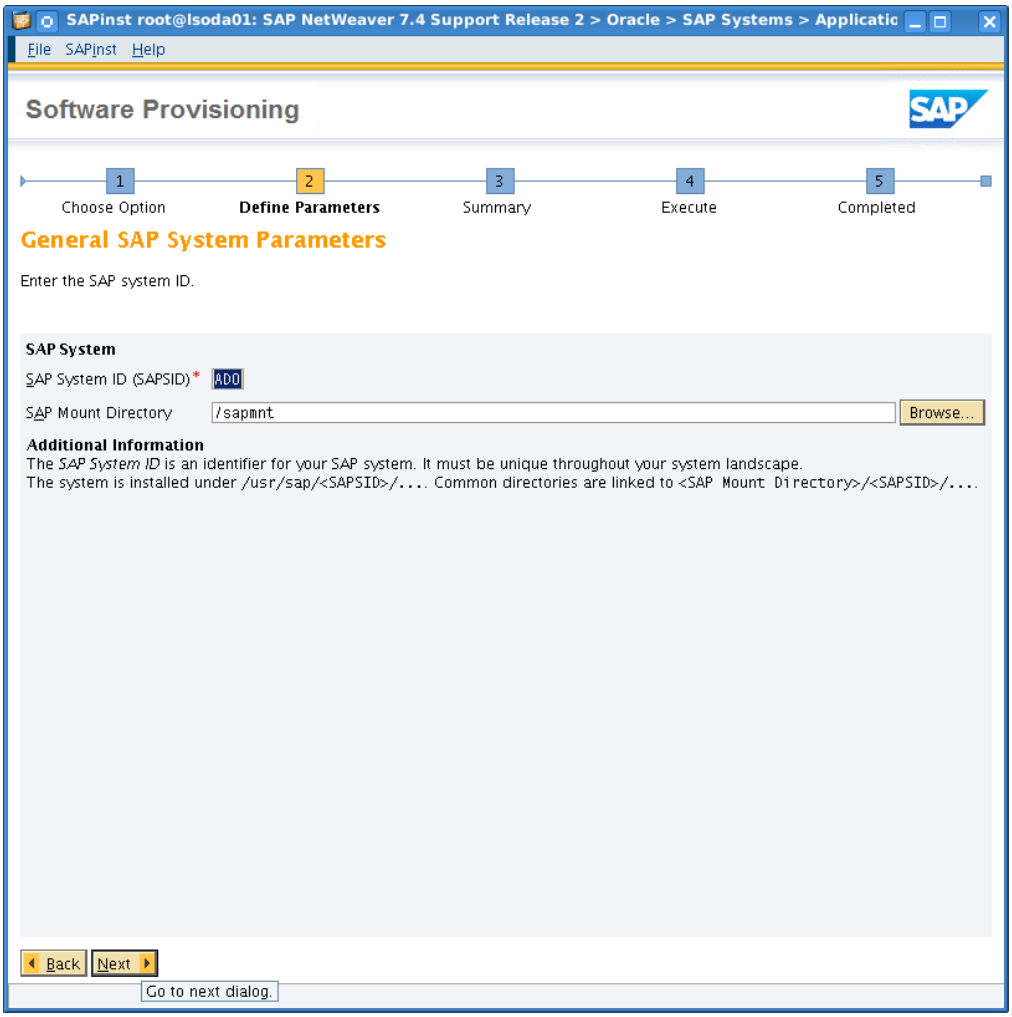
Repeat the last 2 lines for the second host. Thus, host file system equivalence for /usr/sap/<SAPSID>.

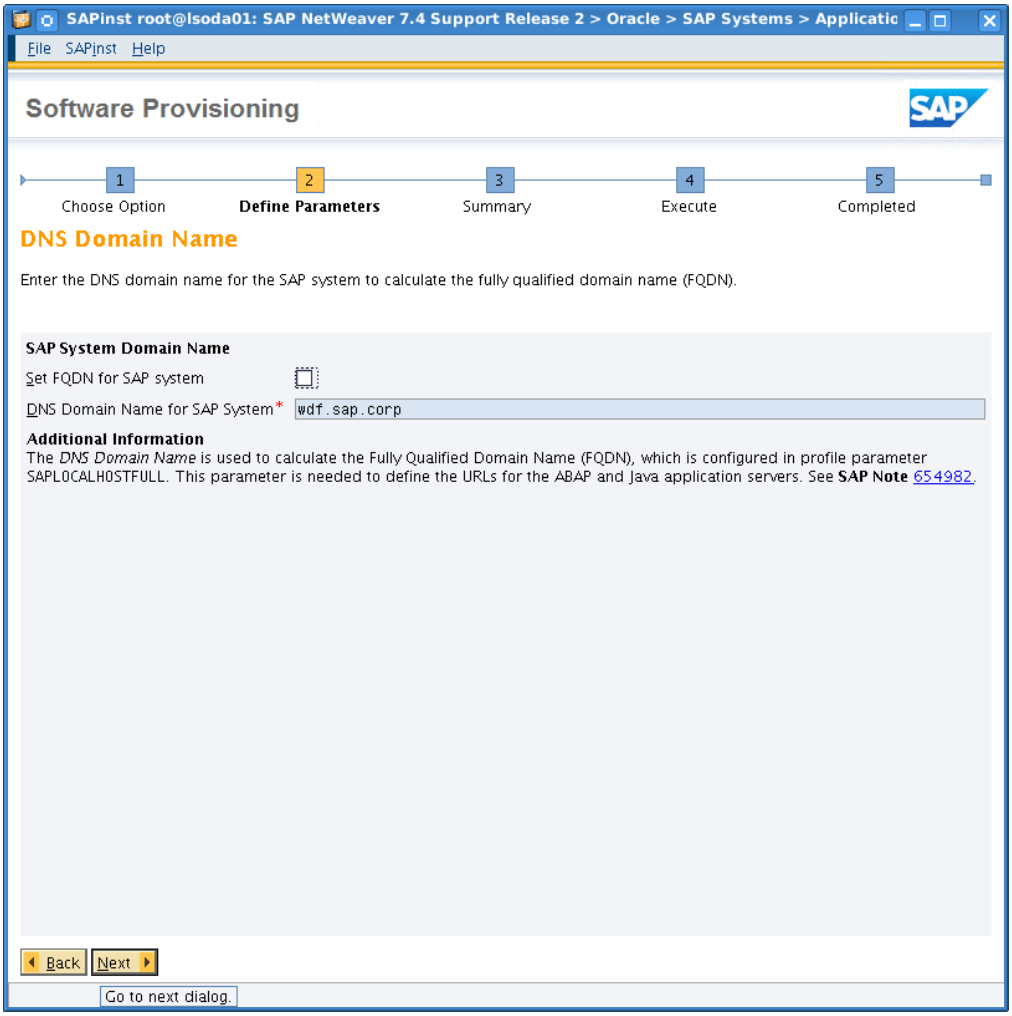
On the first host we start the VIP:

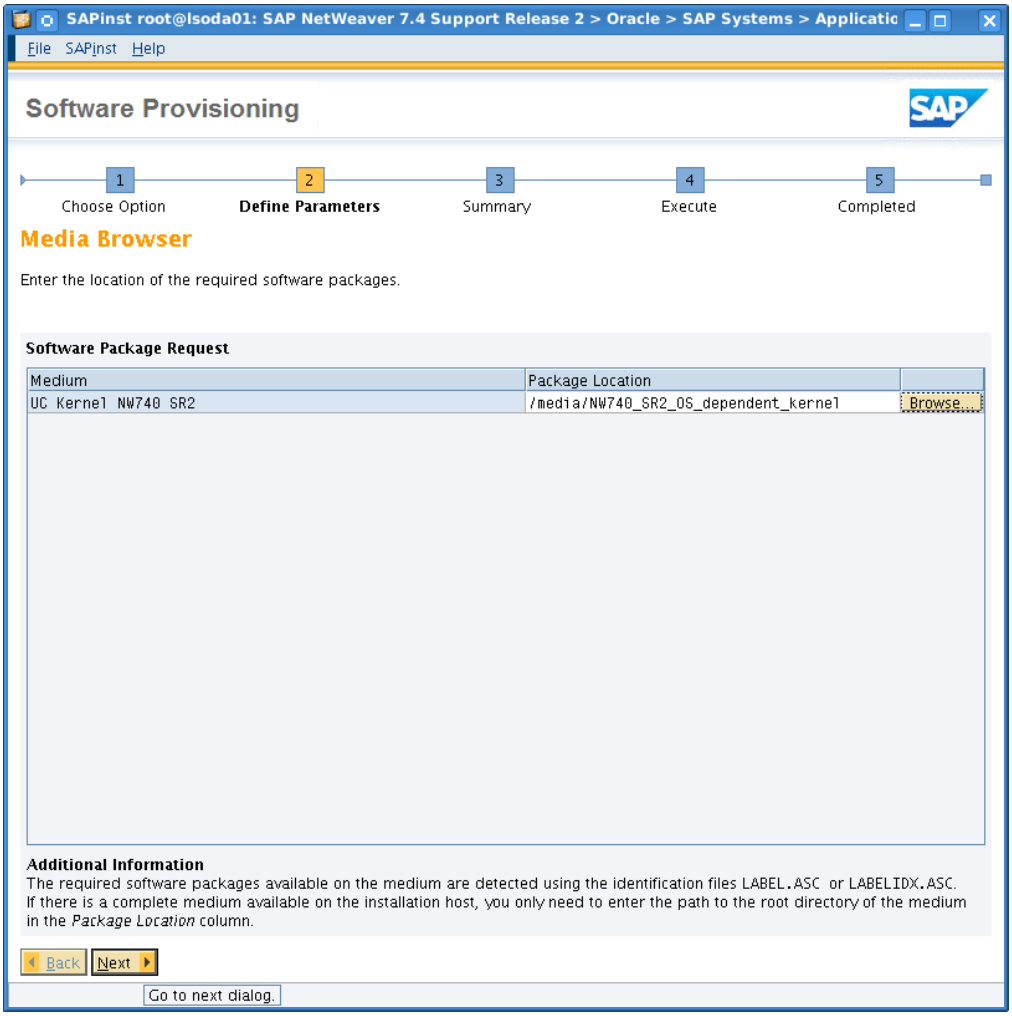
```
# crsctl start ip -A 10.20.88.62/255.255.252.0/bond0
```

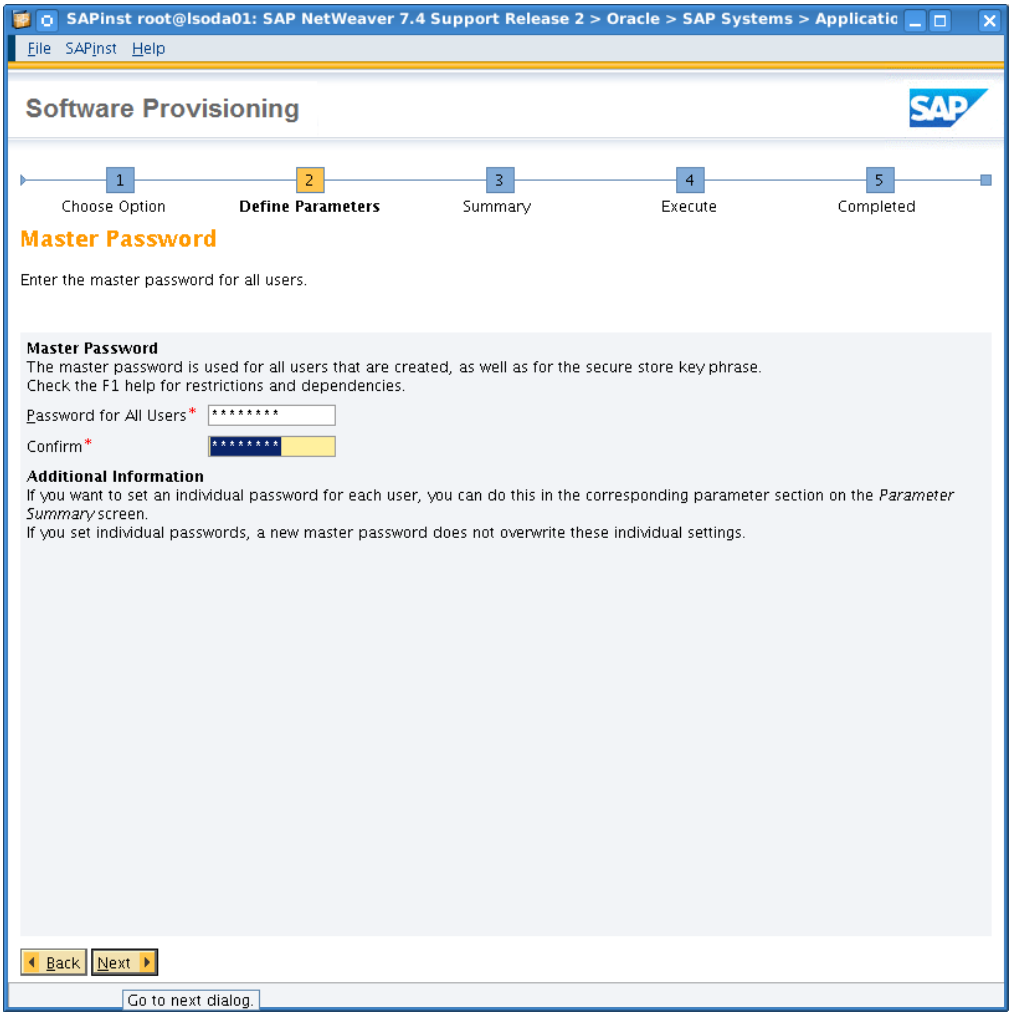
And invoke SWPM on the virtual host using ./sapinst SAPINST_USE_HOSTNAME=lsadoascs

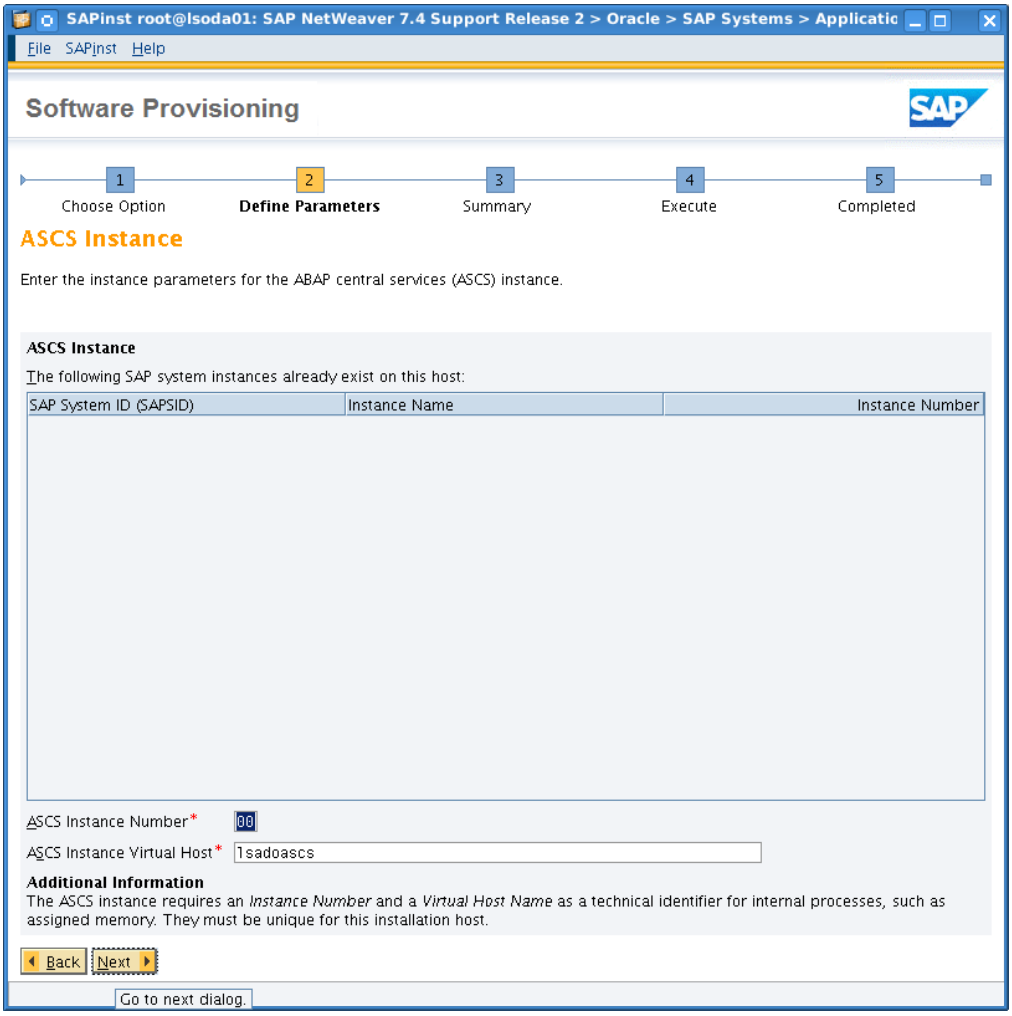


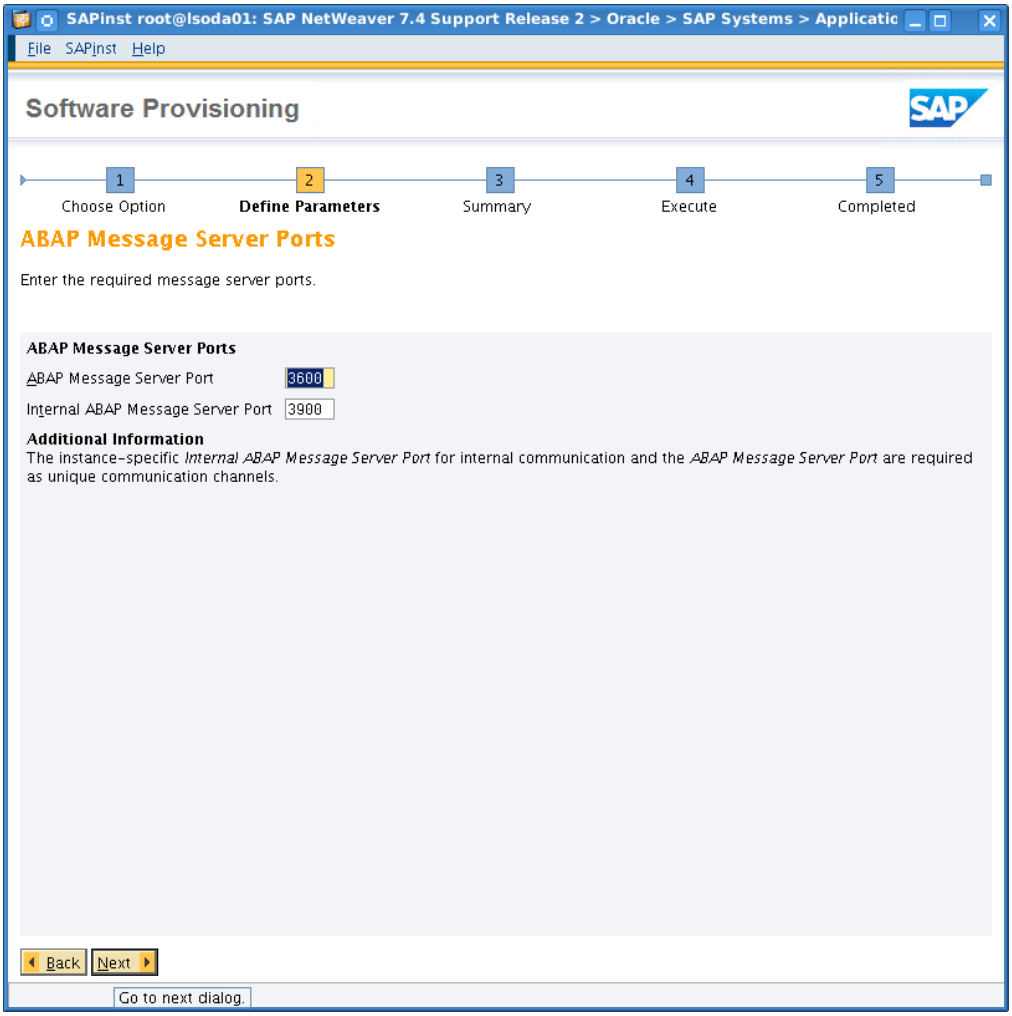

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
General SAP System Parameters
Enter the SAP system ID.
SAP System
SAP System ID (SAPSID) *
ADO
SAP Mount Directory
/sapmnt
Browse...
Additional Information
The SAP System ID is an identifier for your SAP system. It must be unique throughout your system landscape.
The system is installed under /usr/sap/<SAPSID>/.... Common directories are linked to <SAP Mount Directory>/<SAPSID>/....
Back
Next
Go to next dialog.

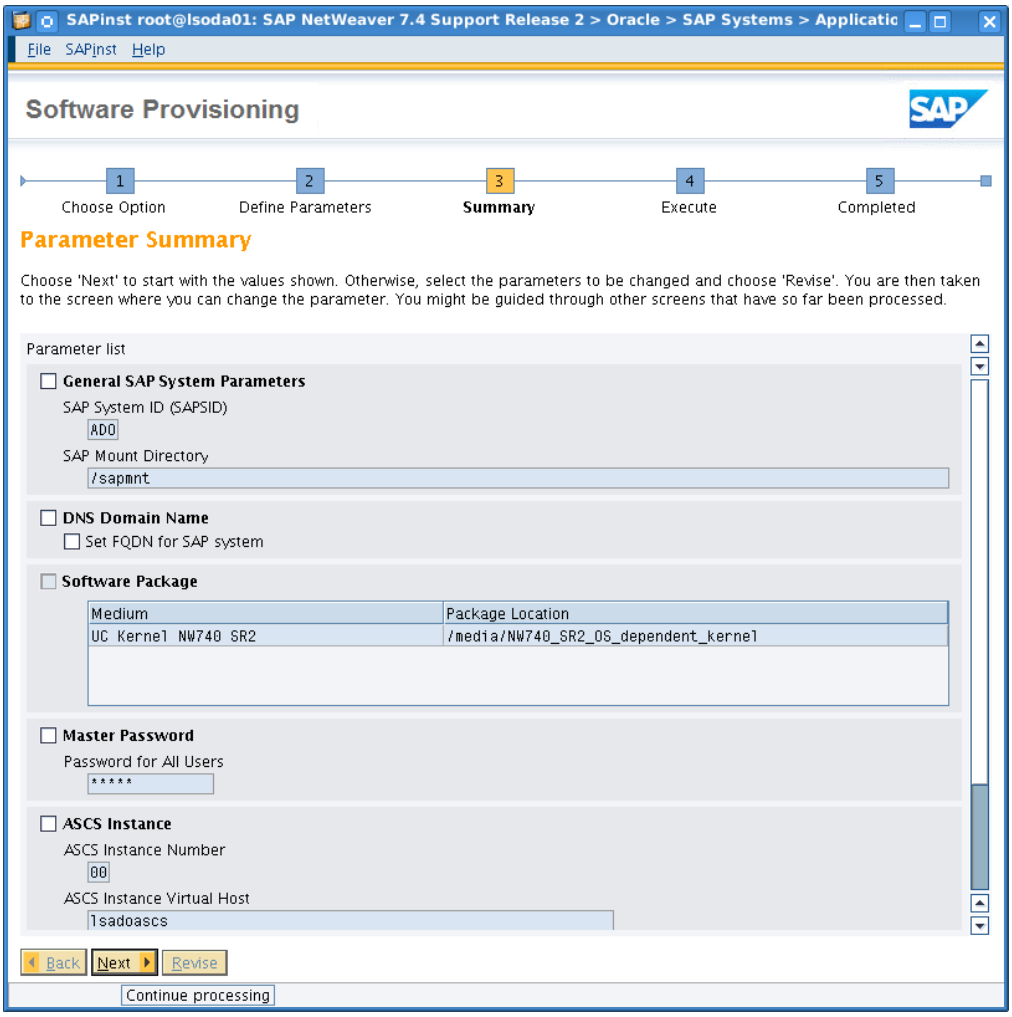

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
DNS Domain Name
Enter the DNS domain name for the SAP system to calculate the fully qualified domain name (FQDN).
SAP System Domain Name
Set FQDN for SAP system
DNS Domain Name for SAP System*
wdf.sap.corp
Additional Information
The DNS Domain Name is used to calculate the Fully Qualified Domain Name (FQDN), which is configured in profile parameter SAPLOCALHOSTFULL. This parameter is needed to define the URLs for the ABAP and Java application servers. See SAP Note 654982.
Back
Next
Go to next dialog.

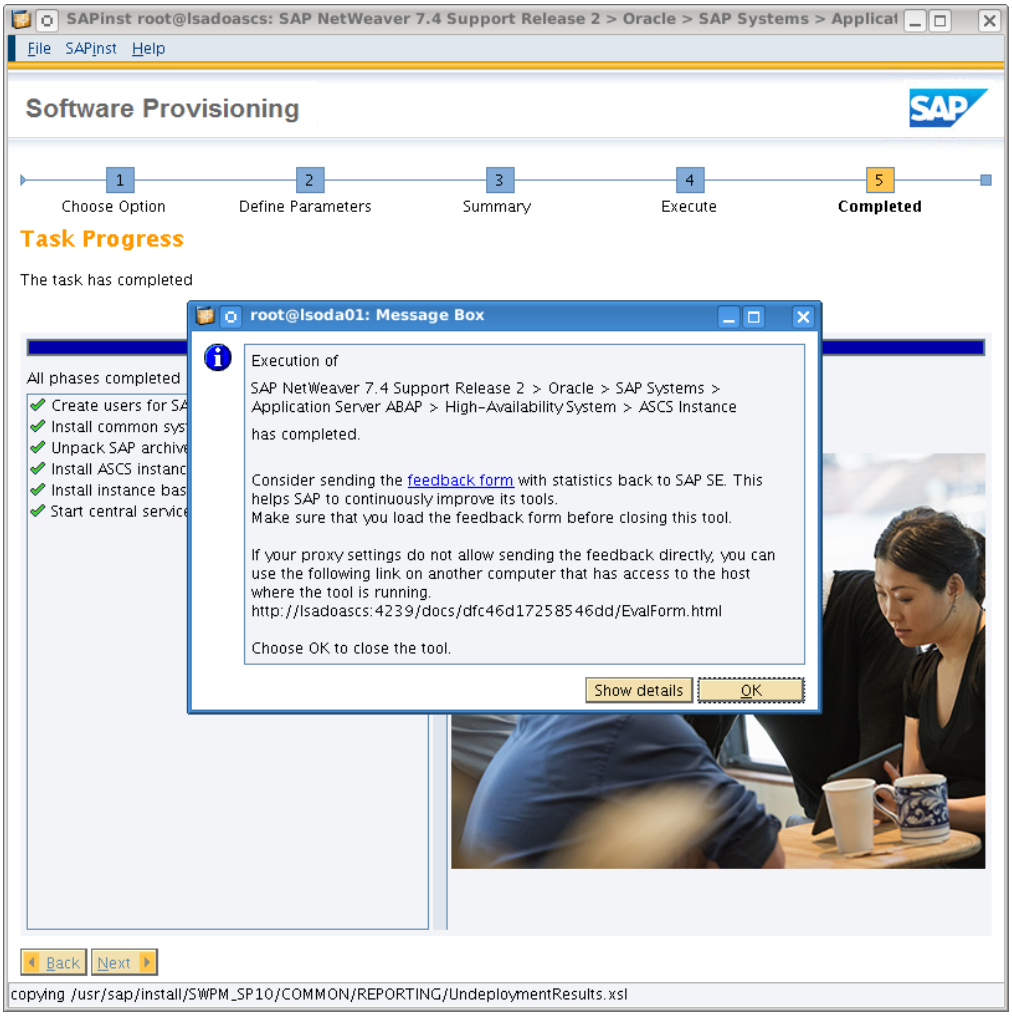

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Media Browser
Enter the location of the required software packages.
Software Package Request
Medium
Package Location
UC Kernel NW740 SR2
/media/NW740_SR2_OS_dependent_kernel
Browse
Additional Information
The required software packages available on the medium are detected using the identification files LABEL.ASC or LABELIDX.ASC.
If there is a complete medium available on the installation host, you only need to enter the path to the root directory of the medium in the Package Location column.
Back
Next
Go to next dialog.


SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Master Password
Enter the master password for all users.
Master Password
The master password is used for all users that are created, as well as for the secure store key phrase.
Check the F1 help for restrictions and dependencies.
Password for All Users*
Confirm*
Additional Information
If you want to set an individual password for each user, you can do this in the corresponding parameter section on the Parameter Summary screen.
If you set individual passwords, a new master password does not overwrite these individual settings.
Back
Next
Go to next dialog.


SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
ASCS Instance
Enter the instance parameters for the ABAP central services (ASCS) instance.
ASCS Instance
The following SAP system instances already exist on this host:
SAP System ID (SAPSID)
Instance Name
Instance Number
ASCS Instance Number*
00
ASCS Instance Virtual Host*
lsadoascs
Additional Information
The ASCS instance requires an Instance Number and a Virtual Host Name as a technical identifier for internal processes, such as assigned memory. They must be unique for this installation host.
Back
Next
Go to next dialog.


SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
ABAP Message Server Ports
Enter the required message server ports.
ABAP Message Server Ports
ABAP Message Server Port 3600
Internal ABAP Message Server Port 3900
Additional Information
The instance-specific Internal ABAP Message Server Port for internal communication and the ABAP Message Server Port are required as unique communication channels.
Back
Next
Go to next dialog.


SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatio
File SAPinst Help
Software Provisioning
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Parameter Summary
Choose 'Next' to start with the values shown. Otherwise, select the parameters to be changed and choose 'Revise'. You are then taken to the screen where you can change the parameter. You might be guided through other screens that have so far been processed.
Parameter list
General SAP System Parameters
SAP System ID (SAPSID)
ADO
SAP Mount Directory
/sapmnt
DNS Domain Name
Set FQDN for SAP system
Software Package
Medium
Package Location
UC Kernel NW740 SR2
/media/NW740_SR2_OS_dependent_kernel
Master Password
Password for All Users
*****
ASCS Instance
ASCS Instance Number
00
ASCS Instance Virtual Host
lsadoascs
Back
Next
Revise
Continue processing



ASCS installation completed at this point. As we're still in the context of SAP Note 1877857 next we install the Enqueue Replication Server (ERS), on both hosts locally. As this is pretty straightforward slides are omitted here. Once ERS installations have been completed, next steps are as <sidadm> on the installation hosts of ASCS:

```
lsoda01: adoadm> sapcontrol -nr 00 -function Stop
lsoda01: adoadm> sapcontrol -nr 00 -function StopService
```

Switch to root on this host, issue:

```
[root@lsoda01]# crsctl stop ip -A 10.20.88.62/bond0
```

Login as root to the 2nd clusternode, restart the IP there:

```
[root@lsoda02]# . oraenv
+ASM2
[root@lsoda02]# crsctl start ip -A 10.20.88.62/255.255.252.0/bond0
[root@lsoda02]# /usr/sap/hostctrl/exe/saphostctrl -function RegisterInstanceService -
sid ADO -nr 00 -saplocalhost lsadoascs

[root@lsoda02]# /etc/init.d/sapinit stop
```

Edit /etc/init.d/sapinit, comment lines 438-444 (including) according to the whitepaper of SAP Note 1877857.

Repeat the steps sapinit stop and edit /etc/init.d/sapinit back on the first node.

Eventually on the first node restart sapinit as root: `# /etc/init.d/sapinit start` and start ASCS services manually for the subsequent SAP Database Instance installation.

```
lsoda01: adoadm> sapcontrol –nr 00 –function StartService ADO
lsoda01: adoadm> sapcontrol –nr 00 –function Start
lsoda01: adoadm> sapcontrol –nr 00 –function GetProcessList
```

Later on we complete the HA integration. At this point we are finished with the content of SAP Note 1877857.

SAP Oracle Home Naming Requirements

The successful installation and operation of any SAP utility such as SWPM or BR*Tools on the database nodes of the Oracle Database Appliance requires some preparation for the correct setting of the ORACLE_HOME environment variable in the SAP environment. The SAP environment requires the ORACLE_HOME environment variable to be set to /oracle/<SID>/<release>.

To create an SAP database, SWPM looks for the ORACLE_HOME directory. If there is a suitable installation with the Oracle RDBMS software correctly installed SWPM will not extract the RDBMS install media; it will use the existing installation.

SWPM looks for the RDBMS software in /oracle/<SID>/<release> - standard path of SAP for the Oracle RDBMS software. The Oracle Database Appliance Software deployment installs the RDBMS software under /u01/app/oracle/product/12.1.0.2/dbhome_1.

Therefore we need to create a symbolic link on both nodes.

Login to the nodes and create the directory /oracle and /oracle/<SID>.

We use here ADO as the <SID>

```
[root@lsoda01 /]# mkdir /oracle
[root@lsoda01 /]# chown oracle:oinstall /oracle
[root@lsoda01 /]# su – oracle
```

Create the symbolic link:

```
[oracle@lsoda01 /]$ mkdir -p /oracle/ADO
[oracle@lsoda01 /]$ ln -s /u01/app/oracle/product/12.1.0.2/dbhome_1 /oracle/ADO/121
```

Repeat above steps on the second node.

At this point we're ready for the Oracle Database installation.

SWPM: Oracle Database Instance

Depending on your deployment scenario and as outlined in the SAP Installation Guide it is required to install the necessary ABAP central services instance (ASCS) first, plus, having created the symbolic links for ORACLE_HOME. We have done these in the previous two steps.

Keep following media handy:

- SAP NetWeaver 7.40 SR2 OS dependent kernel
- Installation Export SAP NetWeaver 7.40 SR2, EXP1
- Oracle Client 12c

SAP Database instance installation is described on the next pages. These steps need to be performed on one of the nodes of Oracle Database Appliance only.

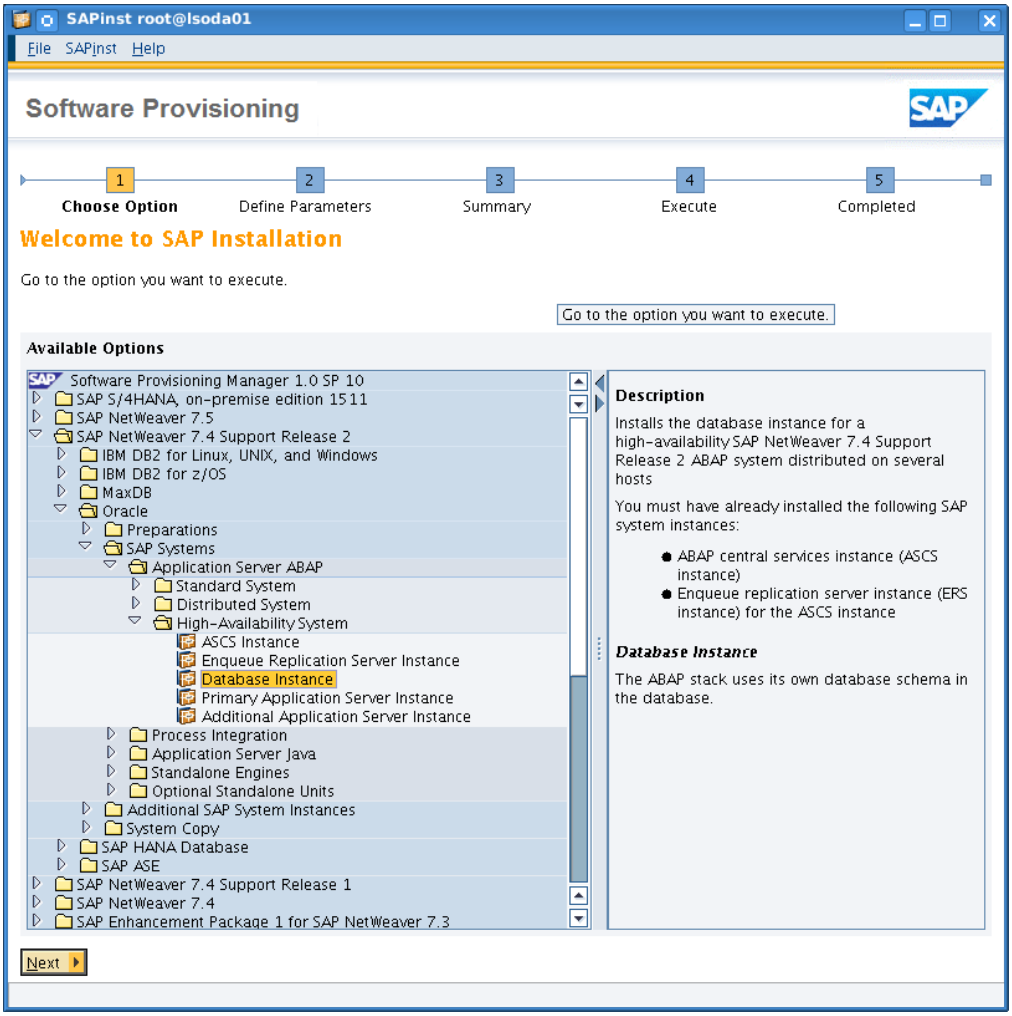
Caveat: Database Instance Installation may fail if the shared profile value for SAPDBHOST is not matching the installation host: `grep SAPDBHOST /sapmnt/ADO/profile/DEFAULT.PFL`

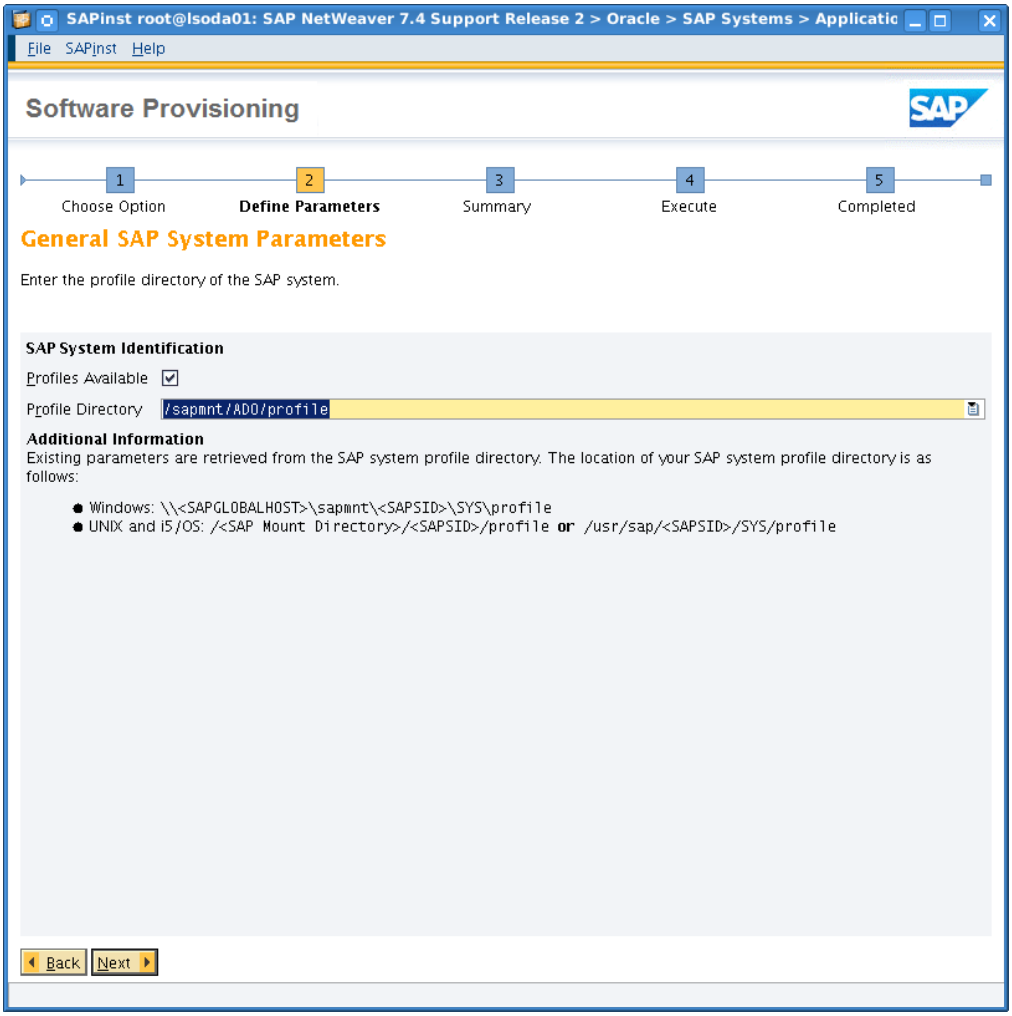
In that case, correct SAPDBHOST setting towards the local hostname.

Login to the first node lsoda01 and invoke SPWM:

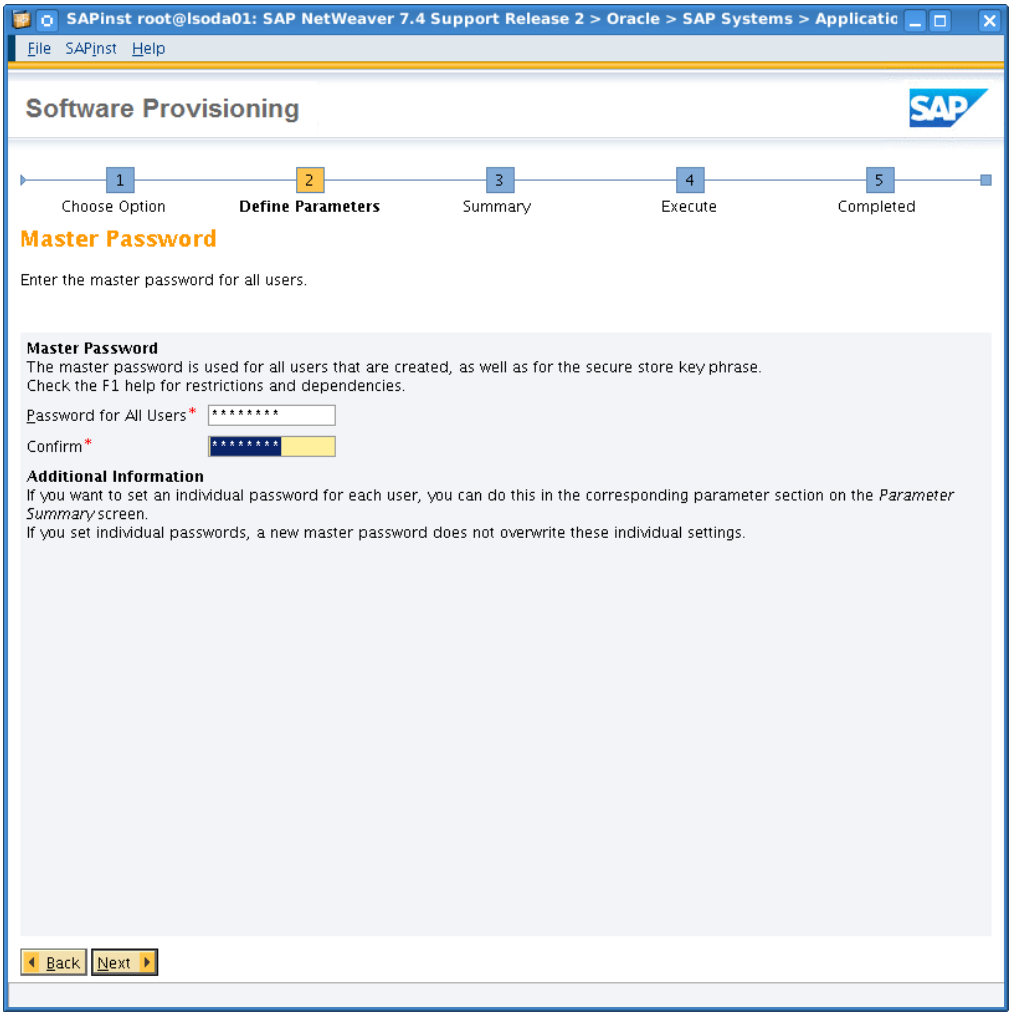
./sapinst SAPINST_USE_HOSTNAME=lsadodb

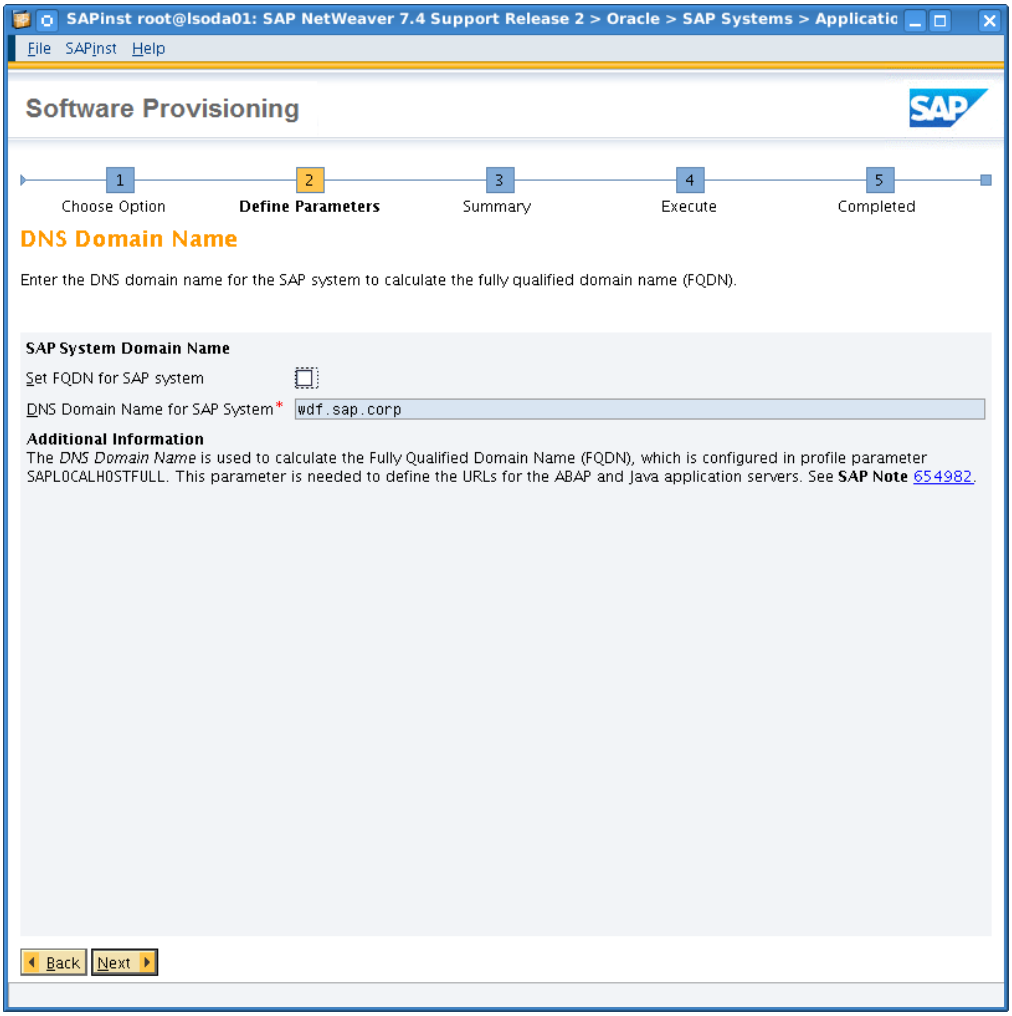
Navigate right away to the shown item below.

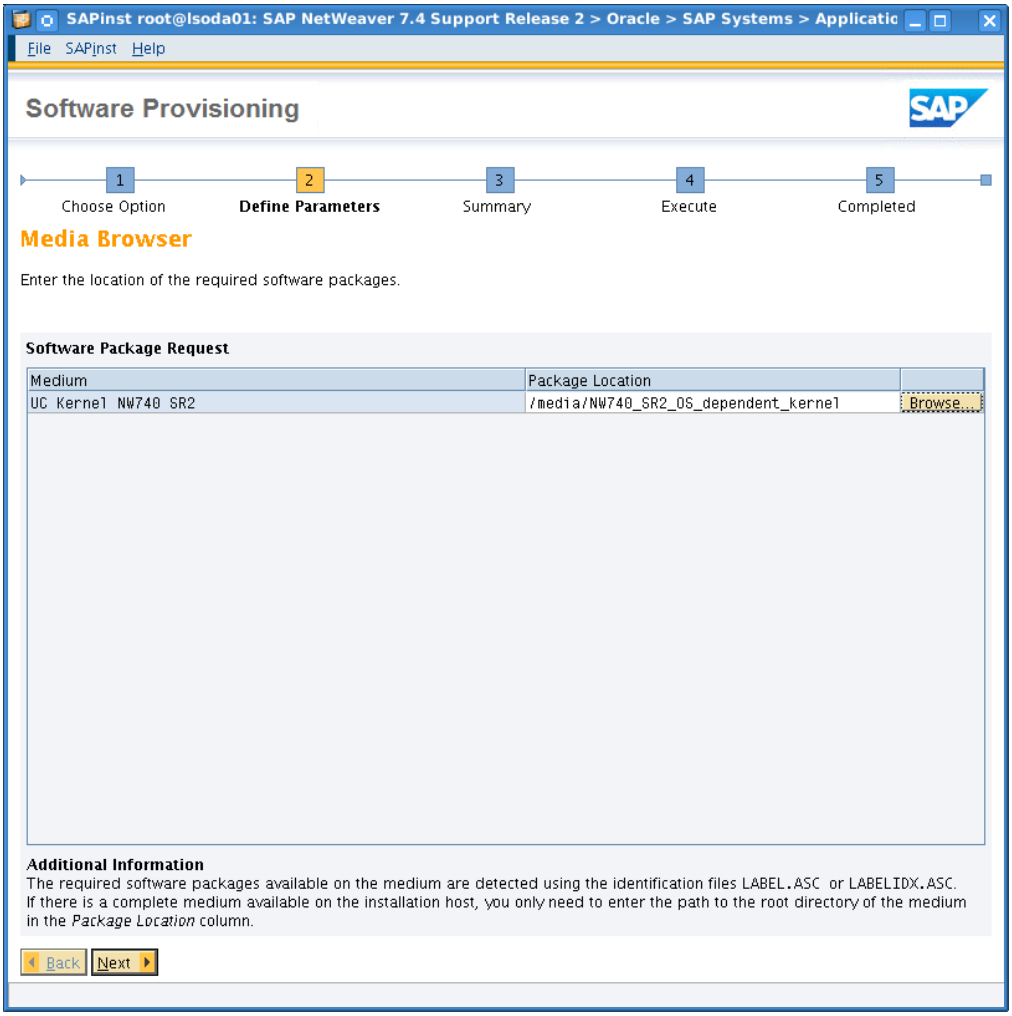


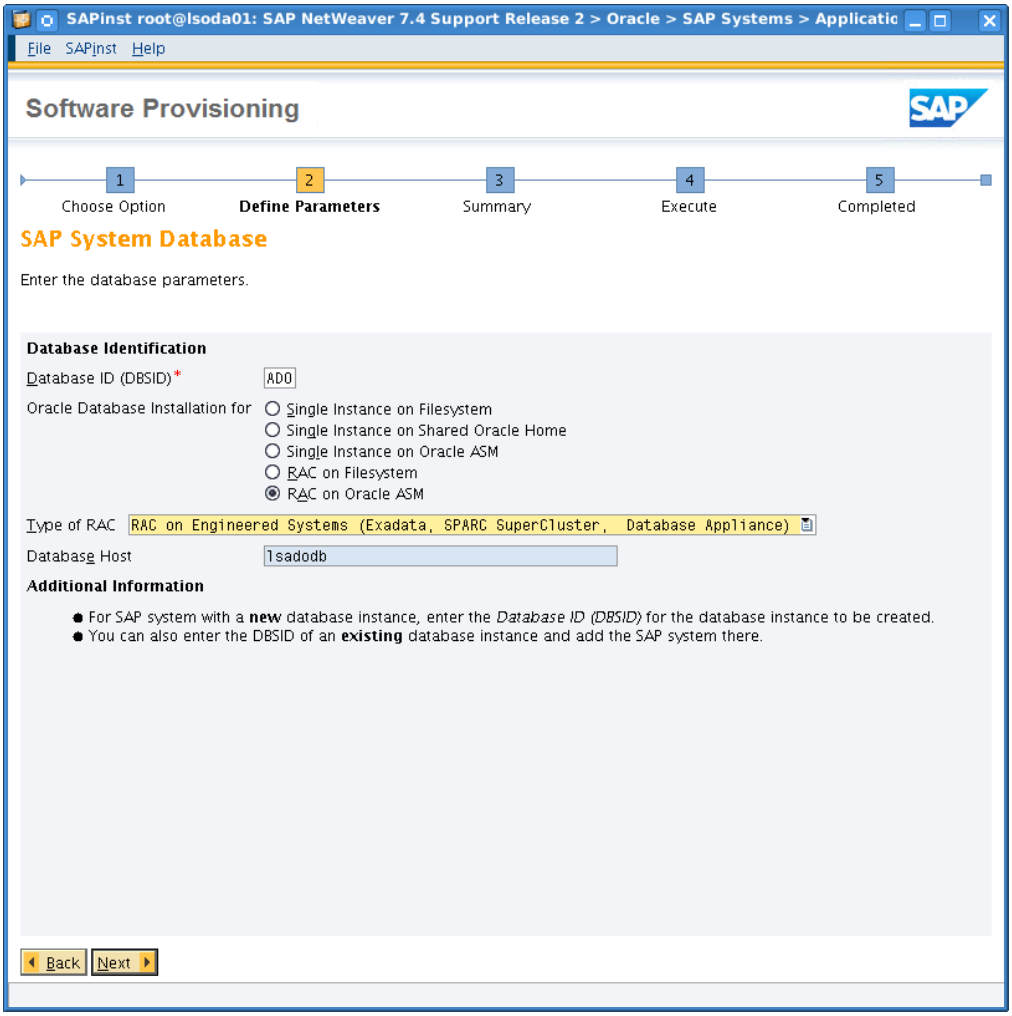


This time we have profiles available, however we correct their location towards /sapmnt/ADO/profile.


SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Master Password
Enter the master password for all users.
Master Password
The master password is used for all users that are created, as well as for the secure store key phrase.
Check the F1 help for restrictions and dependencies.
Password for All Users*
Confirm*
Additional Information
If you want to set an individual password for each user, you can do this in the corresponding parameter section on the Parameter Summary screen.
If you set individual passwords, a new master password does not overwrite these individual settings.
Back
Next

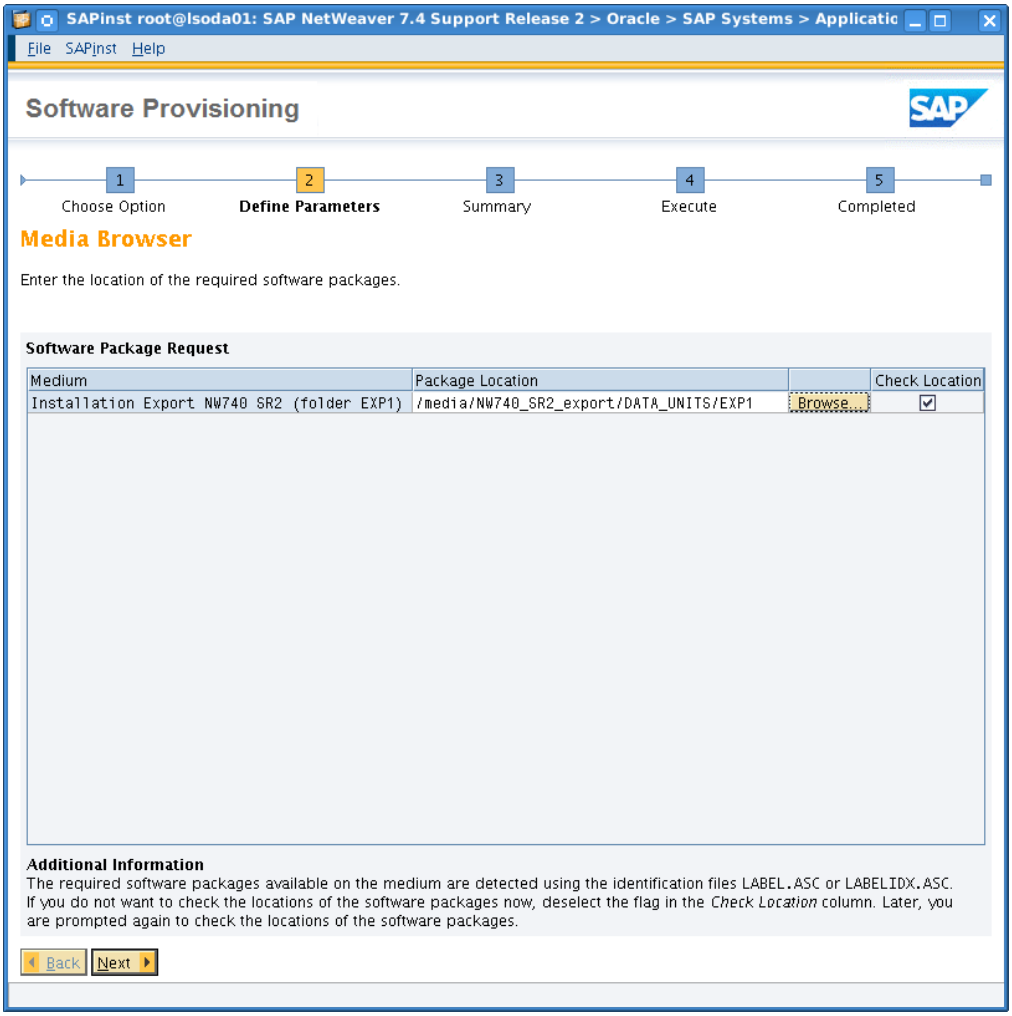

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
DNS Domain Name
Enter the DNS domain name for the SAP system to calculate the fully qualified domain name (FQDN).
SAP System Domain Name
Set FQDN for SAP system
DNS Domain Name for SAP System*
wdf.sap.corp
Additional Information
The DNS Domain Name is used to calculate the Fully Qualified Domain Name (FQDN), which is configured in profile parameter SAPLOCALHOSTFULL. This parameter is needed to define the URLs for the ABAP and Java application servers. See SAP Note 654982.
Back
Next


SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Media Browser
Enter the location of the required software packages.
Software Package Request
Medium
Package Location
UC Kernel NW740 SR2
/media/NW740_SR2_OS_dependent_kernel
Browse
Additional Information
The required software packages available on the medium are detected using the identification files LABEL.ASC or LABELIDX.ASC.
If there is a complete medium available on the installation host, you only need to enter the path to the root directory of the medium in the Package Location column.
Back
Next

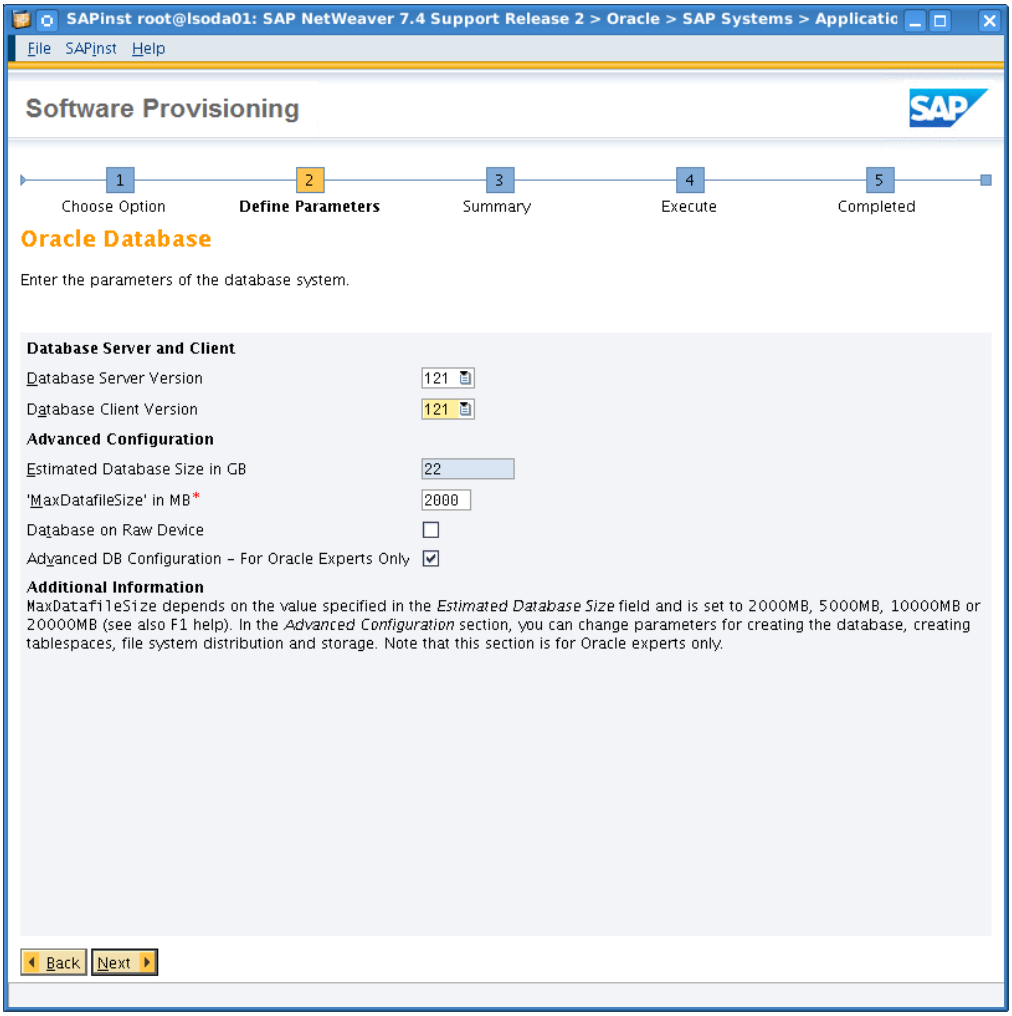


RAC Installation Type needs to match RAC on Engineered Systems.

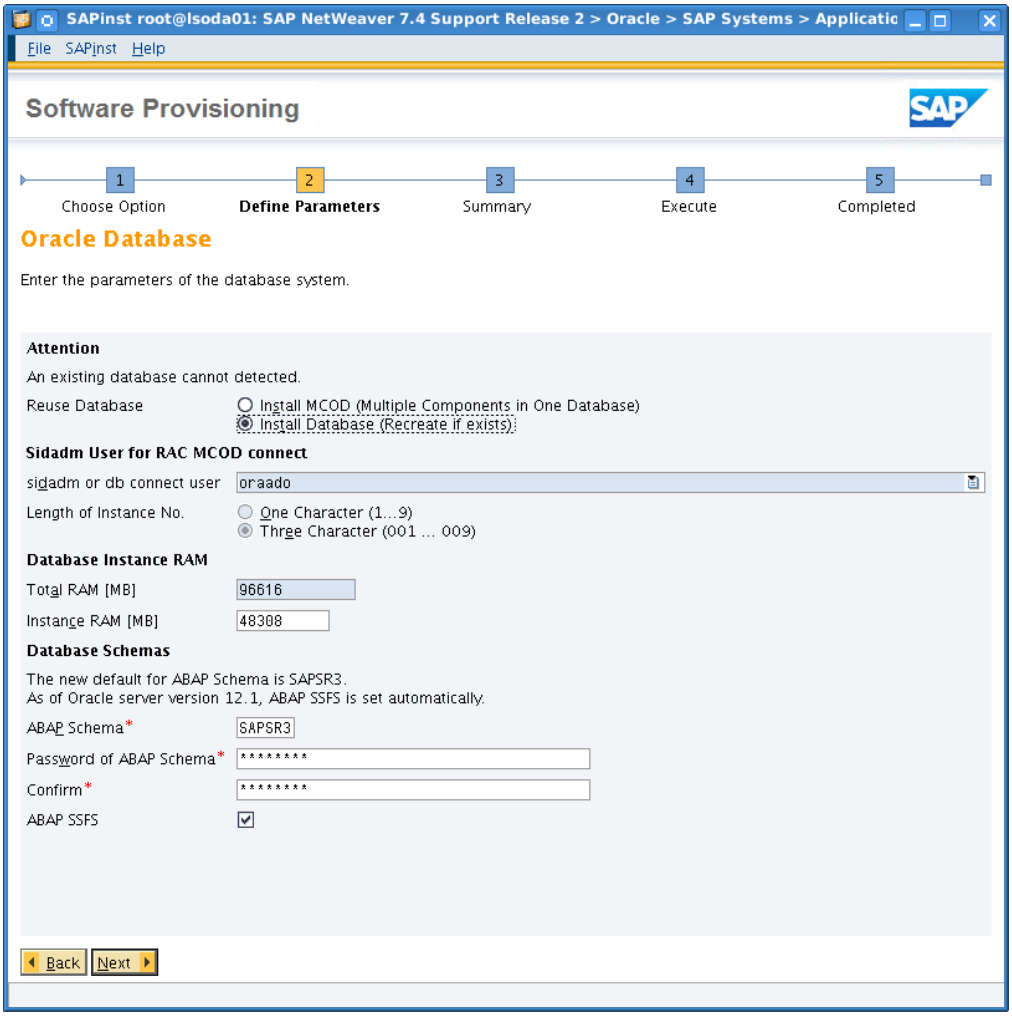
The database hostname lsadodb refers to the invocation of SPWM (./sapinst SAPINST_USE_HOSTNAME=lsadodb). This hostname is consumed by profile settings.



This Installation Export EXP1 will be used as input data for R3Load during this installation step.

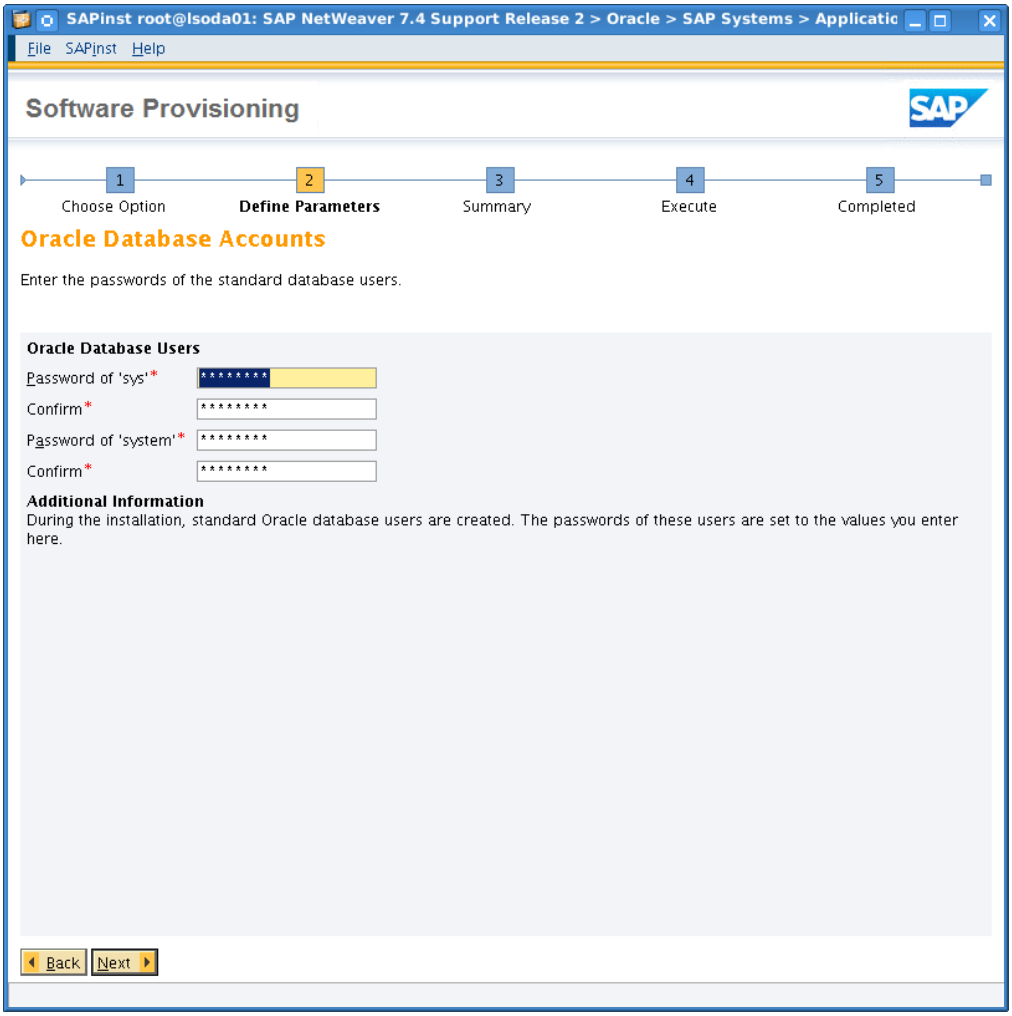


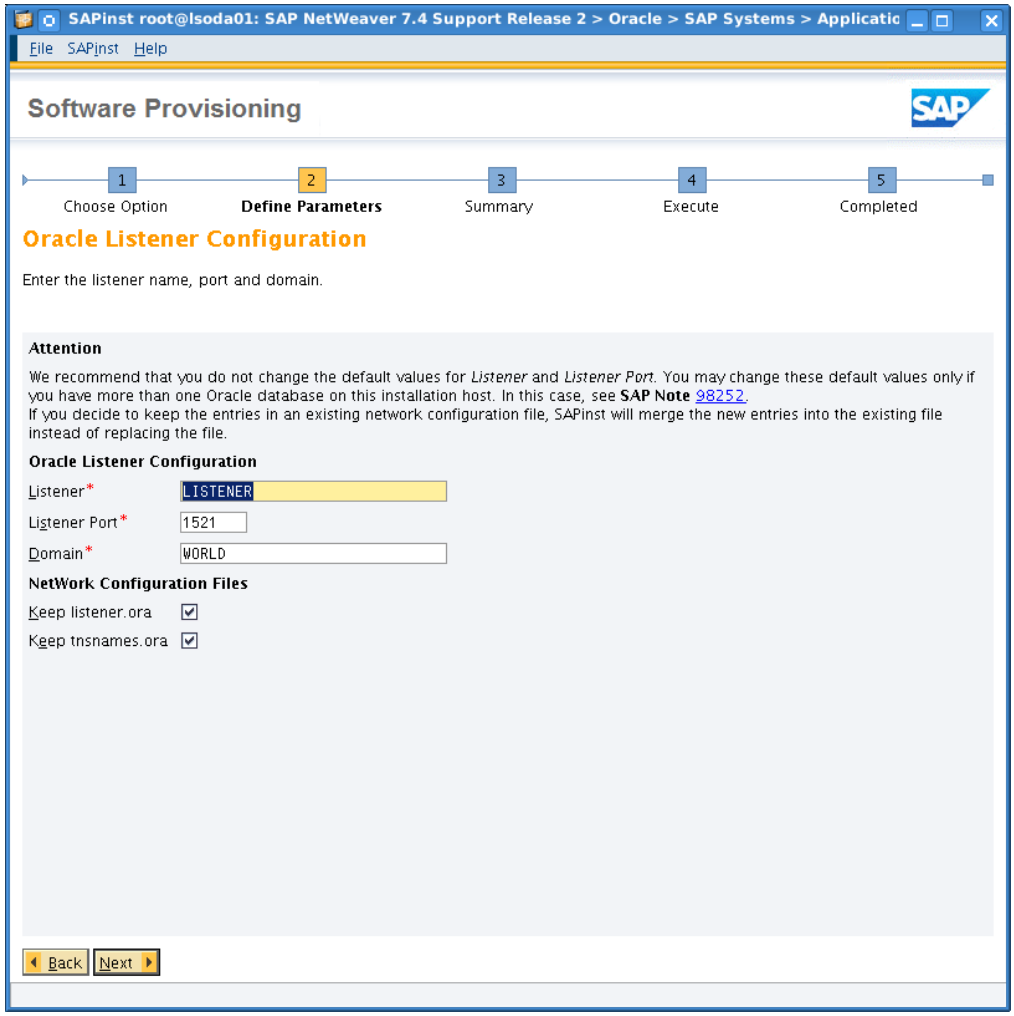
Advanced DB Configuration ticked. Offers various options on initial settings.

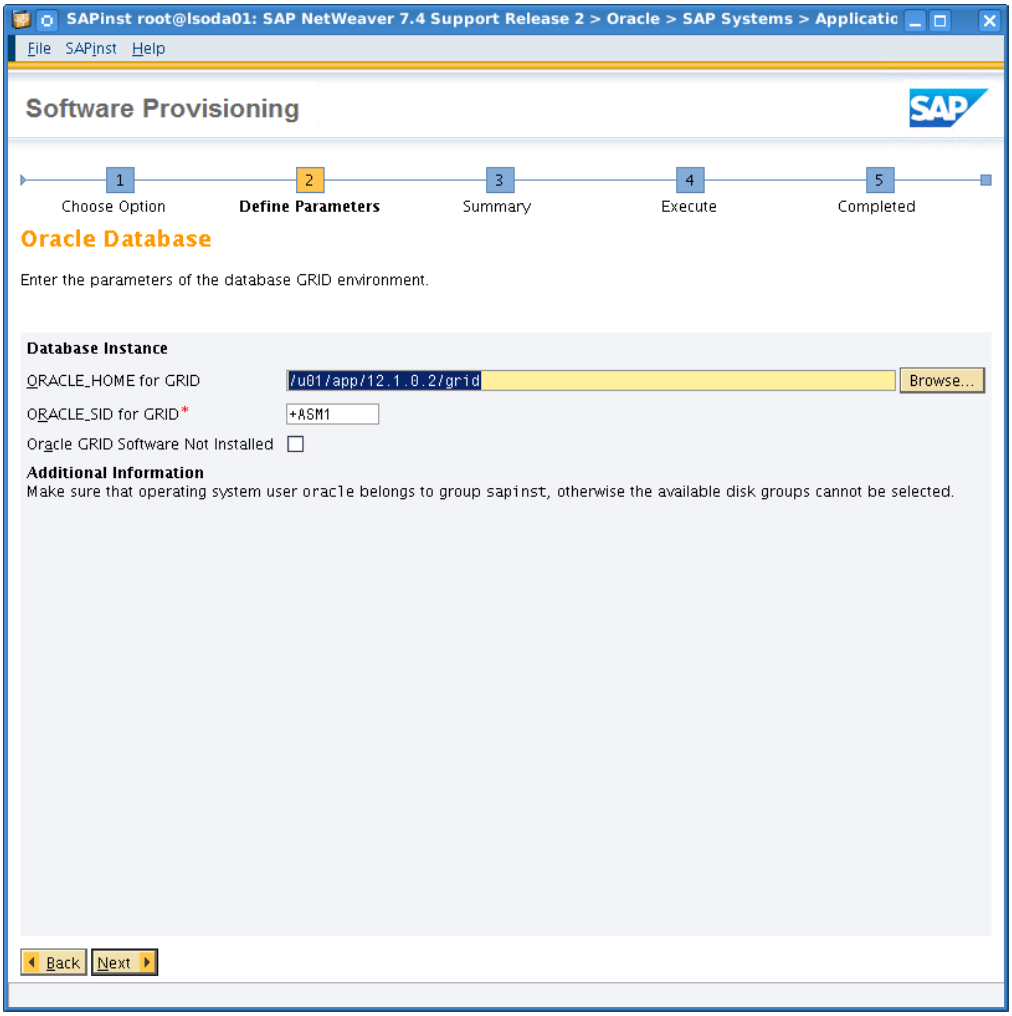


Memory values derived from host query, should be adjusted when running more than one database on the Oracle Database appliance.

Toggling between Install MCOD and / Install Database allows an editable sidadm user (adoadm vs. oraado)

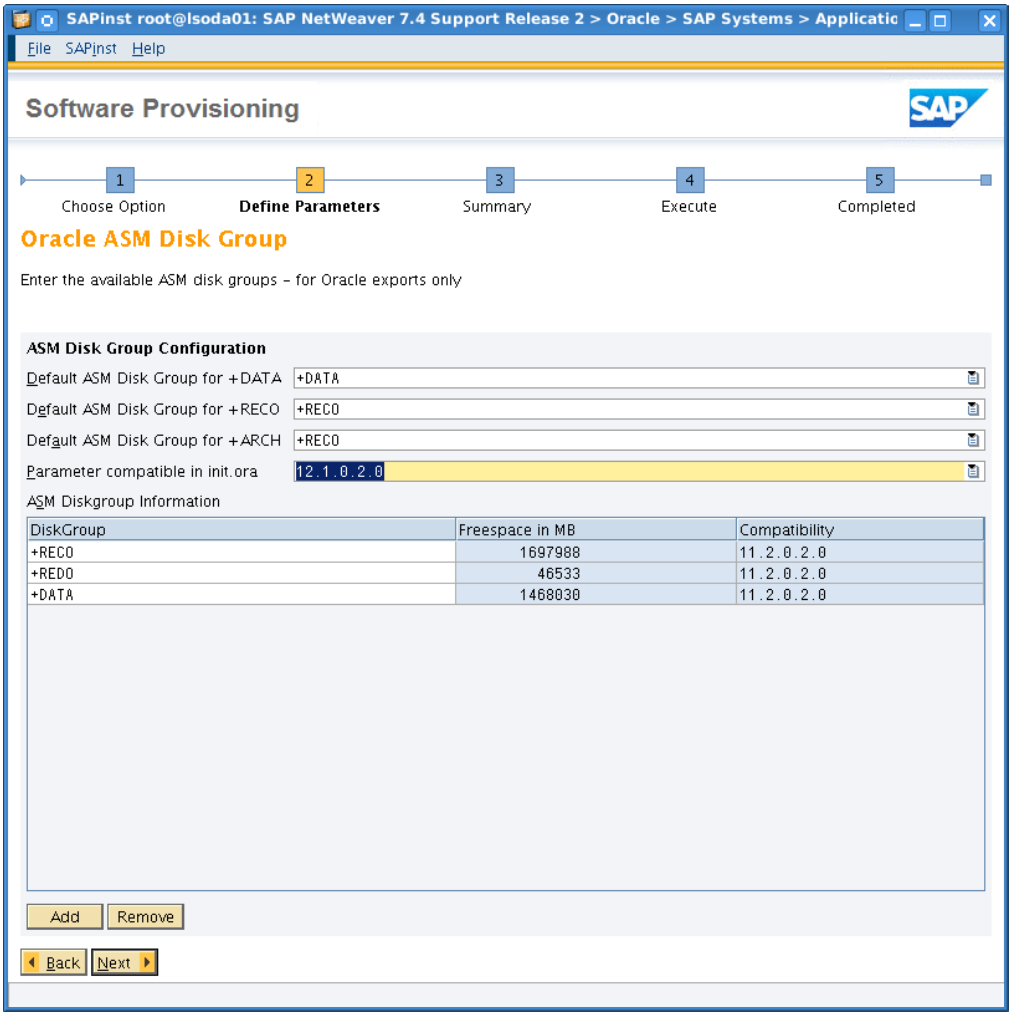

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Oracle Database Accounts
Enter the passwords of the standard database users.
Oracle Database Users
Password of 'sys'*
Confirm*
Password of 'system'*
Confirm*
Additional Information
During the installation, standard Oracle database users are created. The passwords of these users are set to the values you enter here.
Back
Next


SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Oracle Listener Configuration
Enter the listener name, port and domain.
Attention
We recommend that you do not change the default values for Listener and Listener Port. You may change these default values only if you have more than one Oracle database on this installation host. In this case, see SAP Note 98252.
If you decide to keep the entries in an existing network configuration file, SAPinst will merge the new entries into the existing file instead of replacing the file.
Oracle Listener Configuration
Listener*
LISTENER
Listener Port*
1521
Domain*
WORLD
NetWork Configuration Files
Keep listener.ora
Keep tnsnames.ora
Back
Next



Before you press “Next” ensure that the OS user oracle is a member of the OS group sapinst.
For example, on a unix shell: `id oracle` shall return sapinst as well. Do not continue if this criteria is not met.

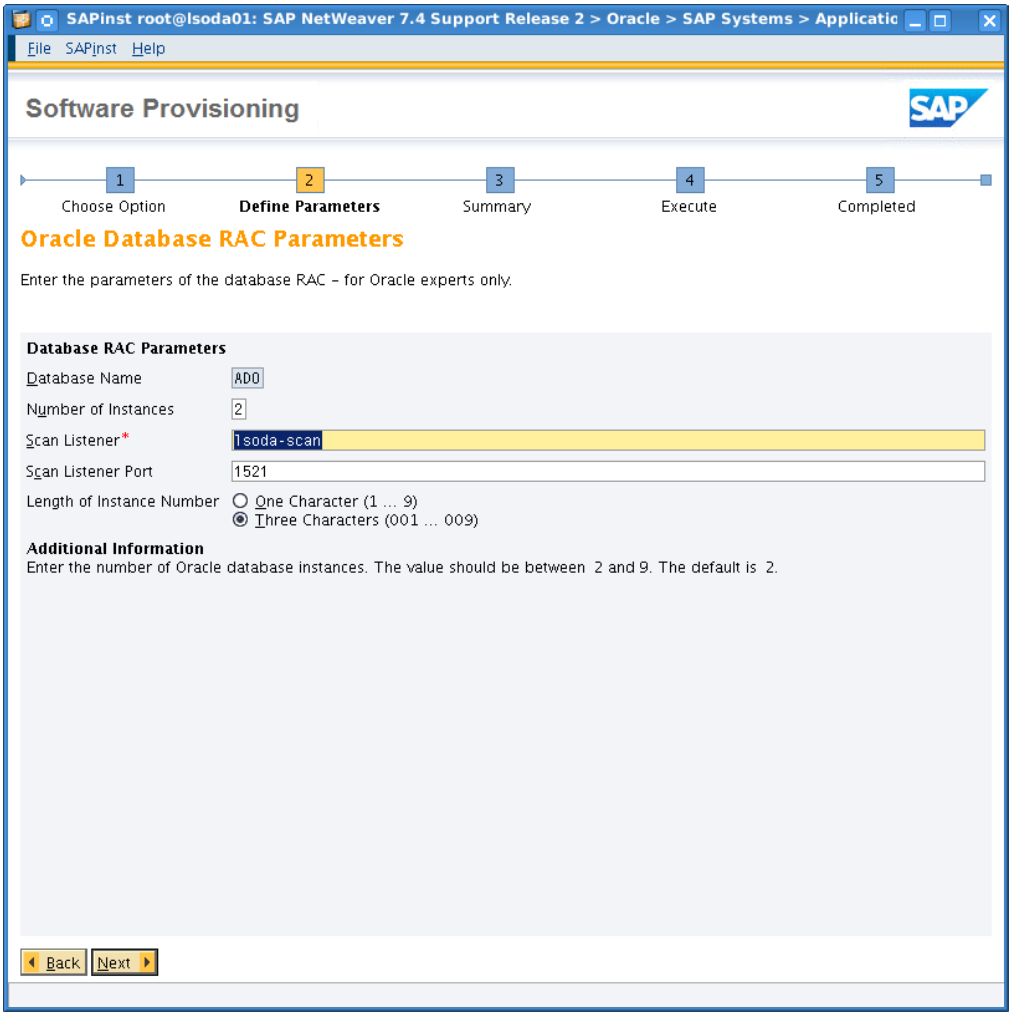
Also, provide correct path for ORACLE_HOME and ORACLE_SID for Oracle Grid Infrastructure.

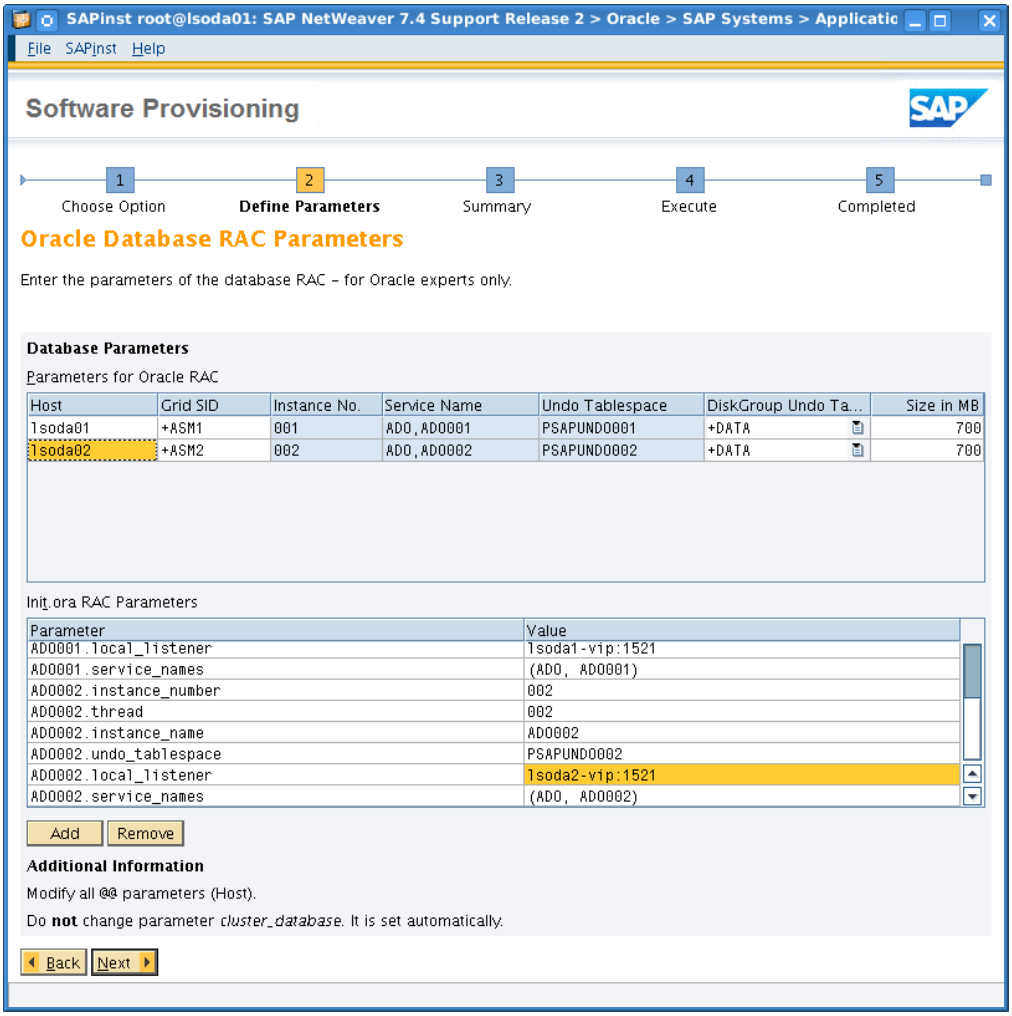


Parameter “compatible” in init.ora refers to the Oracle RAC instances compatible settings – RDBMS runtime settings. Compatible controls feature availability on the highest level. We have to adjust this value becoming 12.1.0.2.0.

Diskgroup compatibility refers to Oracle ASM and means here that it’s permitted to operate database software down to Oracle Database 11.2.0.2.0, if not being on Oracle Database Appliance X5-2.

Note: X5-2 deployments MUST have a diskgroup compatibility of 12.1.0.2.0.

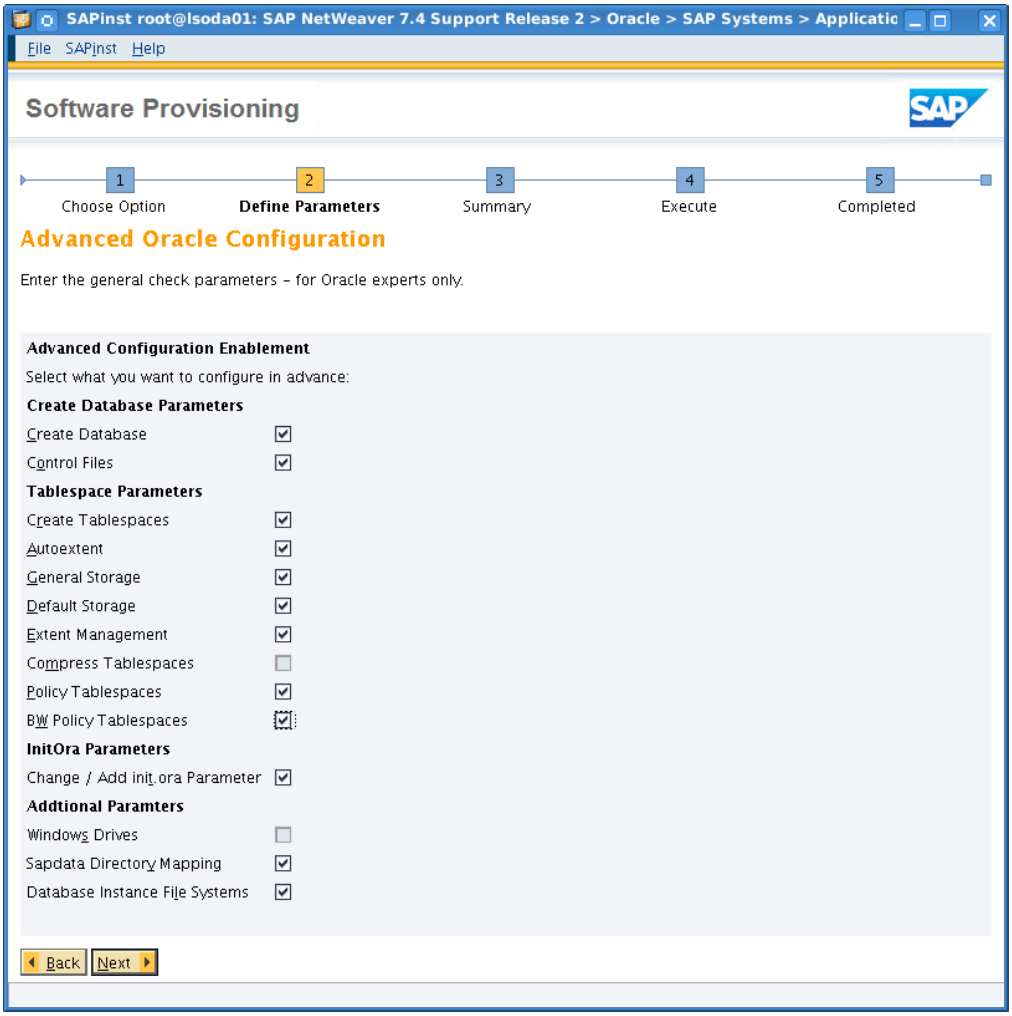

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Oracle Database RAC Parameters
Enter the parameters of the database RAC – for Oracle experts only.
Database RAC Parameters
Database Name ADO
Number of Instances 2
Scan Listener* lsoda-scan
Scan Listener Port 1521
Length of Instance Number One Character (1 ... 9)
Three Characters (001 ... 009)
Additional Information
Enter the number of Oracle database instances. The value should be between 2 and 9. The default is 2.
Back Next



Adjust hostnames at the upper screen section as indicated by SWPM.

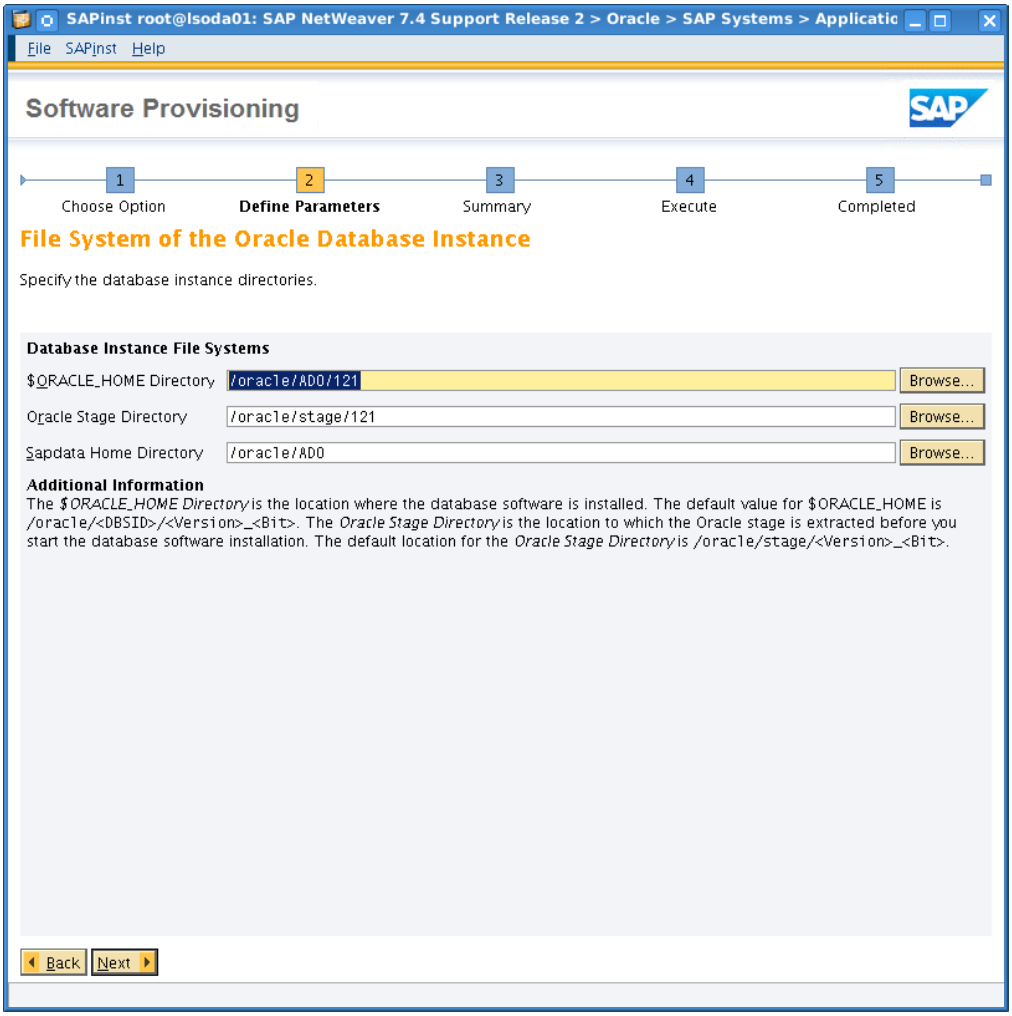
At the bottom screen section change local_listener parameters for both Oracle instances towards:

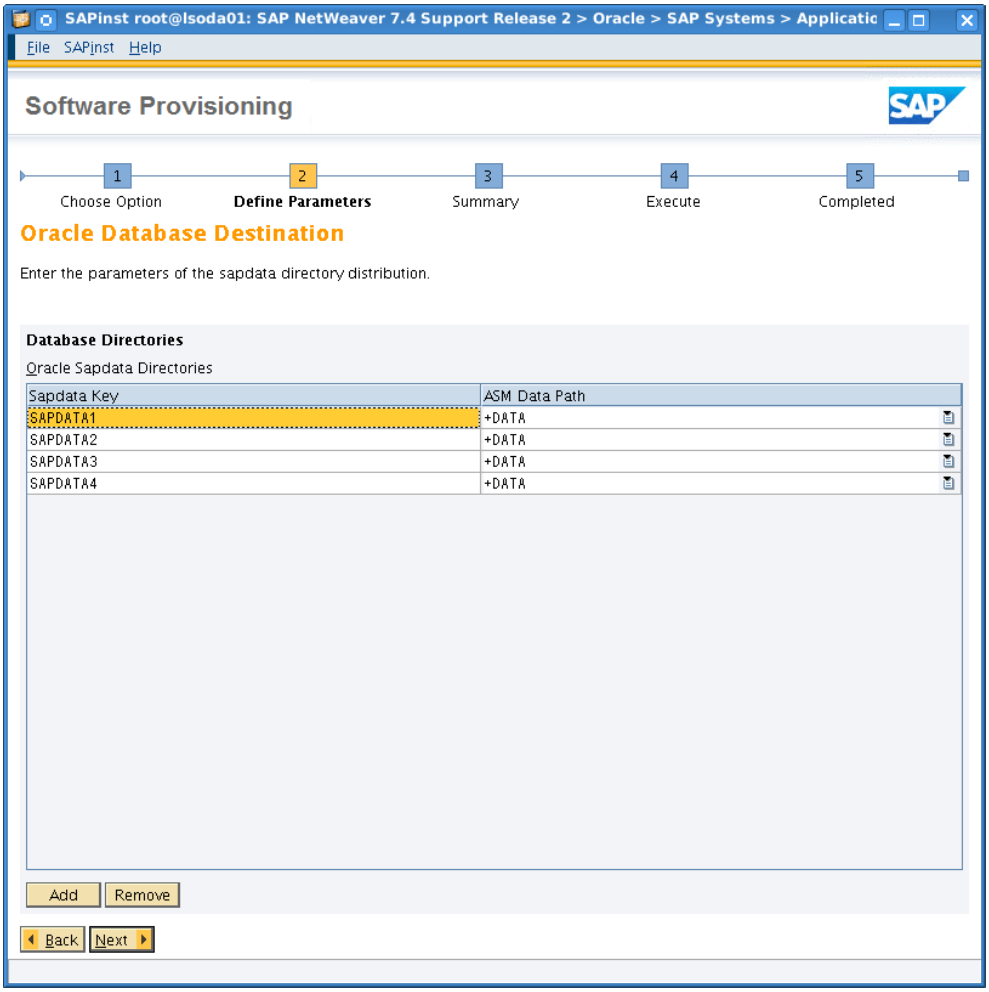
ADO001.local_listener = lsoda1-vip:1521
ADO002.local_listener = lsoda2-vip:1521

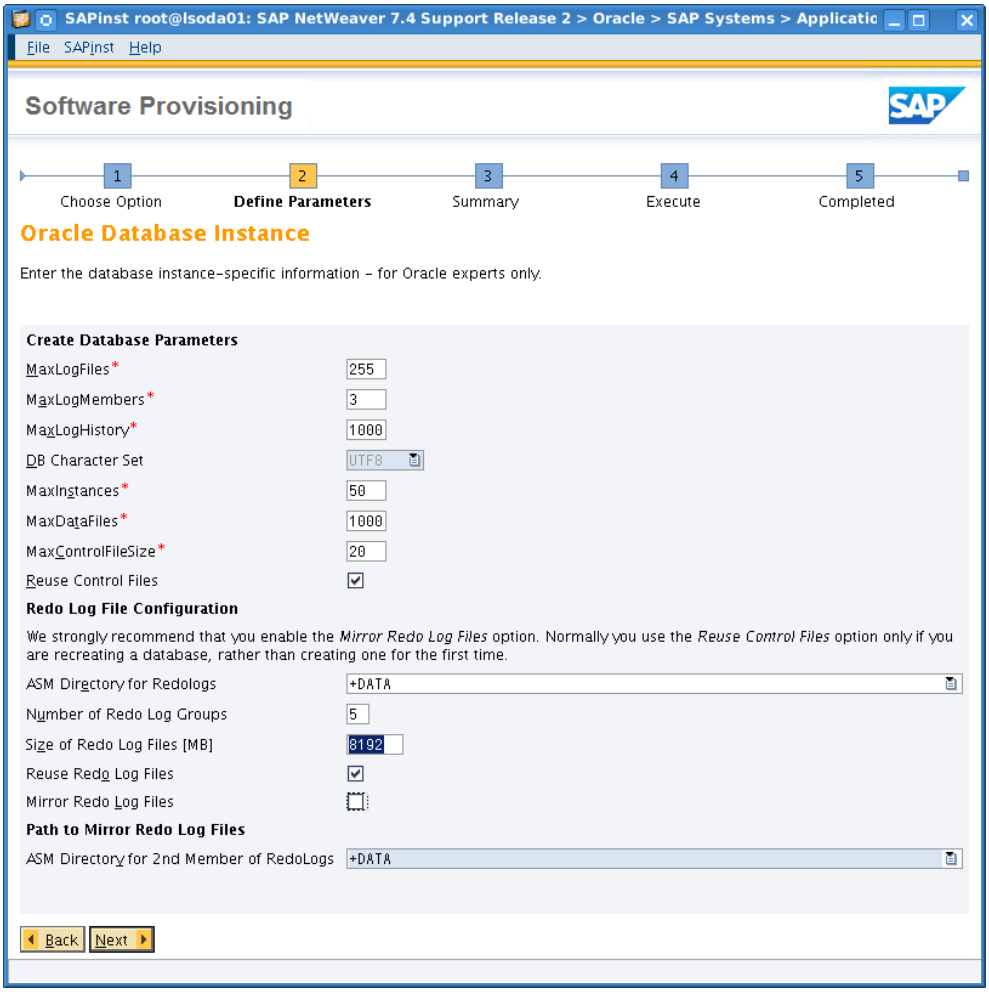


You may tick less options depending on your deployment scenario.

init.ora Parameter discussion is covered later in this whitepaper.

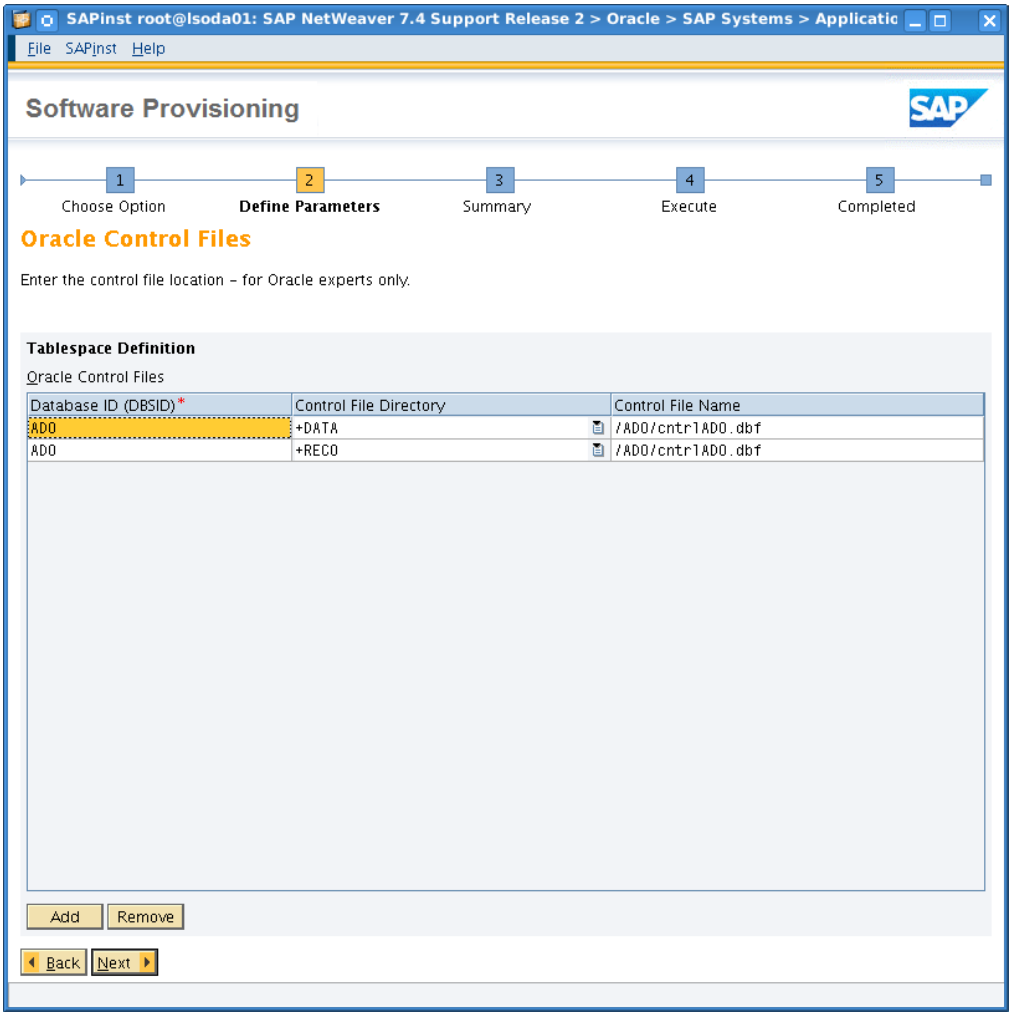

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
File System of the Oracle Database Instance
Specify the database instance directories.
Database Instance File Systems
$ORACLE_HOME Directory /oracle/ADO/121 Browse...
Oracle Stage Directory /oracle/stage/121 Browse...
Sapdata Home Directory /oracle/ADO Browse...
Additional Information
The $ORACLE_HOME Directory is the location where the database software is installed. The default value for $ORACLE_HOME is /oracle/<DBSID>/<Version>_<Bit>. The Oracle Stage Directory is the location to which the Oracle stage is extracted before you start the database software installation. The default location for the Oracle Stage Directory is /oracle/stage/<Version>_<Bit>.
Back
Next


SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Oracle Database Destination
Enter the parameters of the sapdata directory distribution.
Database Directories
Oracle Sapdata Directories
Sapdata Key
ASM Data Path
SAPDATA1 +DATA
SAPDATA2 +DATA
SAPDATA3 +DATA
SAPDATA4 +DATA
Add
Remove
Back
Next

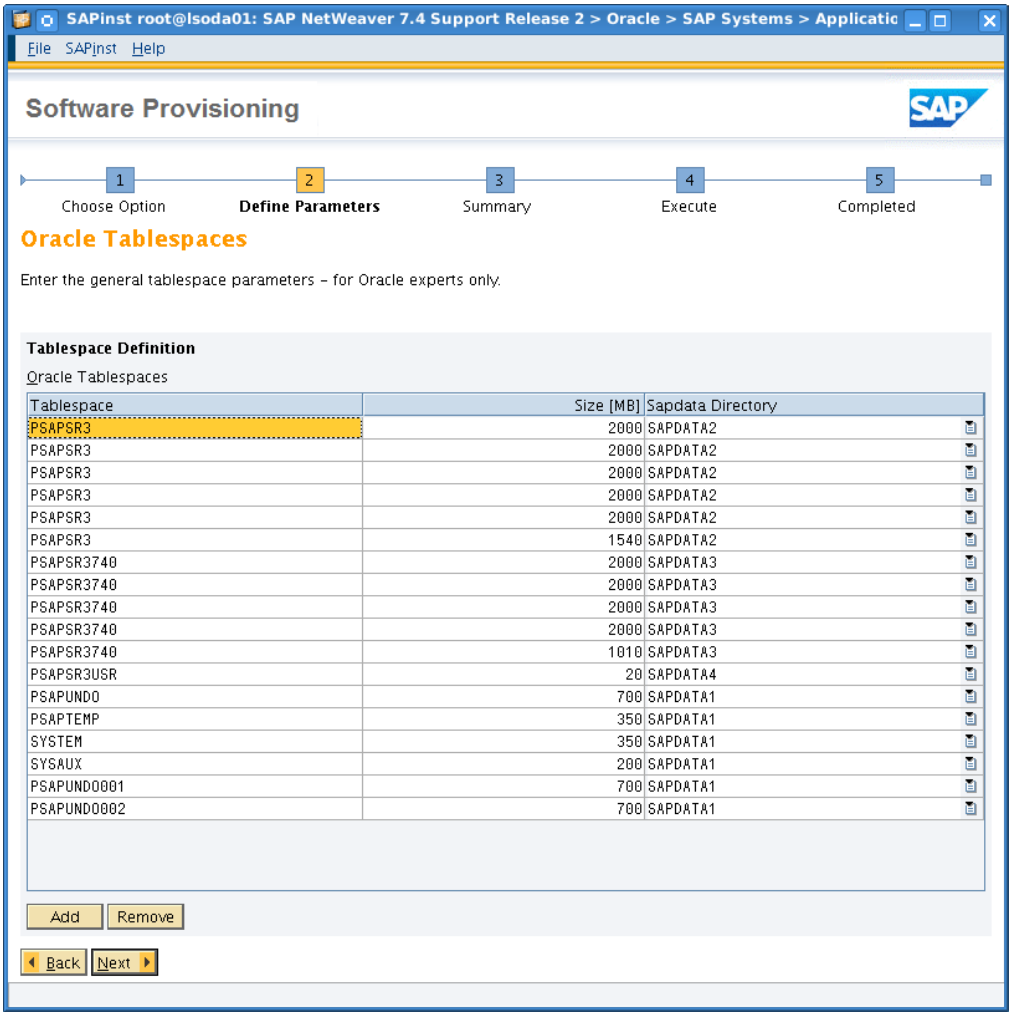


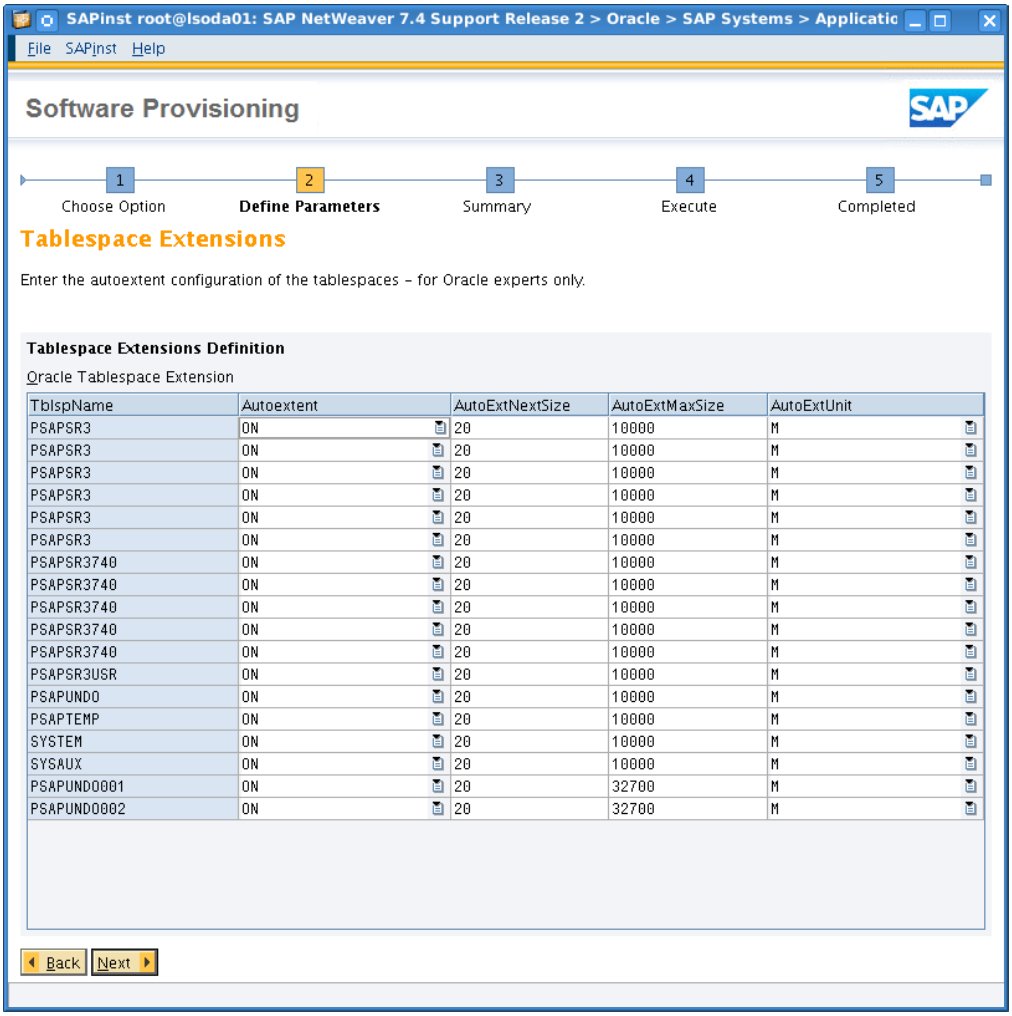
It is suggested not to tick “Mirror Redo Log Files”. We keep redo logs in the +REDO ASM diskgroup on SSDs with 3-way mirroring each. Mirroring them against +DATA diskgroup at the same time would impact runtime performance.

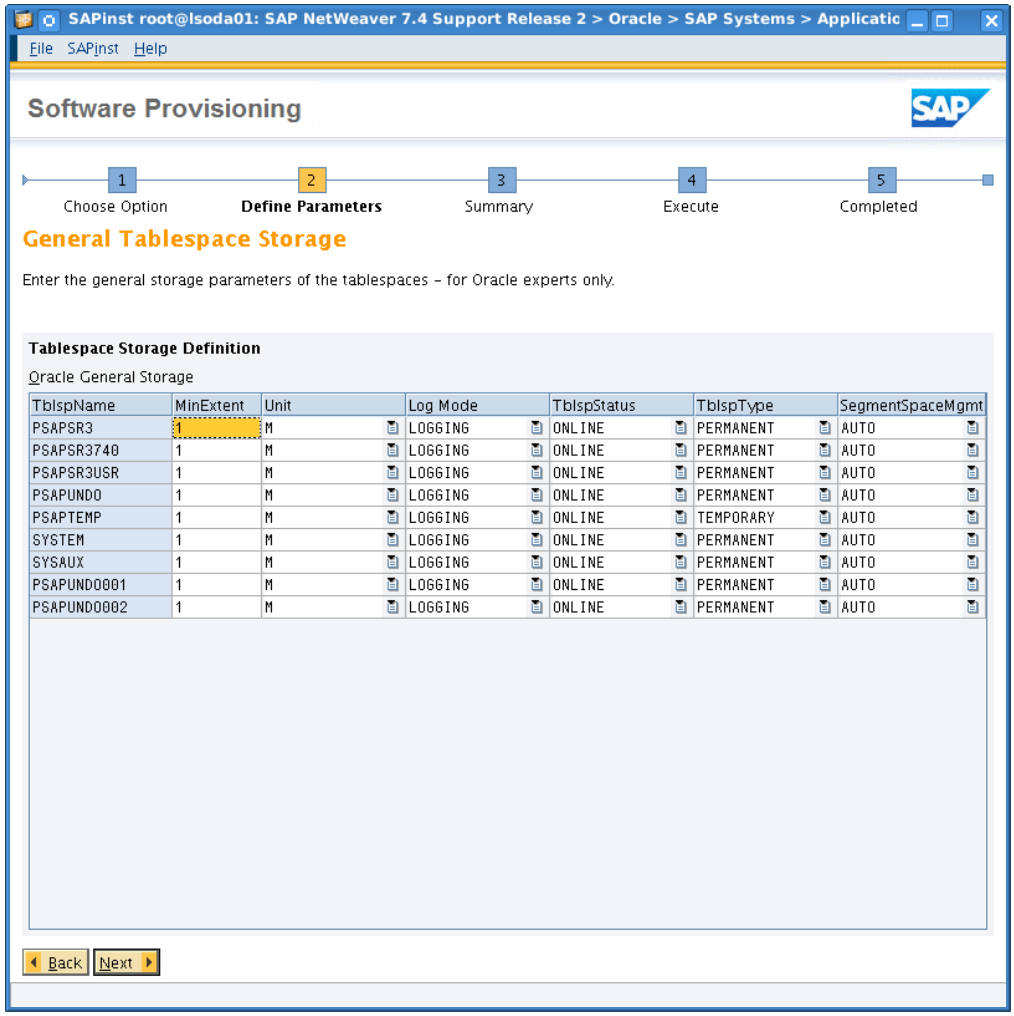
In this dialog we changed also the amount of redo log groups to 5 and their size from 4GB each towards 8GB (formula for diskgroup size is: diskgroupsize [MB] > number of redo log group x size of a single redo log file [MB]).

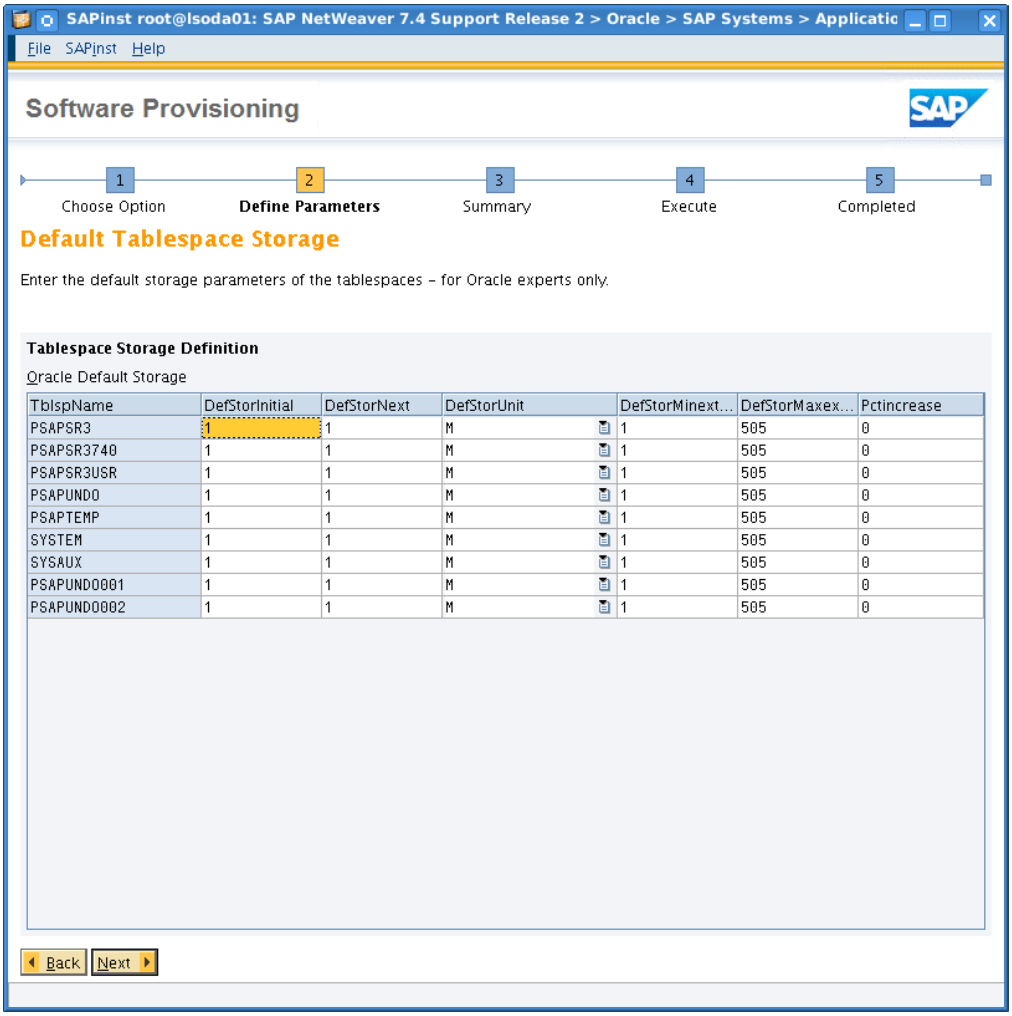


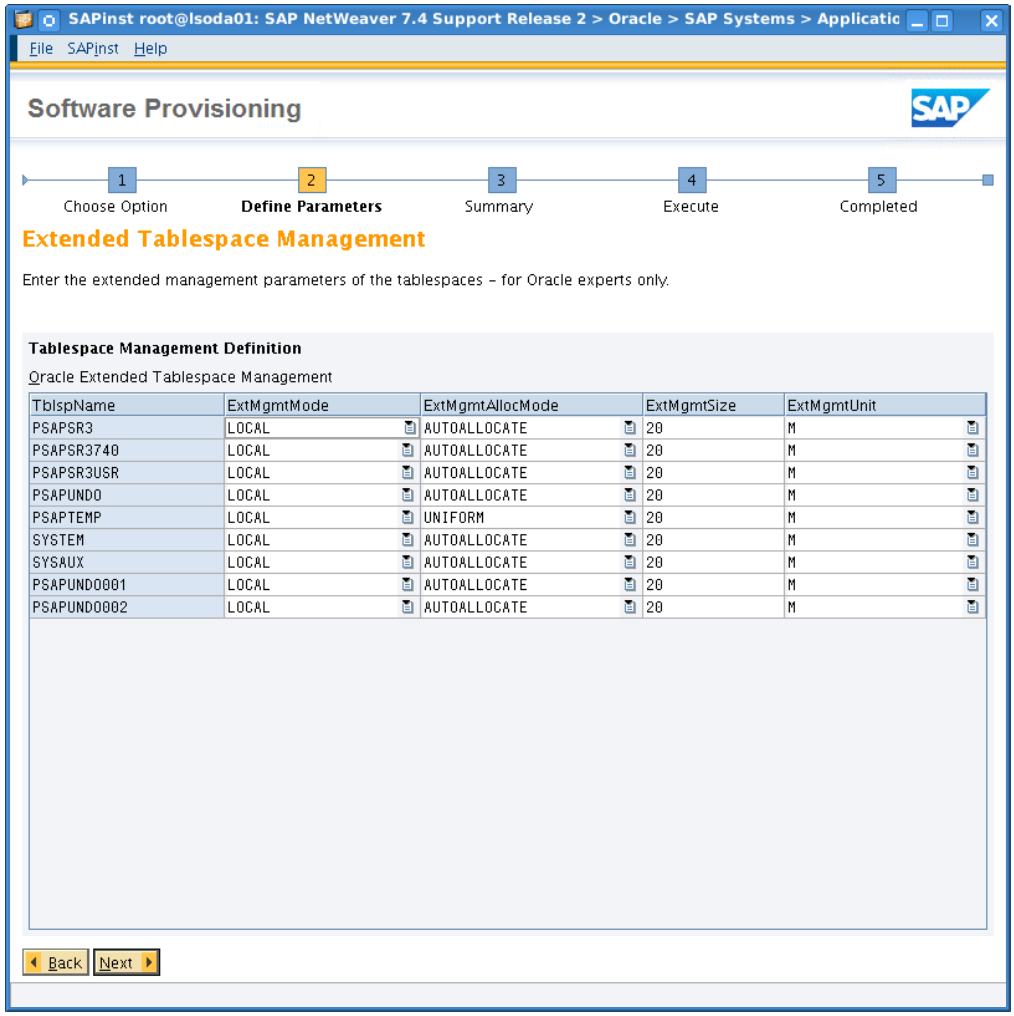
2 logical controlfiles, each of them is 3-way mirrored at ASM level.

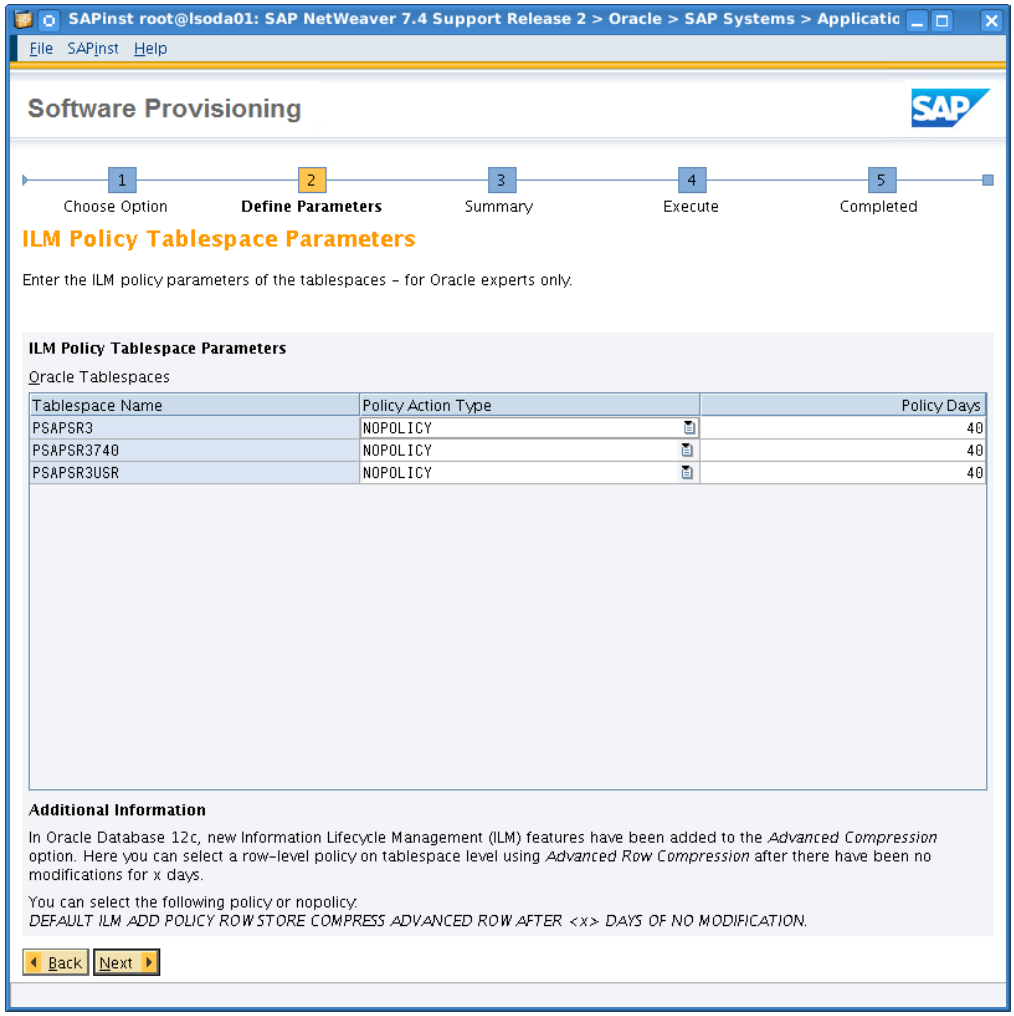

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Oracle Tablespaces
Enter the general tablespace parameters – for Oracle experts only.
Tablespace Definition
Oracle Tablespaces
Tablespace | Size [MB] | Sapdata Directory
PSAPSR3 | 2000 | SAPDATA2
PSAPSR3 | 2000 | SAPDATA2
PSAPSR3 | 2000 | SAPDATA2
PSAPSR3 | 2000 | SAPDATA2
PSAPSR3 | 2000 | SAPDATA2
PSAPSR3 | 1540 | SAPDATA2
PSAPSR3740 | 2000 | SAPDATA3
PSAPSR3740 | 2000 | SAPDATA3
PSAPSR3740 | 2000 | SAPDATA3
PSAPSR3740 | 2000 | SAPDATA3
PSAPSR3740 | 1010 | SAPDATA3
PSAPSR3USR | 20 | SAPDATA4
PSAPUNDO | 700 | SAPDATA1
PSAPTEMP | 350 | SAPDATA1
SYSTEM | 350 | SAPDATA1
SYSAUX | 200 | SAPDATA1
PSAPUNDO001 | 700 | SAPDATA1
PSAPUNDO002 | 700 | SAPDATA1
Add
Remove
Back
Next

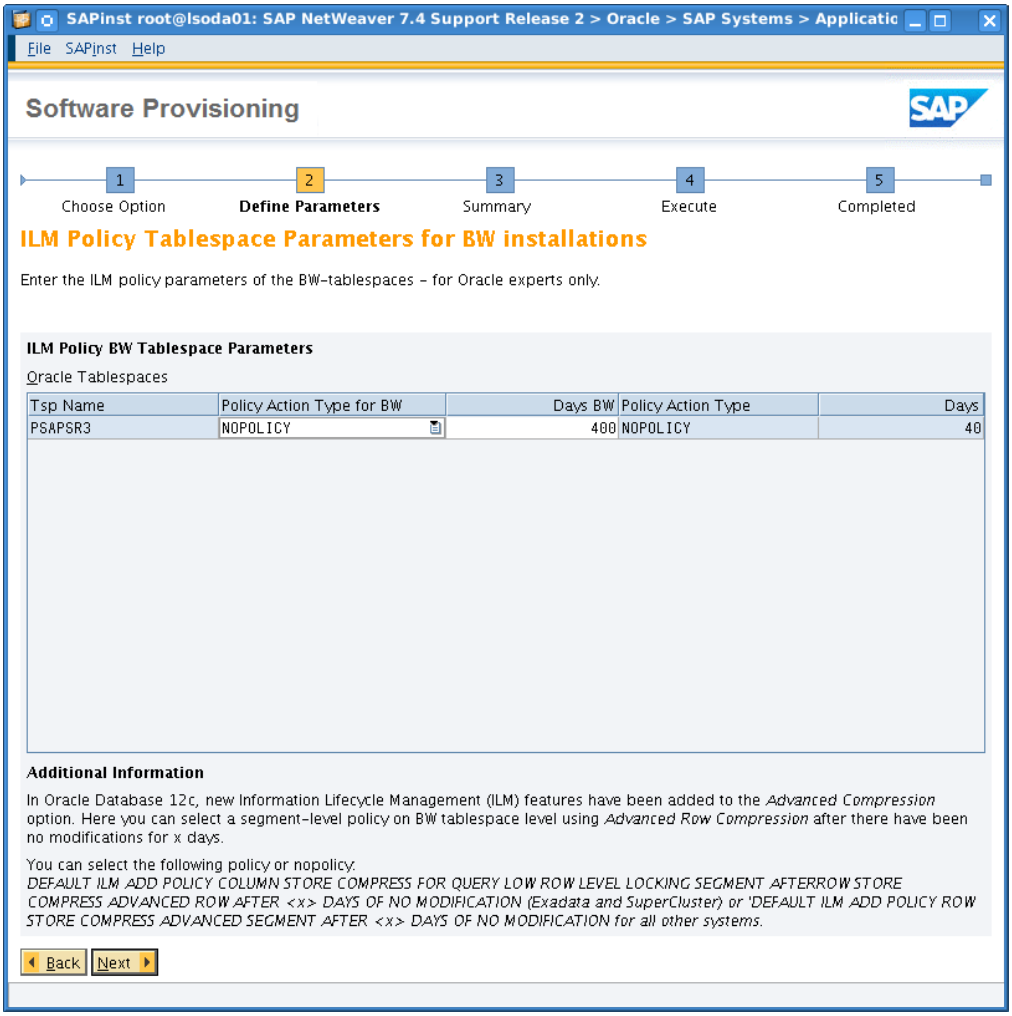

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Tablespace Extensions
Enter the autoextent configuration of the tablespaces – for Oracle experts only.
Tablespace Extensions Definition
Oracle Tablespace Extension
TblspName Autoextent AutoExtNextSize AutoExtMaxSize AutoExtUnit
PSAPSR3 ON 20 10000 M
PSAPSR3 ON 20 10000 M
PSAPSR3 ON 20 10000 M
PSAPSR3 ON 20 10000 M
PSAPSR3 ON 20 10000 M
PSAPSR3 ON 20 10000 M
PSAPSR3740 ON 20 10000 M
PSAPSR3740 ON 20 10000 M
PSAPSR3740 ON 20 10000 M
PSAPSR3740 ON 20 10000 M
PSAPSR3740 ON 20 10000 M
PSAPSR3USR ON 20 10000 M
PSAPUNDO ON 20 10000 M
PSAPTEMP ON 20 10000 M
SYSTEM ON 20 10000 M
SYSAUX ON 20 10000 M
PSAPUNDO001 ON 20 32700 M
PSAPUNDO002 ON 20 32700 M
Back
Next

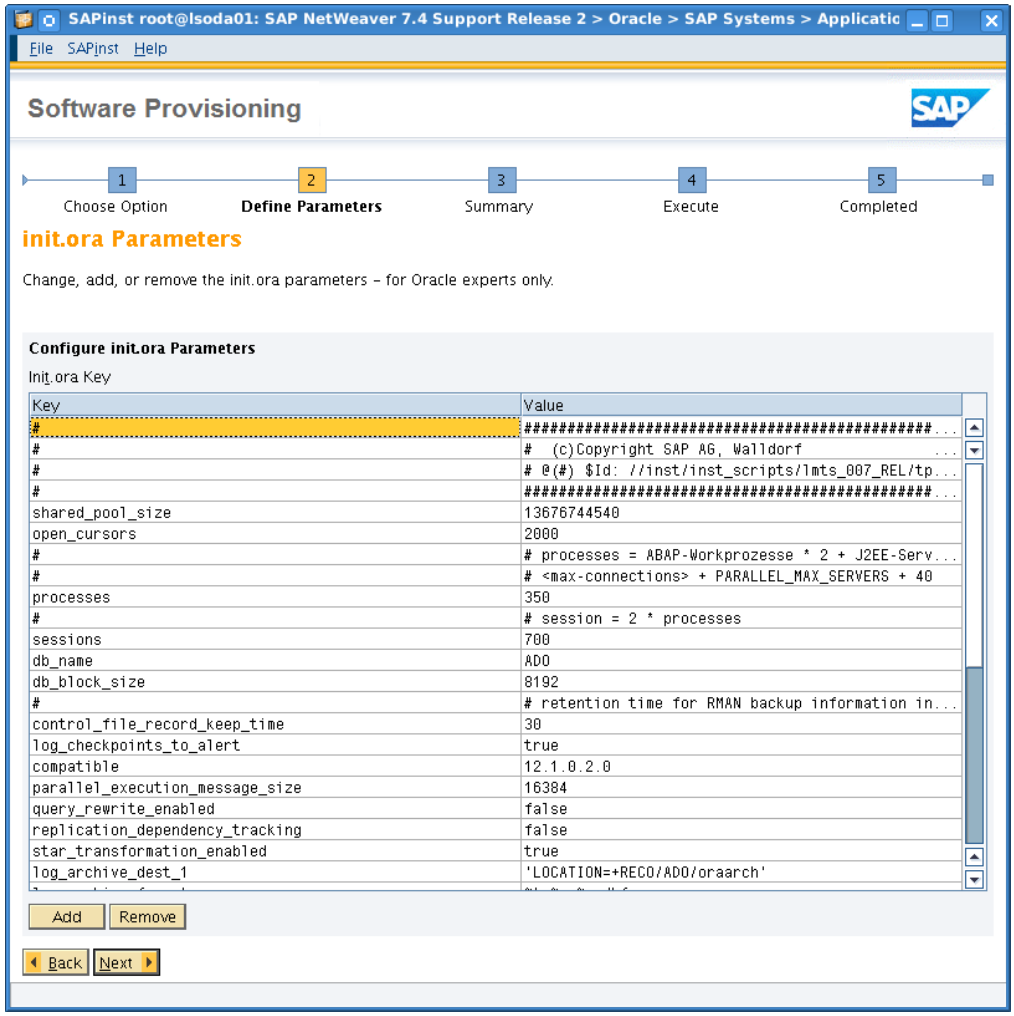

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
General Tablespace Storage
Enter the general storage parameters of the tablespaces – for Oracle experts only.
Tablespace Storage Definition
Oracle General Storage
TblspName MinExtent Unit Log Mode TblspStatus TblspType SegmentSpaceMgmt
PSAPSR3 1 M LOGGING ONLINE PERMANENT AUTO
PSAPSR3740 1 M LOGGING ONLINE PERMANENT AUTO
PSAPSR3USR 1 M LOGGING ONLINE PERMANENT AUTO
PSAPUNDO 1 M LOGGING ONLINE PERMANENT AUTO
PSAPTEMP 1 M LOGGING ONLINE TEMPORARY AUTO
SYSTEM 1 M LOGGING ONLINE PERMANENT AUTO
SYSAUX 1 M LOGGING ONLINE PERMANENT AUTO
PSAPUNDO001 1 M LOGGING ONLINE PERMANENT AUTO
PSAPUNDO002 1 M LOGGING ONLINE PERMANENT AUTO
Back
Next

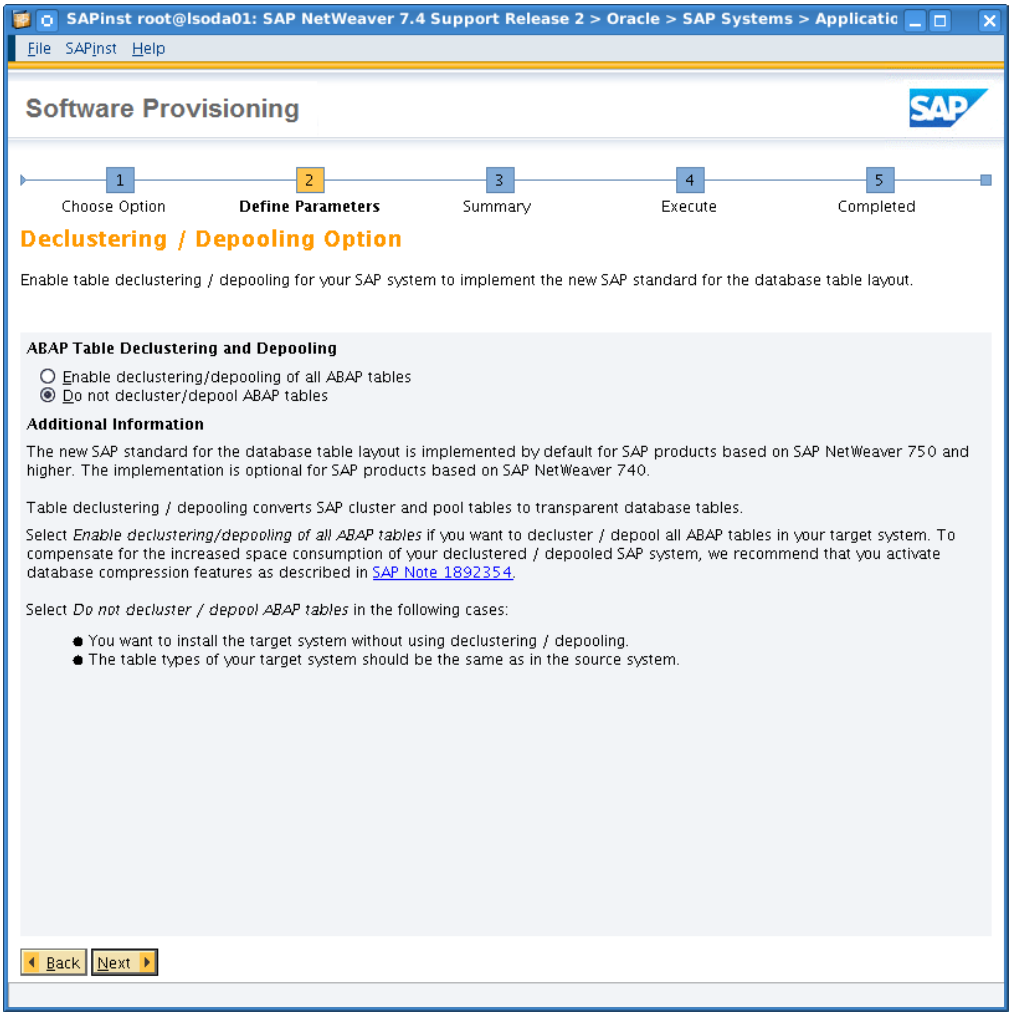

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Default Tablespace Storage
Enter the default storage parameters of the tablespaces – for Oracle experts only.
Tablespace Storage Definition
Oracle Default Storage
TblspName DefStorInitial DefStorNext DefStorUnit DefStorMinext... DefStorMaxex... Pctincrease
PSAPSR3 1 1 M 1 505 0
PSAPSR3740 1 1 M 1 505 0
PSAPSR3USR 1 1 M 1 505 0
PSAPUNDO 1 1 M 1 505 0
PSAPTEMP 1 1 M 1 505 0
SYSTEM 1 1 M 1 505 0
SYSAUX 1 1 M 1 505 0
PSAPUNDO001 1 1 M 1 505 0
PSAPUNDO002 1 1 M 1 505 0
Back
Next

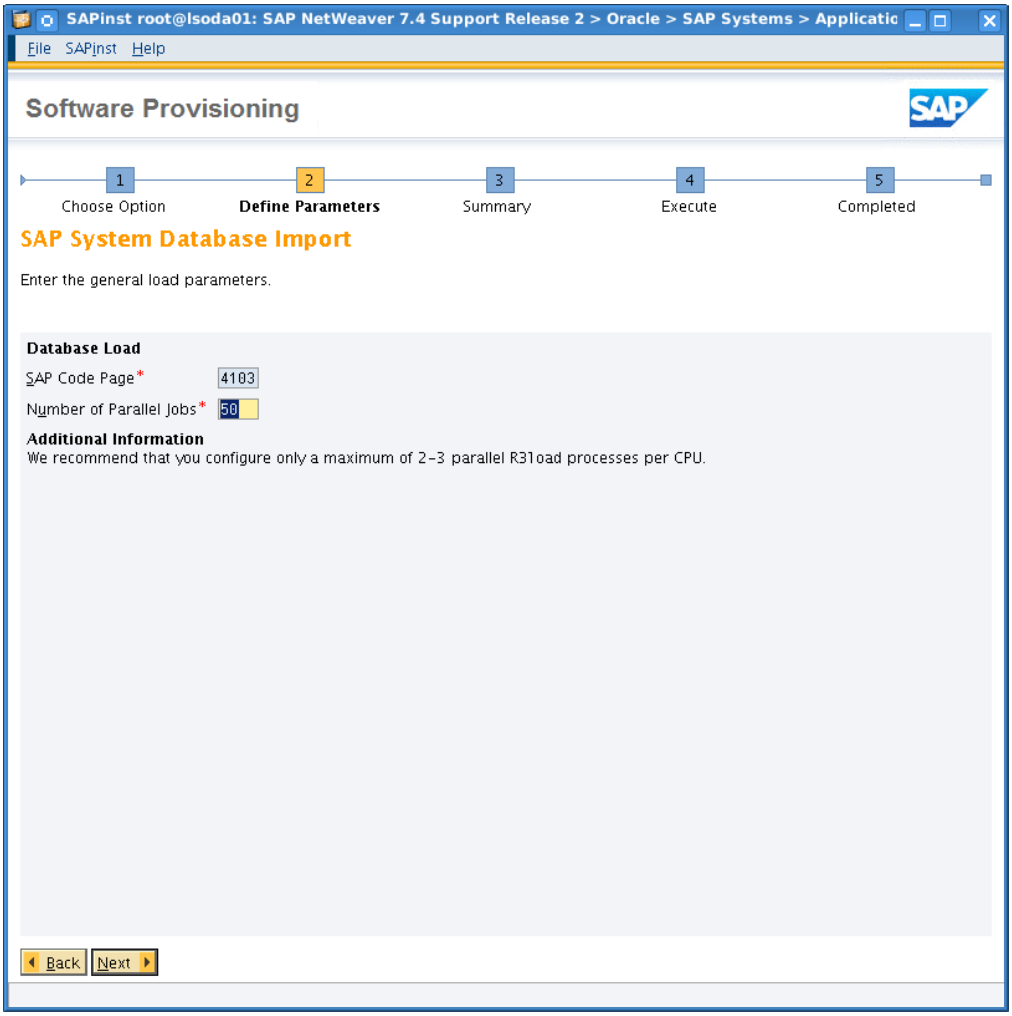

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Extended Tablespace Management
Enter the extended management parameters of the tablespaces – for Oracle experts only.
Tablespace Management Definition
Oracle Extended Tablespace Management
TblspName ExtMgmtMode ExtMgmtAllocMode ExtMgmtSize ExtMgmtUnit
PSAPSR3 LOCAL AUTOALLOCATE 20 M
PSAPSR3740 LOCAL AUTOALLOCATE 20 M
PSAPSR3USR LOCAL AUTOALLOCATE 20 M
PSAPUNDO LOCAL AUTOALLOCATE 20 M
PSAPTEMP LOCAL UNIFORM 20 M
SYSTEM LOCAL AUTOALLOCATE 20 M
SYSAUX LOCAL AUTOALLOCATE 20 M
PSAPUNDO001 LOCAL AUTOALLOCATE 20 M
PSAPUNDO002 LOCAL AUTOALLOCATE 20 M
Back
Next

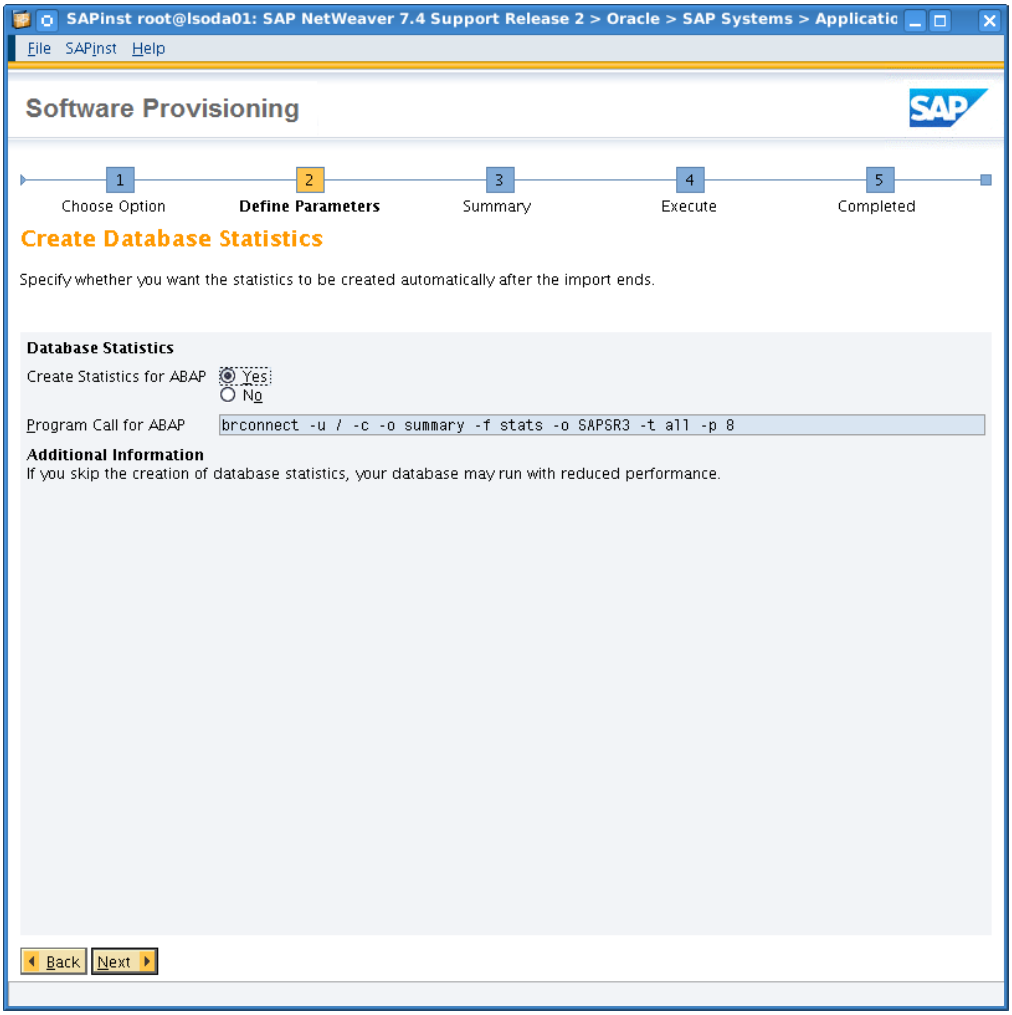

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
ILM Policy Tablespace Parameters
Enter the ILM policy parameters of the tablespaces – for Oracle experts only.
ILM Policy Tablespace Parameters
Oracle Tablespaces
Tablespace Name
Policy Action Type
Policy Days
PSAPSR3
NOPOLICY
40
PSAPSR3740
NOPOLICY
40
PSAPSR3USR
NOPOLICY
40
Additional Information
In Oracle Database 12c, new Information Lifecycle Management (ILM) features have been added to the Advanced Compression option. Here you can select a row-level policy on tablespace level using Advanced Row Compression after there have been no modifications for x days.
You can select the following policy or nopolicy:
DEFAULT ILM ADD POLICY ROW STORE COMPRESS ADVANCED ROW AFTER <x> DAYS OF NO MODIFICATION.
Back
Next

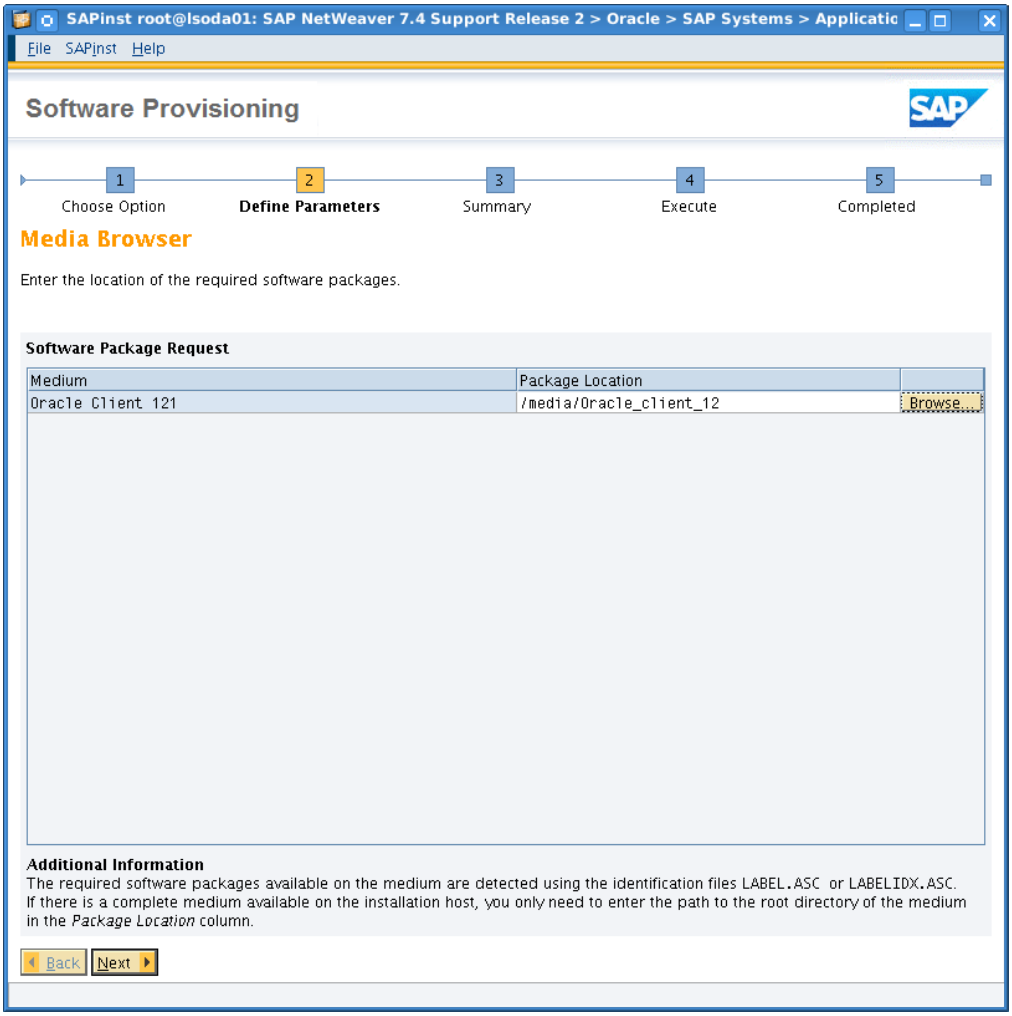

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
ILM Policy Tablespace Parameters for BW installations
Enter the ILM policy parameters of the BW-tablespaces - for Oracle experts only.
ILM Policy BW Tablespace Parameters
Oracle Tablespaces
Tsp Name
Policy Action Type for BW
Days BW
Policy Action Type
Days
PSAPSR3
NOPOLICY
400
NOPOLICY
40
Additional Information
In Oracle Database 12c, new Information Lifecycle Management (ILM) features have been added to the Advanced Compression option. Here you can select a segment-level policy on BW tablespace level using Advanced Row Compression after there have been no modifications for x days.
You can select the following policy or nopolicy:
DEFAULT ILM ADD POLICY COLUMN STORE COMPRESS FOR QUERY LOW ROW LEVEL LOCKING SEGMENT AFTERROW STORE COMPRESS ADVANCED ROW AFTER <x> DAYS OF NO MODIFICATION (Exadata and SuperCluster) or 'DEFAULT ILM ADD POLICY ROW STORE COMPRESS ADVANCED SEGMENT AFTER <x> DAYS OF NO MODIFICATION for all other systems.
Back
Next

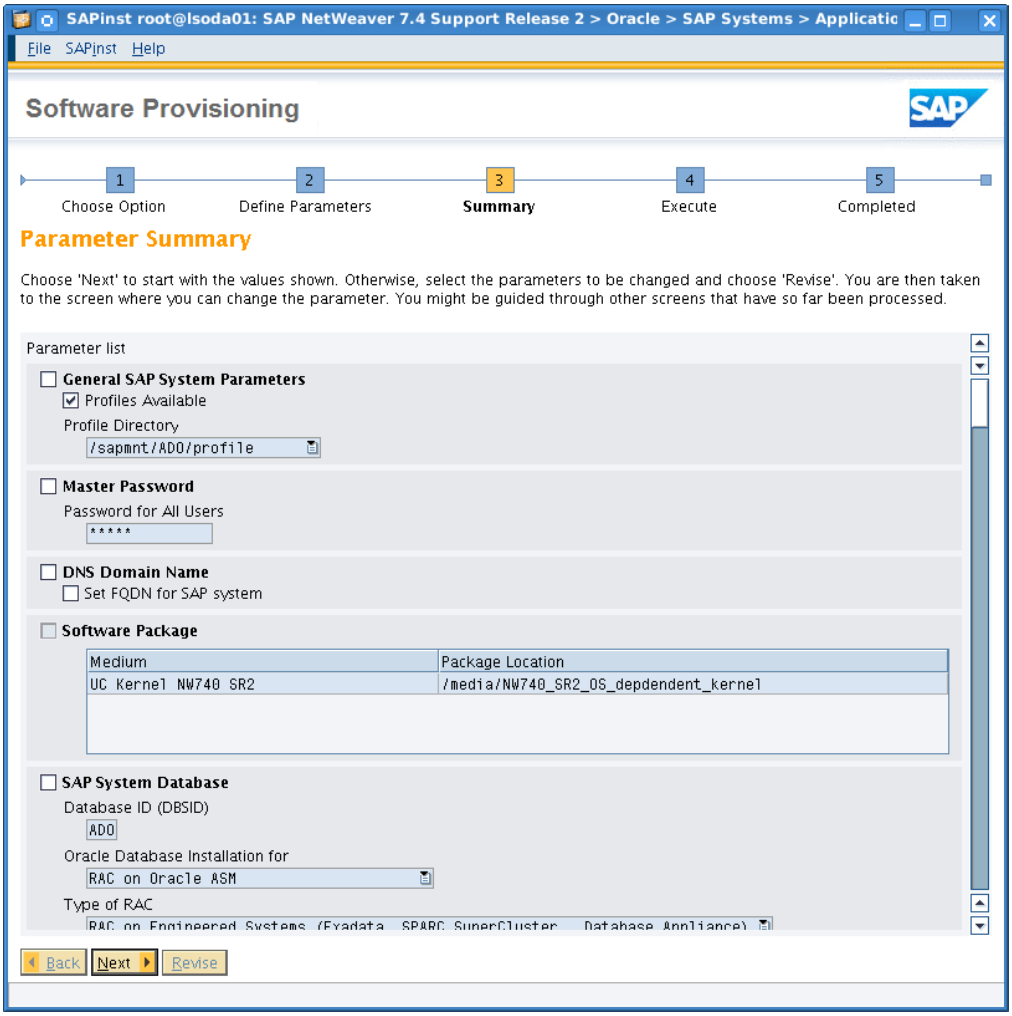

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
init.ora Parameters
Change, add, or remove the init.ora parameters – for Oracle experts only.
Configure init.ora Parameters
Init.ora Key
Key
Value
##########
(c)Copyright SAP AG, Walldorf ...
@(#) $Id: //inst/inst_scripts/lmts_007_REL/tp...
##########
shared_pool_size 13676744540
open_cursors 2000
processes = ABAP-Workprozesse * 2 + J2EE-Serv...
<max-connections> + PARALLEL_MAX_SERVERS + 40
processes 350
session = 2 * processes
sessions 700
db_name ADO
db_block_size 8192
retention time for RMAN backup information in...
control_file_record_keep_time 30
log_checkpoints_to_alert true
compatible 12.1.0.2.0
parallel_execution_message_size 16384
query_rewrite_enabled false
replication_dependency_tracking false
star_transformation_enabled true
log_archive_dest_1 'LOCATION=+RECO/ADO/oraarch'
Add
Remove
Back
Next


SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Declustering / Depooling Option
Enable table declustering / depooling for your SAP system to implement the new SAP standard for the database table layout.
ABAP Table Declustering and Depooling
Enable declustering/depooling of all ABAP tables
Do not decluster/depool ABAP tables
Additional Information
The new SAP standard for the database table layout is implemented by default for SAP products based on SAP NetWeaver 750 and higher. The implementation is optional for SAP products based on SAP NetWeaver 740.
Table declustering / depooling converts SAP cluster and pool tables to transparent database tables.
Select Enable declustering/depooling of all ABAP tables if you want to decluster / depool all ABAP tables in your target system. To compensate for the increased space consumption of your declustered / depooled SAP system, we recommend that you activate database compression features as described in SAP Note 1892354.
Select Do not decluster / depool ABAP tables in the following cases:
You want to install the target system without using declustering / depooling.
The table types of your target system should be the same as in the source system.
Back
Next

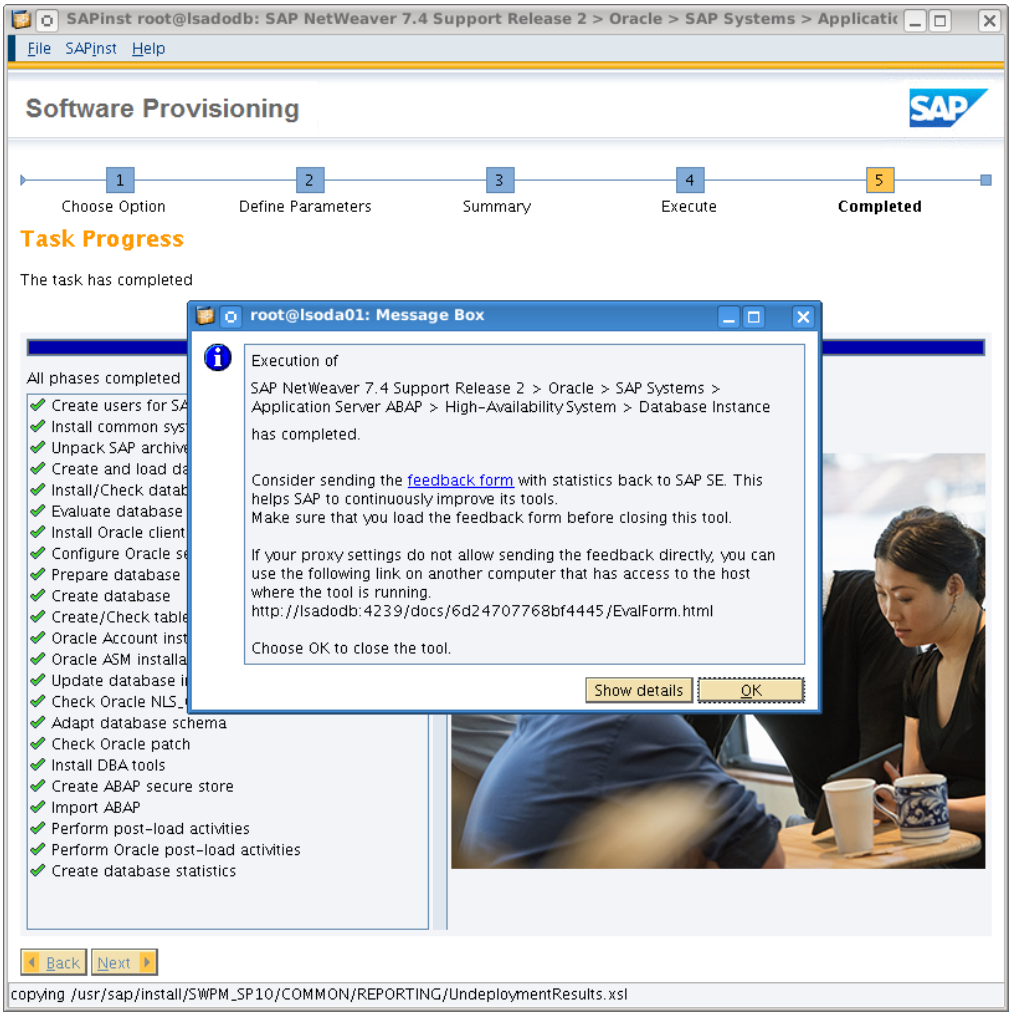

SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
SAP System Database Import
Enter the general load parameters.
Database Load
SAP Code Page* 4103
Number of Parallel Jobs* 50
Additional Information
We recommend that you configure only a maximum of 2-3 parallel R3load processes per CPU.
Back
Next


SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Create Database Statistics
Specify whether you want the statistics to be created automatically after the import ends.
Database Statistics
Create Statistics for ABAP
Yes
No
Program Call for ABAP
brconnect -u / -c -o summary -f stats -o SAPSR3 -t all -p 8
Additional Information
If you skip the creation of database statistics, your database may run with reduced performance.
Back
Next


SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Media Browser
Enter the location of the required software packages.
Software Package Request
Medium
Package Location
Oracle Client 121
/media/Oracle_client_12
Browse
Additional Information
The required software packages available on the medium are detected using the identification files LABEL.ASC or LABELIDX.ASC.
If there is a complete medium available on the installation host, you only need to enter the path to the root directory of the medium in the Package Location column.
Back
Next


SAPinst root@lsoda01: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Parameter Summary
Choose 'Next' to start with the values shown. Otherwise, select the parameters to be changed and choose 'Revise'. You are then taken to the screen where you can change the parameter. You might be guided through other screens that have so far been processed.
Parameter list
General SAP System Parameters
Profiles Available
Profile Directory
/sapmnt/ADO/profile
Master Password
Password for All Users
*****
DNS Domain Name
Set FQDN for SAP system
Software Package
Medium
Package Location
UC Kernel NW740 SR2
/media/NW740_SR2_OS_depdendent_kernel
SAP System Database
Database ID (DBSID)
ADO
Oracle Database Installation for
RAC on Oracle ASM
Type of RAC
Back
Next
Revise

SAPinst root@lsadodb: SAP NetWeaver 7.4 Support Release 2 > Oracle > SAP Systems > Applicatic
File SAPinst Help
Software Provisioning
SAP
1 Choose Option
2 Define Parameters
3 Summary
4 Execute
5 Completed
Task Progress
Running phase: Create database
Phase 10 of 23
Create users for SAP system
Install common system files
Unpack SAP archives
Create and load database
Install/Check database
Evaluate d Create and load database
Install Oracle client software
Configure Oracle server network
Prepare database server configuration
Create database
Create/Check tablespaces
Oracle Account installation
Oracle ASM installation
Update database in RAC environment
Check Oracle NLS_CHARACTERSET
Adapt database schema
Check Oracle patch
Install DBA tools
Create ABAP secure store
Import ABAP
Perform post-load activities
Perform Oracle post-load activities
Create database statistics
Back
Next



Database installation complete at this point.

Post SWPM Installation Steps

/etc/oratab adjustments

Verify the environment for your new database on each node, check the file /etc/oratab, on both nodes it should should read like below. The syntax is <db_unique_name>:<oracle home directory>:startup on host boot (Y vs N).

ADO:/oracle/ADO/121:N

Setup orabtt – Ora BaseTabTool

Navigate to SAP Note 1521371, download OraBaseTabTool, and run it.

Copy init<SID>.ora file to remote host

SWPM runs only on one node; hence we have to copy some files from the installation node to the second node. SWPM already created the necessary files. Say on node 1 we refer to initADO001.ora file then we need to refer to initADO002.ora on node 2. This init<ORACLE_SID>.ora file essentially contains a pointer to the stored parameter file (*spfile*) in Oracle ASM.

Login to installation node as oracle, change to directory <ORACLE_HOME>/dbs

```
scp initADO0002.ora <node2>:/<ORACLE_HOME>/dbs/initADO0002.ora
```

Verify correct database parameter settings, and correct if needed

Download and execute the parameter_check_12 script from SAP Note 1171650. Those settings shall reflect recommended values from SAP Note 1888485 Database Parameter for 12.1.0.2.

```
$ sqlplus "/ as sysdba"

SQL*Plus> @parameter_check_12.txt
```

Aside of the recommendations of above script ensure following parametrization is effective:

```
_enable_NUMA_support = FALSE
_file_size_increase_increment= 2044M
_disable_interface_checking = TRUE
_gc_undo_affinity = FALSE
_gc_policy_time = 0
db_block_checksum = "FULL"
db_block_checking = "FULL"
db_lost_write_protect = "TYPICAL"
db_create_file_dest = "+DATA"
db_create_online_log_dest_1= "+REDO"
```

Also, correct local_listener settings, e.g. from sqlplus level and verify them instance by instance:

```
alter system set local_listener="(ADDRESS = (PROTOCOL=TCP) (HOST=lsoda1-
vip)(PORT=1521))" SID='ADO001' scope=both;
alter system set local_listener="(ADDRESS = (PROTOCOL=TCP) (HOST=lsoda2-
vip)(PORT=1521))" SID='ADO002' scope=both;
show parameters local_listener
```

Database Service scripts on PAS / subsequent Application Server instance(s)

When installing SAP Primary Application Server (PAS) and further Application Server instances which require a database service which hasn't been deployed yet SWPM halts it's activities until you confirm having both copied and ran a generated script for the database service. This script needs to be executed in the database environment. Once

completed SWPM can resume installation of the SAP Application Server Instance installation. The script generates following additional service as a cluster resource:

```
ora.ado.ado_dvebmgs00.svc
      1        ONLINE  ONLINE       lsoda01                  STABLE
```

Clean up install space – TMP

SWPM generates significant footprint in /usr/sap/tmp. It's advisable to pack and transfer this content towards an alternative storage location. Once unpacking and crosschecking at the alternate storage location it's fine to clean up /usr/sap/tmp.

SAP PAS, subsequent Application Servers require uuid and uuidd packages

Ensure you meet SAP Application Server Operation System requirements. In case of packages uuid and uuidd are not installed on Oracle Linux 6 environments, please add them, plus starting the uuidd demon. Also make sure uuidd is checked for startup at OS startup (matching all runlevels that SAP application server starts at). See also SAP Note 1635808.

Virtual host names for SAP PAS and subsequent SAP Application Servers

For high availability reasons, say you run SAP Primary Application Server Instance or, subsequent SAP Application Server Instances in an HA capable environment (such as Oracle Cluster Ready Services), install them on virtual hostnames outside of the Oracle Database Appliance. Invoke SPWM by ./sapinst SAPINST_USE_HOSTNAME=<virtual_host_name> to do so.

Complete the HA awareness for ASCS and ERS instances

ASCS Instance and ERS instance require own VIPs. Follow SAP Note 1496927 Protection of SAP instances through Oracle Clusterware – use the v8.1 from the download section. Our scenario uses 10.20.88.62 and 10.20.88.64 as VIPs for ASCS and ERS, respectively. The sapctl create command create the necessary CRS resources including their dependencies on an ora.net2.network. It is noteworthy to mention to correct the invidual instance profiles from "Restart_Program_00" towards "Start_Program_00".

```
[root@lsoda01]# ./sapctl create -sapsid ADO -if bond0 -nm 255.255.252.0 -net
10.20.88.0 -nodes lsoda01,lsoda02 -abapenq ASCS00 -abapvip 10.20.88.62 -abapmsport
3600 -abaprep ERS10 -aersvip 10.20.88.64
```

```
[root@lsoda01]# ./sapctl start all -sapsid ADO
sapctl version 8.1 Patch 0    Production Copyright 2016 Oracle.  All rights reserved
Starting SAP ABAP Enqueue service
Starting SAP ABAP Replication service
```

The CRS output of the additional resources created and running is listed in Appendix B.

Verify environment for user oraado

Login to each of the nodes as oraado, and `env | grep ORACLE`.

This should read as:

```
ORACLE_SID=ADO
ORACLE_HOME=/oracle/ADO/121
ORACLE_BASE=/oracle/ADO
```

If this is not correct, check in the environment scripts which are the correct ones. Before you move files around, please backup them. .dbenv_<hostname>.<shellname> takes precedence over the files without hostname.

SAP Database Administration with BR*Tools

The installation and configuration of BR*Tools is done by the above described Database Instance step of SWPM and installs BR*Tools 7.40 Patch 12. Usage of BR*Tools on Oracle Database Appliance to manage the Oracle database for SAP is supported. SAP Note 2087004 instructs that full support is provided with BR*Tools 7.40 Patch 14. Further information on BR*Tools can be found in SAP Notes 2087004,1598594 and 1627541.

Lifecycle Management for SAP Databases

An Oracle Database Appliance requires regular patching at several levels of its software stack:

- Oracle RDBMS software
- Oracle Grid Infrastructure software
- Oracle Appliance Kit (OAK) software
- Operating system and firmware

This section describes how to install patches for the above components of an Oracle Database Appliance running databases for SAP applications. For more general information on the Oracle Database Appliance components and patches refer to My Oracle Support Note 888888.1 ("Oracle Database Appliance – 12.1.2 and 2.x Supported ODA Versions & Known Issues").

An Oracle Database Appliance requires the following patches and bundle patches for a complete update (with the mentioned patch versions current at the time of this write-up):

- Oracle Database Appliance Bundle Patch 12.1.2.6.0
- Oracle Database SAP Bundle Patch 12.1.2.0.2.160119 – 201602 for Oracle Database Appliance

Oracle tests and certifies these patches and their successors for SAP databases on a regular basis and makes them available for SAP customers on My Oracle Support and the SAP Service Marketplace. You can find up-to-date release information on the patches and their download locations in SAP Note 2145651 ("Oracle Database Appliance: Patches for 12.1.0.2").

Note: Each SAP Bundle Patch for the Oracle Database Appliance is certified for exactly one particular Oracle Database Appliance version.

Hence you cannot combine SAP Bundle Patches and Oracle Database Appliance versions that are not certified to operate together. See SAP Note 2145651 for information on certified combinations of SAP Bundle Patches for ODA and Oracle Database Appliance versions.

In a nutshell, install the above mentioned patches in the following order:

1. Refer to SAP Note 2145651 to determine the required patches and their download locations.
2. Download the Oracle Database Appliance Bundle Patch and install its operating system and firmware patches.
3. Download and install the SAP Bundle Patch for ODA.

Note: Do <u>not</u> install the Grid Infrastructure patches and the RDBMS patches from the Oracle Database Appliance Bundle Patch.

Instead, apply these via the SAP Bundle Patch for the Oracle Database Appliance.

Installation of the Operating System and Firmware Patches

To install the operating system and firmware patches perform the following steps:

1. Download the Oracle Database Appliance Bundle Patch to both Oracle Database Appliance nodes
2. On both Oracle Database Appliance nodes, verify your current Oracle Database Appliance version:

```
/opt/oracle/oak/bin/oakcli show version
```

3. On both Oracle Database Appliance nodes, unpack the Oracle Database Appliance Bundle Patch:

```
/opt/oracle/oak/bin/oakcli unpack -package <absolute_path_to_ODA_bundle_patch>
```

4. On the first Oracle Database Appliance node, start installation of the operating system and firmware patches of the Oracle Database Appliance Bundle Patch. The `oakcli` utility installs the patches automatically on both nodes.

   ```
   /opt/oracle/oak/bin/oakcli update -patch <version_of_ODA_bundle_patch> \
   --server
   ```

   Depending on which components of the Oracle Database Appliance are getting updated this command may reboot the nodes.

   See section "Patching the Infrastructure Components" in the Readme of the Oracle Database Appliance Bundle Patch for complete information on the installation of its operating system and firmware patches.

   Note: Do not install the Grid Infrastructure patches and the RDBMS patches from the Oracle Database Appliance Bundle Patch.

   Install them as described in the next section from the SAP Bundle Patch for Oracle Database Appliance instead.

   Note: Installation of the Oracle Database Appliance Bundle Patch and the SAP Bundle Patch for Oracle Database Appliance is not RAC-rolling.

Installation of the SAP Bundle Patch for the Oracle Database Appliance

Ensure that the operating system environment requirements are met on both Oracle Database Appliance nodes as described in section "Operating System Environment Requirements" of the SAP Bundle Patch Readme.

Then follow the instructions from section "SAP Bundle Patch Installation" to install the SAP Bundle Patch for the Oracle Database Appliance. This usually comprises:

1. Installation of the latest OPatch and MOPatch utilities (self-contained)
2. Installation of the Grid Infrastructure patches in the GI homes.
3. Installation of the RDBMS patches in the RDBMS homes.
4. Execution of post-installation instructions, most notably of the `catsbp.sql` script, plus setting the updated RDBMS event triggers and fix_control settings

Note: Installation of the Oracle Database Appliance Bundle Patch and the SAP Bundle Patch for Oracle Database Appliance is not RAC-rolling.

Documentation References

[1] Oracle Database Appliance Documentation

http://www.oracle.com/technetwork/server-storage/engineered-systems/database-appliance/documentation/index.html

[2] Upgrade of SAP NetWeaver installation to Oracle Grid Infrastructure 12.1.0.2 and Oracle Real Application Clusters 12c Release 1

http://scn.sap.com/community/oracle

[3] Providing High Availability for SAP Resources with Oracle Clusterware 11g Release 2 and Clusterware 12c Release 1

http://scn.sap.com/community/oracle

[4] Relevant SAP Notes, Oracle Notes

SAP Notes

SAP Notes	SAP Related Notes
2290084	SAP Software and Oracle Database Appliance Version 12.1
1760737	SAP Software and Oracle Database Appliance Versions 2.x (ODA)
1877857	Installation and Configuration of SAP HA ASCS/ERS on ODA
2133079	Oracle Database 12c Integration in SAP Environment
527843	Oracle RAC support in the SAP environment
1677978	Mixed GI/RDBMS Versions or Mixed SAP/Non-SAP Environments on Exadata
1888485	Database Parameters for 12.1.0.2
2087004	BR*Tools Support for Oracle 12c
2145651	Oracle Database Appliance: Patches for 12.1.0.2
1825328	Oracle ASM and NW MDM
1914631	Oracle 12c: Central Technical Note for Oracle 12c
1496927	Protection of SAP instances through Oracle Clusterware
2157904	Oracle 12c: Conversion of compressed tables
819829	Oracle Instant Client Installation and Configuration on Unix
1171650	Automated Oracle DB parameter check
1680045	Release Note for Software Provisioning manager 1.0 SP10
1627541	BR*Tools support for Oracle ASM and Exadata/ODA
1635808	Oracle Linux 6.x SAP Installation and Upgrade
1521371	Setting of ORACLE_BASE in SAP environments

ORACLE NOTES

Oracle Note	Oracle MOS Note Title
888888.1	Oracle Database Appliance - 12.1.2 and 2.X Supported ODA Versions & Known Issues
1409835.1	ODA (Oracle Database Appliance): Deployment & Cleanup Steps
1934030.1	ODA (Oracle Database Appliance): HowTo export ACFS (cloudfs) using HANFS
337737.1	Oracle Clusterware (CRS/GI) - ASM - Database Version Compatibility

Appendix A – crsctl output after a fresh deployment

```
# crsctl stat res -t

--------------------------------------------------------------------------------
Name           Target  State        Server                   State details
--------------------------------------------------------------------------------
Local Resources
--------------------------------------------------------------------------------
ora.ASMNET1LSNR_ASM.lsnr
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.ASMNET2LSNR_ASM.lsnr
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.DATA.dg
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.LISTENER.lsnr
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.RECO.ACFSVOL.advm
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.RECO.DATAFSVOL.advm
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  Volume device /dev/a
                                                             sm/datafsvol-511 is
                                                             online,STABLE
ora.RECO.dg
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.REDO.dg
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.net1.network
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.ons
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.proxy_advm
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.reco.acfsvol.acfs
               ONLINE  ONLINE       lsoda01                  mounted on /sapmnt,S
                                                             TABLE
               ONLINE  ONLINE       lsoda02                  mounted on /sapmnt,S
                                                             TABLE
ora.reco.datafsvol.acfs
               ONLINE  ONLINE       lsoda01                  mounted on /odadataf
                                                             s,STABLE
               ONLINE  ONLINE       lsoda02                  mounted on /odadataf
                                                             s,STABLE
```

```
--------------------------------------------------------------------------------
Cluster Resources
--------------------------------------------------------------------------------
ora.LISTENER_SCAN1.lsnr
      1        ONLINE  ONLINE       lsoda02                  STABLE
ora.LISTENER_SCAN2.lsnr
      1        ONLINE  ONLINE       lsoda01                  STABLE
ora.MGMTLSNR
      1        ONLINE  ONLINE       lsoda01                  169.254.107.203,STAB
                                                             LE
ora.asm
      1        ONLINE  ONLINE       lsoda01                  Started,STABLE
      2        ONLINE  ONLINE       lsoda02                  Started,STABLE
ora.cvu
      1        ONLINE  ONLINE       lsoda01                  STABLE
ora.lsoda01.vip
      1        ONLINE  ONLINE       lsoda01                  STABLE
ora.lsoda02.vip
      1        ONLINE  ONLINE       lsoda02                  STABLE
ora.mgmtdb
      1        ONLINE  ONLINE       lsoda01                  Open,STABLE
ora.oc4j
      1        ONLINE  ONLINE       lsoda01                  STABLE
ora.scan1.vip
      1        ONLINE  ONLINE       lsoda02                  STABLE
ora.scan2.vip
      1        ONLINE  ONLINE       lsoda01                  STABLE
--------------------------------------------------------------------------------
```

Appendix B - Additional Local + Cluster Resources after HA awareness

Local:

```
ora.net2.network
               ONLINE  ONLINE       lsoda01                   STABLE
               ONLINE  ONLINE       lsoda02                   STABLE
```

Cluster:

```
sap.ADO.ASCS00.abapenq
      1        ONLINE  ONLINE       lsoda02                  STABLE
sap.ADO.ASCS00.startsrv
      1        ONLINE  ONLINE       lsoda02                  STABLE
sap.ADO.ERS10.abaprep
      1        ONLINE  ONLINE       lsoda01                  STABLE
sap.ADO.ERS10.startsrv
      1        ONLINE  ONLINE       lsoda01                  STABLE
sap.ADO.abapvip
      1        ONLINE  ONLINE       lsoda02                  STABLE
sap.ADO.aersvip
      1        ONLINE  ONLINE       lsoda01                  STABLE
```

Appendix C – Full CRS output after configuration

```
--------------------------------------------------------------------------------
Name           Target  State        Server                   State details
--------------------------------------------------------------------------------
Local Resources
--------------------------------------------------------------------------------
ora.ASMNET1LSNR_ASM.lsnr
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.ASMNET2LSNR_ASM.lsnr
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.DATA.dg
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.LISTENER.lsnr
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.RECO.ACFSVOL.advm
               ONLINE  ONLINE       lsoda01                  Volume device /dev/a
                                                             sm/acfsvol-86 is onl
                                                             ine,STABLE
               ONLINE  ONLINE       lsoda02                  Volume device /dev/a
                                                             sm/acfsvol-86 is onl
                                                             ine,STABLE
ora.RECO.DATAFSVOL.advm
               ONLINE  ONLINE       lsoda01                  Volume device /dev/a
                                                             sm/datafsvol-86 is o
                                                             nline,STABLE
               ONLINE  ONLINE       lsoda02                  Volume device /dev/a
                                                             sm/datafsvol-86 is o
                                                             nline,STABLE
ora.RECO.dg
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.REDO.dg
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.net1.network
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.net2.network
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
```

```
ora.ons
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.proxy_advm
               ONLINE  ONLINE       lsoda01                  STABLE
               ONLINE  ONLINE       lsoda02                  STABLE
ora.reco.acfsvol.acfs
               ONLINE  ONLINE       lsoda01                  mounted on /sapmnt,S
                                                             TABLE
               ONLINE  ONLINE       lsoda02                  mounted on /sapmnt,S
                                                             TABLE
ora.reco.datafsvol.acfs
               ONLINE  ONLINE       lsoda01                  mounted on /odadataf
                                                             s,STABLE
               ONLINE  ONLINE       lsoda02                  mounted on /odadataf
                                                             s,STABLE
--------------------------------------------------------------------------------
Cluster Resources
--------------------------------------------------------------------------------
ora.LISTENER_SCAN1.lsnr
      1        ONLINE  ONLINE       lsoda01                  STABLE
ora.LISTENER_SCAN2.lsnr
      1        ONLINE  ONLINE       lsoda02                  STABLE
ora.MGMTLSNR
      1        ONLINE  ONLINE       lsoda02                  169.254.106.65 192.1
                                                             68.16.25 192.168.17.
                                                             25,STABLE
ora.ado.ado_dvebmgs00.svc
      1        ONLINE  ONLINE       lsoda02                  STABLE
ora.ado.db
      1        ONLINE  ONLINE       lsoda01                  Open,STABLE
      2        ONLINE  ONLINE       lsoda02                  Open,STABLE
ora.asm
      1        ONLINE  ONLINE       lsoda01                  Started,STABLE
      2        ONLINE  ONLINE       lsoda02                  Started,STABLE
ora.cvu
      1        ONLINE  ONLINE       lsoda02                  STABLE
ora.lsoda01.vip
      1        ONLINE  ONLINE       lsoda01                  STABLE
ora.lsoda02.vip
      1        ONLINE  ONLINE       lsoda02                  STABLE
ora.mgmtdb
      1        ONLINE  ONLINE       lsoda02                  Open,STABLE
ora.oc4j
      1        ONLINE  ONLINE       lsoda02                  STABLE
ora.scan1.vip
```

```
      1        ONLINE  ONLINE       lsoda01                  STABLE
ora.scan2.vip
      1        ONLINE  ONLINE       lsoda02                  STABLE
sap.ADO.ASCS00.abapenq
      1        ONLINE  ONLINE       lsoda02                  STABLE
sap.ADO.ASCS00.startsrv
      1        ONLINE  ONLINE       lsoda02                  STABLE
sap.ADO.ERS10.abaprep
      1        ONLINE  ONLINE       lsoda01                  STABLE
sap.ADO.ERS10.startsrv
      1        ONLINE  ONLINE       lsoda01                  STABLE
sap.ADO.abapvip
      1        ONLINE  ONLINE       lsoda02                  STABLE
sap.ADO.aersvip
      1        ONLINE  ONLINE       lsoda01                  STABLE
--------------------------------------------------------------------------------
```

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