Table of Contents

Rac11gR2OnAIX **1**
1. Introduction 1
1.1. Overview of new concepts in 11gR2 Grid Infrastructure 1
1.1.1. SCAN 1
1.1.2. GNS 1
1.1.3. OCR and Voting Disk on ASM storage 1
1.1.4. Intelligent Platform Management interface (IPMI) 1
1.1.5. Time sync 2
1.1.6. Clusterware and ASM share the same Oracle Home 2
1.2. System Requirements 2
1.2.1. Hardware Requirements 2
1.2.2. Network Hardware Requirements 2
1.2.3. IP Address Requirements 3
1.2.4. Installation method 3
2. Prepare the cluster nodes for Oracle RAC 3
2.1. User Accounts 3
2.1.1. Create Users 3
2.1.2. Check the created users 3
2.1.3. Check and Grant Privileges 4
2.1.4. Setup SSH user equivalency 4
2.1.5. Configure the GRID User profile 4
2.2. OS Configuration 4
2.2.1. AIO Checking 4
2.2.2. VMM Parameter Checking 4
2.2.3. Modification to restricted tunable strict_maxperm 4
2.2.4. NTP Change 5
2.3. Run rootpre.sh 5
2.4. Network Preparation 5
2.5. Client Preparation 5
3. Prepare the shared storage for Oracle RAC 6
4. Oracle Grid Infrastructure Install 6
4.1. Basic Grid Infrastructure Install (without GNS and IPMI) 6
4.2. Detailed "root.sh" output 24
5. Grid Infrastructure Home Patching 27
6. RDBMS Software Install 27
7. RDBMS Home Patching 39
8. Run ASMCA to create diskgroups 39
9. Run DBCA to create the database 40

Rac11gR2OnAIX

1. Introduction

1.1. Overview of new concepts in 11gR2 Grid Infrastructure

1.1.1. SCAN

The single client access name (SCAN) is the address used by all clients connecting to the cluster. The SCAN name is a domain name registered to three IP addresses, either in the domain name service (DNS) or the Grid Naming Service (GNS). The SCAN name eliminates the need to change clients when nodes are added to or removed from the cluster. Clients using SCAN names can also access the cluster using EZCONNECT.

- The Single Client Access Name (SCAN) is a domain name that resolves to all the addresses allocated for the SCAN name. Allocate three addresses to the SCAN name. During Oracle grid infrastructure installation, listeners are created for each of the SCAN addresses, and Oracle grid infrastructure controls which server responds to a SCAN address request. Provide three IP addresses in the DNS to use for SCAN name mapping. This ensures high availability.
- The SCAN addresses need to be on the same subnet as the VIP addresses for nodes in the cluster.
- The SCAN domain name must be unique within your corporate network.

1.1.2. GNS

In the past, the host and VIP names and addresses were defined in the DNS or locally in a hosts file. GNS can simplify this setup by using DHCP. To use GNS, DHCP must be configured in the subdomain in which the cluster resides.

1.1.3. OCR and Voting Disk on ASM storage

The ability to use ASM diskgroups for the storage of Clusterware OCR and Voting disks is a new feature in the Oracle Database 11g Release 2 Grid Infrastructure. If you choose this option and ASM is not yet configured, OUI launches ASM configuration assistant to configure ASM and a diskgroup.

1.1.4. Intelligent Platform Management interface (IPMI)

Intelligent Platform Management Interface (IPMI) provides a set of common interfaces to computer hardware and firmware that administrators can use to monitor system health and manage the system.

With Oracle Database 11g Release 2, Oracle Clusterware can integrate IPMI to provide failure isolation support and to ensure cluster integrity. You must have the following hardware and software configured to enable cluster nodes to be managed with IPMI:

- Each cluster member node requires a Baseboard Management Controller (BMC) running firmware compatible with IPMI version 1.5, which supports IPMI over LANs, and configured for remote control.
- Each cluster member node requires an IPMI driver installed on each node.
- The cluster requires a management network for IPMI. This can be a shared network, but Oracle recommends that you configure a dedicated network.
- Each cluster node's ethernet port used by BMC must be connected to the IPMI management network.

If you intend to use IPMI, then you must provide an administration account username and password to provide when prompted during installation.

1.1.5. Time sync

Oracle Clusterware 11g release 2 (11.2) requires time synchronization across all nodes within a cluster when Oracle RAC is deployed. To achieve this you should have your OS configured network time protocol (NTP). The new Oracle Cluster Time Synchronization Service is designed for organizations whose Oracle RAC databases are unable to access NTP services.

1.1.6. Clusterware and ASM share the same Oracle Home

The clusterware and ASM share the same home thus we call it Grid Infrastructure home (prior to 11gR2 ASM could be installed either in a separate home or in the same Oracle home as RDBMS.)

1.2. System Requirements

1.2.1. Hardware Requirements

- Physical memory (at least 1.5 gigabyte (GB) of RAM)
- An amount of swap space equal to the amount of RAM
- Temporary space (at least 1 GB) available in /tmp
- A processor type (CPU) that is certified with the version of the Oracle software being installed
- At minimum of 1024 x 786 display resolution, so that Oracle Universal Installer (OUI) displays correctly
- All servers that will be used in the cluster have the same chip architecture, for example, all 32-bit processors or all 64-bit processors
- Disk space for software installation locations. You will need at least 4.5 GB of available disk space for the Grid home directory, which includes both the binary files for Oracle Clusterware and Oracle Automatic Storage Management (Oracle ASM) and their associated log files, and at least 4 GB of available disk space for the Oracle Database home directory.
- Shared disk space

An Oracle RAC database is a shared everything database. All data files, control files, redo log files, and the server parameter file (SPFILE) used by the Oracle RAC database must reside on shared storage that is accessible by all the Oracle RAC database instances. The Oracle RAC installation that is described in this guide uses Oracle ASM for the shared storage for Oracle Clusterware and Oracle Database files. The amount of shared disk space is determined by the size of your database.

1.2.2. Network Hardware Requirements

- Each node has at least two network interface cards (NIC), or network adapters.
- Public interface names must be the same for all nodes. If the public interface on one node uses the network adapter 'PublicLAN', then you must configure 'PublicLAN' as the public interface on all nodes.
- You should configure the same private interface names for all nodes as well. If 'PrivateLAN' is the private interface name for the first node, then 'PrivateLAN' should be the private interface name for your second node.
- For the private network, the end points of all designated interconnect interfaces must be completely reachable on the network. Every node in the cluster should be able to connect to every private network interface in the cluster.

- The host name of each node must conform to the RFC 952 standard, which permits alphanumeric characters. Host names using underscores ("_") are not allowed.

1.2.3. IP Address Requirements

- One public IP address for each node
- One virtual IP address for each node
- Three single client access name (SCAN) addresses for the cluster

1.2.4. Installation method

This document details the steps for installing a 2-node Oracle 11gR2 RAC cluster on AIX:

- The Oracle Grid Infrastructure Home binaries are installed on the local disk of each of the RAC nodes.
- The files required by Oracle Clusterware (OCR and Voting disks) are stored in ASM
- The installation is explained without GNS and IPMI (additional Information for installation with GNS and IPMI are explained)

2. Prepare the cluster nodes for Oracle RAC

The guides include hidden sections, use the and image for each section to show/hide the section or you can Expand all or Collapse all by clicking these buttons. This is implemented using the Twisty Plugin which requires Java Script to be enabled on your browser.

2.1. User Accounts

We recommend different users for the installation of the Grid Infrastructure (GI) and the Oracle RDBMS home. The GI will be installed in a separate Oracle base, owned by user grid. After the grid install the GI home will be owned by root, and inaccessible to unauthorized users.

2.1.1. Create Users

```
#mkgroup -'A' id='1000' adms='root' oinstall
#mkgroup -'A' id='1100' adms='root' asmadmin
#mkgroup -'A' id='1200' adms='root' dba
#mkgroup -'A' id='1300' adms='root' asmdba
#mkgroup -'A' id='1301' adms='root' asmoper
#mkuser id='1100' pgrp='oinstall' groups='asmadmin,asmdba,asmoper' home='/home/grid' grid
#mkuser id='1101' pgrp='oinstall' groups='dba,asmdba' home='/home/oracle' oracle
#mkdir -p /haclu/app/11.2.0/grid
#chown -R grid:oinstall /haclu
#mkdir -p /haclu/app/oracle
#chown oracle:oinstall /haclu/app/oracle
#chmod -R 775 /haclu
```

2.1.2. Check the created users

```
# id oracle uid=1101(oracle) gid=1000(oinstall) groups=1001(dba),1300(asmdba)
# id grid uid=1100(grid) gid=1000(oinstall) groups=1100(asmadmin),1301(asmoper),1300(asmdba)
```

2.1.3. Check and Grant Privileges

 # lsuser -a capabilities grid grid
#chuser capabilities=CAP_NUMA_ATTACH,CAP_BYPASS_RAC_VMM,CAP_PROPAGATE grid
 # lsuser -a capabilities grid grid
capabilities=CAP_NUMA_ATTACH,CAP_BYPASS_RAC_VMM,CAP_PROPAGATE

2.1.4. Setup SSH user equivalency

We recommend setting up ssh when setting up the user accounts (but it's also possible to setup ssh through the Oracle Universal Installer (OUI)): *passwd grid passwd oracle*
Use grid user on all nodes *rm -rf $HOME/.ssh*
On node1: *$GI_OUI/sshsetup/sshUserSetup.sh -user grid -hosts "node1 node2" -advanced âno PromptPassphrase*
Use oracle user: *$OUI_HOME/sshsetup/sshUserSetup.sh -user oracle -hosts "node1 node2" -advanced -noPromptPassphrase*

Please test that ssh is successful to and on both nodes without password prompting.

2.1.5. Configure the GRID User profile

 # su - grid $ echo $SHELL /usr/bin/ksh $ vi .profile umask 022
If the ORACLE_SID, ORACLE_HOME, or ORACLE_BASE environment variable are set in the file, then remove the appropriate lines from the file.

```
export GI_OUI=/stage/core/AIX/PPC-64/64bit/rdbms/11.2.0.1.0/grid/
cd $GI_OUI
```

2.2. OS Configuration

NOTE: This cookbook only lists the actions and best practices related to the basic example environment. More OS patches and packages may be required when using other technologies such as VIO, DLPA, etc. Please reference My Oracle Support ExtNote:282036.1 : Minimum Software Versions and Patches Required to Support Oracle Products on IBM Power Systems for more detailed OS software and kernel requirements.

2.2.1. AIO Checking

 # ioo Â¨Co aio_maxreqs aio_maxreqs = 65536
For AIX 5.3: *# lsattr -El aio0 -a maxreqs*

2.2.2. VMM Parameter Checking

Checking: *#vmo -L minperm% #vmo -L maxperm% #vmo -L maxclient% #vmo -L lru_file_repage #vmo -L strict_maxclient #vmo -L strict_maxperm*
Change: *#vmo -p -o minperm%=3 #vmo -p -o maxperm%=90 #vmo -p -o maxclient%=90 #vmo -p -o lru_file_repage=0 #vmo -p -o strict_maxclient=1 #vmo -p -o strict_maxperm=0*

2.2.3. Modification to restricted tunable strict_maxperm

Setting strict_maxperm to 0 in nextboot file Setting strict_maxperm to 0 Warning: a restricted tunable has been modified
AIX 5.3: *#/usr/sbin/chdev -l sys0 -a ncargs='128'*

maxuproc change: *#lsattr -E -l sys0 -a maxuproc #/usr/sbin/chdev -l sys0 -a maxuproc = 16384 sys0 changed*

2.2.4. NTP Change

NTP is not required for 11gR2 since we have the Cluster Time Synchronization Service (CTSD), but if you are using NTP you need to use it with â-xâ option:

Checking: *ps -ef |grep ntps*
If it has no -x option do below steps:

- a. Open the /etc/rc.tcpip file, and locate the following line: start /usr/sbin/xntpd "$src_running"
- b. Change the line to the following: start /usr/sbin/xntpd "$src_running" "-x"
- c. Save the file.

2.3. Run rootpre.sh

```
#./rootpre.sh
./rootpre.sh output will be logged in /tmp/rootpre.out_10-05-30.05:58:36
Saving the original files in /etc/ora_save_10-05-30.05:58:36....
Copying new kernel extension to /etc....
Loading the kernel extension from /etc
```

...

2.4. Network Preparation

Configuring the network:

```
/etc/hosts
10.220.19.160   node1
10.220.19.148   node2
10.220.19.161   node1-vip
10.220.19.149   node2-vip
10.220.52.160   node1-ic
10.220.52.149   node2-ic
```

NOTE: At this moment (before we start installation but after configuring the /etc/hosts and DNS for SCAN)

- We should be able to ping node1, node2, node1-ic, node2-ic
- We should NOT able to ping node1-vip, node2-vip, scan-vip
- We should be able to resolve the IPs (using DNS or hosts file) for: node1-vip, node2-vip, scan-vip

The cluster SCAN address should be configured through DNS to resolve to 3 IP addresses. Follow My Oracle Support ExtNote:1107295.1 : 'How to Configure the DNS Server for SCAN VIP on Linux for 11gR2 GI installation' to setup the SCAN IPs in DNS.

2.5. Client Preparation

Here we are using VNC Client. You can also use other x-terminal software. Download packages vnc*.rpm.
Install the RPM on AIX5L? using the command: *rpm -Uhv vnc**
Start it: *vncserver -geometry 1024x800*
Use root user: *xhost + (remotehost)*

3. Prepare the shared storage for Oracle RAC

This section describes how to prepare the shared storage for Oracle RAC.

Each node in a cluster requires external shared disks for storing the Oracle Clusterware (Oracle Cluster Registry and voting disk) files, and Oracle Database files. To ensure high availability of Oracle Clusterware files on Oracle ASM, you need to have at least 2 GB of disk space for Oracle Clusterware files in three separate failure groups, with at least three physical disks. Each disk must have at least 1 GB capacity to ensure that there is sufficient space to create Oracle Clusterware files. Use the following guidelines when identifying appropriate disk devices:

- All of the devices in an Automatic Storage Management disk group should be the same size and have the same performance characteristics.
- A disk group should not contain more than one partition on a single physical disk device.
- Using logical volumes as a device in an Automatic Storage Management disk group is not supported with Oracle RAC.
- The user account with which you perform the installation (oracle) must have write permissions to create the files in the path that you specify.

In our example, we already have the /dev/rhdisk4 available on both nodes as a raw device.

```
Issue the following command on all nodes:
#chown grid:asmadmin /dev/rhdisk4
#chmod 660 /dev/rhdisk4
# lsattr -E -l hdisk4 | grep reserve_
    reserve_policy  no_reserve
#chdev -l hdisk4 -a [ reserve_lock=no | reserve_policy=no_reserve ]
```

reserve_policy is for AIX storage, rreserve_lock is for EMC and other storage. You need to change the reserve option on every storage device you will be using in ASM

```
# /usr/sbin/chdev -l hdisk4 -a pv=clear
```

You must do this BEFORE you put any disk into an ASM diskgroup. After you put this hdiskX in a diskgroup, running this command at any node will cause an ASM corruption. Reference My Oracle Support ExtNote:750016.1 : 'Corrective Action for Diskgroup with Disks Having PVIDs' for more details.

At this point we can use /dev/rhdisk4 for our ASM diskgroup that will contain the OCR and Voting Disk or datafiles. In a later chapter, we will address how use this file to create a diskgroup using the ASM Configuration Assistant (ASMCA).

4. Oracle Grid Infrastructure Install

4.1. Basic Grid Infrastructure Install (without GNS and IPMI)

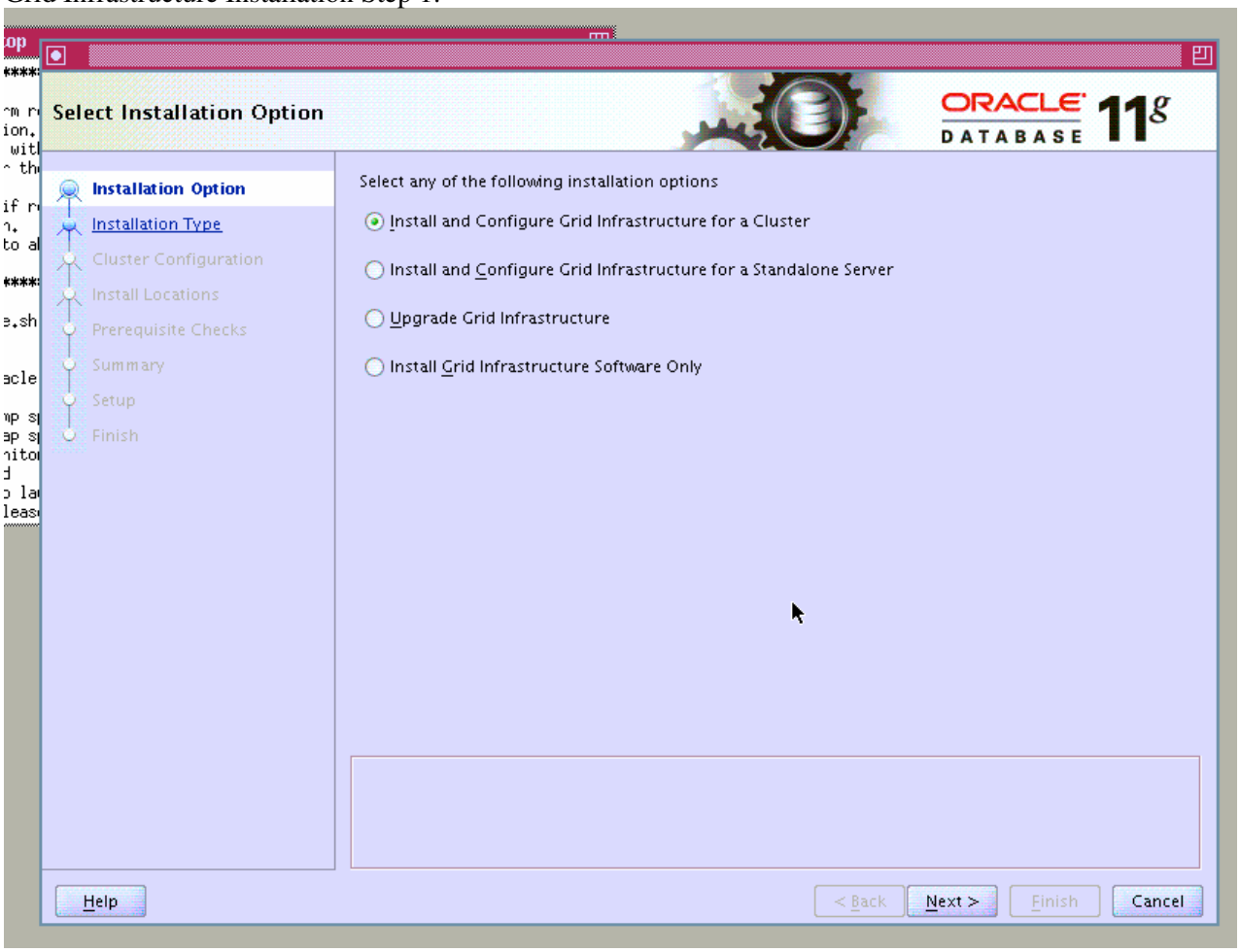
As the grid user (Grid Infrastructure software owner) run the commands below to initiate the OUI

NOTE:
Be sure to run the installer as the intended software owner, the only supported method to change the software owner is to reinstall.

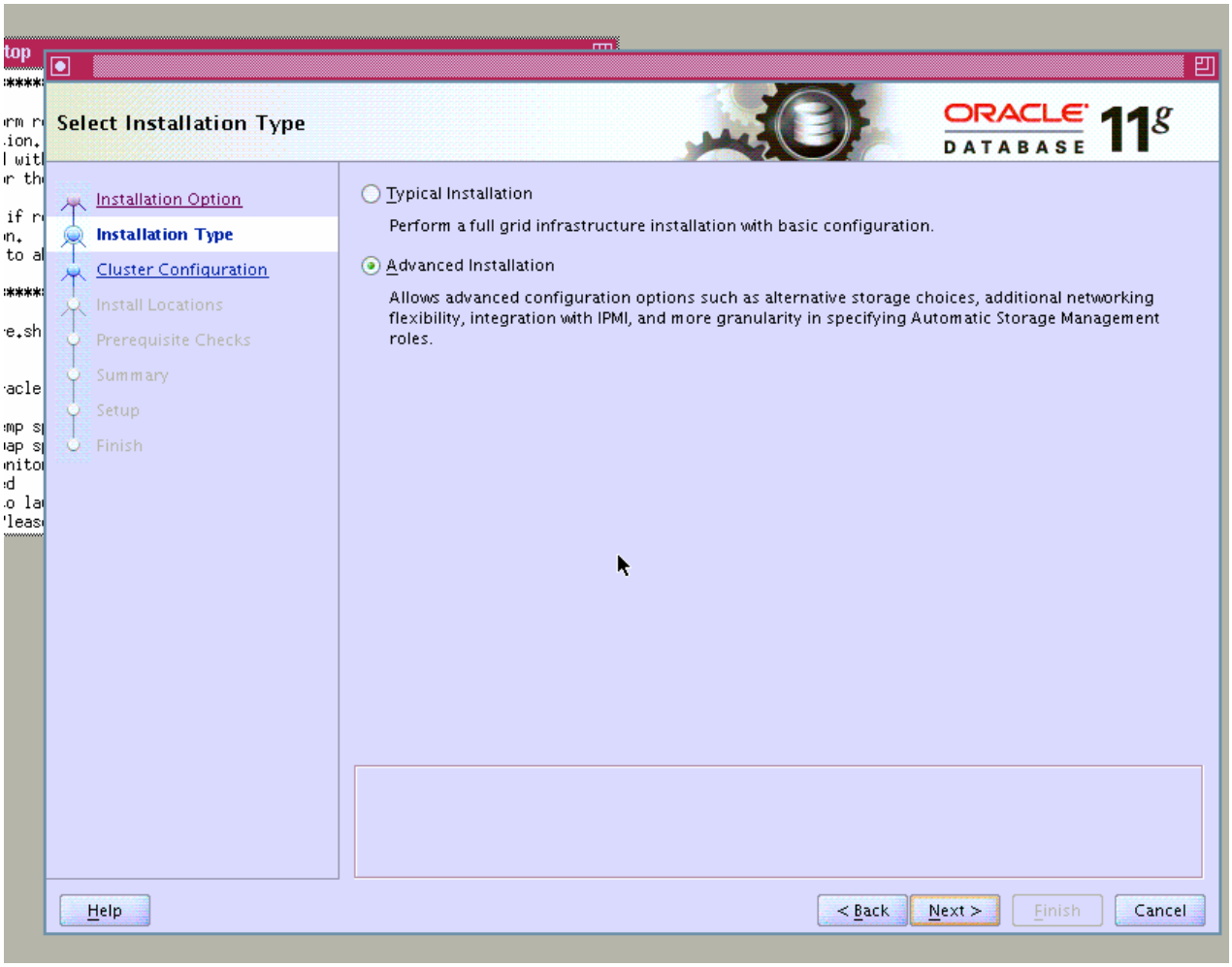
```
#su - grid
$export DISPLAY=localhost:1.0
```

```
$_./runInstaller_
```

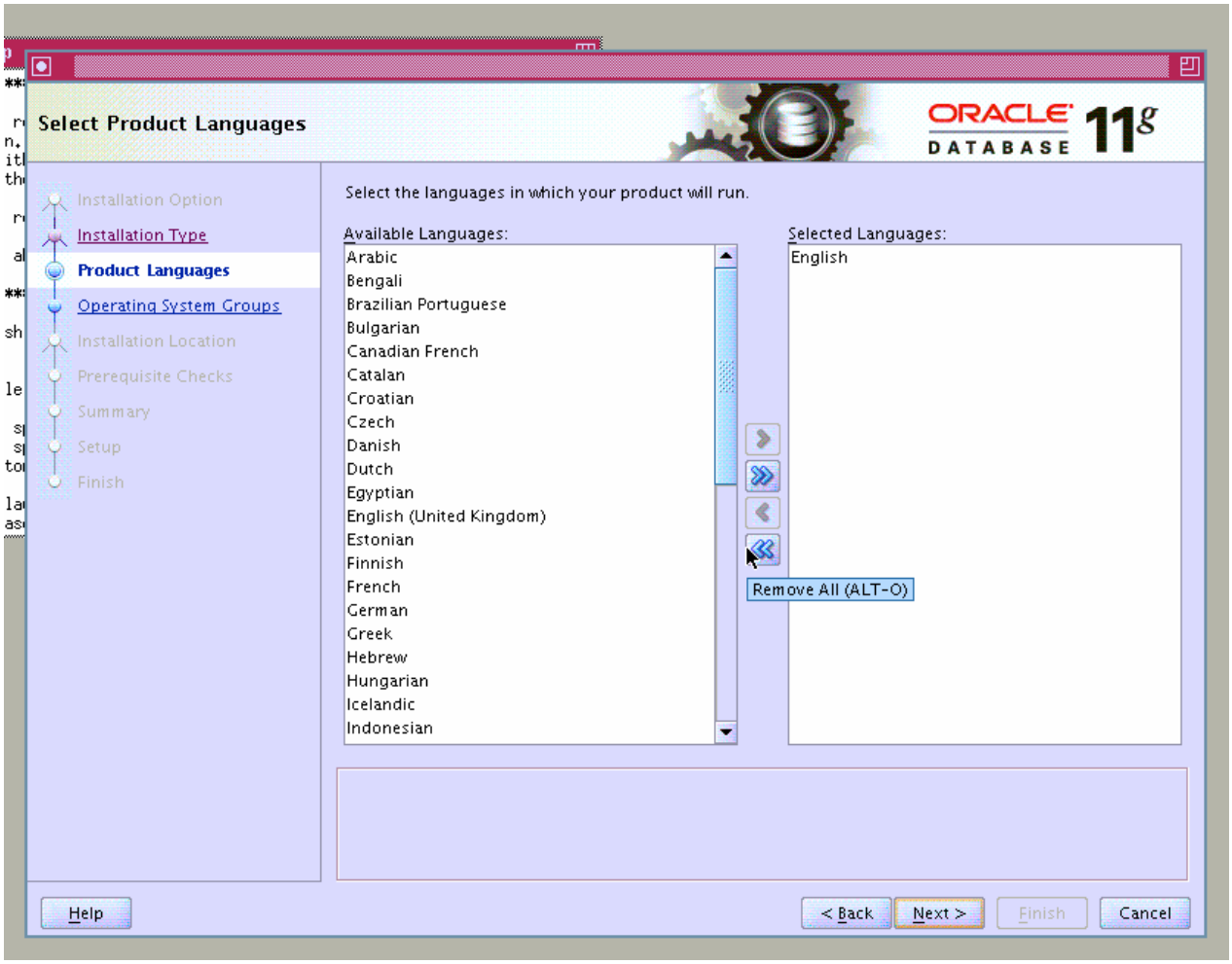
Grid Infrastructure Installation Step 1:



Grid Infrastructure Installation Step 2:



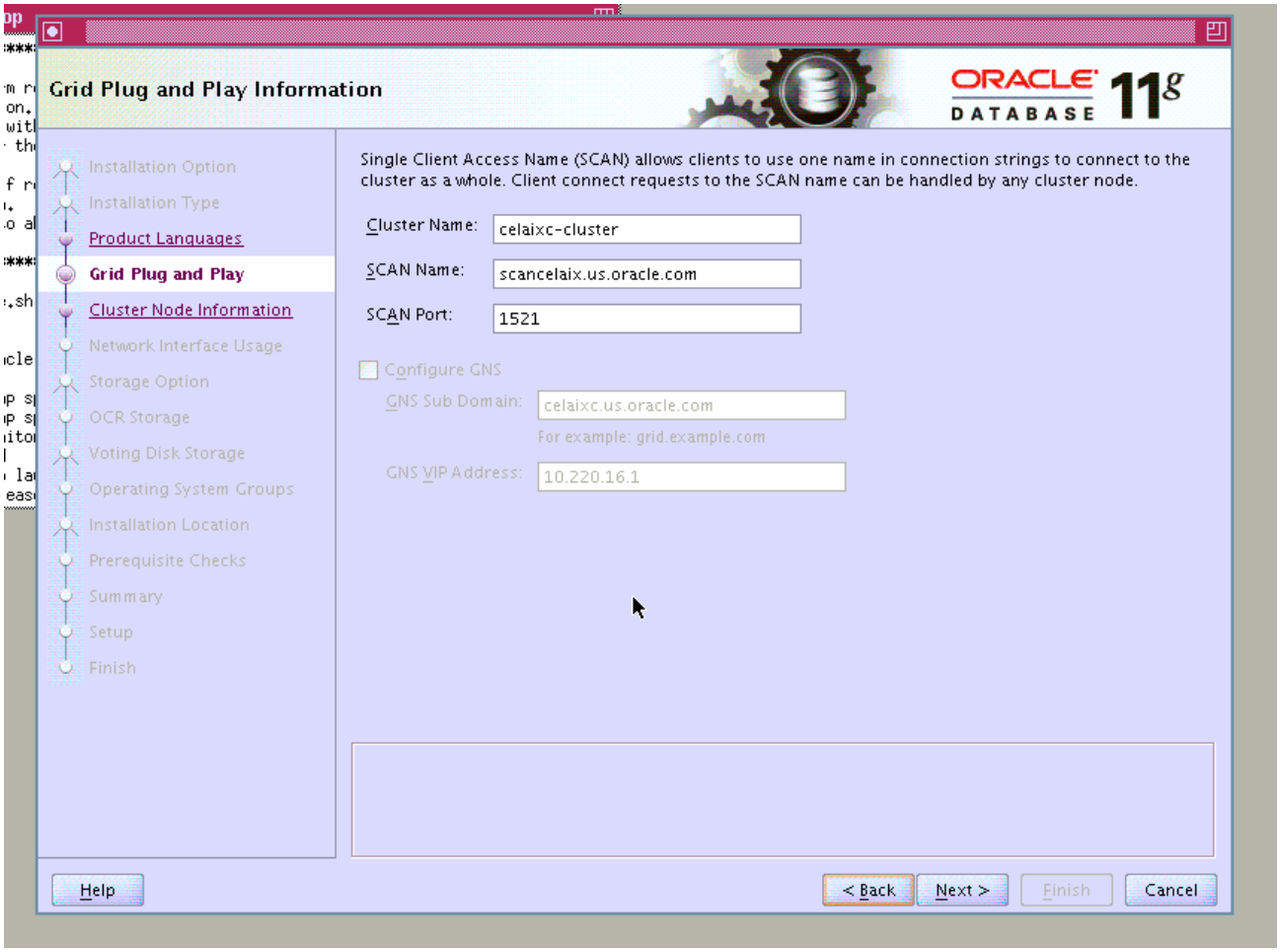
Grid Infrastructure Installation Step 3:



Grid Infrastructure Installation Step 4:

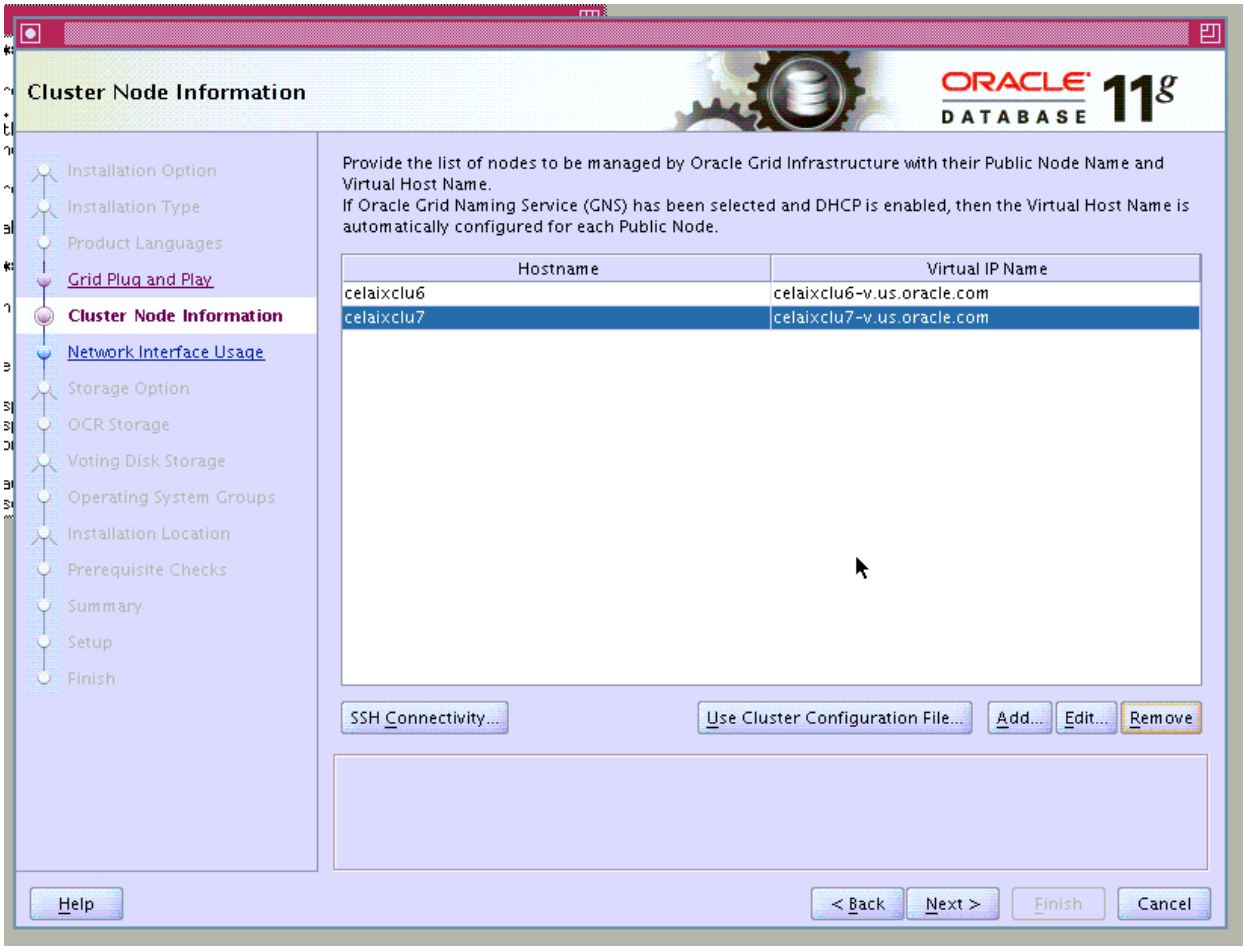
Action: During this step, we need to input the SCAN name which at this point, we can 'lookup' but not yet ping. Reference My Oracle Support ExtNote:887522.1 : '11gR2 Grid Infrastructure Single Client Access Name (SCAN) Explained' for more information about SCAN and My Oracle Support ExtNote:1107295.1 : 'How to Configure the DNS Server for SCAN VIP on Linux for 11gR2 GI installation' for an example DNS configuration for SCAN.

As can be seen here, the GNS setting has been greyed out and cannot be configured from this screen. DHCP and DNS must be correctly configured before you will be able to configure GNS at this step. Please check My Oracle Support ExtNote:946452.1: 'DNS and DHCP Setup Example for Grid Infrastructure GNS' for an example of how to configure DHCP and DNS for GNS.

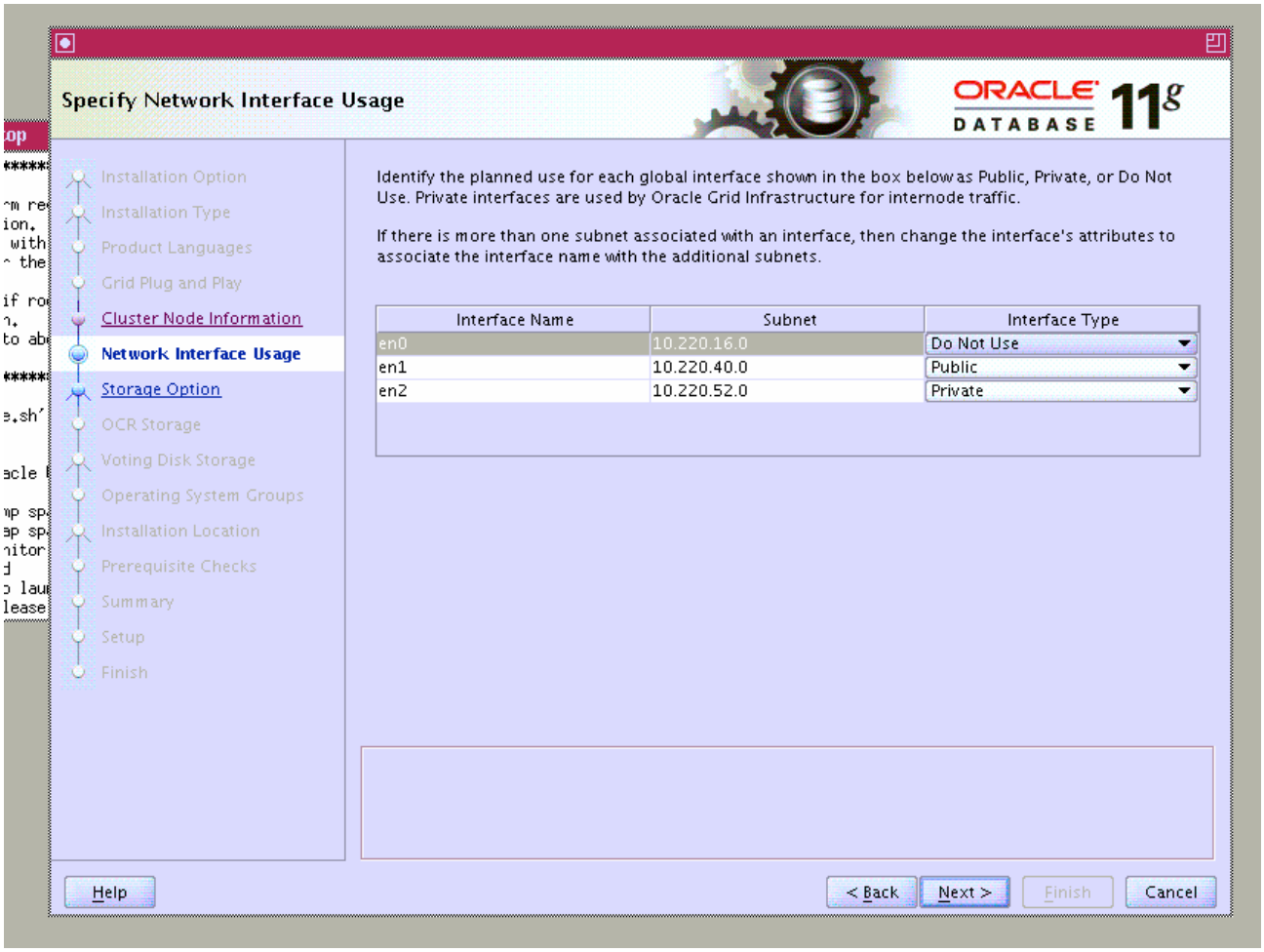


Grid Infrastructure Installation Step 5:

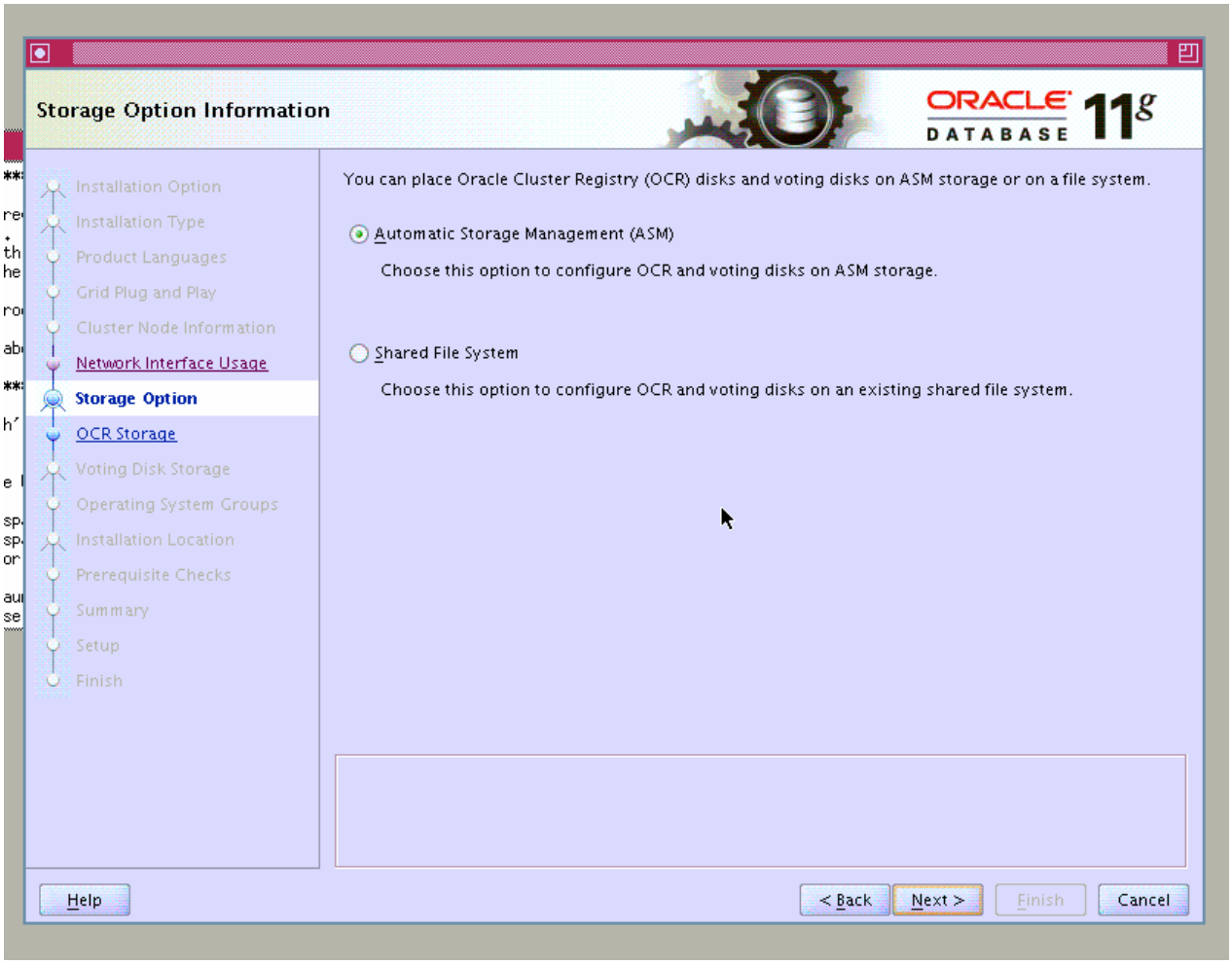
Action: At this step we configure the interface usage for GI. While it is possible to configure multiple interfaces for the interconnect on this screen, configuring multiple interfaces for that purpose in this way will only enable load balancing, not failover.



Grid Infrastructure Installation Step 6:

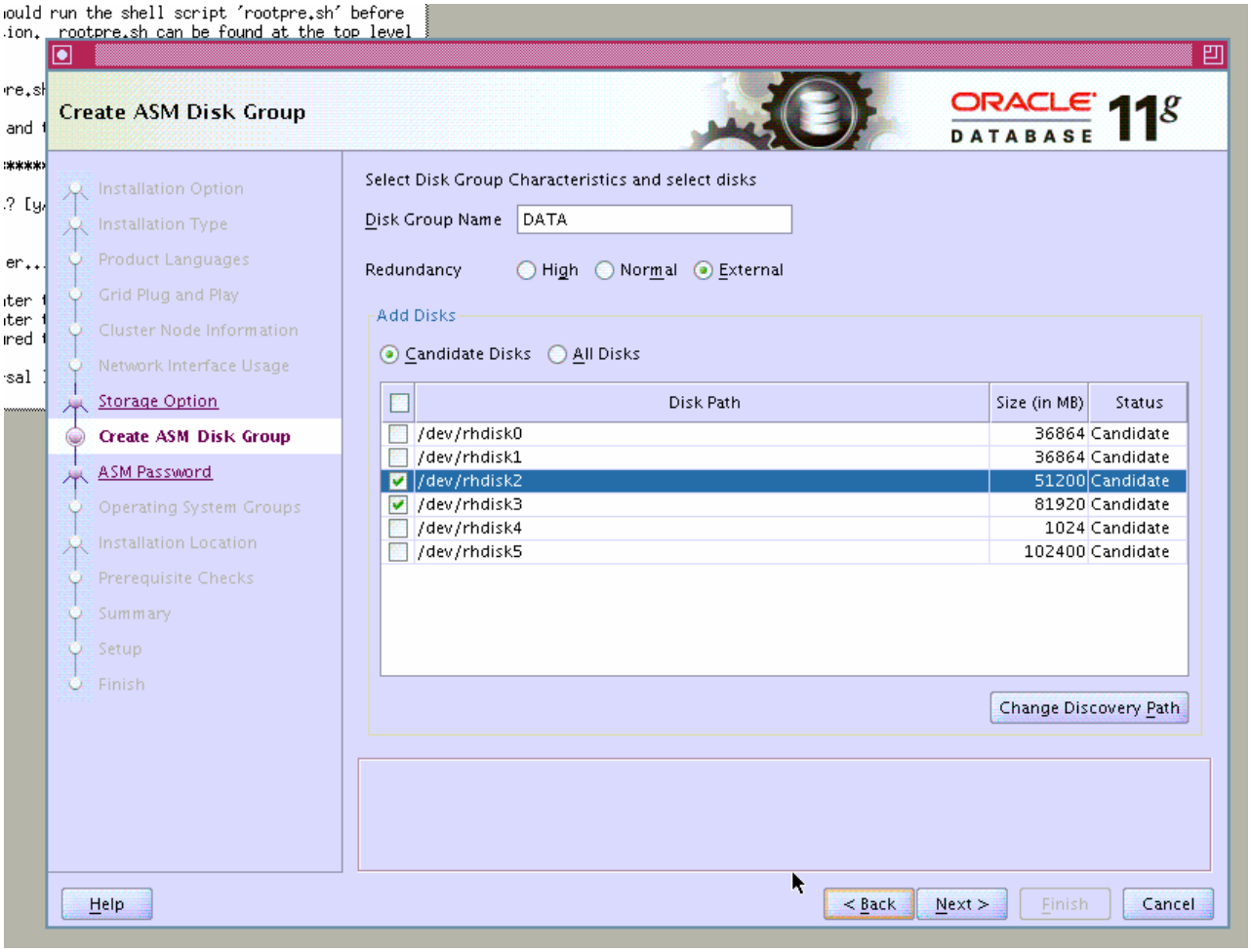


Grid Infrastructure Installation Step 7:

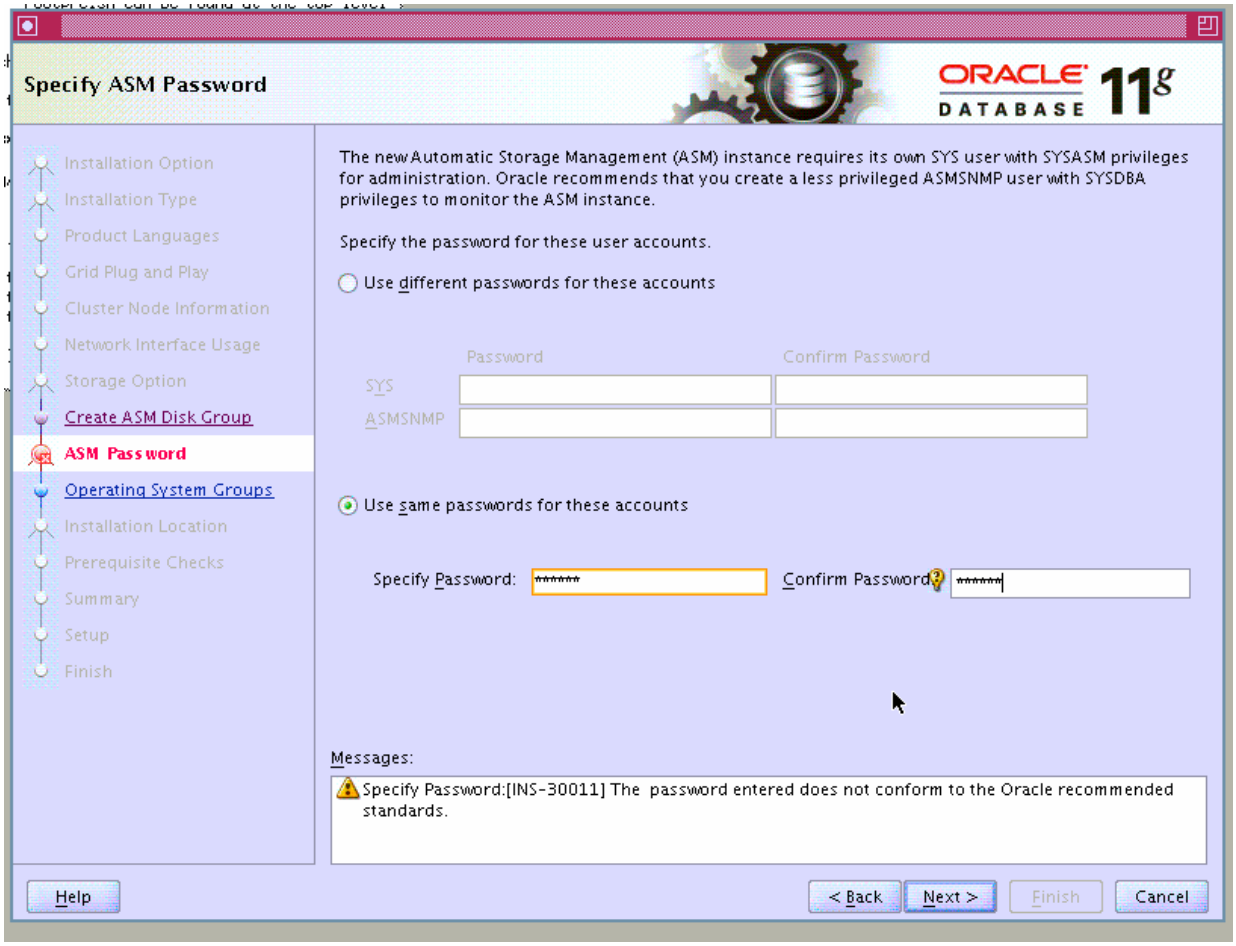


Grid Infrastructure Installation Step 8:

Action: Here we designate the raw devices to be used for the ASM disk group "Data". We can only create one disk group here and the OCR and Voting Disk will be created in this diskgroup. We can create additional diskgroups once Grid Infrastructure is fully installed and configured.

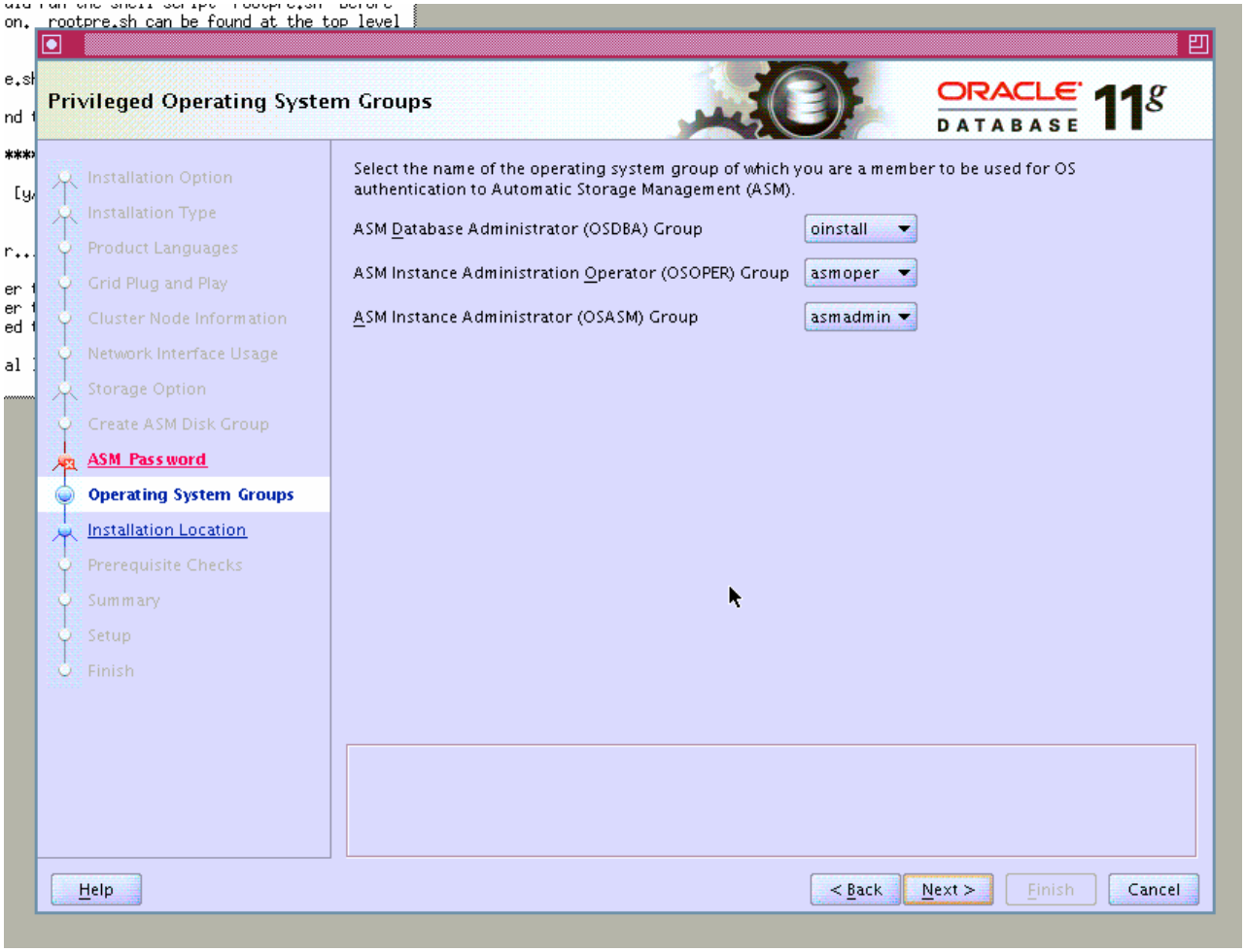


Grid Infrastructure Installation Step 9:

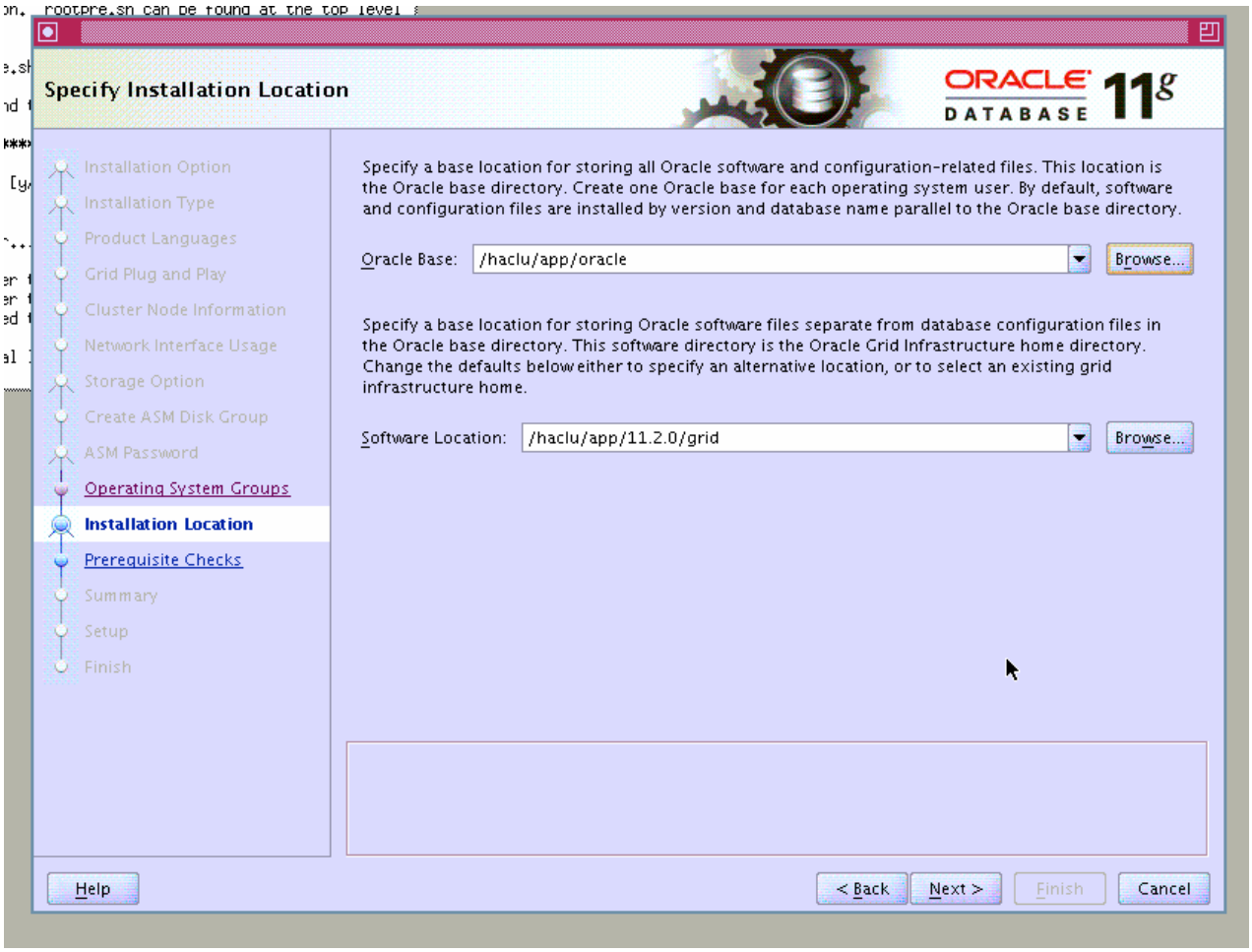


Grid Infrastructure Installation Step 10:

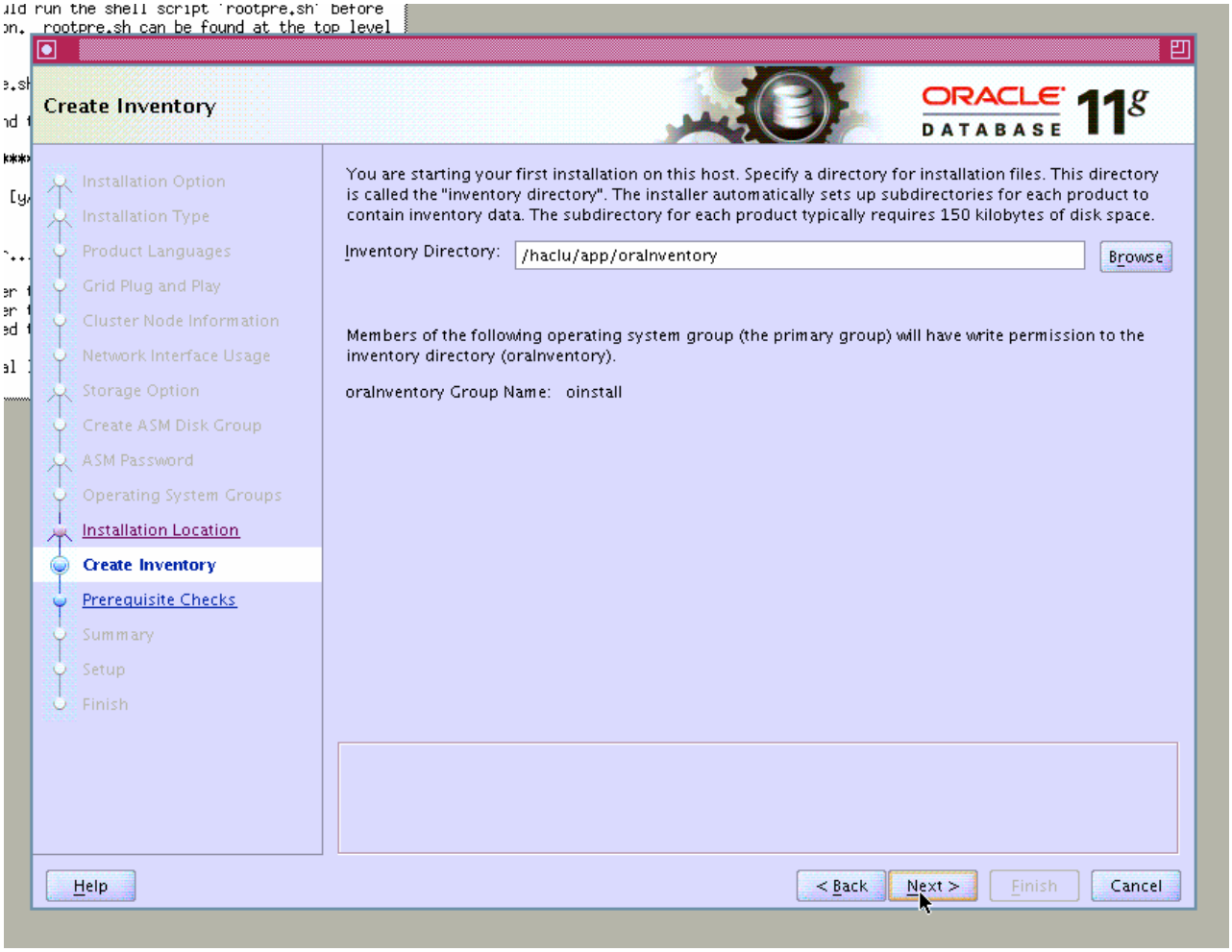
Note: For our example installation we are using the most complex groups. You can setup your OS groups as simple or complex based on individual business requirements.



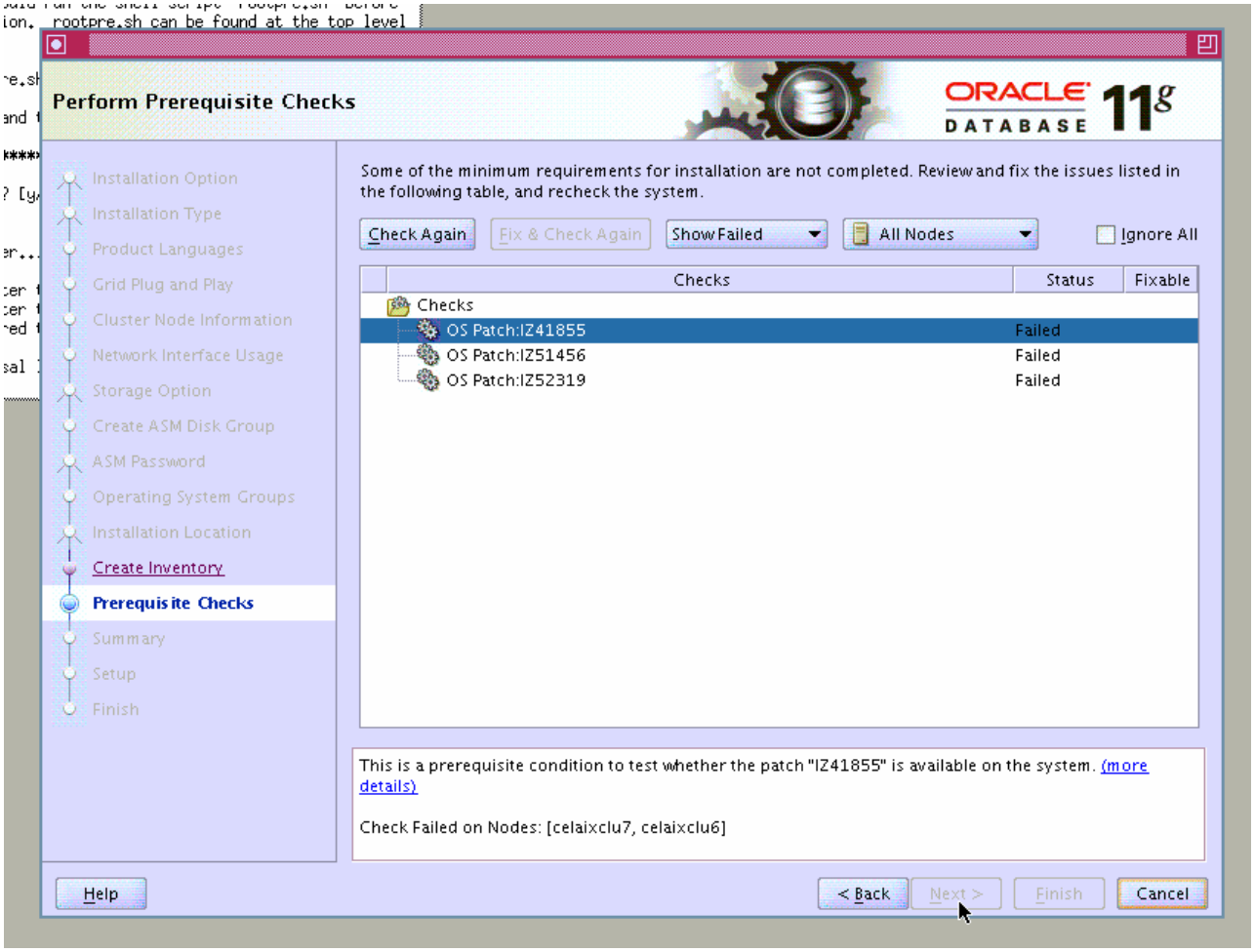
Grid Infrastructure Installation Step 11:
Note: The Oracle software location cannot be placed under the ORACLE_BASE



Grid Infrastructure Installation Step 12:

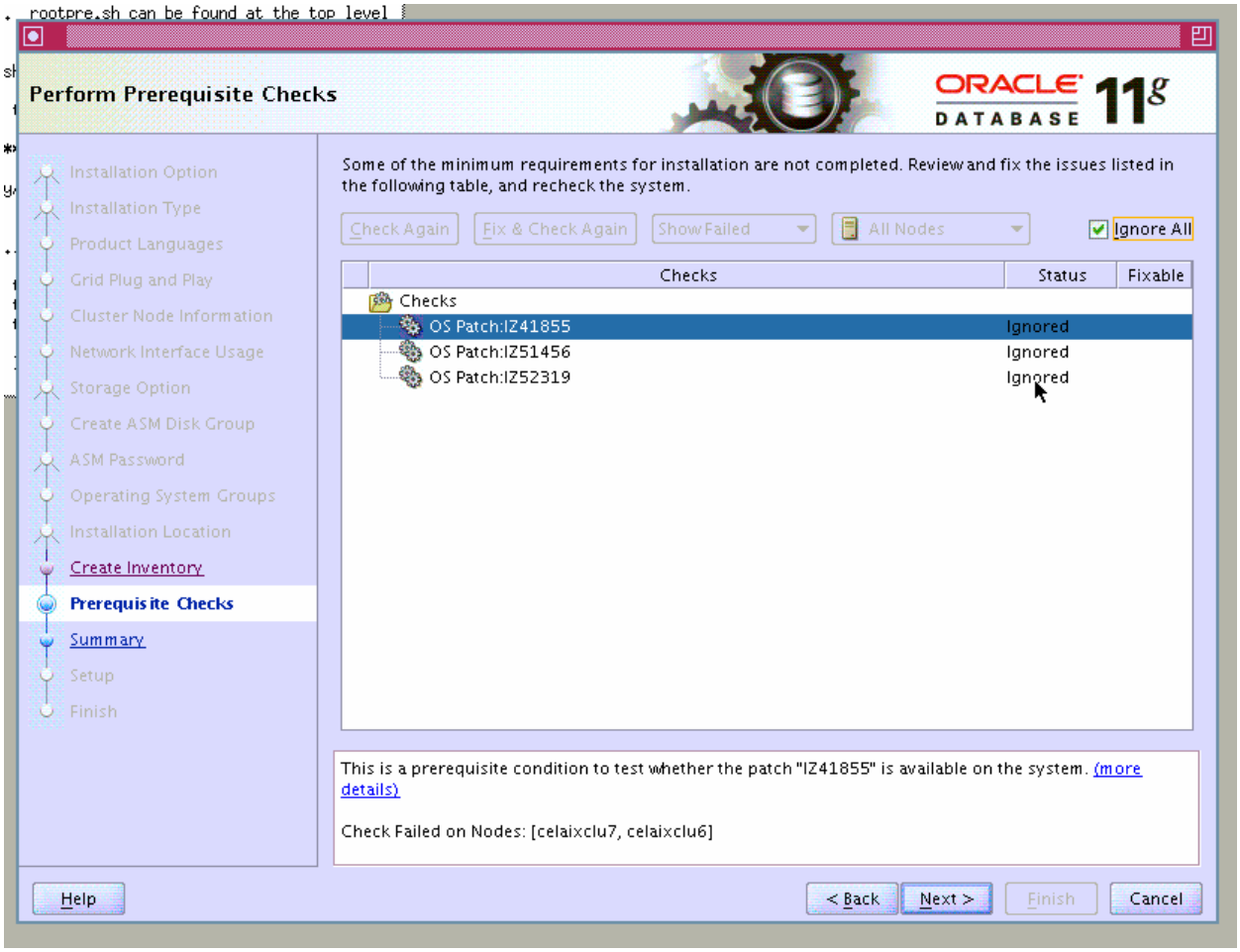


Grid Infrastructure Installation Step 13:

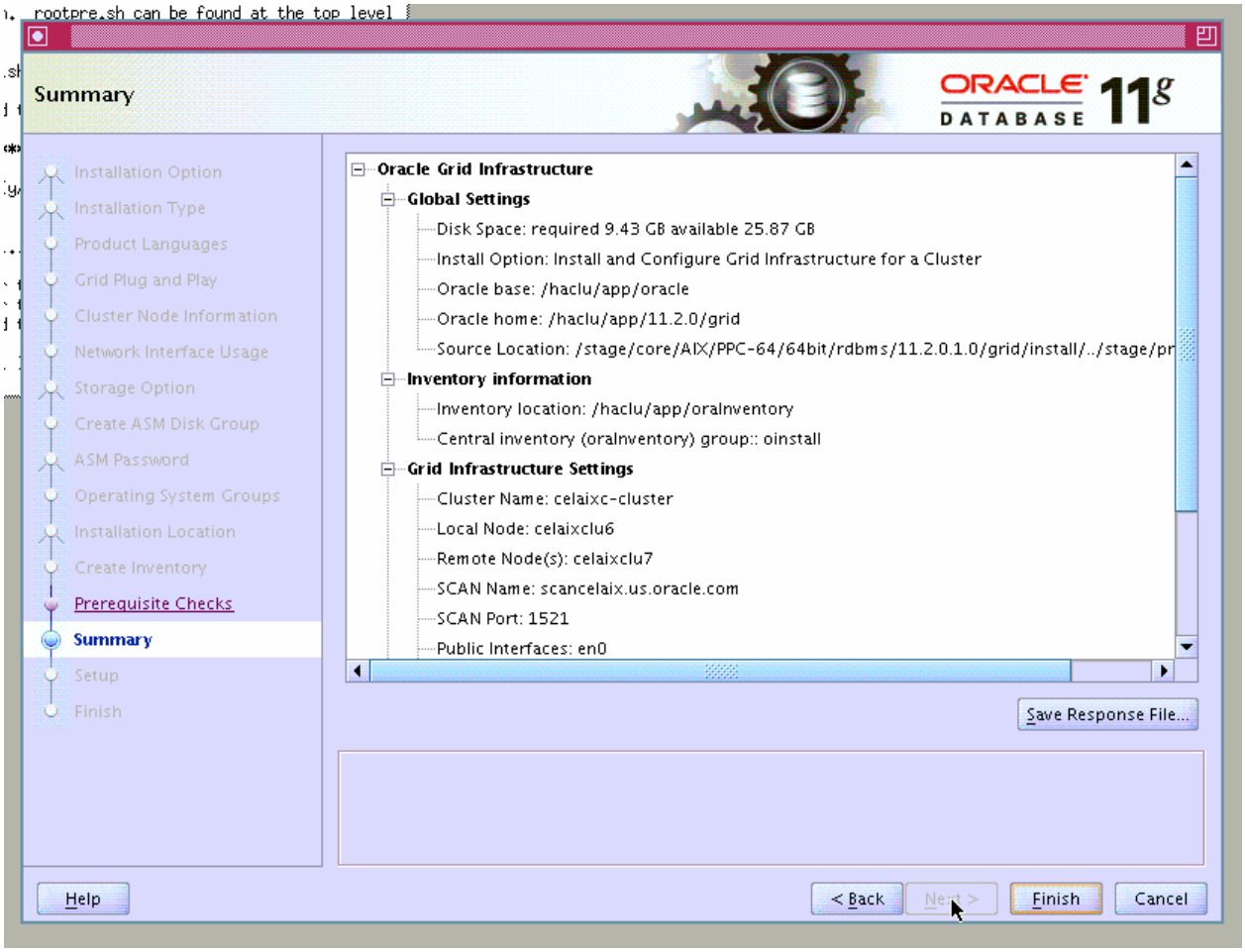


Grid Infrastructure Installation Step 13 - Ignore the warning message:

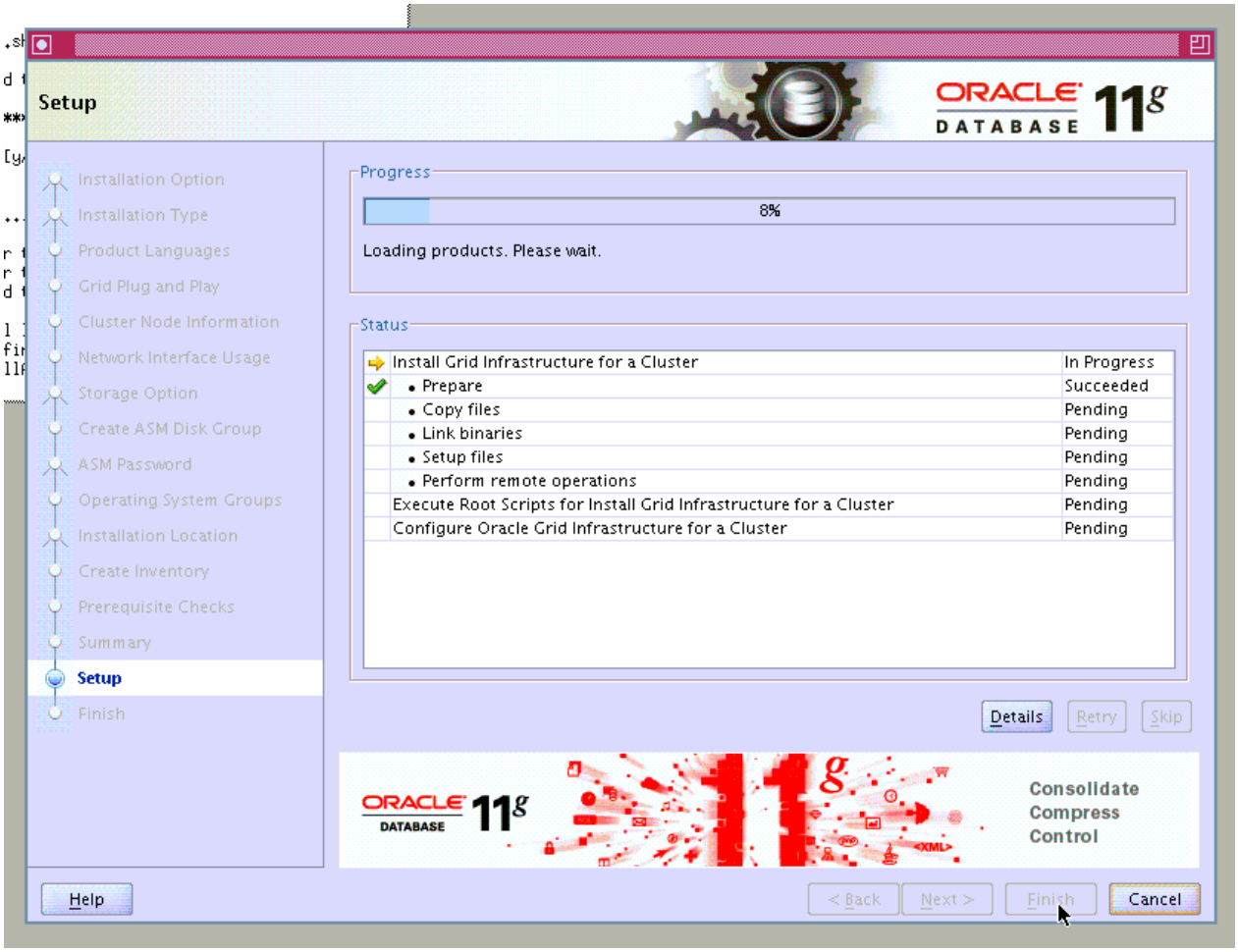
Action: Please reference My Oracle Support ExtNote:1083353.1 : '11gR2 OS Requirements APAR Check Failed on AIX 6.1' in which it is explained that this required IZ may be ignored.



Grid Infrastructure Installation Step 14:



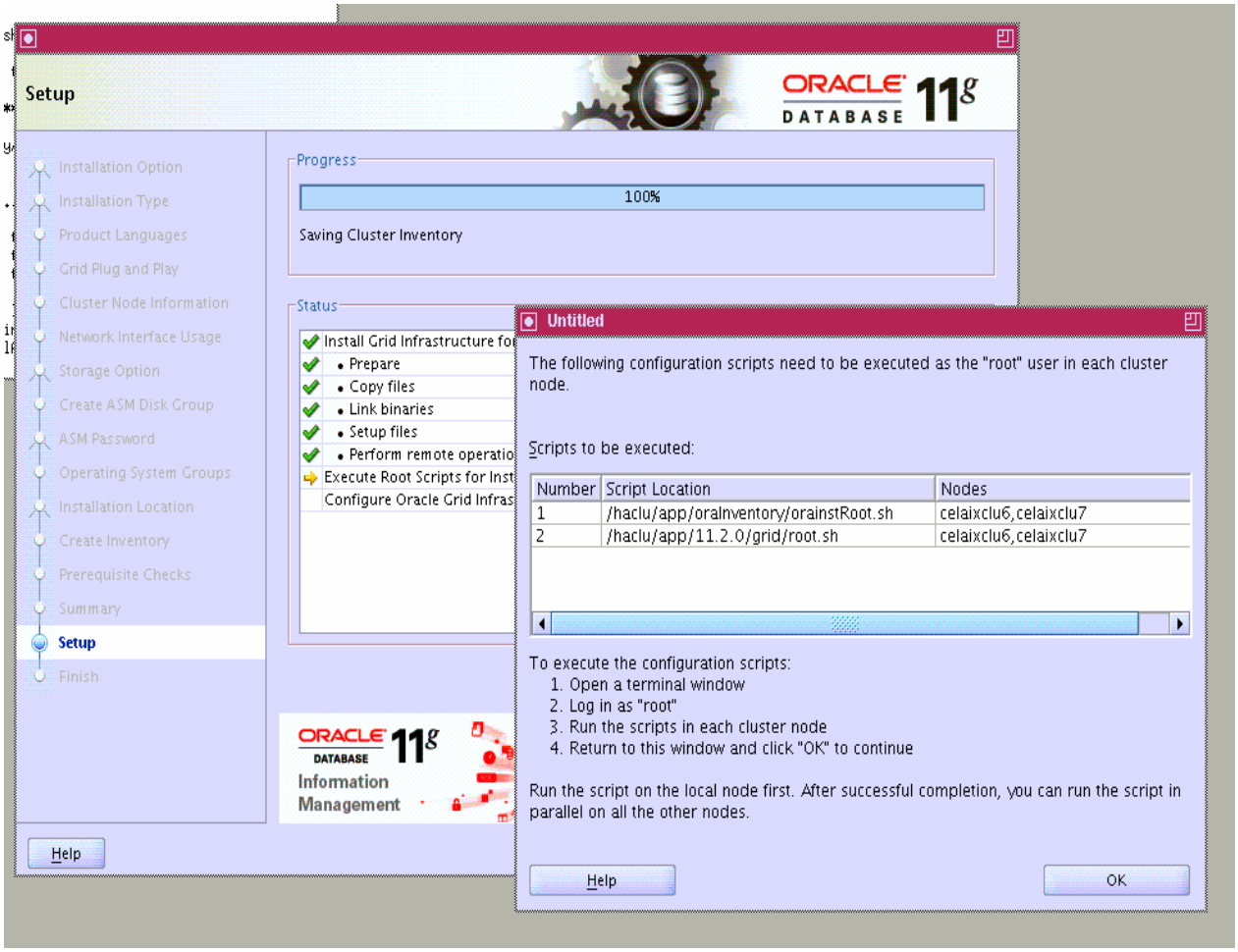
Grid Infrastructure Installation Step 15:



Grid Infrastructure Installation Step 16:

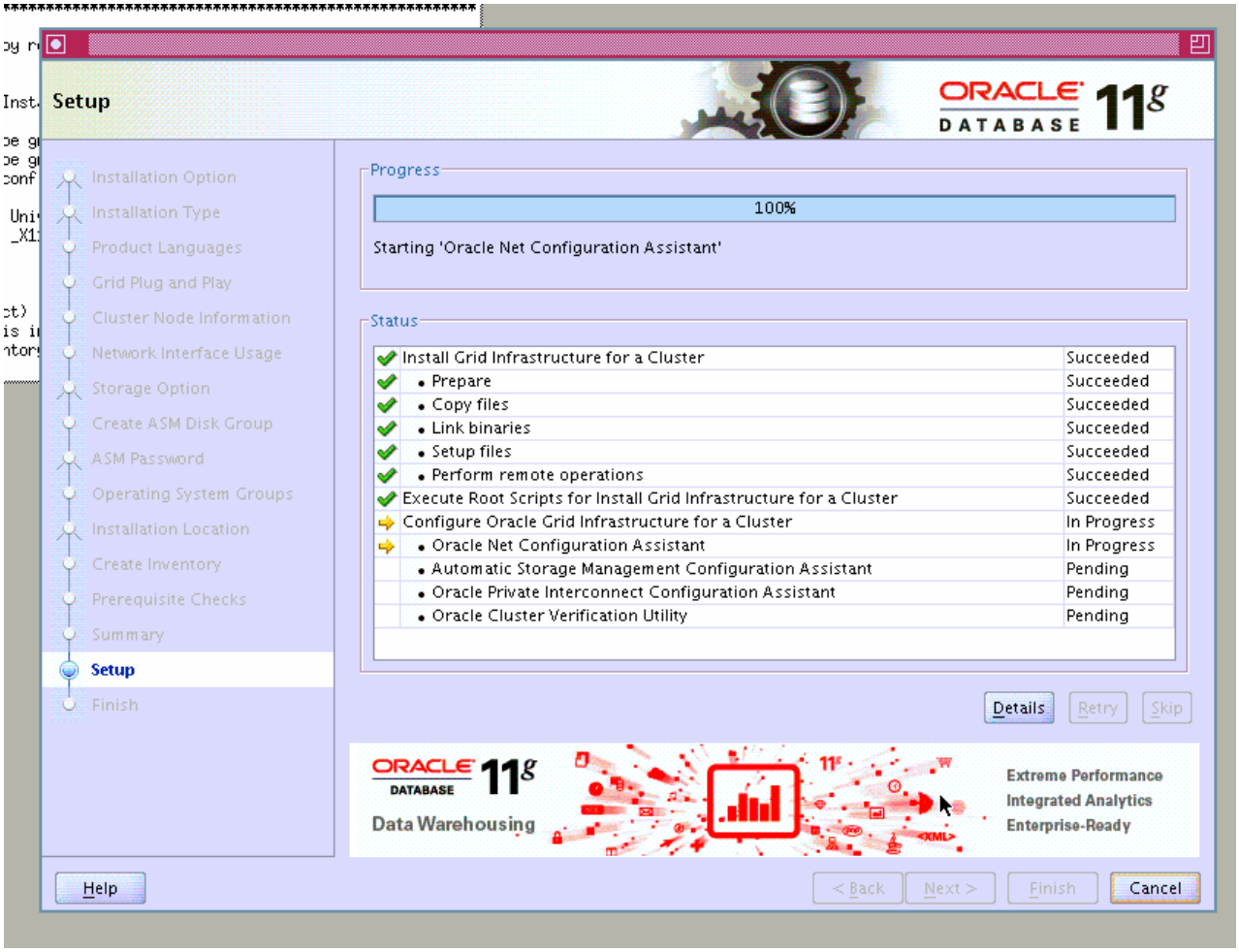
Action: At this point, the OUI should be left running and root.sh should be run on each node - one node at a time. Before running root.sh, it is advisable to clear the directory containing dummy socket files. Any 'left over' dummy socket files will cause root.sh to fail.

```
# rm -rf /tmp/.oracle/
```



Grid Infrastructure Installation Step 17:

Action: After root.sh has been run successfully on each cluster node, click next on this screen.



At this point, the installation of Oracle Grid Infrastructure is complete.

4.2. Detailed "root.sh" output.

 # $ORACLE_BASE/oraInventory/orainstRoot.sh
Changing permissions of /haclu/app/11.2.0/oraInventory.
Adding read,write permissions for group.
Removing read,write,execute permissions for world.
Changing groupname of /haclu/app/11.2.0/oraInventory to oinstall.
The execution of the script is complete.

 # ./root.sh

Running Oracle 11g root.sh script...

The following environment variables are set as:

ORACLE_OWNER= grid
ORACLE_HOME= /haclu/app/11.2.0/grid

Enter the full pathname of the local bin directory: [/usr/local/bin]:

The file "dbhome" already exists in /usr/local/bin. Overwrite it? (y/n) [n]: y
Copying dbhome to /usr/local/bin ...
The file "oraenv" already exists in /usr/local/bin. Overwrite it? (y/n) [n]: y
Copying oraenv to /usr/local/bin ...
The file "coraenv" already exists in /usr/local/bin. Overwrite it? (y/n) [n]: y
Copying coraenv to /usr/local/bin ...

Entries will be added to the /etc/oratab file as needed by

Database Configuration Assistant when a database is created
Finished running generic part of root.sh script.
Now product-specific root actions will be performed.
2010-05-29 23:58:14: Parsing the host name
2010-05-29 23:58:14: Checking for super user privileges
2010-05-29 23:58:14: User has super user privileges
Using configuration parameter file: /haclu/app/11.2.0/grid/crs/install/crsconfig_params
User grid has the required capabilities to run CSSD in realtime mode
LOCAL ADD MODE
Creating OCR keys for user 'root', privgrp 'system'..
Operation successful.
Adding daemon to inittab
CRS-4123: Oracle High Availability Services has been started.
ohasd is starting
CRS-2672: Attempting to start 'ora.gipcd' on 'node1'
CRS-2672: Attempting to start 'ora.mdnsd' on 'node1'
CRS-2676: Start of 'ora.gipcd' on 'node1' succeeded
CRS-2676: Start of 'ora.mdnsd' on 'node1' succeeded
CRS-2672: Attempting to start 'ora.gpnpd' on 'node1'
CRS-2676: Start of 'ora.gpnpd' on 'node1' succeeded
CRS-2672: Attempting to start 'ora.cssdmonitor' on 'node1'
CRS-2676: Start of 'ora.cssdmonitor' on 'node1' succeeded
CRS-2672: Attempting to start 'ora.cssd' on 'node1'
CRS-2672: Attempting to start 'ora.diskmon' on 'node1'
CRS-2676: Start of 'ora.diskmon' on 'node1' succeeded
CRS-2676: Start of 'ora.cssd' on 'node1' succeeded
CRS-2672: Attempting to start 'ora.ctssd' on 'node1'
CRS-2676: Start of 'ora.ctssd' on 'node1' succeeded

ASM created and started successfully.

Diskgroup DATA created successfully.

clscfg: -install mode specified

Successfully accumulated necessary OCR keys.
Creating OCR keys for user 'root', privgrp 'system'..
Operation successful.

CRS-2672: Attempting to start 'ora.crsd' on 'node1'
CRS-2676: Start of 'ora.crsd' on 'node1' succeeded
CRS-4256: Updating the profile
Successful addition of voting disk 9fe9435cb5de4fb3bfb90bf463221f14.
Successfully replaced voting disk group with +DATA.
CRS-4256: Updating the profile
CRS-4266: Voting file(s) successfully replaced
STATE File Universal Id File Name Disk group
-- ----- ----------------- --------- ---------
1. ONLINE 9fe9435cb5de4fb3bfb90bf463221f14 (/dev/rhdisk3) [DATA]
Located 1 voting disk(s).
CRS-2673: Attempting to stop 'ora.crsd' on 'node1'
CRS-2677: Stop of 'ora.crsd' on 'node1' succeeded
CRS-2673: Attempting to stop 'ora.asm' on 'node1'
CRS-2677: Stop of 'ora.asm' on 'node1' succeeded
CRS-2673: Attempting to stop 'ora.ctssd' on 'node1'
CRS-2677: Stop of 'ora.ctssd' on 'node1' succeeded
CRS-2673: Attempting to stop 'ora.cssdmonitor' on 'node1'
CRS-2677: Stop of 'ora.cssdmonitor' on 'node1' succeeded
CRS-2673: Attempting to stop 'ora.cssd' on 'node1'
CRS-2677: Stop of 'ora.cssd' on 'node1' succeeded
CRS-2673: Attempting to stop 'ora.gpnpd' on 'node1'
CRS-2677: Stop of 'ora.gpnpd' on 'node1' succeeded
CRS-2673: Attempting to stop 'ora.gipcd' on 'node1'
CRS-2677: Stop of 'ora.gipcd' on 'node1' succeeded
CRS-2673: Attempting to stop 'ora.mdnsd' on 'node1'
CRS-2677: Stop of 'ora.mdnsd' on 'node1' succeeded
CRS-2672: Attempting to start 'ora.mdnsd' on 'node1'
CRS-2676: Start of 'ora.mdnsd' on 'node1' succeeded
CRS-2672: Attempting to start 'ora.gipcd' on 'node1â succeeded

This is the end of root.sh on node1. On node2, root.sh will do similar things but when it finds that the OCR and voting disk have been configured it will stop Grid Infrastructure on node 1 and restart it on both nodes.

Test if Grid Infrastructure is running as expected, run the following command from $GI_HOME/bin

```
# crsctl stat res ât
Name           Type           Target    State     Host
------------------------------------------------------------
ora.DATA.dg    ora....up.type ONLINE    ONLINE    node1
ora....N1.lsnr ora....er.type ONLINE    ONLINE    node1
ora.asm        ora.asm.type   ONLINE    ONLINE    node1
ora....SM1.asm application    ONLINE    ONLINE    node1
ora....lu7.gsd application    OFFLINE   OFFLINE
ora....lu7.ons application    ONLINE    ONLINE    node1
ora....lu7.vip ora....t1.type ONLINE    ONLINE    node1
ora....SM2.asm application    ONLINE    ONLINE    node2
ora....lu8.gsd application    OFFLINE   OFFLINE
ora....lu8.ons application    ONLINE    ONLINE    node2
ora....lu8.vip ora....t1.type ONLINE    ONLINE    node2
ora.eons       ora.eons.type  ONLINE    ONLINE    node1
ora.gsd        ora.gsd.type   OFFLINE   OFFLINE
ora....network ora....rk.type ONLINE    ONLINE    node1
ora.oc4j       ora.oc4j.type  OFFLINE   OFFLINE
```

```
ora.ons        ora.ons.type   ONLINE    ONLINE    node1
ora.scan1.vip  ora....ip.type ONLINE    ONLINE    node1
```

We can see that all of the resources that are TARGETed for "ONLINE" have in fact been brought online. Return to the OUI and click 'Next' this will run a Cluster Verification Utility (cluvfy) command to verify the cluster status.

5. Grid Infrastructure Home Patching

It is very important to keep current and apply the lastest available Patch Set Update (PSU) patches which are released on a quarterly basis. As of September 2010, the latest available PSU for Grid Infrastructure is PSU 2 (11.2.0.1.2), available for download from My Oracle Support under patch number 9655006. Follow the instructions included in the PSU patch README for how to apply the patch and be sure to also reference My Oracle Support ExtNote:1082394.1 : '11.2.0.X Grid Infrastructure PSU Known Issues.'

6. RDBMS Software Install

NOTE: Be sure the installer is run as the intended software owner, the only supported method to change the software owner is to reinstall.

```
#su â oracle
```

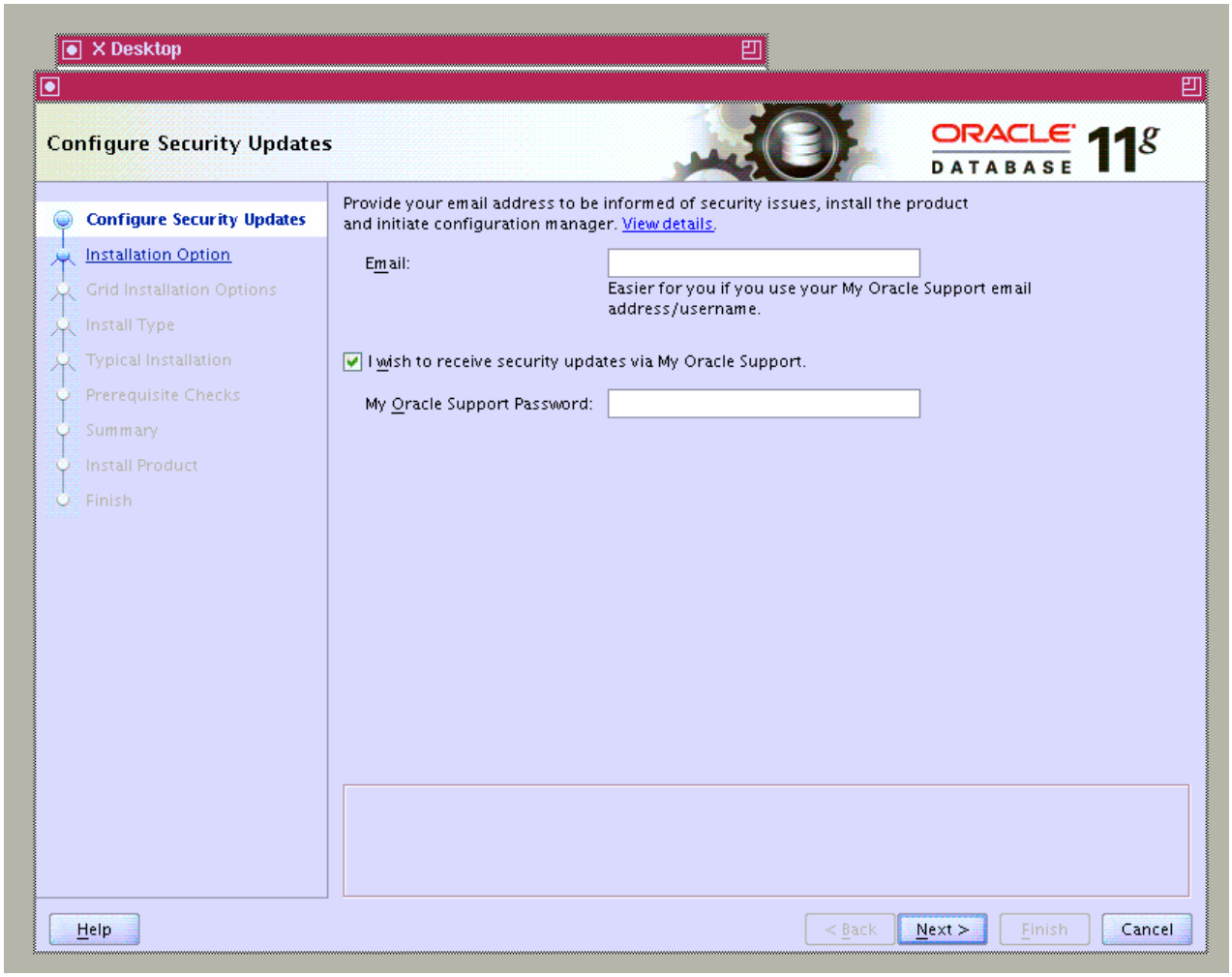
You'll note that we have created the oracle user and configured ssh for the oracle user in a previous chapter. Please refer back to chapter 2, section 2.1.1 if needed.

```
$export DISPLAY=localhost:1.0
```

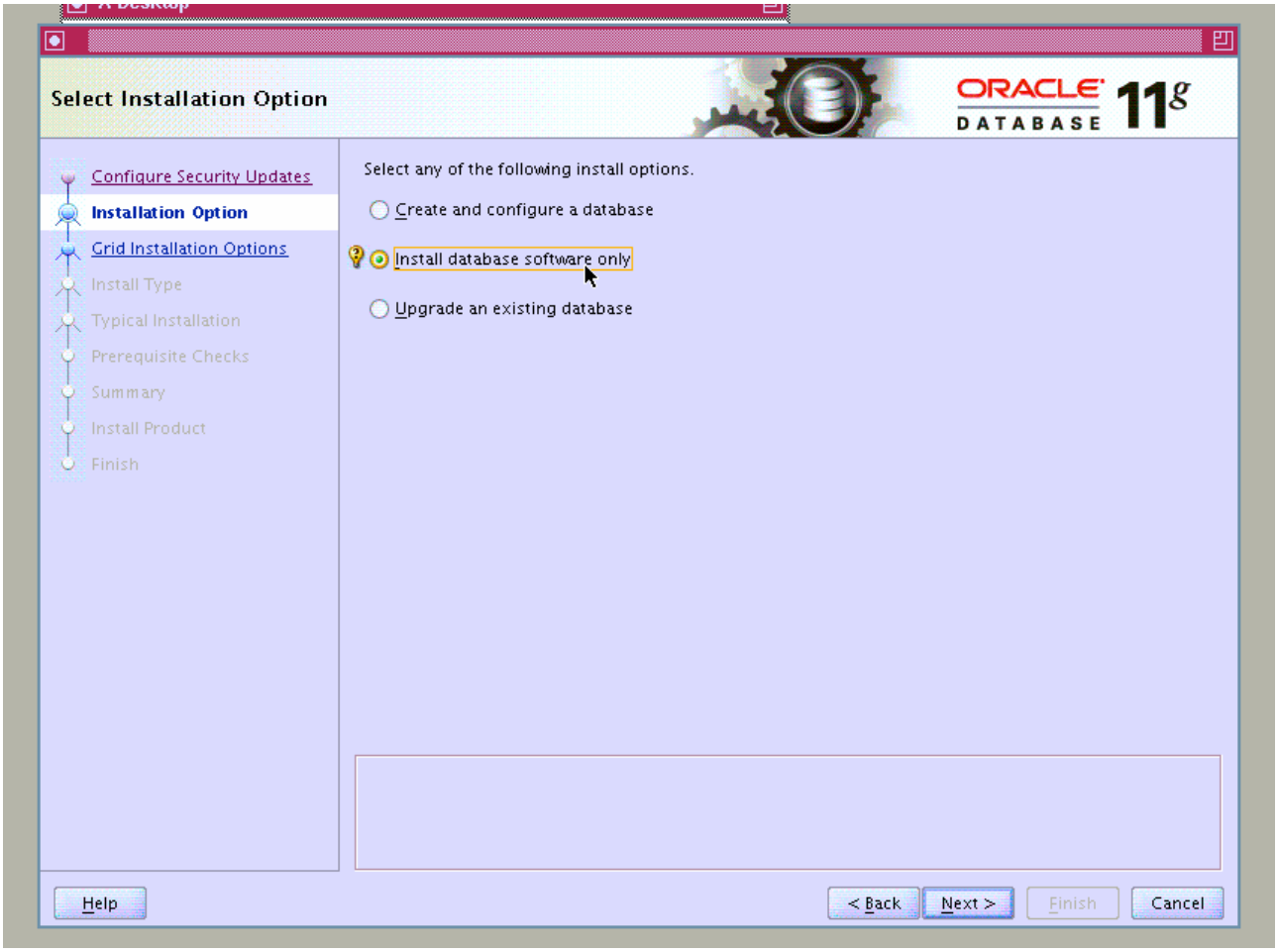
To test if xclock displays correctly, run: **xclock** (assuming **xhost +** has already been run by the root user) As the oracle user (rdbms software owner) start the installer by running "runInstaller" from the staged installation media.

```
$./runInstaller
```

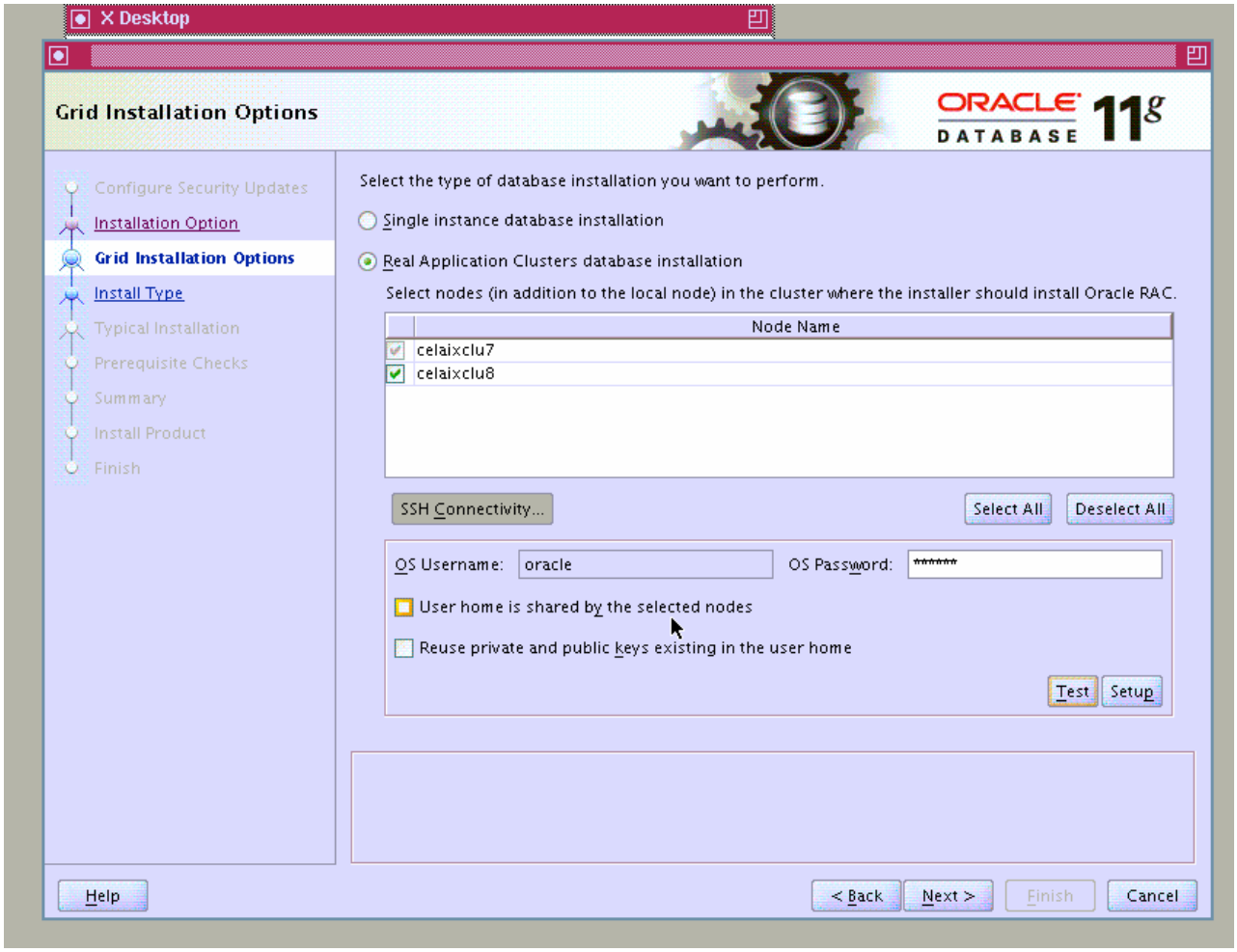
- RDBMS Software Installation Step 1:



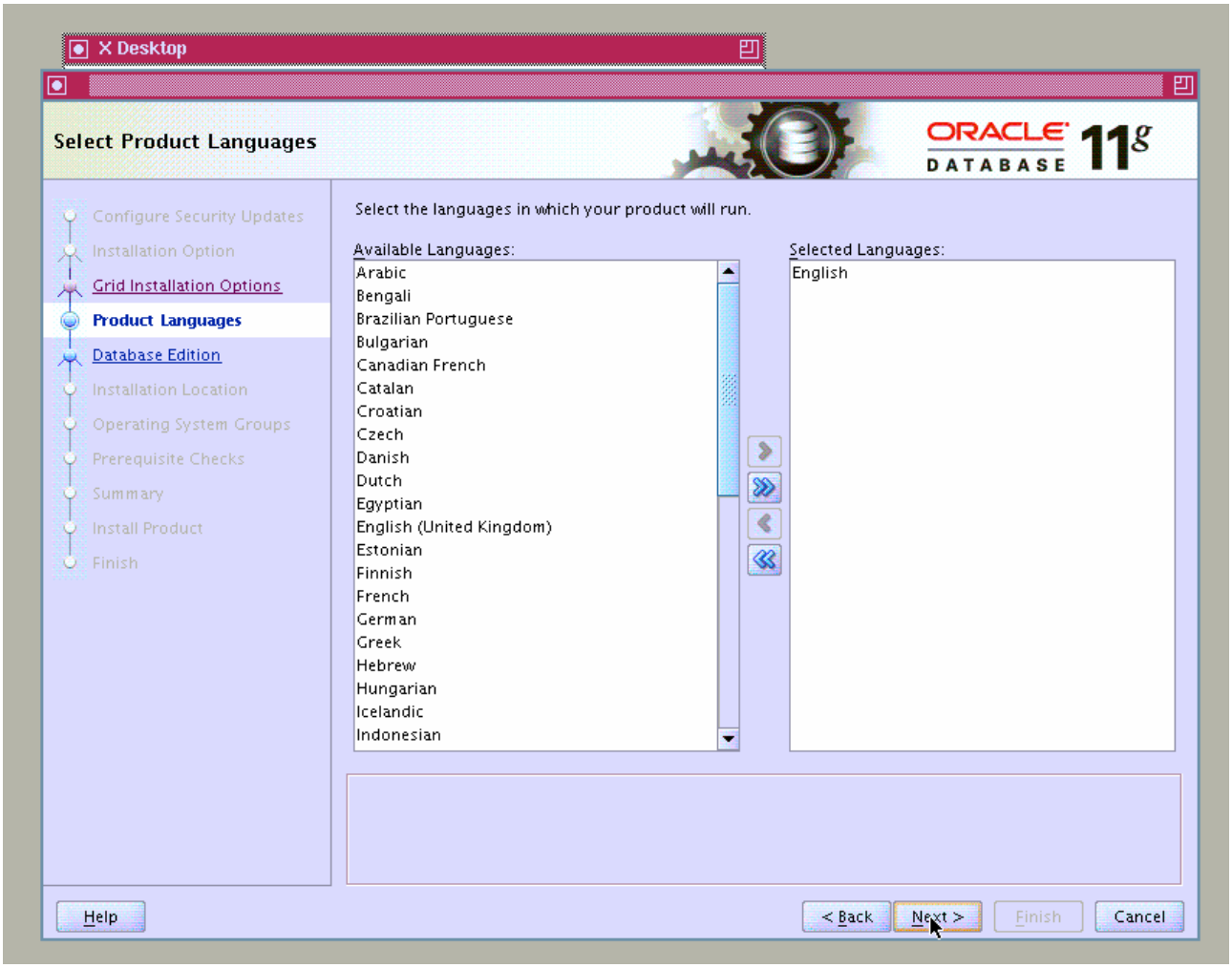
- RDBMS Software Installation Step 2:



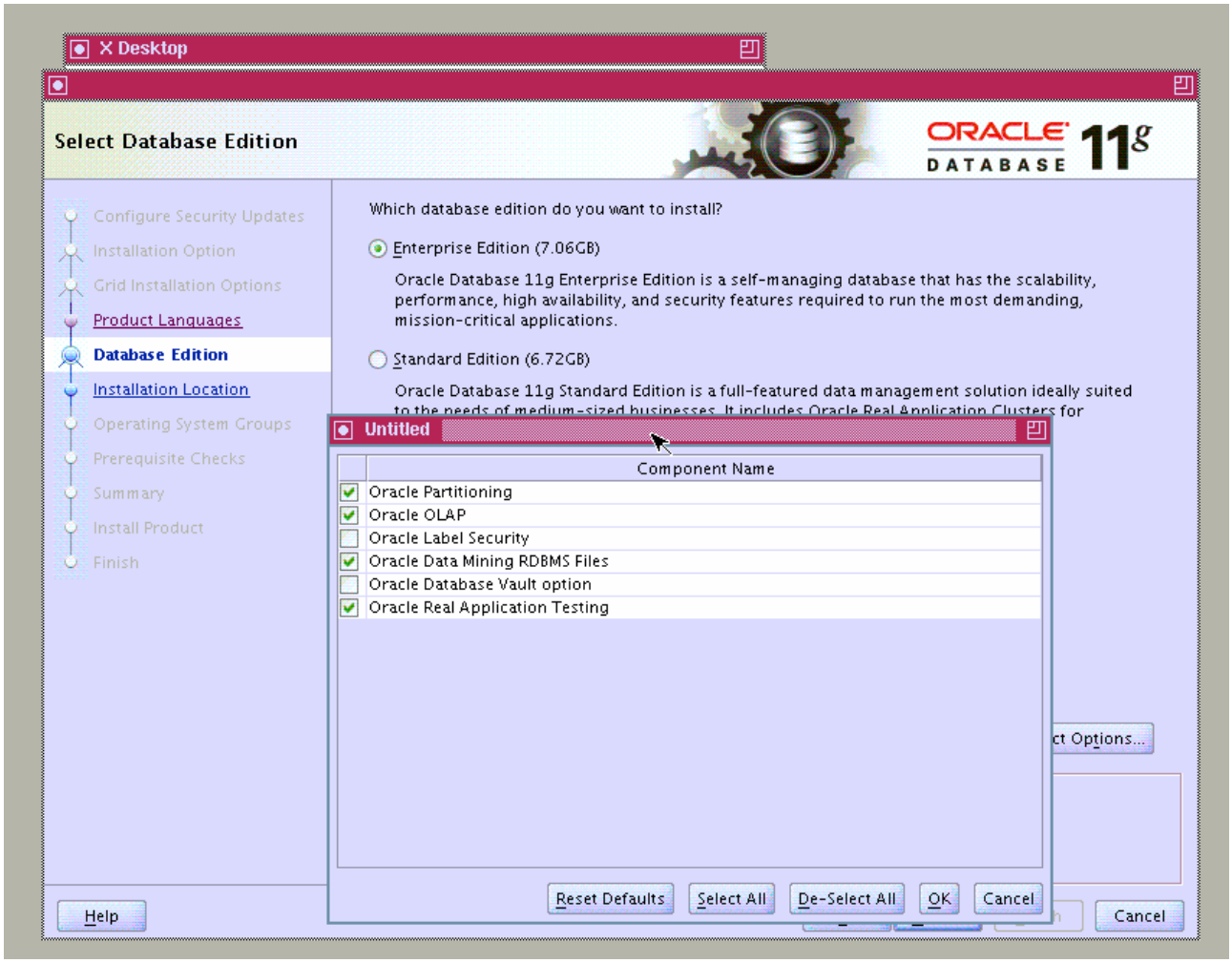
- RDBMS Software Installation Step 3:



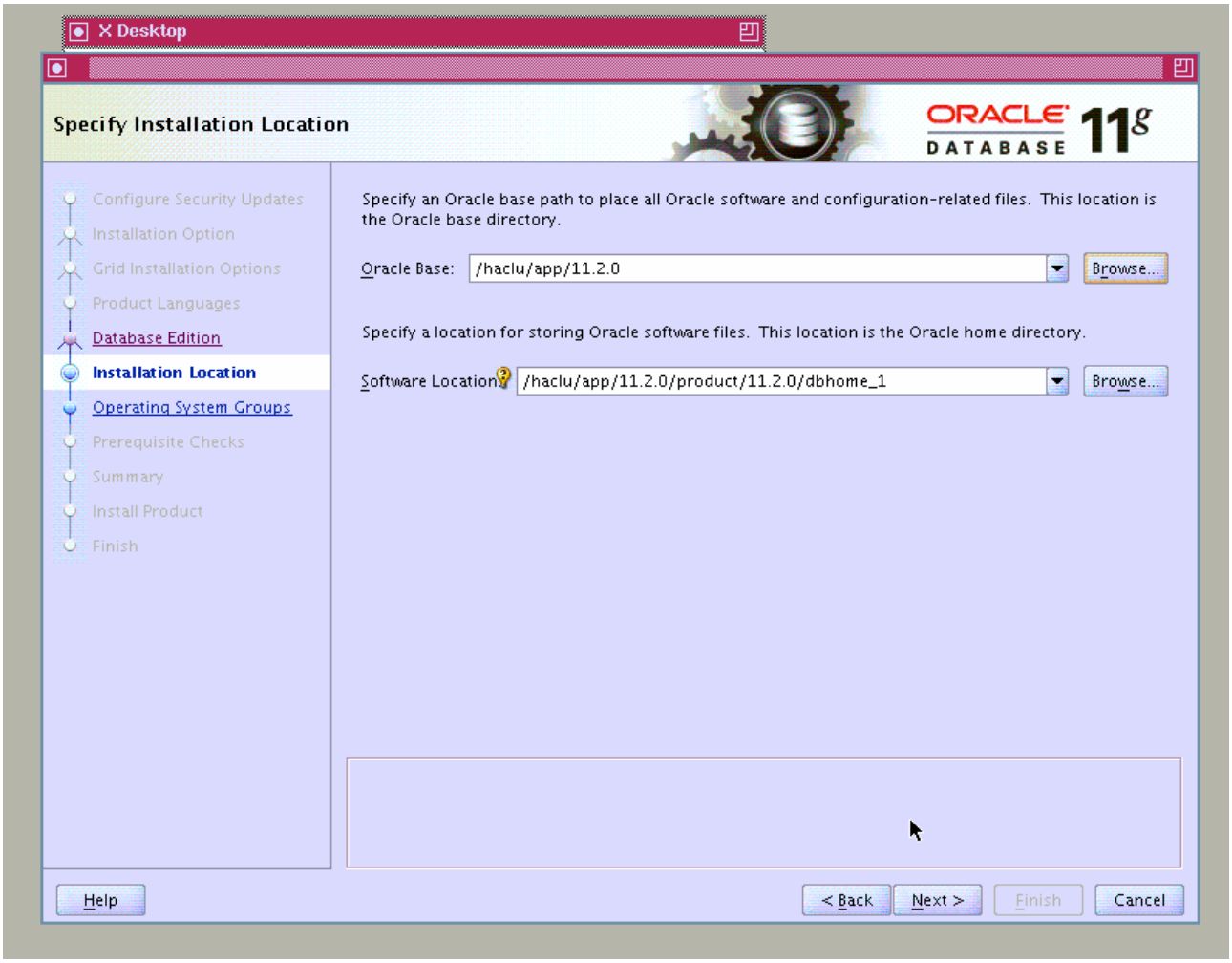
- RDBMS Software Installation Step 4:



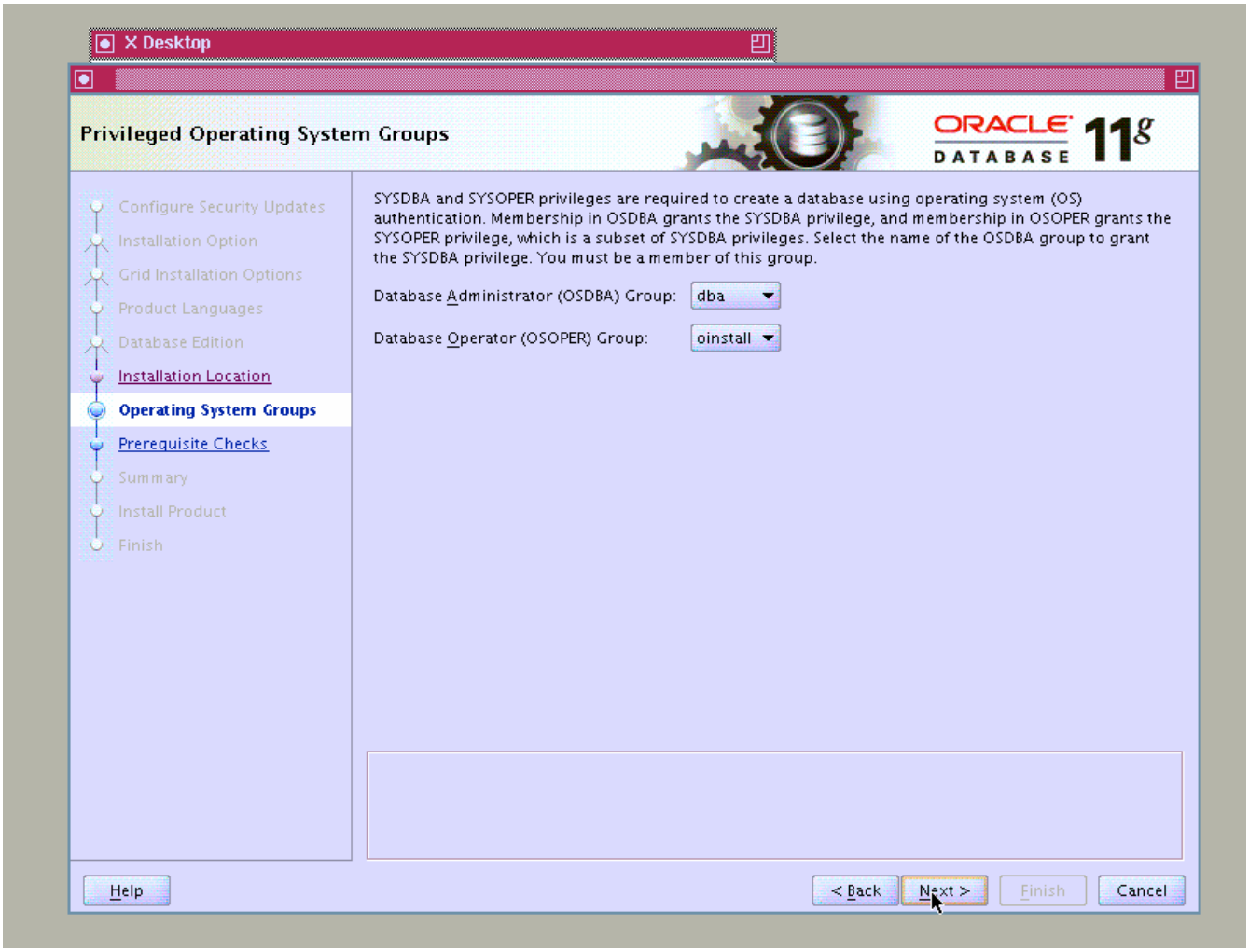
- RDBMS Software Installation Step 5:



- RDBMS Software Installation Step 6 -- The RDBMS ORACLE_HOME is under ORACLE_BASE:

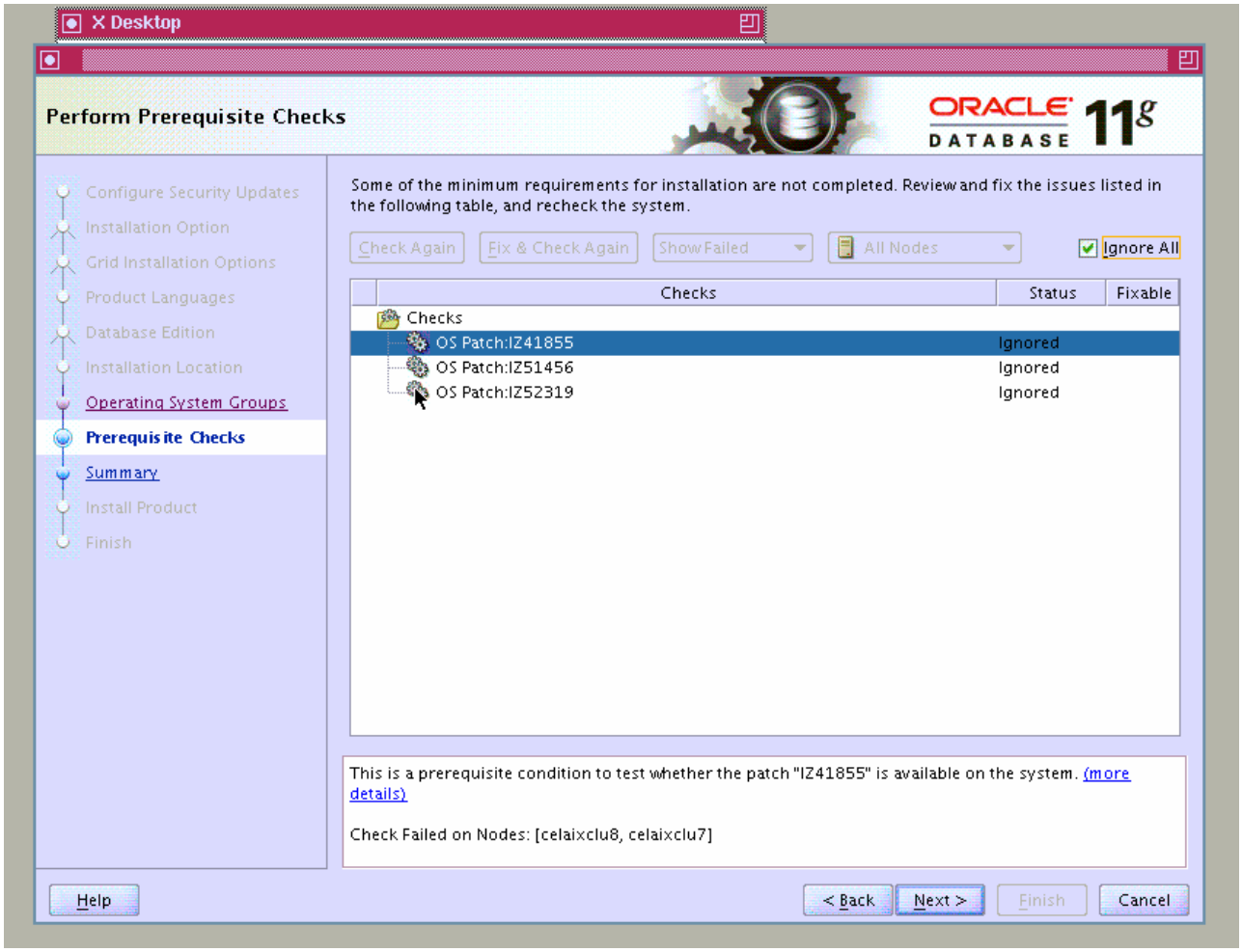


- RDBMS Software Installation Step 7:

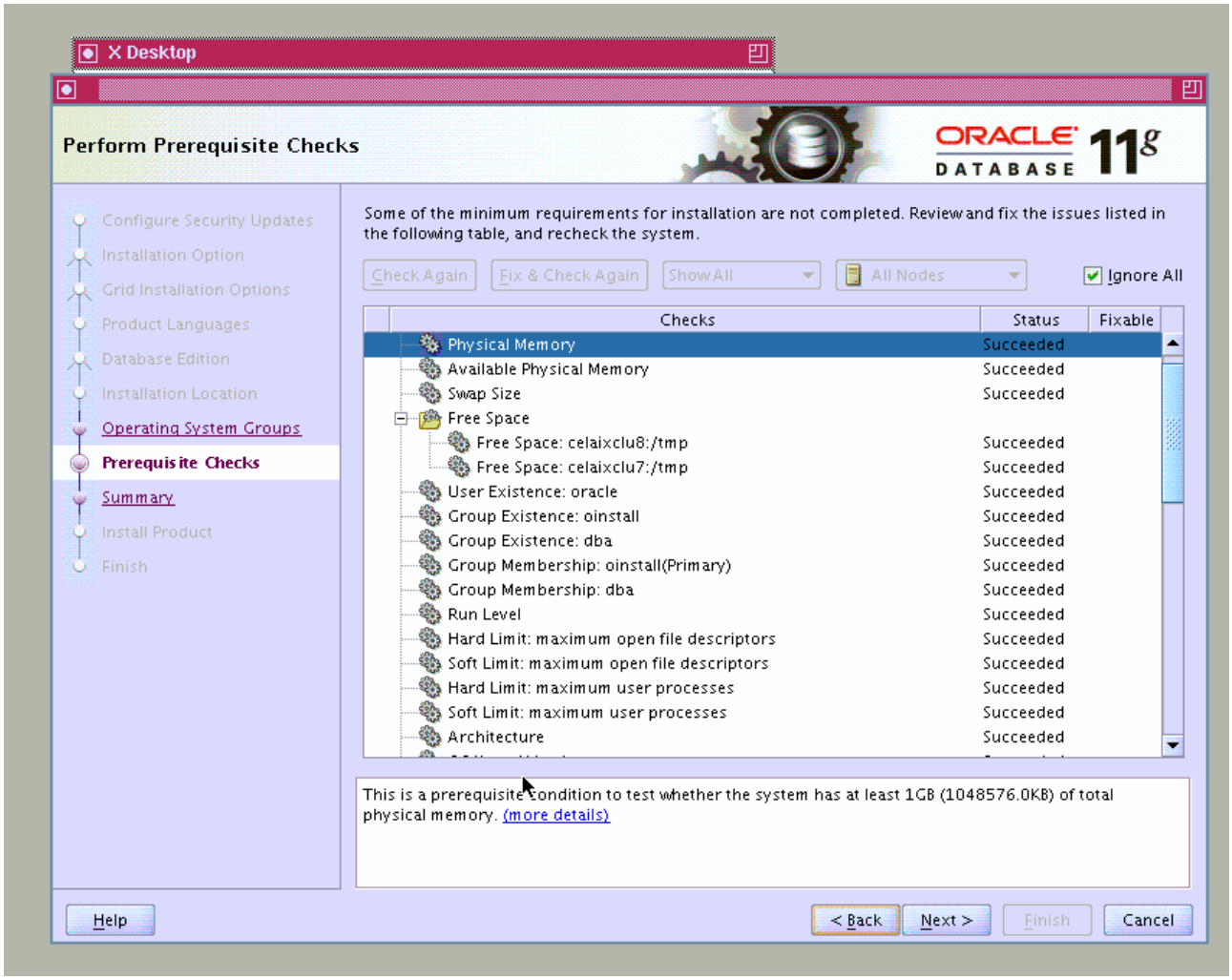


- RDBMS Software Installation Step 8

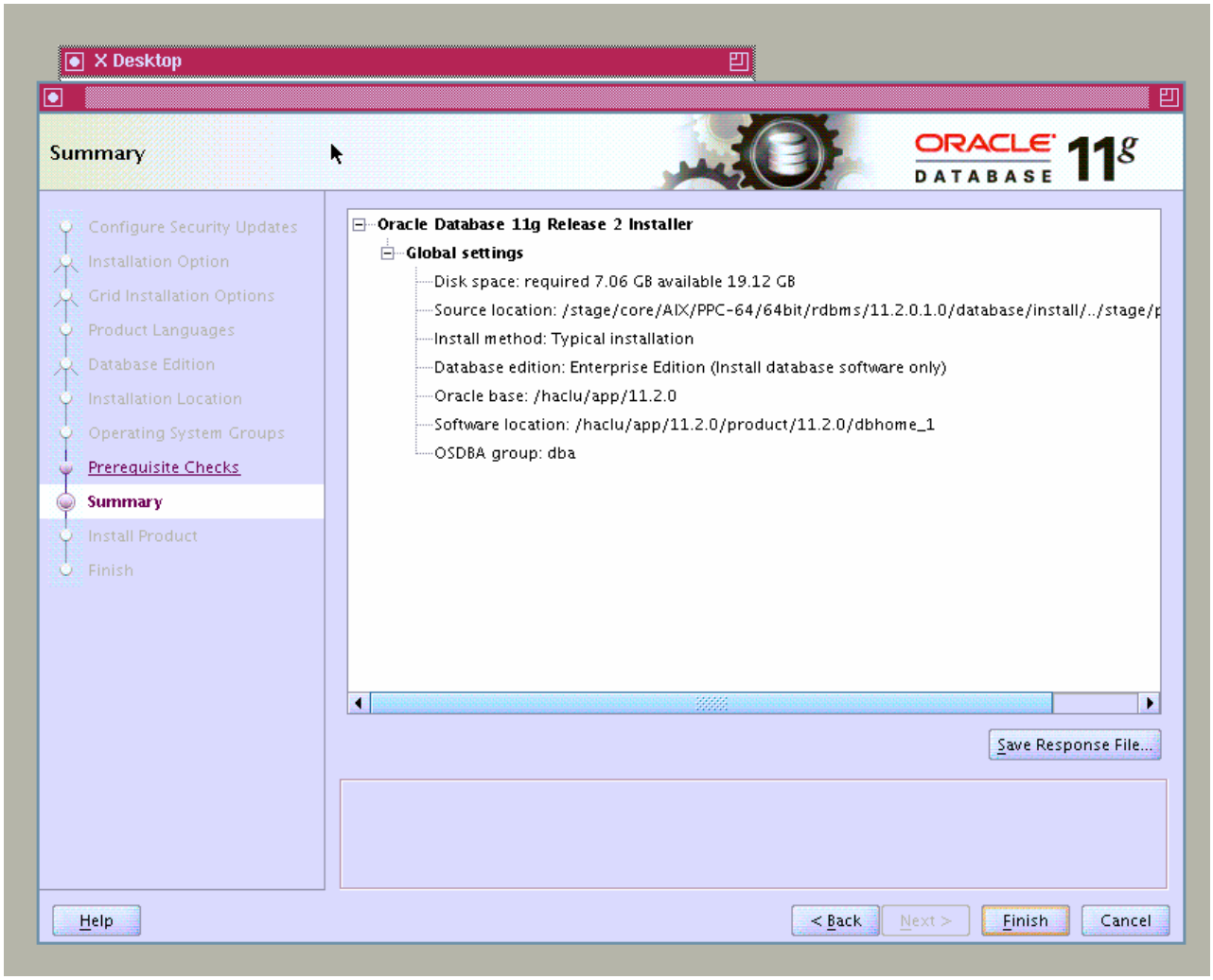
Note: Reference My Oracle Support ExtNote:1083353.1 : '11gR2 OS Requirements APAR Check Failed on AIX 6.1' for information about safely ignoring the required IZ



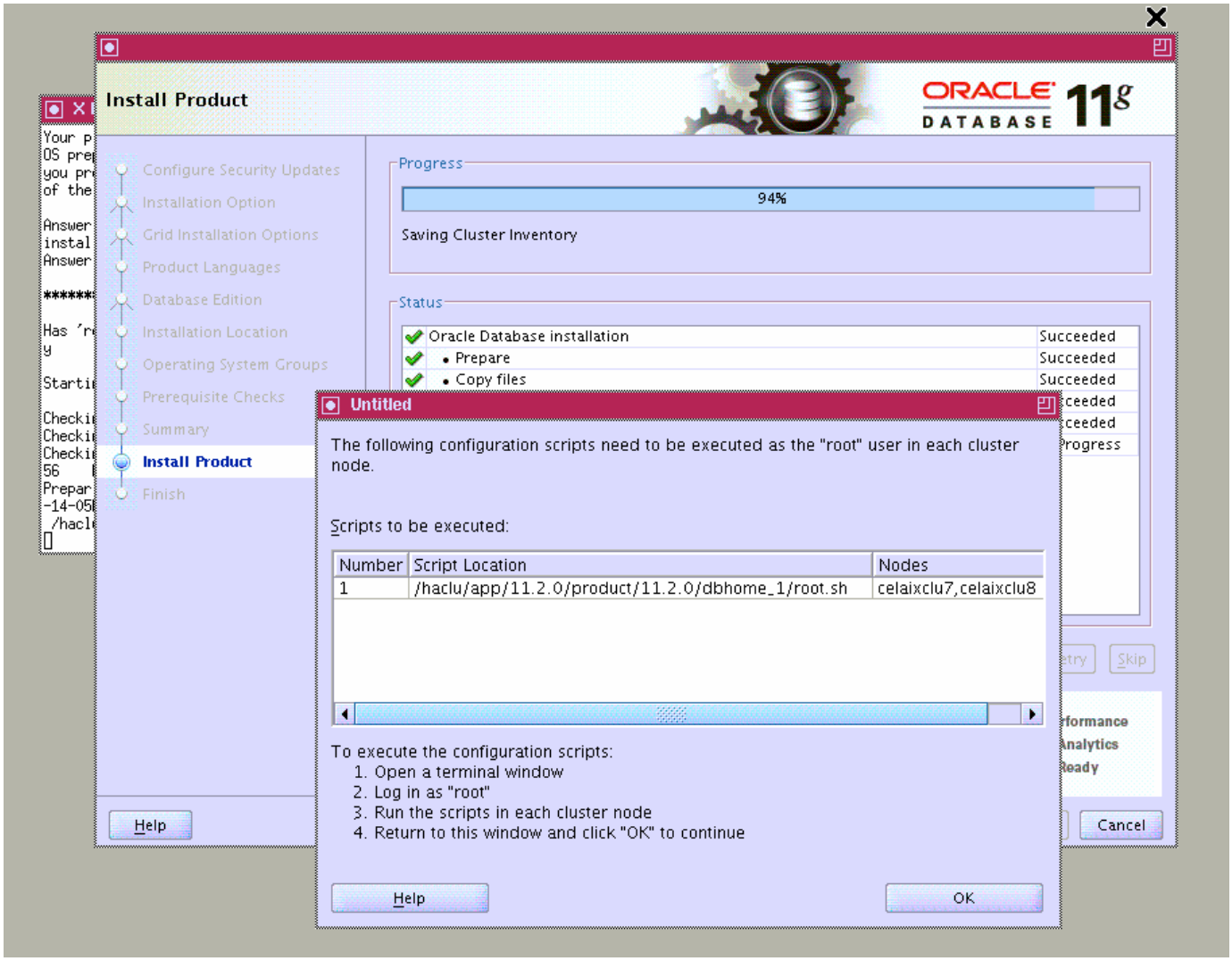
- RDBMS Software Installation Step 9:



- RDBMS Software Installation Step 10:



- RDBMS Software Installation Step 11:



- RDBMS Software Installation Step 12:

Action: Log in to a terminal window as root user and run the root.sh script on the first node. When finished do the same for all other nodes in your cluster as well. When finished click 'OK'

NOTE: root.sh should be run on one node at a time.

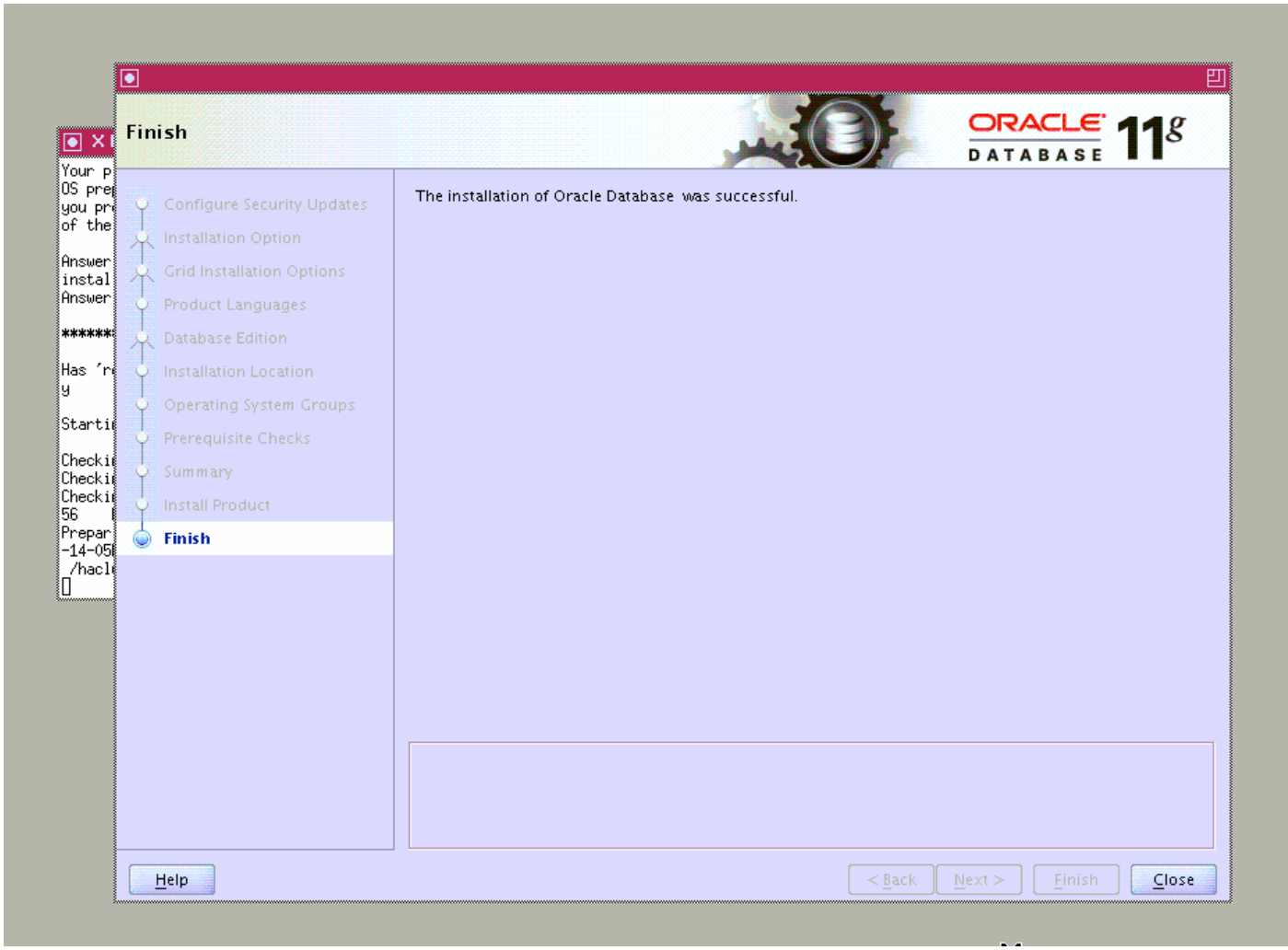
 # ./root.sh
Running Oracle 11g root.sh script...

The following environment variables are set as:
ORACLE_OWNER= oracle
ORACLE_HOME= /haclu/app/11.2.0/product/11.2.0/dbhome_1
Enter the full pathname of the local bin directory: [/usr/local/bin]:
The file "dbhome" already exists in /usr/local/bin. Overwrite it? (y/n) [n]: y
Copying dbhome to /usr/local/bin ...
The file "oraenv" already exists in /usr/local/bin. Overwrite it? (y/n) [n]: y
Copying oraenv to /usr/local/bin ...
The file "coraenv" already exists in /usr/local/bin. Overwrite it? (y/n) [n]: y
Copying coraenv to /usr/local/bin ...

Entries will be added to the /etc/oratab file as needed by
Database Configuration Assistant when a database is created

Finished running generic part of root.sh script.
Now product-specific root actions will be performed.
Finished product-specific root actions.

Action: Click 'Close' to finish the installation of the RDBMS Software.



At this point, the installation and configuration of Oracle RDBMS 11gR2 are complete.

7. RDBMS Home Patching

It is very important to keep current and apply the lastest available Patch Set Update (PSU) patches which are released on a quarterly basis. As of September 2010, the latest available PSU for RDBMS is PSU 2 (11.2.0.1.2), available for download from My Oracle Support under patch number 9654983. Follow the instructions included in the PSU patch README for how to apply the patch and be sure to also reference My Oracle Support ExtNote:854428.1 : 'Patch Set Updates for Oracle Products'

8. Run ASMCA to create diskgroups

We can use ASMCA to create more diskgroups if needed. As the grid user start the ASM Configuration Assistant (ASMCA)

For our example installation, we will use the same "+DATA" diskgroup that we used for OCR and voting disk also for datafiles.

As mentioned earlier, it is a best practice for Oracle 11gR2 to store the OCR and voting disk within ASM and to maintain the ASM best practice of having no more than 2 diskgroups (Flash Recovery Area and Database Area). This means that the OCR and Voting disk will be stored along with the database related files.

If you are utilizing external redundancy for your diskgroups this means that you will have one OCR and one voting disk. If you wish to to utilize Oracle supplied redundancy for the OCR and voting disks you can create a separate (3rd) ASM Diskgroup having a minimum of 2 fail groups (total of 3 disks). This configuration would provide one OCR (which takes on the redundancy of that disk group (mirrored within ASM)) and three voting disks.

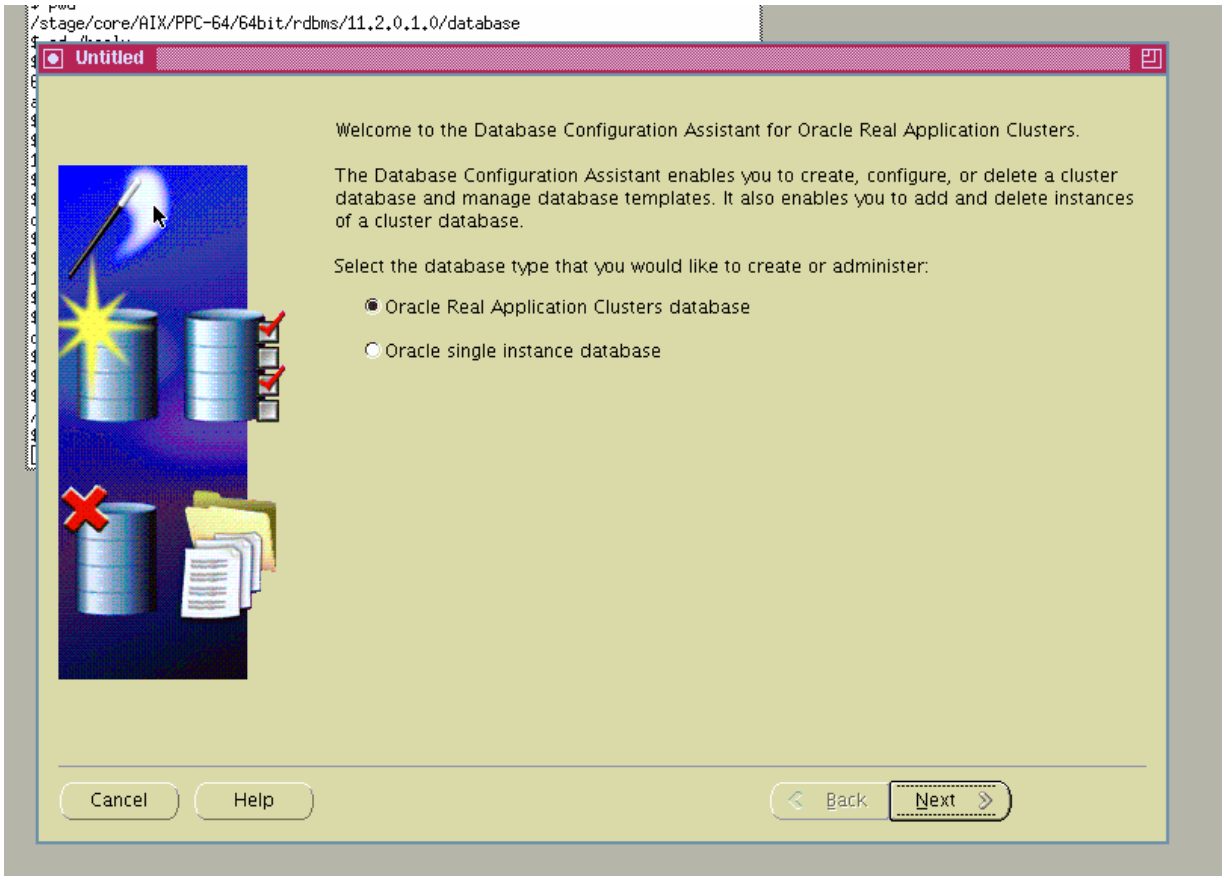
The minimum size of the three disks that make up this normal redundancy diskgroup is 1GB each.

9. Run DBCA to create the database

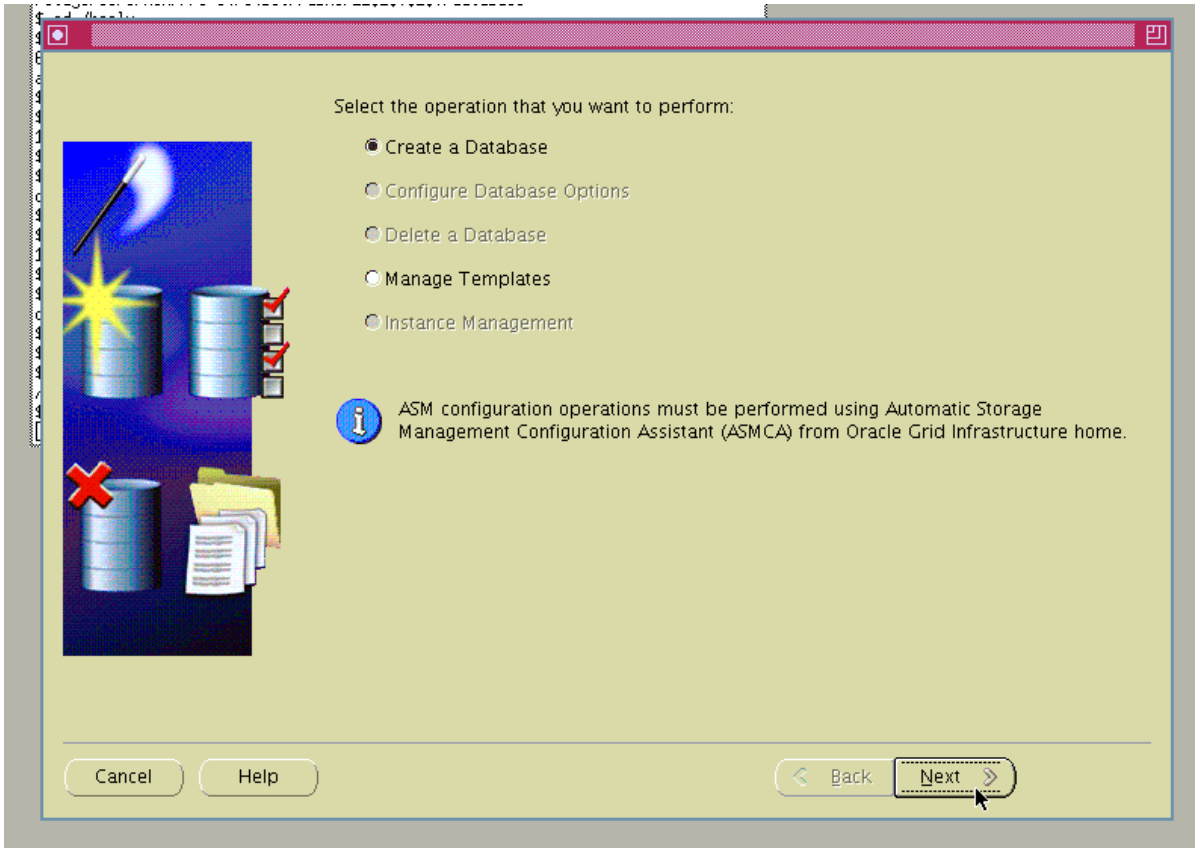
As the oracle user start the Database Configuration Assistant (DBCA)

```
#cd $ORACLE_HOME/bin
#su - oracle
./dbca
```

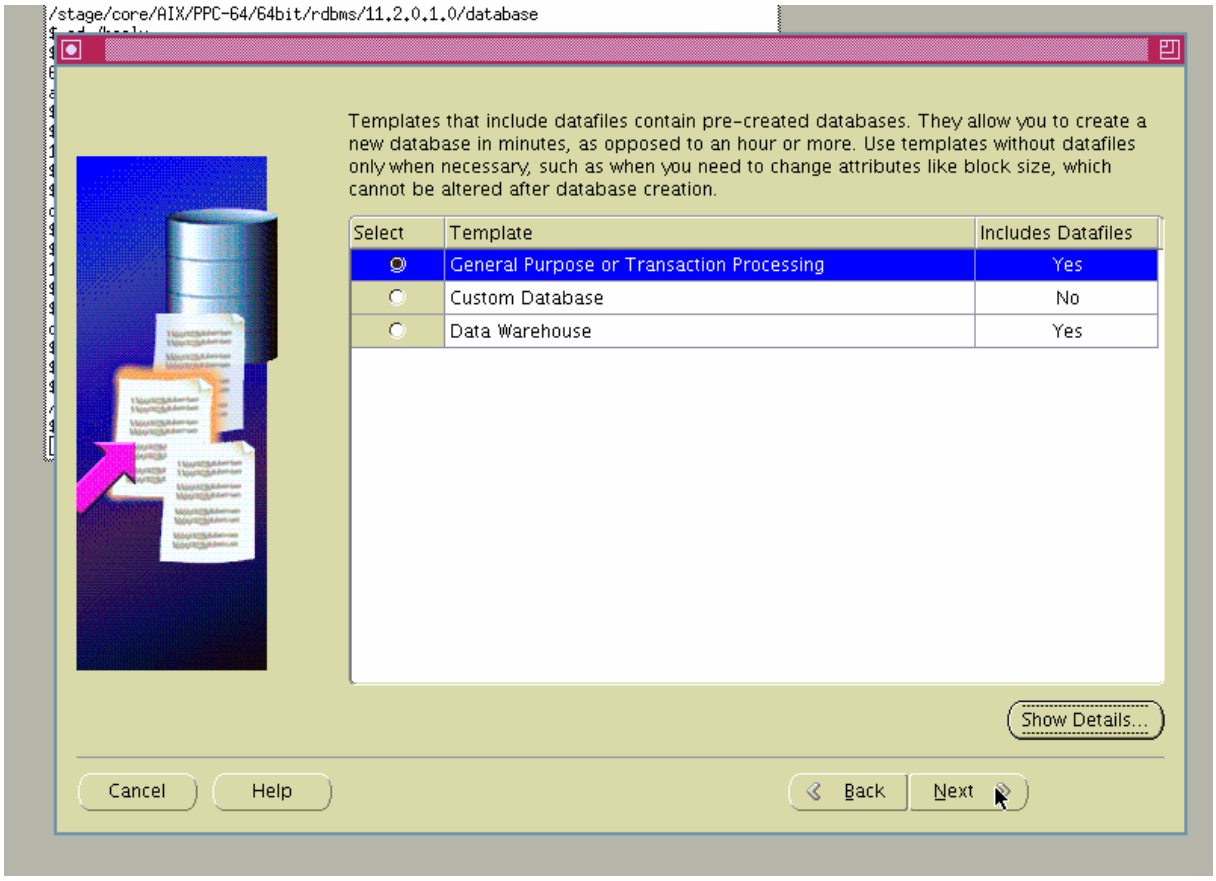
- Using DBCA to Create RAC Database Step 1:



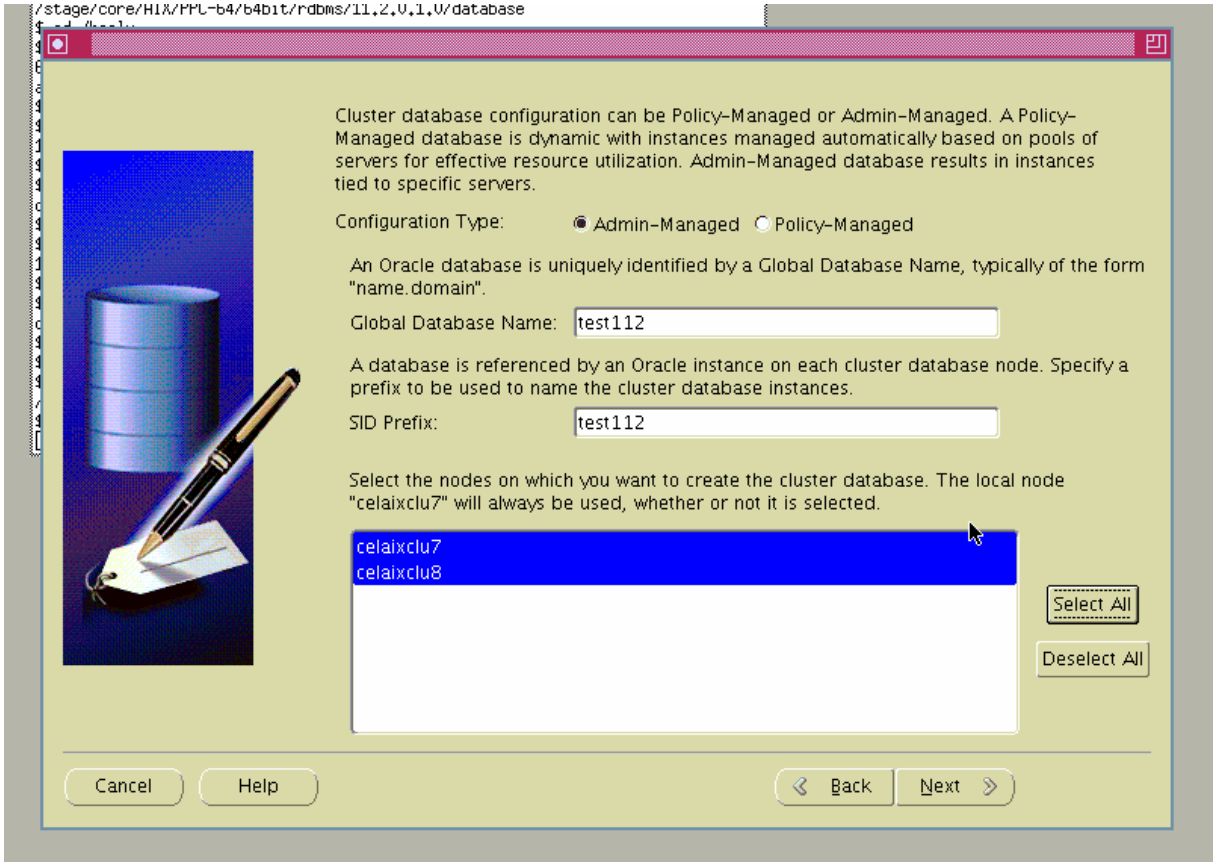
- Using DBCA to Create RAC Database Step 2:



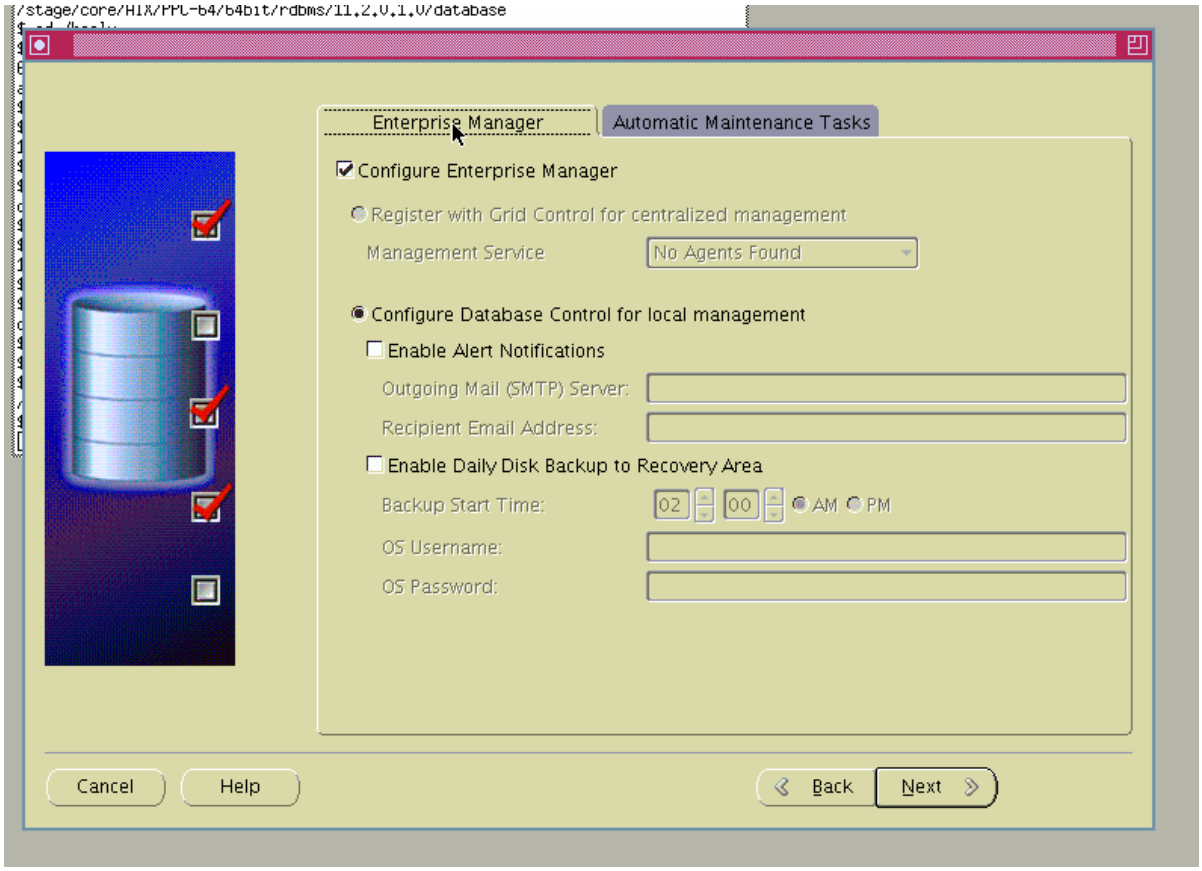
- Using DBCA to Create RAC Database Step 3:



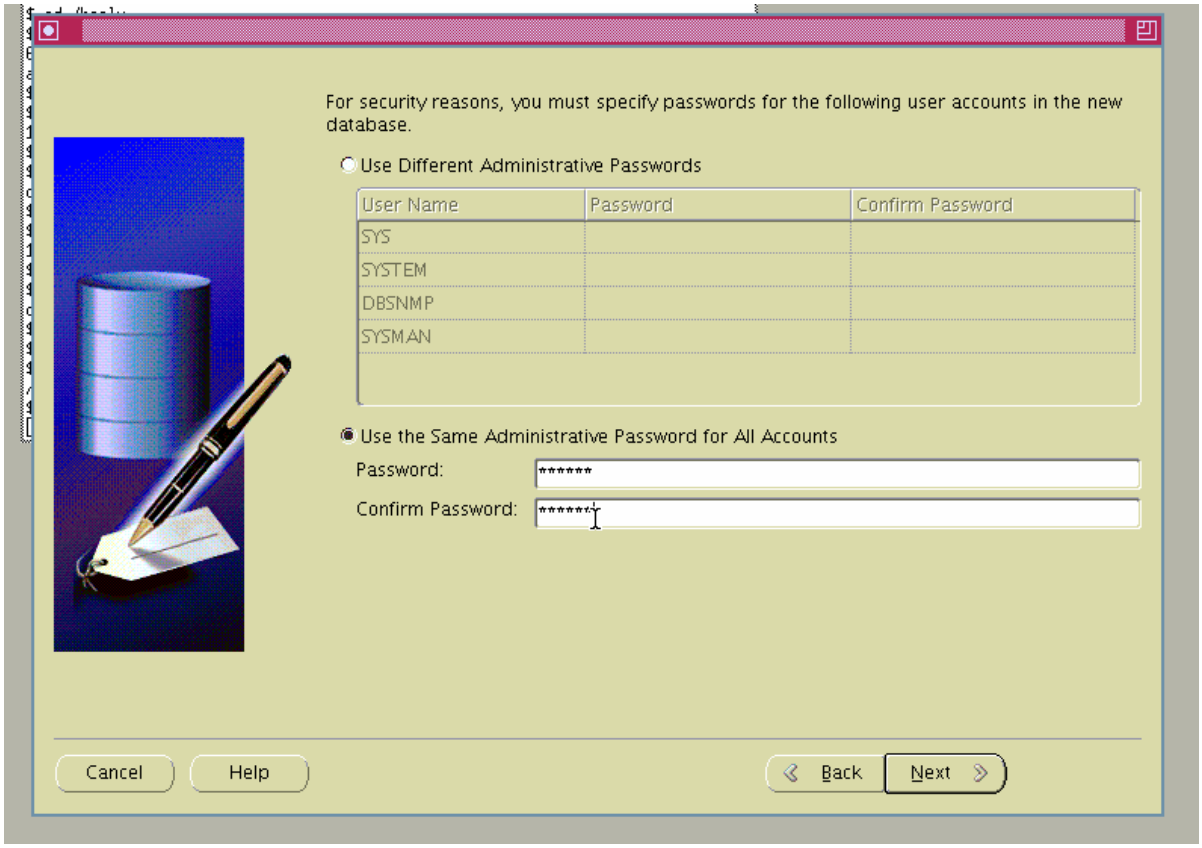
- Using DBCA to Create RAC Database Step 4:



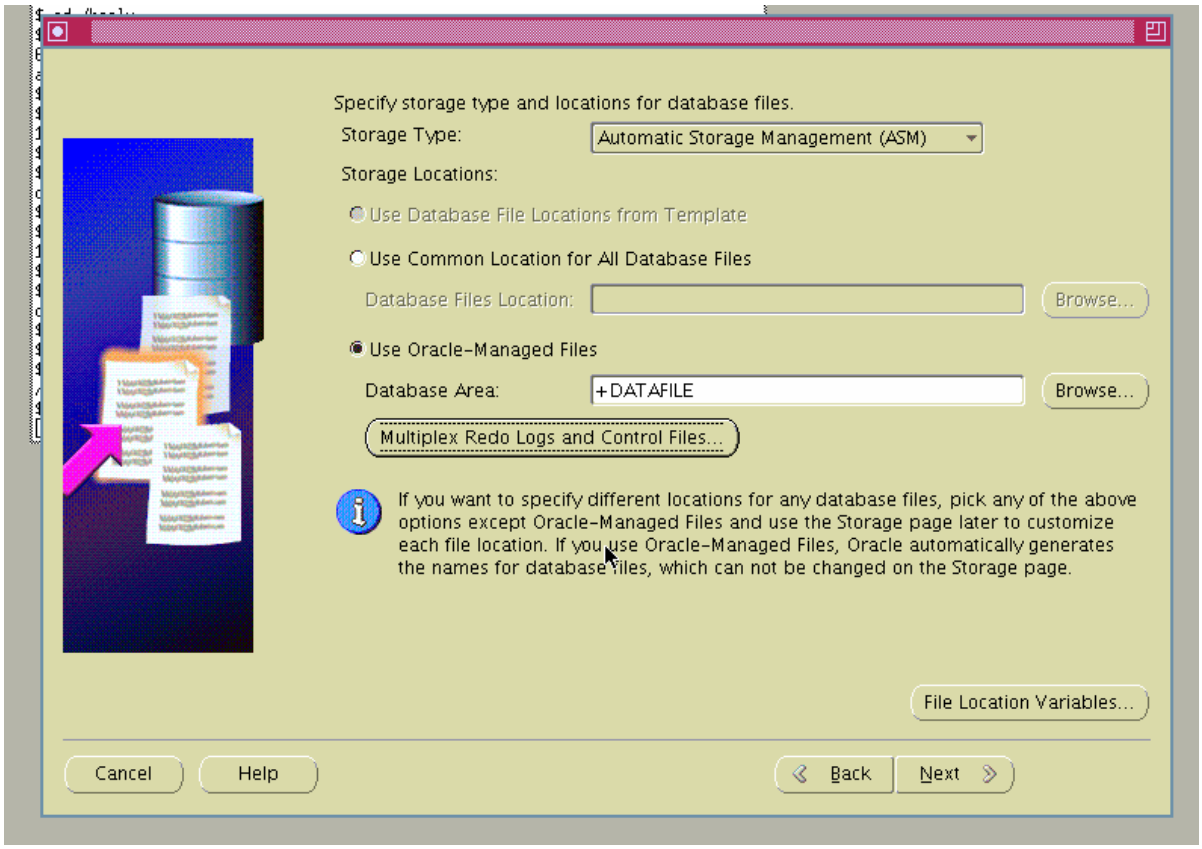
- Using DBCA to Create RAC Database Step 5:



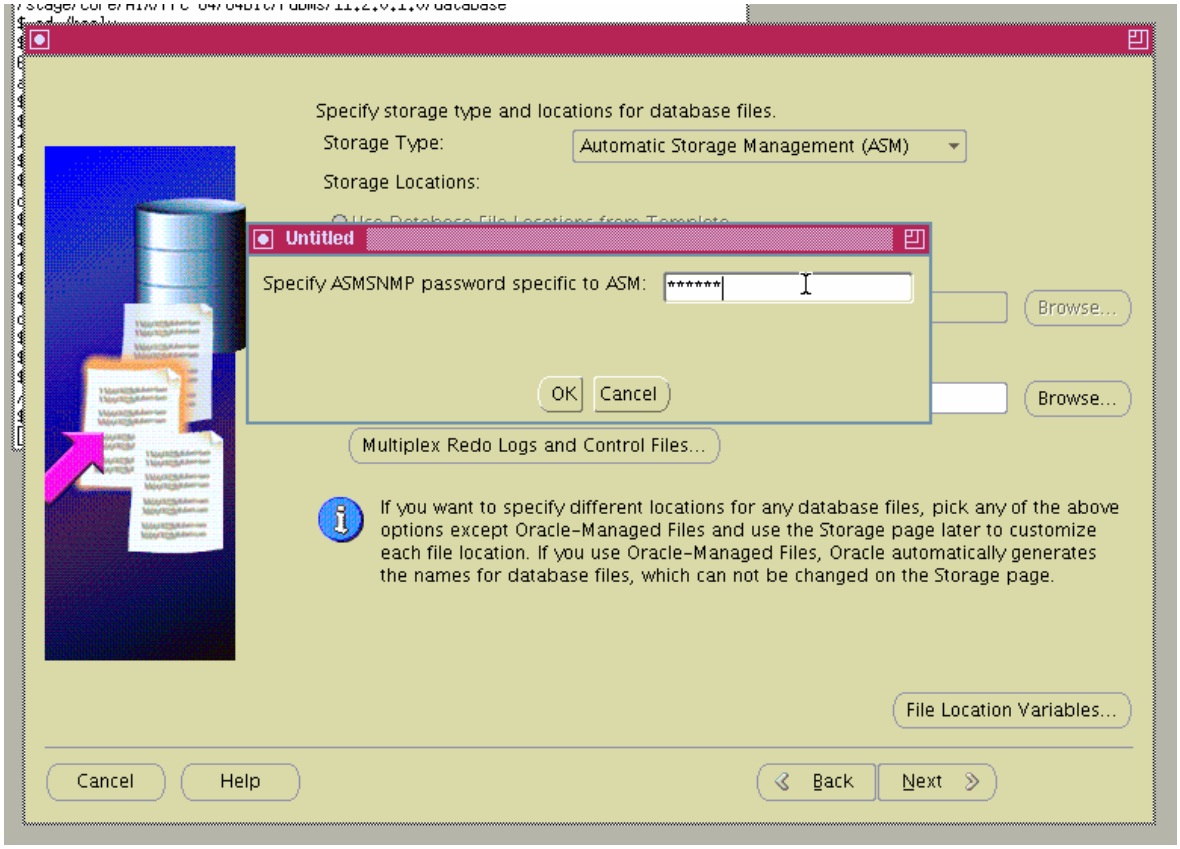
- Using DBCA to Create RAC Database Step 6:



- Using DBCA to Create RAC Database Step 7 - Pick up the ASM Disk Group:

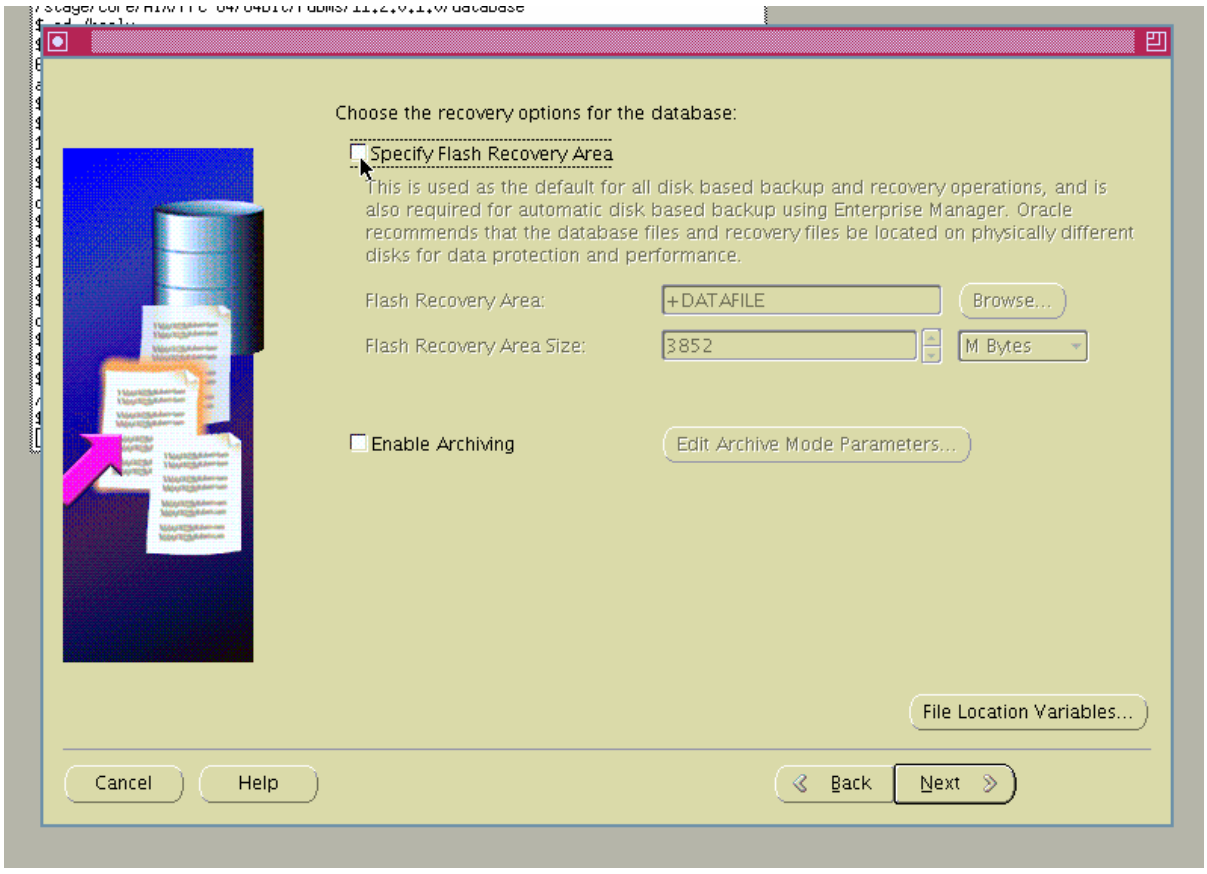


- Using DBCA to Create RAC Database Step 8:

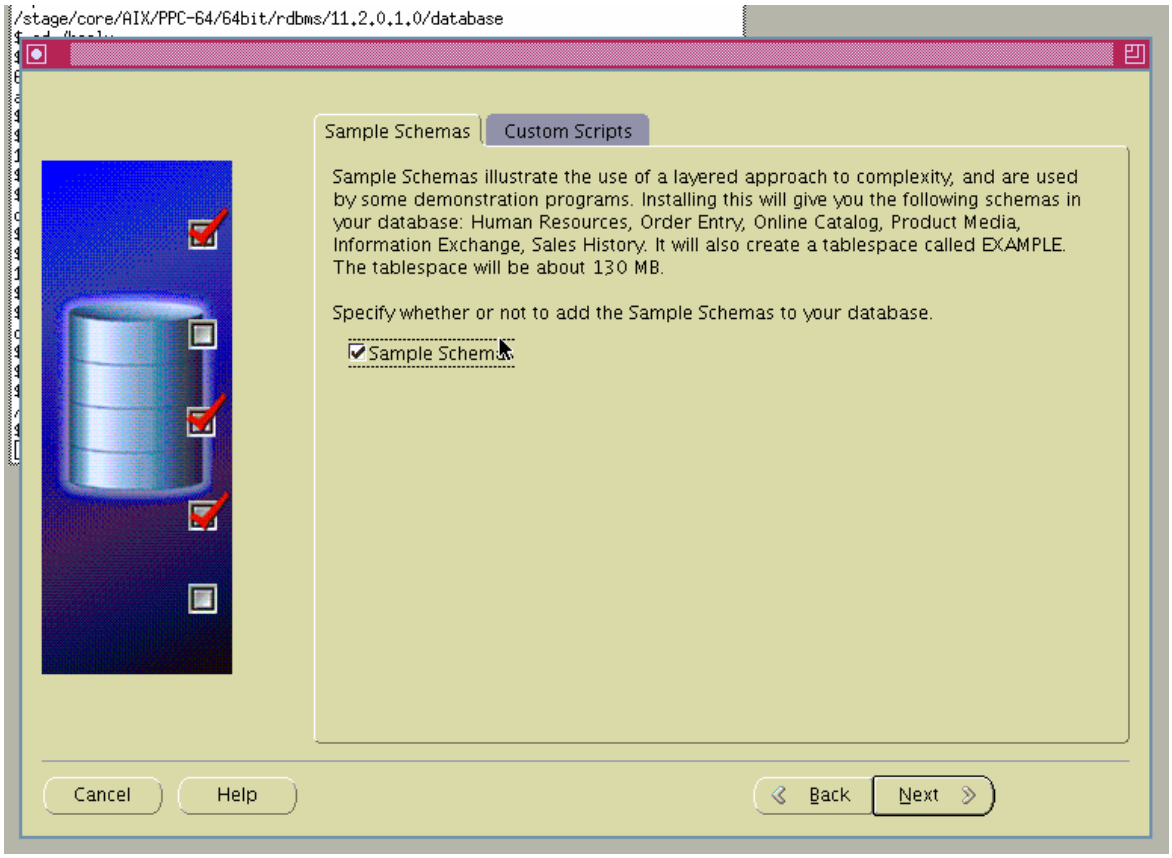


- Using DBCA to Create RAC Database Step 9

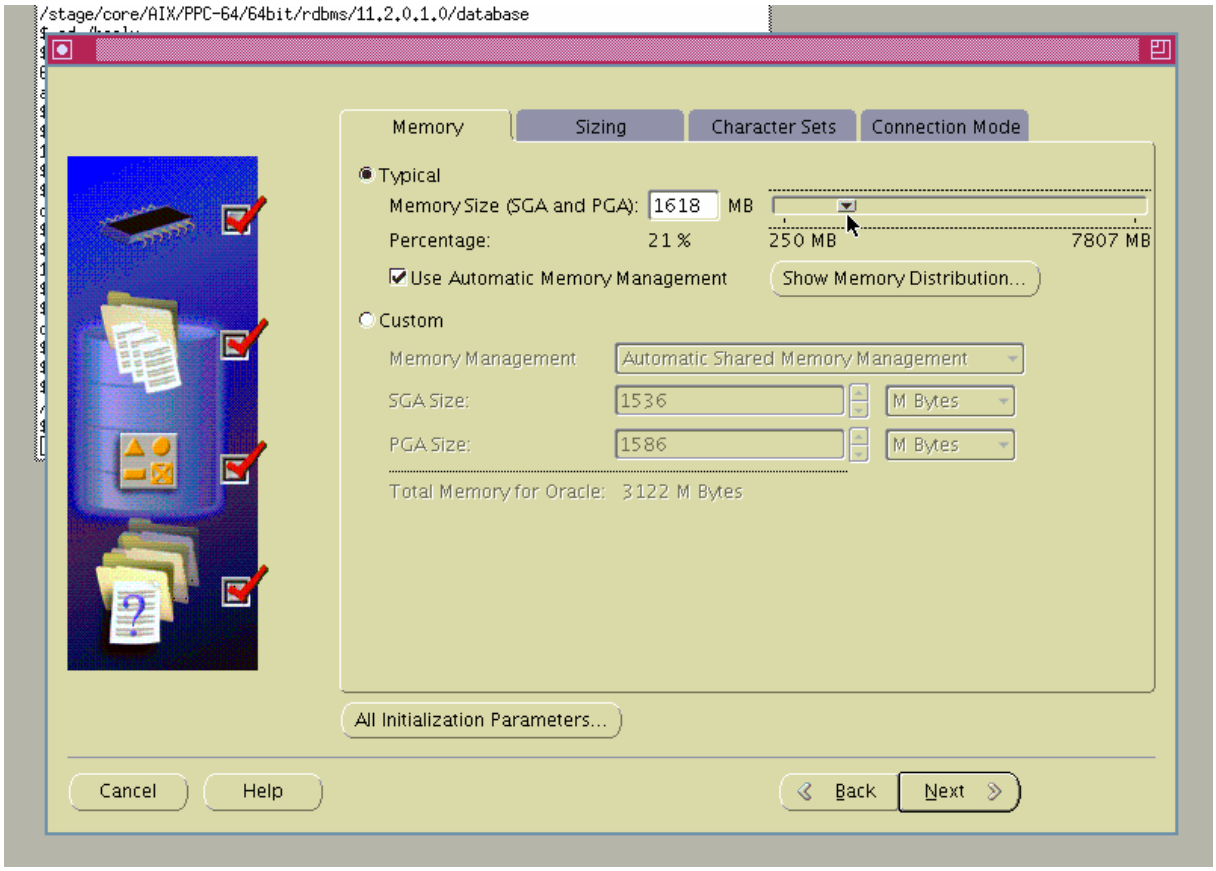
Note: Flash Recovery Area (FRA) is quite important for backup and recovery. We strongly suggest to have a separate ASM diskgroup for FRA



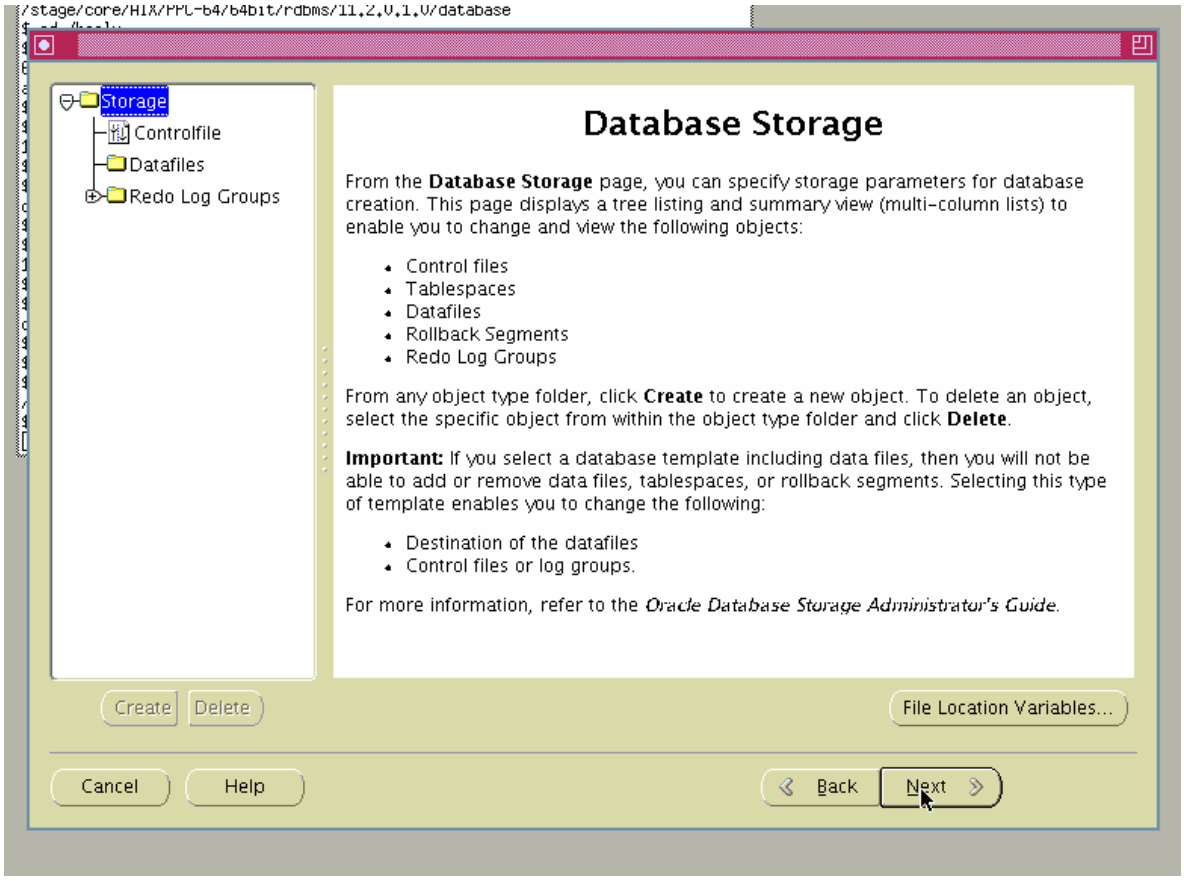
- Using DBCA to Create RAC Database Step 10:



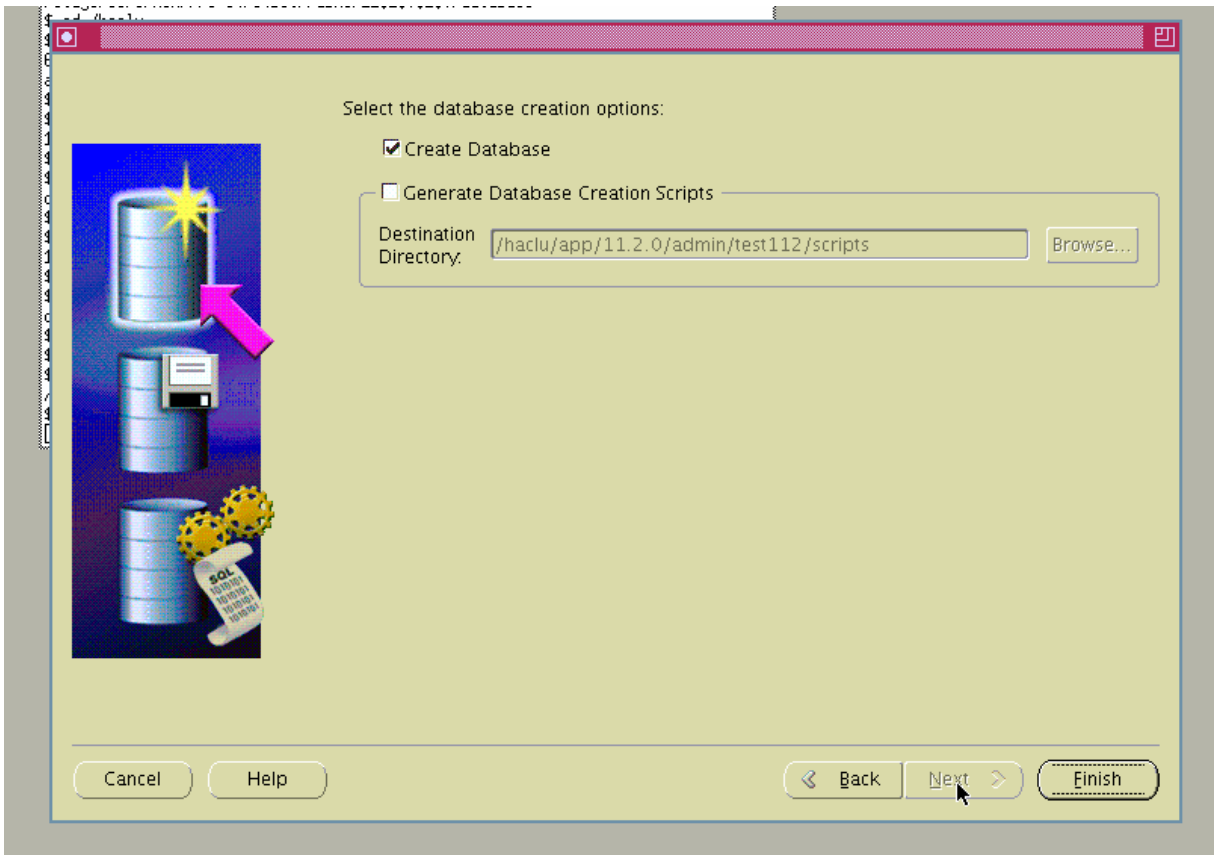
- Using DBCA to Create RAC Database Step 11:



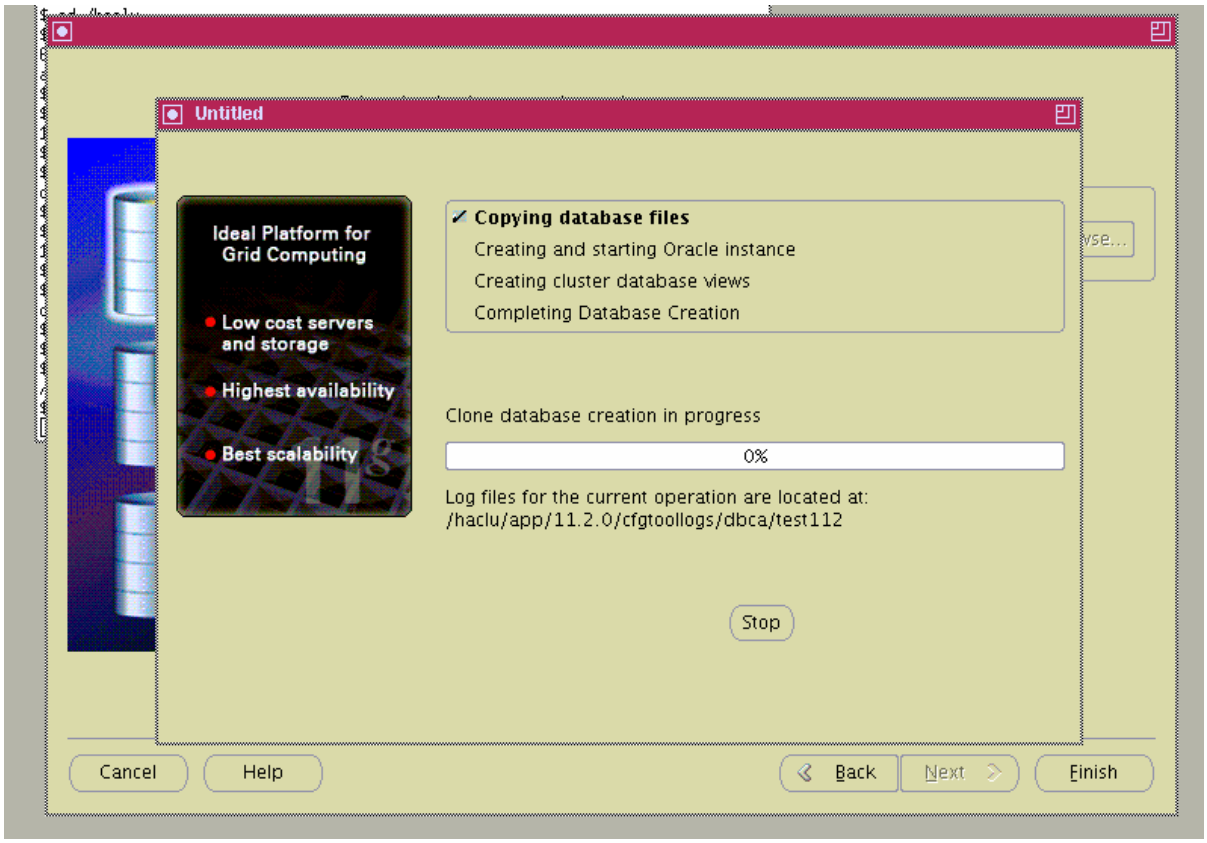
- Using DBCA to Create RAC Database Step 12:



- Using DBCA to Create RAC Database Step 13:

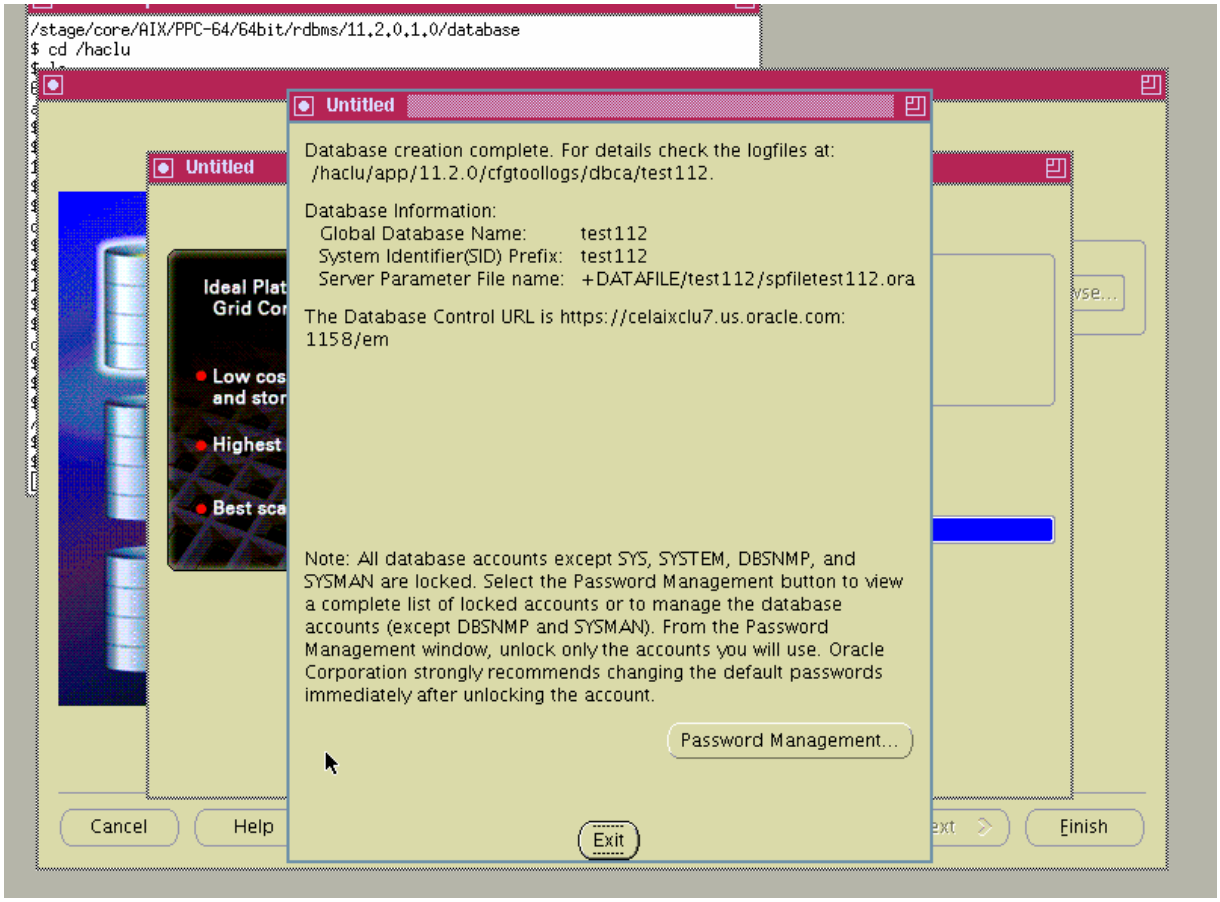


- Using DBCA to Create RAC Database Step 14:



Action: The database is now created, you can either change or unlock your passwords or just click Exit to finish the database creation.

- Using DBCA to Create RAC Database Step 15:


/stage/core/AIX/PPC-64/64bit/rdbms/11.2.0.1.0/database
$ cd /haclu
Untitled
Untitled
Database creation complete. For details check the logfiles at:
/haclu/app/11.2.0/cfgtoollogs/dbca/test112.
Database Information:
Global Database Name: test112
System Identifier(SID) Prefix: test112
Server Parameter File name: +DATAFILE/test112/spfiletest112.ora
The Database Control URL is https://celaixclu7.us.oracle.com:1158/em
Note: All database accounts except SYS, SYSTEM, DBSNMP, and SYSMAN are locked. Select the Password Management button to view a complete list of locked accounts or to manage the database accounts (except DBSNMP and SYSMAN). From the Password Management window, unlock only the accounts you will use. Oracle Corporation strongly recommends changing the default passwords immediately after unlocking the account.
Password Management...
Exit
Cancel
Help
Finish