

**Oracle RAC 11.2.0.4.0 on SUSE Linux
Enterprise Server 12 - x86_64**



Table of Contents

Introduction.....	3
Hardware and Software Requirements.....	3
Hardware Requirements.....	3
Software Requirements.....	3
Testing 4-node cluster information.....	3
Prerequisites.....	4
Install SUSE Linux Enterprise Server 12 on each cluster node.....	4
Network configuration for Oracle RAC install.....	4
Oracle RAC Installation.....	5
Installing Oracle Grid Infrastructure.....	5
Installing Oracle Database.....	30
Additional Comments	61

Introduction

This documentation provides the details for install Oracle RAC 11.2.0.4.0 on SUSE Linux Enterprise Server 12 OS. Here, x86_64 version of both Oracle Database 11gR2 Enterprise and SUSE Linux Enterprise Server is used. Similar steps applies to other platforms(x86, ia64, etc.). If you encounter any problem or have general question, please post your query to suse-oracle@listx.novell.com.

The oracle official product documentation available at: <http://docs.oracle.com/en/>

Hardware and Software Requirements

Hardware Requirements

Requirement	Minimum
RAM	32 GB
Swap space	Approx. twice the size of RAM
Disk space in /tmp	8 GB
Disk space for software files	8 GB
Disk space for database files	8 GB

Software Requirements

SuSE

- SUSE Linux Enterprise Server 12 SP1 (x86_64)
(<http://download.suse.de/install>)

Oracle

- Oracle Database 11g Release 2 (11.2.0.4.0) x86_64
(<http://www.oracle.com/technetwork/indexes/downloads/index.html#database>)

Testing 4-node cluster information

HP DL360 Gen9 Server (Intel Xeon 2x12 core ~ 48 CPU), 64GB RAM
4 NIC per server (two bonded as active/passive) + Static IP Address
Local HDD (500 GB)
Three shared SAN Partition (ASM: 30GB & NFS:400 GB, Other:600GB)
SUSE Linux Enterprise Server 12 SP1 (x86_64)
Kernel version: 3.12.49-11-default

Prerequisites

1. Install SUSE Linux Enterprise Server 12 on each cluster node.

Follow the SUSE official document (URL:<https://www.suse.com/documentation/sles-12/>) to Install SLES 12 (x86_64) on each node in the cluster.

2. Network configuration for Oracle RAC installation as follows:

#Private:

10.1.1.1	c2n1-priv
10.1.1.2	c2n2-priv
10.1.1.3	c2n3-priv
10.1.1.4	c2n4-priv

#Public:

137.65.135.72	c2n1.provo.novell.com	c2n1
137.65.135.73	c2n2.provo.novell.com	c2n2
137.65.135.74	c2n3.provo.novell.com	c2n3
137.65.135.75	c2n4.provo.novell.com	c2n4

Virtual

137.65.135.76	c2n1-vip	c2n1-vip.provo.novell.com
137.65.135.77	c2n2-vip	c2n2-vip.provo.novell.com
137.65.135.78	c2n3-vip	c2n3-vip.provo.novell.com
137.65.135.79	c2n4-vip	c2n4-vip.provo.novell.com

#SCAN:

c2-scan.provo.novell.com (137.65.135.87)
c2-scan.provo.novell.com (137.65.135.148)
c2-scan.provo.novell.com (137.65.135.149)

Oracle RAC Installation

1. Installing Oracle Grid Infrastructure.

1-1. Login to the SLES 12 64-bit OS as a non-admin user. Download the Oracle Database 11g Release 2 Grid Infrastructure (11.2.0.4.0) for Linux x86-64.

1-2. Extract grid.zip and run the installer './runInstaller' from Grid ShipHome.

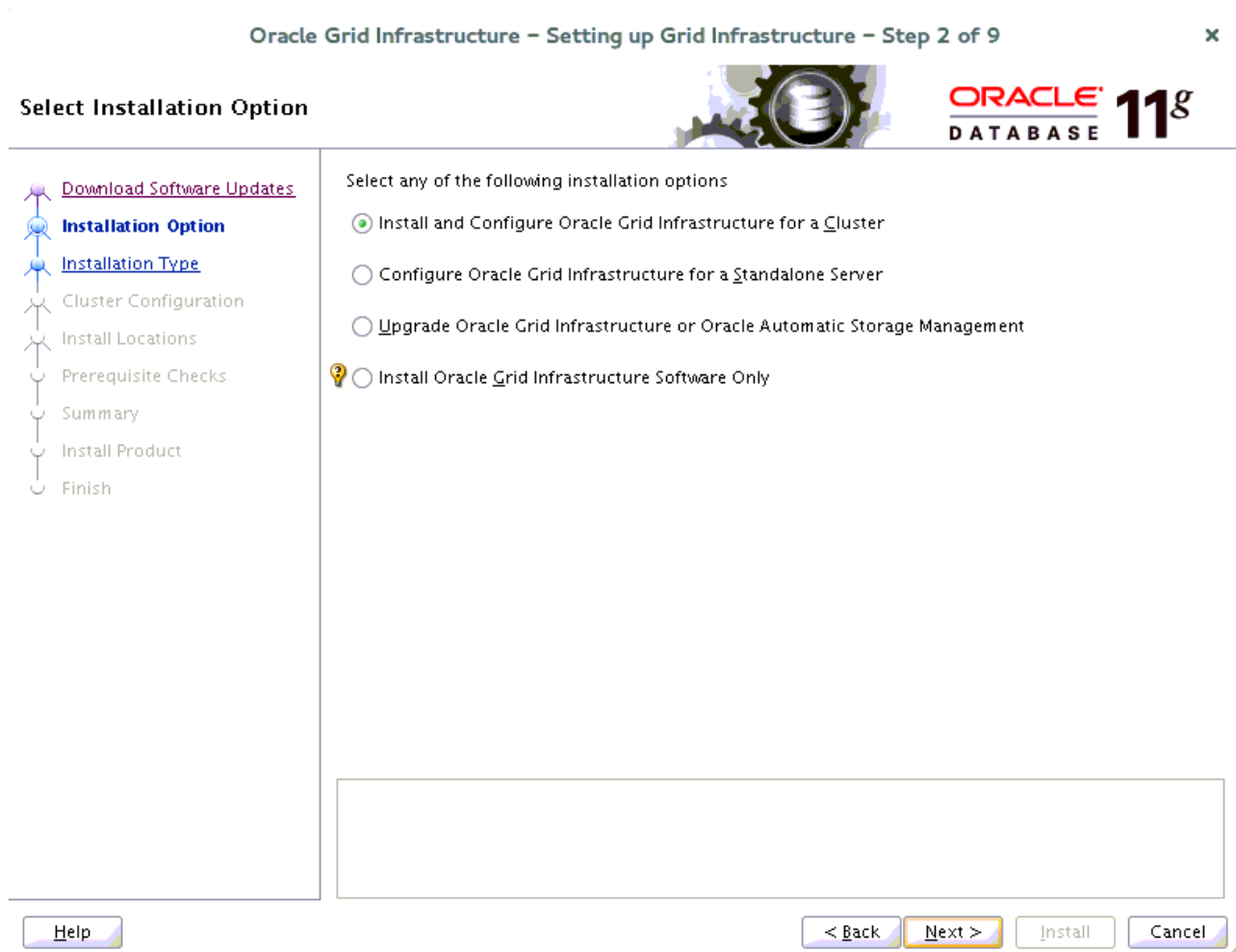
Install Flow:

1). Download Software Updates.

The screenshot shows the Oracle Grid Infrastructure installer window titled "Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 1 of 10". The window has a sidebar on the left with a tree view of installation steps: "Download Software Updates" (selected), "Apply Software Updates", "Installation Option", "Installation Type", "Cluster Configuration", "Install Locations", "Prerequisite Checks", "Summary", "Install Product", and "Finish". The main area is titled "Download Software Updates" and contains the following text: "Download software updates for this installation. Software updates consist of recommended updates to the installer system requirement checks, PatchSet Updates (PSUs), and other recommended patches." Below this, it says "Select one of the following options:" and lists three radio button options: "Use My Oracle Support credentials for download" (with input fields for "My Oracle Support user name:" and "My Oracle Support password:" and buttons for "Proxy Settings..." and "Test Connection"), "Use pre-downloaded software updates" (with a "Location:" input field and a "Browse..." button), and "Skip software updates" (which is highlighted with a yellow box and a lightbulb icon). At the bottom of the window, there are buttons for "Help", "< Back", "Next >", "Install", and "Cancel".

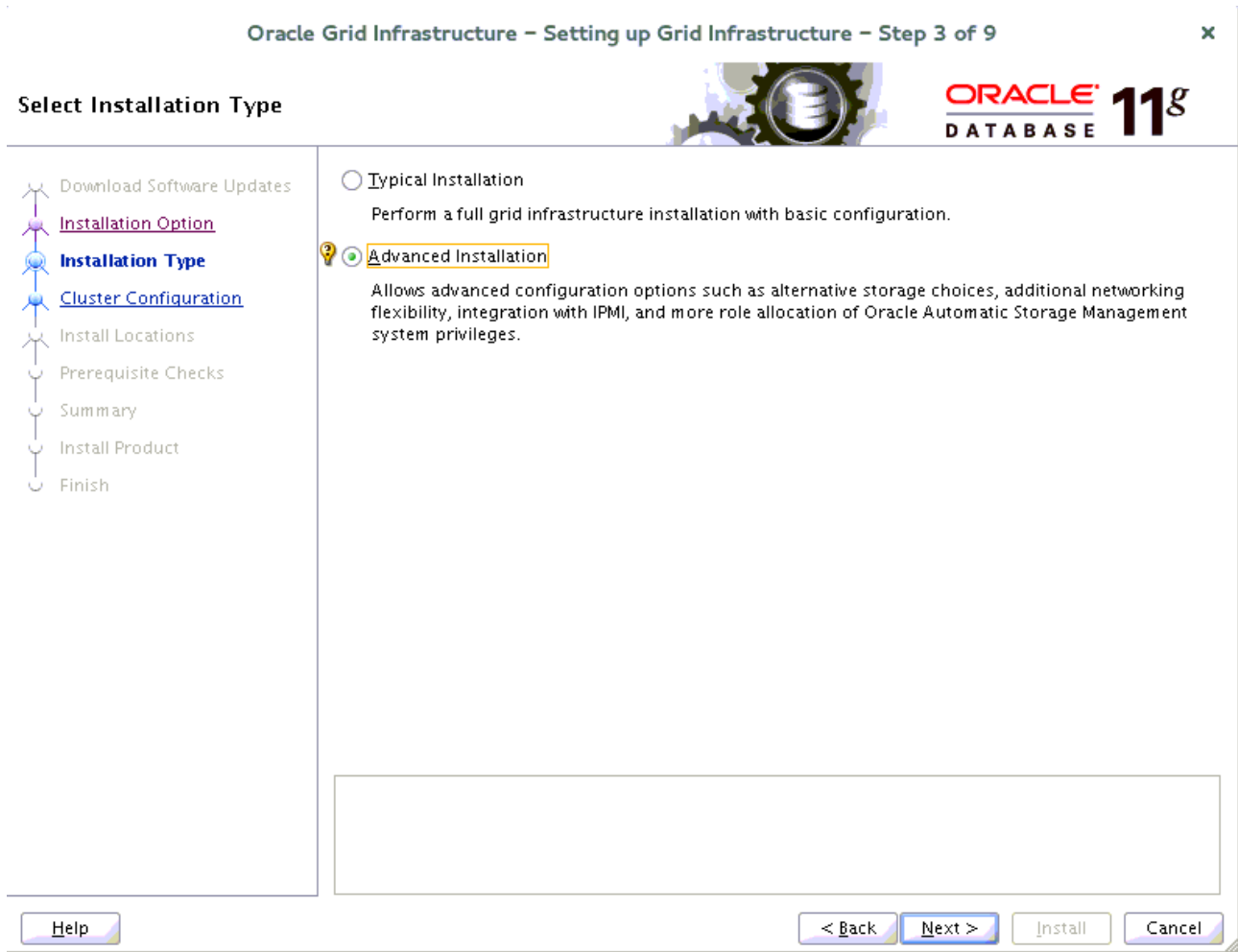
Select one of the options, then click **Next** to continue.

2). Select Installation Option.



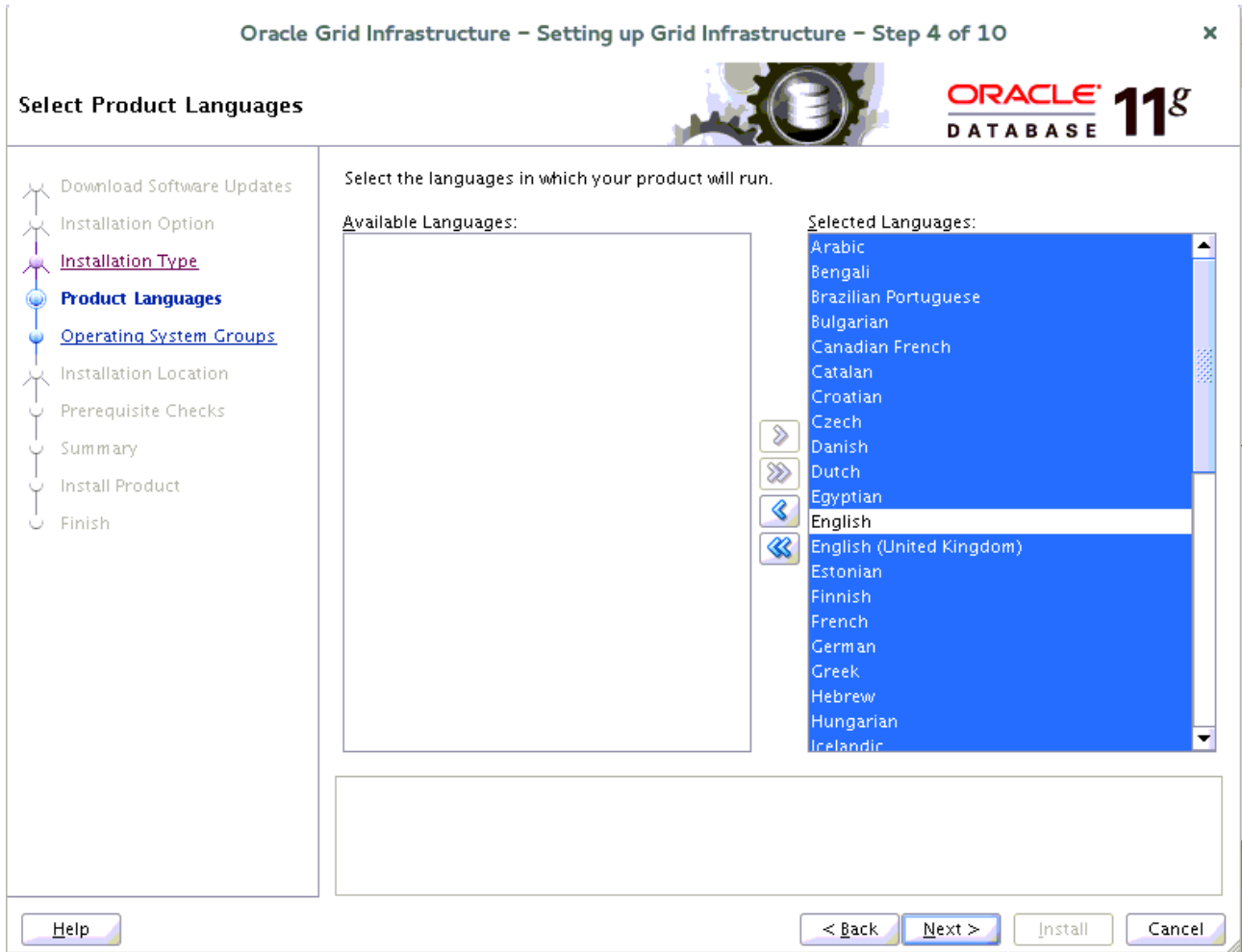
Choose option "Install and Configure Oracle Grid Infrastructure for a Cluster", then click **Next** to continue.

3). Select Installation Type.



Choose option "**Advanced Installation**", then click **Next** to continue.

4). Select Product Languages.



Select all languages, then click **Next** to continue.

5). Grid Plug and Play Information.

Oracle Grid Infrastructure – Setting up Grid Infrastructure – Step 5 of 16 x

Grid Plug and Play Information

- Download Software Updates
- Installation Option
- Installation Type
- Product Languages
- Grid Plug and Play**
- Cluster Node Information
- Network Interface Usage
- Storage Option
- OCR Storage
- Voting Disk Storage
- Operating System Groups
- Installation Location
- Prerequisite Checks
- Summary
- Install Product
- Finish

Single Client Access Name (SCAN) allows clients to use one name in connection strings to connect to the cluster as a whole. Client connect requests to the SCAN name can be handled by any cluster node.

Cluster Name:

SCAN Name:

SCAN Port:

Configure GNS

 GNS Sub Domain:
 For example: grid.example.com

 GNS VIP Address:


Fill in the information as seen above, then click **Next** to continue.

(More details for GNS configuration please see Oracle official document.)

6). Cluster Node Information.

Oracle Grid Infrastructure – Setting up Grid Infrastructure – Step 6 of 16 x

Cluster Node Information



Provide the list of nodes to be managed by Oracle Grid Infrastructure with their Public Hostname and Virtual Hostname.
If Oracle Grid Naming Service (GNS) has been selected and DHCP is enabled, then the Virtual Hostname is automatically configured for each Public Node.

Public Hostname	Virtual Hostname
c2n1.provo.novell.com	c2n1-vip.provo.novell.com
c2n2.provo.novell.com	c2n2-vip.provo.novell.com
c2n3.provo.novell.com	c2n3-vip.provo.novell.com
c2n4.provo.novell.com	c2n4-vip.provo.novell.com

SSH Connectivity... Use Cluster Configuration File... Add... Edit... Remove

< Back Next > Install Cancel

Provide the list of nodes with their public hostname and virtual hostname, then click **Next** to continue.

7). Specify Network Interface Usage.

Oracle Grid Infrastructure – Setting up Grid Infrastructure – Step 7 of 16

Specify Network Interface Usage

Identify the planned use for each global interface shown in the box below as Public, Private, or Do Not Use. Private interfaces are used by Oracle Grid Infrastructure for internode traffic.

If there is more than one subnet associated with an interface, then change the interface's attributes to associate the interface name with the additional subnets.

Interface Name	Subnet	Interface Type
bond0	10.1.1.0	Private
bond1	137.65.135.0	Public



Navigation: Help, < Back, Next >, Install, Cancel

Provide interfaces are used by Oracle Grid for public and private traffic, then click **Next** to continue.

8). Storage Option Information.

Oracle Grid Infrastructure – Setting up Grid Infrastructure – Step 8 of 16 x

Storage Option Information



- Download Software Updates
- Installation Option
- Installation Type
- Product Languages
- Grid Plug and Play
- Cluster Node Information
- Network Interface Usage
- Storage Option**
- OCR Storage
- Voting Disk Storage
- Operating System Groups
- Installation Location
- Prerequisite Checks
- Summary
- Install Product
- Finish

You can place Oracle Cluster Registry (OCR) files and voting disk files on Oracle ASM storage, or on a file system.

Oracle Automatic Storage Management (Oracle ASM)
Choose this option to configure OCR and voting disk files on Oracle ASM storage.

Shared File System
Choose this option to configure OCR and voting disk files on an existing shared file system.

Help< BackNext >InstallCancel

Choose option "Oracle Automatic Storage Management(Oracle ASM)", then click **Next** to continue.

9). Create ASM Disk Group.

Oracle Grid Infrastructure – Setting up Grid Infrastructure – Step 9 of 16

Create ASM Disk Group

Select Disk Group Characteristics and select disks

Disk Group Name:

Redundancy: High Normal External

AU Size: MB

Add Disks

Candidate Disks All Disks

<input type="checkbox"/>	Disk Path	Size (in MB)	Status
<input type="checkbox"/>	/dev/oradata/asm/disk1	100528	Candidate
<input checked="" type="checkbox"/>	/dev/oradata/disk1	7629	Candidate
<input type="checkbox"/>	/dev/oradata/disk10	10240	Candidate
<input type="checkbox"/>	/dev/oradata/disk11	10240	Candidate
<input checked="" type="checkbox"/>	/dev/oradata/disk2	7629	Candidate
<input checked="" type="checkbox"/>	/dev/oradata/disk3	7629	Candidate
<input type="checkbox"/>	/dev/oradata/disk5	307200	Candidate
<input type="checkbox"/>	/dev/oradata/disk6	307199	Candidate

Depending on your needs to create ASM Disk Group, then click **Next** to continue.

10). Specify ASM Password.

Oracle Grid Infrastructure – Setting up Grid Infrastructure – Step 10 of 16

Specify ASM Password

The new Oracle Automatic Storage Management (Oracle ASM) instance requires its own SYS user with SYSASM privileges for administration. Oracle recommends that you create a less privileged ASMSNMP user with SYSDBA privileges to monitor the ASM instance.

Specify the password for these user accounts.

Use different passwords for these accounts

	Password	Confirm Password
SYS		
ASMSNMP		

Use same passwords for these accounts

Specify Password: Confirm Password?

Messages:


Specify Password:[INS-30011] The password entered does not conform to the Oracle recommended standards.

Help < Back Next > Install Cancel

Fill in ASM Password as shown above, then click **Next** to continue.

11). Failure Isolation Support.

Oracle Grid Infrastructure – Setting up Grid Infrastructure – Step 11 of 17 x

Failure Isolation Support 

Download Software Updates
Installation Option
Installation Type
Product Languages
Grid Plug and Play
Cluster Node Information
Network Interface Usage
Storage Option
Create ASM Disk Group
~~ASM Password~~
Failure Isolation
Operating System Groups
Installation Location
Prerequisite Checks
Summary
Install Product
Finish

Choose one of the following Failure Isolation Support options.

Use Intelligent Platform Management Interface (IPMI)

To ensure successful installation with IPMI enabled, ensure your IPMI drivers are properly installed and enabled.

User Name :

Password :

Do not use Intelligent Platform Management Interface (IPMI)

Choose option "Do not use IPMI", then click **Next** to continue.

12). Privileged Operating System Groups.

Oracle Grid Infrastructure – Setting up Grid Infrastructure – Step 12 of 17

Privileged Operating System Groups

Select the name of the operating system group, of which the user you are running this installation is a member, that you want to use for operating system authentication to Oracle Automatic Storage Management.

Oracle ASM Administrator (OSASM) Group

Oracle ASM DBA (OSDBA for ASM) Group

Oracle ASM Operator (OSOPER for ASM) Group (Optional)



Help < Back Next > Install Cancel

Selected by default, then click **Next** to continue.

13). Specify Installation Location.

Oracle Grid Infrastructure – Setting up Grid Infrastructure – Step 13 of 17 x

Specify Installation Location



- Download Software Updates
- Installation Option
- Installation Type
- Product Languages
- Grid Plug and Play
- Cluster Node Information
- Network Interface Usage
- Storage Option
- Create ASM Disk Group
- ASM Password
- Failure Isolation
- Operating System Groups
- Installation Location**
- Prerequisite Checks
- Summary
- Install Product
- Finish

Specify the Oracle Grid Infrastructure for a Cluster Oracle base. By default, Oracle Grid Infrastructure is installed in a path indicating the Oracle Grid Infrastructure release and grid infrastructure software owner.

Oracle Base:

Specify a location for storing Oracle software files separate from configuration files in the Oracle base directory. This software directory is the Oracle Grid Infrastructure home directory.

Software Location ?

Fill in **Oracle base** and **Software location**, then click **Next** to continue.

14). Create Inventory.

Oracle Grid Infrastructure – Setting up Grid Infrastructure – Step 14 of 18

Create Inventory

You are starting your first installation on this host. Specify a directory for installation files. This directory is called the "inventory directory". The installer automatically sets up subdirectories for each product to contain inventory data. The subdirectory for each product typically requires 150 kilobytes of disk space.

Inventory Directory:

Members of the following operating system group (the primary group) will have write permission to the inventory directory (orainventory).

orainventory Group Name: oinstall

Specify a directory for installation metadata files if this is your first installation on this host, then click **Next** to continue.

15). Perform Prerequisite Checks.

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 15 of 18

Perform Prerequisite Checks

Some of the minimum requirements for installation are not completed. Review and fix the issues listed in the following table, and recheck the system.

Ignore All

Checks	Status	Fixable
Checks		
Packages		
Package: libaio-0.3.104	Warning	No
Package: ksh-93t	Warning	No
Package: libstdc++33-3.3.3	Warning	No
Package: libstdc++43-devel-4.3.3_20081022	Warning	No
Package: libstdc++43-4.3.3_20081022	Warning	No
Package: libgcc43-4.3.3_20081022	Warning	No
Device Checks for ASM	Warning	No

This is a pre-check to verify if the specified devices meet the requirements for configuration through the Oracle Universal Storage Manager Configuration Assistant. [\(more details\)](#)

Check Failed on Nodes: [c2n4, c2n3, c2n2, c2n1]

Perform Pre-Check as shown above;

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 15 of 18

Perform Prerequisite Checks

Some of the minimum requirements for installation are not completed. Review and fix the issues listed in the following table, and recheck the system.

Ignore All

Checks	Status	Fixable
Checks		
Packages		
Package: libaio-0.3.104	Ignored	No
Package: ksh-93t	Ignored	No
Package: libstdc++33-3.3.3	Ignored	No
Package: libstdc++43-devel-4.3.3_20081022	Ignored	No
Package: libstdc++43-4.3.3_20081022	Ignored	No
Package: libgcc43-4.3.3_20081022	Ignored	No
Device Checks for ASM	Ignored	No

This is a prerequisite condition to test whether the package "libaio-0.3.104" is available on the system. [\(more details\)](#)

Check Failed on Nodes: [c2n4, c2n3, c2n2, c2n1]

Select option "Ignore All", then click **Next** to continue.

Oracle Grid Infrastructure – Setting up Grid Infrastructure – Step 15 of 18


Perform Prerequisite Checks

Some of the minimum requirements for installation are not completed. Review and fix the issues listed in the following table, and recheck the system.

Ignore All

Checks	Status	Fixable
Checks	Ignored	No
Packages	Ignored	No
	Ignored	No
	Ignored	No
	Ignored	No
	Ignored	No
	Ignored	No

Oracle Grid Infrastructure

 [INS-13016] You have chosen to ignore some of the prerequisites for this installation. This may impact product configuration.

Are you sure you want to continue?

This is a prerequisite condition to test whether the package "libaio-0.3.104" is available on the system. [\(more details\)](#)

Check Failed on Nodes: [c2n4, c2n3, c2n2, c2n1]

Ignore the information,click **Yes** to continue.

16). Summary.

Oracle Grid Infrastructure – Setting up Grid Infrastructure – Step 16 of 18

Summary

ORACLE 11g
DATABASE

- Download Software Updates
- Installation Option
- Installation Type
- Product Languages
- Grid Plug and Play
- Cluster Node Information
- Network Interface Usage
- Storage Option
- Create ASM Disk Group
- ASM Password
- Failure Isolation
- Operating System Groups
- Installation Location
- Create Inventory
- Prerequisite Checks**
- Summary**
- Install Product
- Finish

Oracle Grid Infrastructure

- Global Settings**
 - ...Disk Space: required 5.5 GB available 495.65 GB
 - ...Install Option: Install and Configure Oracle Grid Infrastructure for a Cluster
 - ...Oracle base for Oracle Grid Infrastructure: /home/grid_base
 - ...Grid home: /home/grid
 - ...Source Location: /opt/oracle/11204_SW_20160119/grid/install/./stage/products.xml
 - ...Privileged Operating System Groups: oinstall (OSDBA), dba (OSASM)
- Inventory information**
 - ...Inventory location: /home/orainventory
 - ...Central inventory (orainventory) group: oinstall
- Grid Infrastructure Settings**
 - ...Cluster Name: c2-cluster
 - ...Local Node: c2n1
 - ...Remote Nodes: c2n2,c2n3,c2n4
 - ...Single Client Access Name (SCAN): c2-scan.provo.novell.com
 - ...SCAN Port: 1521

Save Response File...

Help < Back Next > Install Cancel

Installation Summary as shown above, click **Install** to continue.

17). Install Product.



Completed 'prepare for configuration steps'. Here to stay and install **Oracle Patch 18370031** first, then execute the configuration scripts as the "root" user in each new cluster node.

```
c2n1:/home # /home/orainventory/orainstRoot.sh
Changing permissions of /home/orainventory.
Adding read,write permissions for group.
Removing read,write,execute permissions for world.

Changing groupname of /home/orainventory to oinstall.
The execution of the script is complete.
```

```

c2n1:/home # /home/grid/root.sh
Performing root user operation for Oracle 11g

The following environment variables are set as:
ORACLE_OWNER= oracle
ORACLE_HOME= /home/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 ...

Creating /etc/oratab file...
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 script.
Now product-specific root actions will be performed.
Using configuration parameter file: /home/grid/crs/install/crsconfig_params
Creating trace directory
User ignored Prerequisites during installation
Installing Trace File Analyzer
OLR initialization - successful
root wallet
root wallet cert
root cert export
peer wallet
profile reader wallet
pa wallet
peer wallet keys
pa wallet keys
peer cert request
pa cert request
peer cert
pa cert
peer root cert TP

```

```

pa user cert
Adding Clusterware entries to oracle-ohasd.service
CRS-2672: Attempting to start 'ora.mdnsd' on 'c2n1'
CRS-2676: Start of 'ora.mdnsd' on 'c2n1' succeeded
CRS-2672: Attempting to start 'ora.gpnpd' on 'c2n1'
CRS-2676: Start of 'ora.gpnpd' on 'c2n1' succeeded
CRS-2672: Attempting to start 'ora.cssdmonitor' on 'c2n1'
CRS-2672: Attempting to start 'ora.gipcd' on 'c2n1'
CRS-2676: Start of 'ora.cssdmonitor' on 'c2n1' succeeded
CRS-2676: Start of 'ora.gipcd' on 'c2n1' succeeded
CRS-2672: Attempting to start 'ora.cssd' on 'c2n1'
CRS-2672: Attempting to start 'ora.diskmon' on 'c2n1'
CRS-2676: Start of 'ora.diskmon' on 'c2n1' succeeded
CRS-2676: Start of 'ora.cssd' on 'c2n1' succeeded

ASM created and started successfully.


Disk Group SUSETEST created successfully.


clscfg: -install mode specified
Successfully accumulated necessary OCR keys.
Creating OCR keys for user 'root', privgrp 'root'..
Operation successful.
CRS-4256: Updating the profile
Successful addition of voting disk 51663f3ea0a44ff1bfd99e370bb9f5f5.
Successful addition of voting disk 744112dd771f4f04bf93e961916edacb.
Successful addition of voting disk aada3a8b1ebf4f70bfe361b1b536e243.
Successfully replaced voting disk group with +SUSETEST.
CRS-4256: Updating the profile
CRS-4266: Voting file(s) successfully replaced
## STATE File Universal Id File Name Disk group
---
1. ONLINE 51663f3ea0a44ff1bfd99e370bb9f5f5 (/dev/oradata/disk1) [SUSETEST]
2. ONLINE 744112dd771f4f04bf93e961916edacb (/dev/oradata/disk2) [SUSETEST]
3. ONLINE aada3a8b1ebf4f70bfe361b1b536e243 (/dev/oradata/disk3) [SUSETEST]
Located 3 voting disk(s).
CRS-2672: Attempting to start 'ora.asm' on 'c2n1'
CRS-2676: Start of 'ora.asm' on 'c2n1' succeeded
CRS-2672: Attempting to start 'ora.SUSETEST.dg' on 'c2n1'
CRS-2676: Start of 'ora.SUSETEST.dg' on 'c2n1' succeeded
Configure Oracle Grid Infrastructure for a Cluster ... succeeded

```

After the configuration scripts completed and succeeded in each cluster node, then click **OK** to continue.

Oracle Grid Infrastructure – Setting up Grid Infrastructure – Step 17 of 18





Install Product

- Download Software Updates
- Installation Option
- Installation Type
- Product Languages
- Grid Plug and Play
- Cluster Node Information
- Network Interface Usage
- Storage Option
- Create ASM Disk Group
- ASM Password
- Failure Isolation
- Operating System Groups
- Installation Location
- Create Inventory
- Prerequisite Checks
- Summary
- Install Product**
- Finish



Progress

81%

Starting 'Update Inventory'


Status


<input checked="" type="checkbox"/>	Install Grid Infrastructure for a Cluster	Succeeded
<input checked="" type="checkbox"/>	• Prepare	Succeeded
<input checked="" type="checkbox"/>	• Copy files	Succeeded
<input checked="" type="checkbox"/>	• Link binaries	Succeeded
<input checked="" type="checkbox"/>	• Setup files	Succeeded
<input checked="" type="checkbox"/>	• Perform remote operations	Succeeded
<input checked="" type="checkbox"/>	Execute Root Scripts	Succeeded
<input type="checkbox"/>	Configure Oracle Grid Infrastructure for a Cluster	In Progress
<input type="checkbox"/>	• Update Inventory	In Progress
<input type="checkbox"/>	• Oracle Net Configuration Assistant	Pending
<input type="checkbox"/>	• Automatic Storage Management Configuration Assistant	Pending
<input type="checkbox"/>	• Oracle Cluster Verification Utility	Pending

Consolidate on Fast,
Reliable, and Scalable
Low-Cost Grids

Oracle Grid Infrastructure – Setting up Grid Infrastructure – Step 17 of 18





Install Product

- Download Software Updates
- Installation Option
- Installation Type
- Product Languages
- Grid Plug and Play
- Cluster Node Information
- Network Interface Usage
- Storage Option
- Create ASM Disk Group
- ASM Password
- Failure Isolation
- Operating System Groups
- Installation Location
- Create Inventory
- Prerequisite Checks
- Summary
- Install Product**
- Finish



Progress

95%

Starting 'Oracle Cluster Verification Utility'

Status

<input checked="" type="checkbox"/>	Install Grid Infrastructure for a Cluster	Succeeded
<input checked="" type="checkbox"/>	• Prepare	Succeeded
<input checked="" type="checkbox"/>	• Copy files	Succeeded
<input checked="" type="checkbox"/>	• Link binaries	Succeeded
<input checked="" type="checkbox"/>	• Setup files	Succeeded
<input checked="" type="checkbox"/>	• Perform remote operations	Succeeded
<input checked="" type="checkbox"/>	Execute Root Scripts	Succeeded
<input type="checkbox"/>	Configure Oracle Grid Infrastructure for a Cluster	In Progress
<input checked="" type="checkbox"/>	• Update Inventory	Succeeded
<input checked="" type="checkbox"/>	• Oracle Net Configuration Assistant	Succeeded
<input checked="" type="checkbox"/>	• Automatic Storage Management Configuration Assistant	Succeeded
<input type="checkbox"/>	• Oracle Cluster Verification Utility	In Progress

Consolidate
Compress
Control

24

The installation of Oracle Grid Infrastructure for a Cluster is Finished. Click **Close** to dismiss the screen.

The screenshot shows the final step of the Oracle Grid Infrastructure installation. The window title is "Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 18 of 18". The Oracle Database 11g logo is in the top right corner. On the left, a vertical list of steps is shown, with "Finish" highlighted at the bottom. The main area contains the message "The installation of Oracle Grid Infrastructure for a Cluster was successful." Below this message is a large empty rectangular box. At the bottom of the window, there are four buttons: "Help", "< Back", "Next >", and "Close".

Finish

Download Software Updates
Installation Option
Installation Type
Product Languages
Grid Plug and Play
Cluster Node Information
Network Interface Usage
Storage Option
Create ASM Disk Group
ASM Password
Failure Isolation
Operating System Groups
Installation Location
Create Inventory
Prerequisite Checks
Summary
Install Product
Finish

The installation of Oracle Grid Infrastructure for a Cluster was successful.

Help < Back Next > Install Close

1-3. Post-Install Checks.

1). Check Oracle Clusterware health.

```
oracle@c2n1:~> /home/grid/bin/crsctl check cluster -all
```

```
*****
```

```
c2n1:
```

```
CRS-4537: Cluster Ready Services is online  
CRS-4529: Cluster Synchronization Services is online  
CRS-4533: Event Manager is online
```

```
*****
```

```
c2n2:
```

```
CRS-4537: Cluster Ready Services is online  
CRS-4529: Cluster Synchronization Services is online  
CRS-4533: Event Manager is online
```

```
*****
```

```
c2n3:
```

```
CRS-4537: Cluster Ready Services is online  
CRS-4529: Cluster Synchronization Services is online  
CRS-4533: Event Manager is online
```

```
*****
```

```
c2n4:
```

```
CRS-4537: Cluster Ready Services is online  
CRS-4529: Cluster Synchronization Services is online  
CRS-4533: Event Manager is online
```

```
*****
```

2). Check Oracle Clusterware resources.

```
oracle@c2n1:~> /home/grid/bin/srvctl status nodeapps
```

```
VIP c2n1-vip is enabled  
VIP c2n1-vip is running on node: c2n1  
VIP c2n2-vip is enabled  
VIP c2n2-vip is running on node: c2n2  
VIP c2n3-vip is enabled  
VIP c2n3-vip is running on node: c2n3  
VIP c2n4-vip is enabled  
VIP c2n4-vip is running on node: c2n4  
Network is enabled  
Network is running on node: c2n1  
Network is running on node: c2n2  
Network is running on node: c2n3  
Network is running on node: c2n4  
GSD is disabled  
GSD is not running on node: c2n1  
GSD is not running on node: c2n2  
GSD is not running on node: c2n3  
GSD is not running on node: c2n4  
ONS is enabled  
ONS daemon is running on node: c2n1  
ONS daemon is running on node: c2n2  
ONS daemon is running on node: c2n3  
ONS daemon is running on node: c2n4
```

3). Check status of designated resources.

oracle@c2n1:~> /home/grid/bin/crsctl stat res -t

NAME	TARGET	STATE	SERVER	STATE_DETAILS
Local Resources				

ora.LISTENER.lsnr				
	ONLINE	ONLINE	c2n1	
	ONLINE	ONLINE	c2n2	
	ONLINE	ONLINE	c2n3	
	ONLINE	ONLINE	c2n4	
ora.SUSETEST.dg				
	ONLINE	ONLINE	c2n1	
	ONLINE	ONLINE	c2n2	
	ONLINE	ONLINE	c2n3	
	ONLINE	ONLINE	c2n4	
ora.asm				
	ONLINE	ONLINE	c2n1	Started
	ONLINE	ONLINE	c2n2	Started
	ONLINE	ONLINE	c2n3	Started
	ONLINE	ONLINE	c2n4	Started
ora.gsd				
	OFFLINE	OFFLINE	c2n1	
	OFFLINE	OFFLINE	c2n2	
	OFFLINE	OFFLINE	c2n3	
	OFFLINE	OFFLINE	c2n4	
ora.net1.network				
	ONLINE	ONLINE	c2n1	
	ONLINE	ONLINE	c2n2	
	ONLINE	ONLINE	c2n3	
	ONLINE	ONLINE	c2n4	
ora.ons				
	ONLINE	ONLINE	c2n1	
	ONLINE	ONLINE	c2n2	
	ONLINE	ONLINE	c2n3	
	ONLINE	ONLINE	c2n4	

Cluster Resources				

ora.LISTENER_SCAN1.lsnr				
1	ONLINE	ONLINE	c2n2	
ora.LISTENER_SCAN2.lsnr				
1	ONLINE	ONLINE	c2n3	
ora.LISTENER_SCAN3.lsnr				
1	ONLINE	ONLINE	c2n1	
ora.c2n1.vip				
1	ONLINE	ONLINE	c2n1	
ora.c2n2.vip				
1	ONLINE	ONLINE	c2n2	
ora.c2n3.vip				
1	ONLINE	ONLINE	c2n3	
ora.c2n4.vip				
1	ONLINE	ONLINE	c2n4	
ora.cvu				
1	ONLINE	ONLINE	c2n1	
ora.oc4j				

```

1    ONLINE ONLINE    c2n1
ora.scan1.vip
1    ONLINE ONLINE    c2n2
ora.scan2.vip
1    ONLINE ONLINE    c2n3
ora.scan3.vip
1    ONLINE ONLINE    c2n1
-----

```

4). Check OCR and Voting disk files.

oracle@c2n1:~> /home/grid/bin/ocrcheck

Status of Oracle Cluster Registry is as follows :

```

Version           :      3
Total space (kbytes) : 262120
Used space (kbytes)  :   2892
Available space (kbytes) : 259228
ID                : 203023517
Device/File Name   : +SUSETEST
                   Device/File integrity check succeeded

                   Device/File not configured

                   Device/File not configured

                   Device/File not configured

                   Device/File not configured

```

Cluster registry integrity check succeeded

Logical corruption check bypassed due to non-privileged user

oracle@c2n1:~> /home/grid/bin/crsctl query css votedisk

```

## STATE   File Universal Id               File Name Disk group
--  -----
1. ONLINE  51663f3ea0a44ff1bfd99e370bb9f5f5 (/dev/oradata/disk1) [SUSETEST]
2. ONLINE  744112dd771f4f04bf93e961916edacb (/dev/oradata/disk2) [SUSETEST]
3. ONLINE  aada3a8b1ebf4f70bfe361b1b536e243 (/dev/oradata/disk3) [SUSETEST]
Located 3 voting disk(s).

```

2. Installing Oracle Database.

1-1. Login to the SLES 12 64-bit OS as a non-admin user. Download the Oracle Database 11g Release 2 (11.2.0.4.0) for Linux x86-64.

1-2. Extract grid.zip and run the installer './runInstaller' from Database ShipHome.

Install Flow:

1). Configure Security Updates.

Oracle Database 11g Release 2 Installer - Installing database - Step 1 of 11

Configure Security Updates

Provide your email address to be informed of security issues, install the product and initiate configuration manager. [View details.](#)

Email:

Easier for you if you use your My Oracle Support email address/username.

I wish to receive security updates via My Oracle Support.

My Oracle Support Password:

Provide your email address to be informed of security issues, then click **Next** to continue.

2). Download Software Updates.

Oracle Database 11g Release 2 Installer – Installing database – Step 2 of 11

Download Software Updates

Download software updates for this installation. Software updates consist of recommended updates to the installer system requirement checks, PatchSet Updates (PSUs), and other recommended patches.

Select one of the following options:

Use My Oracle Support credentials for download

My Oracle Support user name:

My Oracle Support password:

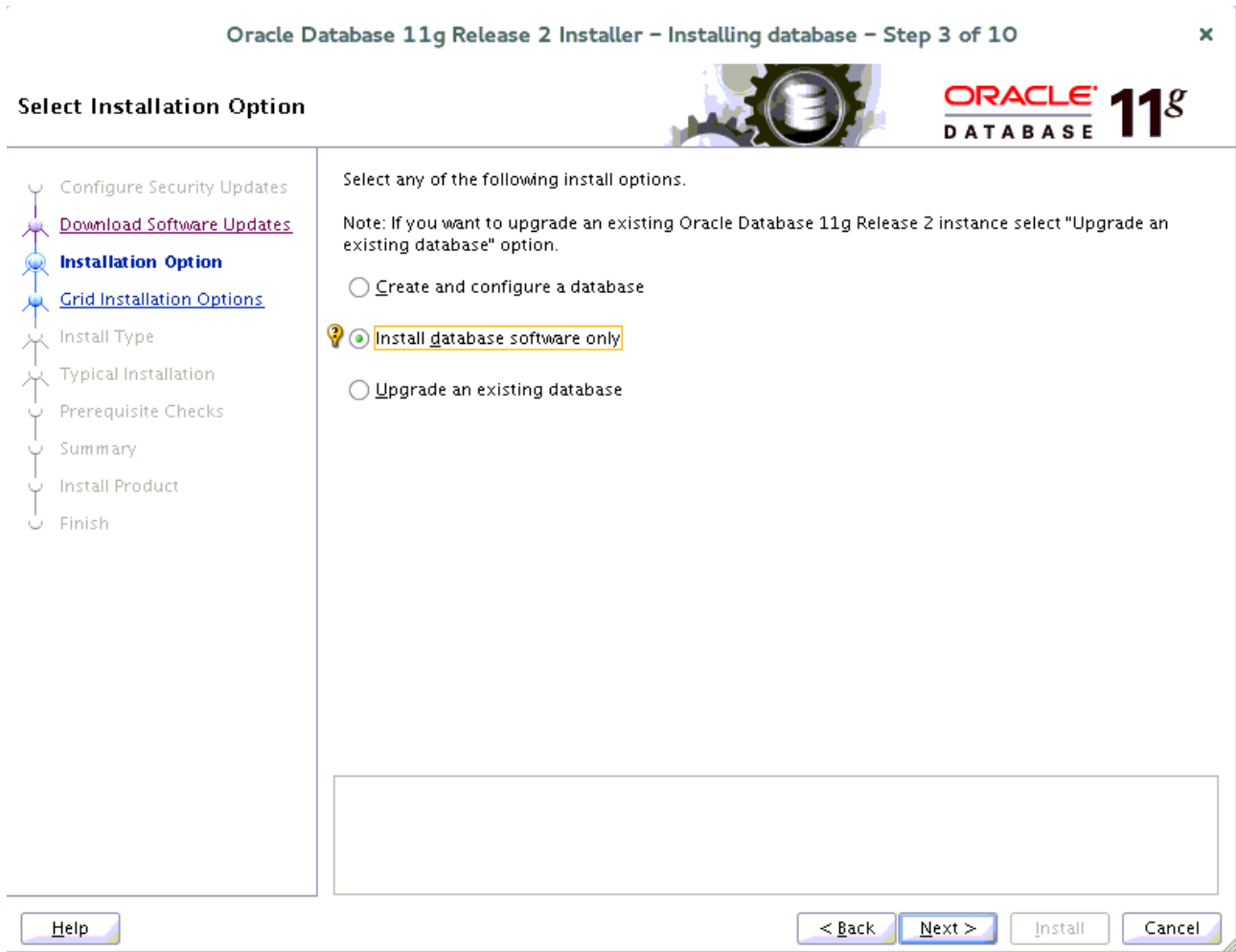
Use pre-downloaded software updates

Location:

Skip software updates

Select one of the options, then click **Next** to continue.

3). Select Installation Option.



Choose option "Install database software only.", then click **Next** to continue.

4). Grid Installation Options.

Oracle Database 11g Release 2 Installer – Installing database – Step 4 of 10

Grid Installation Options

Select the type of database installation you want to perform.

- Single instance database installation
- Oracle Real Application Clusters database installation
- Oracle RAC One Node database installation

Select nodes (in addition to the local node) in the cluster where the installer should install Oracle RAC or Oracle RAC One.

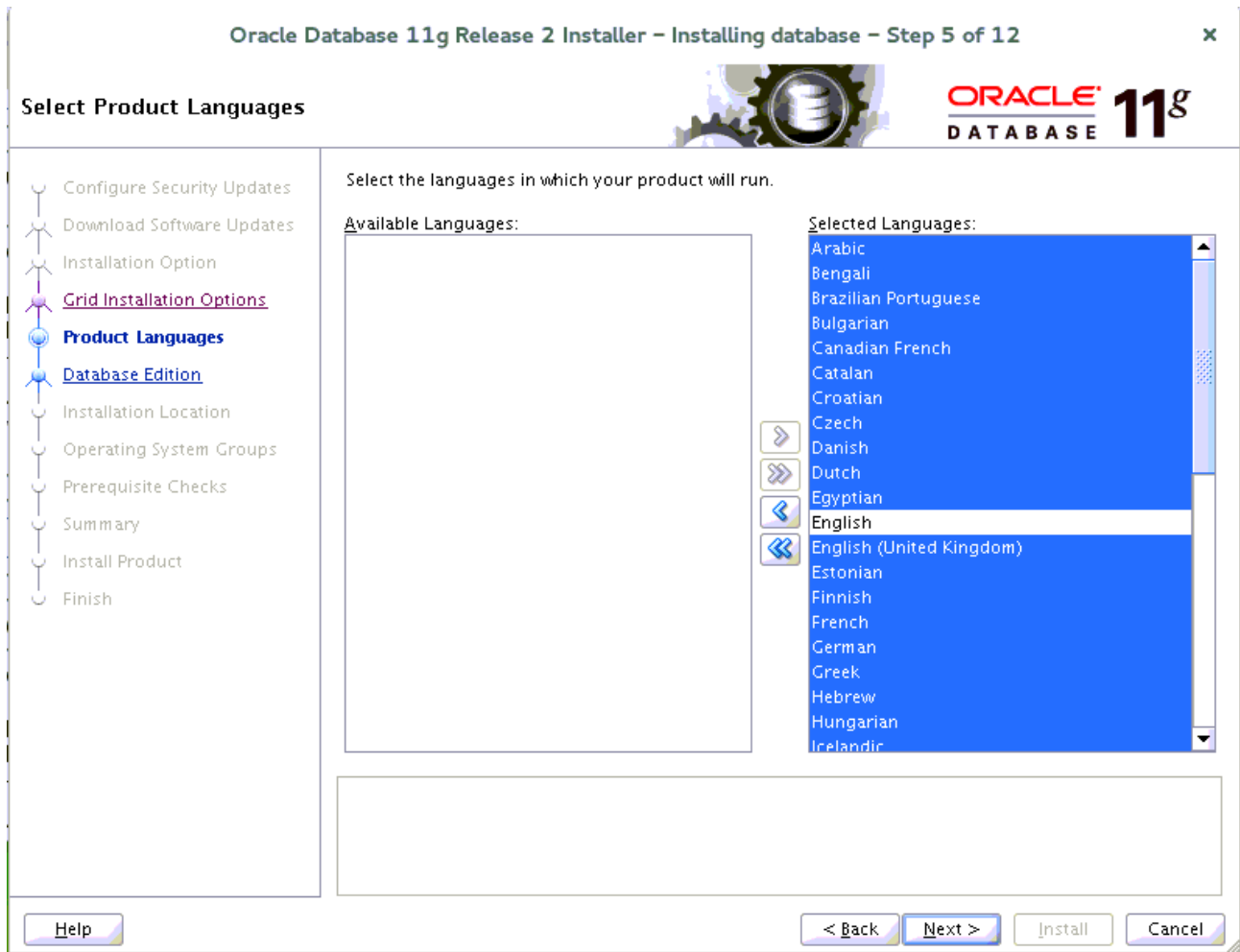
	Node Name
<input checked="" type="checkbox"/>	1 c2n1
<input checked="" type="checkbox"/>	2 c2n2
<input checked="" type="checkbox"/>	3 c2n3
<input checked="" type="checkbox"/>	4 c2n4

SSH Connectivity... Select All Deselect All

Help < Back Next > Install Cancel

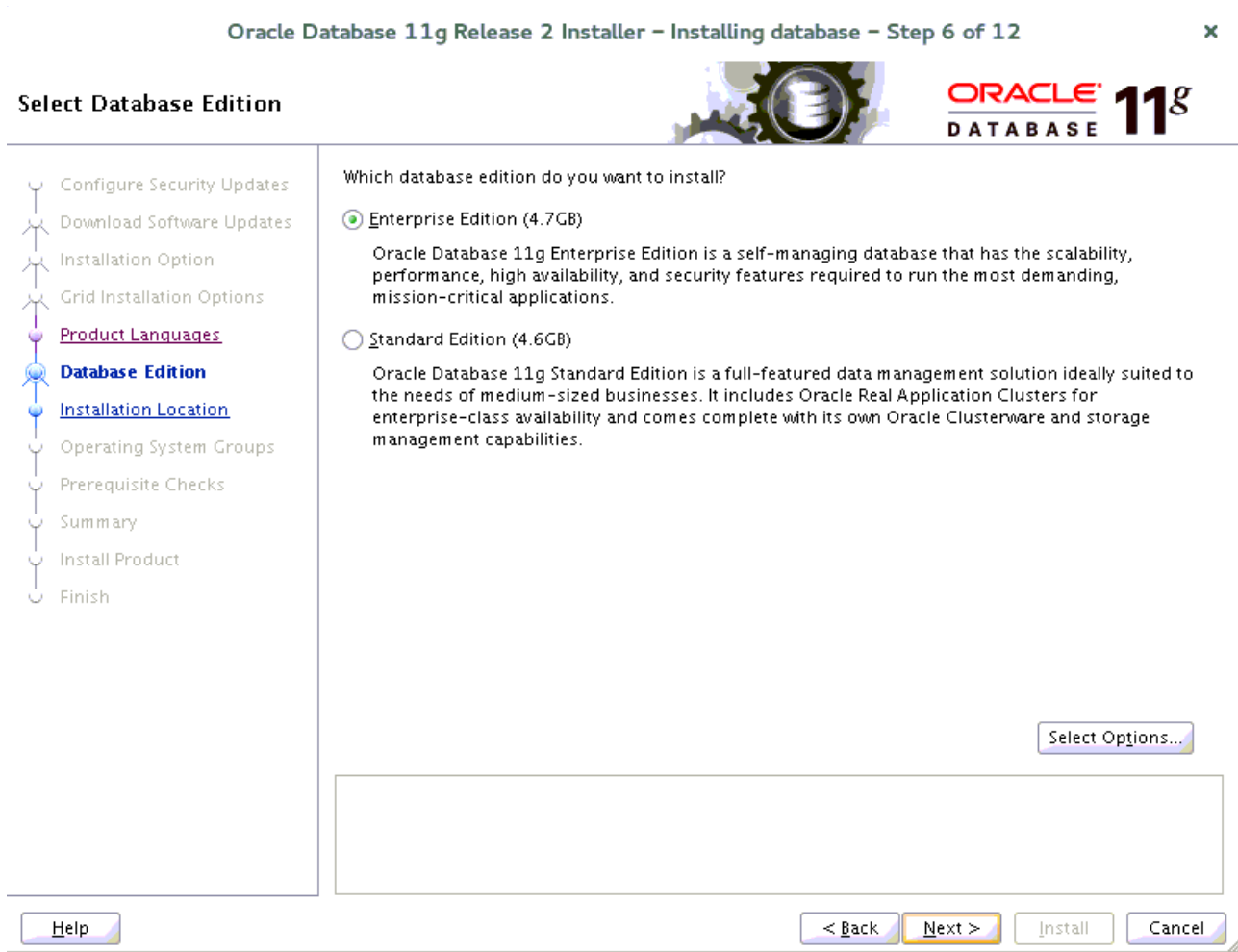
Choose option "Oracle Real Application Clusters database installation", and select all nodes in the cluster, then click **Next** to continue.

5). Select Product Languages.



Select all languages, then click **Next** to continue.

6). Select Database Edition.



Choose option "Enterprise Edition", then click **Next** to continue.

7). Specify Installation Location.



Fill in **Oracle base** and **Software location** as shown above, then click **Next** to continue.

8). Privileged Operating System groups.



Selected by default, then click **Next** to continue.

9). Perform Prerequisite Checks.

Oracle Database 11g Release 2 Installer – Installing database – Step 9 of 12

Perform Prerequisite Checks

Some of the minimum requirements for installation are not completed. Review and fix the issues listed in the following table, and recheck the system.

Ignore All

Checks	Status	Fixable
<ul style="list-style-type: none"> Package: libaio-0.3.104 Package: ksh-93t Package: libstdc++33-3.3.3 Package: libstdc++43-devel-4.3.3_20081022 Package: libstdc++43-4.3.3_20081022 Package: libgcc43-4.3.3_20081022 	Warning	No

This is a prerequisite condition to test whether the package "libaio-0.3.104" is available on the system. [\(more details\)](#)

Check Failed on Nodes: [c2n4, c2n3, c2n2, c2n1]

Perform Pre-Check as shown above;

Oracle Database 11g Release 2 Installer – Installing database – Step 9 of 12

Perform Prerequisite Checks

Some of the minimum requirements for installation are not completed. Review and fix the issues listed in the following table, and recheck the system.

Ignore All

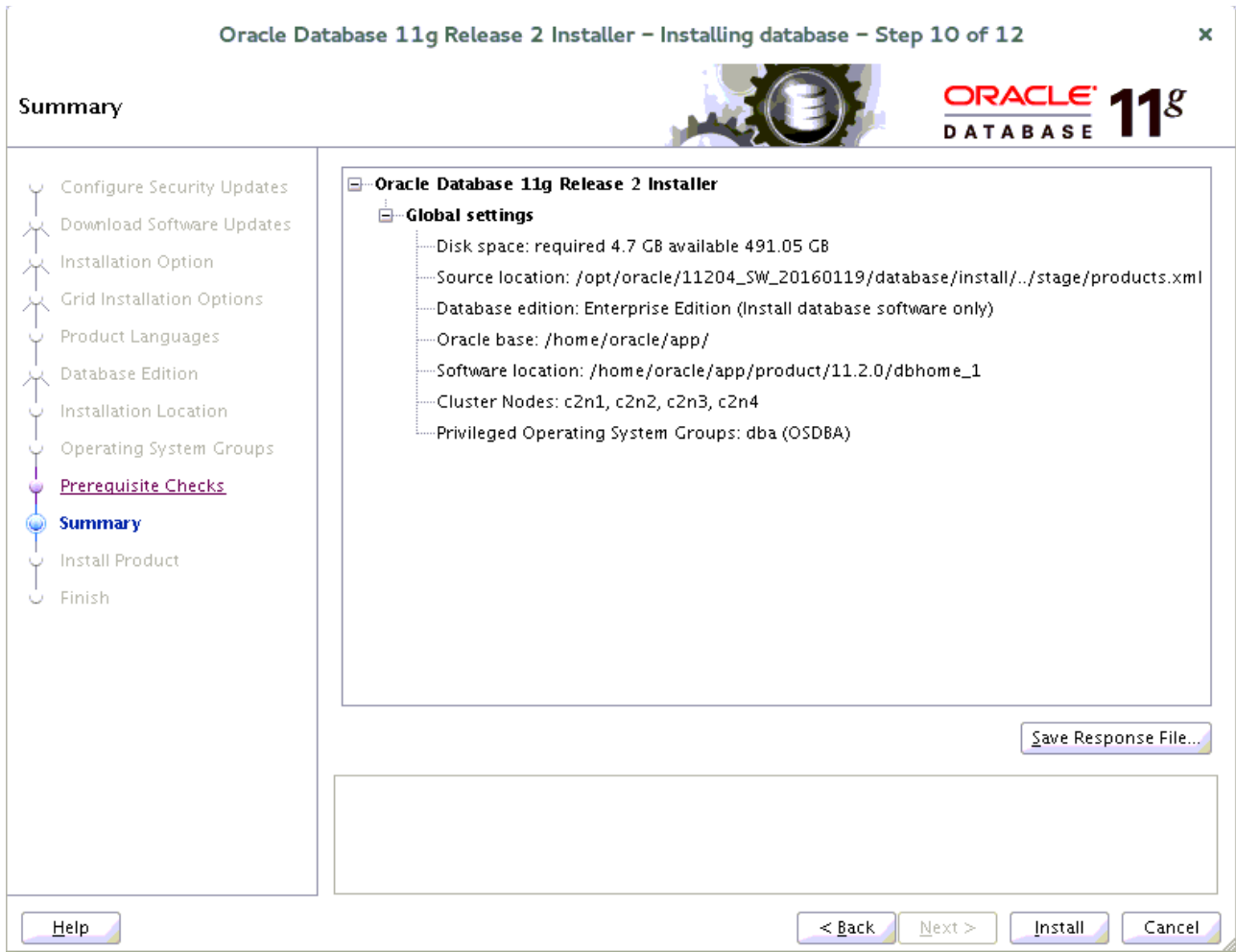
Checks	Status	Fixable
<ul style="list-style-type: none"> Package: libaio-0.3.104 Package: ksh-93t Package: libstdc++33-3.3.3 Package: libstdc++43-devel-4.3.3_20081022 Package: libstdc++43-4.3.3_20081022 Package: libgcc43-4.3.3_20081022 	Ignored	No

This is a prerequisite condition to test whether the package "libaio-0.3.104" is available on the system. [\(more details\)](#)

Check Failed on Nodes: [c2n4, c2n3, c2n2, c2n1]

Select option "Ignore All", then click **Next** to continue.

10). Summary.



Installation Summary as shown above, click **Install** to continue.

11). Install Product.

Oracle Database 11g Release 2 Installer - Installing database - Step 11 of 12

Install Product

Progress: 9%
Processing Oracle Database 11g 11.2.0.4.0

Status:

Task	Status
Oracle Database installation	In Progress
• Prepare	Succeeded
• Copy files	Pending
• Link binaries	Pending
• Setup files	Pending
Execute Root Scripts	Pending

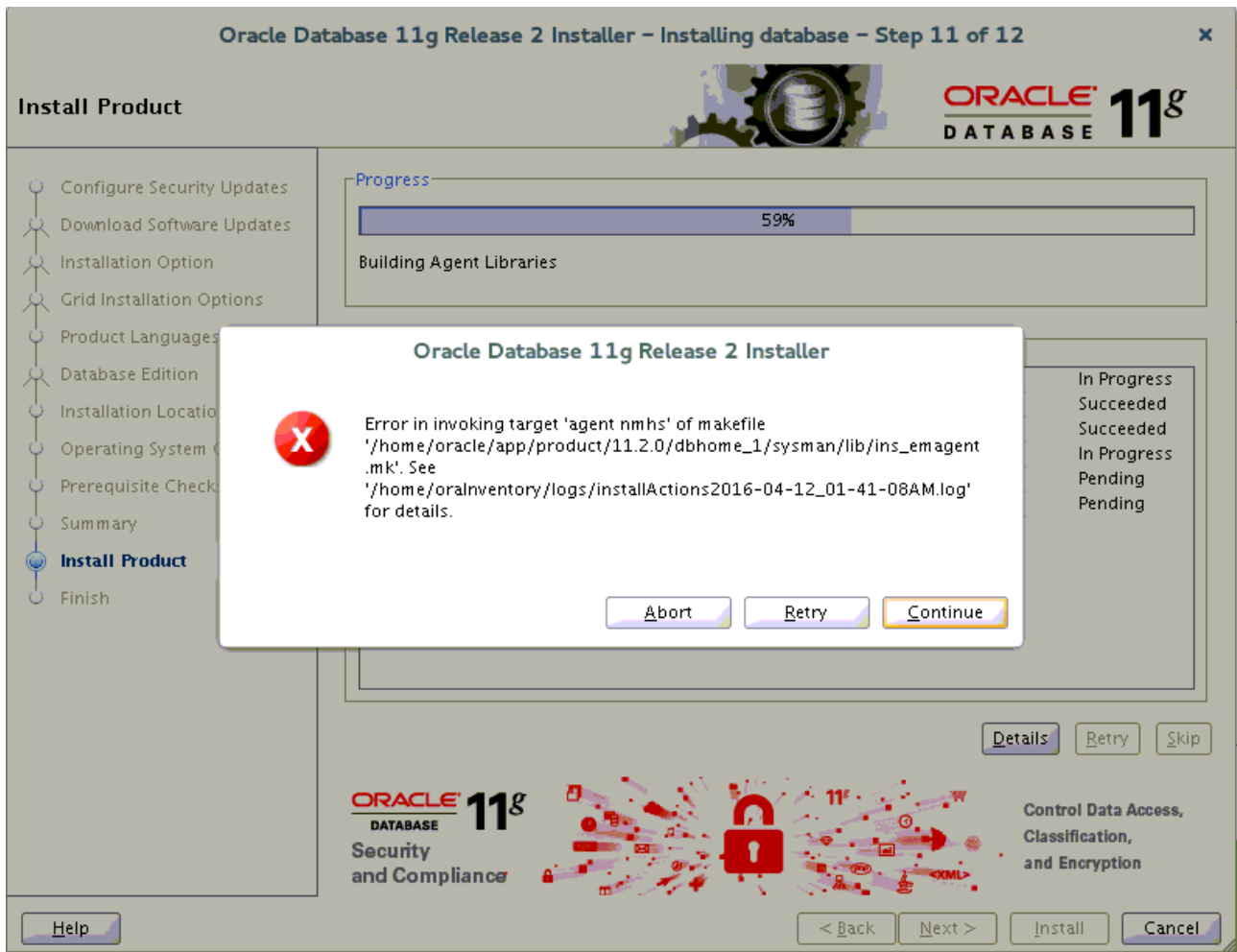
Buttons: Details, Retry, Skip

Oracle Database 11g

Consolidate, Compress, Control

Buttons: Help, < Back, Next >, Install, Cancel

Oracle Database installation in progress.



(Note:

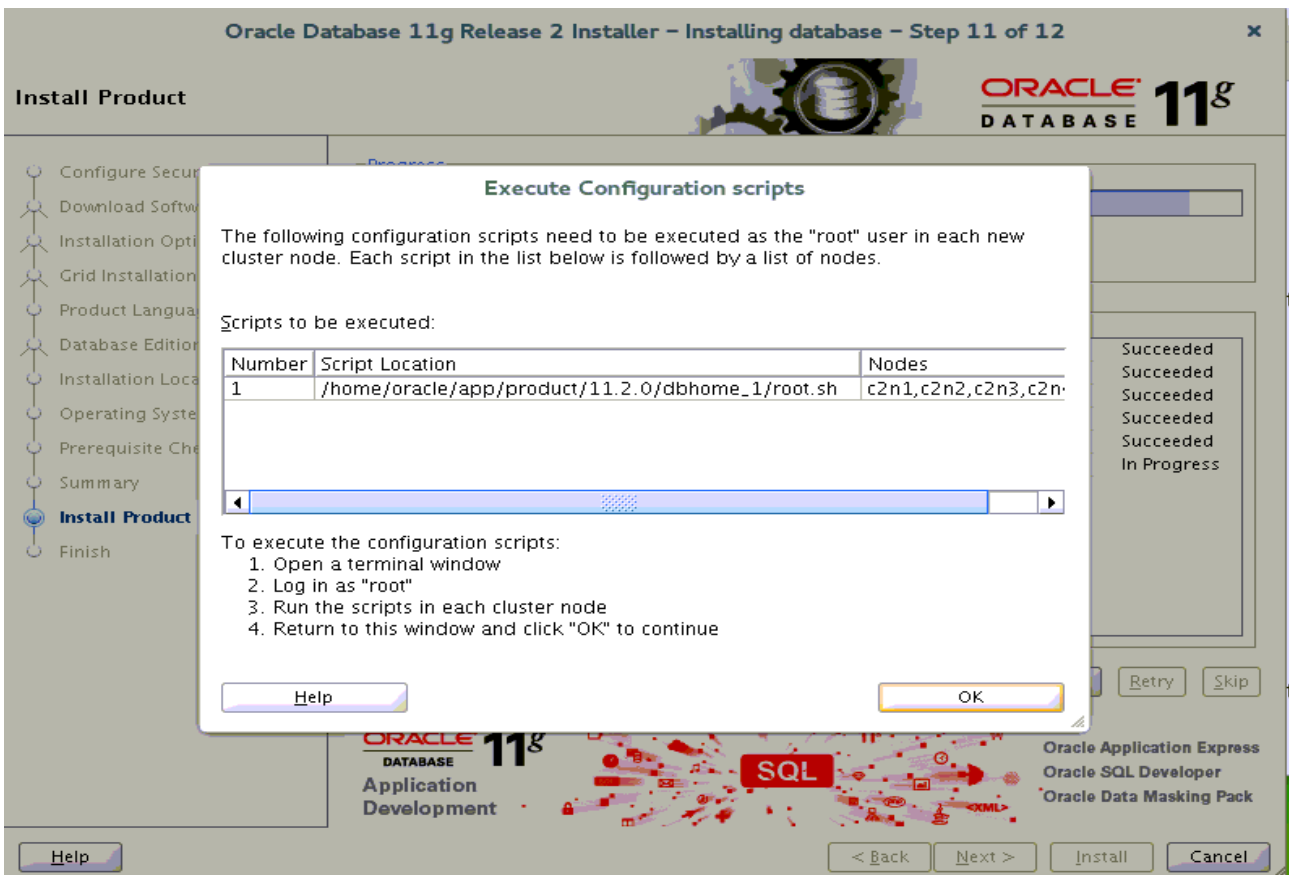
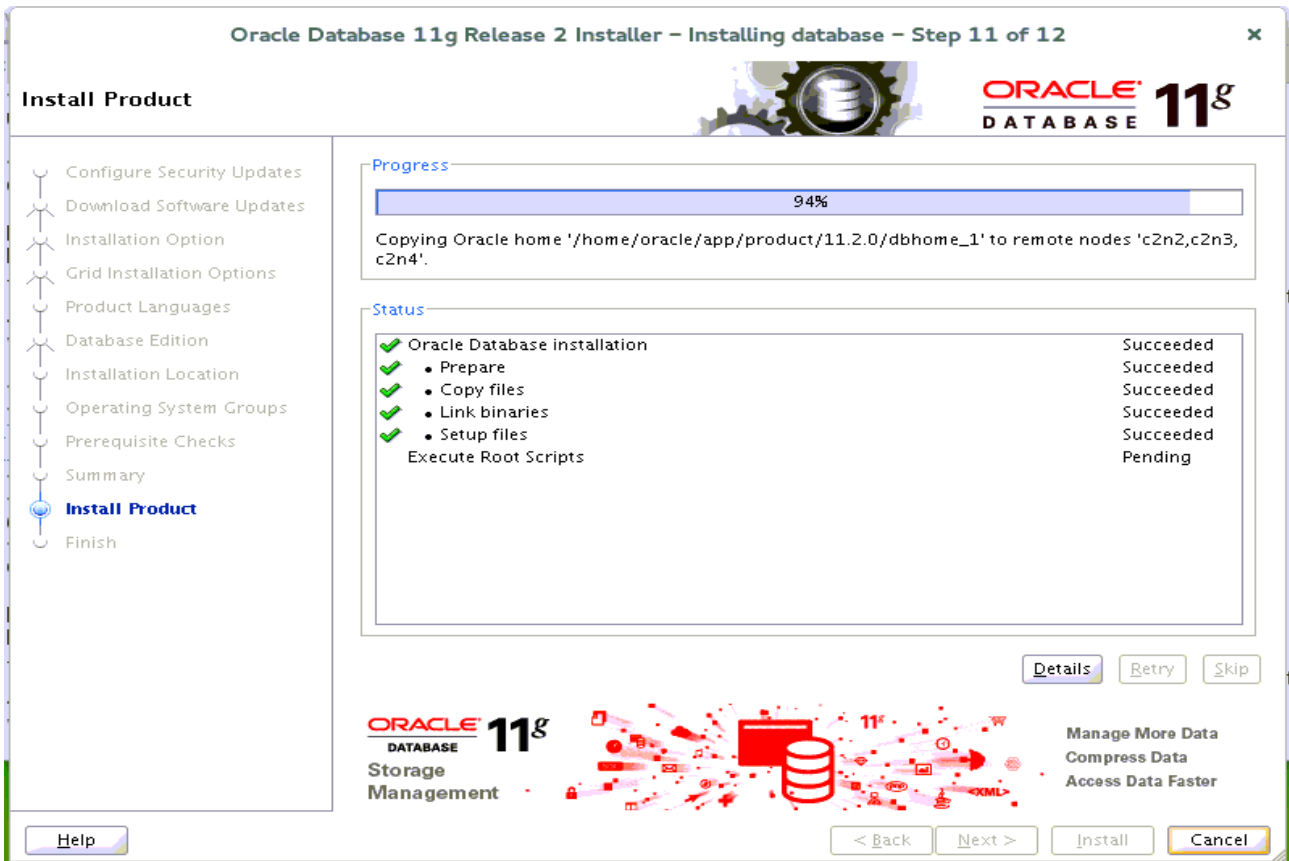
Linking Error - "ins_emagent.mk" - Fix & Retry

To solve this issue do following changes as user Oracle: Edit
\$ORACLE_HOME/sysman/lib/ins_emagent.mk, search for the line

\$(MK_EMAGENT_NMECTL) and replace the line with
\$(MK_EMAGENT_NMECTL) -lnnz11

Then click Retry to continue.

)



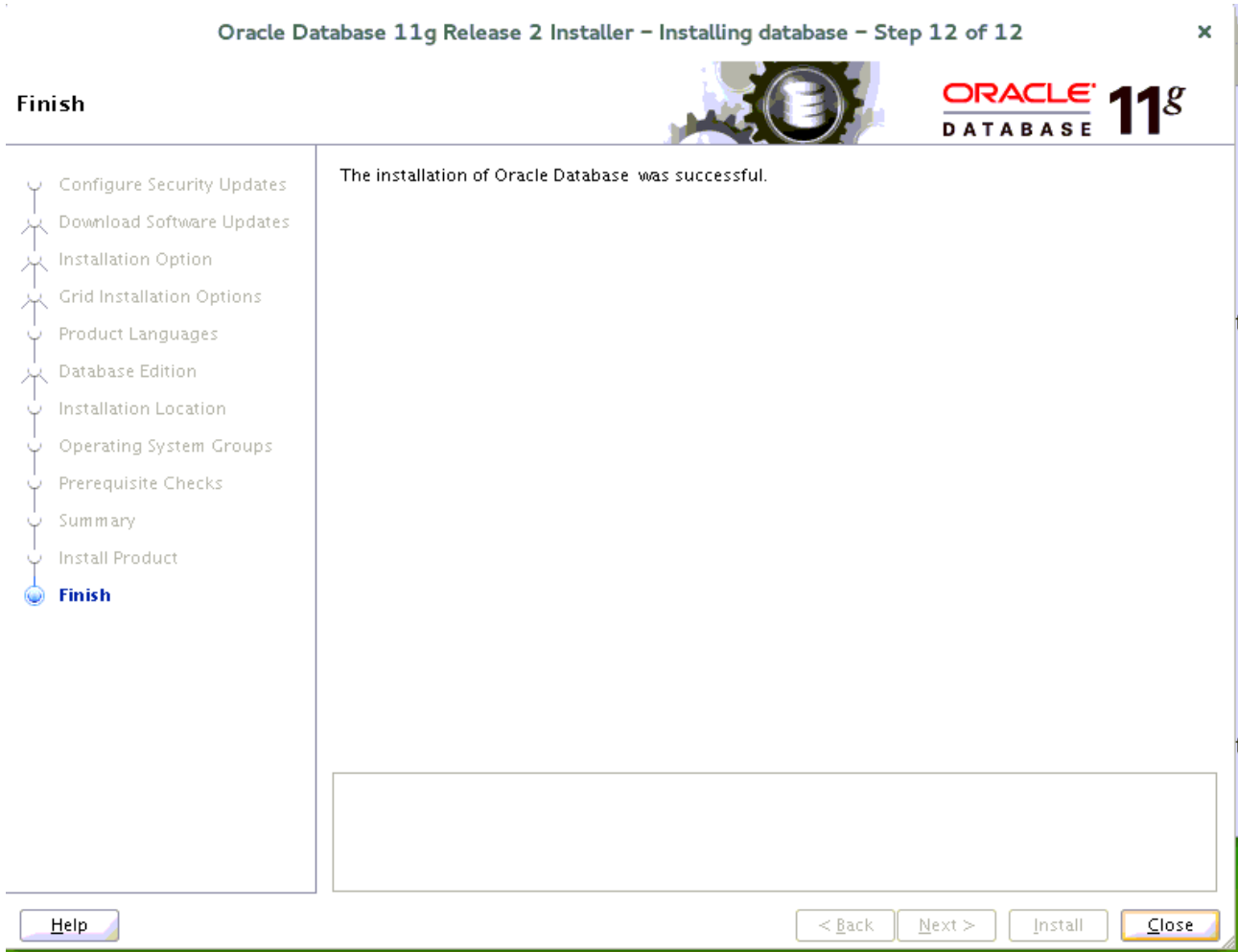
```
c2n1:/home # /home/oracle/app/product/11.2.0/dbhome_1/root.sh
Performing root user operation for Oracle 11g

The following environment variables are set as:
ORACLE_OWNER= oracle
ORACLE_HOME= /home/oracle/app/product/11.2.0/dbhome_1

Enter the full pathname of the local bin directory: [/usr/local/bin]:
The contents of "dbhome" have not changed. No need to overwrite.
The contents of "oraenv" have not changed. No need to overwrite.
The contents of "coraenv" have not changed. No need to overwrite.

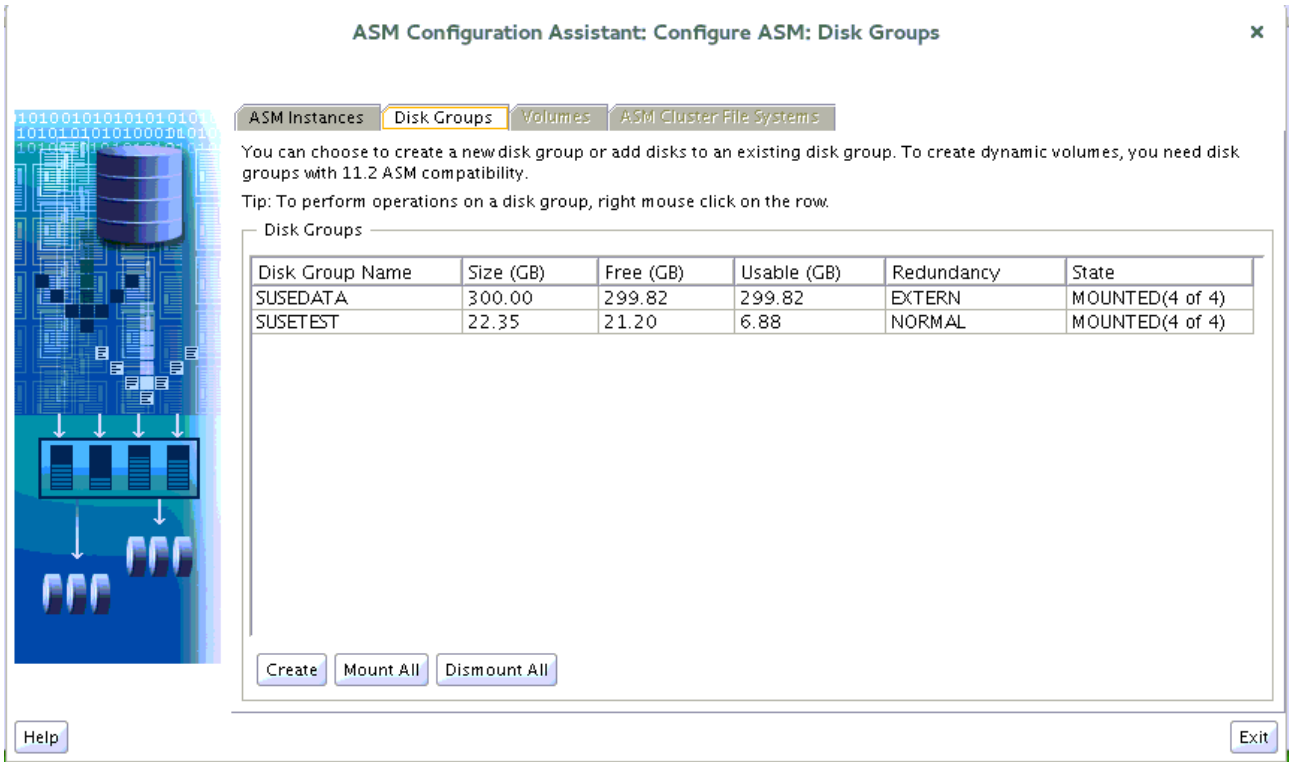
Entries will be added to the /etc/oratab file as needed by
Database Configuration Assistant when a database is created
Finished running generic part of root script.
Now product-specific root actions will be performed.
Finished product-specific root actions.
```

Execute **root.sh** as the "root" user in each cluster node, then click **OK** to continue.



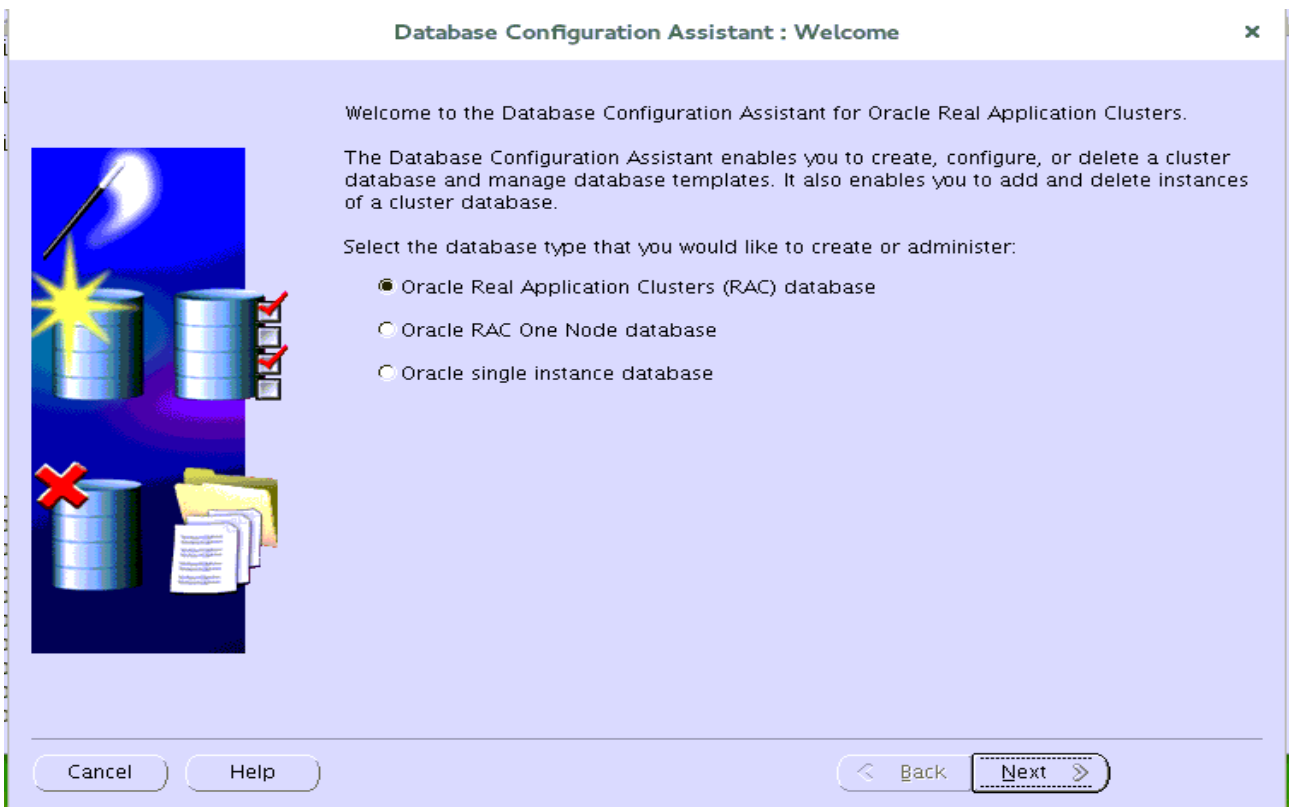
The installation of Oracle Database is finished, click **Close** to dismiss the screen.

1-3. Use ASMCA to create ASM disk group for datafile storage.



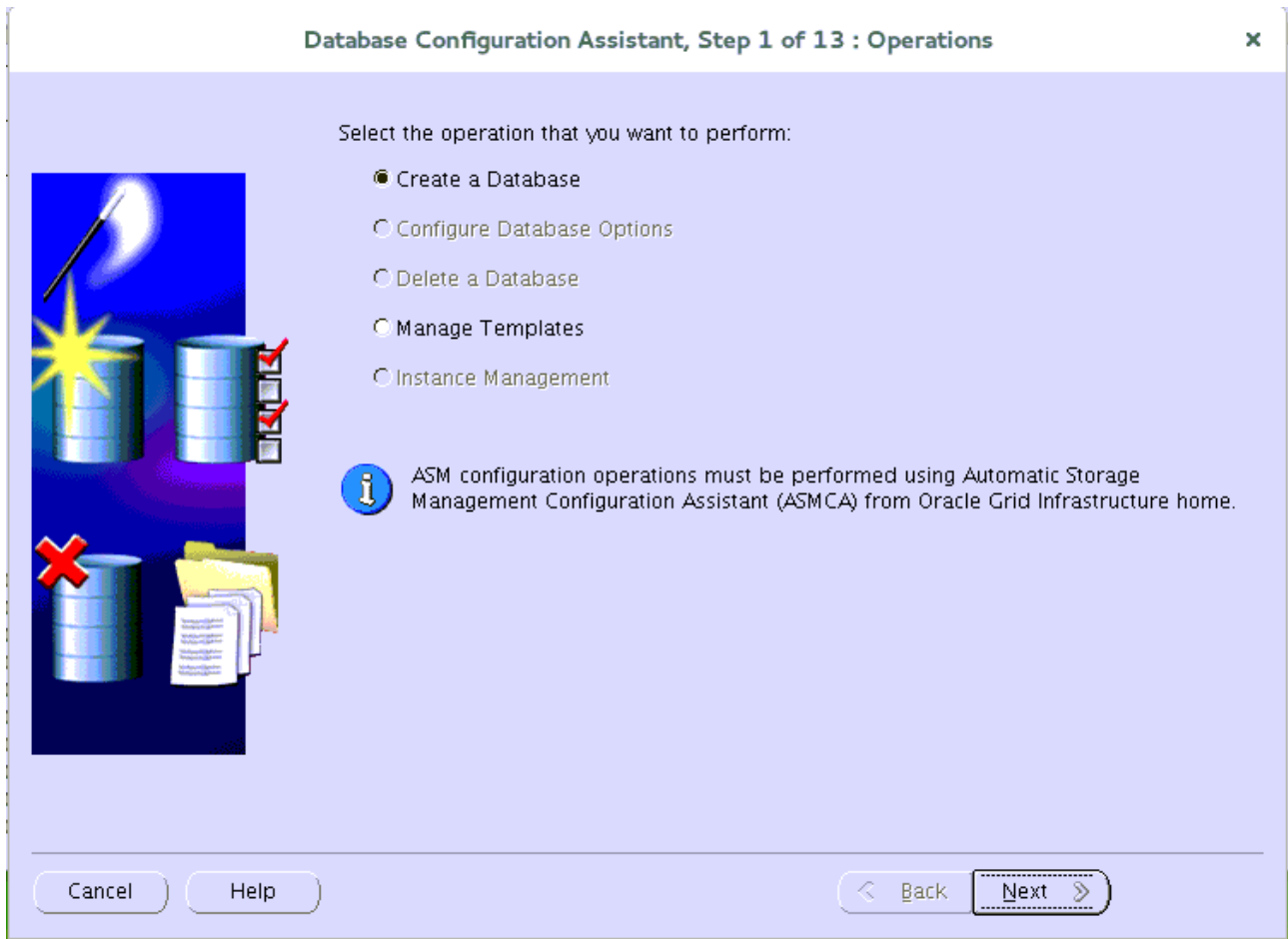
1-4. Using DBCA to create Oracle RAC 11.2.0.4 Database.

1). DBCA - Welcome.



Select the db type that you would like to create, then click **Next** to continue.

2). DBCA - Operations.




Choose option "**Create a Database**", then click **Next** to continue.

3). DBCA - Database Templates.

Database Configuration Assistant, Step 2 of 14 : Database Templates x

Templates that include datafiles contain pre-created databases. They allow you to create a new database in minutes, as opposed to an hour or more. Use templates without datafiles only when necessary, such as when you need to change attributes like block size, which cannot be altered after database creation.




Select	Template	Includes Datafiles
<input checked="" type="radio"/>	General Purpose or Transaction Processing	Yes
<input type="radio"/>	Custom Database	No
<input type="radio"/>	Data Warehouse	Yes

[Show Details...](#)

Select the type of database you want to configure, then click **Next** to continue.

4). DBCA - Database Identification.

Database Configuration Assistant, Step 3 of 13 : Database Identification x



Cluster database configuration can be Policy-Managed or Admin-Managed. A Policy-Managed database is dynamic with instances managed automatically based on pools of servers for effective resource utilization. Admin-Managed database results in instances tied to specific servers.

Configuration Type: Admin-Managed Policy-Managed

An Oracle database is uniquely identified by a Global Database Name, typically of the form "name.domain".

Global Database Name:

A database is referenced by an Oracle instance on each cluster database node. Specify a prefix to be used to name the cluster database instances.

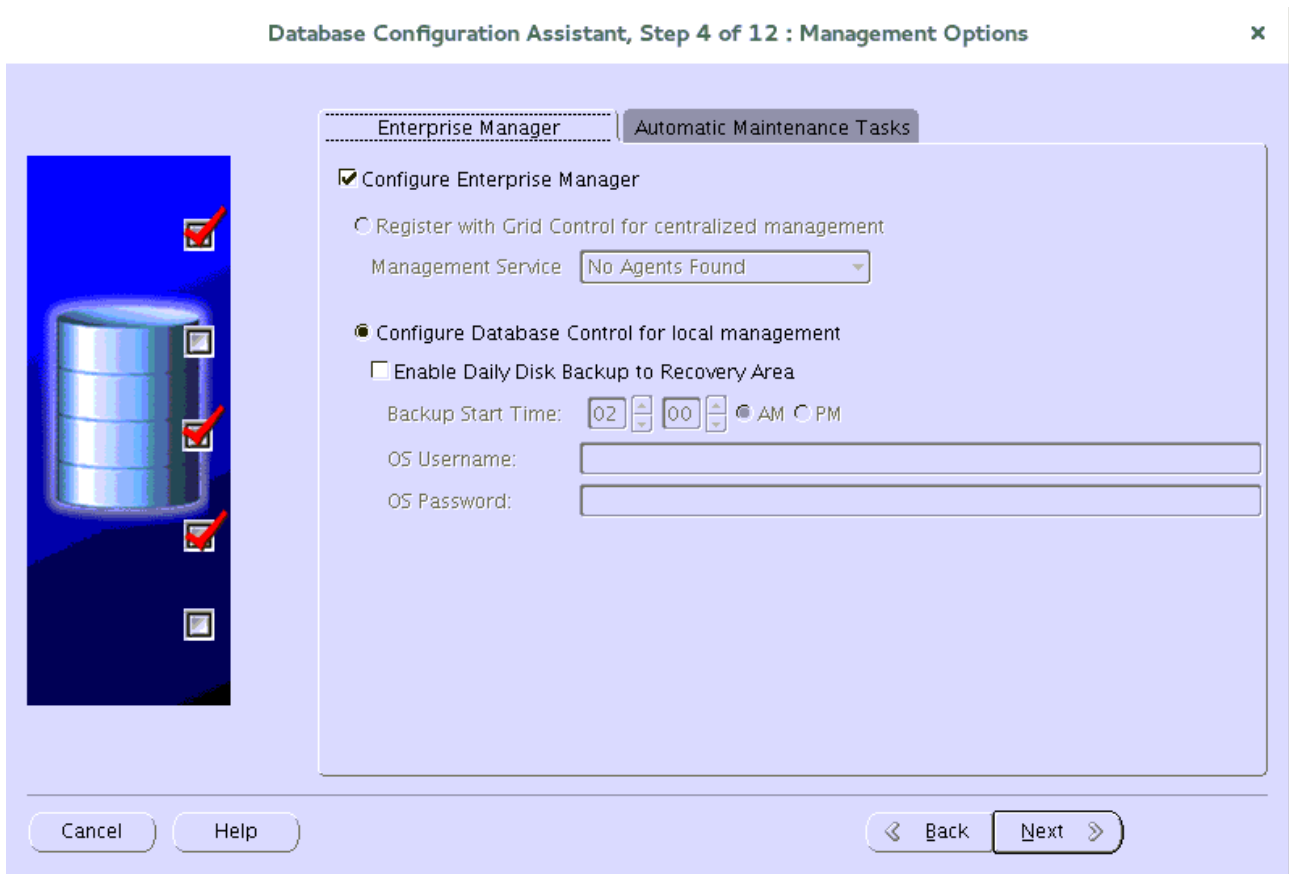
SID Prefix:

Select the nodes on which you want to create the cluster database. The local node "c2n1" will always be used, whether or not it is selected.

c2n1	<input type="checkbox"/>
c2n2	<input type="checkbox"/>
c2n3	<input type="checkbox"/>
c2n4	<input type="checkbox"/>

Fill in **Global Database Name** and **SID** as shown above, then click **Next** to continue.

5). DBCA - Management Options.



Specify the management options for the database, then click **Next** to continue.

6). DBCA - Database Credentials.

Database Configuration Assistant, Step 5 of 12 : Database Credentials ✕

For security reasons, you must specify passwords for the following user accounts in the new database.


Use Different Administrative Passwords

User Name	Password	Confirm Password
SYS		
SYSTEM		
DBSNMP		
SYSMAN		

Use the Same Administrative Password for All Accounts

Password:

Confirm Password:



Specify administrative password for DB users, then click **Next** to continue.

7). DBCA – Database File Locations.

Database Configuration Assistant, Step 6 of 12 : Database File Locations

Specify storage type and locations for database files.

Storage Type: Automatic Storage Management (ASM)

Storage Locations:

Use Database File Locations from Template

Use Common Location for All Database Files

Database Files Location: Browse...

Use Oracle-Managed Files

Database Area: +SUSEDATA Browse...

Multiplex Redo Logs and Control Files...

i If you want to specify different locations for any database files, pick any of the above options except Oracle-Managed Files and use the Storage page later to customize each file location. If you use Oracle-Managed Files, Oracle automatically generates the names for database files, which can not be changed on the Storage page.

File Location Variables...

Cancel Help Back Next

Specify database files storage information as shown above, then click **Next** to continue.

Database Configuration Assistant, Step 6 of 12 : Database File Locations

Specify storage type and locations for database files.

Storage Type: Automatic Storage Management (ASM)

Storage Locations:

Use Database File Locations from Template

Use Common Location for All Database Files

Database Files Location: Browse...

Database Area: +SUSEDATA Browse...

Multiplex Redo Logs and Control Files...

i If you want to specify different locations for any database files, pick any of the above options except Oracle-Managed Files and use the Storage page later to customize each file location. If you use Oracle-Managed Files, Oracle automatically generates the names for database files, which can not be changed on the Storage page.

File Location Variables...

Cancel Help Back Next

ASM Credentials

Specify ASMSNMP password specific to ASM: *****

OK Cancel

Specify ASMSNMP passwork specific to ASM, then click **OK** to continue.

8). DBCA - Recovery Configuration.

Database Configuration Assistant, Step 7 of 12 : Recovery Configuration x

Choose the recovery options for the database:

Specify Fast Recovery Area

This is used as the default for all disk based backup and recovery operations, and is also required for automatic disk based backup using Enterprise Manager. Oracle recommends that the database files and recovery files be located on physically different disks for data protection and performance.

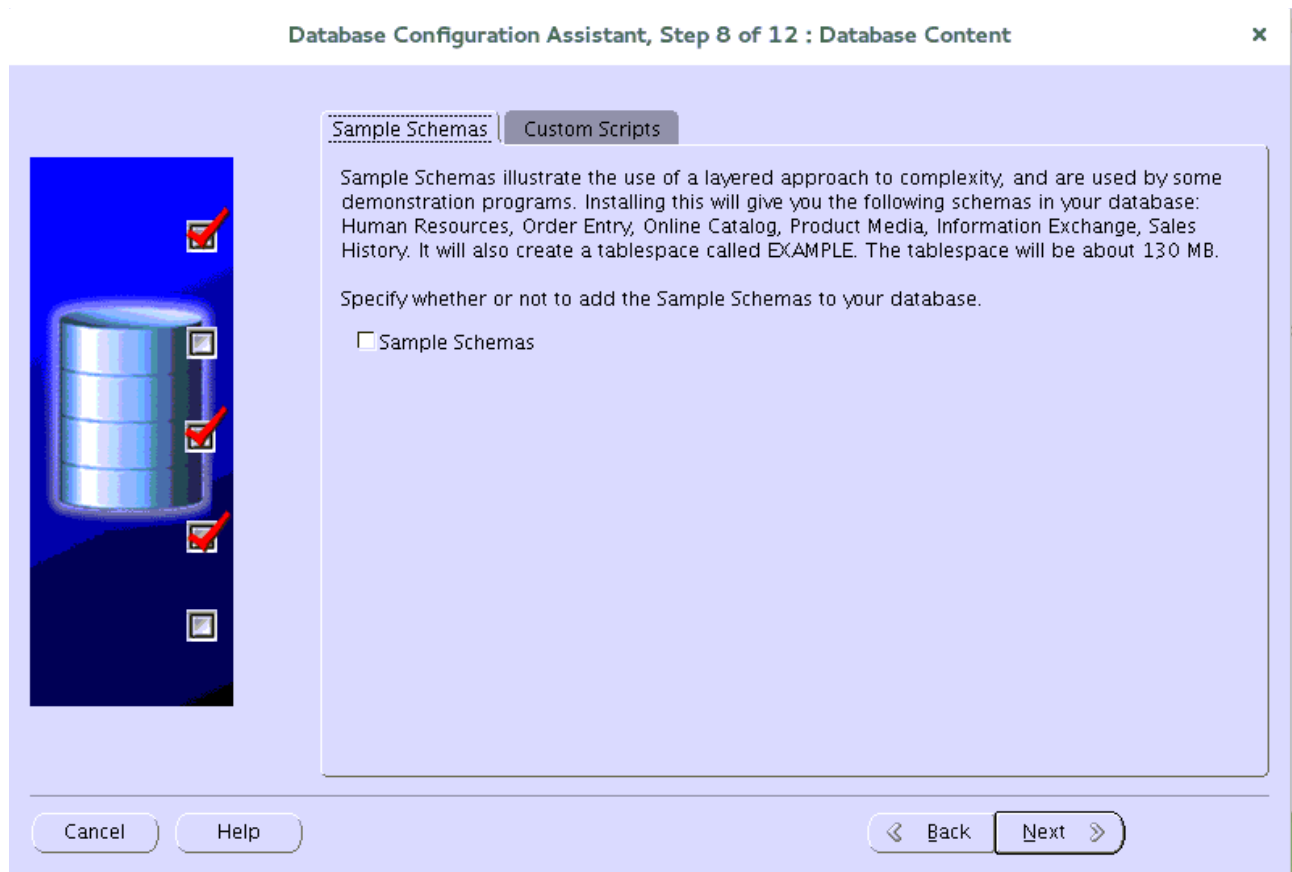
Fast Recovery Area:

Fast Recovery Area Size:

Enable Archiving

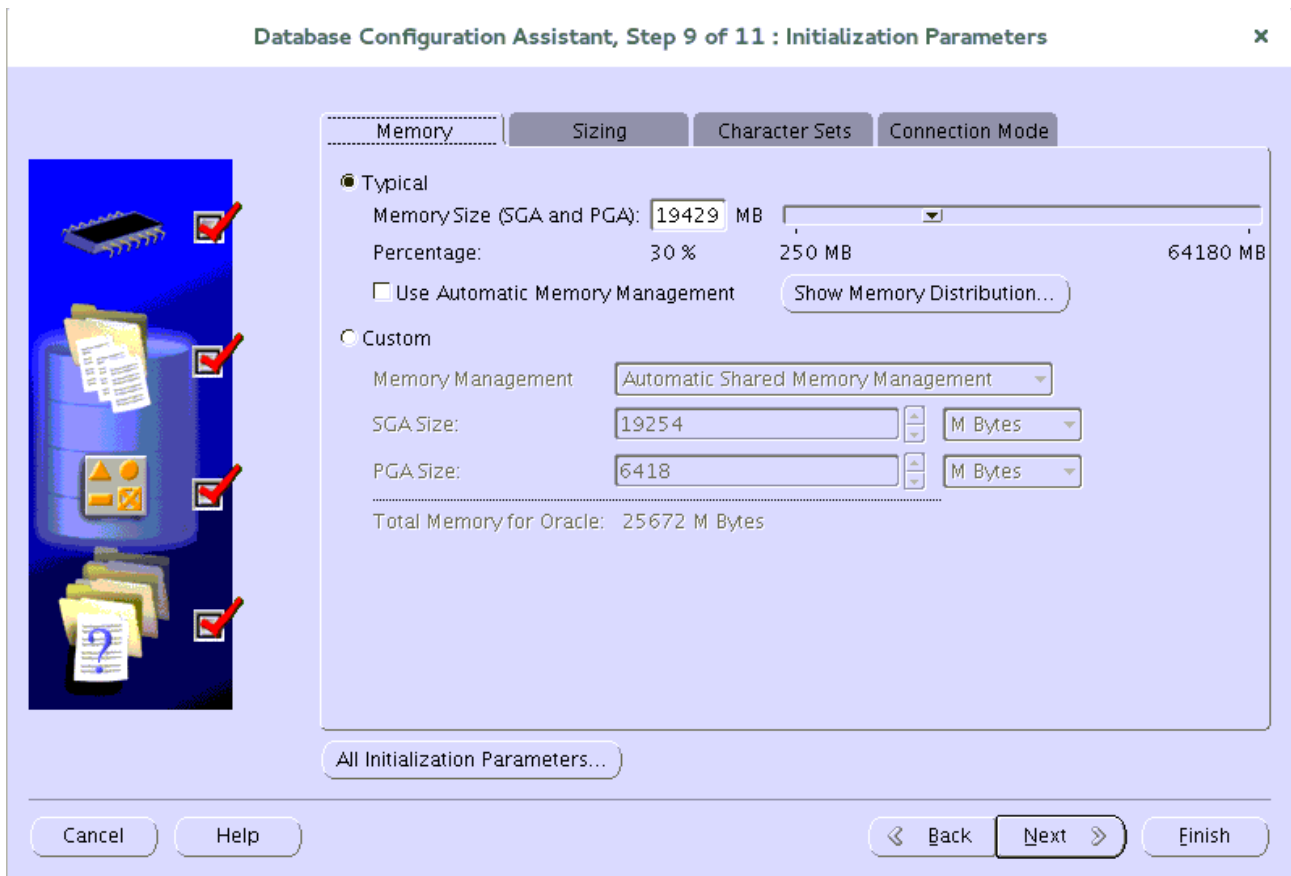
According to your needs to choose the recovery options for the database, then click **Next** to continue.

9). DBCA – Database Content.



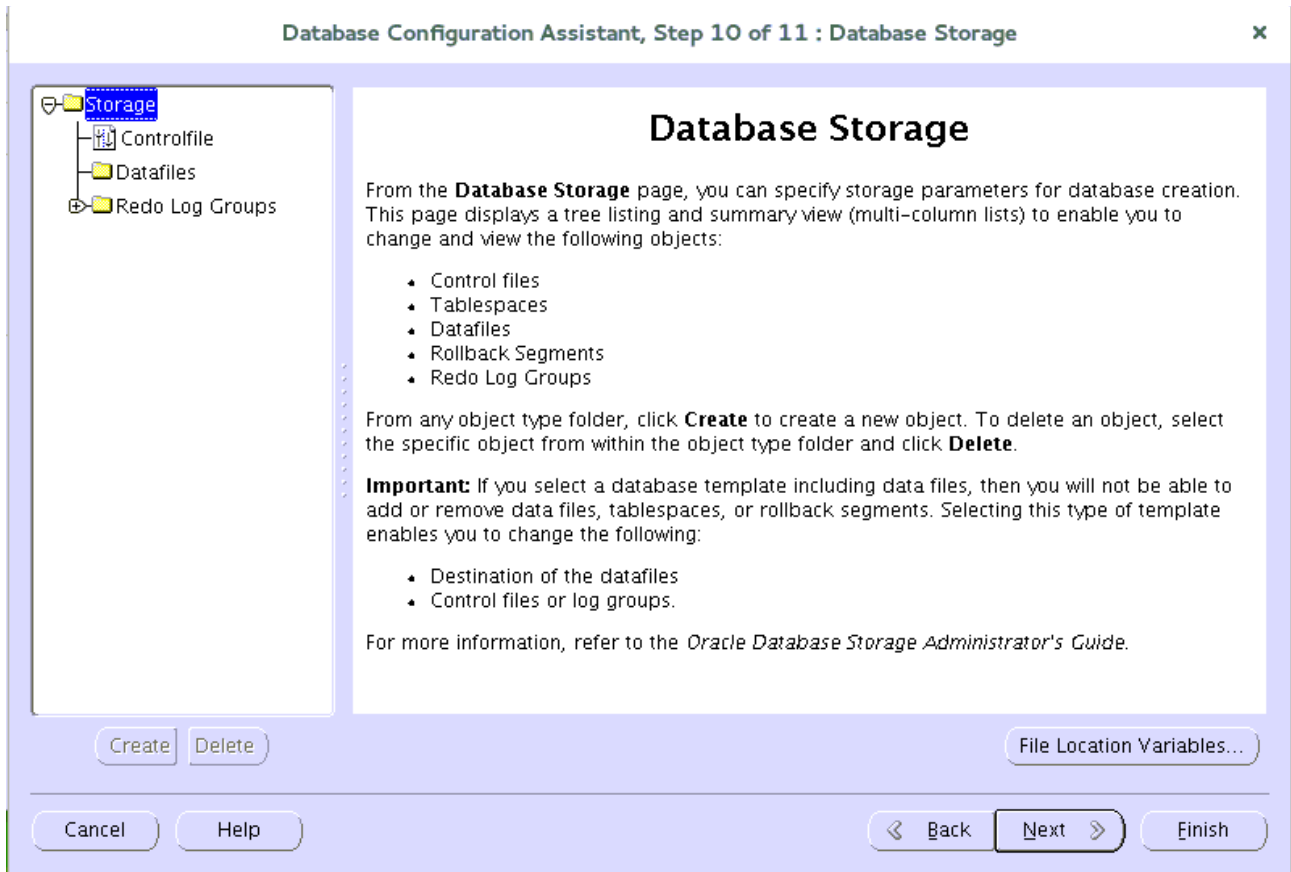
Specify whether or not to add the schemas to your database, then click **Next** to continue.

10). DBCA - Initialization Parameters.



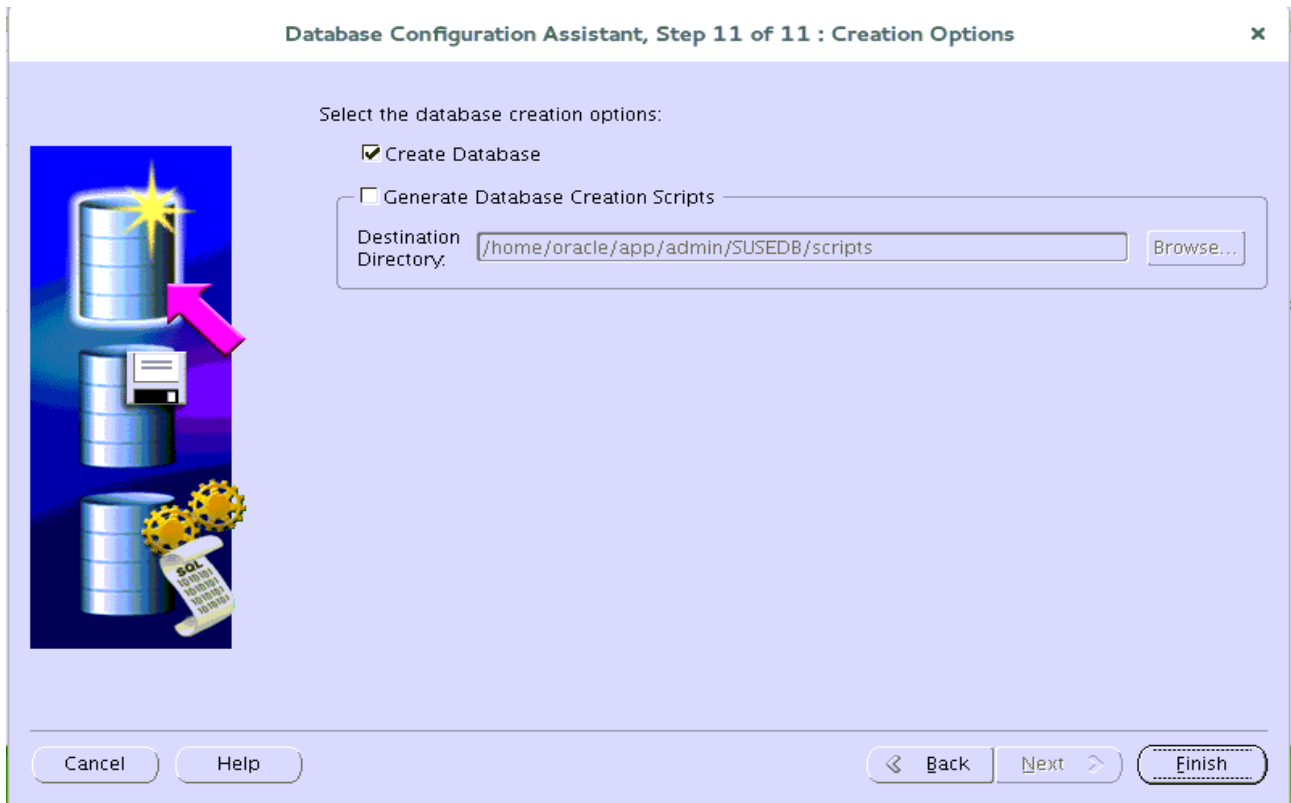
Choose option "**Typical**" and adjust parameters to meet your requirements, then click **Next** to continue.

11). DBCA – Database Storage.

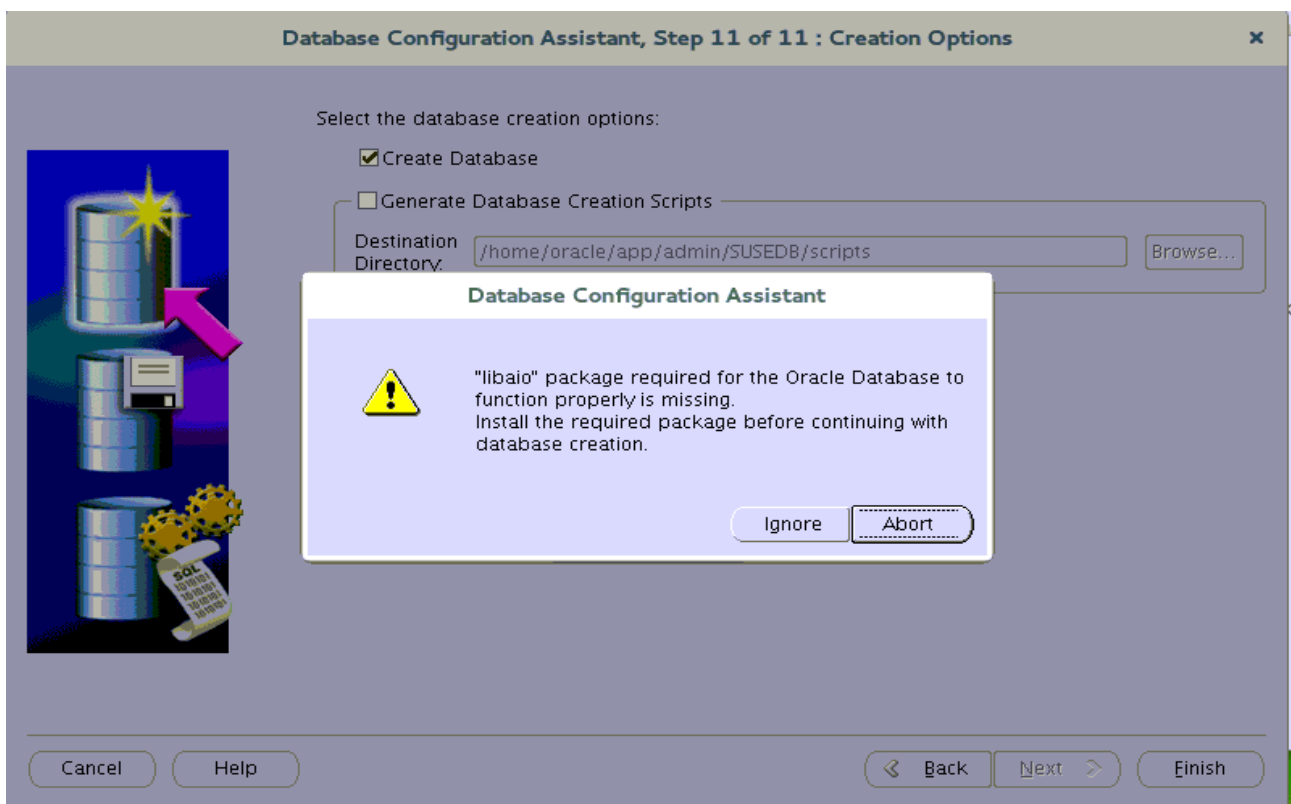


Check the info as shown above, then click **Next** to continue.

12). DBCA - Creation Options.

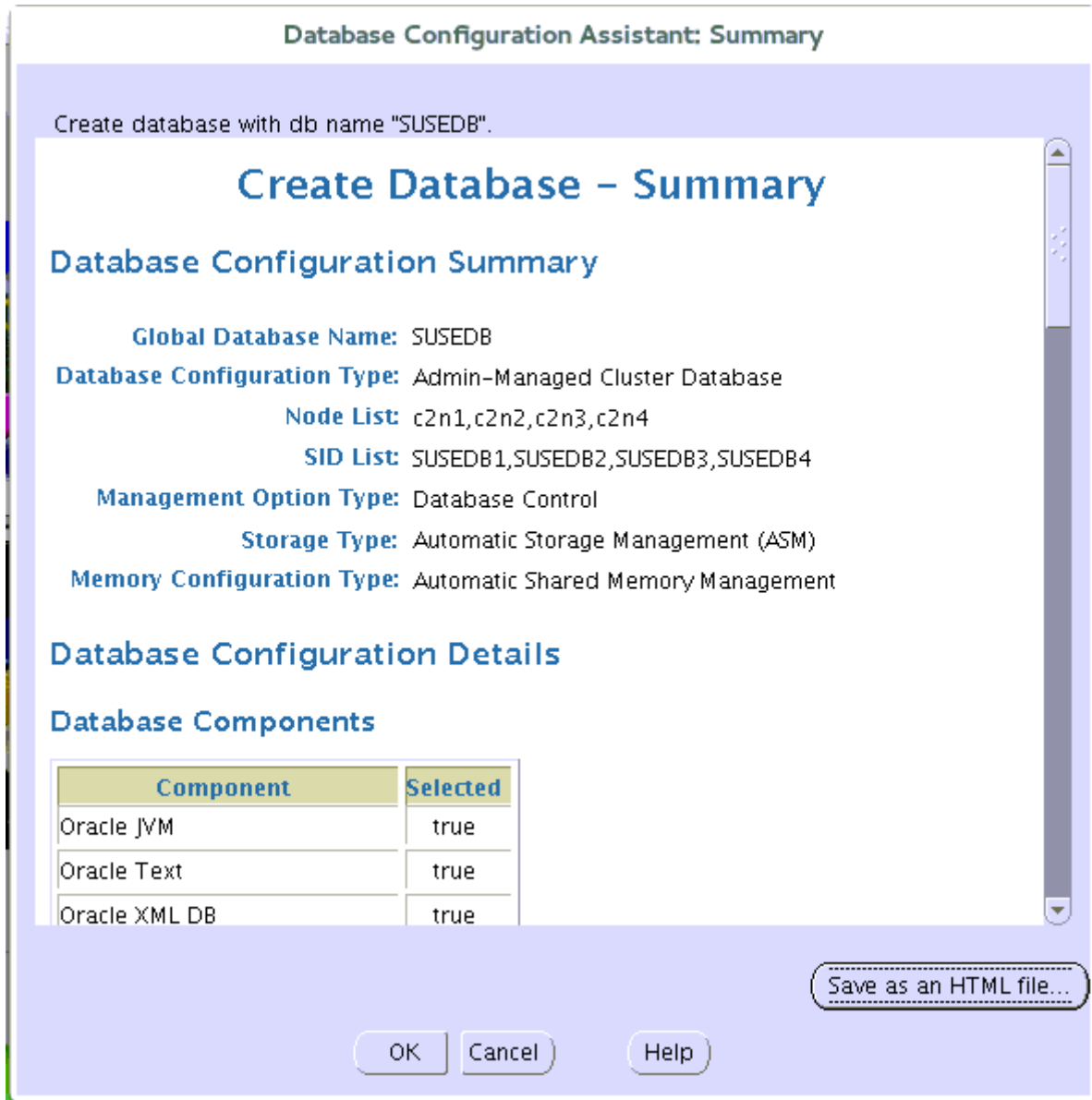


Select the database creation options as shown above, then click **Next** to continue.



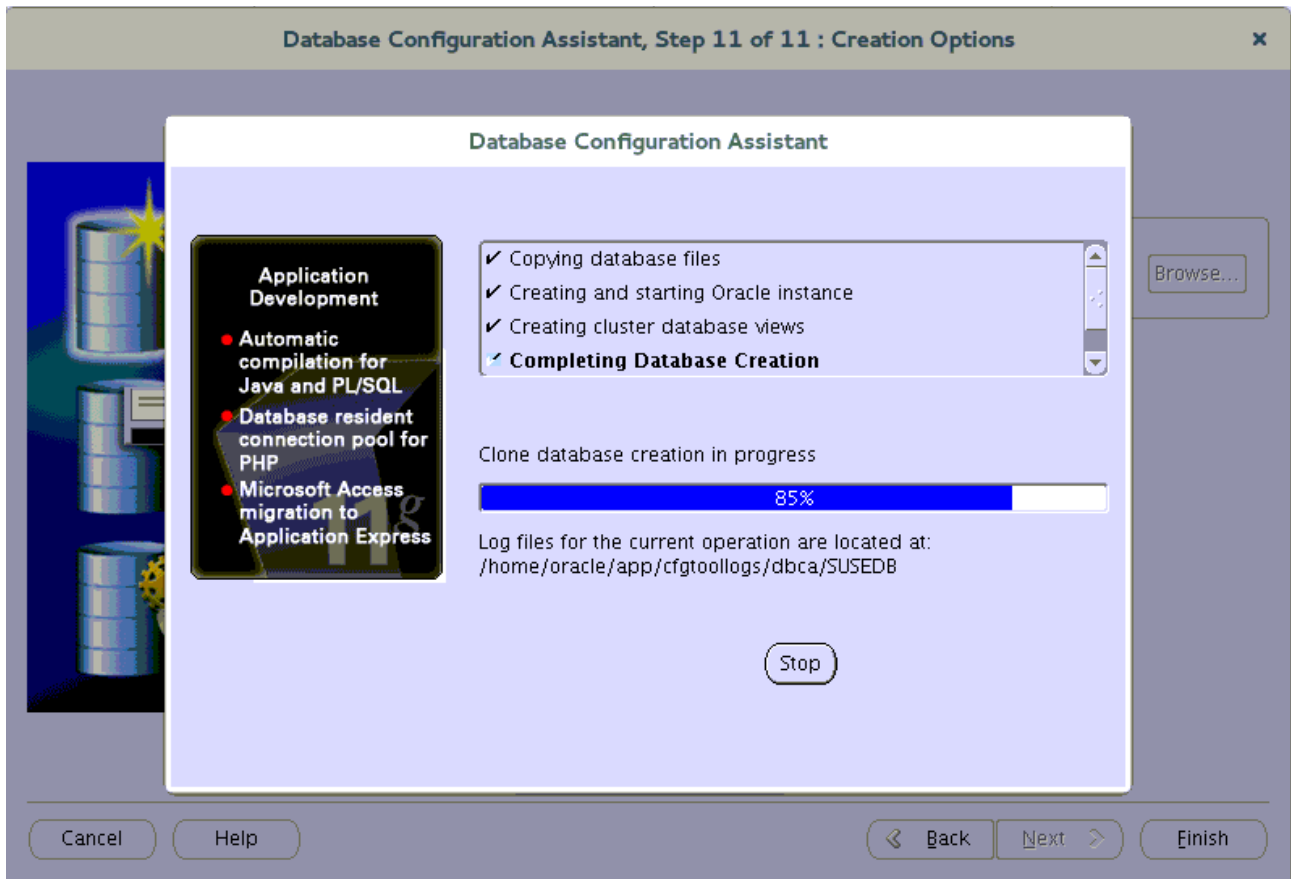
A warning window as shown above, click **Ignore** to continue.

13). DBCA - Summary.



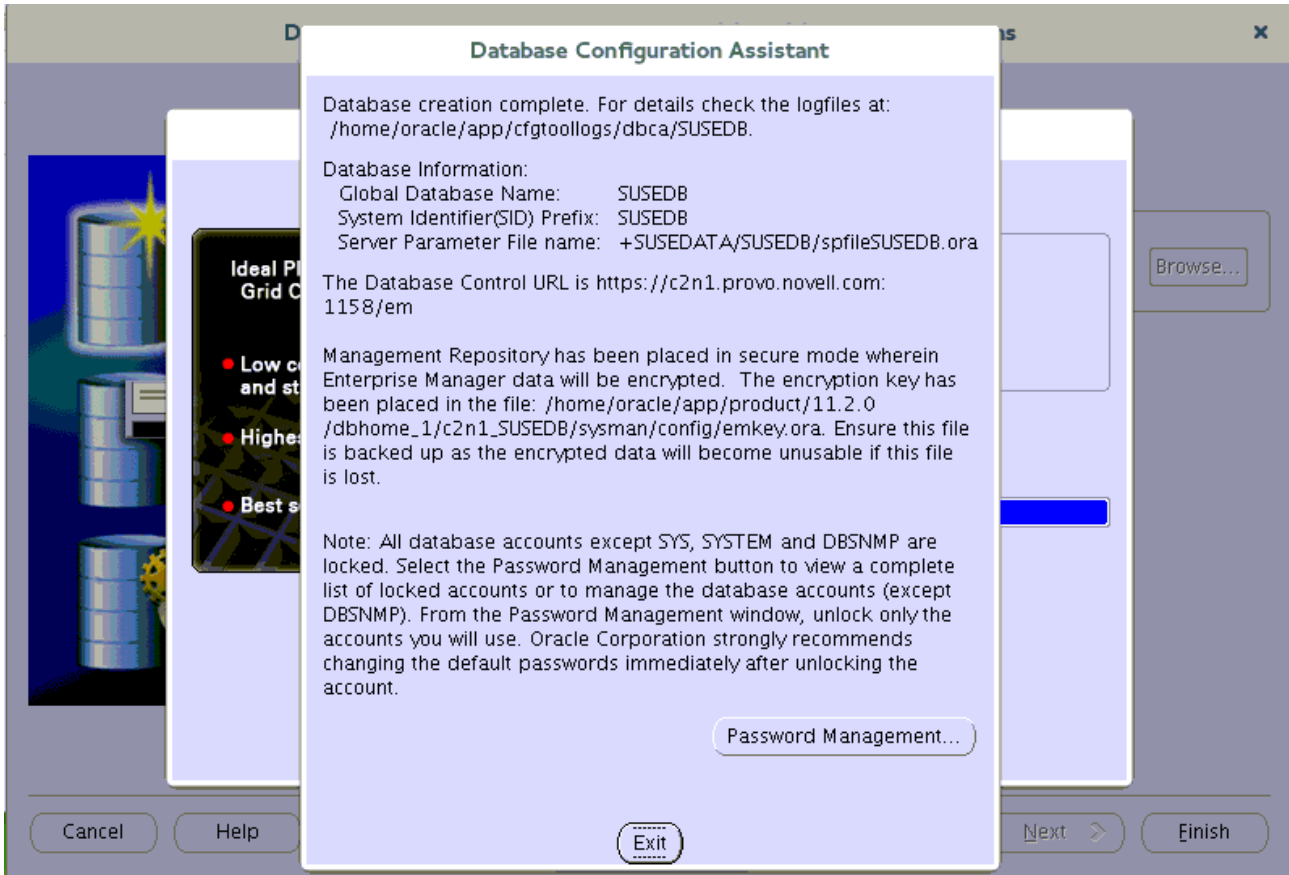
Database Configuration Summary as shown above, check the information, then click **OK** to continue.

14). DBCA - Progress Page.



Database creating progress as shown above, waiting until the creation is complete.

15). DBCA - Finish.



Database creation complete, some information as shown above. Click **Exit** to dismiss the screen.

1-5. Post-Install Checks.

1). Verify database status and configuration.

```
oracle@c2n1:~> export ORACLE_HOME=/home/oracle/app/product/11.2.0/dbhome_1/
oracle@c2n1:~> /home/oracle/app/product/11.2.0/dbhome_1/bin/srvctl status database -d
SUSEDDB
```

```
Instance SUSEDDB1 is running on node c2n1
Instance SUSEDDB2 is running on node c2n2
Instance SUSEDDB3 is running on node c2n3
Instance SUSEDDB4 is running on node c2n4
```

```
oracle@c2n1:~> /home/oracle/app/product/11.2.0/dbhome_1/bin/srvctl config database -d
SUSEDDB -a
```

```
Database unique name: SUSEDDB
Database name: SUSEDDB
Oracle home: /home/oracle/app/product/11.2.0/dbhome_1
Oracle user: oracle
Spfile: +SUSEDATA/SUSEDDB/spfileSUSEDDB.ora
Domain:
Start options: open
Stop options: immediate
Database role: PRIMARY
Management policy: AUTOMATIC
Server pools: SUSEDDB
Database instances: SUSEDDB1,SUSEDDB2,SUSEDDB3,SUSEDDB4
Disk Groups: SUSEDATA
Mount point paths:
Services:
Type: RAC
Database is enabled
Database is administrator managed
```

```
oracle@c2n1:~> /home/grid/bin/crsctl stat res -t
```

NAME	TARGET	STATE	SERVER	STATE_DETAILS

Local Resources				

ora.LISTENER.lsnr				
	ONLINE	ONLINE	c2n1	
	ONLINE	ONLINE	c2n2	
	ONLINE	ONLINE	c2n3	
	ONLINE	ONLINE	c2n4	
ora.SUSEDATA.dg				
	ONLINE	ONLINE	c2n1	
	ONLINE	ONLINE	c2n2	
	ONLINE	ONLINE	c2n3	
	ONLINE	ONLINE	c2n4	
ora.SUSETEST.dg				
	ONLINE	ONLINE	c2n1	
	ONLINE	ONLINE	c2n2	
	ONLINE	ONLINE	c2n3	
	ONLINE	ONLINE	c2n4	
ora.asm				
	ONLINE	ONLINE	c2n1	Started
	ONLINE	ONLINE	c2n2	Started
	ONLINE	ONLINE	c2n3	Started

	ONLINE	ONLINE	c2n4	Started
ora.gsd	OFFLINE	OFFLINE	c2n1	
	OFFLINE	OFFLINE	c2n2	
	OFFLINE	OFFLINE	c2n3	
	OFFLINE	OFFLINE	c2n4	
ora.net1.network	ONLINE	ONLINE	c2n1	
	ONLINE	ONLINE	c2n2	
	ONLINE	ONLINE	c2n3	
	ONLINE	ONLINE	c2n4	
ora.ons	ONLINE	ONLINE	c2n1	
	ONLINE	ONLINE	c2n2	
	ONLINE	ONLINE	c2n3	
	ONLINE	ONLINE	c2n4	

Cluster Resources

ora.LISTENER_SCAN1.lsnr	1	ONLINE	ONLINE	c2n2	
ora.LISTENER_SCAN2.lsnr	1	ONLINE	ONLINE	c2n3	
ora.LISTENER_SCAN3.lsnr	1	ONLINE	ONLINE	c2n1	
ora.c2n1.vip	1	ONLINE	ONLINE	c2n1	
ora.c2n2.vip	1	ONLINE	ONLINE	c2n2	
ora.c2n3.vip	1	ONLINE	ONLINE	c2n3	
ora.c2n4.vip	1	ONLINE	ONLINE	c2n4	
ora.cvu	1	ONLINE	ONLINE	c2n1	
ora.oc4j	1	ONLINE	ONLINE	c2n1	
ora.scan1.vip	1	ONLINE	ONLINE	c2n2	
ora.scan2.vip	1	ONLINE	ONLINE	c2n3	
ora.scan3.vip	1	ONLINE	ONLINE	c2n1	
ora.susedb.db	1	ONLINE	ONLINE	c2n1	Open
	2	ONLINE	ONLINE	c2n2	Open
	3	ONLINE	ONLINE	c2n3	Open
	4	ONLINE	ONLINE	c2n4	Open

2). Verify Oracle Enterprise Manager.

ORACLE Enterprise Manager 11g
Database Control

Cluster Database: SUSEDB

Home | Performance | Availability | Server | Schema | Data Movement | Software and Support | Topology

Latest Data Collected From Target **Apr 19, 2016 2:20:19 AM MDT** (Refresh) View Data **Automatically (60 sec)**

General

Shutdown Black Out

Status **Up**

Instances **4** (↑ 4)

Availability (%) **100**
(Last 24 hours)

Database Name **SUSEDB**

Version **11.2.0.4.0**

Cluster **c2-cluster**

[View All Properties](#)

Host CPU

Load **1.52**

Active Sessions

Maximum CPU **168**

Diagnostic Summary

Interconnect Alerts **0**

ADDM Findings **0**

Active Incidents **0**

Key SQL Profiles **4**

Space Summary

Database Size (GB) **2,019**

Problem Tablespaces **0**

Segment Advisor Recommendations **0**

Policy Violations **0**

High Availability

Console **Details**

Last Backup **n/a**

Flashback Database Logging **Disabled**

Alerts

Category All Critical **1** Warnings **11**

Severity	Target Name	Target Type	Category	Name	Impact Message	Alert Triggered
	SUSEDB-SUSEDB-Database	Cluster	Alerts	Multiple Critical Alerts		Apr 19, 2016 2:20:00

Additional Comments

- *Edit CV_ASSUME_DISTID=SUSE11 parameter in database/stage/cvu/cv/admin/cvu_config & grid/stage/cvu/cv/admin/cvu_config*
- *Apply Patch 18370031 (see MOS Note 1951613.1; this patch is applicable on SLES12 also)*
- *Install libcap1 (libcap2 libraries are installed by default); i.e. libcap1-1.10-59.61.x86_64 & libcap1-32bit-1.10-59.61.x86_64*
- *ksh is replaced by mksh; e.g. mksh-50-2.13.x86_64*
- *libaio has been renamed to libaio1 (i.e. libaio1-0.3.109-17.15.x86_64); ensure that libaio1 is installed*
- *OUI may be invoked with -ignoreSysPreqs to temporarily workaround ongoing CVU check failures*

SuSE ISV Engineering Team
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<https://www.suse.com/>