

Oracle RAC on SUSE Linux Enterprise Server 12 SP1

Installation Guide for x86-64 Architectures

SUSE Linux Enterprise Server 12 SP1
Oracle RAC 12.1.0.2.0

Chen Wu, ISV Technical Manager (SUSE)
Arun Singh, ISV Technical Manager (SUSE)

In database computing, Oracle Real Application Clusters (RAC) provides software for clustering and high availability in Oracle database environments. Oracle includes RAC with the Standard Edition, provided the nodes are clustered using Oracle Clusterware.

SUSE Linux Enterprise Server provides Oracle customers a scalable platform for demanding workloads and applications such as Oracle Database. Oracle and SUSE have teamed up to enable Linux in enterprises with Oracle Database and have created a world-class solution that offers real-grid benefits for IT data centers today. This document provides the details for installing Oracle RAC 12.1.0.2.0 on SUSE Linux Enterprise Server 12 OS.


Disclaimer: Documents published as part of the SUSE Best Practices series have been contributed voluntarily by SUSE employees and third parties. They are meant to serve as examples of how particular actions can be performed. They have been compiled with utmost attention to detail. However, this does not guarantee complete accuracy. SUSE cannot verify that actions described in these documents do what is claimed or whether actions described have unintended consequences. SUSE LLC, its affiliates, the authors, and the translators may not be held liable for possible errors or the consequences thereof.

Contents

1	Introduction	4
2	Hardware and Software Requirements	4
3	Testing 4-Node Cluster Information	5
4	Prerequisites	5
5	Oracle RAC Installation	6
6	Additional Comments	50
7	Legal notice	52
8	GNU Free Documentation License	53

1 Introduction

This document provides the details for installing Oracle RAC 12.1.0.2.0 on SUSE Linux Enterprise Server 12. For the example at hand, the x86_64 version of both the Oracle Database 12c Enterprise and SUSE Linux Enterprise Server is used. Similar steps apply to other platforms (x86, IA64, etc.). If you encounter any problem or have general questions, submit your query to suse-oracle@listx.novell.com.

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

2 Hardware and Software Requirements

Hardware Requirements

TABLE 1: **HARDWARE REQUIREMENTS**

Requirement	Minimum
RAM	32 GB
Swap space	Approximately 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)
(<https://www.suse.com/download/sles/> )

Oracle:

- Database 12c Enterprise/Standard Editions (x86_64)

(<http://www.oracle.com/technetwork/indexes/downloads/index.html#database> ↗)

3 Testing 4-Node Cluster Information

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

4 Prerequisites

4.1 Installing SUSE Linux Enterprise Server 12

Install SUSE Linux Enterprise Server 12 on each node of the cluster. To do so, follow the instructions in the official SUSE Linux Enterprise Server documentation at <https://documentation.suse.com/sles/12-SP5/> ↗

4.2 Network Configuration

The network configuration for your Oracle RAC installation should look 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)

```

5 Oracle RAC Installation

The following sections explain how to perform your Oracle RAC installation.

5.1 Installing Oracle Grid Infrastructure

5.1.1 Preparation

Log in to the SUSE Linux Enterprise Server 12 64-bit OS as a non-administration user. Download the Oracle Database 12c Release 1 Grid Infrastructure (12.1.0.2.0) for Linux x86-64.

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

5.1.2 Installation

For the actual installation, follow the steps below:

1. Select **Installation Option**.

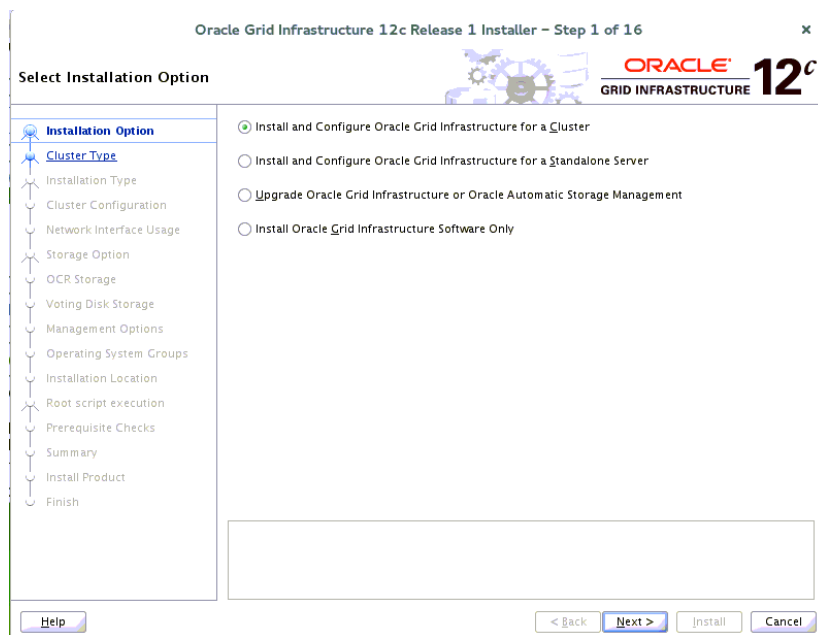


FIGURE 1: INSTALLATION OPTION

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

2. Proceed to Cluster Type.

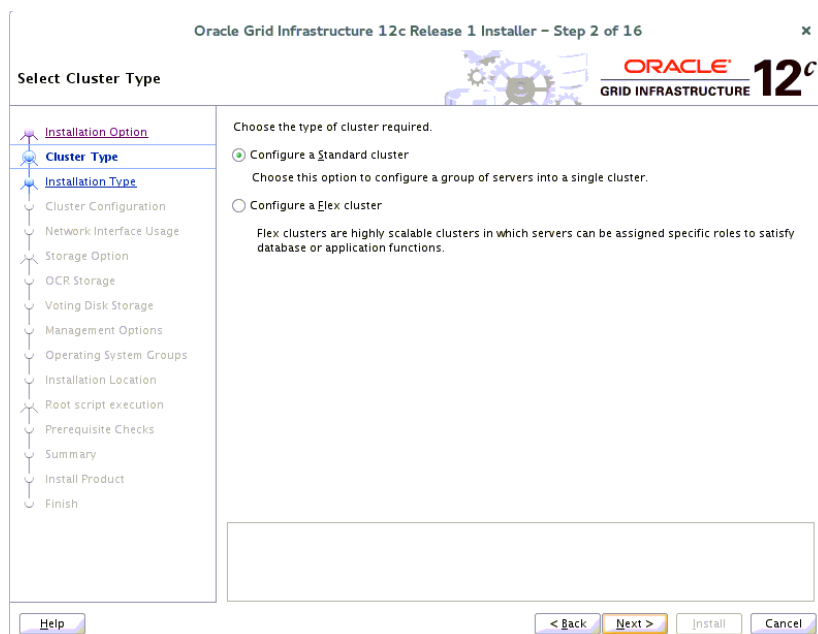


FIGURE 2: CLUSTER TYPE

Choose the option **Configure a Standard Cluster**", then click **Next** to continue.

3. Proceed to **Installation Type**.

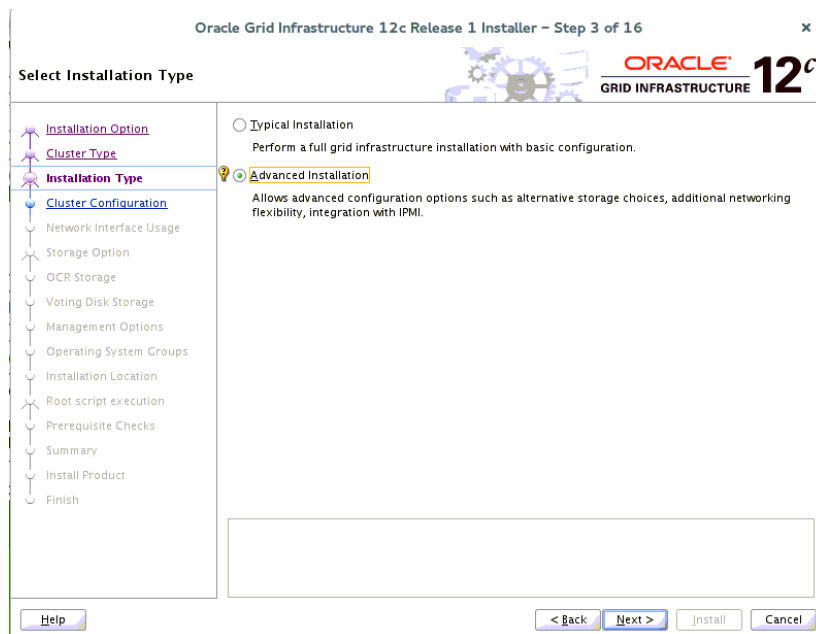


FIGURE 3: **INSTALLATION TYPE**

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

4. Proceed to **Product Languages**.

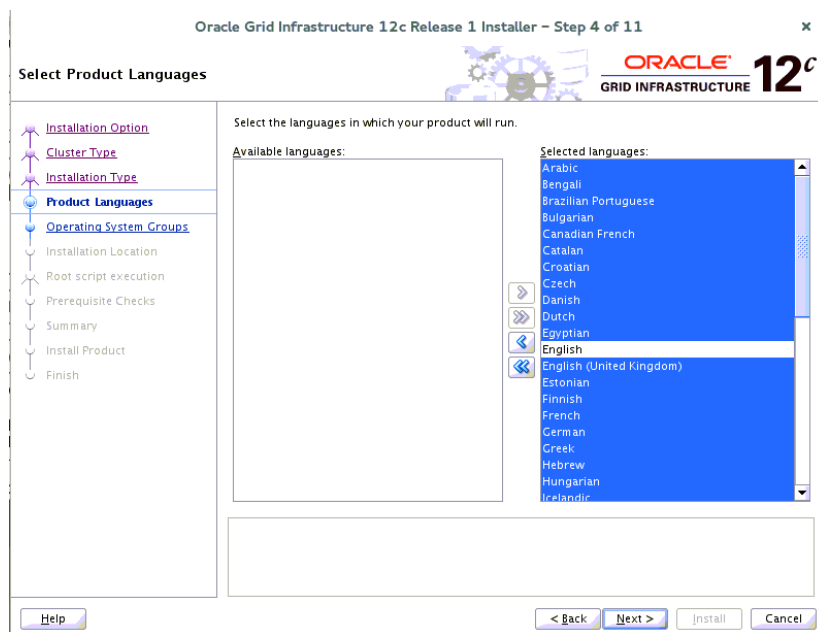


FIGURE 4: PRODUCT LANGUAGES

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

5. Fill in the required **Grid Plug and Play Information**.

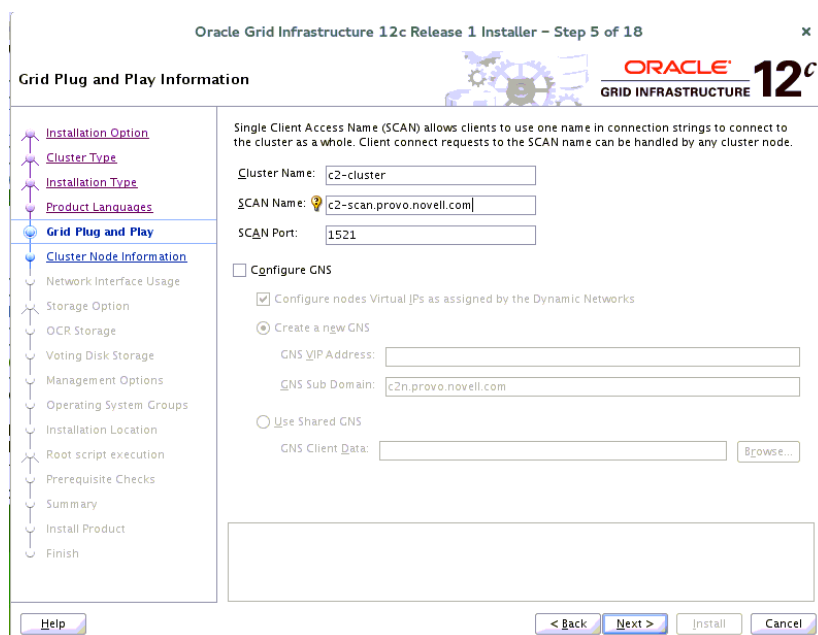


FIGURE 5: GRID PLUG AND PLAY INFORMATION

Fill in the information as displayed in the screenshot, then click **Next** to continue.

For more details about the GNS configuration consult the official Oracle documentation at <https://docs.oracle.com/database/121/CWLIN/toc.htm>.

6. Proceed to Cluster Node Information.

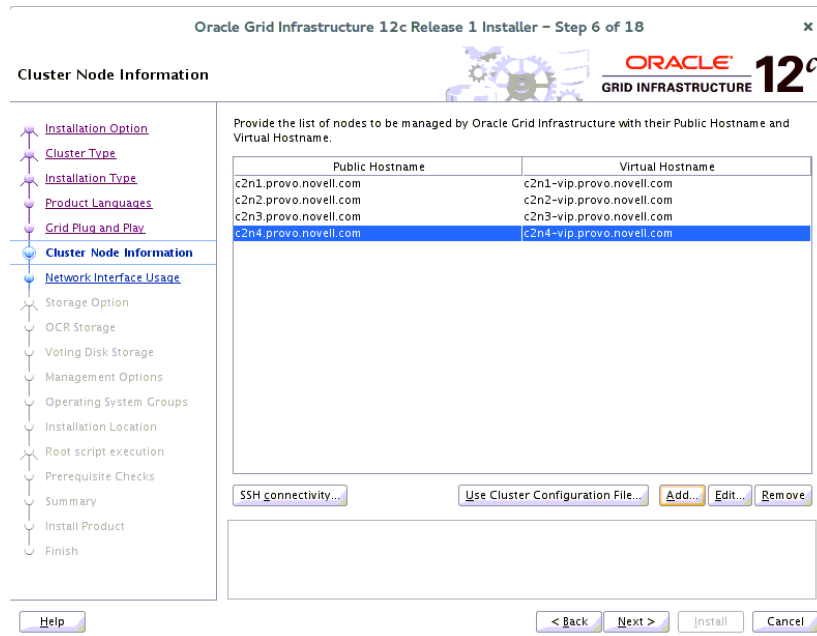


FIGURE 6: CLUSTER NODE INFORMATION

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

7. Specify the Network Interface Usage .

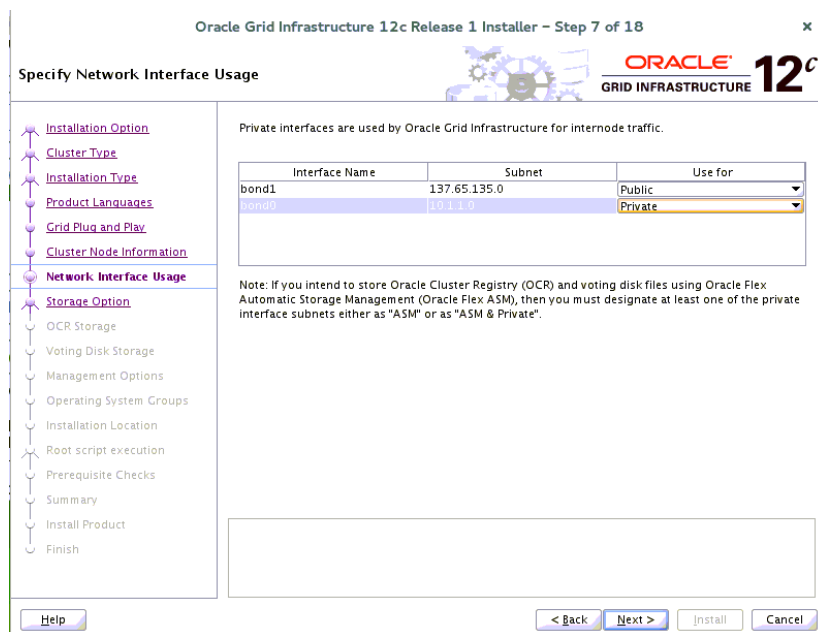


FIGURE 7: NETWORK INTERFACE USAGE

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

8. Fill in the Storage Option Information.

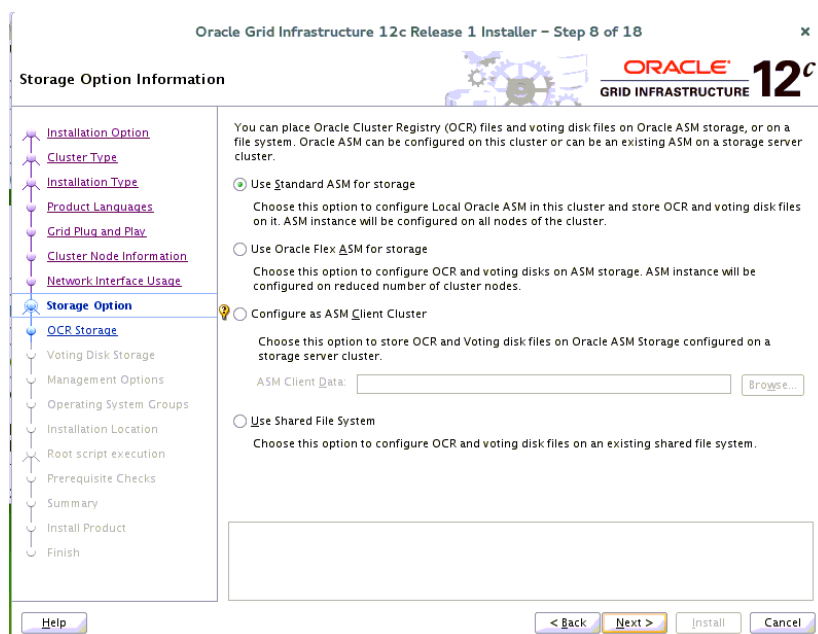


FIGURE 8: STORAGE OPTION INFORMATION

Choose the option **Use Standard ASM for storage**, then click **Next** to continue.

9. Proceed to Create ASM Disk Group.

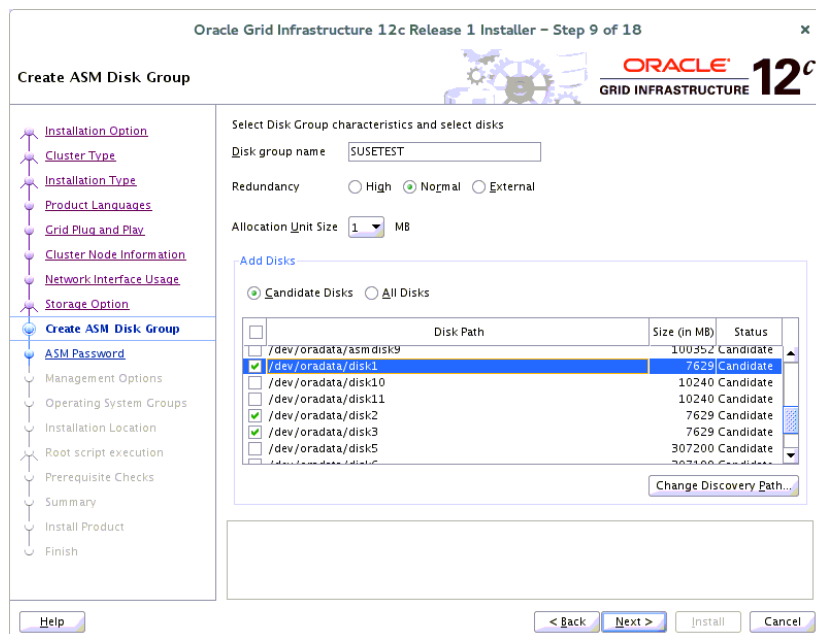


FIGURE 9: CREATE AMS DISK GROUP

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

10. Specify the ASM Password.

Oracle Grid Infrastructure 12c Release 1 Installer - Step 10 of 18

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

FIGURE 10: ASM PASSWORD

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

11. Define the Failure Isolation Support.

Oracle Grid Infrastructure 12c Release 1 Installer - Step 11 of 19

Failure Isolation Support

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)

Help < Back Next > Install Cancel

FIGURE 11: FAILURE ISOLATION SUPPORT

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

12. Specify the Management Options.

The screenshot shows the 'Specify Management Options' window. On the left is a navigation pane with links: Installation Option, Cluster Type, Installation Type, Product Languages, Grid Plug and Play, Cluster Node Information, Network Interface Usage, Storage Option, Create ASM Disk Group, ASM Password, Failure Isolation, Management Options (highlighted), Operating System Groups, Installation Location, Root script execution, Prerequisite Checks, Summary, Install Product, and Finish. The main area contains the text: 'You can configure to have this instance of Oracle Grid Infrastructure and Oracle Automatic Storage Management to be managed by Enterprise Manager Cloud Control. Specify the details of the Cloud Control configuration to perform the registration.' Below this is a checkbox 'Register with Enterprise Manager (EM) Cloud Control'. If checked, there are input fields for 'OMS host:', 'OMS port:', 'EM Admin User Name:', and 'EM Admin Password:'. At the bottom are buttons: Help, < Back, Next >, Install, and Cancel.

FIGURE 12: MANAGEMENT OPTIONS

If you select or deselect the option **Register with EM** depends on your needs. After you made your choice click **Next** to continue.

13. Proceed to *Privileged Operating System Groups*.

The screenshot shows the 'Privileged Operating System Groups' window. The navigation pane on the left is similar to the previous step, but 'Operating System Groups' is highlighted. The main area contains the text: 'Select the name of the operating system group, that you want to use for operating system authentication to Oracle Automatic Storage Management.' Below this are three rows of labels and dropdown menus: 'Oracle ASM Administrator (OSASM) Group' with a dropdown showing 'dba', 'Oracle ASM_DB_A (OSDBA for ASM) Group' with a dropdown showing 'oinstall', and 'Oracle ASM_Operator (OSOPER for ASM) Group (Optional)' with an empty dropdown. At the bottom are buttons: Help, < Back, Next >, Install, and Cancel.

FIGURE 13: PRIVILEGED OPERATING SYSTEM GROUPS

The operating system groups are selected by default. Click **Next** to continue.

14. Specify the **Installation Location**.

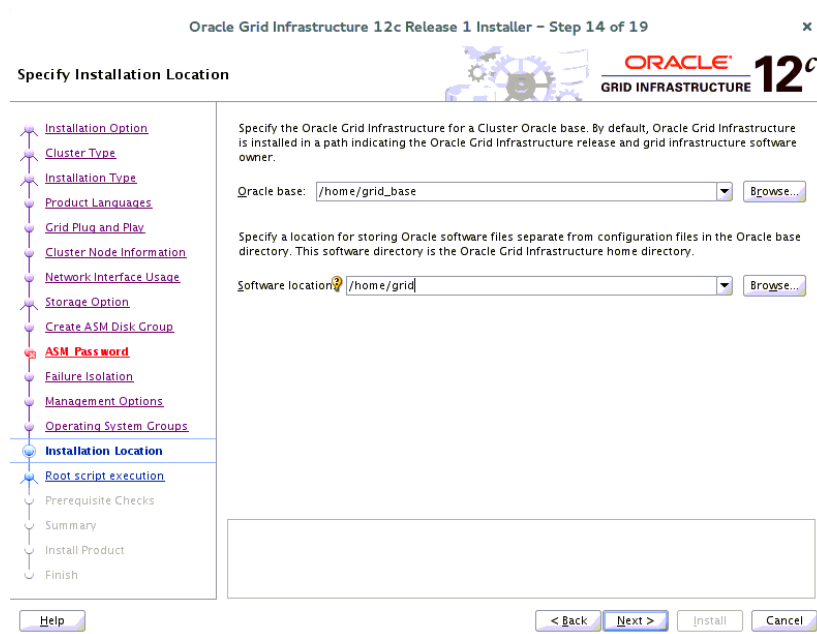


FIGURE 14: **INSTALLATION LOCATION**

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

15. Create the **Inventory**.

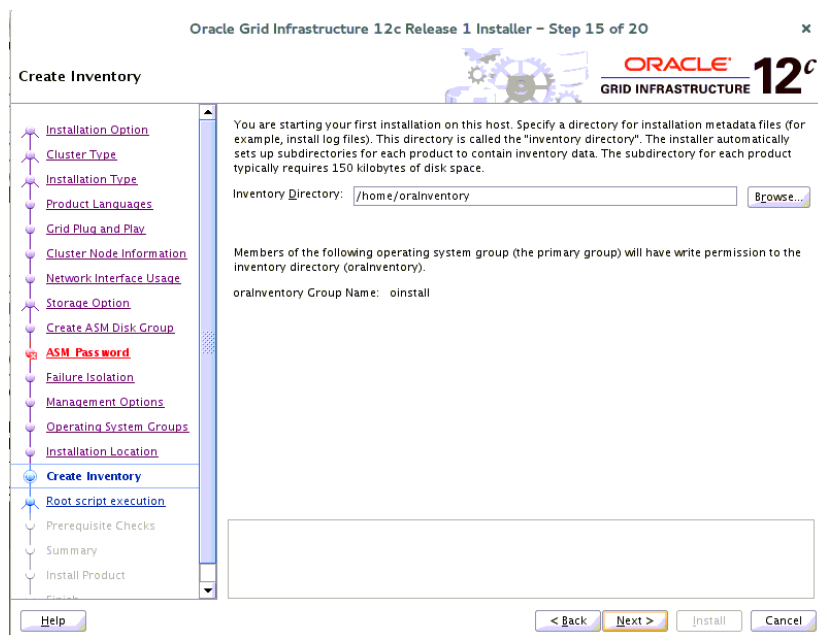


FIGURE 15: CREATE INVENTORY

If this is your first installation on this host, specify a directory for the installation metadata files. Click **Next** to continue.

16. Proceed to Root Script Execution Configuration.

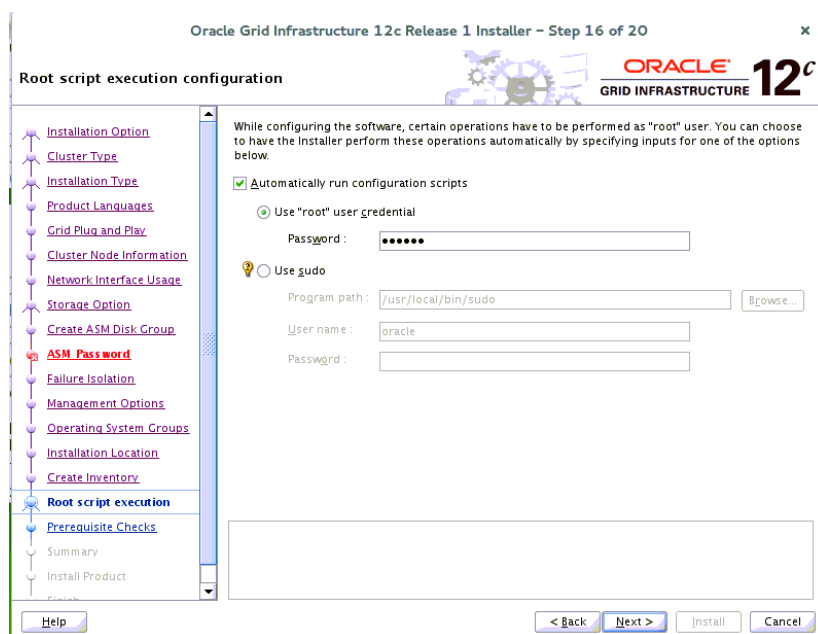


FIGURE 16: ROOT SCRIPT EXECUTION CONFIGURATION

While configuring the software, you need to perform certain operations as **root** user. Choose the option as shown above. The **Installer** will then perform these operations automatically. Fill in the password for **root** user. Click **Next** to continue.

17. Proceed to **Prerequisite Checks**.

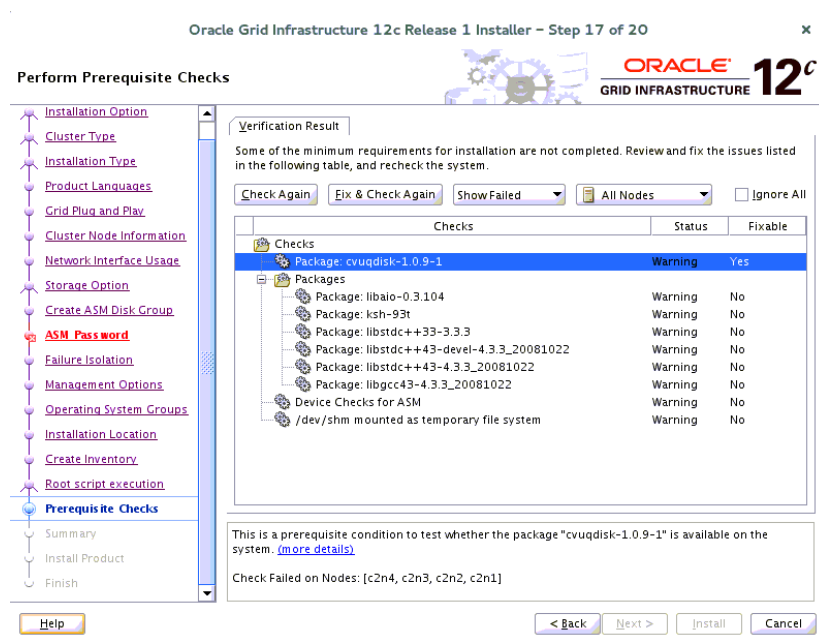


FIGURE 17: **PREREQUISITE CHECKS 1**

Perform the prerequisite check as shown on the screen above. Click **Fix&Check Again** to recheck the system.

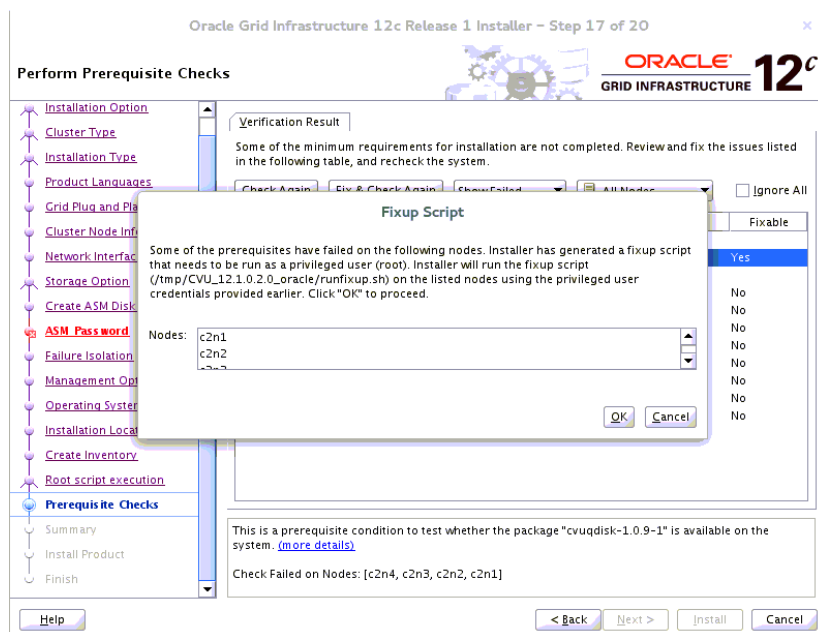


FIGURE 18: PREREQUISITE CHECKS 2

Follow the prompts, and run the fixup script as **root** manually on each node. Click **OK**.

```
c2n1:/home # /tmp/CVU_12.1.0.2.0_oracle/runfixup.sh
All Fix-up operations were completed successfully.
c2n1:/home #
```

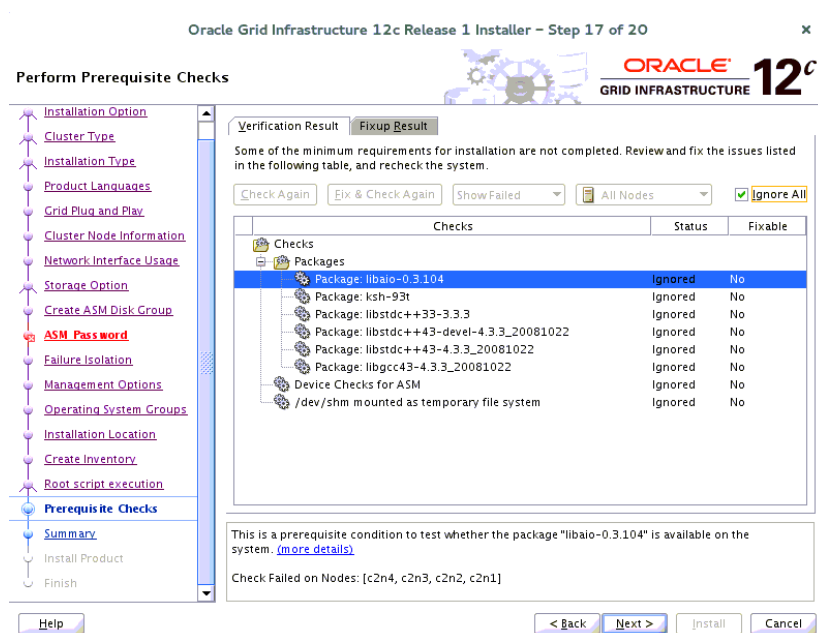


FIGURE 19: PREREQUISITE CHECKS 3

On the **Fixup Result** tab, activate the option **Ignore All**. Click **Next** to continue.

18. Review the **Summary**.

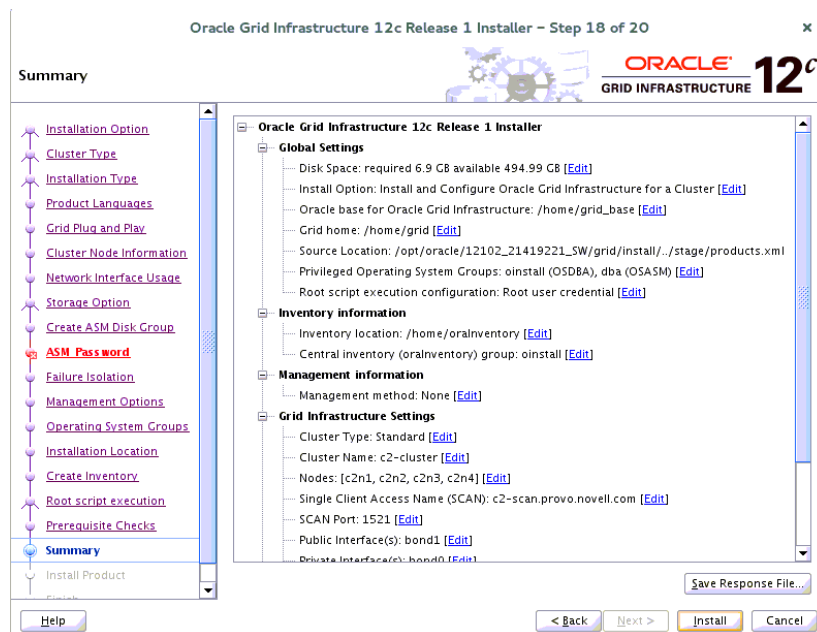


FIGURE 20: **SUMMARY**

Review the installation **Summary** as shown above. If everything is correct, click **Install** to continue.

19. Install the product.

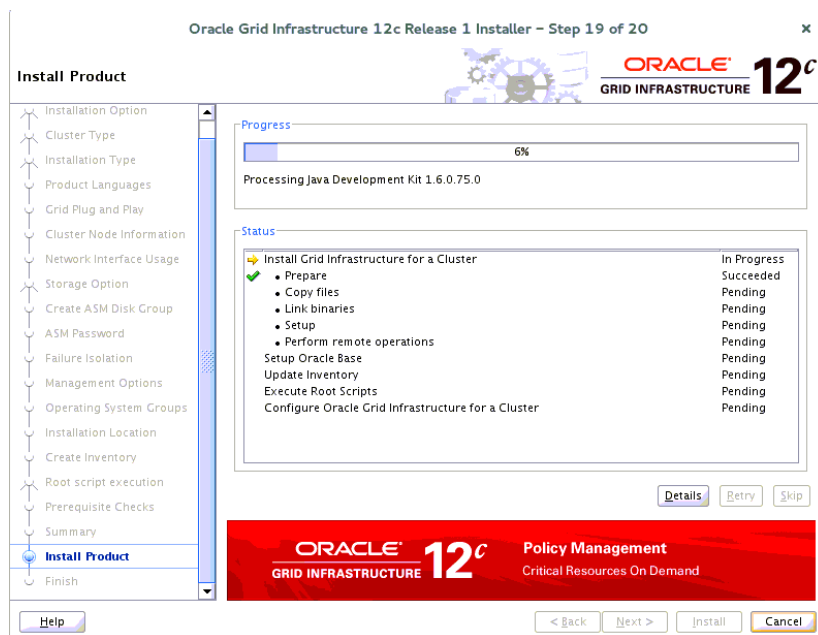


FIGURE 21: INSTALL PRODUCT - PROGRESS

The packages are being installed.

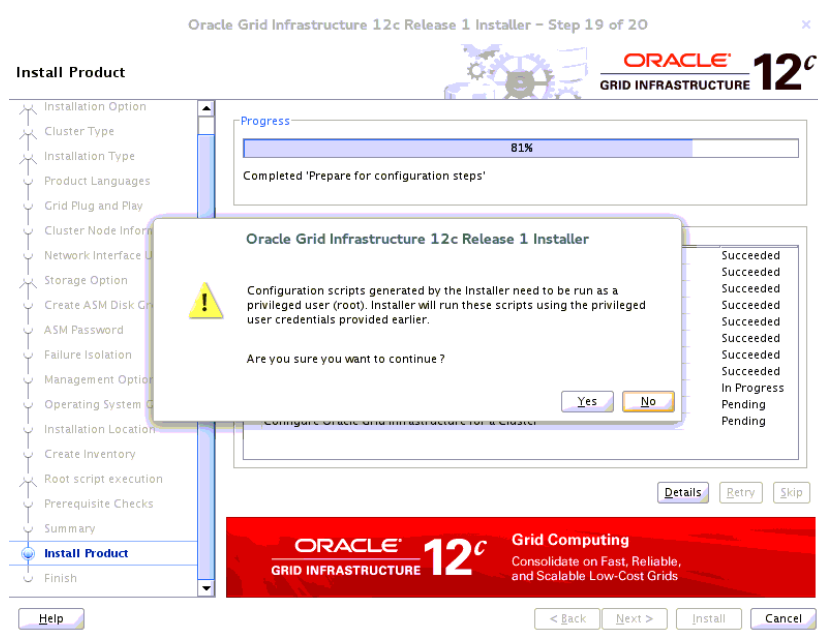


FIGURE 22: INSTALL PRODUCT - CONFIGURATION STEPS

The action **prepare for configuration steps** is to be completed. At this point you first need to install the Oracle Patch 18456643. After that, click **Yes** to run the configuration scripts.

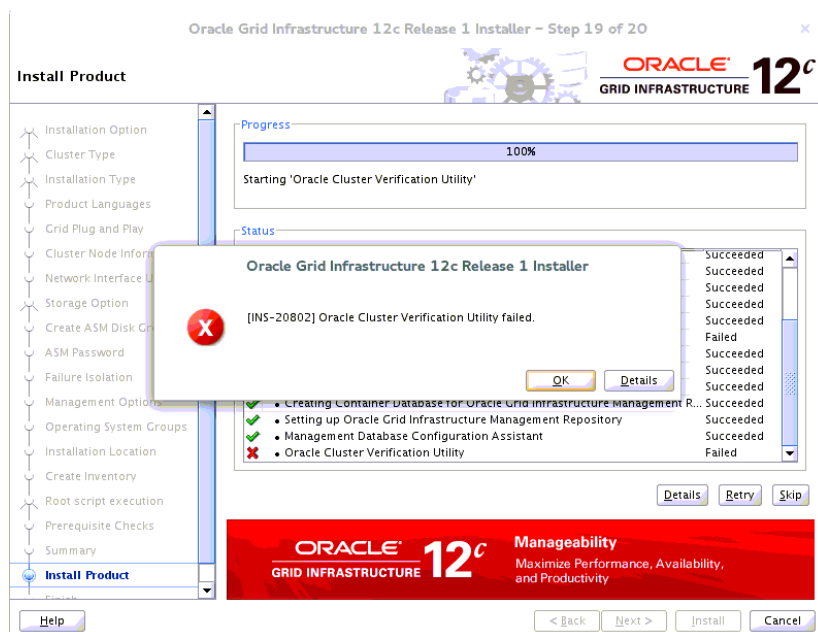


FIGURE 23: INSTALL PRODUCT - VERIFICATION UTILITY

An error message will pop up **Oracle Cluster Verification Utility failed**. Ignore the error and click **OK** to continue.

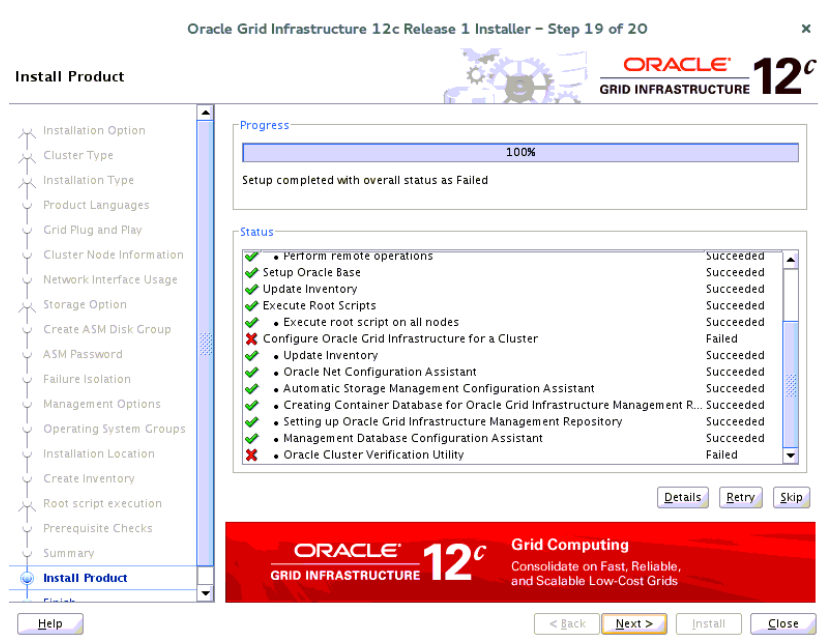


FIGURE 24: INSTALL PRODUCT - SETUP COMPLETED

When the setup is completed, click **Next** to continue.

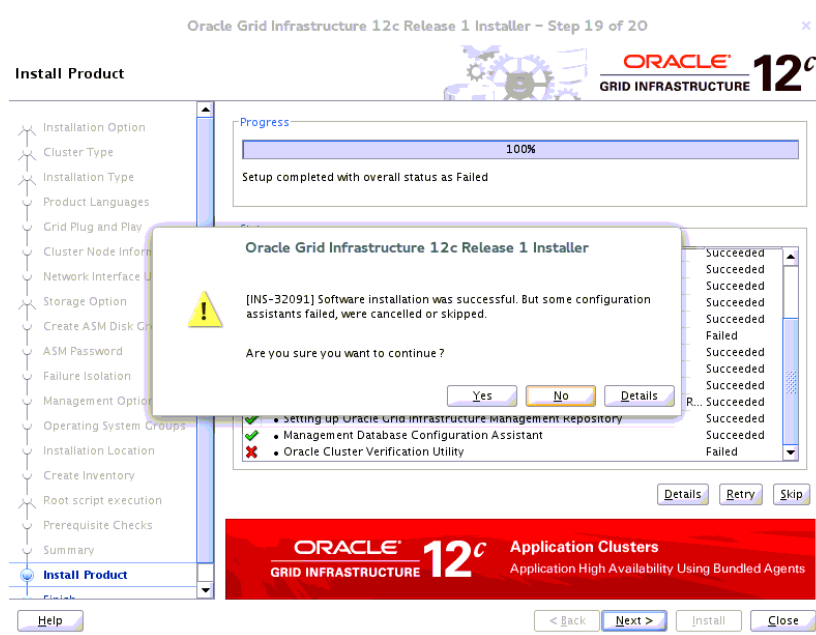


FIGURE 25: INSTALL PRODUCT - SETUP COMPLETED MESSAGE

An error message will pop up to inform you about some configuration assistants that failed. Click **Yes** to confirm.

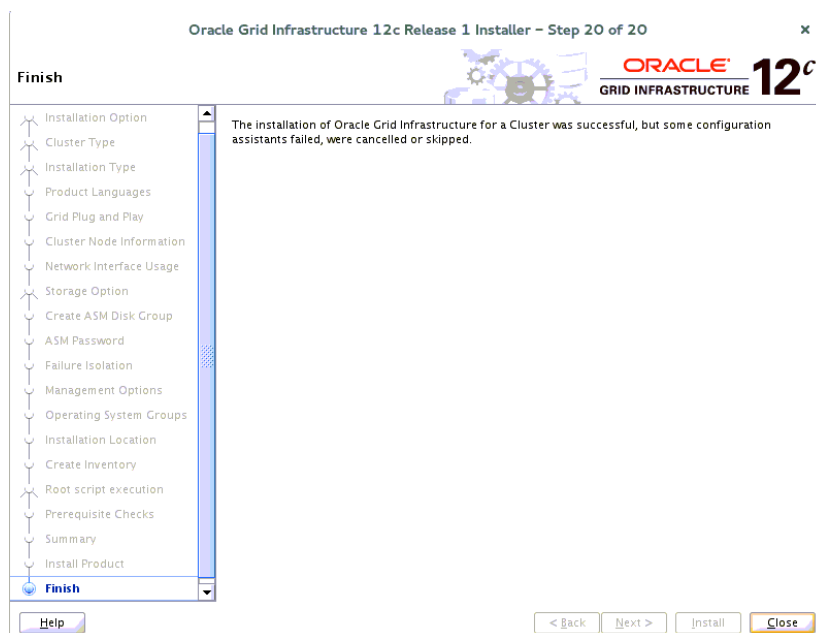


FIGURE 26: INSTALL PRODUCT - FINISH

You have now finished the installation of the Oracle Grid Infrastructure for a Cluster.

5.1.3 Post-Installation Checks

1. Check the 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 the Oracle Clusterware resources:

```
oracle@c2n1:~> /home/grid/bin/srvctl status nodeapps
VIP c2n1-vip.provo.novell.com is enabled
VIP c2n1-vip.provo.novell.com is running on node: c2n1
VIP c2n2-vip.provo.novell.com is enabled
VIP c2n2-vip.provo.novell.com is running on node: c2n2
VIP c2n3-vip.provo.novell.com is enabled
VIP c2n3-vip.provo.novell.com is running on node: c2n3
VIP c2n4-vip.provo.novell.com is enabled
VIP c2n4-vip.provo.novell.com is running on node: c2n4
Network is enabled
Network is running on node: c2n1
Network is running on node: c2n4
Network is running on node: c2n3
Network is running on node: c2n2
ONS is enabled
ONS daemon is running on node: c2n1
ONS daemon is running on node: c2n4
ONS daemon is running on node: c2n3
```

ONS daemon is running on node: c2n2

3. Check the status of the 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	STABLE
	ONLINE	ONLINE	c2n2	STABLE
	ONLINE	ONLINE	c2n3	STABLE
	ONLINE	ONLINE	c2n4	STABLE
ora.SUSETEST.dg				
	ONLINE	ONLINE	c2n1	STABLE
	ONLINE	ONLINE	c2n2	STABLE
	ONLINE	ONLINE	c2n3	STABLE
	ONLINE	ONLINE	c2n4	STABLE
ora.SUSETEST01.dg				
	ONLINE	ONLINE	c2n1	STABLE
	ONLINE	ONLINE	c2n2	STABLE
	ONLINE	ONLINE	c2n3	STABLE
	ONLINE	ONLINE	c2n4	STABLE
ora.asm				
	ONLINE	ONLINE	c2n1	Started,STABLE
	ONLINE	ONLINE	c2n2	Started,STABLE
	ONLINE	ONLINE	c2n3	Started,STABLE
	ONLINE	ONLINE	c2n4	Started,STABLE
ora.net1.network				
	ONLINE	ONLINE	c2n1	STABLE
	ONLINE	ONLINE	c2n2	STABLE
	ONLINE	ONLINE	c2n3	STABLE
	ONLINE	ONLINE	c2n4	STABLE
ora.ons				
	ONLINE	ONLINE	c2n1	STABLE
	ONLINE	ONLINE	c2n2	STABLE
	ONLINE	ONLINE	c2n3	STABLE
	ONLINE	ONLINE	c2n4	STABLE
Cluster Resources				
ora.LISTENER_SCAN1.lsnr				
1	ONLINE	ONLINE	c2n4	STABLE
ora.LISTENER_SCAN2.lsnr				
1	ONLINE	ONLINE	c2n3	STABLE


```

ora.LISTENER_SCAN3.lsnr
  1    ONLINE  ONLINE      c2n1                STABLE
ora.MGMTLSNR
  1    ONLINE  ONLINE      c2n1                169.254.38.57 10.1.1.1,STABLE
ora.c2n1.vip
  1    ONLINE  ONLINE      c2n1                STABLE
ora.c2n2.vip
  1    ONLINE  ONLINE      c2n2                STABLE
ora.c2n3.vip
  1    ONLINE  ONLINE      c2n3                STABLE
ora.c2n4.vip
  1    ONLINE  ONLINE      c2n4                STABLE
ora.cvu
  1    ONLINE  ONLINE      c2n1                STABLE
ora.mgmtdb
  1    ONLINE  ONLINE      c2n1                Open,STABLE
ora.oc4j
  1    ONLINE  ONLINE      c2n1                STABLE
ora.scan1.vip
  1    ONLINE  ONLINE      c2n4                STABLE
ora.scan2.vip
  1    ONLINE  ONLINE      c2n3                STABLE
ora.scan3.vip
  1    ONLINE  ONLINE      c2n1                STABLE
-----

```

4. Check OCR and the Voting disk files:

```

oracle@c2n1:~> /home/grid/bin/ocrcheck
Status of Oracle Cluster Registry is as follows :
    Version                          :            4
    Total space (kbytes)              :       409568
    Used space (kbytes)               :        1696
    Available space (kbytes)          :       407872
    ID                                : 1286433802
    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     3195ba343d234f0cbf92bf2df0f7d3b9 (/dev/oradata/disk1) [SUSETEST]
2.  ONLINE     3410554dce114fa1bfb86b8cd1f3288b (/dev/oradata/disk2) [SUSETEST]
3.  ONLINE     69bb2fac7bac4f71bf4b3ec63154f76c (/dev/oradata/disk3) [SUSETEST]
Located 3 voting disk(s).
```

5.2 Installing Oracle Database

5.2.1 Preparation

Log in to the SUSE Linux Enterprise Server 12 64-bit OS as a non-admin user. Download the Oracle Database 12c Release 1 (12.1.0.2.0) for Linux x86-64.

Extract `grid.zip` and run the installer '`./runInstaller`' from Database ShipHome.

5.2.2 Installation

For the actual installation, follow the steps below:

1. Select **Configure Security Updates**

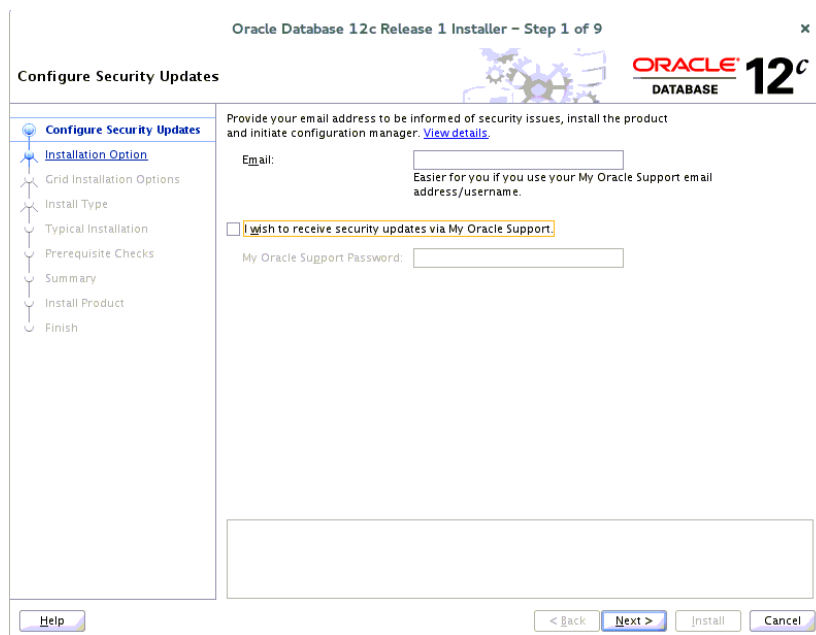


FIGURE 27: CONFIGURE SECURITY UPDATES

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

2. Proceed to **Installation Option**.

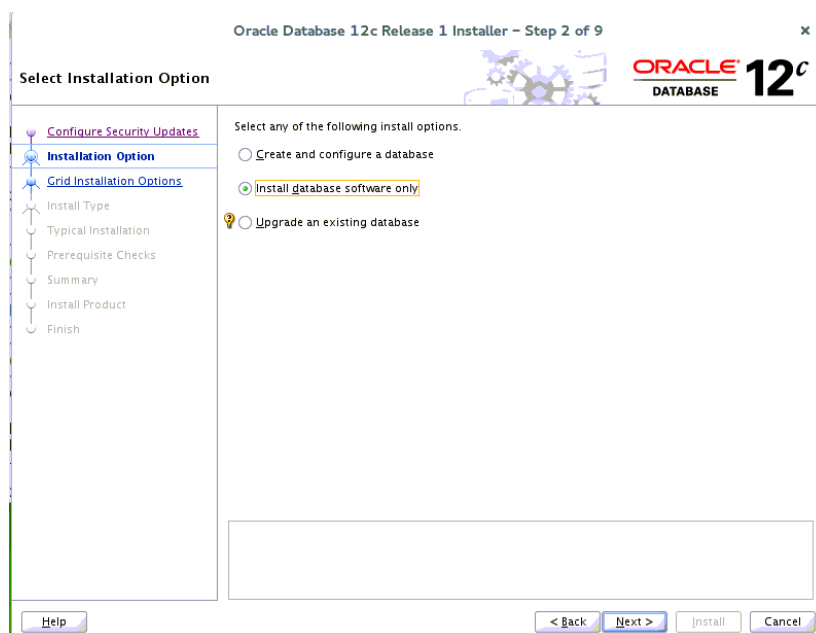


FIGURE 28: INSTALLATION OPTION

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

3. Proceed to **Grid Installation Options**.

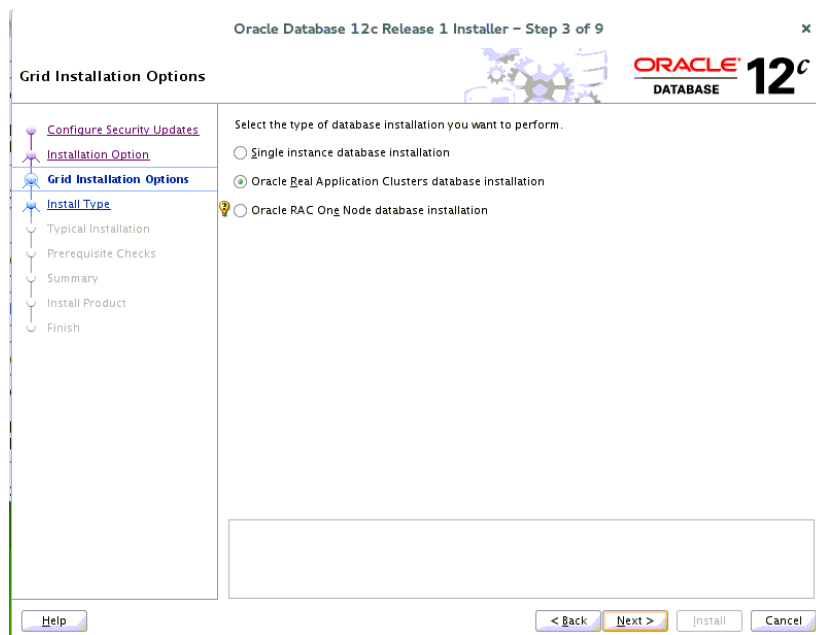


FIGURE 29: GRID INSTALLATION OPTIONS

Choose the option **Oracle Real Application Clusters database installation**, then click **Next** to continue.

4. Go to **Nodes Selection** to select from the list of nodes.

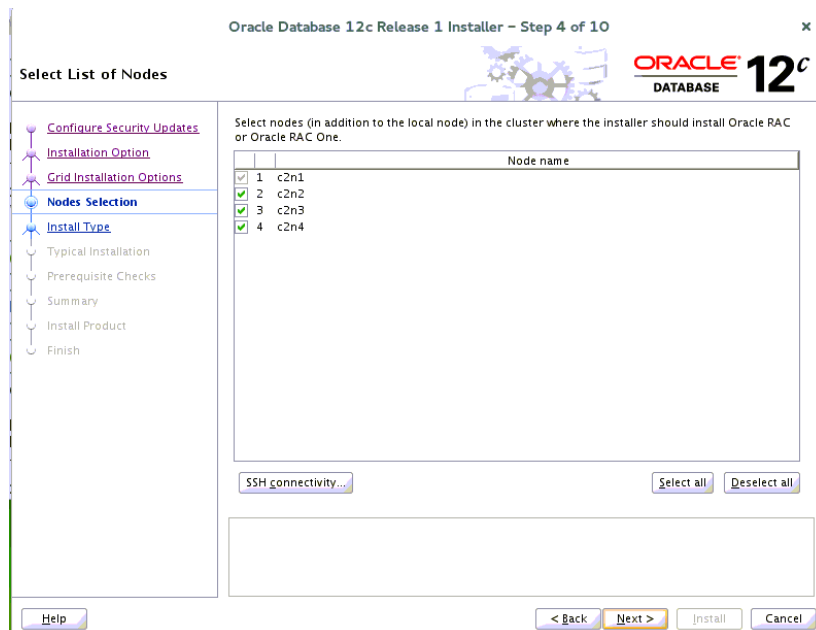


FIGURE 30: NODES SELECTION

Select all nodes in the cluster, then click **Next** to continue.

5. Proceed to **Product Languages**.

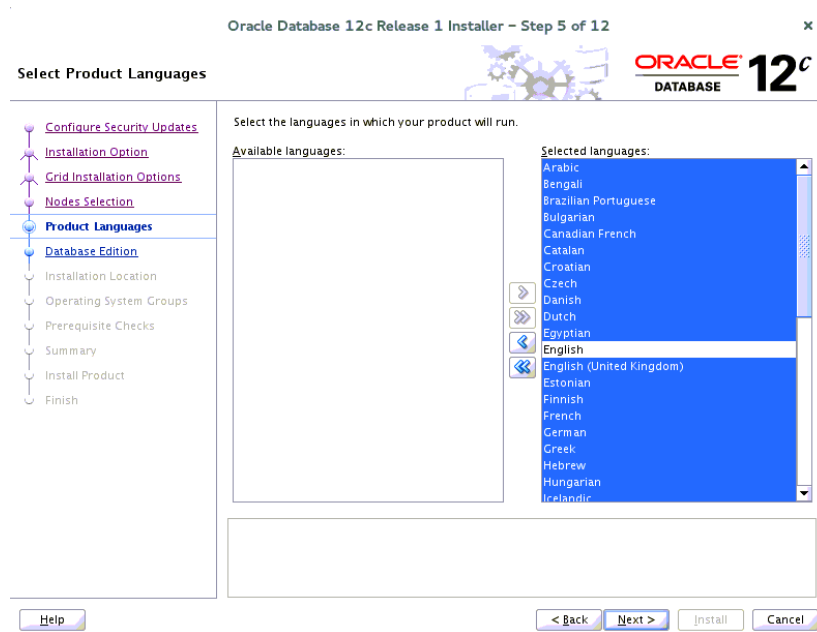


FIGURE 31: **PRODUCT LANGUAGES**

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

6. Select the **Database Edition**.

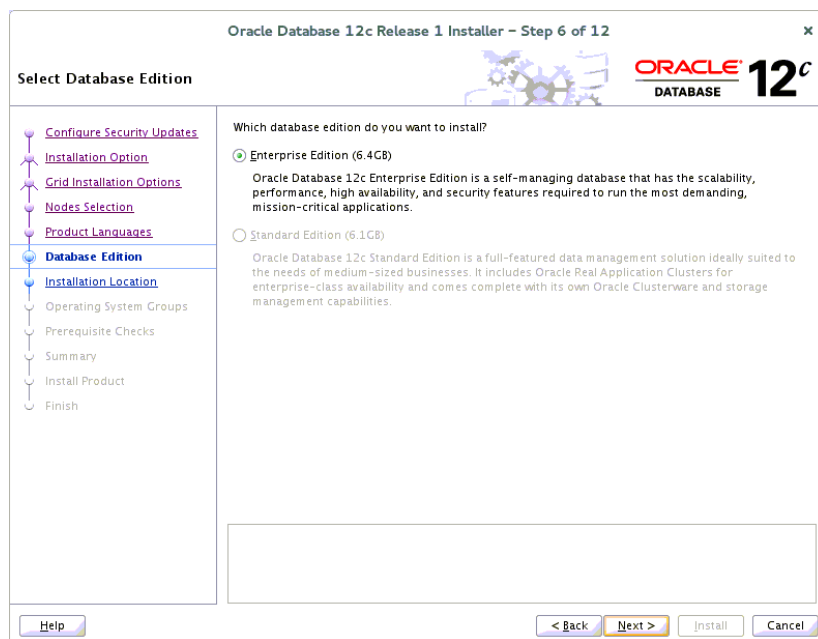


FIGURE 32: DATABASE EDITION

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

7. Specify the Installation Location.

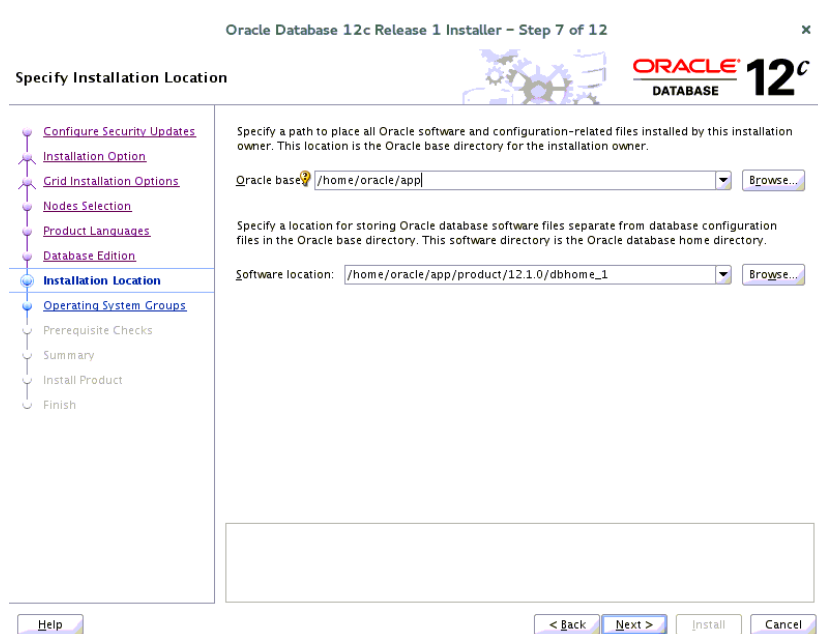


FIGURE 33: INSTALLATION LOCATION

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

8. Define the privileged **Operating System Groups**.

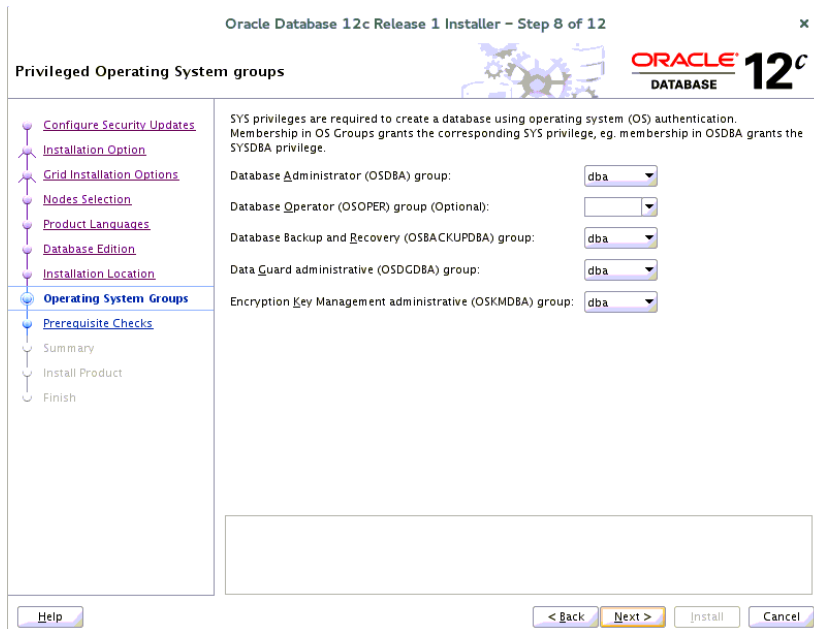


FIGURE 34: OPERATING SYSTEM GROUPS

The privileged Operating System groups are selected by default. Click **Next** to continue.

9. Perform the **Prerequisite Checks** .

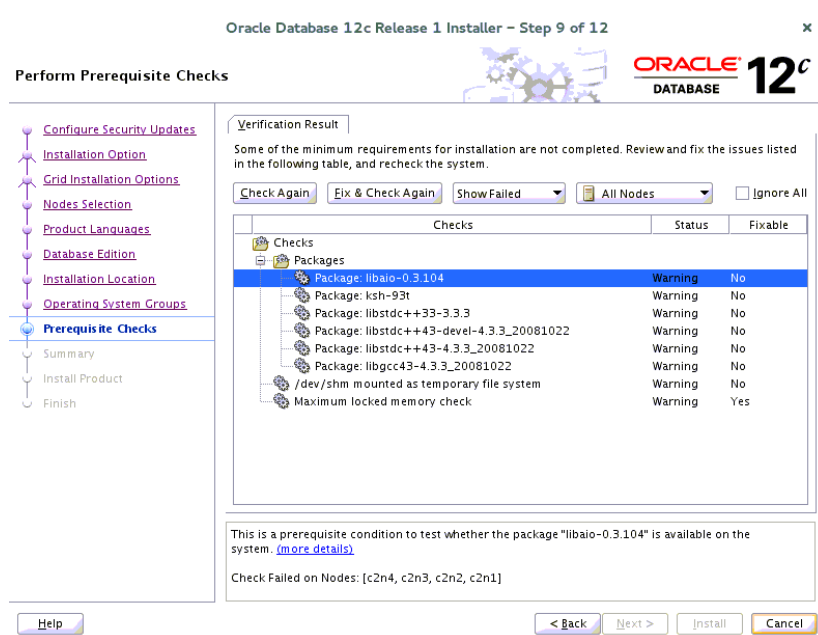


FIGURE 35: PREREQUISITE CHECKS

Perform the pre-check as shown above; to recheck the system. Click **Fix&Check Again** to continue.

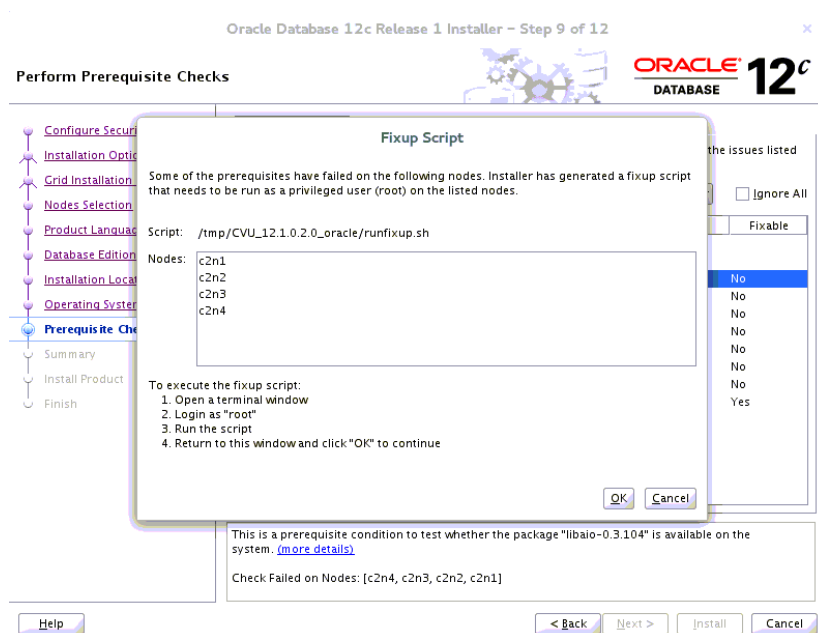


FIGURE 36: FIXUP SCRIPT

Follow the prompts. Manually run the fixup script as “root” user on each node, then click **OK**.

You should see the following output:

```
c2n1 ~ #: /tmp/CVU_12.1.0.2.0_oracle/runfixup.sh
All Fix-up operations were completed successfully.
```

Check the **Fixup Results** here:

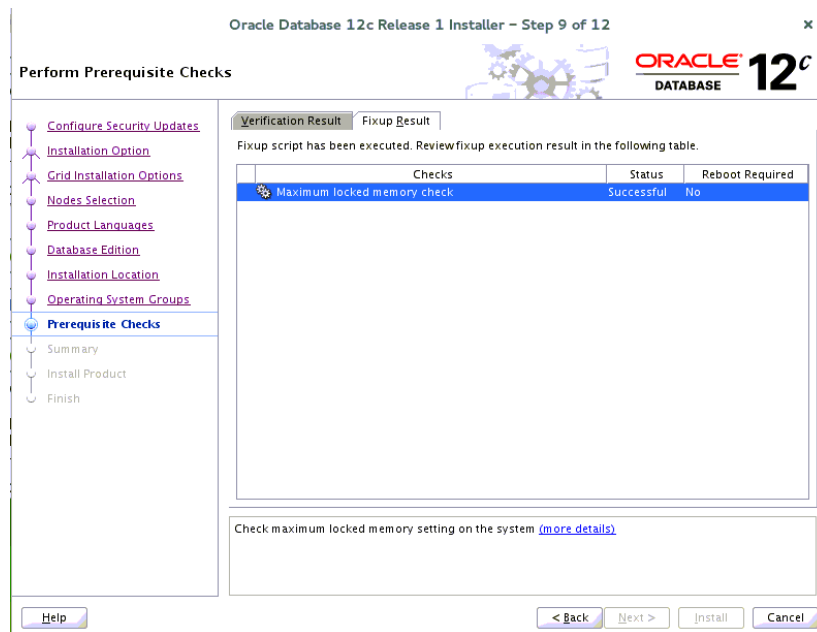


FIGURE 37: FIXUP RESULTS

Check the **Verification Results** here:

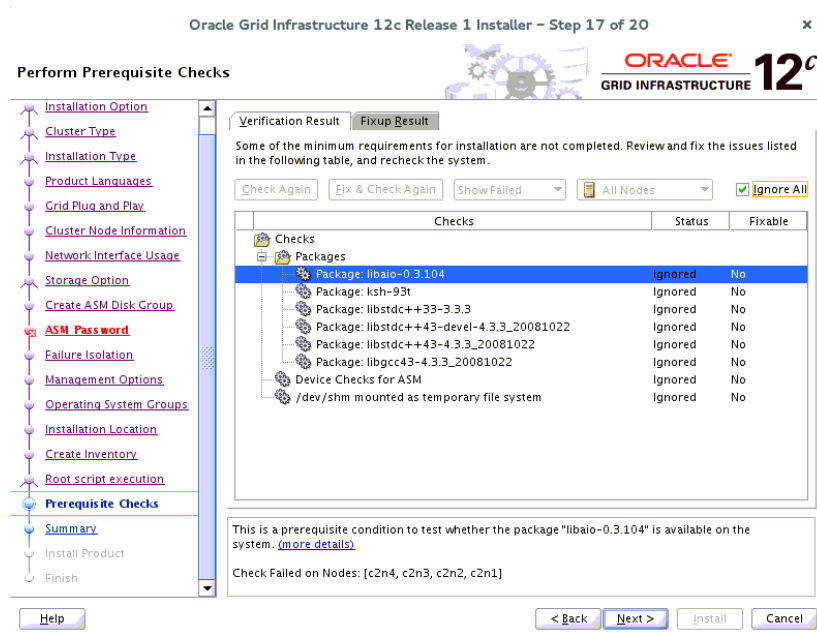


FIGURE 38: VERIFICATION RESULTS

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

10. Review the Summary.

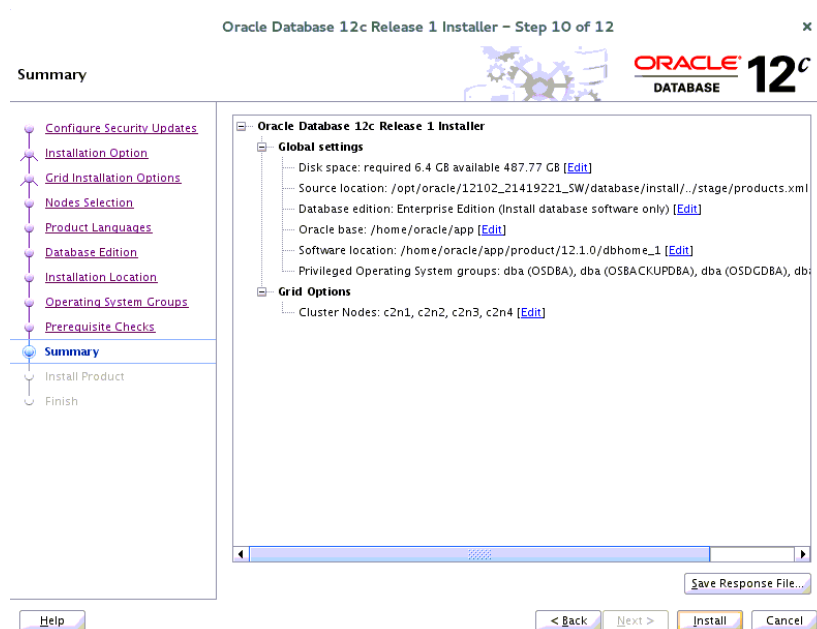


FIGURE 39: SUMMARY

If you see the installation summary as shown above, click **Install** to continue.

11. Proceed to **Install Product**.

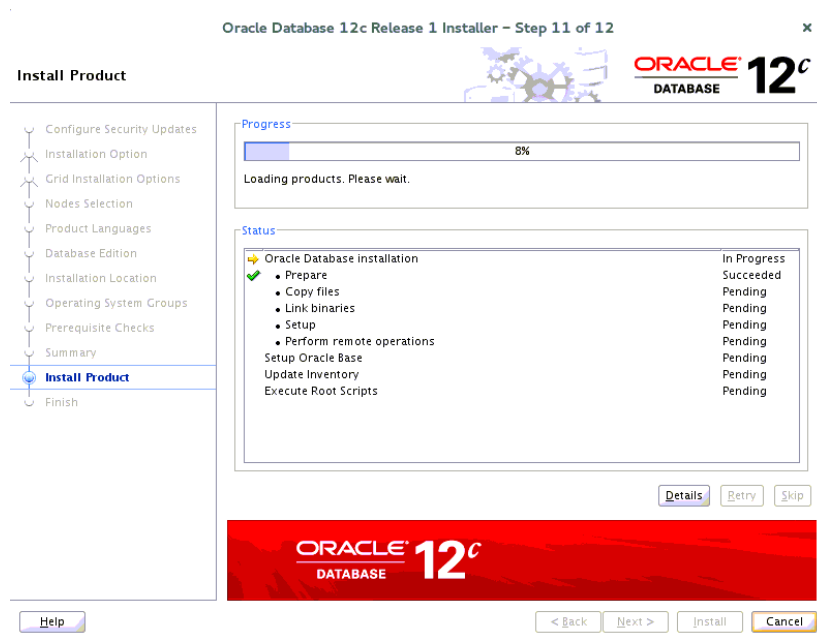


FIGURE 40: **INSTALL PRODUCT**

While the product loads, a window pops up where you can execute the configuration scripts.

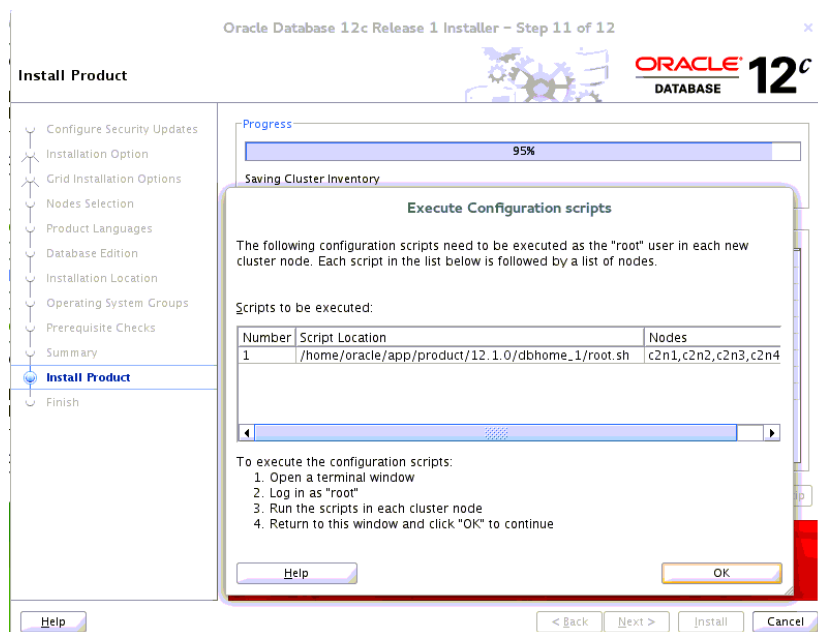


FIGURE 41: EXECUTE CONFIGURATION SCRIPTS

Execute `root.sh` as the **root** user in each cluster node, then click **OK** to continue. You will see the following output:

```
c2n1:~ # /home/oracle/app/product/12.1.0/dbhome_1/root.sh
Performing root user operation.

The following environment variables are set as:
  ORACLE_OWNER=oracle
  ORACLE_Home=/home/oracle/app/product/12.1.0/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.
```

The next screen indicates that the installation has been finished successfully.

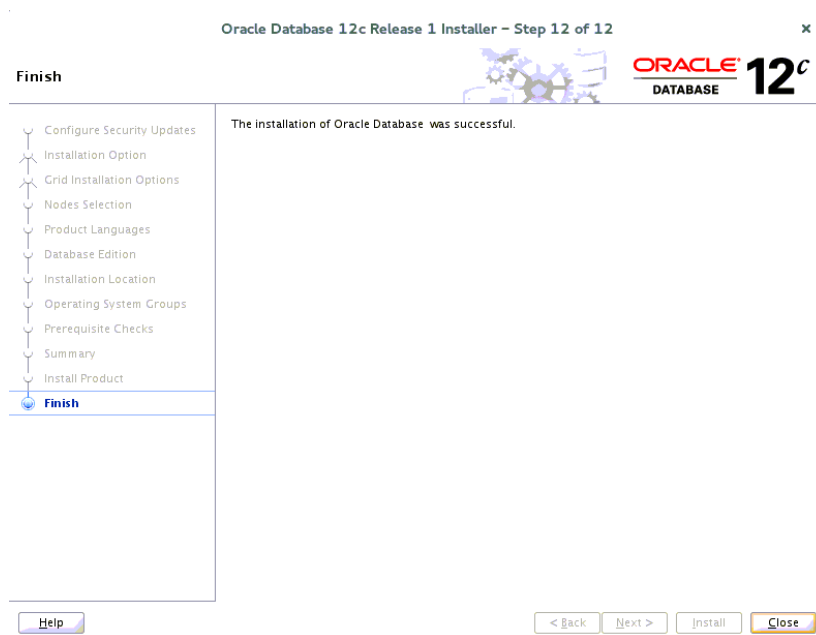


FIGURE 42: FINISH

The installation of your Oracle Database is finished. Click **Close** to close the screen.

5.2.3 Create ASM Disk Group

Use the ASM Configuration Assistant to create the ASM disk group for datafile storage.

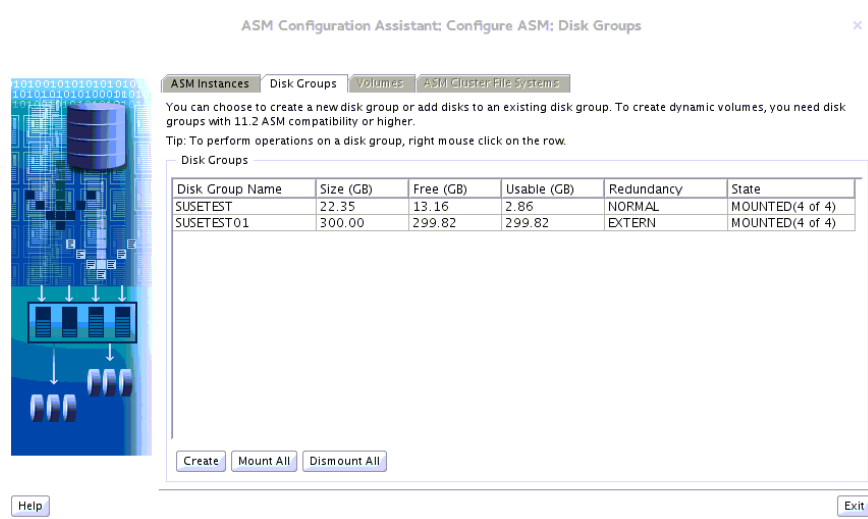


FIGURE 43: ASM CONFIGURATION ASSISTANT

Follow the instructions displayed on the screen.

5.2.4 Create Oracle RAC 12.1.0.2 Database

Perform the following steps to create your Oracle RAC 12.1.0.2 database by using the Database Configuration Assistant:

1. Select Database Operation.

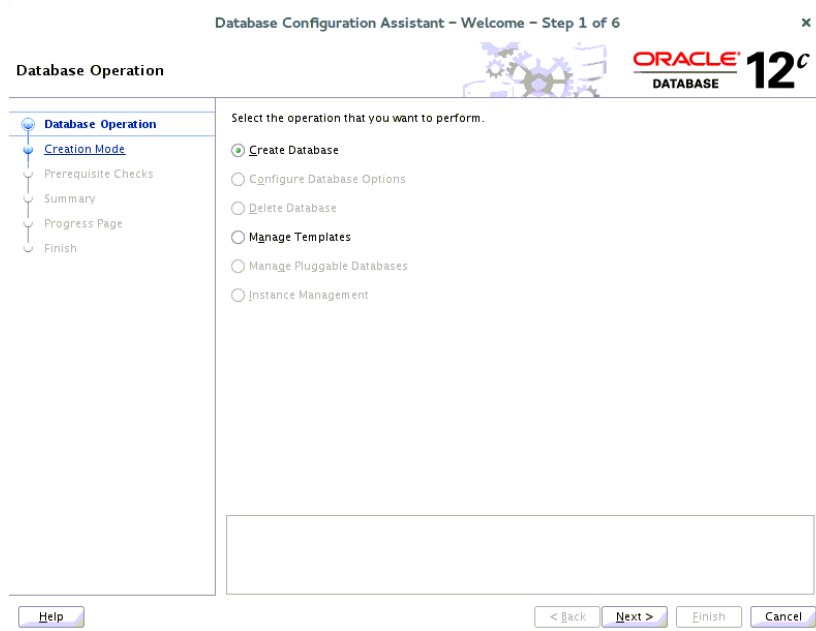


FIGURE 44: DATABASE OPERATION

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

2. Proceed to Creation Mode.

Database Configuration Assistant - Create Database - Step 2 of 14

Creation Mode

Database Operation

Creation Mode

Database Template

Database Identification

Management Options

Database Credentials

Storage Locations

Database Options

Initialization Parameters

Creation Options

Prerequisite Checks

Summary

Progress Page

Finish

Create a database with default configuration

Global Database Name:

Storage Type: Automatic Storage Management (ASM)

Database Files Location: +SUSETEST01

Fast Recovery Area: +SUSETEST

Database Character Set: WE8MSWIN1252 - MS Windows Code Page 1252 8-bit Wes...

Administrative Password:

Confirm Password:

Create As Container Database

Pluggable Database Name:

Advanced Mode

Help

< Back

Next >

Finish

Cancel

FIGURE 45: CREATION MODE

Choose the option **Advanced Mode**, then click **Next** to continue.

3. Define the Database Template.

Database Configuration Assistant - Create Database - Step 3 of 14

Database Template

Database Operation

Creation Mode

Database Template

Database Identification

Management Options

Database Credentials

Storage Locations

Database Options

Initialization Parameters

Creation Options

Prerequisite Checks

Summary

Progress Page

Finish

Select the type of database you want to configure.

Database Type: Oracle Real Application Clusters (RAC) database

Configuration Type: Policy-Managed

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 a template for your database.

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...

Help

< Back

Next >

Finish

Cancel

FIGURE 46: DATABASE TEMPLATE

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

4. Proceed to Database Identification.

Database Configuration Assistant - Create Database - Step 4 of 15

Database Identification

Provide the identifier information required to access the database uniquely. An Oracle database is uniquely identified by a Global Database Name, typically of the form "name.domain".

Global Database Name: SUSED8

☐ Create As Container Database

Creates a database container for consolidating multiple databases into a single database and enables database virtualization. A container database (CDB) can have zero or more pluggable databases (PDB).

☐ Create an Empty Container Database

☒ Create a Container Database with one or more PDBs

Number of PDBs: 1

PDB Name:

< Back Next > Finish Cancel

FIGURE 47: DATABASE IDENTIFICATION

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



Note: Container Database

Oracle Database 12C supports the creation of a Container Database. This means you can also create a Container Database depending on your needs.

5. Proceed to Database Placement.

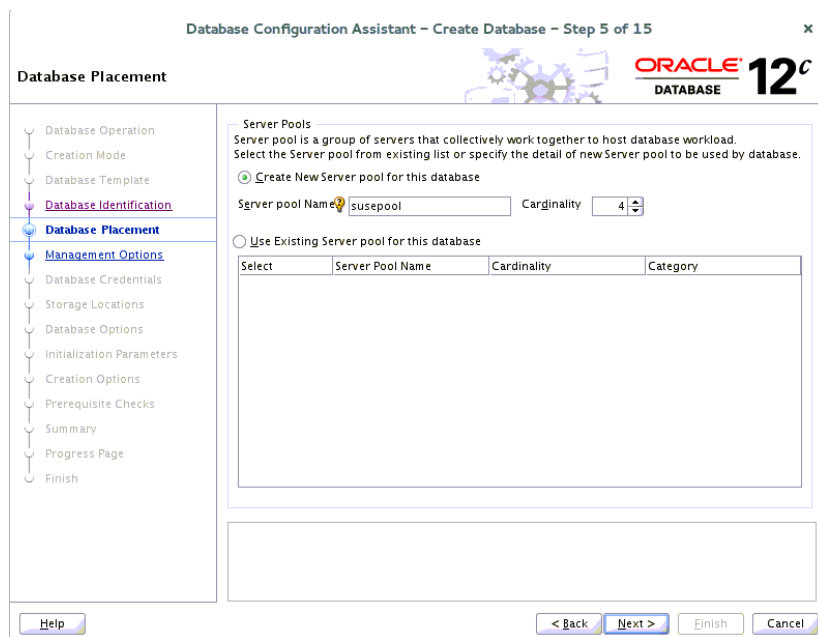


FIGURE 48: DATABASE PLACEMENT

Review the **Server Pools** information as shown above. Click **Next** to continue.

6. Specify the Management Options.

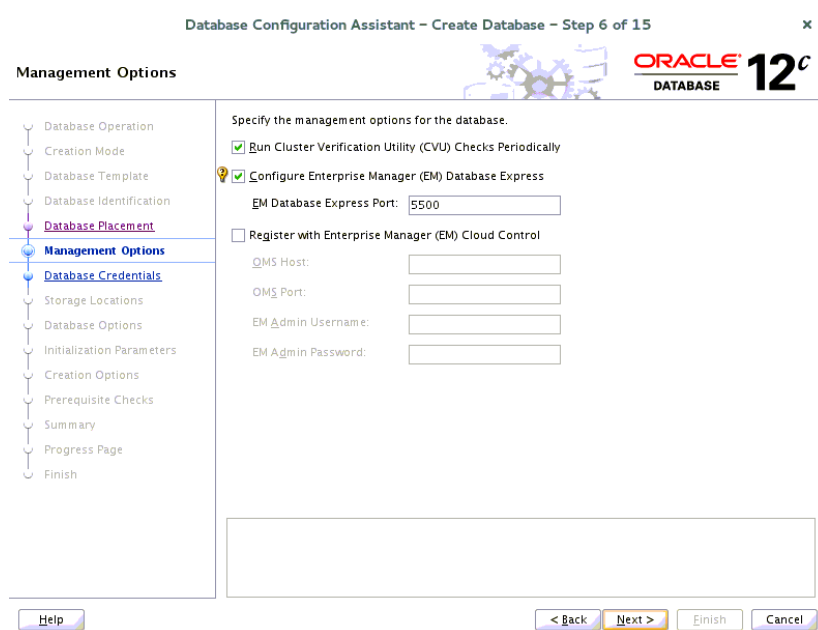


FIGURE 49: MANAGEMENT OPTIONS

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

7. Proceed to Database Credentials.

Database Configuration Assistant – Create Database – Step 7 of 15

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		

☒ Use the Same Administrative Password for All Accounts

Password:

Confirm Password:

[Help](#) [< Back](#) [Next >](#) [Finish](#) [Cancel](#)

FIGURE 50: DATABASE CREDENTIALS

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

8. Proceed to Storage Locations.

Database Configuration Assistant – Create Database – Step 8 of 15

Storage Locations

Database files Storage Type: **Automatic Storage Management (ASM)**

☐ Use Database File Locations from Template

☒ Use Common Location for All Database Files

File Location: [Browse...](#)

☒ Use Oracle-Managed Files [Multiplex Redo Logs and Control Files...](#)

Choose the recovery options for the database.

Recovery files Storage Type: **Automatic Storage Management (ASM)**

☐ Specify Fast Recovery Area

Fast Recovery Area: [Browse...](#)

Fast Recovery Area Size: MB

☐ Enable Archiving [Edit Archive Mode Parameters](#)

[File Location Variables...](#)

[Help](#) [< Back](#) [Next >](#) [Finish](#) [Cancel](#)

FIGURE 51: STORAGE LOCATIONS

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

9. Proceed to Database Options.



FIGURE 52: DATABASE OPTIONS

According to your needs, specify whether to add the schemas to your database. Click **Next** to continue.

10. Proceed to Initialization Parameters.

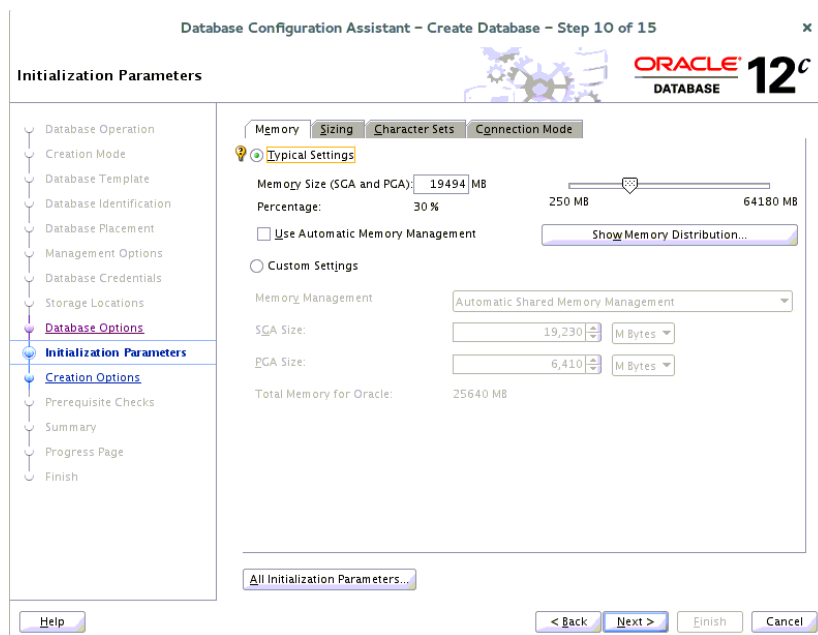


FIGURE 53: INITIALIZATION PARAMETERS

Choose the option **Typical Settings** and adjust the parameters to meet your requirements. Click **Next** to continue.

11. Proceed to Creation Options.

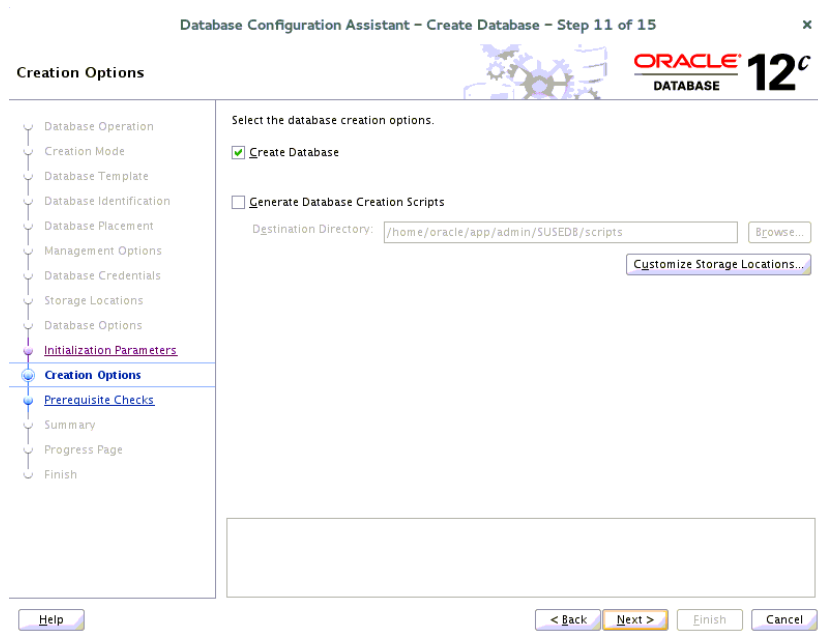


FIGURE 54: CREATION OPTIONS

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

12. Perform the **Prerequisite Checks**.

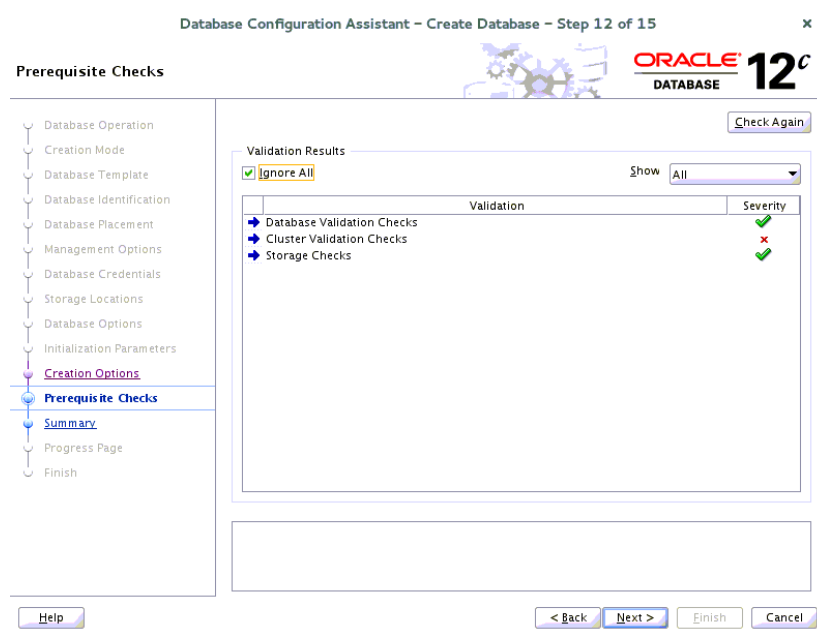


FIGURE 55: **PREREQUISITE CHECKS**

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

13. Review the **Summary**.

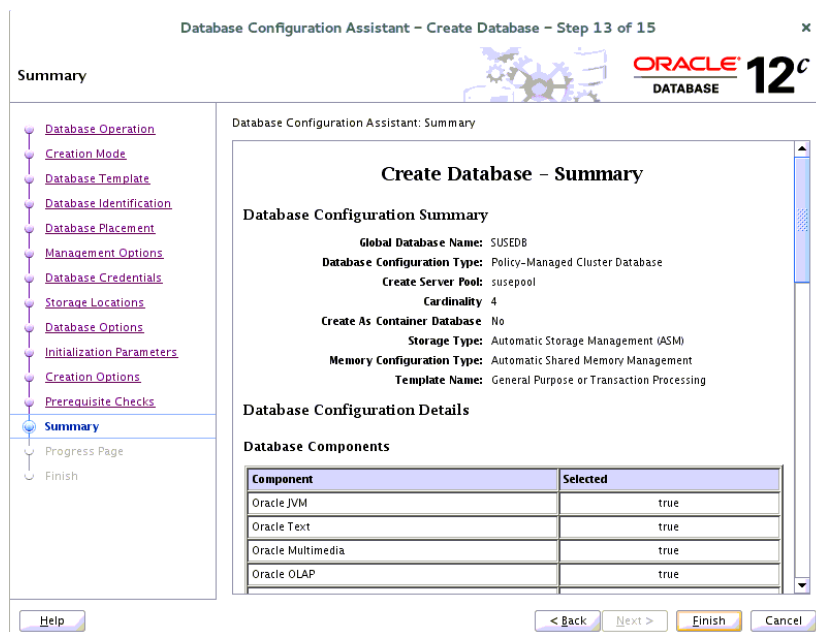


FIGURE 56: SUMMARY

Review and check the information displayed in the Database Configuration Summary as shown above. Click **Finish** to continue.

14. Review the Progress Page.

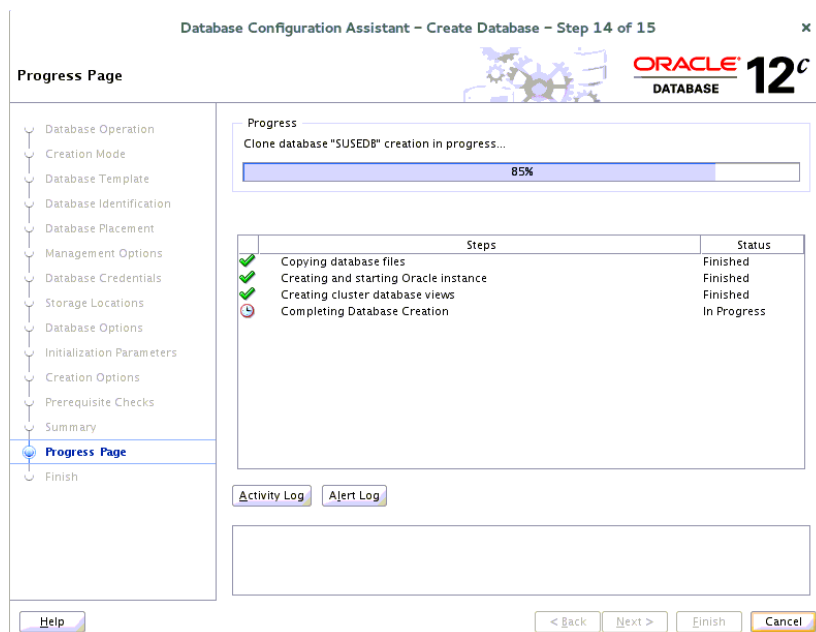


FIGURE 57: PROGRESS PAGE

The creation of your database is now progressing as shown above. Wait until the creation process is completed.

15. Proceed to **Finish**.

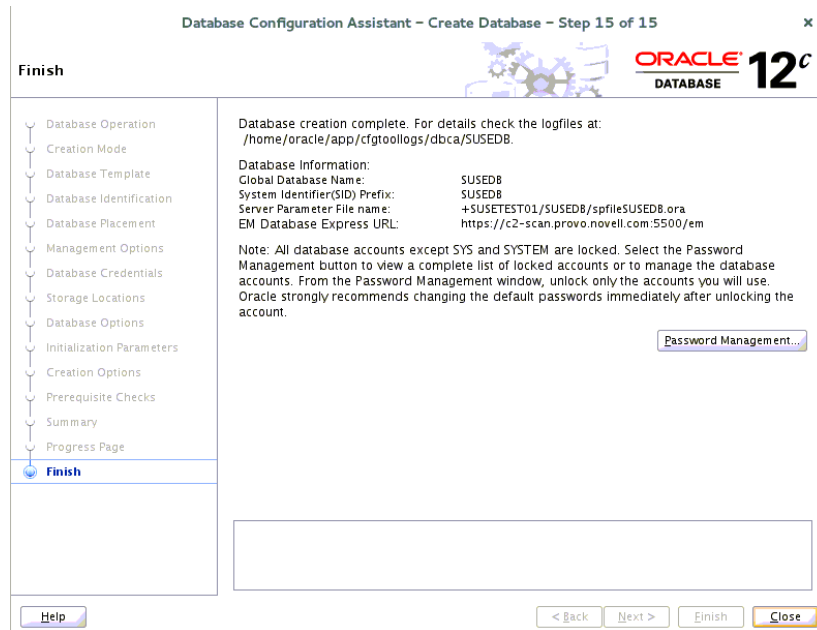


FIGURE 58: **FINISH**

When the creation of the database is completed, some information is displayed on the screen as shown above. Click **Close** to close the screen.

5.2.5 Post-Installation Checks

1. Verify the database status and the configuration.

```
oracle@c2n1:~> export ORACLE_HOME=/home/oracle/app/product/12.1.0/dbhome_1
oracle@c2n1:~> /home/oracle/app/product/12.1.0/dbhome_1/bin/srvctl status database -d susedb
Instance SUSED8_1 is running on node c2n2
Instance SUSED8_2 is running on node c2n3
Instance SUSED8_3 is running on node c2n4
Instance SUSED8_4 is running on node c2n1
```

```
oracle@c2n1:~> /home/oracle/app/product/12.1.0/dbhome_1/bin/srvctl config database -d susedb -a
Database unique name: SUSED8
```

```

Database name: SUSEDDB
Oracle home: /home/oracle/app/product/12.1.0/dbhome_1
Oracle user: oracle
Spfile: +SUSETEST01/SUSEDDB/PARAMETERFILE/spfile.274.908484433
Password file: +SUSETEST01/SUSEDDB/PASSWORD/pwdsusedb.256.908484093
Domain:
Start options: open
Stop options: immediate
Database role: PRIMARY
Management policy: AUTOMATIC
Server pools: susepool
Disk Groups: SUSETEST01
Mount point paths:
Services:
Type: RAC
Start concurrency:
Stop concurrency:
Database is enabled
Database is individually enabled on nodes:
Database is individually disabled on nodes:
OSDBA group: dba
OSOPER group:
Database instances:
Configured nodes:
Database is policy managed

```

```

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

```

Name	Target	State	Server	State details
Local Resources				
ora.LISTENER.lsnr				
	ONLINE	ONLINE	c2n1	STABLE
	ONLINE	ONLINE	c2n2	STABLE
	ONLINE	ONLINE	c2n3	STABLE
	ONLINE	ONLINE	c2n4	STABLE
ora.SUSETEST.dg				
	ONLINE	ONLINE	c2n1	STABLE
	ONLINE	ONLINE	c2n2	STABLE
	ONLINE	ONLINE	c2n3	STABLE
	ONLINE	ONLINE	c2n4	STABLE
ora.SUSETEST01.dg				
	ONLINE	ONLINE	c2n1	STABLE
	ONLINE	ONLINE	c2n2	STABLE
	ONLINE	ONLINE	c2n3	STABLE
	ONLINE	ONLINE	c2n4	STABLE


```

ora.asm
    ONLINE  ONLINE      c2n1          Started,STABLE
    ONLINE  ONLINE      c2n2          Started,STABLE
    ONLINE  ONLINE      c2n3          Started,STABLE
    ONLINE  ONLINE      c2n4          Started,STABLE
ora.net1.network
    ONLINE  ONLINE      c2n1          STABLE
    ONLINE  ONLINE      c2n2          STABLE
    ONLINE  ONLINE      c2n3          STABLE
    ONLINE  ONLINE      c2n4          STABLE
ora.ons
    ONLINE  ONLINE      c2n1          STABLE
    ONLINE  ONLINE      c2n2          STABLE
    ONLINE  ONLINE      c2n3          STABLE
    ONLINE  ONLINE      c2n4          STABLE
-----
Cluster Resources
-----
ora.LISTENER_SCAN1.lsnr
  1  ONLINE  ONLINE      c2n4          STABLE
ora.LISTENER_SCAN2.lsnr
  1  ONLINE  ONLINE      c2n3          STABLE
ora.LISTENER_SCAN3.lsnr
  1  ONLINE  ONLINE      c2n1          STABLE
ora.MGMTLSNR
  1  ONLINE  ONLINE      c2n1          169.254.38.57 10.1.1.1,STABLE
ora.c2n1.vip
  1  ONLINE  ONLINE      c2n1          STABLE
ora.c2n2.vip
  1  ONLINE  ONLINE      c2n2          STABLE
ora.c2n3.vip
  1  ONLINE  ONLINE      c2n3          STABLE
ora.c2n4.vip
  1  ONLINE  ONLINE      c2n4          STABLE
ora.cvu
  1  ONLINE  ONLINE      c2n1          STABLE
ora.mgmtdb
  1  ONLINE  ONLINE      c2n1          Open,STABLE
ora.oc4j
  1  ONLINE  ONLINE      c2n1          STABLE
ora.scan1.vip
  1  ONLINE  ONLINE      c2n4          STABLE
ora.scan2.vip
  1  ONLINE  ONLINE      c2n3          STABLE
ora.scan3.vip
  1  ONLINE  ONLINE      c2n1          STABLE
ora.susedb.db

```

1	ONLINE	ONLINE	c2n2	Open, STABLE
2	ONLINE	ONLINE	c2n3	Open, STABLE
3	ONLINE	ONLINE	c2n4	Open, STABLE
4	ONLINE	ONLINE	c2n1	Open, STABLE

2. Verify the availability of your Oracle Enterprise Manager.

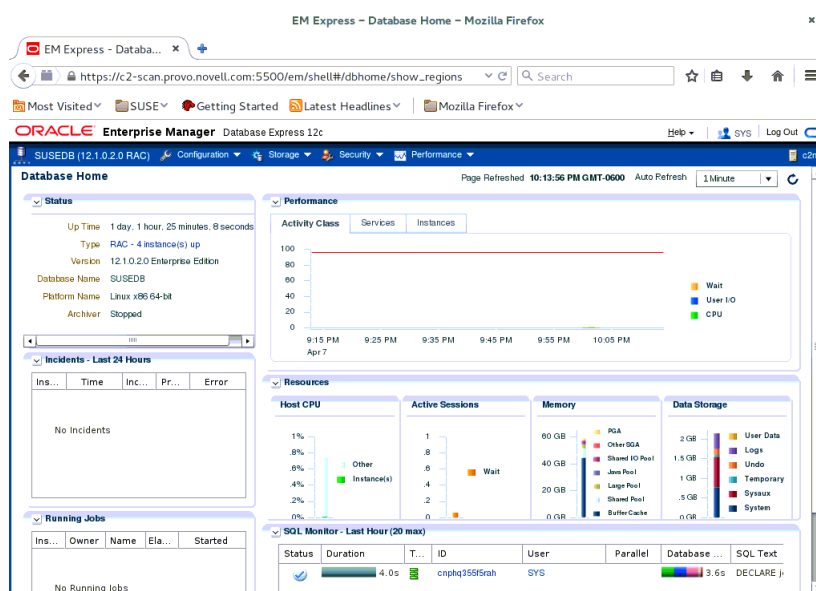


FIGURE 59: ORACLE ENTERPRISE MANAGER


6 Additional Comments

1. Edit the `CV_ASSUME_DISTID=SUSE11` parameter in `database/stage/cvu/cv/admin/cvu_config` & `grid/stage/cvu/cv/admin/cvu_config`
2. Apply Patch 20737462 to address CVU issues relating to the lack of reference data
3. Install `libcap1` (`libcap2` libraries are installed by default); for example `libcap1-1.10-59.61.x86_64` & `libcap1-32bit-1.10-59.61.x86_64`
4. `ksh` is replaced by `mksh`; that is `mksh-50-2.13.x86_64`
5. `libaio` has been renamed to `libaio1` (that is `libaio1-0.3.109-17.15.x86_64`); ensure that `libaio1` is installed
6. OUI may be invoked with `-ignoreSysPreqs` to temporarily workaround ongoing CVU check failures

7 Legal notice

Copyright ©2006-2025 SUSE LLC and contributors. All rights reserved.

Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or (at your option) version 1.3; with the Invariant Section being this copyright notice and license. A copy of the license version 1.2 is included in the section entitled “GNU Free Documentation License”.

SUSE, the SUSE logo and YaST are registered trademarks of SUSE LLC in the United States and other countries. For SUSE trademarks, see <http://www.suse.com/company/legal/> . Linux is a registered trademark of Linus Torvalds. All other names or trademarks mentioned in this document may be trademarks or registered trademarks of their respective owners.

Documents published as part of the **SUSE Best Practices** series have been contributed voluntarily by SUSE employees and third parties. They are meant to serve as examples of how particular actions can be performed. They have been compiled with utmost attention to detail. However, this does not guarantee complete accuracy. SUSE cannot verify that actions described in these documents do what is claimed or whether actions described have unintended consequences. SUSE LLC, its affiliates, the authors, and the translators may not be held liable for possible errors or the consequences thereof.

Below we draw your attention to the license under which the articles are published.

GNU Free Documentation License

Copyright (C) 2000, 2001, 2002 Free Software Foundation, Inc. 51 Franklin St, Fifth Floor, Boston, MA 02110-1301 USA. Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

0. PREAMBLE

The purpose of this License is to make a manual, textbook, or other functional and useful document "free" in the sense of freedom: to assure everyone the effective freedom to copy and redistribute it, with or without modifying it, either commercially or non-commercially. Secondly, this License preserves for the author and publisher a way to get credit for their work, while not being considered responsible for modifications made by others.

This License is a kind of "copyleft", which means that derivative works of the document must themselves be free in the same sense. It complements the GNU General Public License, which is a copyleft license designed for free software.

We have designed this License to use it for manuals for free software, because free software needs free documentation: a free program should come with manuals providing the same freedoms that the software does. But this License is not limited to software manuals; it can be used for any textual work, regardless of subject matter or whether it is published as a printed book. We recommend this License principally for works whose purpose is instruction or reference.

1. APPLICABILITY AND DEFINITIONS

This License applies to any manual or other work, in any medium, that contains a notice placed by the copyright holder saying it can be distributed under the terms of this License. Such a notice grants a world-wide, royalty-free license, unlimited in duration, to use that work under the conditions stated herein. The "Document", below, refers to any such manual or work. Any member of the public is a licensee, and is addressed as "you". You accept the license if you copy, modify or distribute the work in a way requiring permission under copyright law.

A "Modified Version" of the Document means any work containing the Document or a portion of it, either copied verbatim, or with modifications and/or translated into another language.

A "Secondary Section" is a named appendix or a front-matter section of the Document that deals exclusively with the relationship of the publishers or authors of the Document to the Document's overall subject (or to related matters) and contains nothing that could fall directly within that overall subject. (Thus, if the Document is in part a textbook of mathematics, a Secondary Section may not explain any mathematics.) The relationship could be a matter of historical connection with the subject or with related matters, or of legal, commercial, philosophical, ethical or political position regarding them.

The "Invariant Sections" are certain Secondary Sections whose titles are designated, as being those of Invariant Sections, in the notice that says that the Document is released under this License. If a section does not fit the above definition of Secondary then it is not allowed to be designated as Invariant. The Document may contain zero Invariant Sections. If the Document does not identify any Invariant Sections then there are none.

The "Cover Texts" are certain short passages of text that are listed, as Front-Cover Texts or Back-Cover Texts, in the notice that says that the Document is released under this License. A Front-Cover Text may be at most 5 words, and a Back-Cover Text may be at most 25 words.

A "Transparent" copy of the Document means a machine-readable copy, represented in a format whose specification is available to the general public, that is suitable for revising the document straightforwardly with generic text editors or (for images composed of pixels) generic paint programs or (for drawings) some widely available drawing editor, and that is suitable for input to text formatters or for automatic translation to a variety of formats suitable for input to text formatters. A copy made in an otherwise Transparent file format whose markup, or absence of markup, has been arranged to thwart or discourage subsequent modification by readers is not Transparent. An image format is not Transparent if used for any substantial amount of text. A copy that is not "Transparent" is called "Opaque".

Examples of suitable formats for Transparent copies include plain ASCII without markup, Texinfo input format, LaTeX input format, SGML or XML using a publicly available DTD, and standard-conforming simple HTML, PostScript or PDF designed for human modification. Examples of transparent image formats include PNG, XCF and JPG. Opaque formats include proprietary formats that can be read and edited only by proprietary word processors, SGML or XML for which the DTD and/or processing tools are not generally available, and the machine-generated HTML, PostScript or PDF produced by some word processors for output purposes only.

The "Title Page" means, for a printed book, the title page itself, plus such following pages as are needed to hold, legibly, the material this License requires to appear in the title page. For works in formats which do not have any title page as such, "Title Page" means the text near the most prominent appearance of the work's title, preceding the beginning of the body of the text.

A section "Entitled XYZ" means a named subunit of the Document whose title either is precisely XYZ or contains XYZ in parentheses following text that translates XYZ in another language. (Here XYZ stands for a specific section name mentioned below, such as "Acknowledgements", "Dedications", "Endorsements", or "History".) To "Preserve the Title" of such a section when you modify the Document means that it remains a section "Entitled XYZ" according to this definition.

The Document may include Warranty Disclaimers next to the notice which states that this License applies to the Document. These Warranty Disclaimers are considered to be included by reference in this License, but only as regards disclaiming warranties: any other implication that these Warranty Disclaimers may have is void and has no effect on the meaning of this License.

2. VERBATIM COPYING

You may copy and distribute the Document in any medium, either commercially or noncommercially, provided that this License, the copyright notices, and the license notice saying this License applies to the Document are reproduced in all copies, and that you add no other conditions whatsoever to those of this License. You may not use technical measures to obstruct or control the reading or further copying of the copies you make or distribute. However, you may accept compensation in exchange for copies. If you distribute a large enough number of copies you must also follow the conditions in section 3.

You may also lend copies, under the same conditions stated above, and you may publicly display copies.

3. COPYING IN QUANTITY

If you publish printed copies (or copies in media that commonly have printed covers) of the Document, numbering more than 100, and the Document's license notice requires Cover Texts, you must enclose the copies in covers that carry, clearly and legibly, all these Cover Texts: Front-Cover Texts on the front cover, and Back-Cover Texts on the back cover. Both covers must also clearly and legibly identify you as the publisher of these copies. The front cover must present the full title with all words of the title equally prominent and visible. You may add other material on the covers in addition. Copying with changes limited to the covers, as long as they preserve the title of the Document and satisfy these conditions, can be treated as verbatim copying in other respects. If the required texts for either cover are too voluminous to fit legibly, you should put the first ones listed (as many as fit reasonably) on the actual cover, and continue the rest onto adjacent pages.

If you publish or distribute Opaque copies of the Document numbering more than 100, you must either include a machine-readable Transparent copy along with each Opaque copy, or state in or with each Opaque copy a computer-network location from which the general network-using public has access to download using public-standard network protocols a complete Transparent copy of the Document, free of added material. If you use the latter option, you must take reasonably prudent steps, when you begin distribution of Opaque copies in quantity, to ensure that this Transparent copy will remain thus accessible at the stated location until at least one year after the last time you distribute an Opaque copy (directly or through your agents or retailers) of that edition to the public.

It is requested, but not required, that you contact the authors of the Document well before redistributing any large number of copies, to give them a chance to provide you with an updated version of the Document.

4. MODIFICATIONS

You may copy and distribute a Modified Version of the Document under the conditions of sections 2 and 3 above, provided that you release the Modified Version under precisely this License, with the Modified Version filling the role of the Document, thus licensing distribution and modification of the Modified Version to whoever possesses a copy of it. In addition, you must do these things in the Modified Version:

- A. Use in the Title Page (and on the covers, if any) a title distinct from that of the Document, and from those of previous versions (which should, if there were any, be listed in the History section of the Document). You may use the same title as a previous version if the original publisher of that version gives permission.
- B. List on the Title Page, as authors, one or more persons or entities responsible for authorship of the modifications in the Modified Version, together with at least five of the principal authors of the Document (all of its principal authors, if it has fewer than five), unless they release you from this requirement.
- C. State on the Title page the name of the publisher of the Modified Version, as the publisher.
- D. Preserve all the copyright notices of the Document.
- E. Add an appropriate copyright notice for your modifications adjacent to the other copyright notices.
- F. Include, immediately after the copyright notices, a license notice giving the public permission to use the Modified Version under the terms of this License, in the form shown in the Addendum below.
- G. Preserve in that license notice the full lists of Invariant Sections and required Cover Texts given in the Document's license notice.
- H. Include an unaltered copy of this License.
- I. Preserve the section Entitled "History", Preserve its Title, and add to it an item stating at least the title, year, new authors, and publisher of the Modified Version as given on the Title Page. If there is no section Entitled "History" in the Document, create one stating the title, year, authors, and publisher of the Document as given on its Title Page, then add an item describing the Modified Version as stated in the previous sentence.
- J. Preserve the network location, if any, given in the Document for public access to a Transparent copy of the Document, and likewise the network locations given in the Document for previous versions it was based on. These may be placed in the "History" section. You may omit a network location for a work that was published at least four years before the Document itself, or if the original publisher of the version it refers to gives permission.
- K. For any section Entitled "Acknowledgements" or "Dedications", Preserve the Title of the section, and preserve in the section all the substance and tone of each of the contributor acknowledgements and/or dedications given therein.
- L. Preserve all the Invariant Sections of the Document, unaltered in their text and in their titles. Section numbers or the equivalent are not considered part of the section titles.
- M. Delete any section Entitled "Endorsements". Such a section may not be included in the Modified Version.
- N. Do not retitle any existing section to be Entitled "Endorsements" or to conflict in title with any Invariant Section.
- O. Preserve any Warranty Disclaimers.

If the Modified Version includes new front-matter sections or appendices that qualify as Secondary Sections and contain no material copied from the Document, you may at your option designate some or all of these sections as invariant. To do this, add their titles to the list of Invariant Sections in the Modified Version's license notice. These titles must be distinct from any other section titles.

You may add a section Entitled "Endorsements", provided it contains nothing but endorsements of your Modified Version by various parties--for example, statements of peer review or that the text has been approved by an organization as the authoritative definition of a standard.

You may add a passage of up to five words as a Front-Cover Text, and a passage of up to 25 words as a Back-Cover Text, to the end of the list of Cover Texts in the Modified Version. Only one passage of Front-Cover Text and one of Back-Cover Text may be added by (or through arrangements made by) any one entity. If the Document already includes a cover text for the same cover, previously added by you or by arrangement made by the same entity you are acting on behalf of, you may not add another; but you may replace the old one, on explicit permission from the previous publisher that added the old one.

The author(s) and publisher(s) of the Document do not by this License give permission to use their names for publicity for or to assert or imply endorsement of any Modified Version.

5. COMBINING DOCUMENTS

You may combine the Document with other documents released under this License, under the terms defined in section 4 above for modified versions, provided that you include in the combination all of the Invariant Sections of all of the original documents, unmodified, and list them all as Invariant Sections of your combined work in its license notice, and that you preserve all their Warranty Disclaimers.

The combined work need only contain one copy of this License, and multiple identical Invariant Sections may be replaced with a single copy. If there are multiple Invariant Sections with the same name but different contents, make the title of each such section unique by adding at the end of it, in parentheses, the name of the original author or publisher of that section if known, or else a unique number. Make the same adjustment to the section titles in the list of Invariant Sections in the license notice of the combined work.

In the combination, you must combine any sections Entitled "History" in the various original documents, forming one section Entitled "History"; likewise combine any sections Entitled "Acknowledgements", and any sections Entitled "Dedications". You must delete all sections Entitled "Endorsements".

6. COLLECTIONS OF DOCUMENTS

You may make a collection consisting of the Document and other documents released under this License, and replace the individual copies of this License in the various documents with a single copy that is included in the collection, provided that you follow the rules of this License for verbatim copying of each of the documents in all other respects.

You may extract a single document from such a collection, and distribute it individually under this License, provided you insert a copy of this License into the extracted document, and follow this License in all other respects regarding verbatim copying of that document.

7. AGGREGATION WITH INDEPENDENT WORKS

A compilation of the Document or its derivatives with other separate and independent documents or works, in or on a volume of a storage or distribution medium, is called an "aggregate" if the copyright resulting from the compilation is not used to limit the legal rights of the compilation's users beyond what the individual works permit. When the Document is included in an aggregate, this License does not apply to the other works in the aggregate which are not themselves derivative works of the Document.

If the Cover Text requirement of section 3 is applicable to these copies of the Document, then if the Document is less than one half of the entire aggregate, the Document's Cover Texts may be placed on covers that bracket the Document within the aggregate, or the electronic equivalent of covers if the Document is in electronic form. Otherwise they must appear on printed covers that bracket the whole aggregate.

8. TRANSLATION

Translation is considered a kind of modification, so you may distribute translations of the Document under the terms of section 4. Replacing Invariant Sections with translations requires special permission from their copyright holders, but you may include translations of some or all Invariant Sections in addition to the original versions of these Invariant Sections. You may include a translation of this License, and all the license notices in the Document, and any Warranty Disclaimers, provided that you also include the original English version of this License and the original versions of those notices and disclaimers. In case of a disagreement between the translation and the original version of this License or a notice or disclaimer, the original version will prevail.

If a section in the Document is Entitled "Acknowledgements", "Dedications", or "History", the requirement (section 4) to Preserve its Title (section 1) will typically require changing the actual title.

9. TERMINATION

You may not copy, modify, sublicense, or distribute the Document except as expressly provided for under this License. Any other attempt to copy, modify, sublicense or distribute the Document is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

10. FUTURE REVISIONS OF THIS LICENSE

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. See <http://www.gnu.org/copyleft/>.

Each version of the License is given a distinguishing version number. If the Document specifies that a particular numbered version of this License "or any later version" applies to it, you have the option of following the terms and conditions either of that specified version or of any later version that has been published (not as a draft) by the Free Software Foundation. If the Document does not specify a version number of this License, you may choose any version ever published (not as a draft) by the Free Software Foundation.

ADDENDUM: How to use this License for your documents

```
Copyright (c) YEAR YOUR NAME.
Permission is granted to copy, distribute and/or modify this document
under the terms of the GNU Free Documentation License, Version 1.2
or any later version published by the Free Software Foundation;
with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts.
A copy of the license is included in the section entitled "GNU
Free Documentation License".
```

If you have Invariant Sections, Front-Cover Texts and Back-Cover Texts, replace the "with...Texts". line with this:

```
with the Invariant Sections being LIST THEIR TITLES, with the
Front-Cover Texts being LIST, and with the Back-Cover Texts being LIST.
```

If you have Invariant Sections without Cover Texts, or some other combination of the three, merge those two alternatives to suit the situation.

If your document contains nontrivial examples of program code, we recommend releasing these examples in parallel under your choice of free software license, such as the GNU General Public License, to permit their use in free software.