Oracle RAC 19c(19.20.0.0.0) on SUSE Linux Enterprise Server 15 (SP5) for x86-64

SUSE ISV Engineering Team

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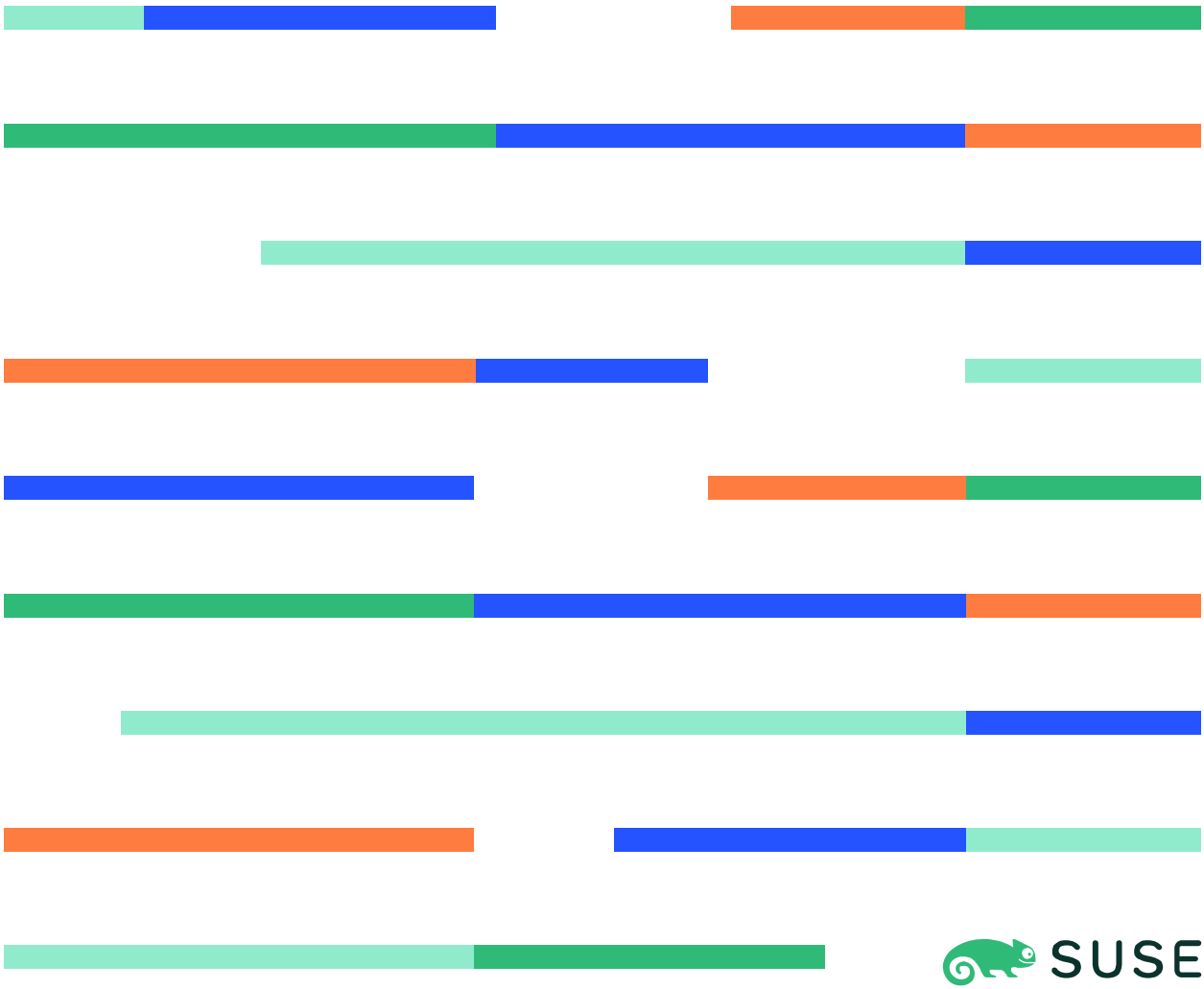

SUSE

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Introduction

This document provides details on installing Oracle Grid/Database 19c on SUSE Linux Enterprise Server 15 SP5. It covers x86_64 version but installation steps are same for other supported platforms. (x86, ia64, System z, etc.).
Official Oracle product documentation is available at: http://docs.oracle.com/en/

System Requirements and Specifications

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 15 SP5 GM (x86_64)*
*(*https://www.suse.com/products/server/download*)*

Oracle

• *Oracle Grid Infrastructure 19c (19.3) (x86_64)*
• *Oracle Database 19c (19.3) (x86_64)*
*(*https://www.oracle.com/database/technologies/oracle19c-linux-downloads.html*)*

• *Patch 35319490: GI RELEASE UPDATE 19.20.0.0.0*
(https://support.oracle.com)

Cluster(4-node) Information

HP DL360 Gen10 Server (Intel Xeon Gold 6136 (~24 CPU)), 96GB RAM
4 NIC per server (two bonded as active/passive) + Static IP Address
Local HDD (500GB)
Shared SAN Partition (ASM: 40GB, NFS:500GB, OAST:600GB)
OS: SUSE Linux Enterprise Server 15 SP5(x86_64)
Kernel version: 5.14.21-150500.55.28-default

Network configuration:

```
# Public
10.124.140.21  c1n1.yeslab.pgu1.suse.com c1n1
10.124.140.22  c1n2.yeslab.pgu1.suse.com c1n2
10.124.140.23  c1n3.yeslab.pgu1.suse.com c1n3
10.124.140.24  c1n4.yeslab.pgu1.suse.com c1n4

# Private
10.1.1.11       c1n1-priv
10.1.1.12       c1n2-priv
10.1.1.13       c1n3-priv
10.1.1.14       c1n4-priv

# Virtual
10.124.140.25          c1n1-vip        c1n1-vip.yeslab.pgu1.suse.com
10.124.140.26          c1n2-vip        c1n2-vip.yeslab.pgu1.suse.com
10.124.140.27          c1n3-vip        c1n3-vip.yeslab.pgu1.suse.com
10.124.140.28          c1n4-vip        c1n4-vip.yeslab.pgu1.suse.com

# SCAN
 c1-scan.yeslab.pgu1.suse.com (10.124.140.29, 10.124.140.51, 10.124.140.52)
```

Prerequisites

1. Installing SUSE Linux Enterprise Server 15 SP5 on each cluster node

1-1. Install SUSE Linux Enterprise Server 15 SP5 with “Enhanced Base System, Software Management, X Window System, Oracle Server Base” pattern. You can follow official Oracle Grid/Database Installation manual for selective SLES OS required rpms, however “Oracle Server Base” pattern from SUSE will fulfil minimum setup required for Oracle RAC Installation.

Figure 1-1 Software Installed as shown below

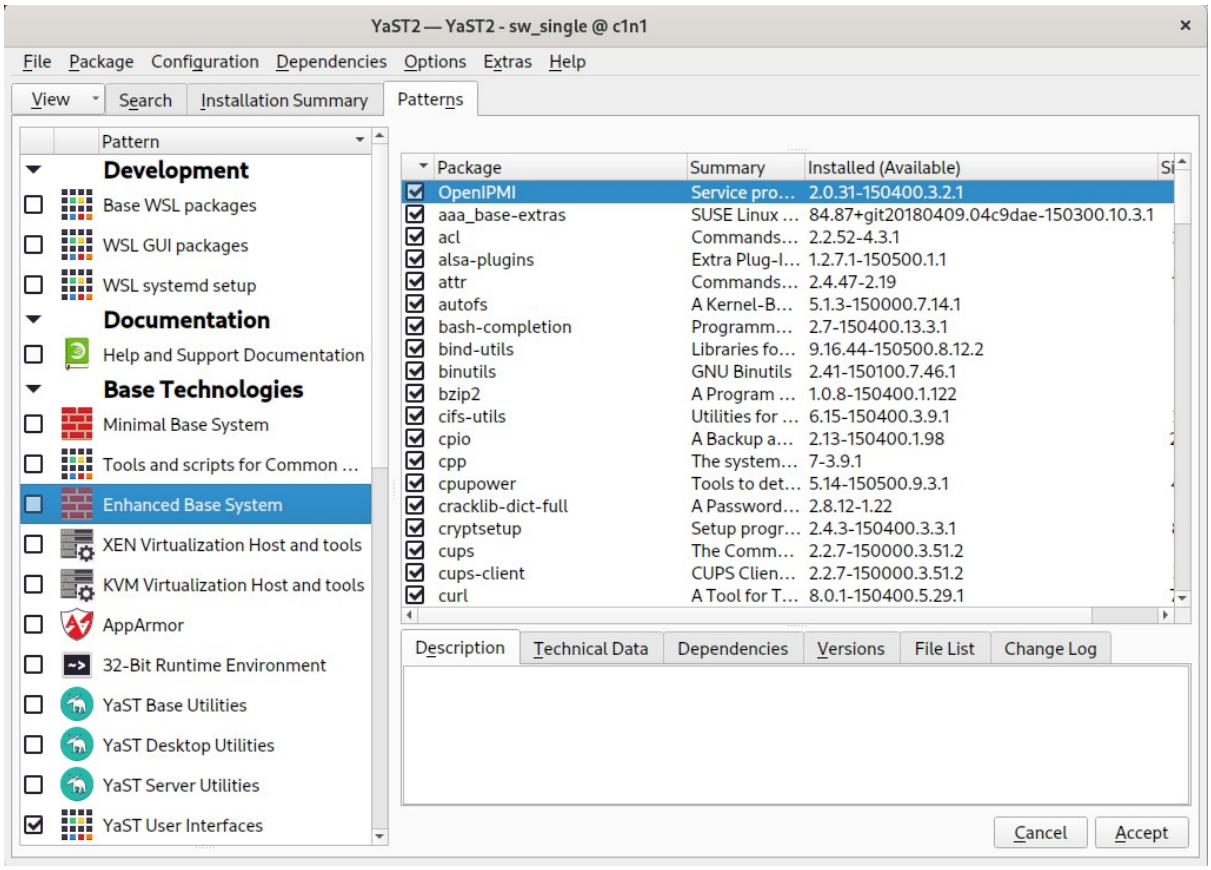


Figure 1-2 Software Installed as shown below

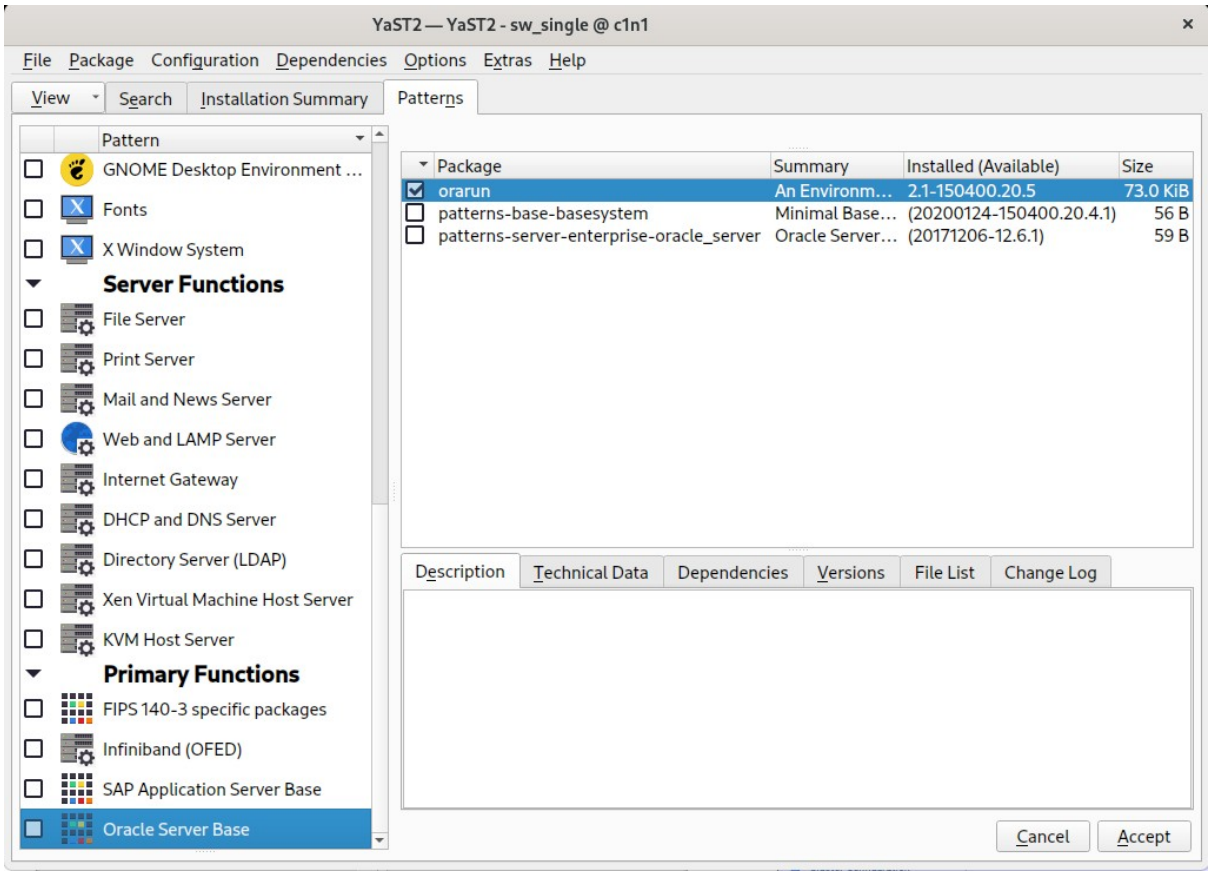


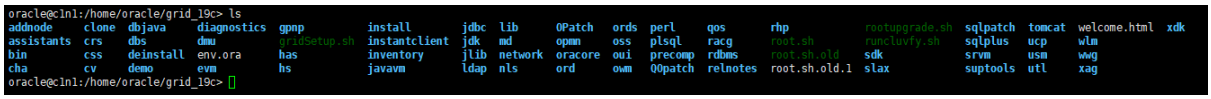
Figure 1-3 OS release information and kernel version

```
oracle@c1n1:~> more /etc/os-release
NAME="SLES"
VERSION="15-SP5"
VERSION_ID="15.5"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP5"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp5"
DOCUMENTATION_URL="https://documentation.suse.com/"
oracle@c1n1:~> uname -a
Linux c1n1 5.14.21-150500.55.28-default #1 SMP PREEMPT_DYNAMIC Fri Sep 22 10:04:29 UTC 2023 (c11336f) x86_64 x86_64 x86_64 GNU/Linux
oracle@c1n1:~>
```

2. Oracle software pre-install verify

2-1. Login to the SLES 15 SP5 64-bit OS as a non-admin user. Download Oracle Database 19c Grid Infrastructure (19.3) for Linux x86-64 from: https://www.oracle.com/database/technologies/oracle19c-linux-downloads.html.

2-2. Extract LINUX.X64_193000_grid_home.zip and run Oracle 'runcluvfy.sh' tool to verify cluster setup is ready for install. Resolve any issues you encounter, before proceeding. Please refer official Oracle Install Guide for help.



(**Note:**

1. GI RunInstaller Fails If OpenSSH Is Upgraded to 8.x.

Workaround:

Before installation, as root user: (please change the path if the location of your "scp" is not the same with below)

Rename the original scp.
mv /usr/bin/scp /usr/bin/scp.orig

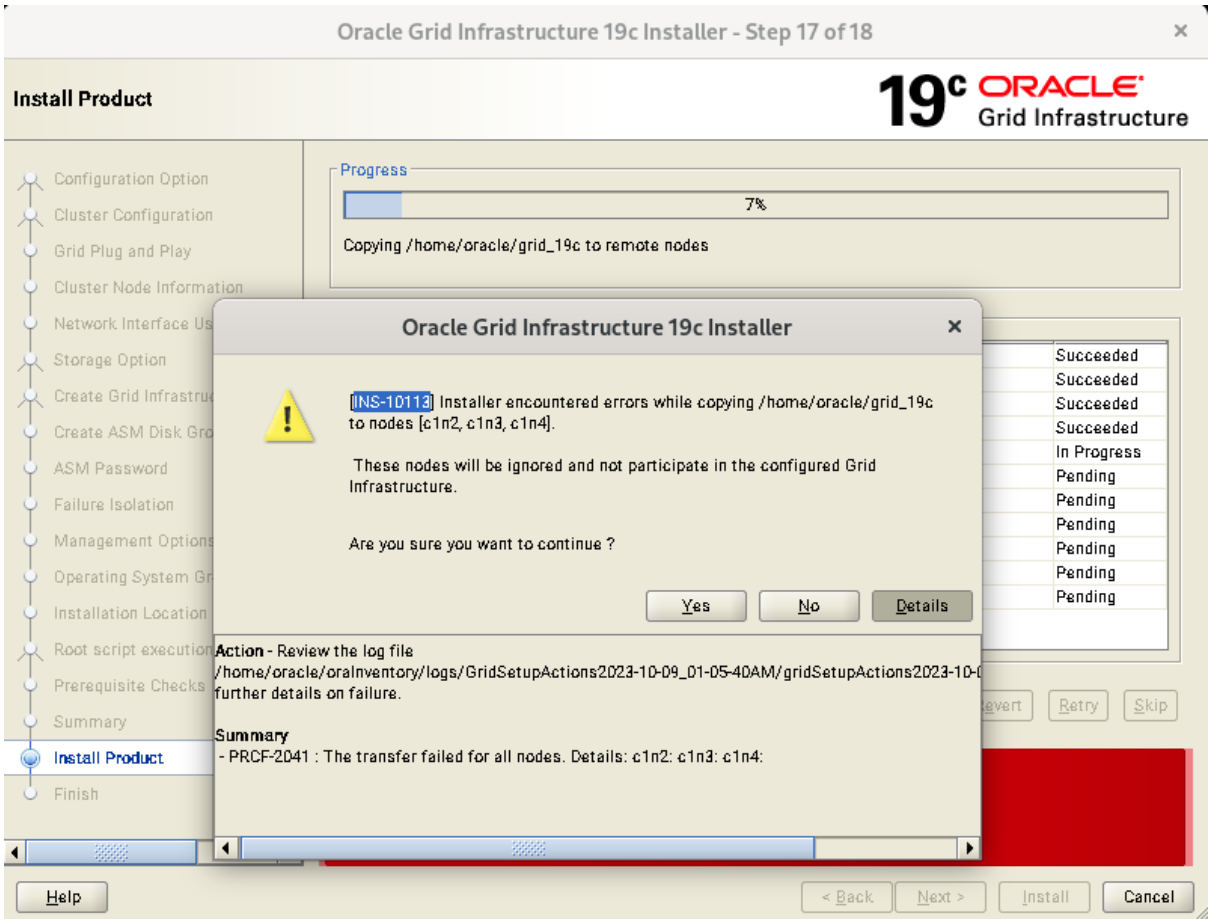
Create a new file </usr/bin/scp>.
vi /usr/bin/scp

Add the below line to the new created file </usr/bin/scp>.
/usr/bin/scp.orig -T $*

Change the file permission.
chmod 555 /usr/bin/scp

After installation:
mv /usr/bin/scp.orig /usr/bin/scp

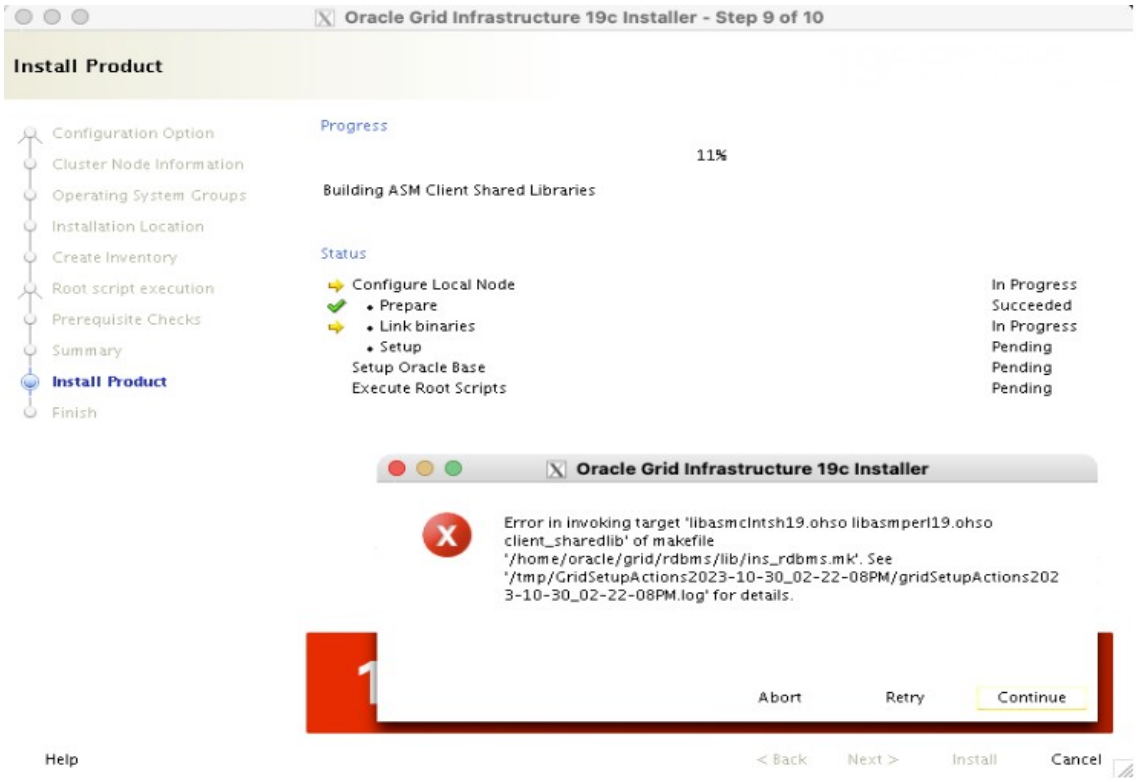
2. [INS-10113] Installer encountered errors while copying…



Workaround:

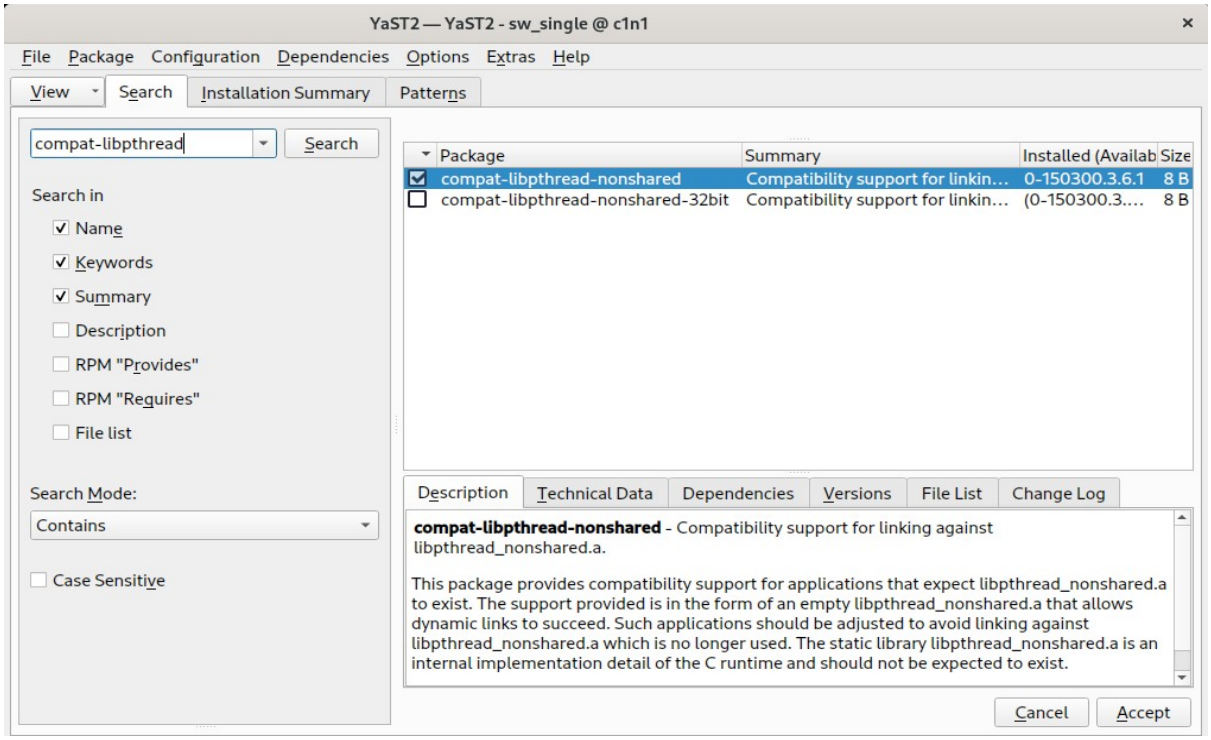
export SRVM_DISABLE_MTTRANS=true
./gridSetup.sh

3. Installation/relink fails with :"Error in invoking target 'libasmclntsh19.ohso libasmperl19.ohso client_sharedlib' of makefile ins_rdbms.mk"



Workaround:

Install '**compat-libpthread-nonshared**' package.



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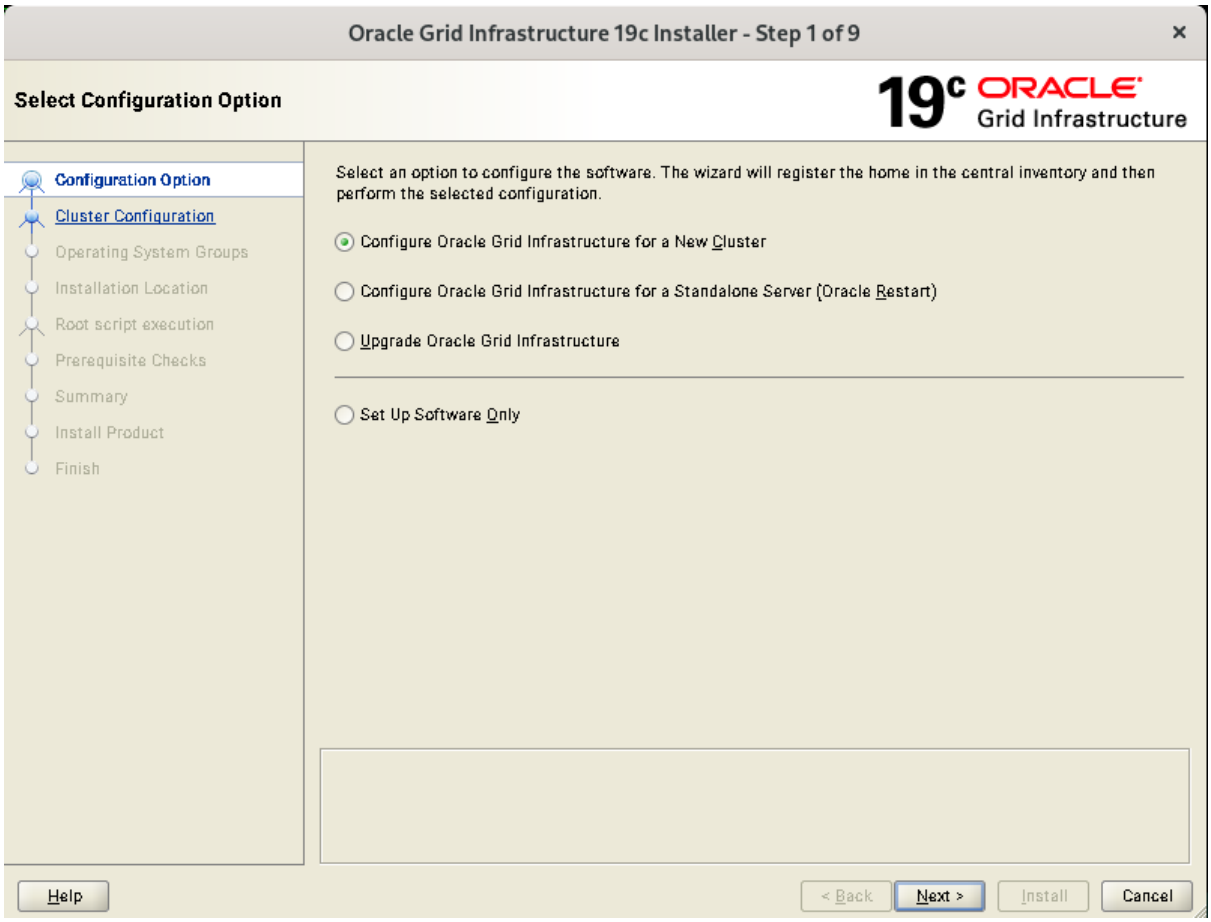
Oracle RAC Installation

1. Installing Oracle Grid Infrastructure.

1-1. Run Oracle Grid installer '**./gridSetup.sh**' from Gird ShipHome.

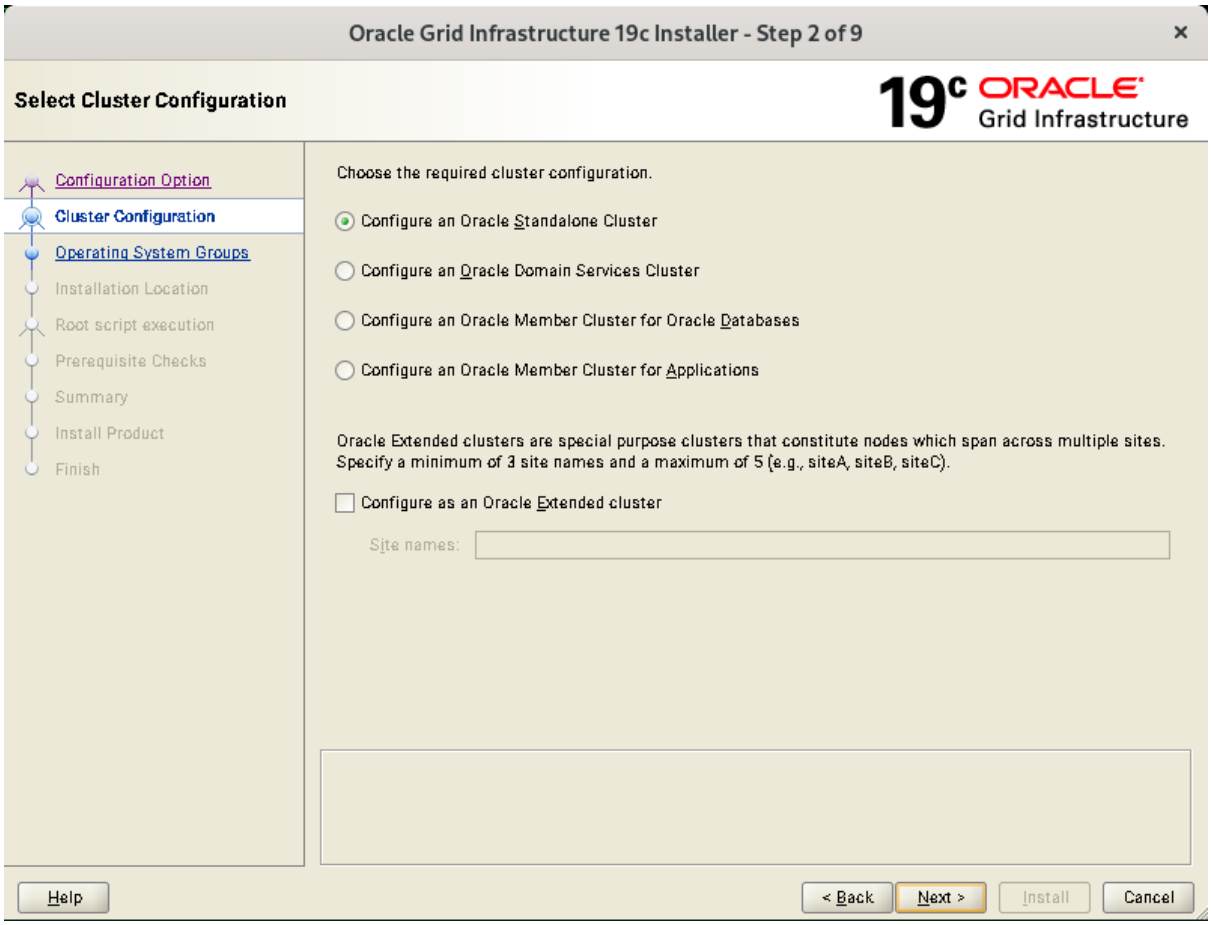
Install Flow:

1). Select Configuration Option.



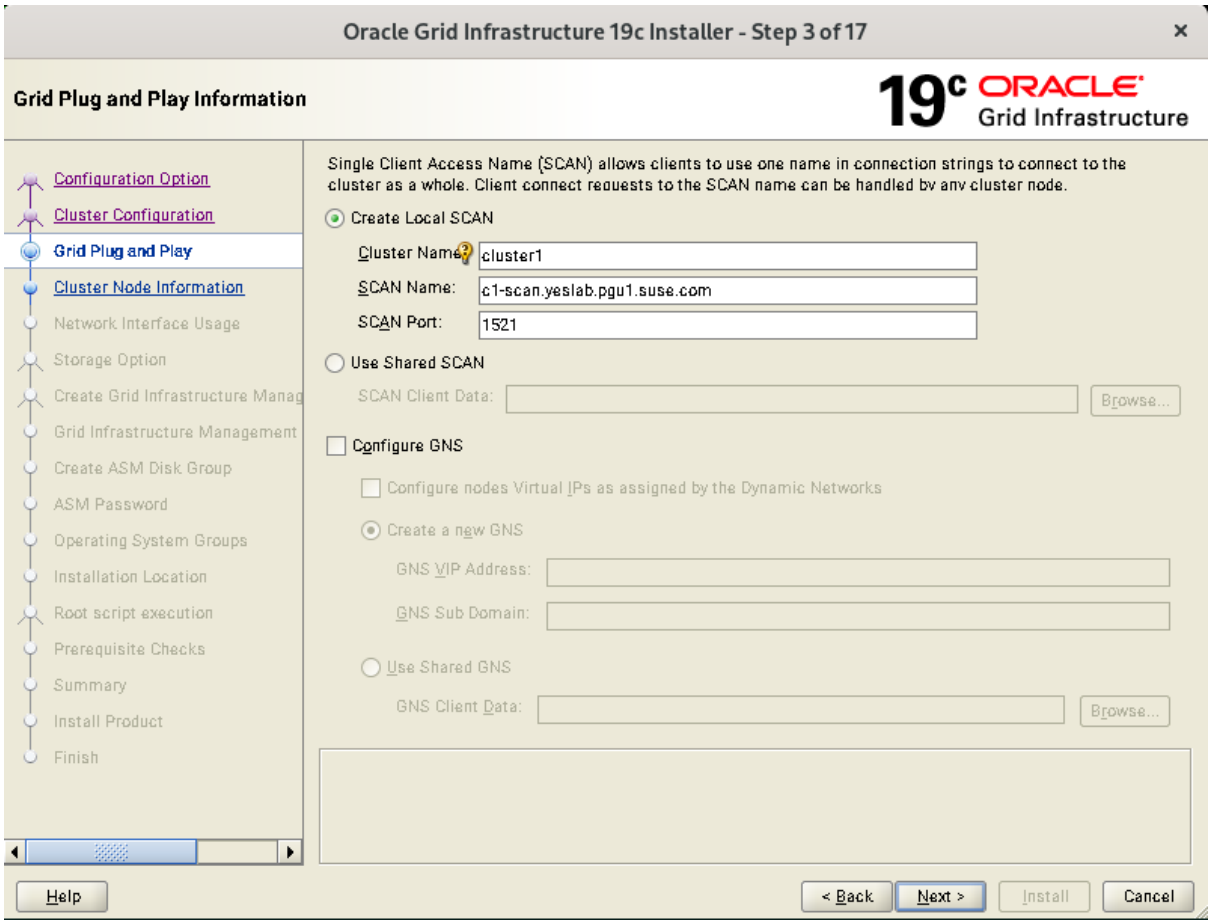
Choose option "**Configure Oracle Grid Infrastructure for a New Cluster**", then click **Next** to continue.

2). Select Cluster Configuration.



Choose option "**Configure an Oracle Standalone Cluster**", then click **Next** to continue.

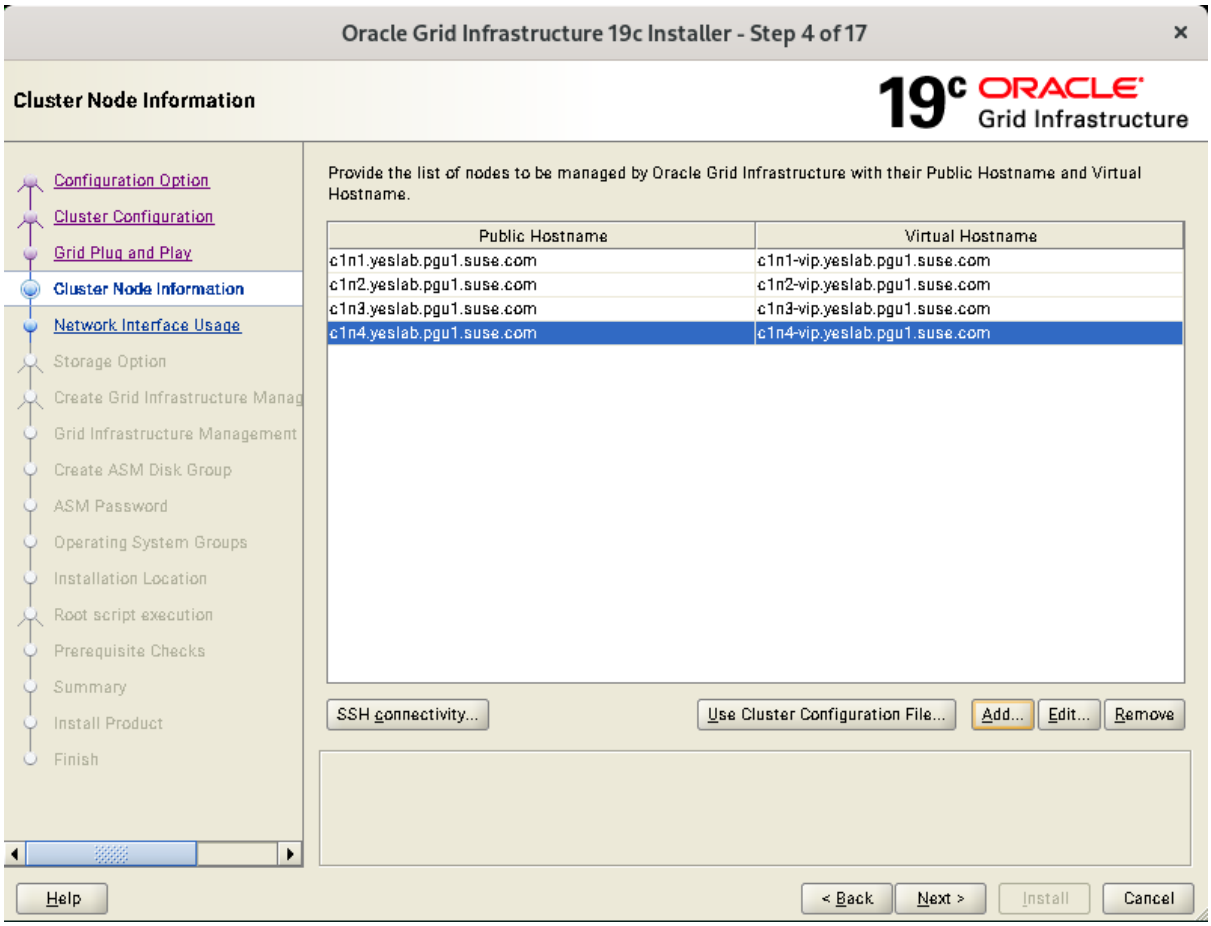
3). Grid Plug and Play Information.



In the **Cluster Name** and **SCAN Name** fields, enter the names for your cluster and cluster scan that are unique throughout your entire enterprise network, then click **Next** to continue.

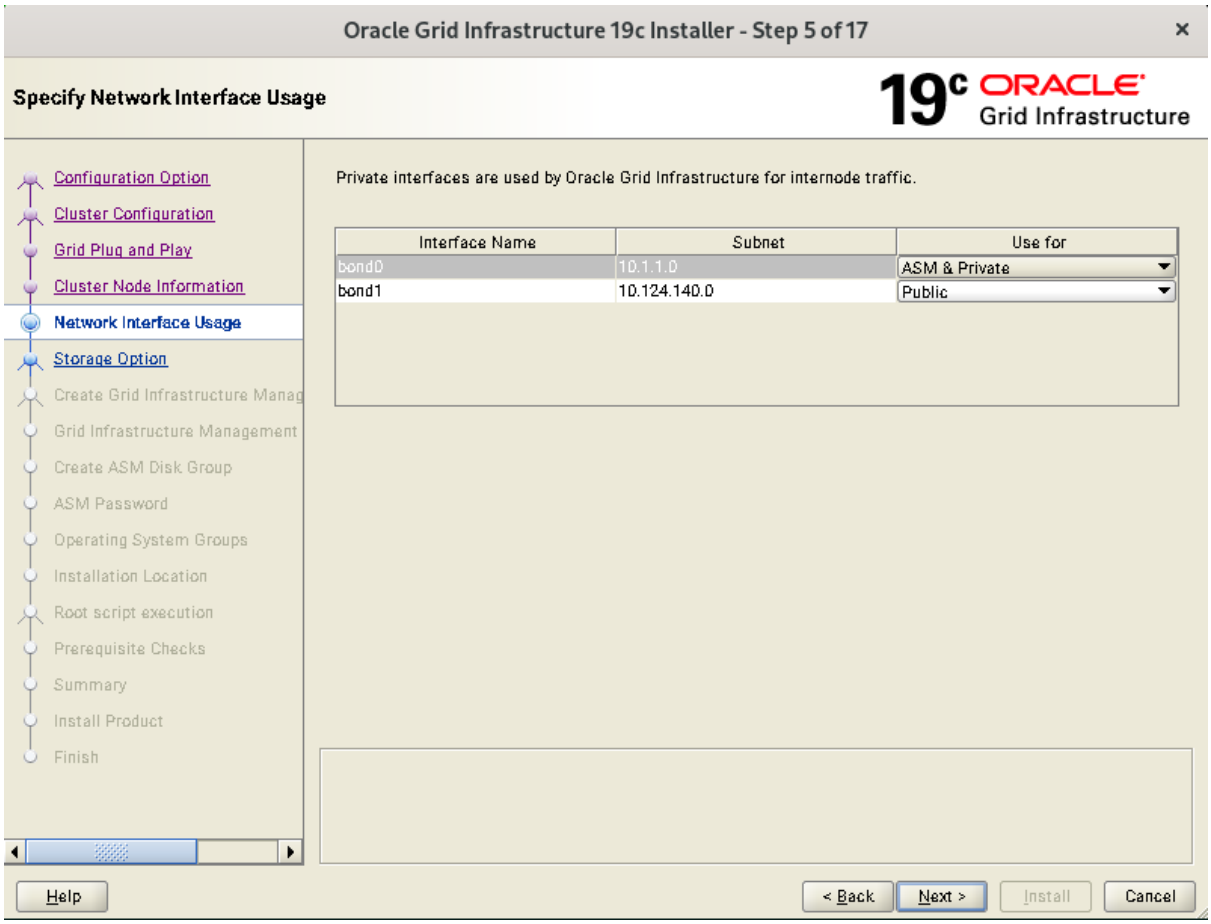
(More details for GNS configuration please see Oracle official document.)

4). The 'Cluster Node Information' screen appears.



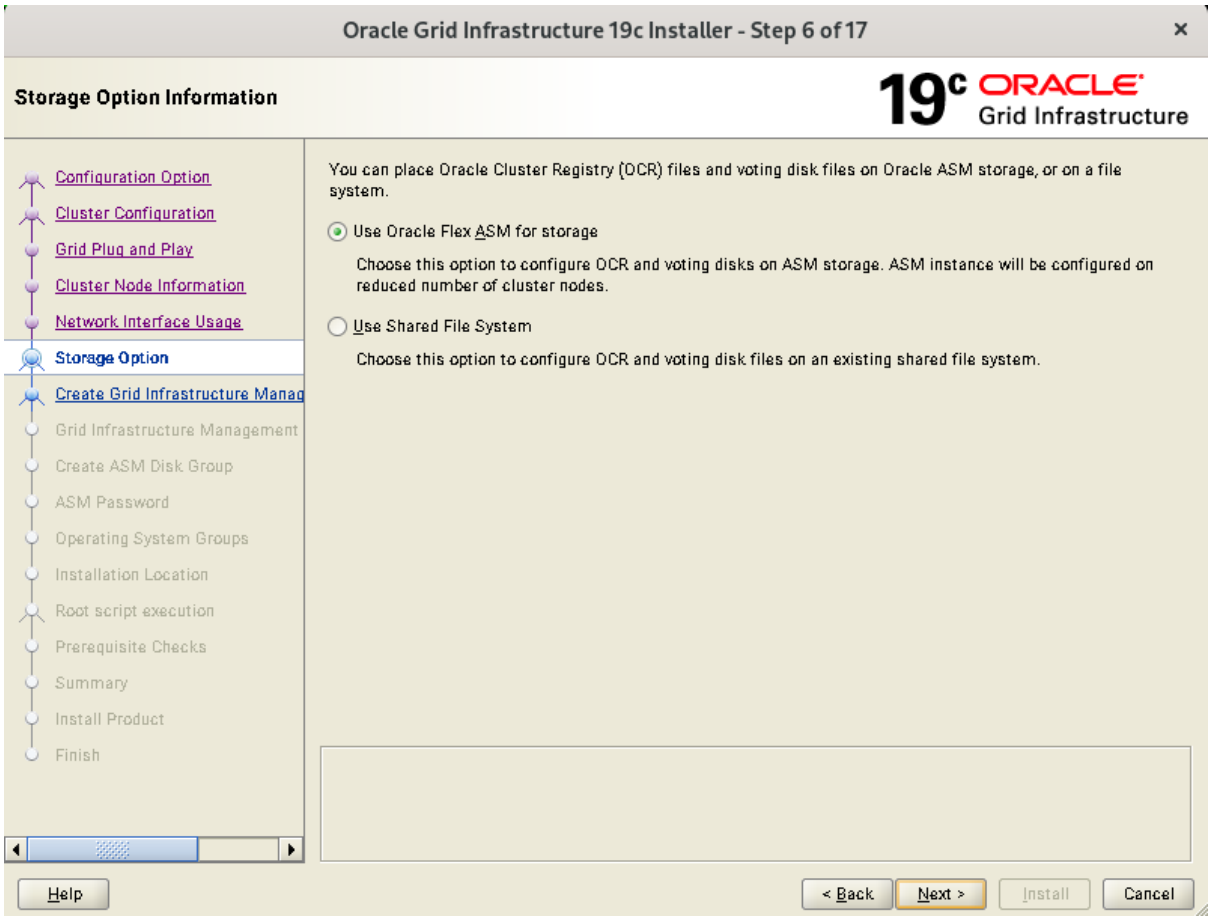
In the Public Hostname column of the table of cluster nodes, you should see your local node. Click **Add** to add another node to the cluster. Enter the second node's public name(node2), and virtual IP name (node2-vip), then click OK. Make sure all nodes are selected, then click the SSH Connectivity button at the bottom of the window. After a short period, another message window appears indicating that passwordless SSH connectivity has been established between the cluster nodes. Click **OK** to continue. When returned to the Cluster Node Information window, click **Next** to continue.

5). Specify Network Interface Usage.



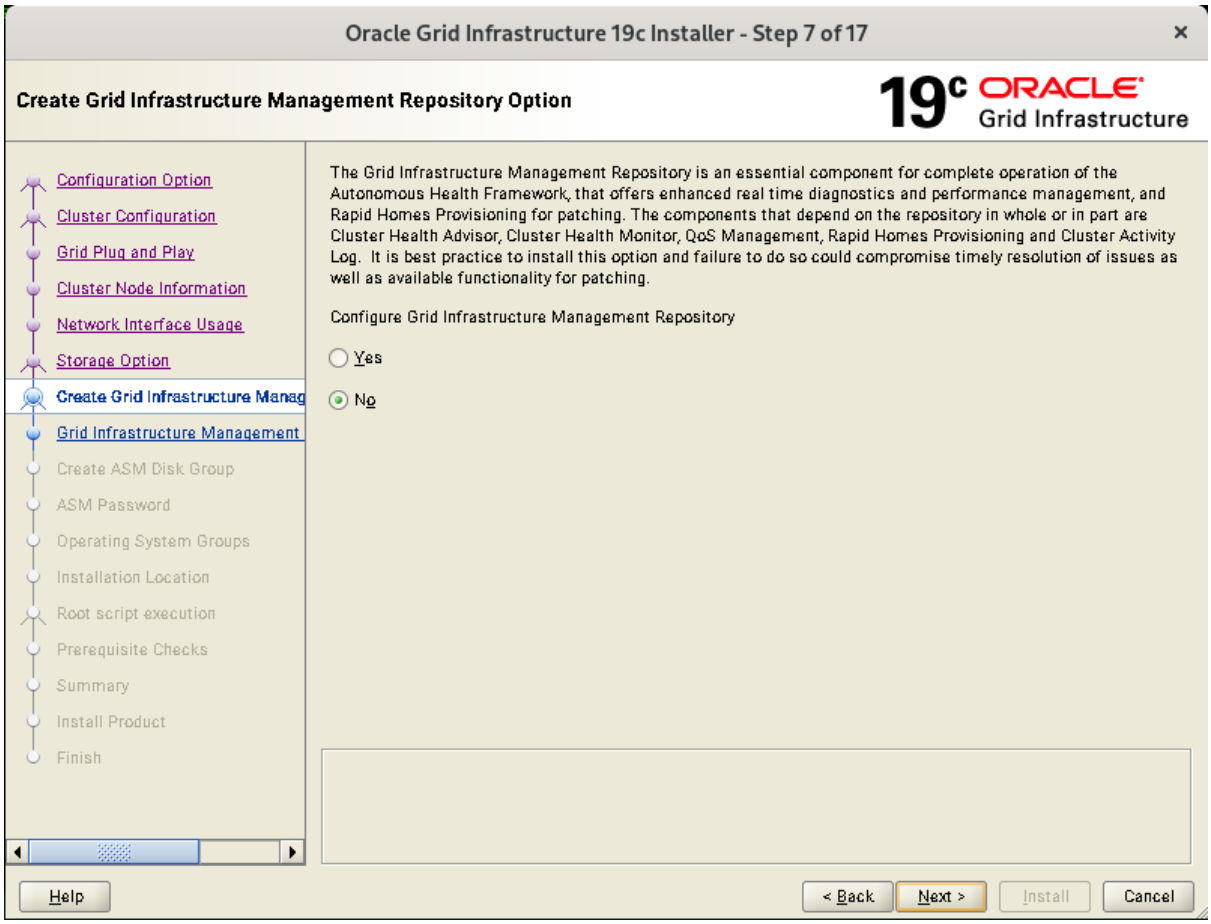
Verify that each interface has the correct interface type associated with it. If you have network interfaces that should not be used by Oracle Clusterware, then set the network interface type to **Do Not Use**. For example, if you have only two network interfaces, then set the public interface to have a Use For value of **Public** and set the private network interface to have a Use For value of **ASM & Private**, then click **Next** to continue.

6). Storage Option Information.



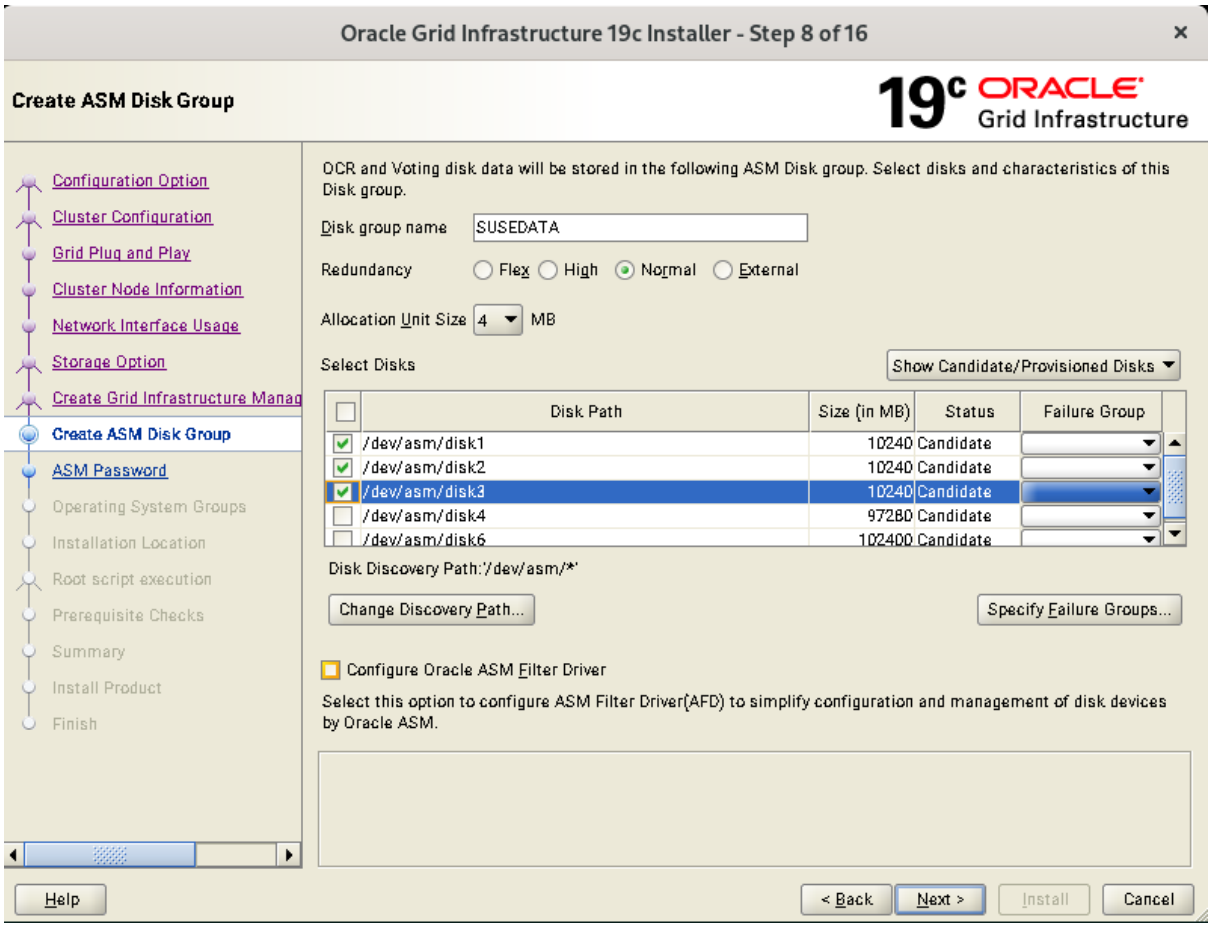
Choose option "**Use Oracle Flex ASM for storage**", then click **Next** to continue.

7). Grid Infrastructure Management Repository Option.



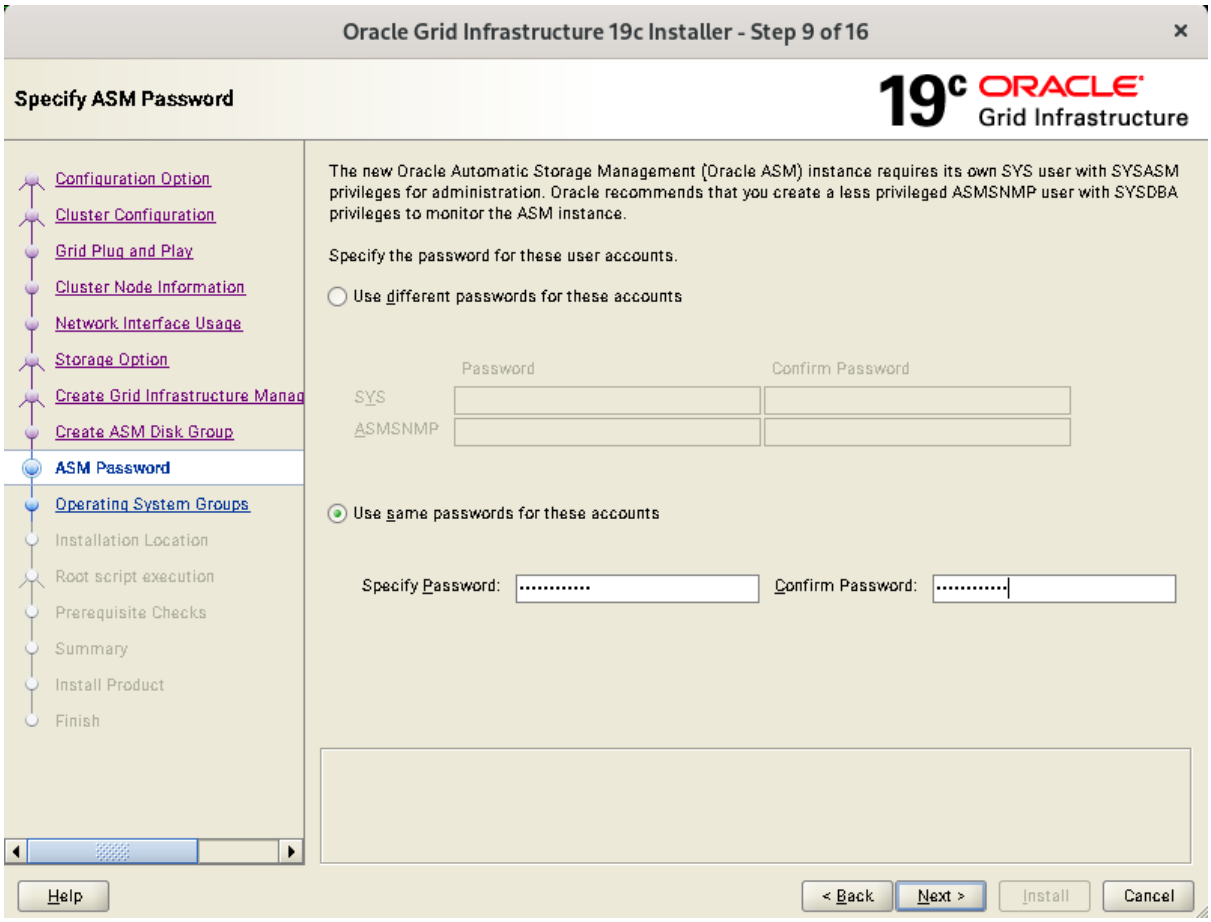
Choose whether you want to store the Grid Infrastructure Management Repository in a separate Oracle ASM disk group, then click **Next** to continue.

8). Create ASM Disk Group.



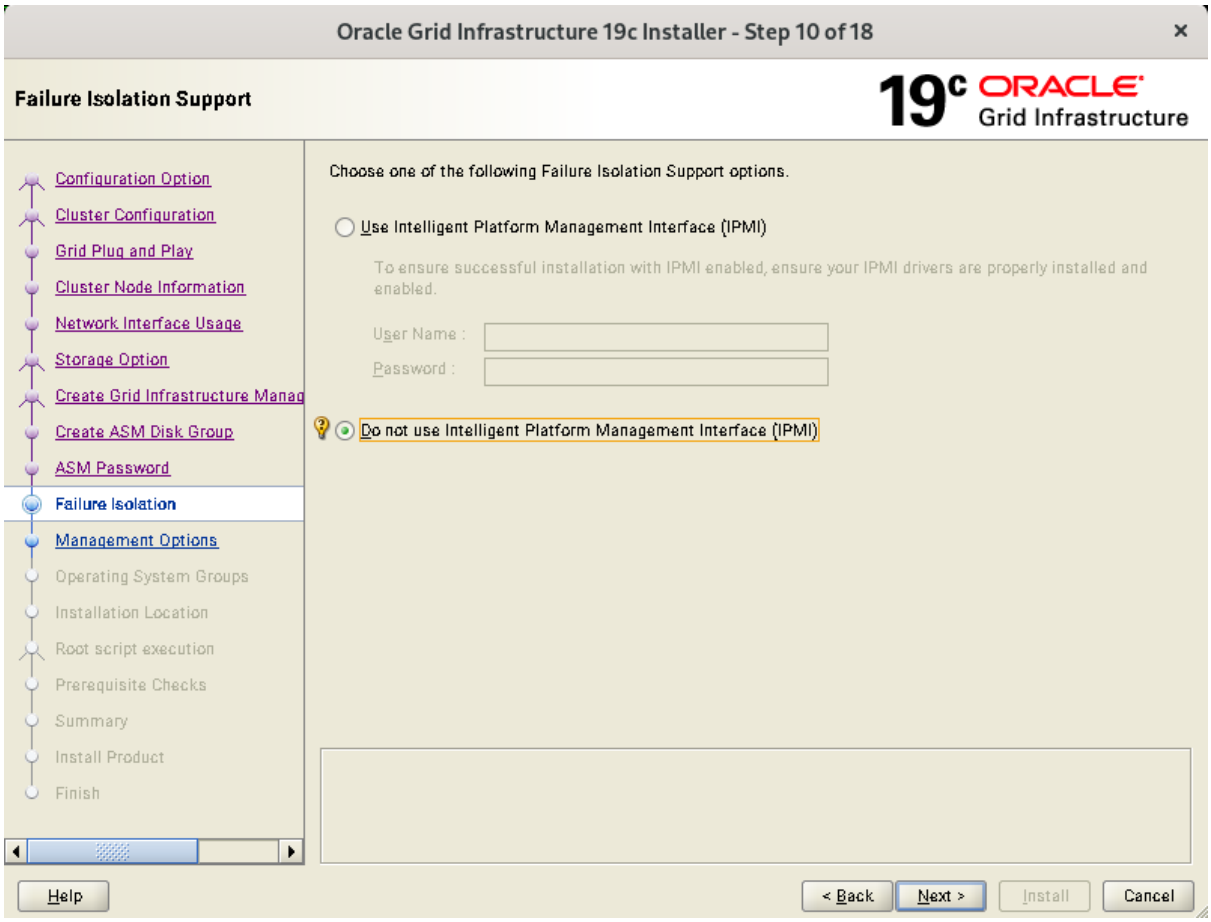
Depending on your needs to creat ASM Disk Group, then click **Next** to continue.

9). Specify ASM Password.



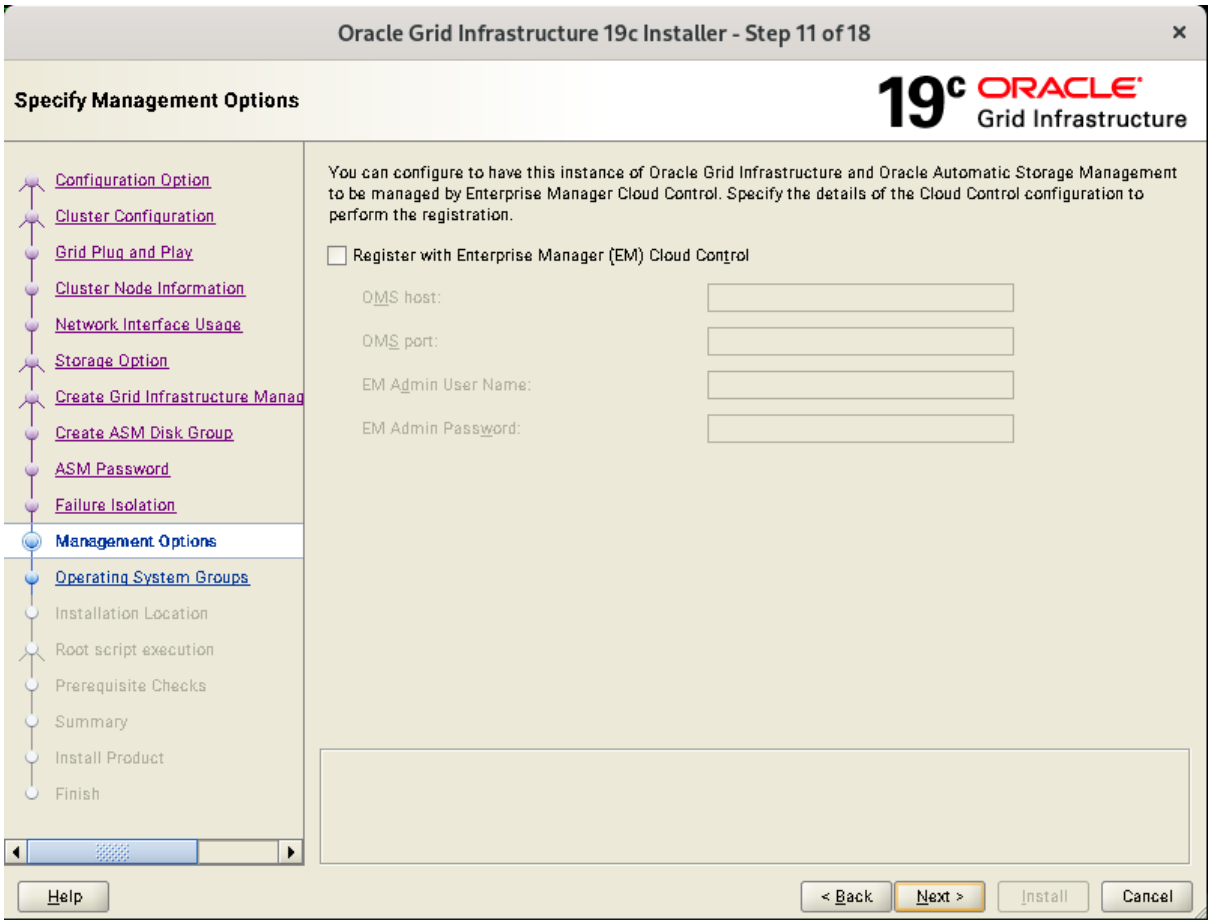
Choose the same password for the Oracle ASM SYS and ASMSNMP account, or specify different passwords for each account, then click **Next** to continue.

10). Failure Isolation Support.



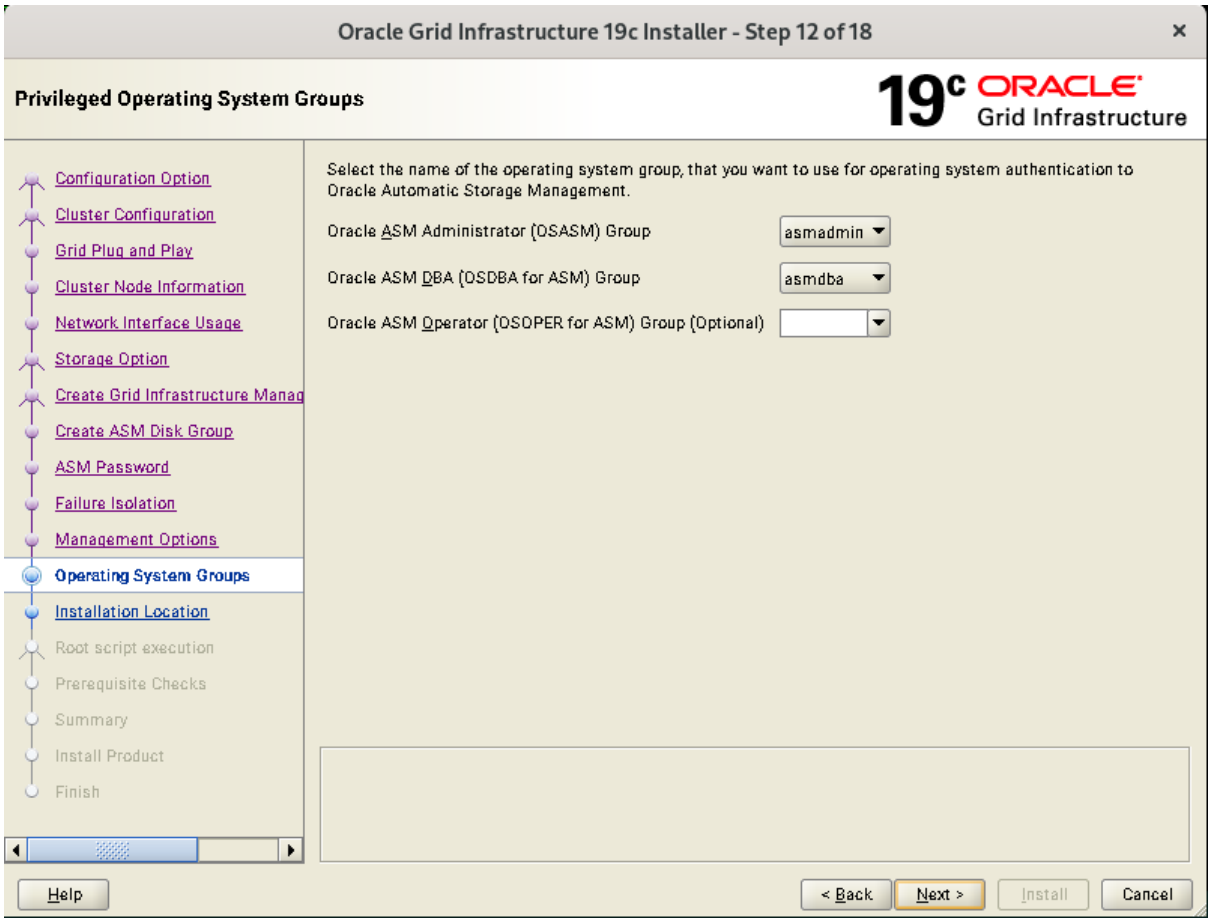
Select the option "**Do not use Intelligent Platform Management Interface** (IPMI)", then click **Next** to continue.

11). Specify Management Options.



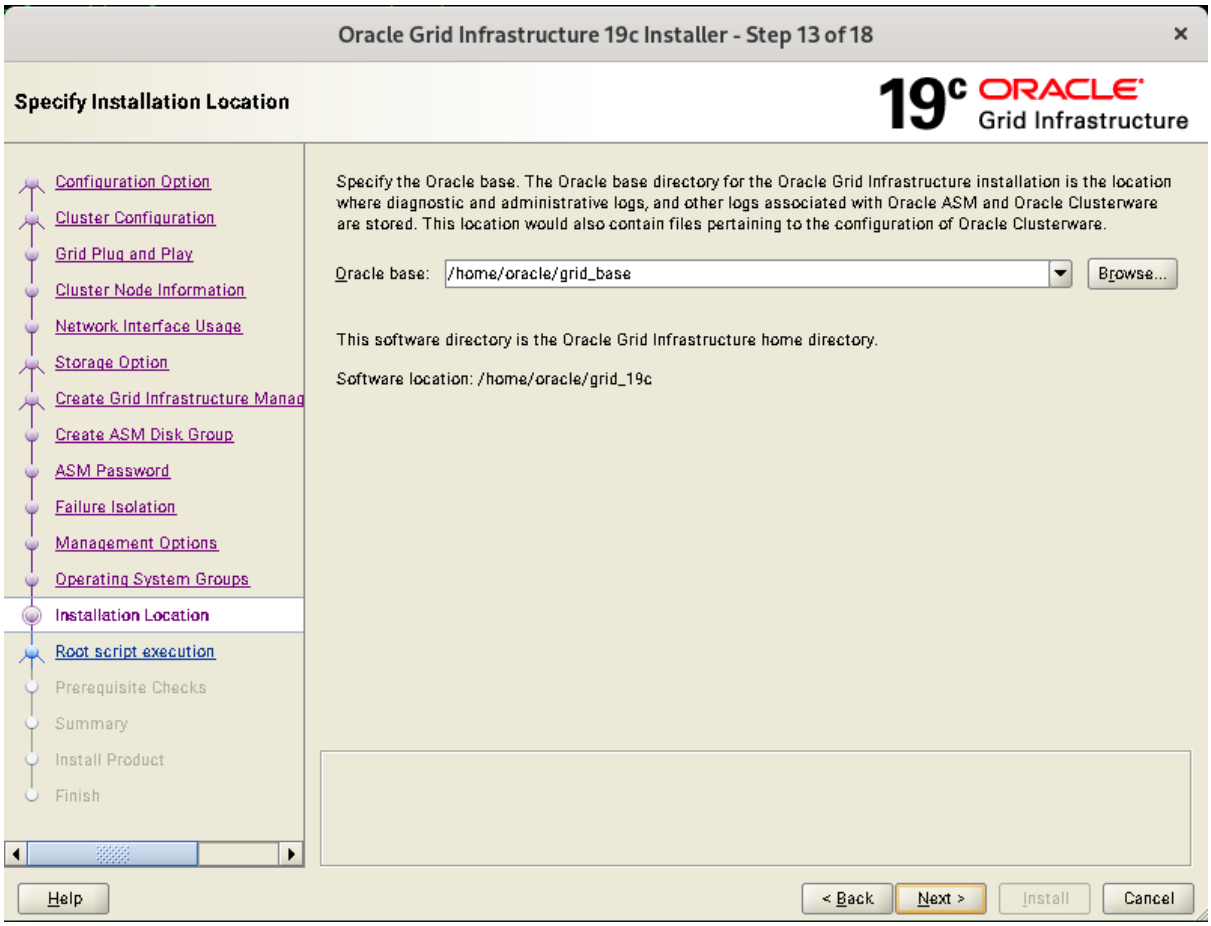
Selected/Deselected the option "**Register with EM...**", then click **Next** to continue.

12). Privileged Operating System Groups.



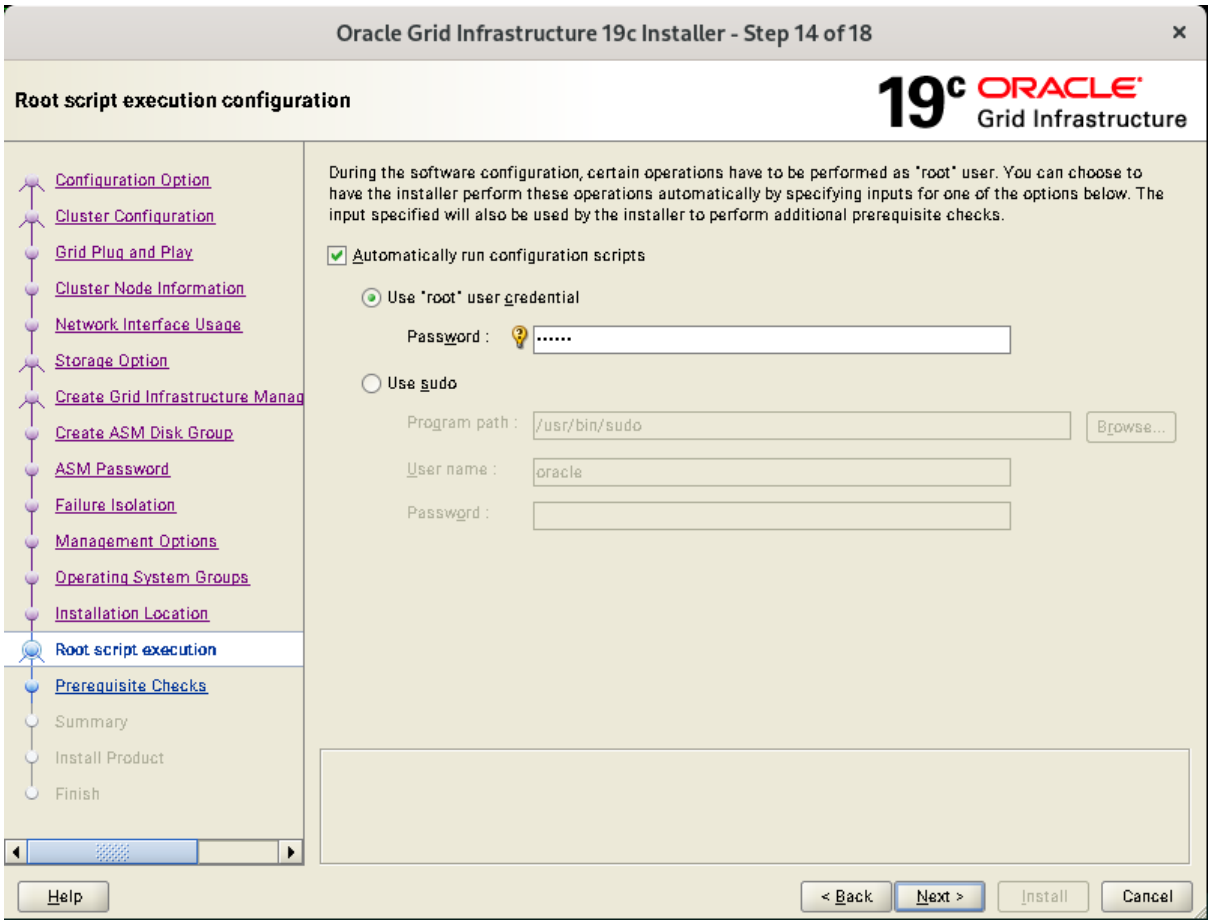
Accept the default operating system group names for Oracle ASM administration, then click **Next** to continue.

13). Specify Installation Location.



Specify the directory to use for the Oracle base for the Oracle Grid Infrastructure installation, then click **Next** to continue. The Oracle base directory must be different from the Oracle home directory.

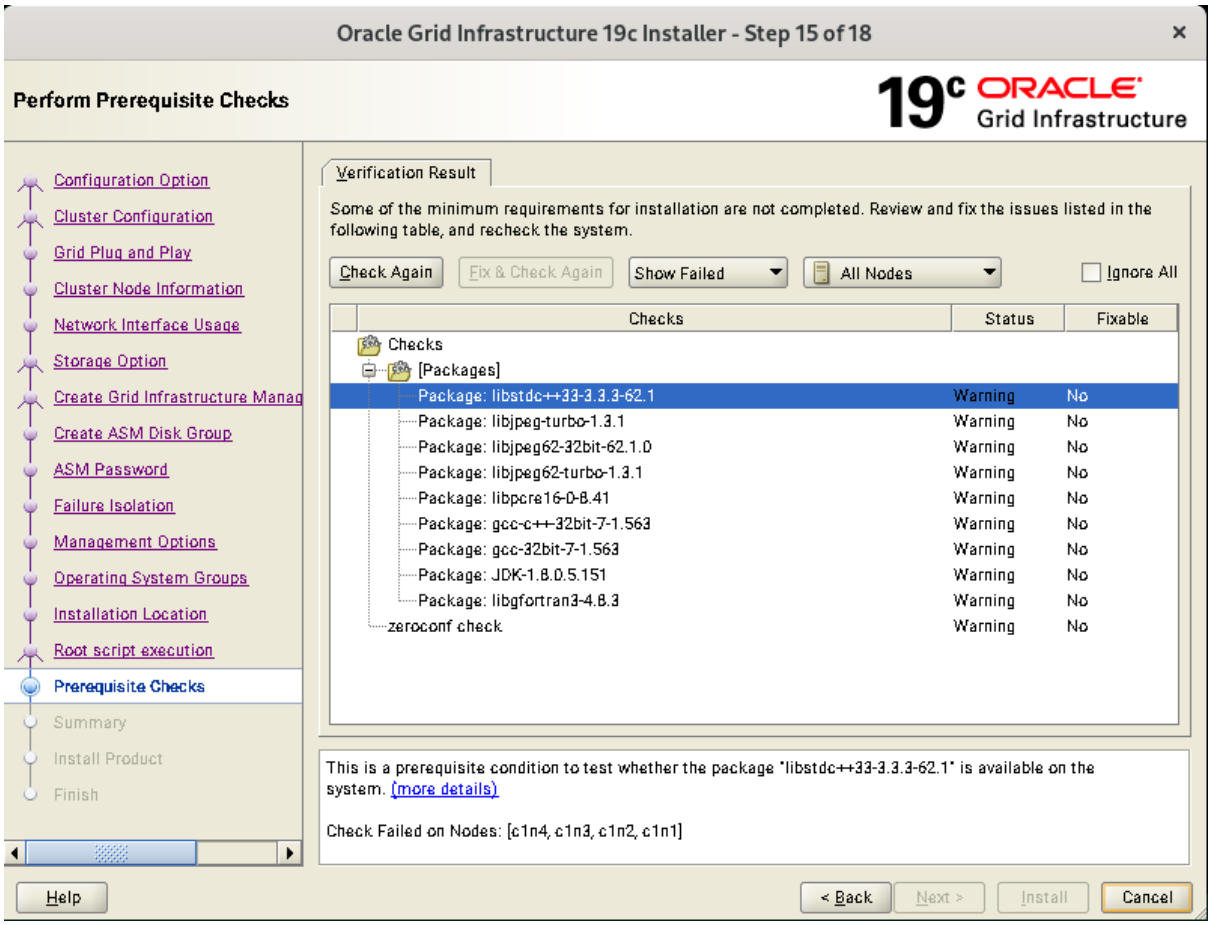
14). Root script execution configuration.



Select the option to **Automatically run configuration scripts**. Enter the credentials for the root user or a sudo account,then click **Next** to continue.

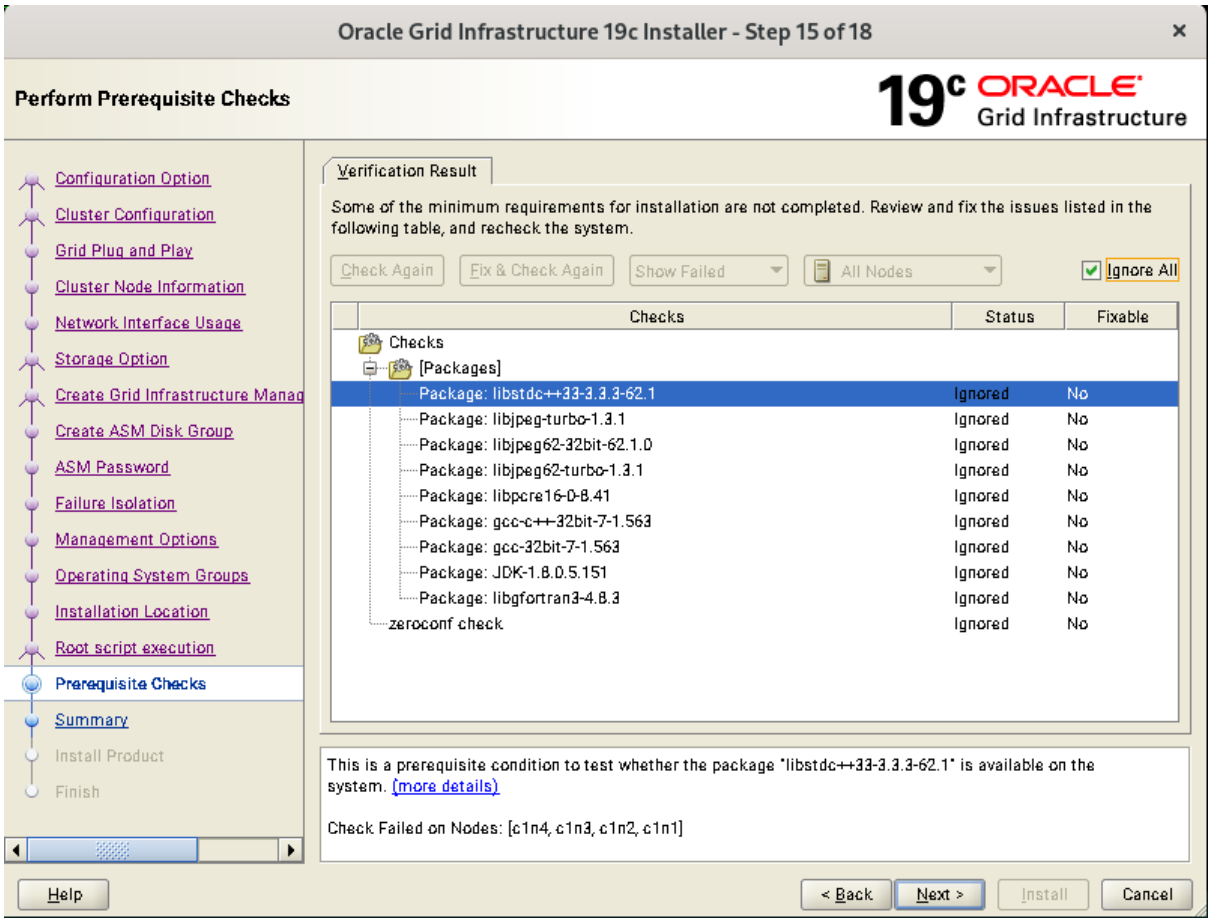
Alternatively, you can Run the scripts manually as the root user at the end of the installation process when prompted by the installer.

15). Perform Prerequisite Checks.



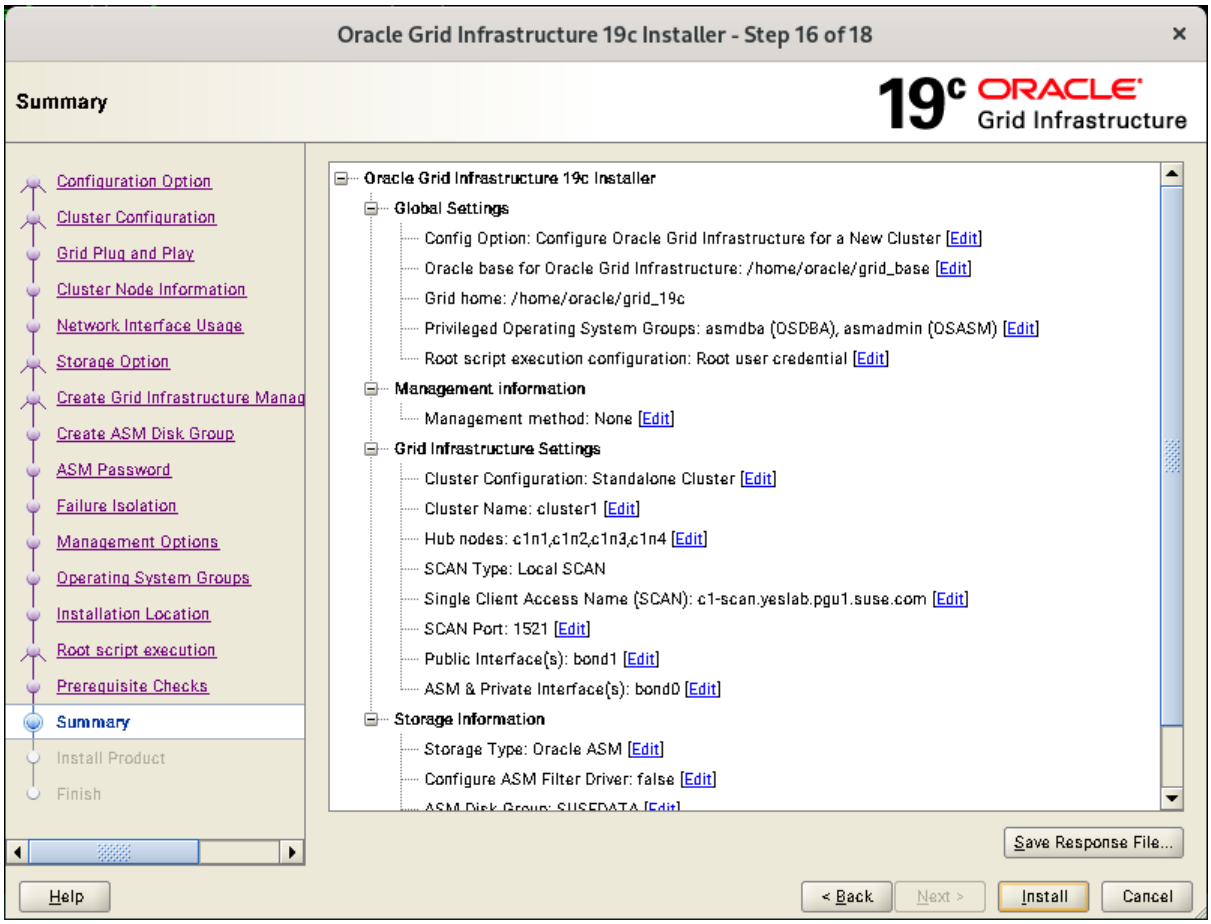
Resolve all the errors and warnings on all nodes in the cluster & run “**Fix & Check Again**”. If the “**Fix & check again**” button is not available, try to fix manually.

Once verified, select option "**Ignore All**", then click **Next** to continue.



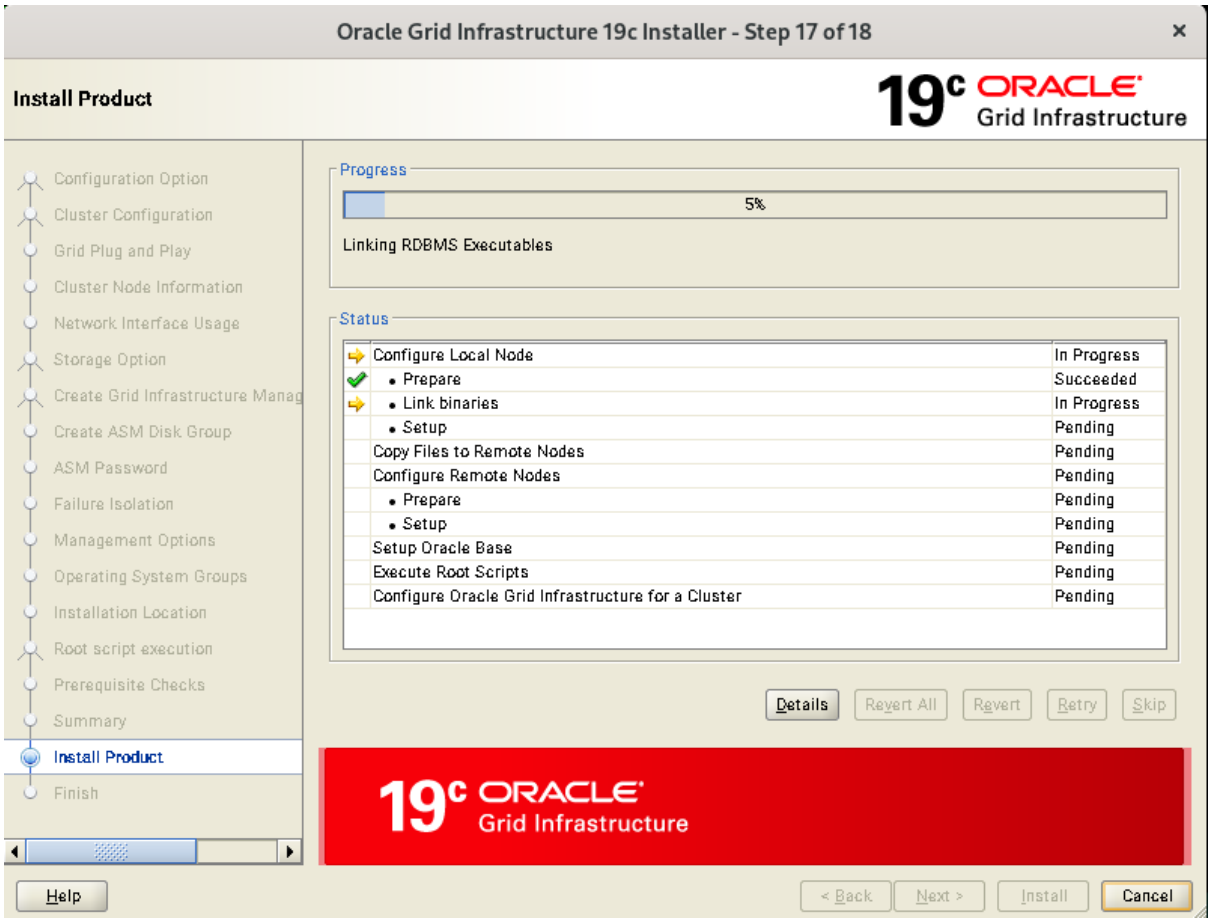
(**Note:** There are still some warning messages, please refer to the details of **Additional Comments** in the last section of the document.)

16). Summary.

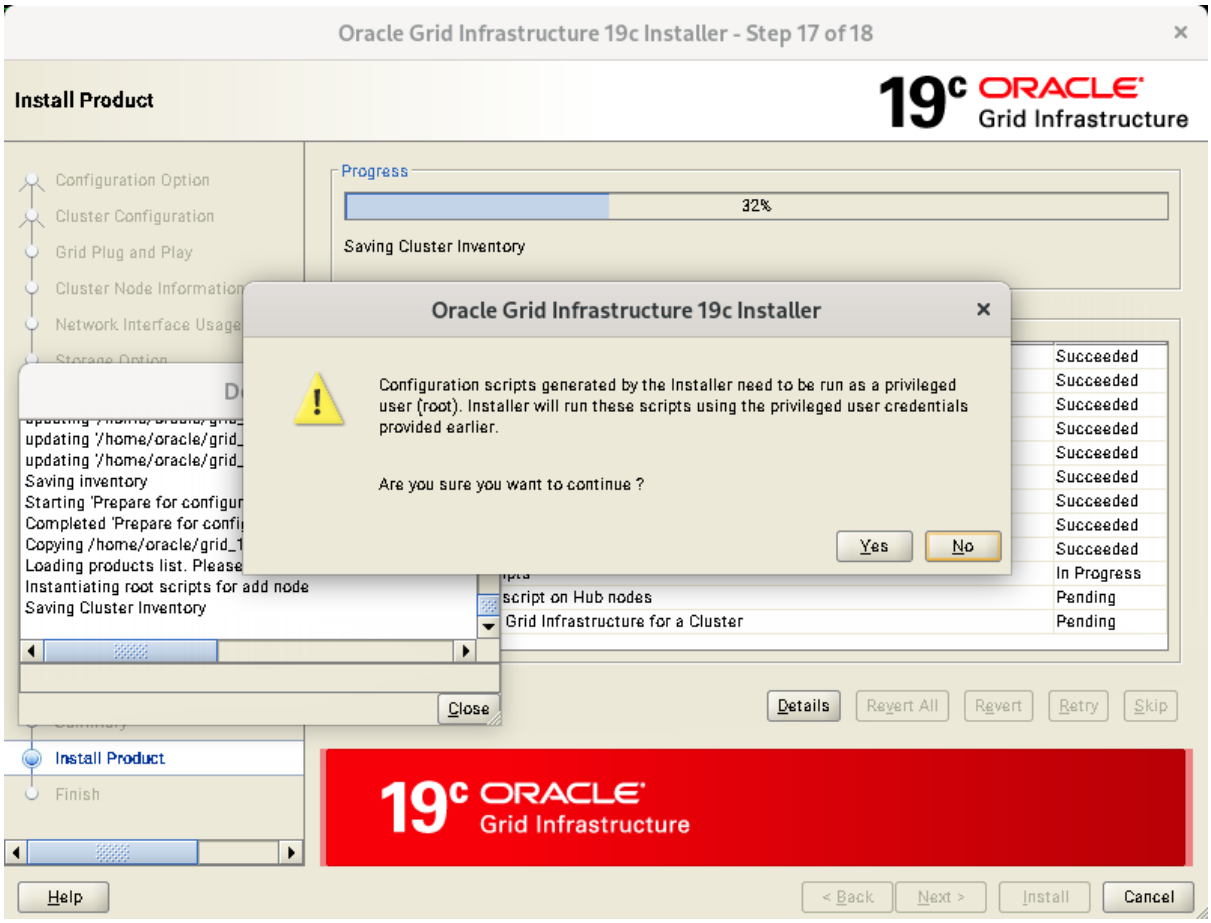


Installation Summary as shown above, click **Install** to continue.

17). Install Product.

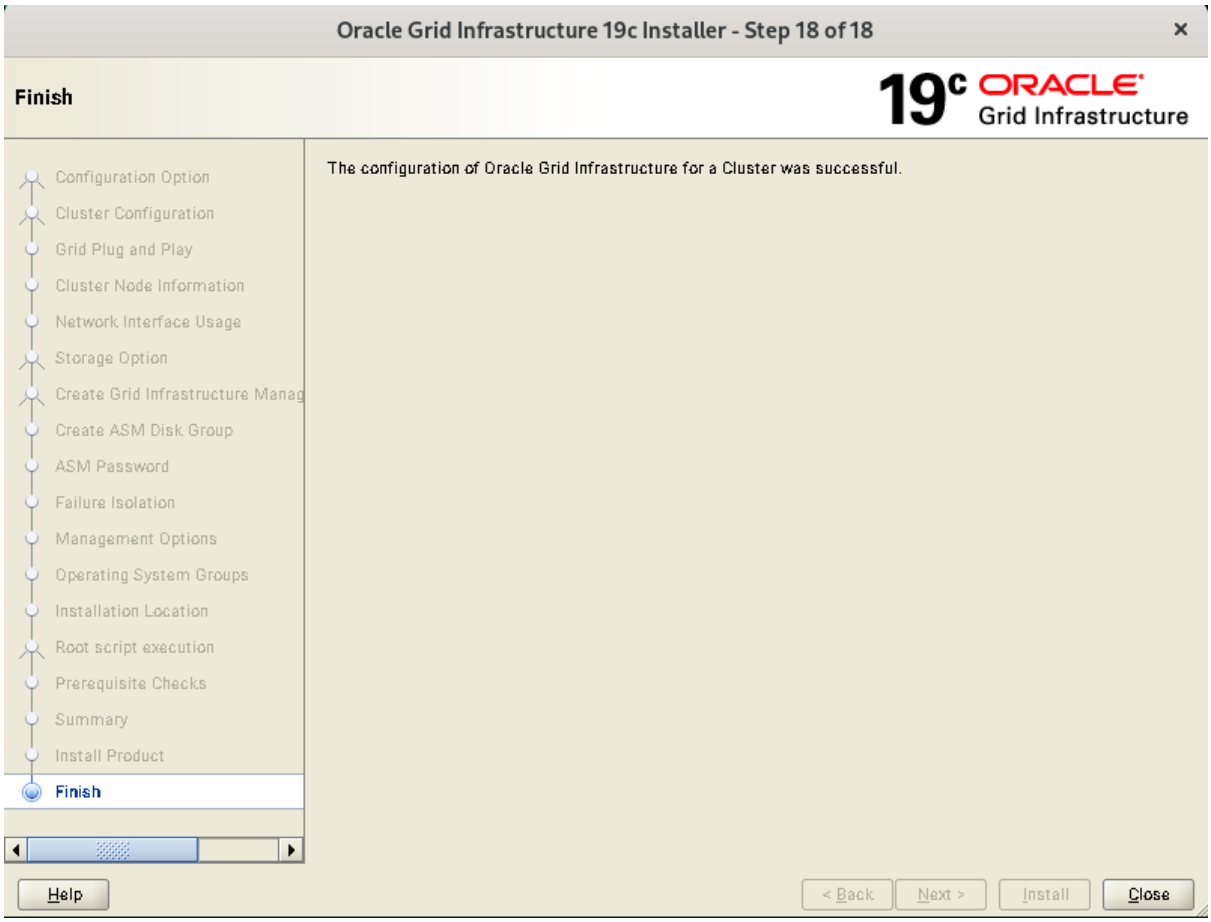


Installer prompted you to run the orainstRoot.sh and root.sh scripts. Click **Yes**.



Continue monitoring the installation until the Finish window appears.

18). Finish.



Click **Close** to complete the installation process and exit the installer.

1-2. Oracle Database 19c(19.3) Grid Infrastructure Post-Install Checks.

1).Check Oracle Clusterware health and resources.

```
oracle@cln1:~> /home/oracle/grid_19c/bin/crsctl check cluster -all
**************************************************************
cln1:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
cln2:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
cln3:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
cln4:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
oracle@cln1:~> /home/oracle/grid_19c/bin/srvctl status nodeapps
VIP 10.124.140.25 is enabled
VIP 10.124.140.25 is running on node: cln1
VIP 10.124.140.26 is enabled
VIP 10.124.140.26 is running on node: cln2
VIP 10.124.140.27 is enabled
VIP 10.124.140.27 is running on node: cln3
VIP 10.124.140.28 is enabled
VIP 10.124.140.28 is running on node: cln4
Network is enabled
Network is running on node: cln1
Network is running on node: cln2
Network is running on node: cln3
Network is running on node: cln4
ONS is enabled
ONS daemon is running on node: cln1
ONS daemon is running on node: cln2
ONS daemon is running on node: cln3
ONS daemon is running on node: cln4
oracle@cln1:~>
```

2). Check status of designated resources.

```
oracle@cln1:~> /home/oracle/grid_19c/bin/crsctl stat res -t
--------------------------------------------------------------------------------
Name           Target  State        Server                   State details
--------------------------------------------------------------------------------
Local Resources
--------------------------------------------------------------------------------
ora.LISTENER.lsnr
               ONLINE  ONLINE       cln1                     STABLE
               ONLINE  ONLINE       cln2                     STABLE
               ONLINE  ONLINE       cln3                     STABLE
               ONLINE  ONLINE       cln4                     STABLE
ora.chad
               ONLINE  ONLINE       cln1                     STABLE
               ONLINE  ONLINE       cln2                     STABLE
               ONLINE  ONLINE       cln3                     STABLE
               ONLINE  ONLINE       cln4                     STABLE
ora.net1.network
               ONLINE  ONLINE       cln1                     STABLE
               ONLINE  ONLINE       cln2                     STABLE
               ONLINE  ONLINE       cln3                     STABLE
               ONLINE  ONLINE       cln4                     STABLE
ora.ons
               ONLINE  ONLINE       cln1                     STABLE
               ONLINE  ONLINE       cln2                     STABLE
               ONLINE  ONLINE       cln3                     STABLE
               ONLINE  ONLINE       cln4                     STABLE
--------------------------------------------------------------------------------
```

```
Cluster Resources
--------------------------------------------------------------------------------
ora.ASMNET1LSNR_ASM.lsnr(ora.asmgroup)
      1        ONLINE  ONLINE       cln1                     STABLE
      2        ONLINE  ONLINE       cln2                     STABLE
      3        ONLINE  ONLINE       cln3                     STABLE
ora.LISTENER_SCAN1.lsnr
      1        ONLINE  ONLINE       cln2                     STABLE
ora.LISTENER_SCAN2.lsnr
      1        ONLINE  ONLINE       cln3                     STABLE
ora.LISTENER_SCAN3.lsnr
      1        ONLINE  ONLINE       cln4                     STABLE
ora.SUSEDATA.dg(ora.asmgroup)
      1        ONLINE  ONLINE       cln1                     STABLE
      2        ONLINE  ONLINE       cln2                     STABLE
      3        ONLINE  ONLINE       cln3                     STABLE
ora.asm(ora.asmgroup)
      1        ONLINE  ONLINE       cln1                     Started,STABLE
      2        ONLINE  ONLINE       cln2                     Started,STABLE
      3        ONLINE  ONLINE       cln3                     Started,STABLE
ora.asmnet1.asmnetwork(ora.asmgroup)
      1        ONLINE  ONLINE       cln1                     STABLE
      2        ONLINE  ONLINE       cln2                     STABLE
      3        ONLINE  ONLINE       cln3                     STABLE
ora.cln1.vip
      1        ONLINE  ONLINE       cln1                     STABLE
ora.cln2.vip
      1        ONLINE  ONLINE       cln2                     STABLE
ora.cln3.vip
      1        ONLINE  ONLINE       cln3                     STABLE
ora.cln4.vip
      1        ONLINE  ONLINE       cln4                     STABLE
ora.cvu
      1        ONLINE  ONLINE       cln1                     STABLE
ora.qosmserver
      1        ONLINE  ONLINE       cln1                     STABLE
ora.scan1.vip
      1        ONLINE  ONLINE       cln2                     STABLE
ora.scan2.vip
      1        ONLINE  ONLINE       cln3                     STABLE
ora.scan3.vip
      1        ONLINE  ONLINE       cln4                     STABLE
--------------------------------------------------------------------------------
```

3).Check OCR and Voting disk files.

```
oracle@c1n1:~> /home/oracle/grid_19c/bin/ocrcheck
Status of Oracle Cluster Registry is as follows :
         Version                  :          4
         Total space (kbytes)     :     491684
         Used space (kbytes)      :      84292
         Available space (kbytes) :     407392
         ID                       : 1237116313
         Device/File Name         :  +SUSEDATA
                                    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@c1n1:~> /home/oracle/grid_19c/bin/crsctl query css votedisk
##  STATE    File Universal Id                File Name Disk group
--  -----    -----------------                --------- ---------
 1. ONLINE   eadfbbbb1a114f23bf1790cca1ee3159 (/dev/asm/disk1) [SUSEDATA]
 2. ONLINE   208ee23d497c4f1abf03f4f2fb7ca86e (/dev/asm/disk2) [SUSEDATA]
 3. ONLINE   e29687a5673e4f9dbf4bed7d4239deb4 (/dev/asm/disk3) [SUSEDATA]
Located 3 voting disk(s).
oracle@c1n1:~>
```

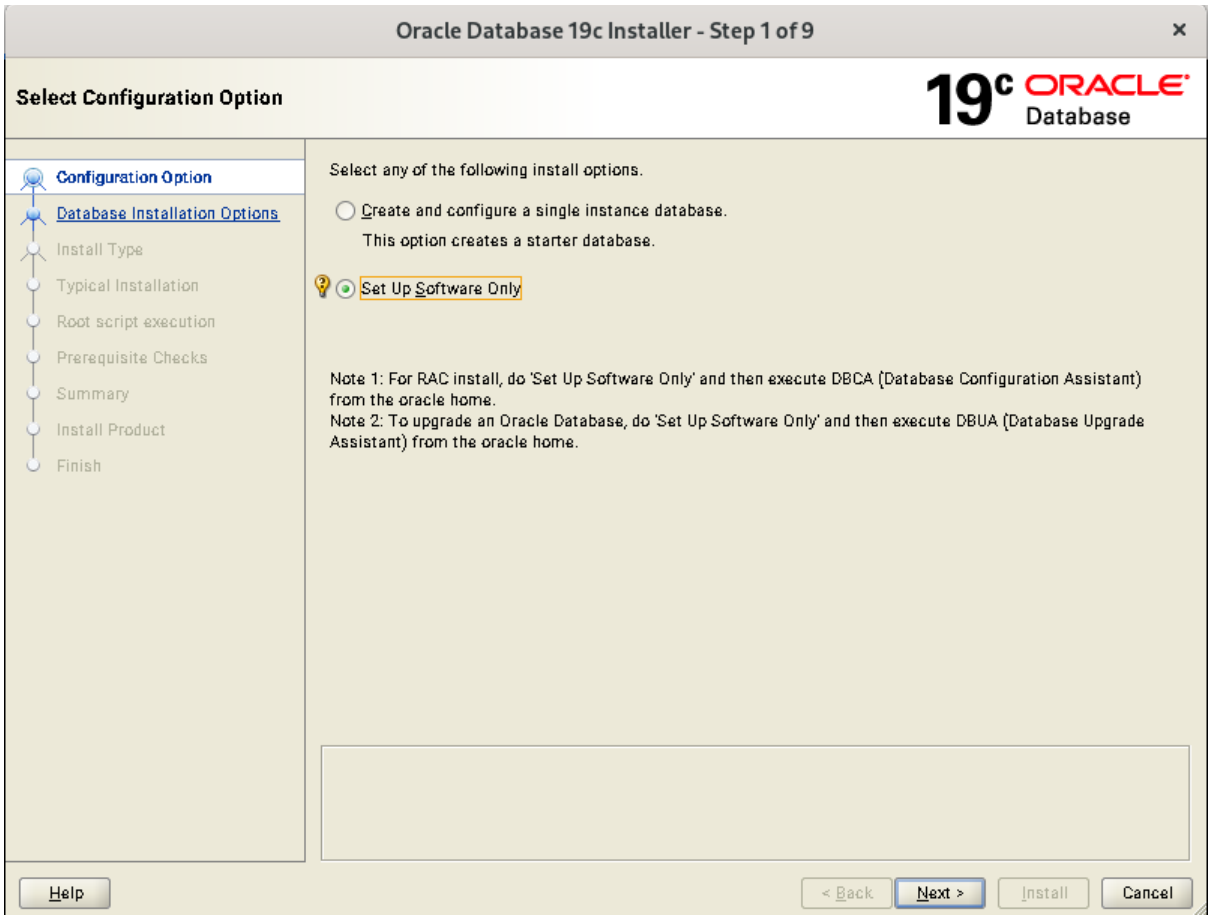
2. Installing Oracle Database.

2-1. Login to the SLES 15 SP5 64-bit OS as a non-admin user. Download Oracle Database 19c (19.3) for Linux x86-64 from:
https://www.oracle.com/database/technologies/oracle19c-linux-downloads.html.

2-2. Extract LINUX.X64_193000_db_home.zip and run Oracle DB installer 'runInstaller' from Database ShipHome.

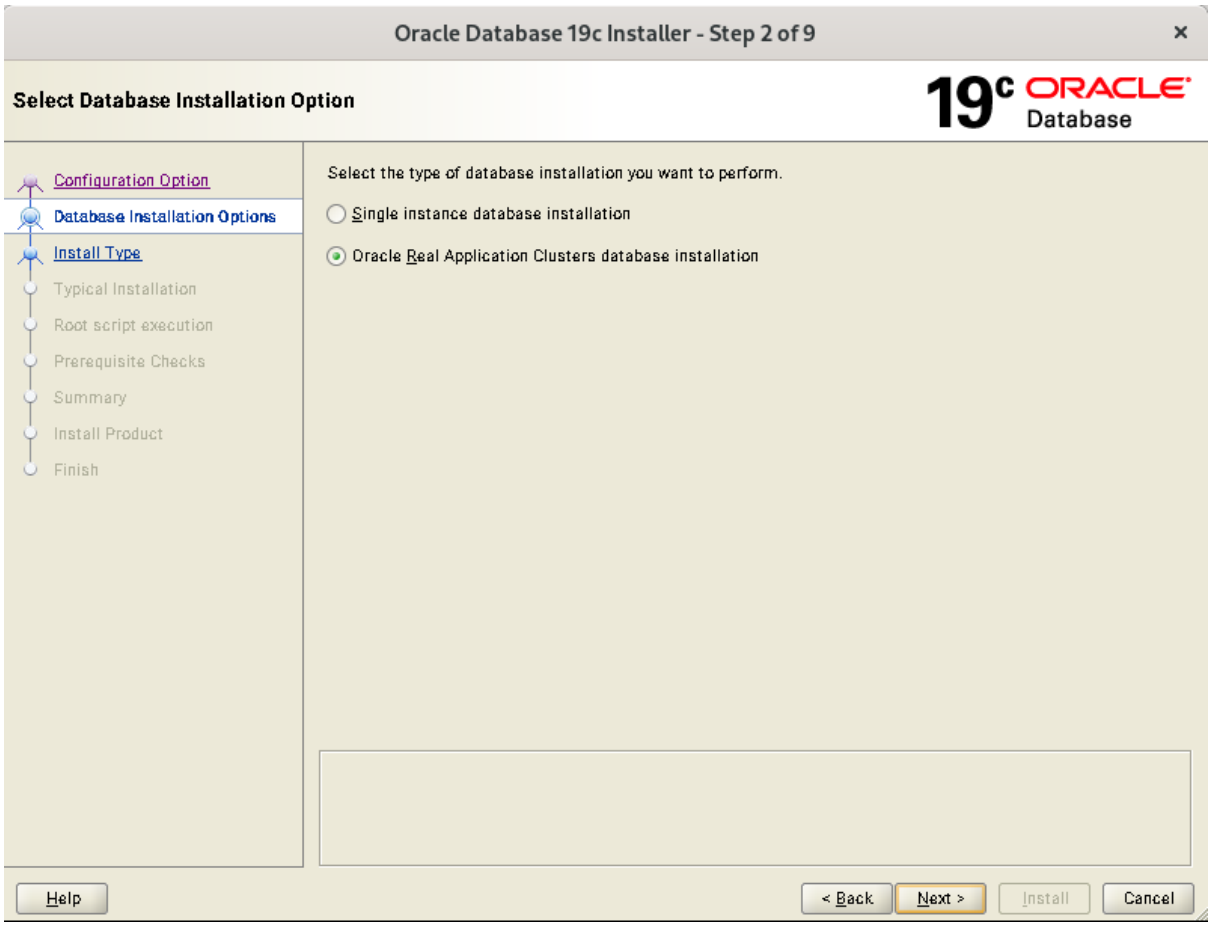
Install Flow:

1). Select Configuration Option.



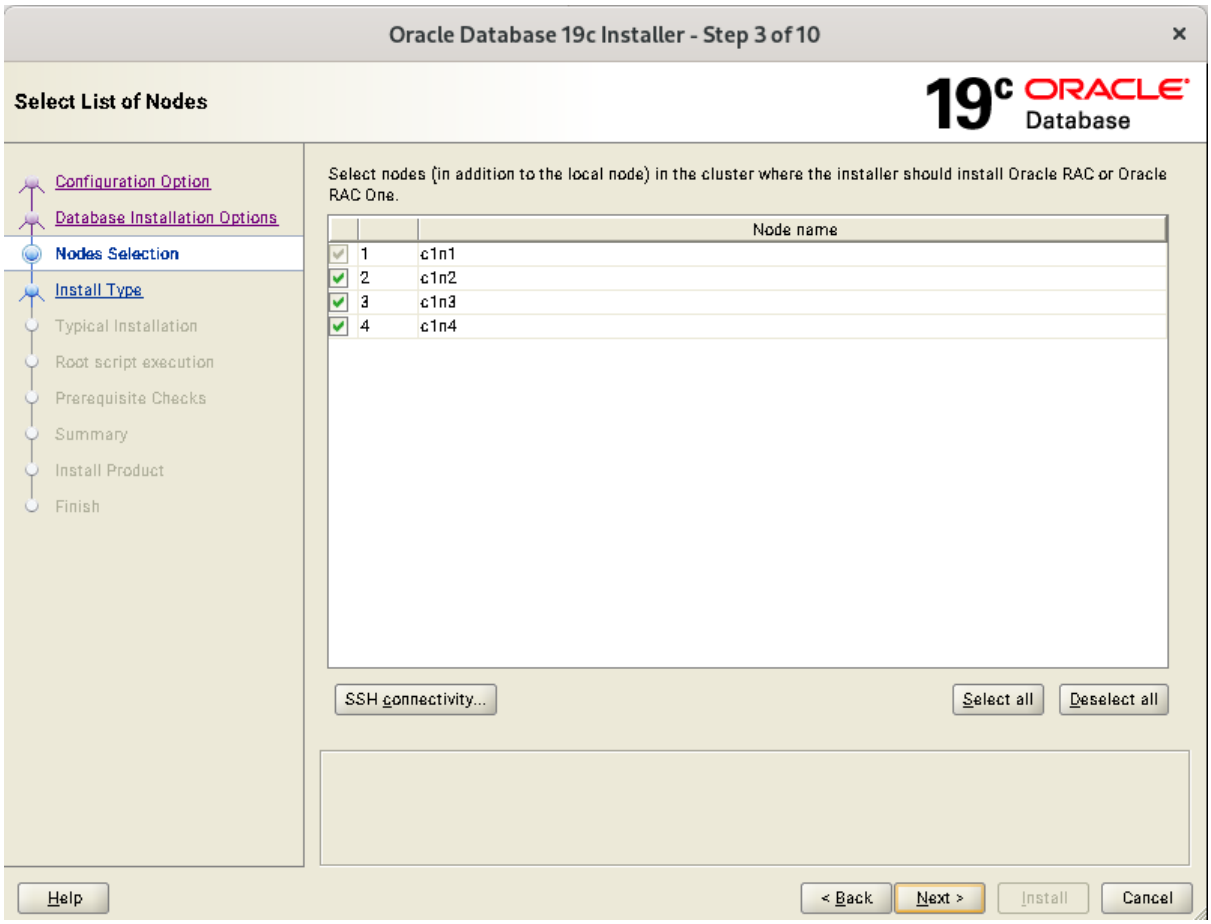
Select option "**Set Up Software Only**", then click **Next** to continue.

2). Select Database Installation Option.



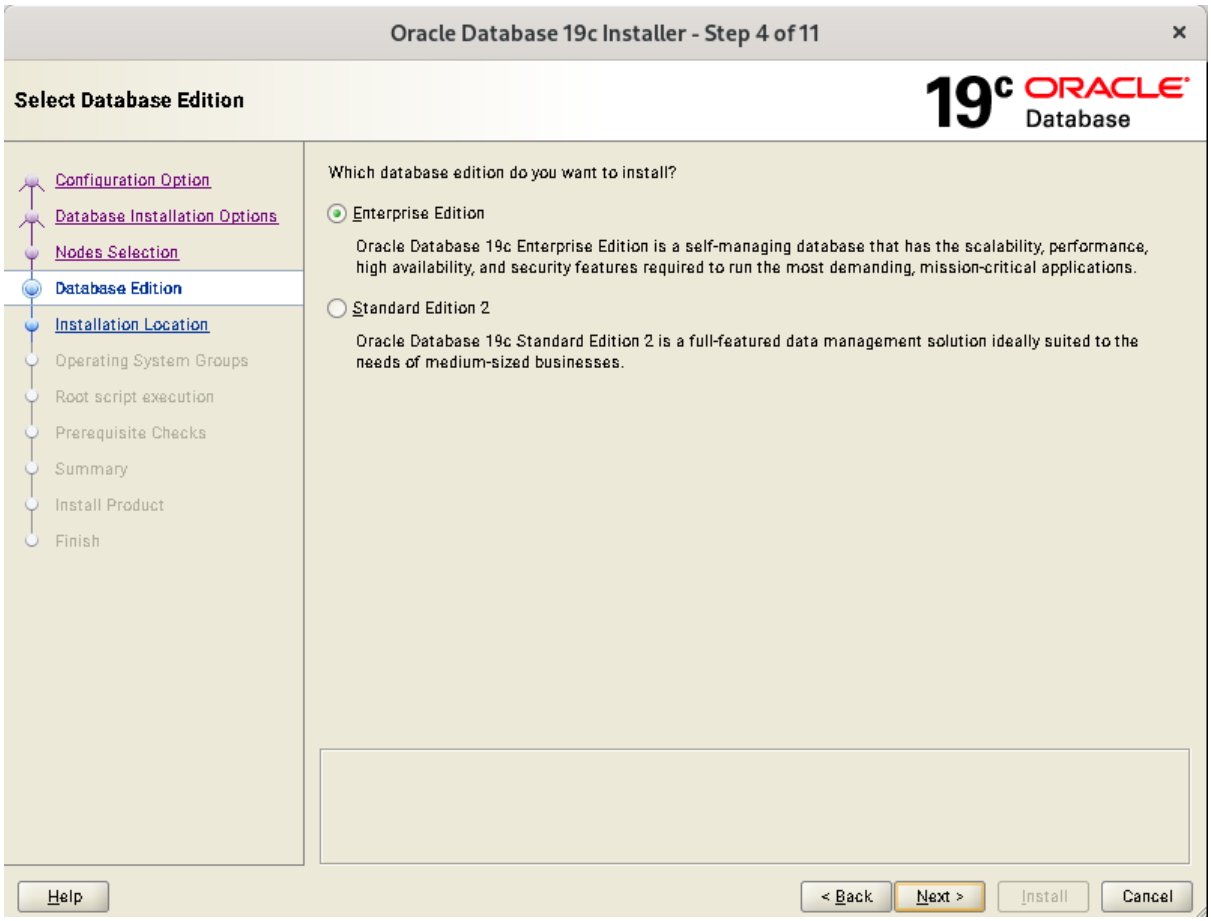
Choose option "**Oracle Real Application Clusters database installation**", then click **Next** to continue.

3). Select List of Nodes.



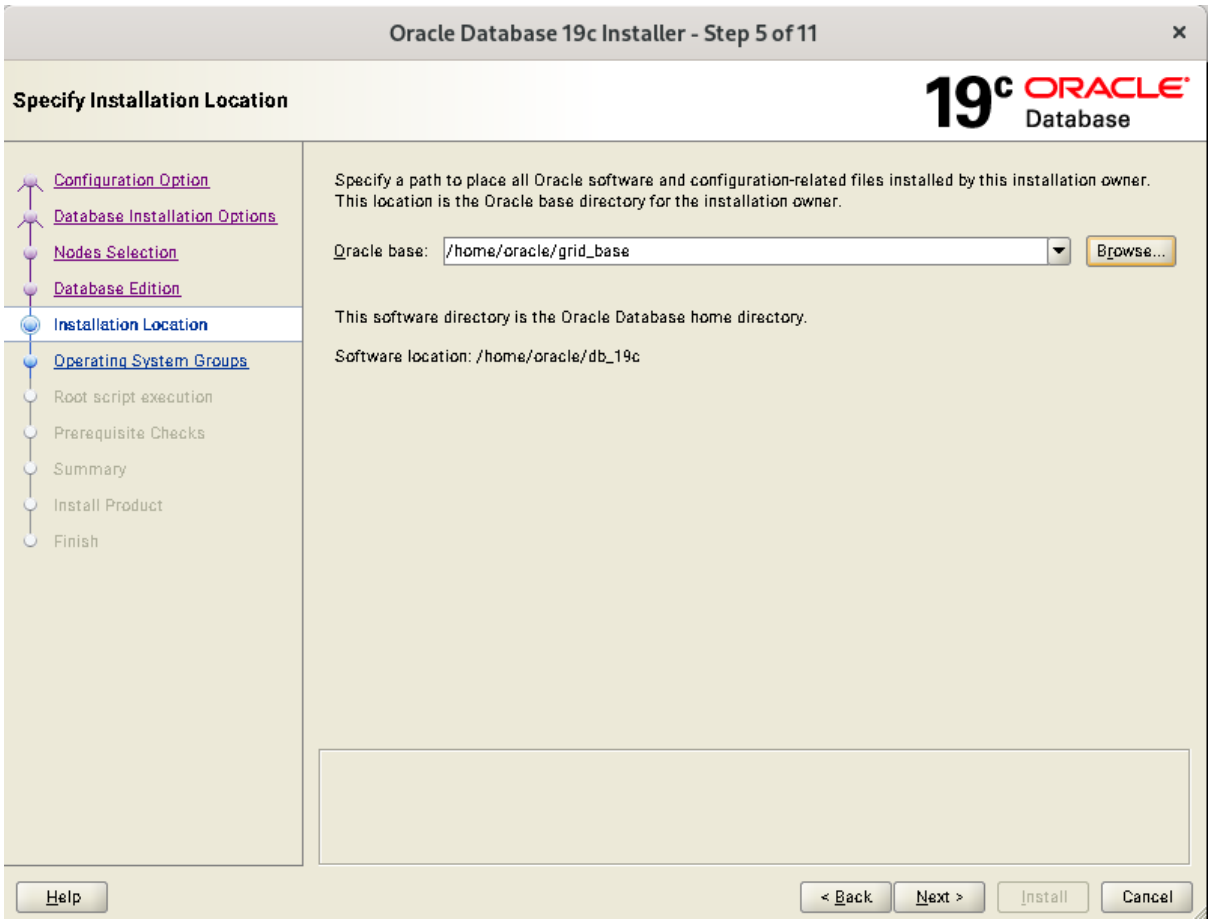
Select all nodes in the cluster, then click **Next** to continue.

4). Select Database Edition.



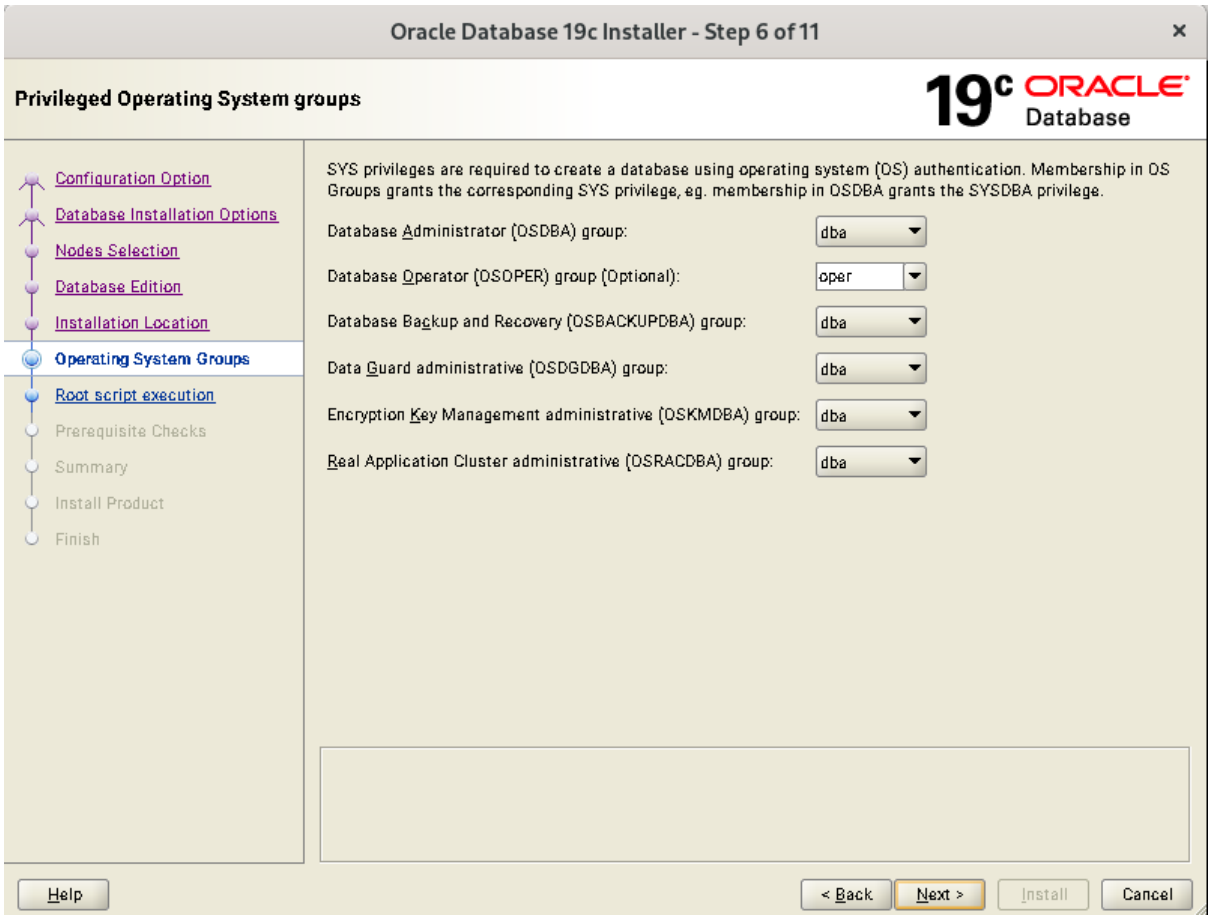
Choose option "**Enterprise Edition**", then click **Next** to continue.

5). Specify Installation Location.



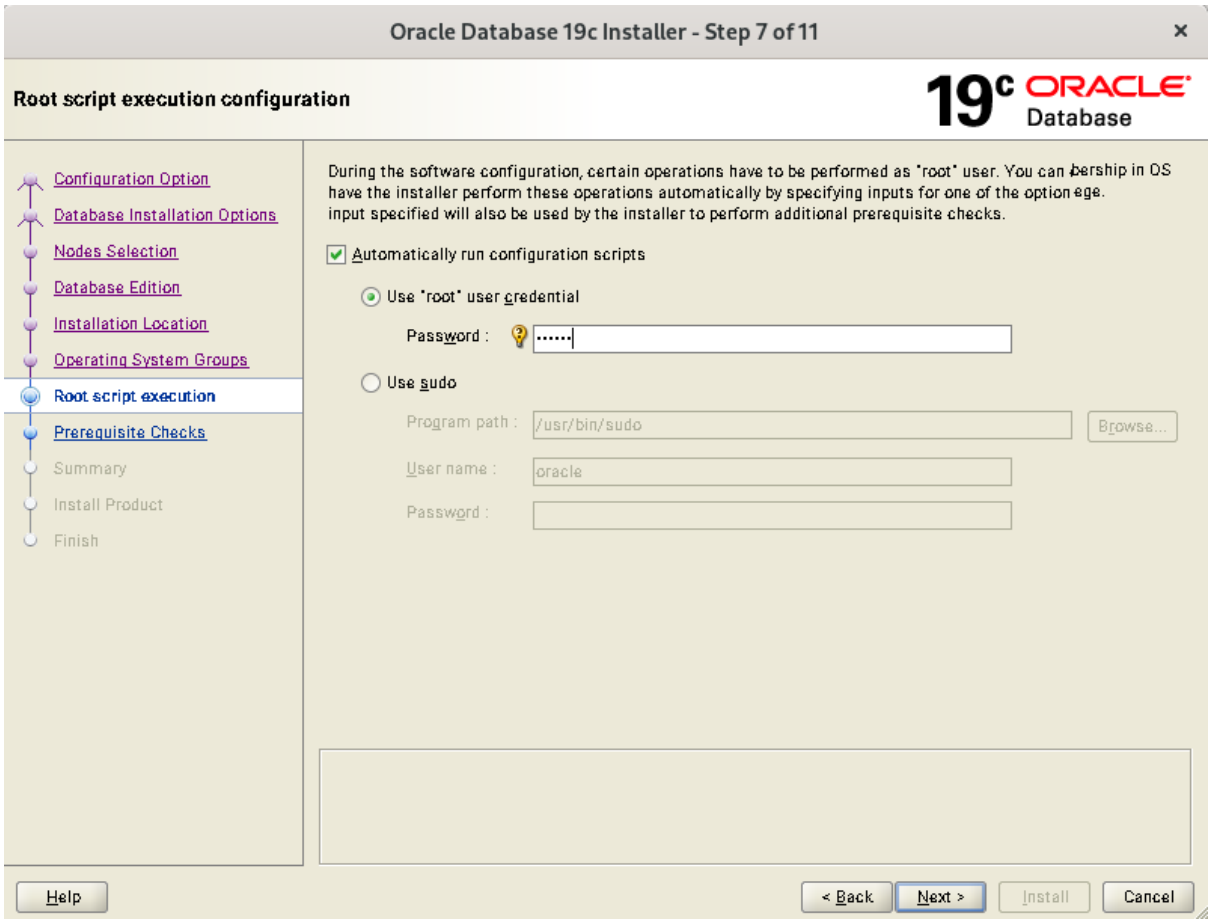
Fill in **Oracle base** as shown above, then click **Next** to continue.

6). Privileged Operating System groups.



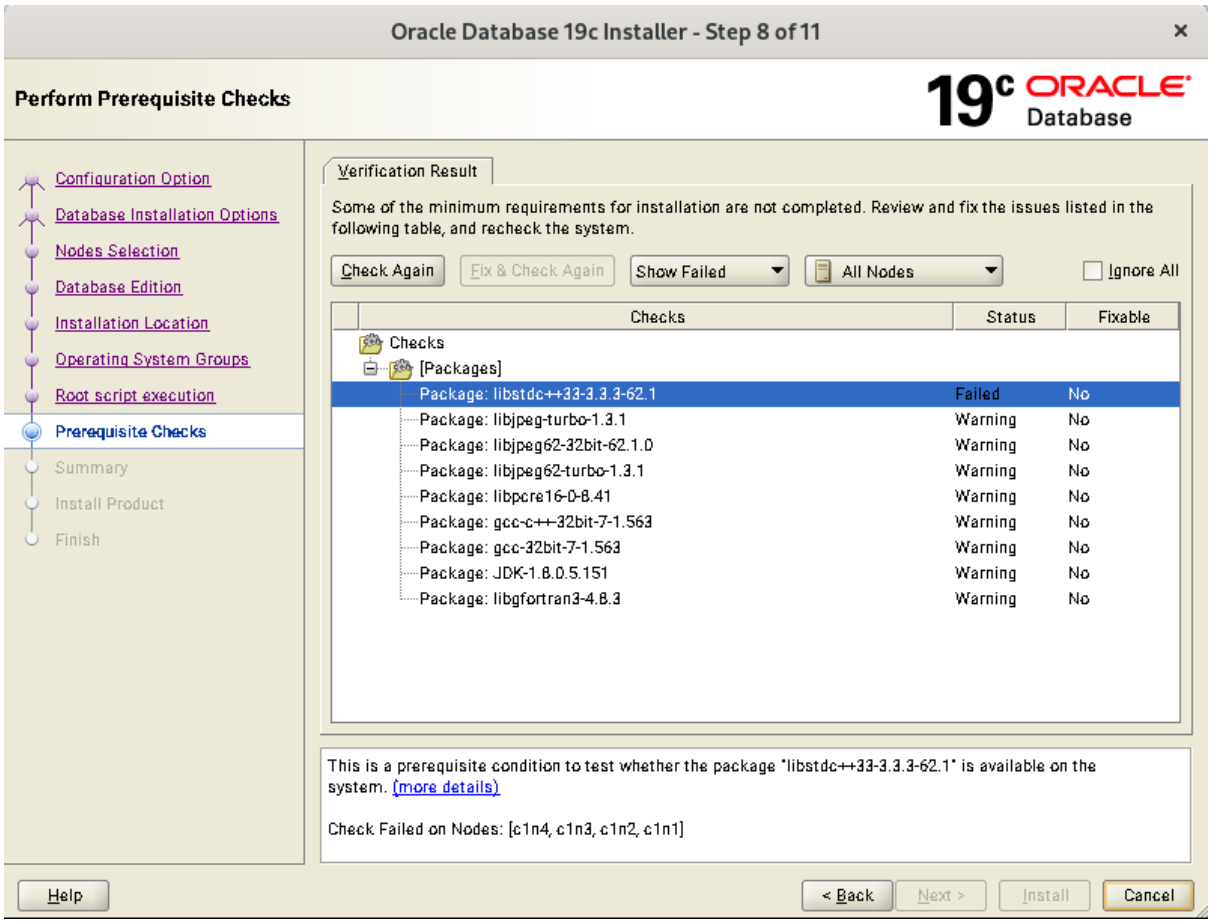
Selected by default, then click **Next** to continue.

7). Root script execution configuration.



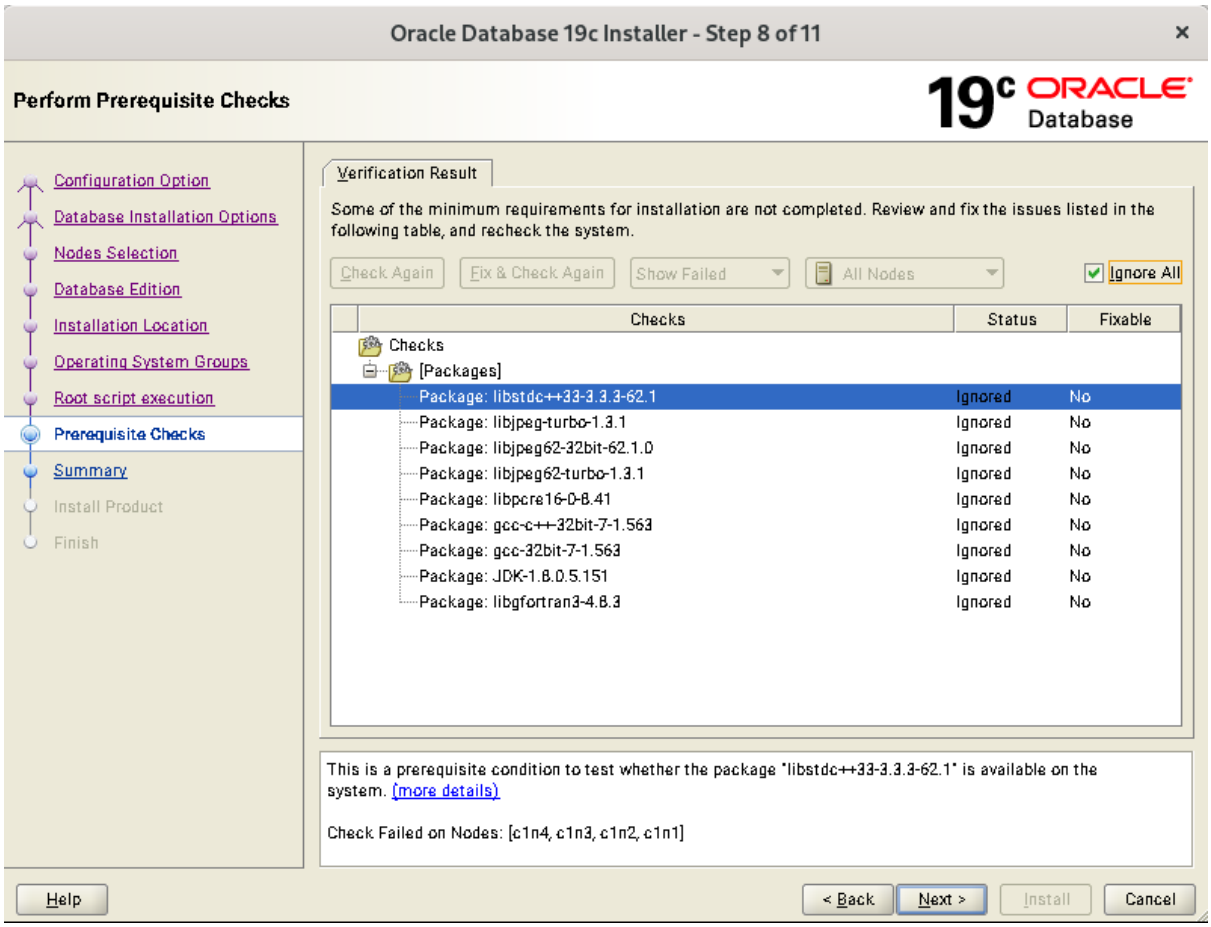
Select the option to **Automatically run configuration scripts**. Enter the credentials for the root user or a sudo account, then click **Next** to continue. Alternatively, you can Run the scripts manually as the root user at the end of the installation process when prompted by the installer.

8). Perform Prerequisite Checks.



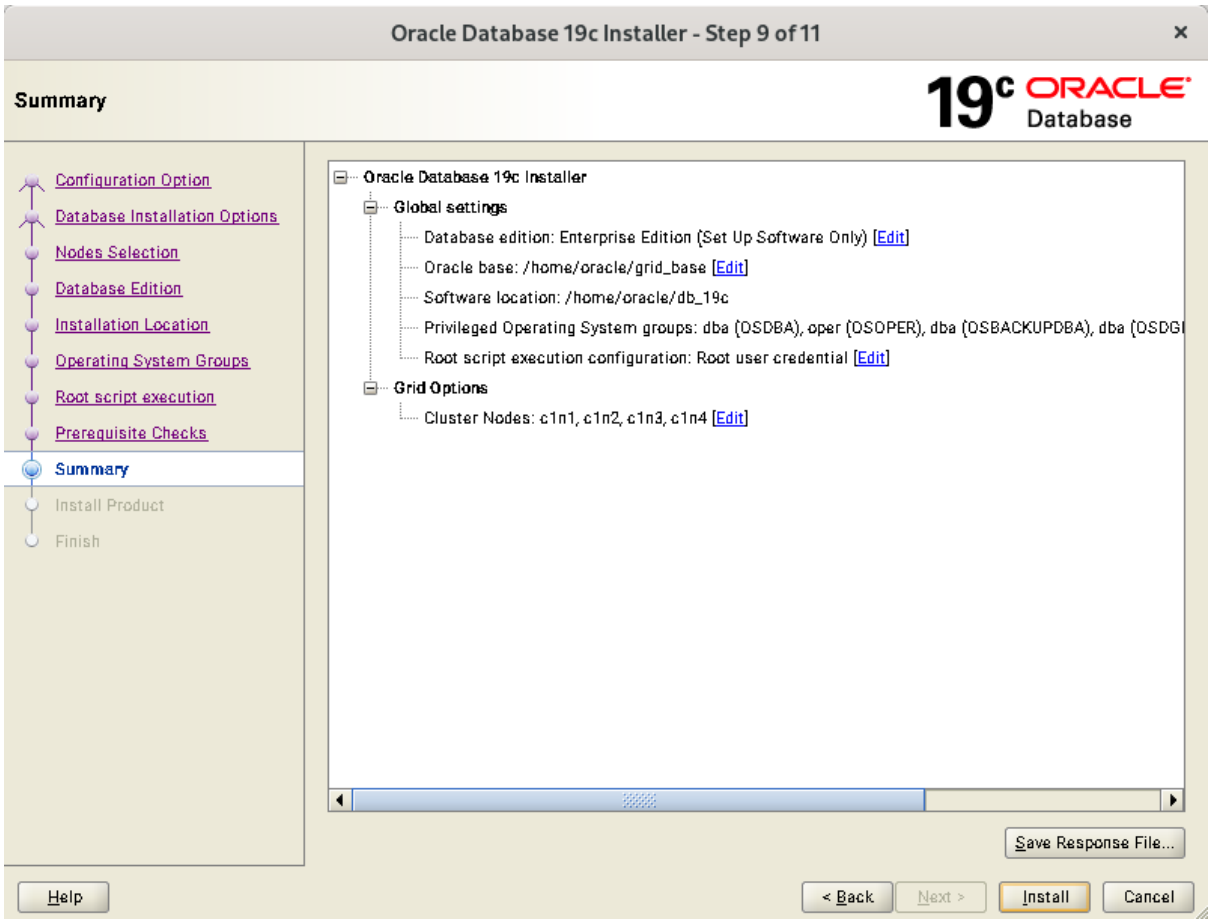
Perform Pre-Check as shown above. Resolve all the errors and warnings on all nodes in the cluster & run “**Fix & Check Again**”. If the “**Fix & check again**” button is not available, try to fix manually.

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



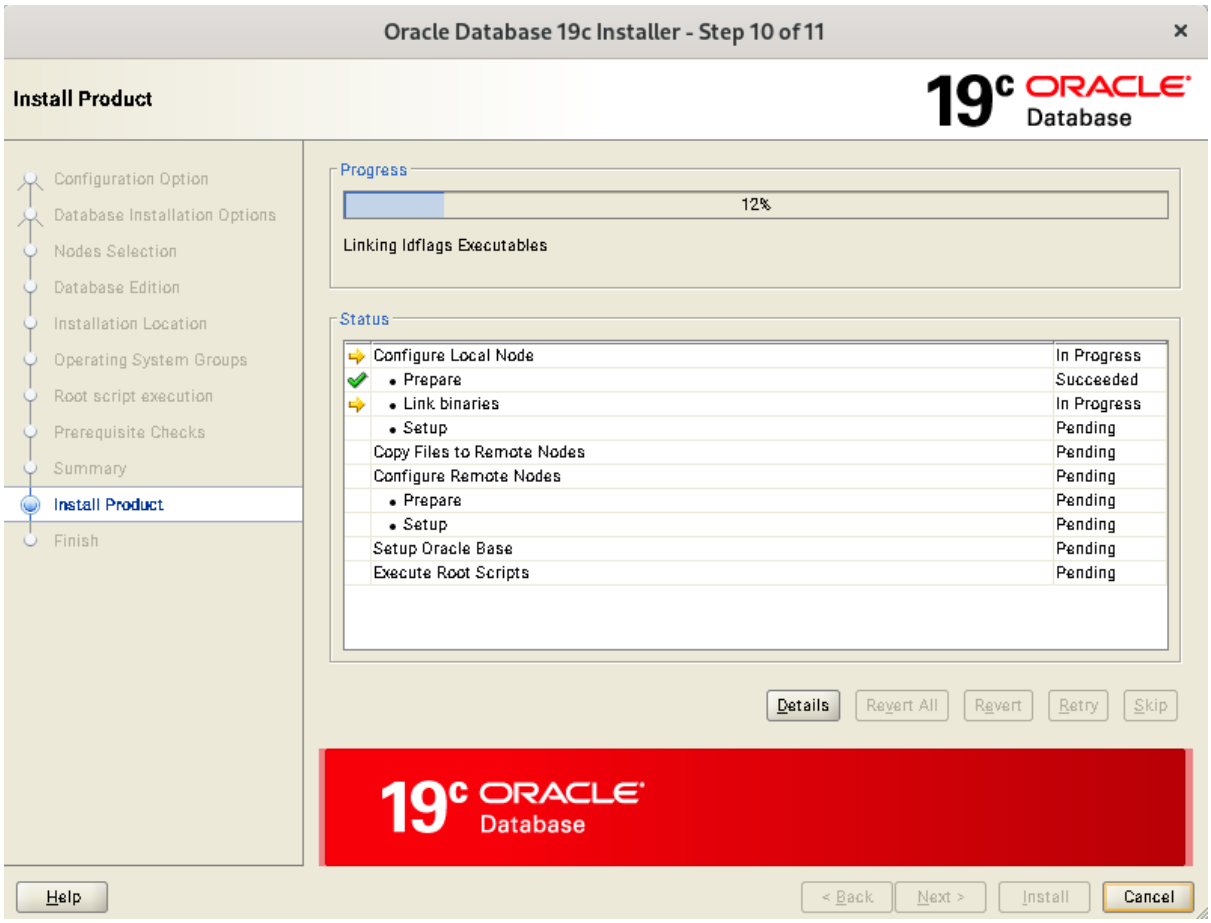
(**Note:** There are still some unsatisfied items, please refer to the details of **Additional Comments** in the last section of the document.)

9). Summary.

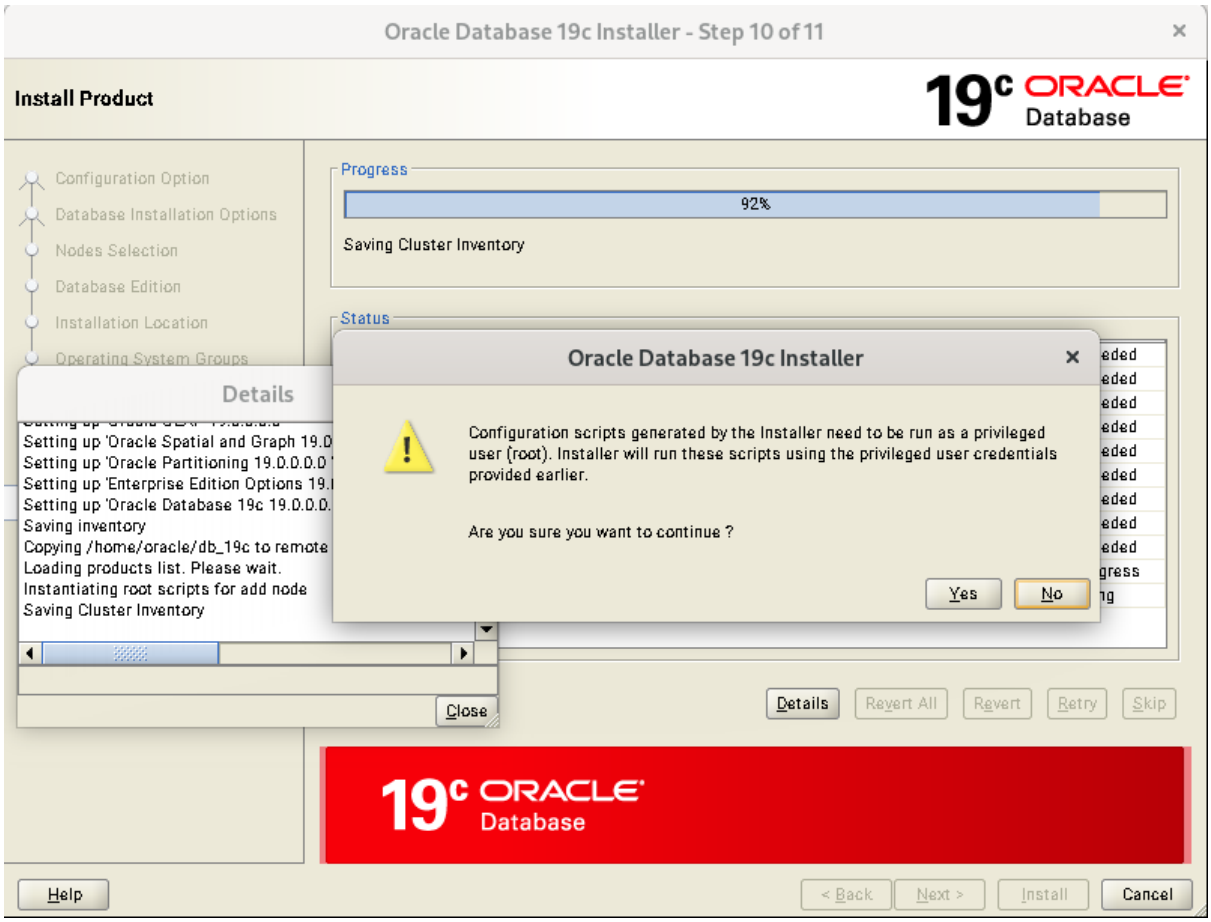


Installation Summary as shown above, click **Install** to continue.

10). Install Product.

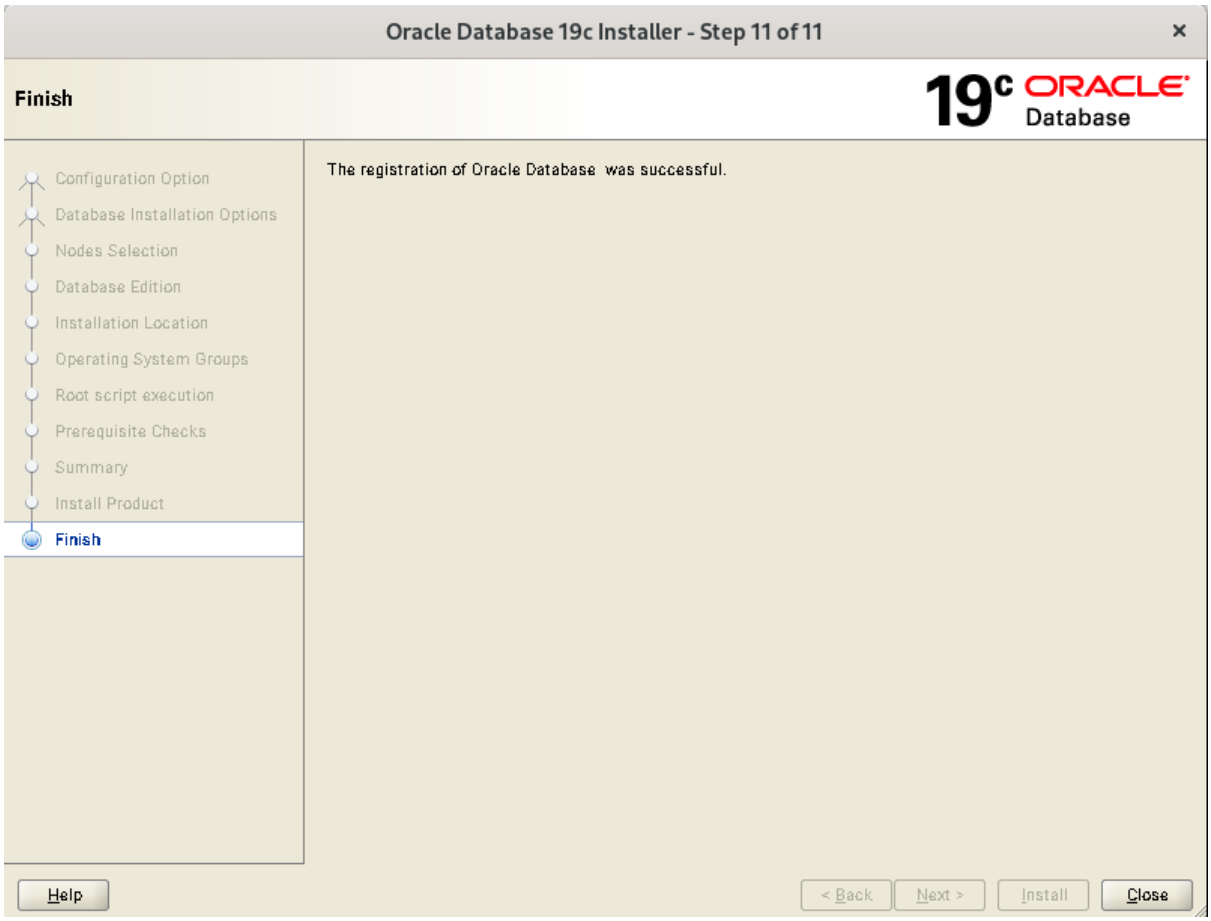


Installer prompted you to run the orainstRoot.sh and root.sh scripts. Click **Yes**.



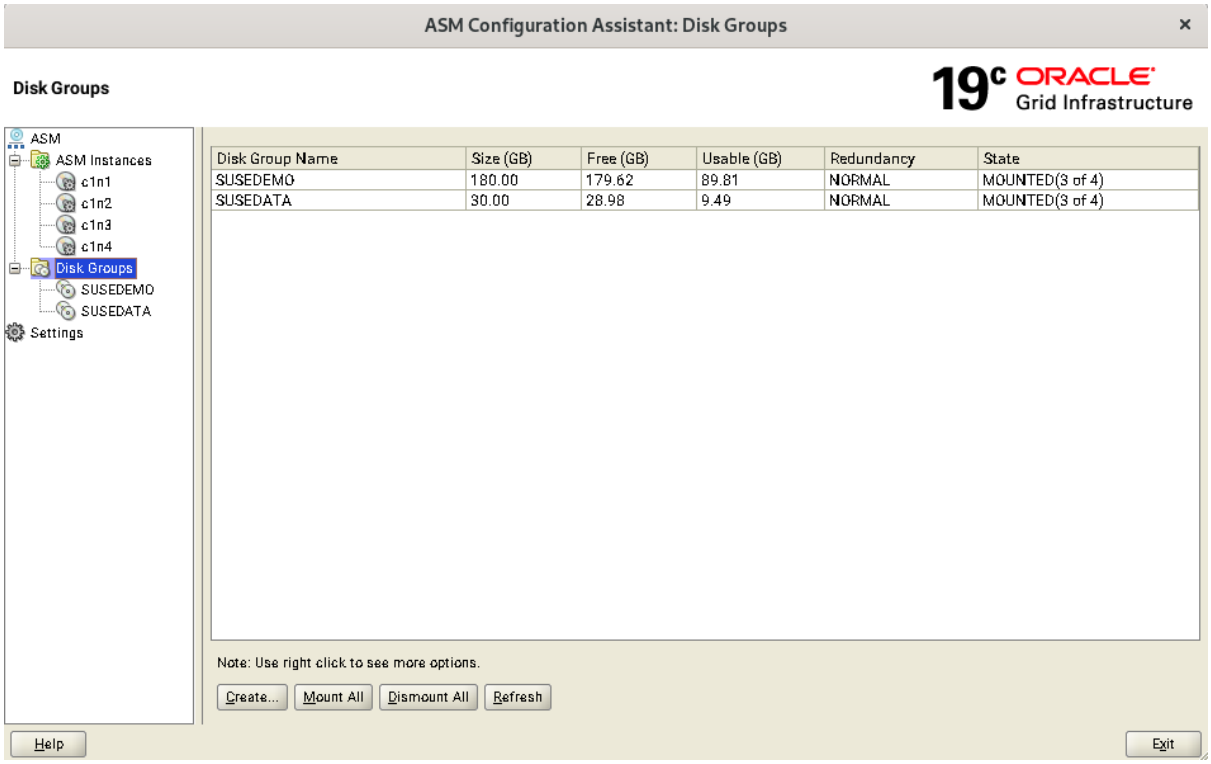
Continue monitoring the installation until the Finish window appears.

11). Finish



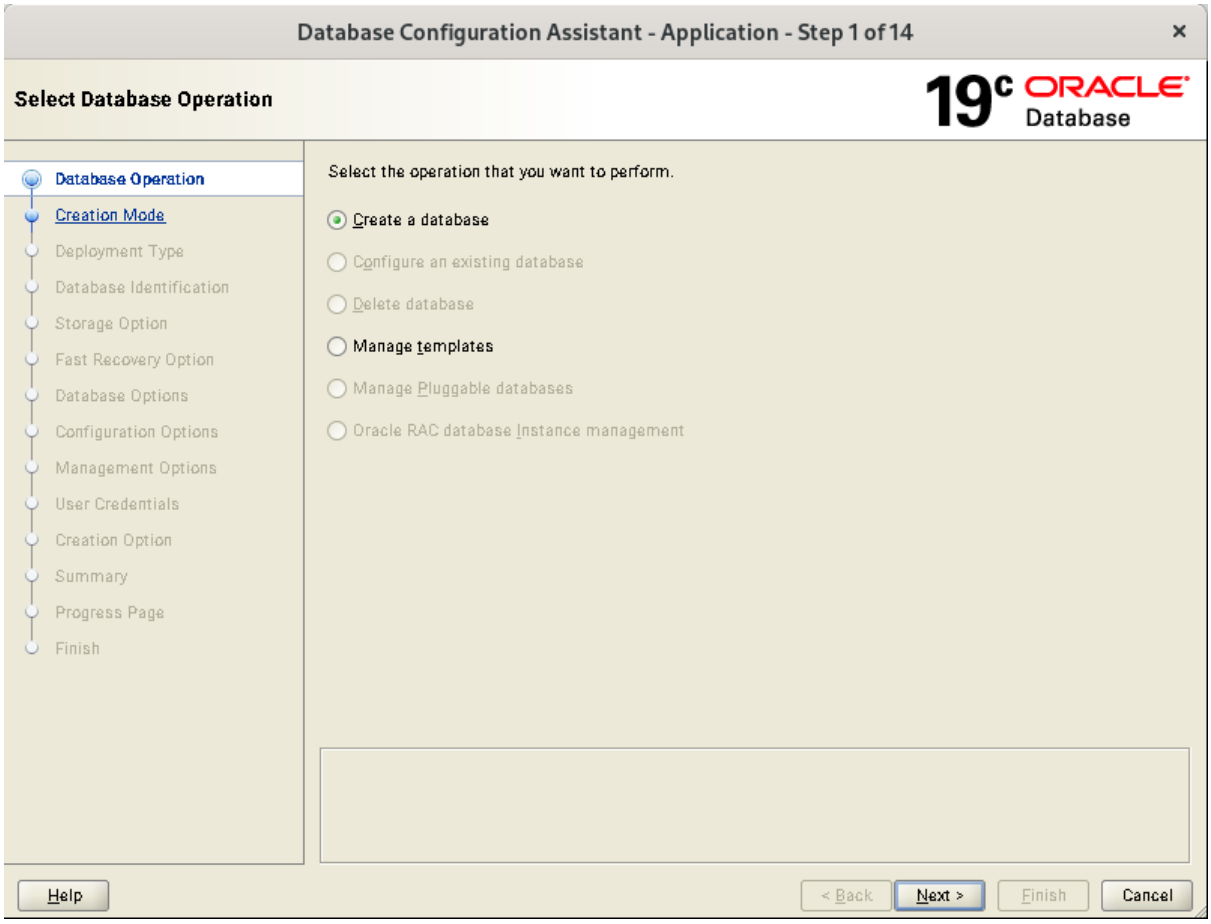
The installation of Oracle Database is finished, click **Close** to dismiss the screen.

2-3. Using ASM Configuration Assistant to create ASM Disk Group for Database files.



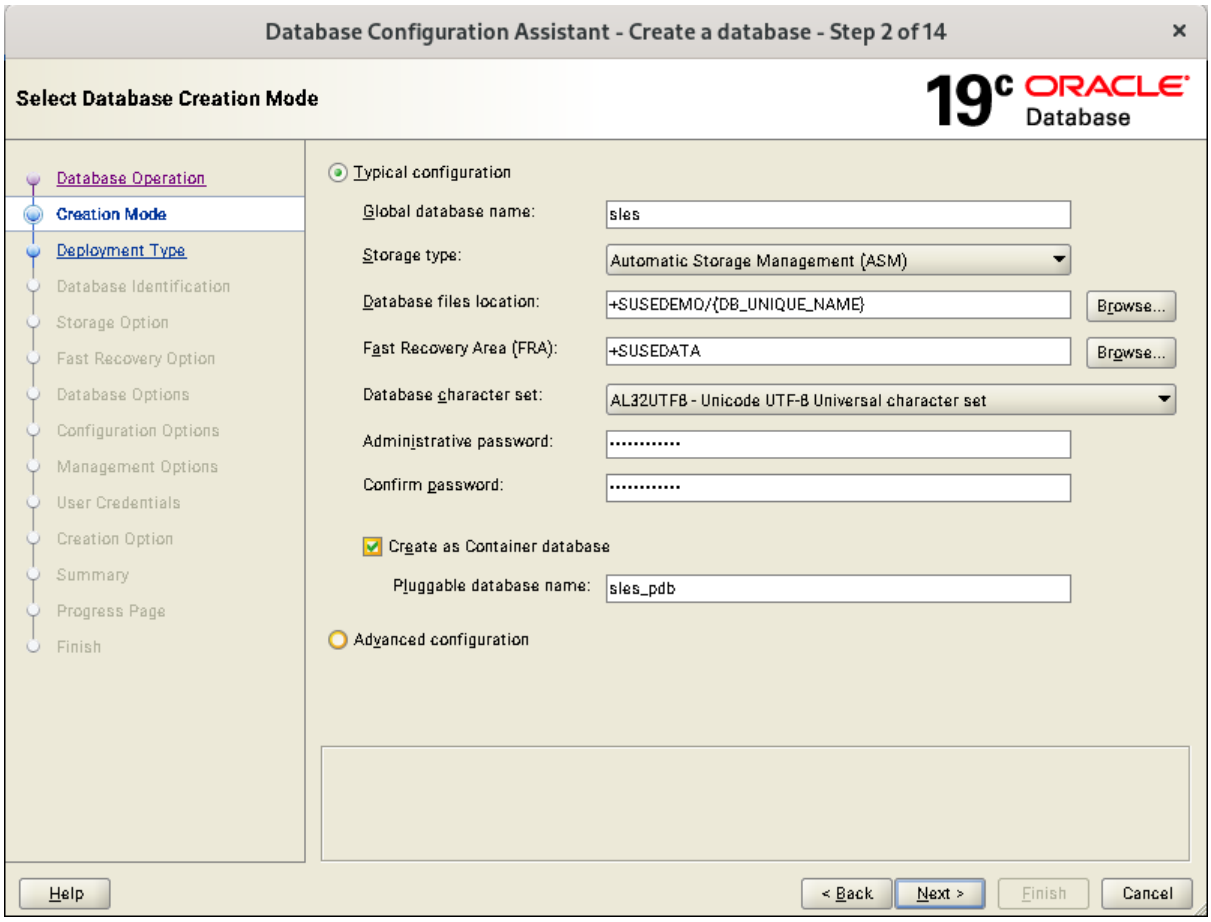
2-4. Using DBCA to create Oracle RAC DataBase.

1). Select Database Operation.



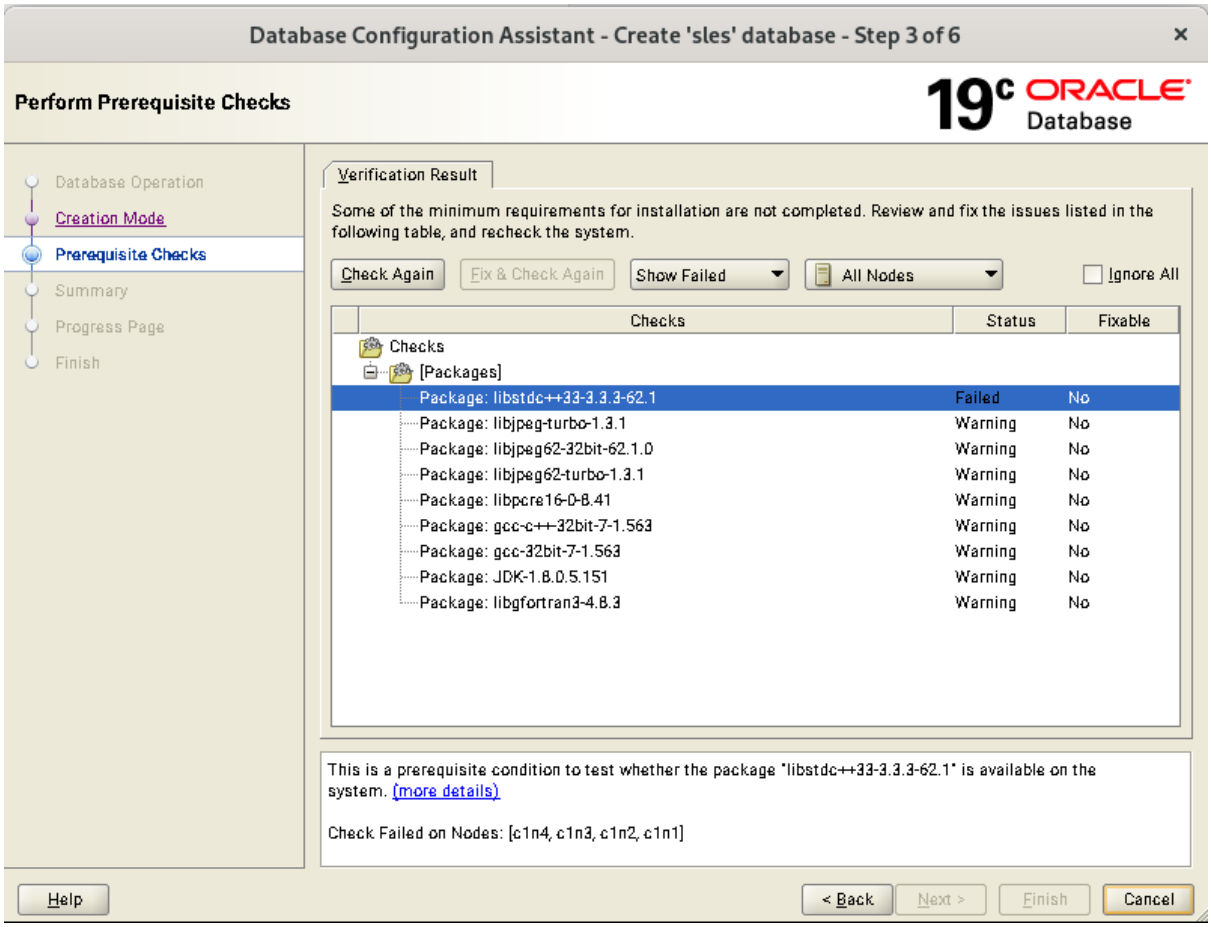
Select option "**Create a database**", then click **Next** to continue.

2). Select Database Creation Mode.



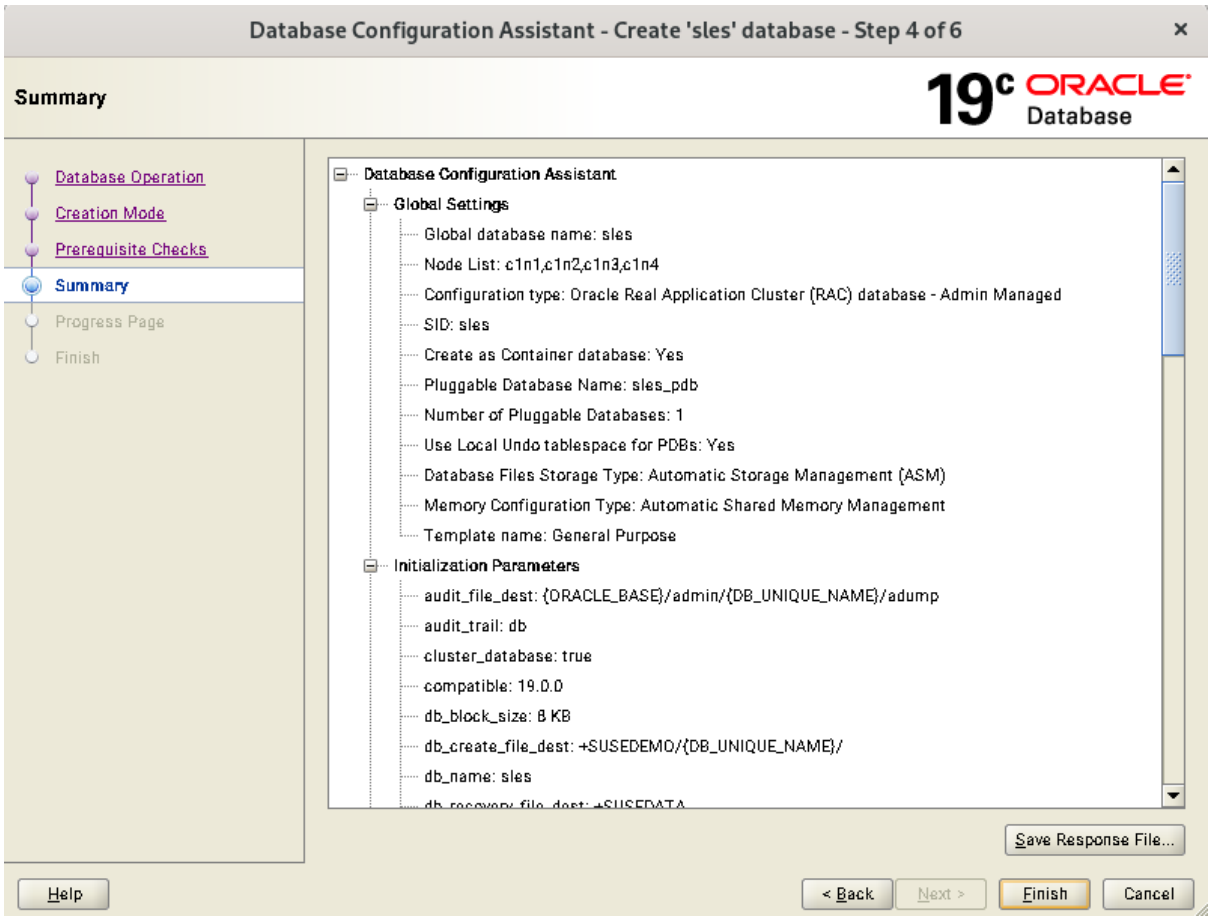
Select option "**Typical configuration**" and fill in administrator password. Then, click **Next** to continue.

3). Perform Prerequisite Checks.



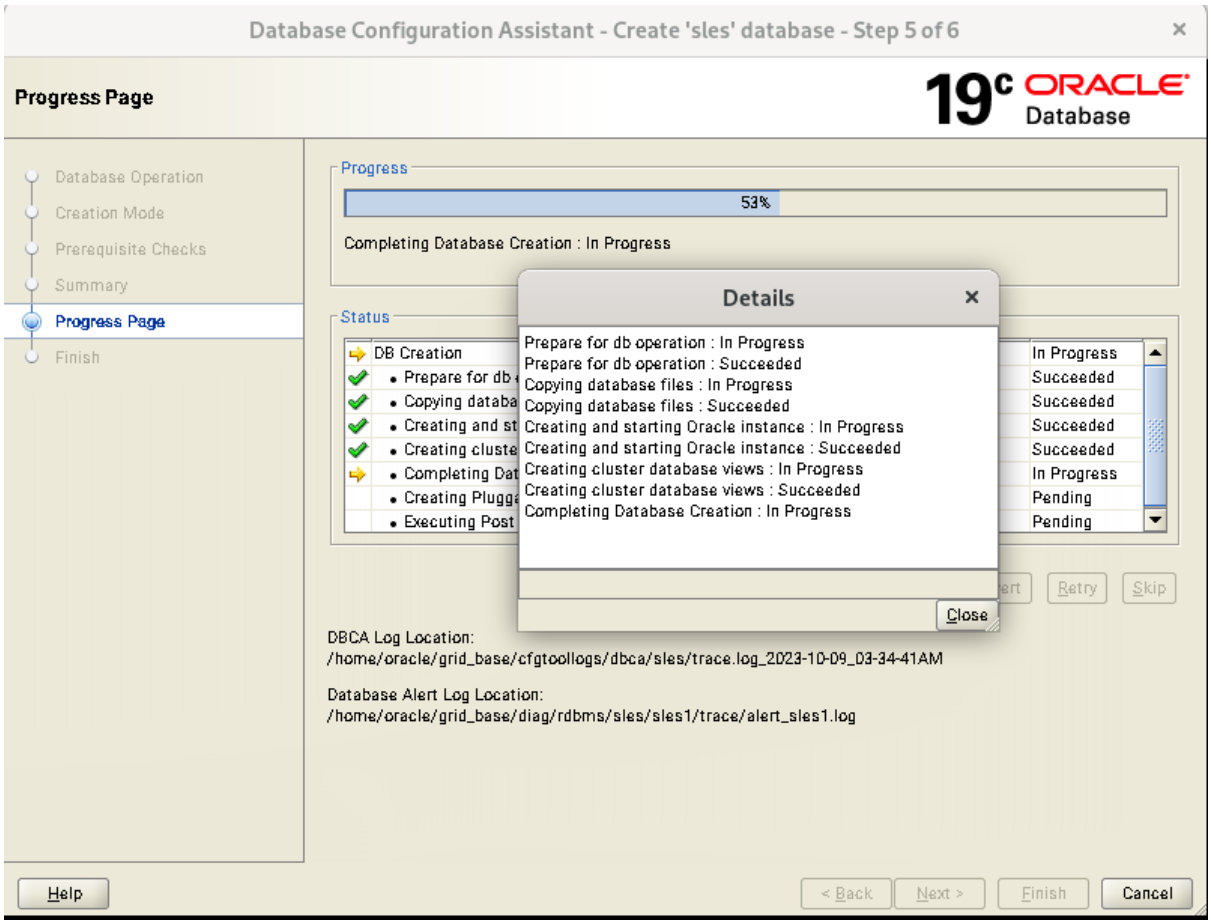
Perform Pre-Check as shown above. Select option "**Ignore All**", then click **Next** to continue.

4). Summary.



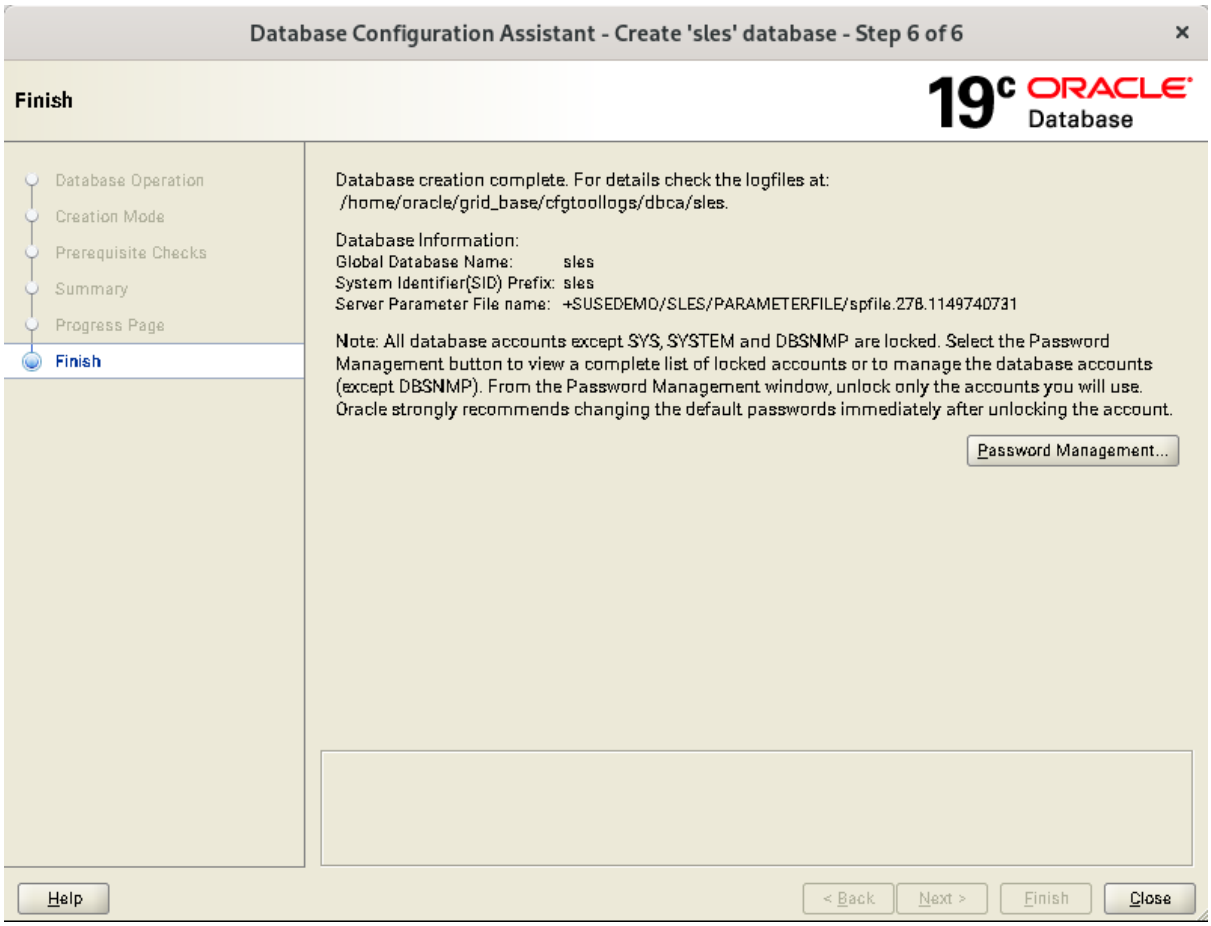
Database Configuration Summary as shown above, review the information, then click **Finish** to continue.

5). Progress Page.



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

6). Finish.



Database creation complete, some details as shown above. Click **Close** to dismiss the screen.

2-5. Oracle Database 19c(19.3) Post-Install Checks.

1). Checking database status and configuration.

```
oracle@c1n1:~> export ORACLE_HOME=/home/oracle/db_19c/
oracle@c1n1:~> /home/oracle/db_19c/bin/srvctl status database -d sles -a
Instance sles1 is running on node c1n1
Instance sles1 is connected to ASM instance +ASM1
Instance sles2 is running on node c1n2
Instance sles2 is connected to ASM instance +ASM2
Instance sles3 is running on node c1n3
Instance sles3 is connected to ASM instance +ASM3
Instance sles4 is running on node c1n4
Instance sles4 is connected to ASM instance +ASM3
oracle@c1n1:~> /home/oracle/db_19c/bin/srvctl config database -d sles -a
Database unique name: sles
Database name: sles
Oracle home: /home/oracle/db_19c
Oracle user: oracle
Spfile: +SUSEDEMO/SLES/PARAMETERFILE/spfile.278.1149740731
Password file: +SUSEDEMO/SLES/PASSWORD/pwdsles.256.1149738119
Domain:
Start options: open
Stop options: immediate
Database role: PRIMARY
Management policy: AUTOMATIC
Server pools:
Disk Groups: SUSEDATA,SUSEDEMO
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: oper
Database instances: sles1,sles2,sles3,sles4
Configured nodes: c1n1,c1n2,c1n3,c1n4
CSS critical: no
CPU count: 0
Memory target: 0
Maximum memory: 0
Default network number for database services:
Database is administrator managed
oracle@c1n1:~>
```

2-6. Oracle RAC 19c(19.3) Post-Install Checks.

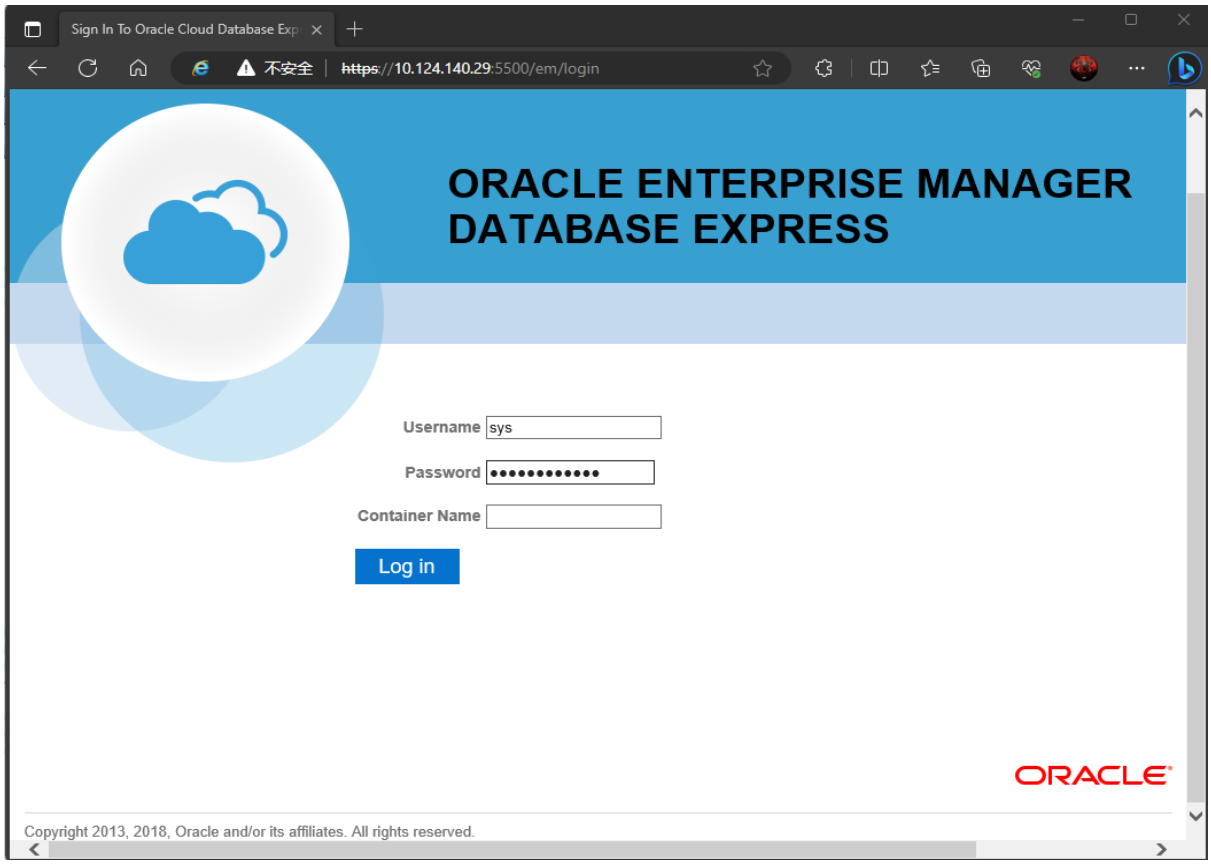
1). Checking Oracle RAC status and resources.

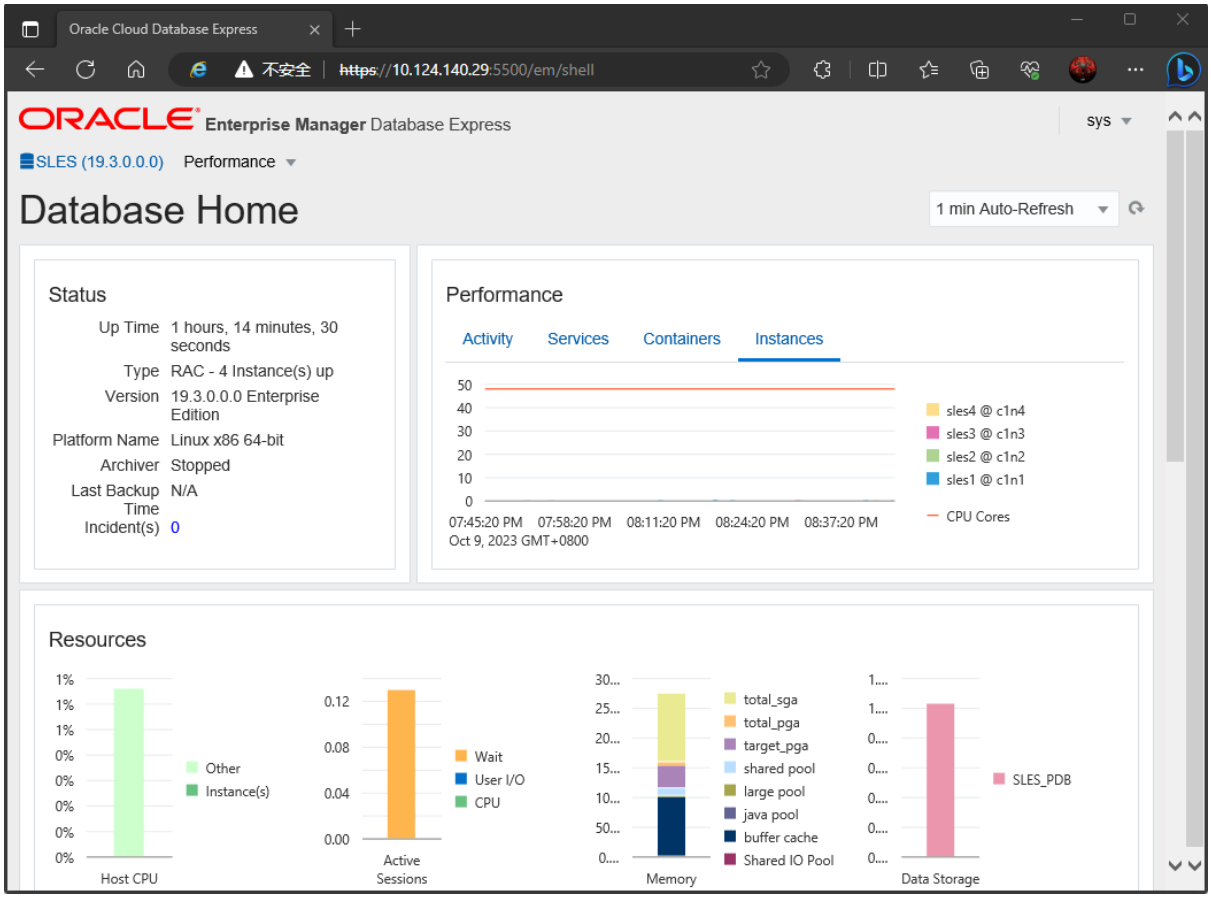
```
oracle@cln1:~> /home/oracle/grid_19c/bin/crsctl check cluster -all
**************************************************************
cln1:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
cln2:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
cln3:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
cln4:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
oracle@cln1:~> /home/oracle/grid_19c/bin/srvctl status nodeapps
VIP 10.124.140.25 is enabled
VIP 10.124.140.25 is running on node: cln1
VIP 10.124.140.26 is enabled
VIP 10.124.140.26 is running on node: cln2
VIP 10.124.140.27 is enabled
VIP 10.124.140.27 is running on node: cln3
VIP 10.124.140.28 is enabled
VIP 10.124.140.28 is running on node: cln4
Network is enabled
Network is running on node: cln1
Network is running on node: cln2
Network is running on node: cln3
Network is running on node: cln4
ONS is enabled
ONS daemon is running on node: cln1
ONS daemon is running on node: cln2
ONS daemon is running on node: cln3
ONS daemon is running on node: cln4
oracle@cln1:~>
```

```
oracle@cln1:~> /home/oracle/grid_19c/bin/crsctl stat res -t
--------------------------------------------------------------------------------
Name           Target  State        Server                   State details
--------------------------------------------------------------------------------
Local Resources
--------------------------------------------------------------------------------
ora.LISTENER.lsnr
               ONLINE  ONLINE       cln1                     STABLE
               ONLINE  ONLINE       cln2                     STABLE
               ONLINE  ONLINE       cln3                     STABLE
               ONLINE  ONLINE       cln4                     STABLE
ora.chad
               ONLINE  ONLINE       cln1                     STABLE
               ONLINE  ONLINE       cln2                     STABLE
               ONLINE  ONLINE       cln3                     STABLE
               ONLINE  ONLINE       cln4                     STABLE
ora.net1.network
               ONLINE  ONLINE       cln1                     STABLE
               ONLINE  ONLINE       cln2                     STABLE
               ONLINE  ONLINE       cln3                     STABLE
               ONLINE  ONLINE       cln4                     STABLE
ora.ons
               ONLINE  ONLINE       cln1                     STABLE
               ONLINE  ONLINE       cln2                     STABLE
               ONLINE  ONLINE       cln3                     STABLE
               ONLINE  ONLINE       cln4                     STABLE
--------------------------------------------------------------------------------
```

```
Cluster Resources
--------------------------------------------------------------------------------
ora.ASMNET1LSNR_ASM.lsnr(ora.asmgroup)
      1        ONLINE  ONLINE       cln1                     STABLE
      2        ONLINE  ONLINE       cln2                     STABLE
      3        ONLINE  ONLINE       cln3                     STABLE
ora.LISTENER_SCAN1.lsnr
      1        ONLINE  ONLINE       cln2                     STABLE
ora.LISTENER_SCAN2.lsnr
      1        ONLINE  ONLINE       cln3                     STABLE
ora.LISTENER_SCAN3.lsnr
      1        ONLINE  ONLINE       cln4                     STABLE
ora.SUSEDATA.dg(ora.asmgroup)
      1        ONLINE  ONLINE       cln1                     STABLE
      2        ONLINE  ONLINE       cln2                     STABLE
      3        ONLINE  ONLINE       cln3                     STABLE
ora.SUSEDEMO.dg(ora.asmgroup)
      1        ONLINE  ONLINE       cln1                     STABLE
      2        ONLINE  ONLINE       cln2                     STABLE
      3        ONLINE  ONLINE       cln3                     STABLE
ora.asm(ora.asmgroup)
      1        ONLINE  ONLINE       cln1                     Started,STABLE
      2        ONLINE  ONLINE       cln2                     Started,STABLE
      3        ONLINE  ONLINE       cln3                     Started,STABLE
ora.asmnet1.asmnetwork(ora.asmgroup)
      1        ONLINE  ONLINE       cln1                     STABLE
      2        ONLINE  ONLINE       cln2                     STABLE
      3        ONLINE  ONLINE       cln3                     STABLE
ora.cln1.vip
      1        ONLINE  ONLINE       cln1                     STABLE
ora.cln2.vip
      1        ONLINE  ONLINE       cln2                     STABLE
ora.cln3.vip
      1        ONLINE  ONLINE       cln3                     STABLE
ora.cln4.vip
      1        ONLINE  ONLINE       cln4                     STABLE
ora.cvu
      1        ONLINE  ONLINE       cln1                     STABLE
ora.qosmserver
      1        ONLINE  ONLINE       cln1                     STABLE
ora.scan1.vip
      1        ONLINE  ONLINE       cln2                     STABLE
ora.scan2.vip
      1        ONLINE  ONLINE       cln3                     STABLE
ora.scan3.vip
      1        ONLINE  ONLINE       cln4                     STABLE
ora.sles.db
      1        ONLINE  ONLINE       cln1                     Open,HOME=/home/orac
                                                             le/db_19c,STABLE
      2        ONLINE  ONLINE       cln2                     Open,HOME=/home/orac
                                                             le/db_19c,STABLE
      3        ONLINE  ONLINE       cln3                     Open,HOME=/home/orac
                                                             le/db_19c,STABLE
      4        ONLINE  ONLINE       cln4                     Open,HOME=/home/orac
                                                             le/db_19c,STABLE
--------------------------------------------------------------------------------
```

2). Access to Oracle Enterprise Manager.





3. Installing (Patch 35319490):GI RELEASE UPDATE 19.20.0.0.0

3-1. Patch Installation. You must use the OPatch utility version 12.2.0.1.37 or later to apply this patch.

```
oracle@c1n1:/home/oracle/grid_19c/OPatch> ./opatch version
OPatch Version: 12.2.0.1.39

OPatch succeeded.
oracle@c1n1:/home/oracle/grid_19c/OPatch>
```

Run OPatch Conflict Check

```
oracle@c1n1:/home/oracle/grid_19c/OPatch> ./opatch prereq CheckConflictAgainstOHWithDetail -phBaseDir /home/Oracle_SW/RAC_19c_SW/GI_Patch_19.20/35319490/33575402
Oracle Interim Patch Installer version 12.2.0.1.39
Copyright (c) 2023, Oracle Corporation.  All rights reserved.

PREREQ session

Oracle Home       : /home/oracle/grid_19c
Central Inventory : /home/oracle/oraInventory
   from           : /home/oracle/grid_19c/oraInst.loc
OPatch version    : 12.2.0.1.39
OUI version       : 12.2.0.7.0
Log file location : /home/oracle/grid_19c/cfgtoollogs/opatch/opatch2023-10-10_04-03-34AM_1.log

Invoking prereq "checkconflictagainstohwithdetail"

Prereq "checkConflictAgainstOHWithDetail" passed.

OPatch succeeded.
oracle@c1n1:/home/oracle/grid_19c/OPatch> ./opatch prereq CheckConflictAgainstOHWithDetail -phBaseDir /home/Oracle_SW/RAC_19c_SW/GI_Patch_19.20/35319490/35320081
Oracle Interim Patch Installer version 12.2.0.1.39
Copyright (c) 2023, Oracle Corporation.  All rights reserved.

PREREQ session

Oracle Home       : /home/oracle/grid_19c
Central Inventory : /home/oracle/oraInventory
   from           : /home/oracle/grid_19c/oraInst.loc
OPatch version    : 12.2.0.1.39
OUI version       : 12.2.0.7.0
Log file location : /home/oracle/grid_19c/cfgtoollogs/opatch/opatch2023-10-10_04-03-48AM_1.log

Invoking prereq "checkconflictagainstohwithdetail"

Prereq "checkConflictAgainstOHWithDetail" passed.

OPatch succeeded.
oracle@c1n1:/home/oracle/grid_19c/OPatch> ./opatch prereq CheckConflictAgainstOHWithDetail -phBaseDir /home/Oracle_SW/RAC_19c_SW/GI_Patch_19.20/35319490/35320149
Oracle Interim Patch Installer version 12.2.0.1.39
Copyright (c) 2023, Oracle Corporation.  All rights reserved.

PREREQ session

Oracle Home       : /home/oracle/grid_19c
Central Inventory : /home/oracle/oraInventory
   from           : /home/oracle/grid_19c/oraInst.loc
OPatch version    : 12.2.0.1.39
OUI version       : 12.2.0.7.0
Log file location : /home/oracle/grid_19c/cfgtoollogs/opatch/opatch2023-10-10_04-04-03AM_1.log

Invoking prereq "checkconflictagainstohwithdetail"

Prereq "checkConflictAgainstOHWithDetail" passed.

OPatch succeeded.
oracle@c1n1:/home/oracle/grid_19c/OPatch> ./opatch prereq CheckConflictAgainstOHWithDetail -phBaseDir /home/Oracle_SW/RAC_19c_SW/GI_Patch_19.20/35319490/35332537
Oracle Interim Patch Installer version 12.2.0.1.39
Copyright (c) 2023, Oracle Corporation.  All rights reserved.

PREREQ session

Oracle Home       : /home/oracle/grid_19c
Central Inventory : /home/oracle/oraInventory
   from           : /home/oracle/grid_19c/oraInst.loc
OPatch version    : 12.2.0.1.39
OUI version       : 12.2.0.7.0
Log file location : /home/oracle/grid_19c/cfgtoollogs/opatch/opatch2023-10-10_04-04-17AM_1.log

Invoking prereq "checkconflictagainstohwithdetail"

Prereq "checkConflictAgainstOHWithDetail" passed.

OPatch succeeded.
```

```
oracle@c1n1:/home/oracle/grid_19c/OPatch> ./opatch prereq CheckConflictAgainstOHWithDetail -phBaseDir /home/Oracle_SW/RAC_19c_SW/GI_Patch_19.20/35319490/35553096
Oracle Interim Patch Installer version 12.2.0.1.39
Copyright (c) 2023, Oracle Corporation.  All rights reserved.

PREREQ session

Oracle Home       : /home/oracle/grid_19c
Central Inventory : /home/oracle/oraInventory
   from           : /home/oracle/grid_19c/oraInst.loc
OPatch version    : 12.2.0.1.39
OUI version       : 12.2.0.7.0
Log file location : /home/oracle/grid_19c/cfgtoollogs/opatch/opatch2023-10-10_04-04-33AM_1.log

Invoking prereq "checkconflictagainstohwithdetail"

Prereq "checkConflictAgainstOHWithDetail" passed.

OPatch succeeded.
oracle@c1n1:/home/oracle/grid_19c/OPatch>
```

Run OPatch System Space Check

```
oracle@c1n1:/home/oracle/grid_19c/OPatch> ./opatch prereq CheckSystemSpace -phBaseFile /tmp/patch_list_gihome.txt
Oracle Interim Patch Installer version 12.2.0.1.39
Copyright (c) 2023, Oracle Corporation.  All rights reserved.

PREREQ session

Oracle Home       : /home/oracle/grid_19c
Central Inventory : /home/oracle/oraInventory
   from           : /home/oracle/grid_19c/oraInst.loc
OPatch version    : 12.2.0.1.39
OUI version       : 12.2.0.7.0
Log file location : /home/oracle/grid_19c/cfgtoollogs/opatch/opatch2023-10-10_04-09-02AM_1.log

Invoking prereq "checksystemspace"

Prereq "checkSystemSpace" passed.

OPatch succeeded.
oracle@c1n1:/home/oracle/grid_19c/OPatch>
```

Then, as root user, execute the following command on each node of the cluster:

 # opatchauto apply <UNZIPPED_PATCH_LOCATION>/35319490

For more details, please refer to the 'Read Me' file included in the patch package. Choose the upgrade method that is appropriate for your environment, make sure the installation is successful.

On c1n1:

```
oracle@c1n1:/home/oracle/grid_19c/OPatch> ./opatch lspatches
35553096;TOMCAT RELEASE UPDATE 19.0.0.0.0 (35553096)
35332537;ACFS RELEASE UPDATE 19.20.0.0.0 (35332537)
35320149;OCW RELEASE UPDATE 19.20.0.0.0 (35320149)
35320081;Database Release Update : 19.20.0.0.230718 (35320081)
33575402;DBWLM RELEASE UPDATE 19.0.0.0.0 (33575402)

OPatch succeeded.
oracle@c1n1:/home/oracle/grid_19c/OPatch> cd /home/oracle/db_19c/OPatch
oracle@c1n1:/home/oracle/db_19c/OPatch> ./opatch lspatches
35320149;OCW RELEASE UPDATE 19.20.0.0.0 (35320149)
35320081;Database Release Update : 19.20.0.0.230718 (35320081)

OPatch succeeded.
oracle@c1n1:/home/oracle/db_19c/OPatch>
```

On c1n2:

```
oracle@c1n2:/home/oracle/grid_19c/OPatch> ./opatch lspatches
35553096;TOMCAT RELEASE UPDATE 19.0.0.0.0 (35553096)
35332537;ACFS RELEASE UPDATE 19.20.0.0.0 (35332537)
35320149;OCW RELEASE UPDATE 19.20.0.0.0 (35320149)
35320081;Database Release Update : 19.20.0.0.230718 (35320081)
33575402;DBWLM RELEASE UPDATE 19.0.0.0.0 (33575402)

OPatch succeeded.
oracle@c1n2:/home/oracle/grid_19c/OPatch> cd /home/oracle/db_19c/OPatch
oracle@c1n2:/home/oracle/db_19c/OPatch> ./opatch lspatches
35320149;OCW RELEASE UPDATE 19.20.0.0.0 (35320149)
35320081;Database Release Update : 19.20.0.0.230718 (35320081)

OPatch succeeded.
oracle@c1n2:/home/oracle/db_19c/OPatch>
```

On c1n3:

```
oracle@c1n3:/home/oracle/grid_19c/OPatch> ./opatch lspatches
35553096;TOMCAT RELEASE UPDATE 19.0.0.0.0 (35553096)
35332537;ACFS RELEASE UPDATE 19.20.0.0.0 (35332537)
35320149;OCW RELEASE UPDATE 19.20.0.0.0 (35320149)
35320081;Database Release Update : 19.20.0.0.230718 (35320081)
33575402;DBWLM RELEASE UPDATE 19.0.0.0.0 (33575402)

OPatch succeeded.
oracle@c1n3:/home/oracle/grid_19c/OPatch> cd /home/oracle/db_19c/OPatch
oracle@c1n3:/home/oracle/db_19c/OPatch> ./opatch lspatches
35320149;OCW RELEASE UPDATE 19.20.0.0.0 (35320149)
35320081;Database Release Update : 19.20.0.0.230718 (35320081)

OPatch succeeded.
oracle@c1n3:/home/oracle/db_19c/OPatch>
```

On c1n4:

```
oracle@c1n4:/home/oracle/grid_19c/OPatch> ./opatch lspatches
35553096;TOMCAT RELEASE UPDATE 19.0.0.0.0 (35553096)
35332537;ACFS RELEASE UPDATE 19.20.0.0.0 (35332537)
35320149;OCW RELEASE UPDATE 19.20.0.0.0 (35320149)
35320081;Database Release Update : 19.20.0.0.230718 (35320081)
33575402;DBWLM RELEASE UPDATE 19.0.0.0.0 (33575402)

OPatch succeeded.
oracle@c1n4:/home/oracle/grid_19c/OPatch> cd /home/oracle/db_19c/OPatch
oracle@c1n4:/home/oracle/db_19c/OPatch> ./opatch lspatches
35320149;OCW RELEASE UPDATE 19.20.0.0.0 (35320149)
35320081;Database Release Update : 19.20.0.0.230718 (35320081)

OPatch succeeded.
oracle@c1n4:/home/oracle/db_19c/OPatch>
```

3-2. Patch 35319490: GI RELEASE UPDATE 19.20.0.0.0 Post-Install Checks.

1). Checking Oracle RAC status and resources.

```
oracle@cln1:~> /home/oracle/grid_19c/bin/crsctl check cluster -all
**************************************************************
cln1:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
cln2:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
cln3:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
cln4:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
oracle@cln1:~> /home/oracle/grid_19c/bin/srvctl status nodeapps
VIP 10.124.140.25 is enabled
VIP 10.124.140.25 is running on node: cln1
VIP 10.124.140.26 is enabled
VIP 10.124.140.26 is running on node: cln2
VIP 10.124.140.27 is enabled
VIP 10.124.140.27 is running on node: cln3
VIP 10.124.140.28 is enabled
VIP 10.124.140.28 is running on node: cln4
Network is enabled
Network is running on node: cln1
Network is running on node: cln2
Network is running on node: cln3
Network is running on node: cln4
ONS is enabled
ONS daemon is running on node: cln1
ONS daemon is running on node: cln2
ONS daemon is running on node: cln3
ONS daemon is running on node: cln4
oracle@cln1:~>
```

```
oracle@cln1:~> /home/oracle/grid_19c/bin/crsctl stat res -t
--------------------------------------------------------------------------------
Name           Target  State        Server                   State details
--------------------------------------------------------------------------------
Local Resources
--------------------------------------------------------------------------------
ora.LISTENER.lsnr
               ONLINE  ONLINE       cln1                     STABLE
               ONLINE  ONLINE       cln2                     STABLE
               ONLINE  ONLINE       cln3                     STABLE
               ONLINE  ONLINE       cln4                     STABLE
ora.chad
               ONLINE  ONLINE       cln1                     STABLE
               ONLINE  ONLINE       cln2                     STABLE
               ONLINE  ONLINE       cln3                     STABLE
               ONLINE  ONLINE       cln4                     STABLE
ora.net1.network
               ONLINE  ONLINE       cln1                     STABLE
               ONLINE  ONLINE       cln2                     STABLE
               ONLINE  ONLINE       cln3                     STABLE
               ONLINE  ONLINE       cln4                     STABLE
ora.ons
               ONLINE  ONLINE       cln1                     STABLE
               ONLINE  ONLINE       cln2                     STABLE
               ONLINE  ONLINE       cln3                     STABLE
               ONLINE  ONLINE       cln4                     STABLE
--------------------------------------------------------------------------------
```

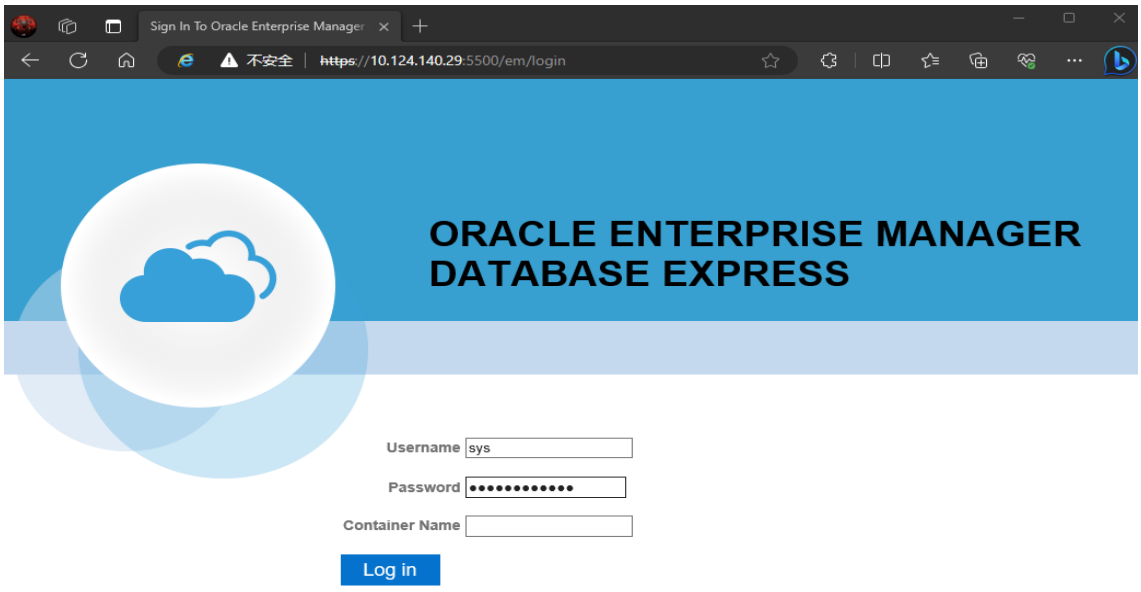
```
Cluster Resources
--------------------------------------------------------------------------------
ora.ASMNET1LSNR_ASM.lsnr(ora.asmgroup)
      1        ONLINE  ONLINE       cln2                     STABLE
      2        ONLINE  ONLINE       cln1                     STABLE
      3        ONLINE  ONLINE       cln3                     STABLE
ora.LISTENER_SCAN1.lsnr
      1        ONLINE  ONLINE       cln3                     STABLE
ora.LISTENER_SCAN2.lsnr
      1        ONLINE  ONLINE       cln2                     STABLE
ora.LISTENER_SCAN3.lsnr
      1        ONLINE  ONLINE       cln1                     STABLE
ora.SUSEDATA.dg(ora.asmgroup)
      1        ONLINE  ONLINE       cln2                     STABLE
      2        ONLINE  ONLINE       cln1                     STABLE
      3        ONLINE  ONLINE       cln3                     STABLE
ora.SUSEDEMO.dg(ora.asmgroup)
      1        ONLINE  ONLINE       cln2                     STABLE
      2        ONLINE  ONLINE       cln1                     STABLE
      3        ONLINE  ONLINE       cln3                     STABLE
ora.asm(ora.asmgroup)
      1        ONLINE  ONLINE       cln2                     Started,STABLE
      2        ONLINE  ONLINE       cln1                     Started,STABLE
      3        ONLINE  ONLINE       cln3                     Started,STABLE
ora.asmnet1.asmnetwork(ora.asmgroup)
      1        ONLINE  ONLINE       cln2                     STABLE
      2        ONLINE  ONLINE       cln1                     STABLE
      3        ONLINE  ONLINE       cln3                     STABLE
ora.cln1.vip
      1        ONLINE  ONLINE       cln1                     STABLE
ora.cln2.vip
      1        ONLINE  ONLINE       cln2                     STABLE
ora.cln3.vip
      1        ONLINE  ONLINE       cln3                     STABLE
ora.cln4.vip
      1        ONLINE  ONLINE       cln4                     STABLE
ora.cvu
      1        ONLINE  ONLINE       cln1                     STABLE
ora.qosmserver
      1        ONLINE  ONLINE       cln1                     STABLE
ora.scan1.vip
      1        ONLINE  ONLINE       cln3                     STABLE
ora.scan2.vip
      1        ONLINE  ONLINE       cln2                     STABLE
ora.scan3.vip
      1        ONLINE  ONLINE       cln1                     STABLE
ora.sles.db
      1        ONLINE  ONLINE       cln1                     Open,HOME=/home/orac
                                                             le/db_19c,STABLE
      2        ONLINE  ONLINE       cln2                     Open,HOME=/home/orac
                                                             le/db_19c,STABLE
      3        ONLINE  ONLINE       cln3                     Open,HOME=/home/orac
                                                             le/db_19c,STABLE
      4        ONLINE  ONLINE       cln4                     Open,HOME=/home/orac
                                                             le/db_19c,STABLE
--------------------------------------------------------------------------------
oracle@cln1:~>
```

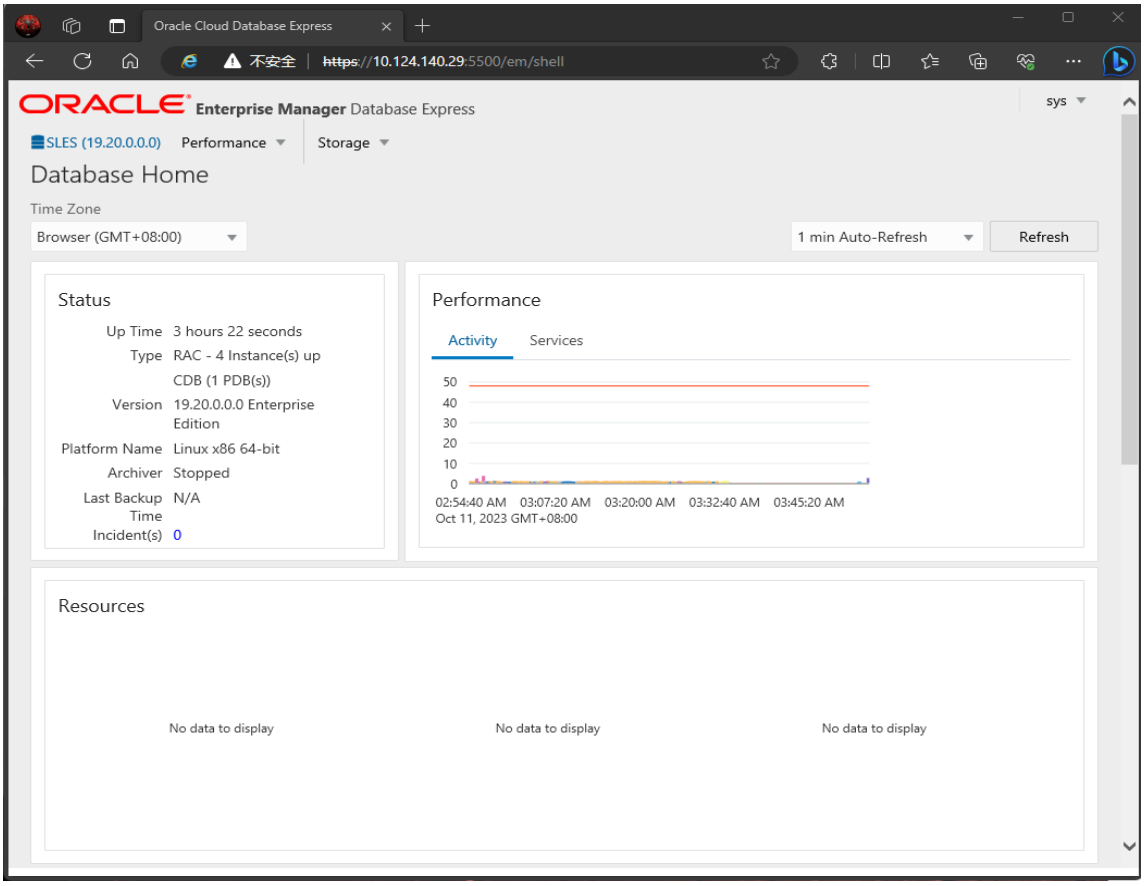
2). Checking database status and configuration.

```
oracle@cln1:~> export ORACLE_HOME=/home/oracle/db_19c/
oracle@cln1:~> /home/oracle/db_19c/bin/srvctl status database -d sles -a
Instance sles1 is running on node cln1
Instance sles1 is connected to ASM instance +ASM1
Instance sles2 is running on node cln2
Instance sles2 is connected to ASM instance +ASM2
Instance sles3 is running on node cln3
Instance sles3 is connected to ASM instance +ASM3
Instance sles4 is running on node cln4
Instance sles4 is connected to ASM instance +ASM3
oracle@cln1:~> /home/oracle/db_19c/bin/srvctl config database -d sles -a
Database unique name: sles
Database name: sles
Oracle home: /home/oracle/db_19c
Oracle user: oracle
Spfile: +SUSEDEMO/SLES/PARAMETERFILE/spfile.278.1149740731
Password file: +SUSEDEMO/SLES/PASSWORD/pwdsles.256.1149738119
Domain:
Start options: open
Stop options: immediate
Database role: PRIMARY
Management policy: AUTOMATIC
Server pools:
Disk Groups: SUSEDATA,SUSEDEMO
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: oper
Database instances: sles1,sles2,sles3,sles4
Configured nodes: cln1,cln2,cln3,cln4
CSS critical: no
CPU count: 0
Memory target: 0
Maximum memory: 0
Default network number for database services:
Database is administrator managed
oracle@cln1:~>
```

```
oracle@cln1:~> export ORACLE_SID=sles
oracle@cln1:~> /home/oracle/db_19c/bin/sqlplus /nolog

SQL*Plus: Release 19.0.0.0.0 - Production on Wed Oct 11 02:22:45 2023
Version 19.20.0.0.0

Copyright (c) 1982, 2022, Oracle.  All rights reserved.

SQL> conn sys/[redacted]@cln1:1521/sles as sysdba
Connected.
SQL> show sga

Total System Global Area 3.0266E+10 bytes
Fixed Size                  32777264 bytes
Variable Size             4294967296 bytes
Database Buffers         2.5904E+10 bytes
Redo Buffers                34328576 bytes
SQL> show pdbs

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
         3 SLES_PDB                       READ WRITE NO
SQL>
```

3). Access to Oracle Enterprise Manager.





Additional Comments

This document provides a brief instruction to install Oracle RAC Database 19c on SLES 15 SP5. You can extend this topology to make it highly available and secure so it is suitable for a production system.

- *GI&DB 19c(19.3) - GI RunInstaller Fails If OpenSSH Is Upgraded to 8.x. Actually, the Passwordless SSH connectivity is work normal on the Cluster.*

  Workaround: Before installation, as root user: (please change the path if the location of your "scp" is not the same with below)

  # Rename the original scp.
  mv /usr/bin/scp /usr/bin/scp.orig

  # Create a new file </usr/bin/scp>.
  vi /usr/bin/scp

  # Add the below line to the new created file </usr/bin/scp>.
  */usr/bin/scp.orig -T $**

  # Change the file permission.
  chmod 555 /usr/bin/scp

  After installation:
  mv /usr/bin/scp.orig /usr/bin/scp

- *GI&DB 19c(19.3) - [INS-10113] Installer encountered errors while copying…*

  Workaround:
  # export SRVM_DISABLE_MTTRANS=true
  # ./gridSetup.sh

- *GI&DB 19c(19.3) - Installation/relink fails with :"Error in invoking target 'libasmclntsh19.ohso libasmperl19.ohso client_sharedlib' of makefile ins_rdbms.mk"*

  Workaround: Install 'compat-libpthread-nonshared' package.

- *CVU Pre-installation Check Issue - "Verifying zeroconf check ...Warning". Please ignore this error, a fix will be in the next distributed CVU.*

- *CVU Pre-installation Check Issue - Some packages are not applicable to sles15 SP5*

  Workaround: Manually ensure updated packages are installed.

  libstdc++33-3.3.3-62.1 (Deprecated on SLES15 SP5)
  libjpeg-turbo-1.3.1, libjpeg62-32bit-62.1.0, libjpeg62-turbo-1.3.1 (Replaced by: libjpeg62-62.3.0-150400.15.7.x86_64, libjpeg8-8.2.2-150400.15.9.x86_64 and libjpeg8-32bit-8.2.2-150400.15.9.x86_64)
  libpcre16-0-8.41 (New name is libpcre16-0-8.45-150000.20.13.1.x86_64)
  JDK-1.8.0.5.151 (New name is java-1_8_0-openjdk-1.8.0.382-150000.3.82.1.x86_64)
  libgfortran3-4.8.3 (Replaced by: libgfortran4-7.5.0+r278197-150000.4.35.1.x86_64 or libgfortran5-12.3.0+git1204-150000.1.16.1.x86_64)
  gcc-c++32bit-7-1.563 (Deprecated on SLES15 SP5)
  gcc-32bit-7-1.563 (Deprecated on SLES15 SP5)

- *If you are using ASMLib please Install insserv-compat-0.1-4.6.1.noarch. The package insserv-compat adds compatibility with System V init scripts to system.*

  Error Resolved:
  # systemctl enable oracleasm
  Synchronizing state of oracleasm.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
  Executing: /usr/lib/systemd/systemd-sysv-install enable oracleasm
  ln -sf ../oracleasm /etc/init.d/rc2.d/S50oracleasm
  ln: failed to create symbolic link '/etc/init.d/rc2.d/S50oracleasm': No such file or directory

- *Apply Patch 35319490:GI RELEASE UPDATE 19.20.0.0.0 (Including Database patches)*

*Thanks for selecting **SUSE Linux Enterprise Server** as your Linux platform of choice!*