Oracle RAC 19c(19.24.0.0.0) on SUSE Linux Enterprise Server 15 (SP6) for x86-64

SUSE ISV Engineering Team

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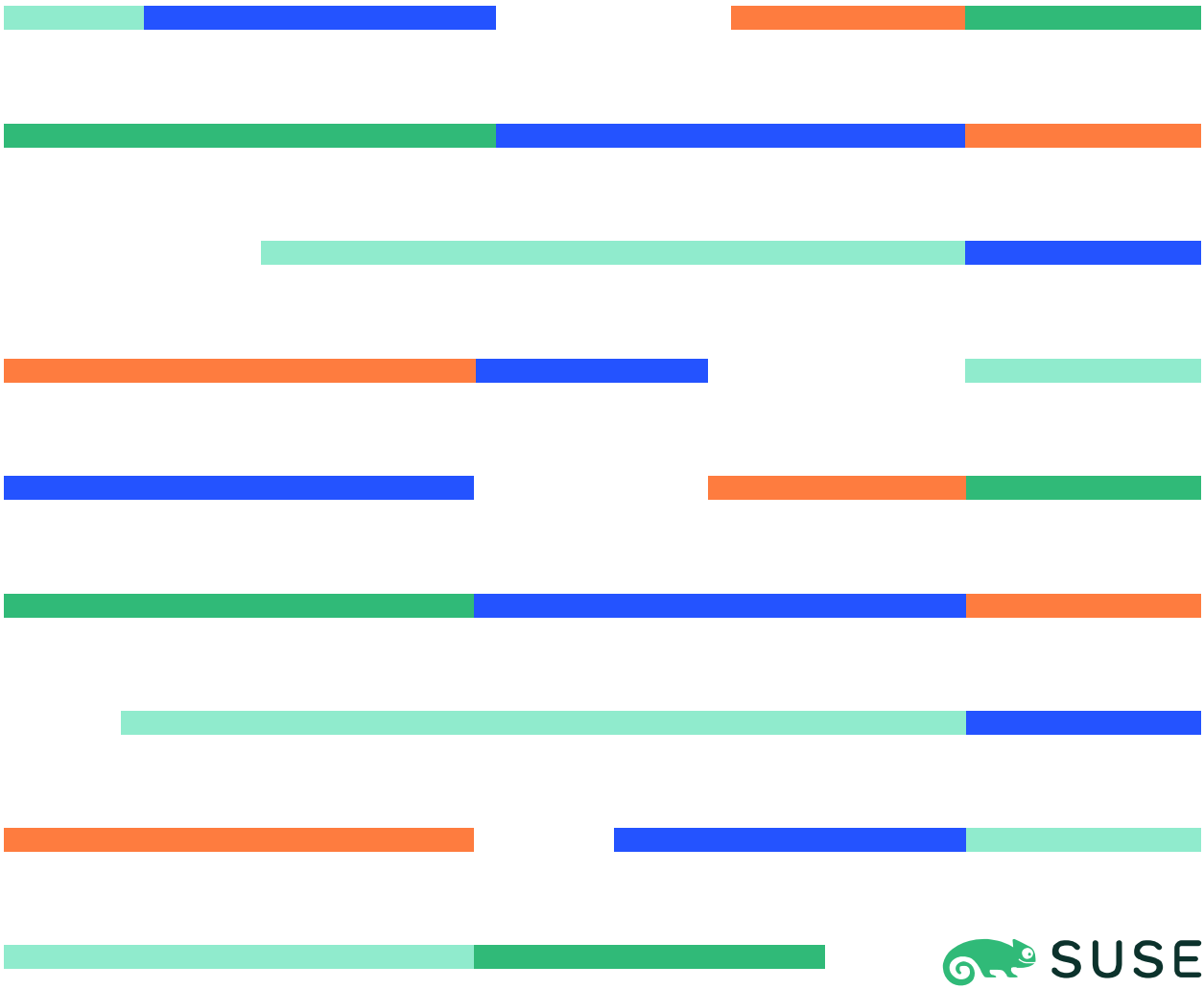

SUSE

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Introduction

This document provides details on installing Oracle Grid/Database 19c on SUSE Linux Enterprise Server 15 SP6. 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 SP6 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 36582629: GI RELEASE UPDATE 19.24.0.0.0*
• *Patch 6880880: OPatch utility 12.2.0.1.43 for DB 23.0.0.0.0*
(https://support.oracle.com)

Cluster(4-node) Information

Dell PowerEdge R750 Server (2 x CPU Intel Xeon Gold 5318Y 2.1G, 24C/48T, 11.2GT/s, 36M Cache, Turbo, HT (165W)), DDR4-2933 128GB of memory
Local 2 x SSD (1TB, NVMe)
2 x NIC Intel Ethernet Converged Network Adapter X710-DA2 (10GbE SFP+, Dual Port) (two bonded as active/passive) + Static IP Address
Shared SAN Partition: 100G(ASM disk group for OCR and voting disk), 600G(ASM disk group for DB data)

OS: SUSE Linux Enterprise Server 16 SP6 (x86_64)
Kernel version: 6.4.0-150600.21-default

Network configuration:

Public IP:
10.200.176.11 c3n1.oraclab.bej.suse.com c3n1
10.200.176.12 c3n2.oraclab.bej.suse.com c3n2
10.200.176.13 c3n3.oraclab.bej.suse.com c3n3
10.200.176.14 c3n4.oraclab.bej.suse.com c3n4

Private IP:
192.168.3.1 c3n1-priv c3n1-priv
192.168.3.2 c3n2-priv c3n2-priv
192.168.3.3 c3n3-priv c3n3-priv
192.168.3.4 c3n4-priv c3n4-priv

Virtual IP:
10.200.176.15 c3n1-vip.oraclab.bej.suse.com c3n1-vip
10.200.176.16 c3n2-vip.oraclab.bej.suse.com c3n2-vip
10.200.176.17 c3n3-vip.oraclab.bej.suse.com c3n3-vip
10.200.176.18 c3n4-vip.oraclab.bej.suse.com c3n4-vip

SCAN
c3-scan.oraclab.bej.suse.com - (10.200.176.30, 10.200.176.31, 10.200.176.32)

Prerequisites

1. Installing SUSE Linux Enterprise Server 15 SP6 on each cluster node

1-1. Install SUSE Linux Enterprise Server 15 SP6 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

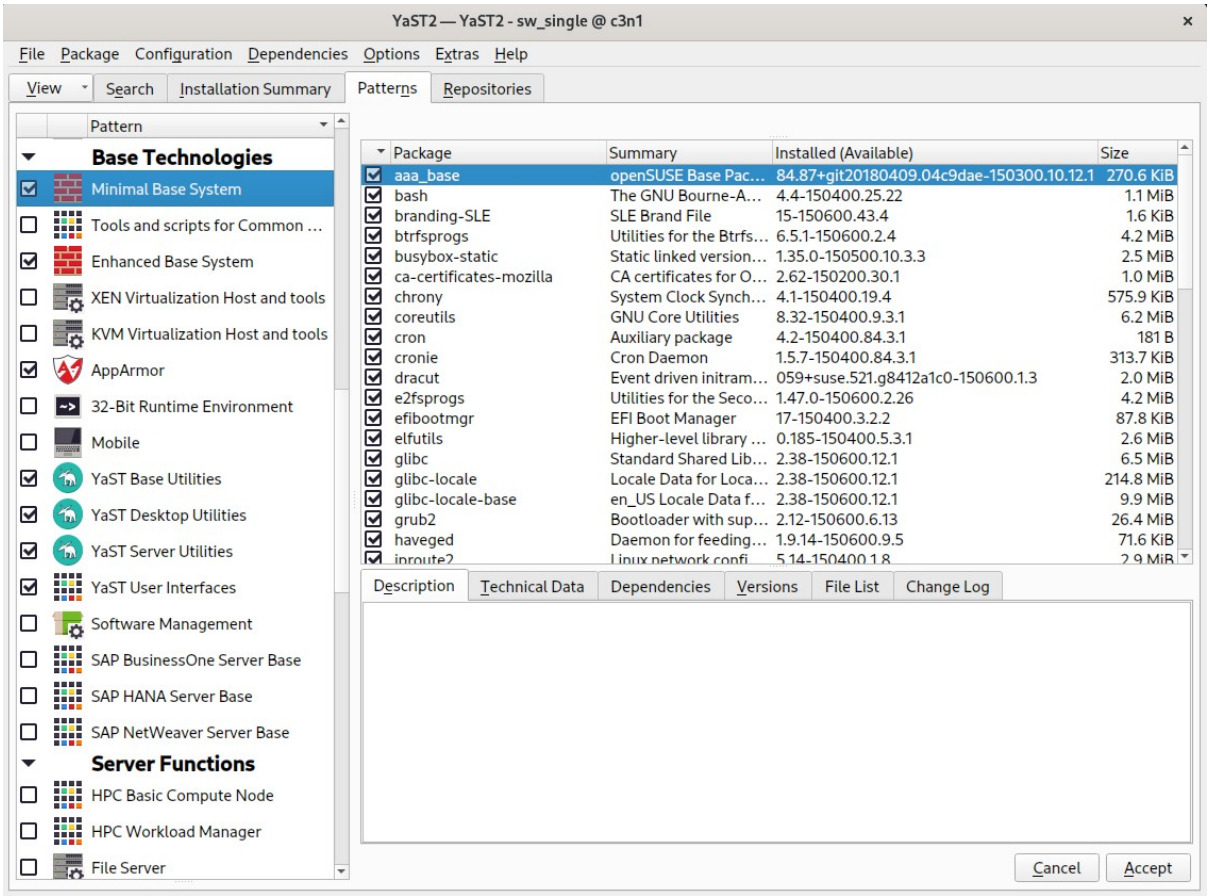


Figure 1-2 Software Installed as shown below

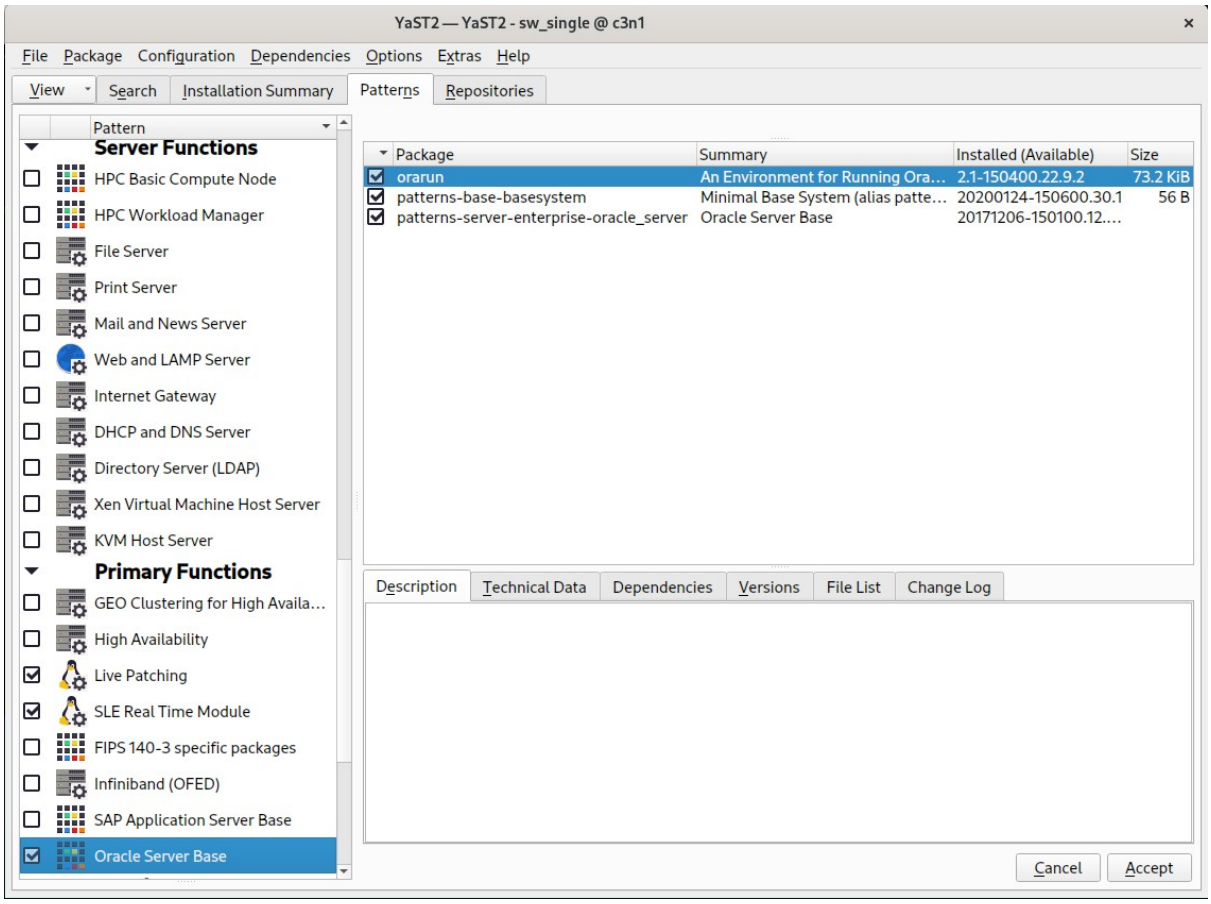


Figure 1-3 OS release information and kernel version

```
oracle@c3n1:~> more /etc/os-release
NAME="SLES"
VERSION="15-SP6"
VERSION_ID="15.6"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP6"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp6"
DOCUMENTATION_URL="https://documentation.suse.com/"
oracle@c3n1:~> uname -a
Linux c3n1 6.4.0-150600.21-default #1 SMP PREEMPT_DYNAMIC Thu May 16 11:09:22 UTC 2024 (36c1e09/lp) x86_64 x86_64 x86_64 GNU/Linux
oracle@c3n1:~>
```

2. Oracle software pre-install verify

2-1. Login to the SLES 15 SP6 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.

Download GI RELEASE UPDATE 19.24.0.0.0(Patch 36582629) and OPatch utility 12.2.0.1.43(Patch 6880880) from:
https://support.oracle.com.

2-2. Extract LINUX.X64_193000_grid_home.zip, p36582629_190000_Linux-x86-64.zip, and p6880880_230000_Linux-x86-64.zip. Replace the OPatch directory located in the Grid 19.3 ShipHome with OPatch version 12.2.0.1.43. Then, through the Grid Installer(gridSetup.sh) to apply the patch 36582629(GI RELEASE UPDATE 19.24.0.0.0).

```
oracle@c3n1:/home/oracle/grid_19c> ./gridSetup.sh -applyRU /home/ORACLE_SW/patch_RU_192400/36582629/
Preparing the home to patch...
Applying the patch /home/ORACLE_SW/patch_RU_192400/36582629/...
Successfully applied the patch.
```

2-3. After successfully installing the patch, stop the grid Installer(gridSetup.sh). Run the Oracle 'runcluvfy.sh' tool to verify that the cluster setup is ready for installation. Before proceeding, resolve any issues you encounter. Please refer to the official Oracle Installation Guide for assistance.

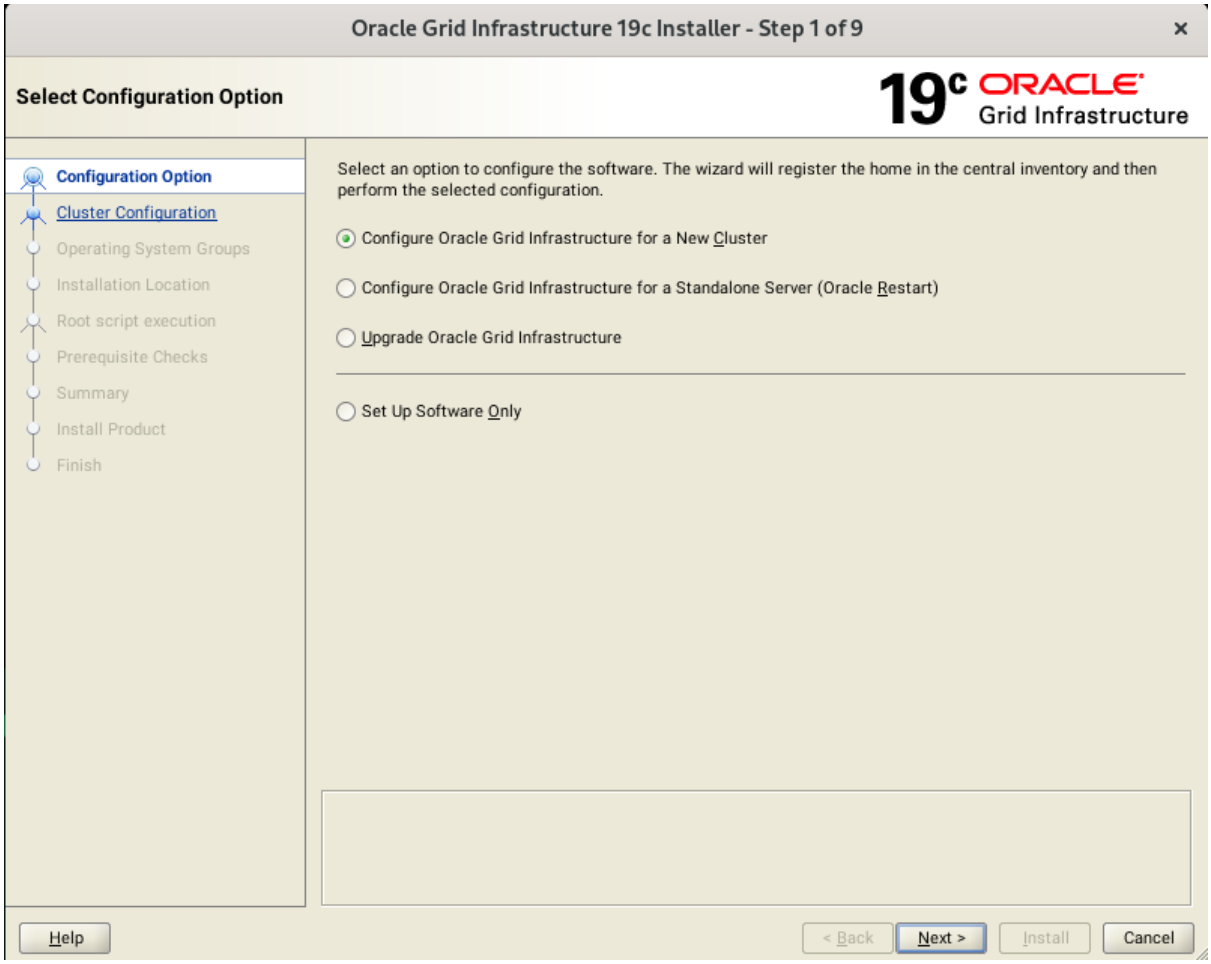
Oracle RAC Installation

1. Installing Oracle Grid Infrastructure.

1-1. Export SRVM_DISABLE_MTTRANS=true, then run Oracle Grid installer '**./gridSetup.sh**' from Gird ShipHome.

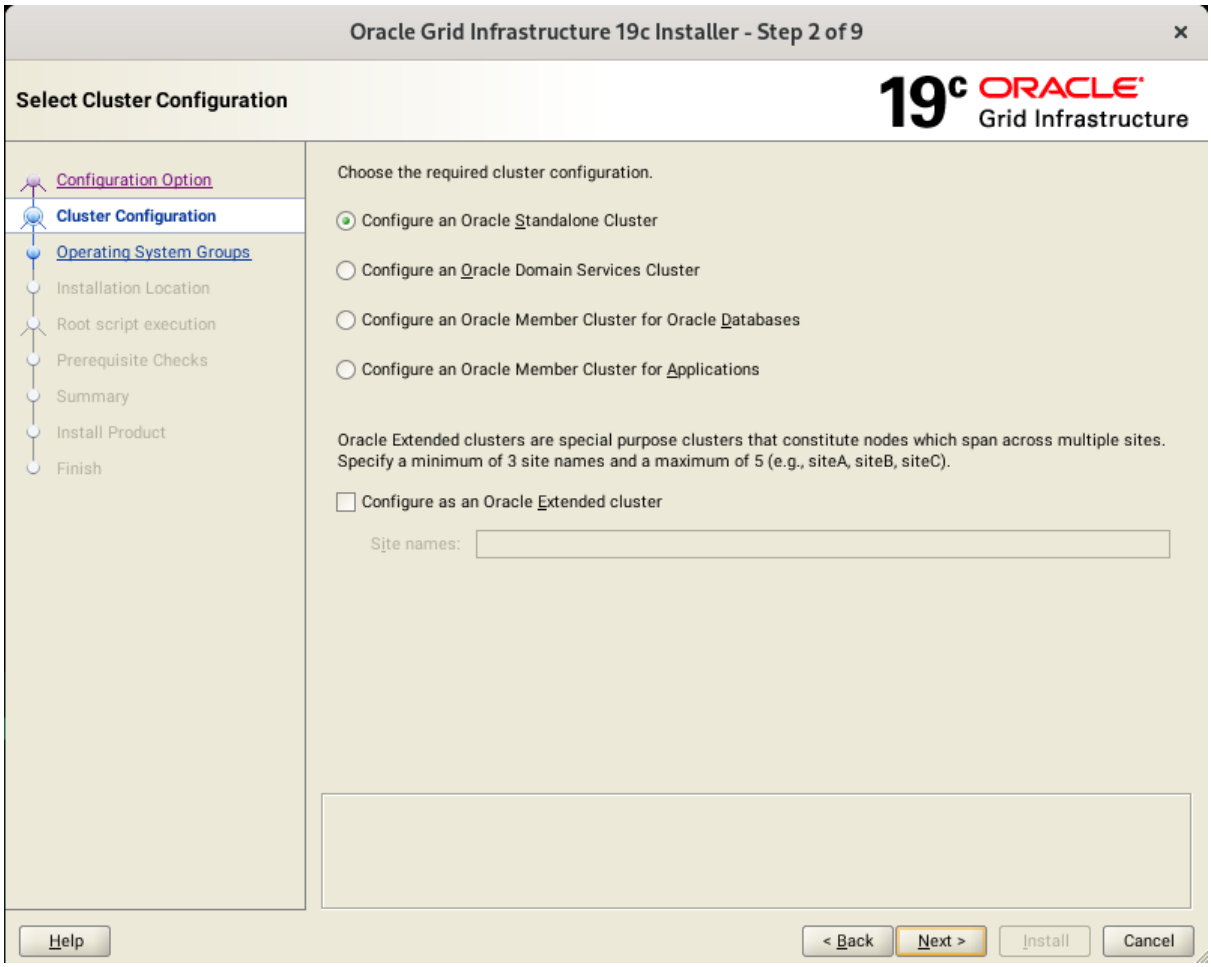
Install Flow:

1). Select Configuration Option.



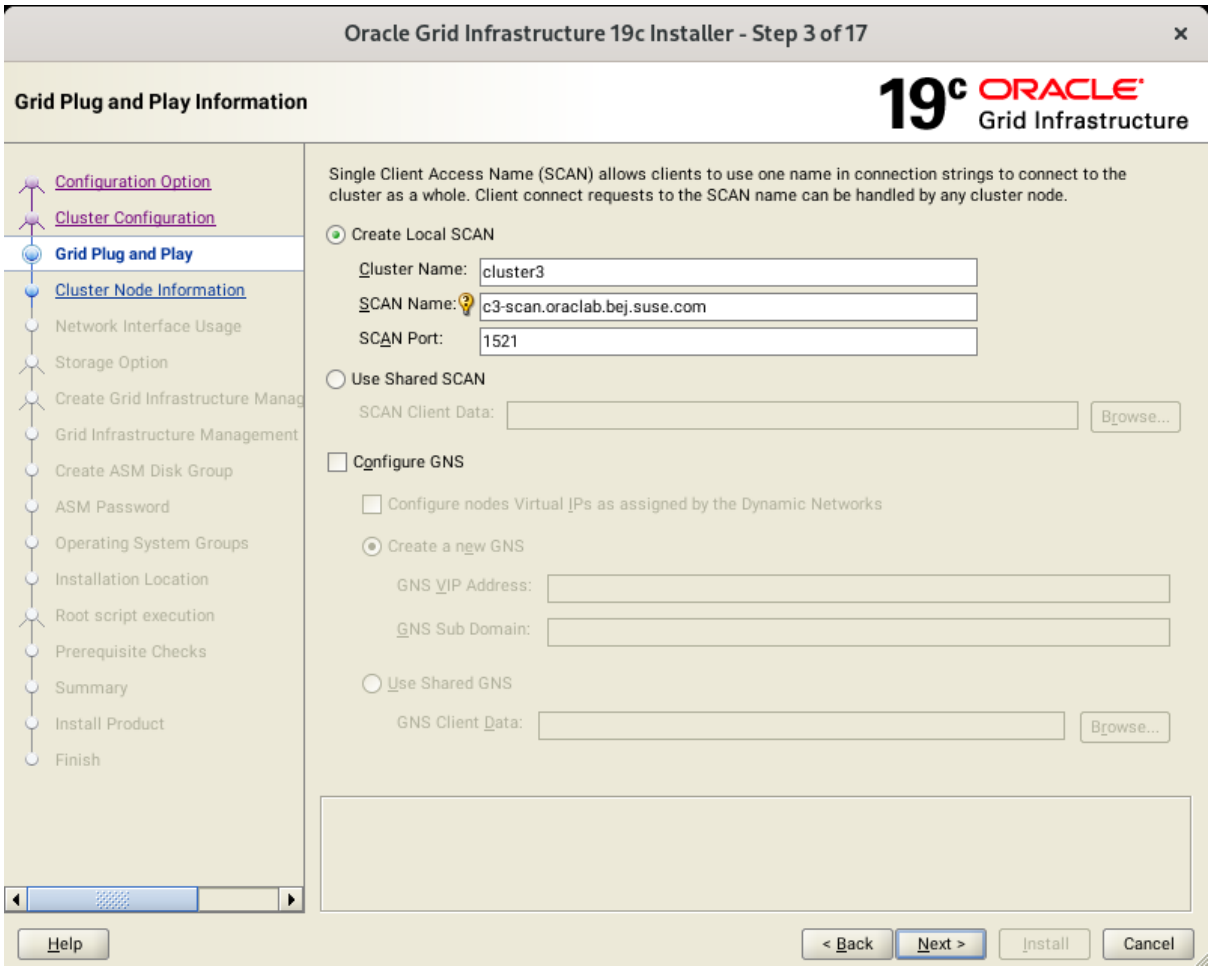
Choose option "**Configure Oracle Grid Infrastructure for a New Cluster**", then click **Next** to continue.

2). Select Cluster Configuration.



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

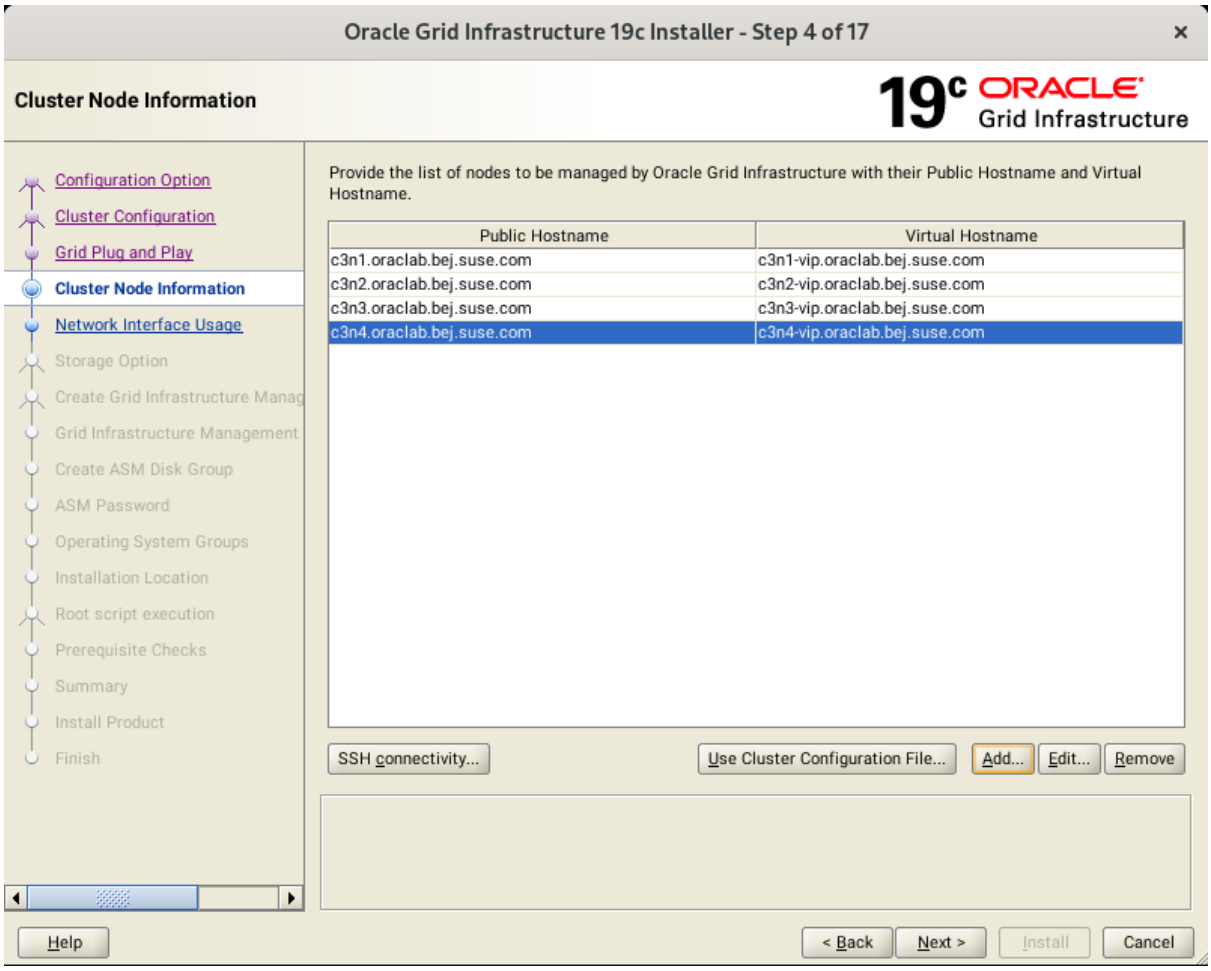
3). Grid Plug and Play Information.



Enter the names of the cluster and scan in the **Cluster Name** and **SCAN Name** fields, which are unique across the entire subnet, and then click **Next** to continue.

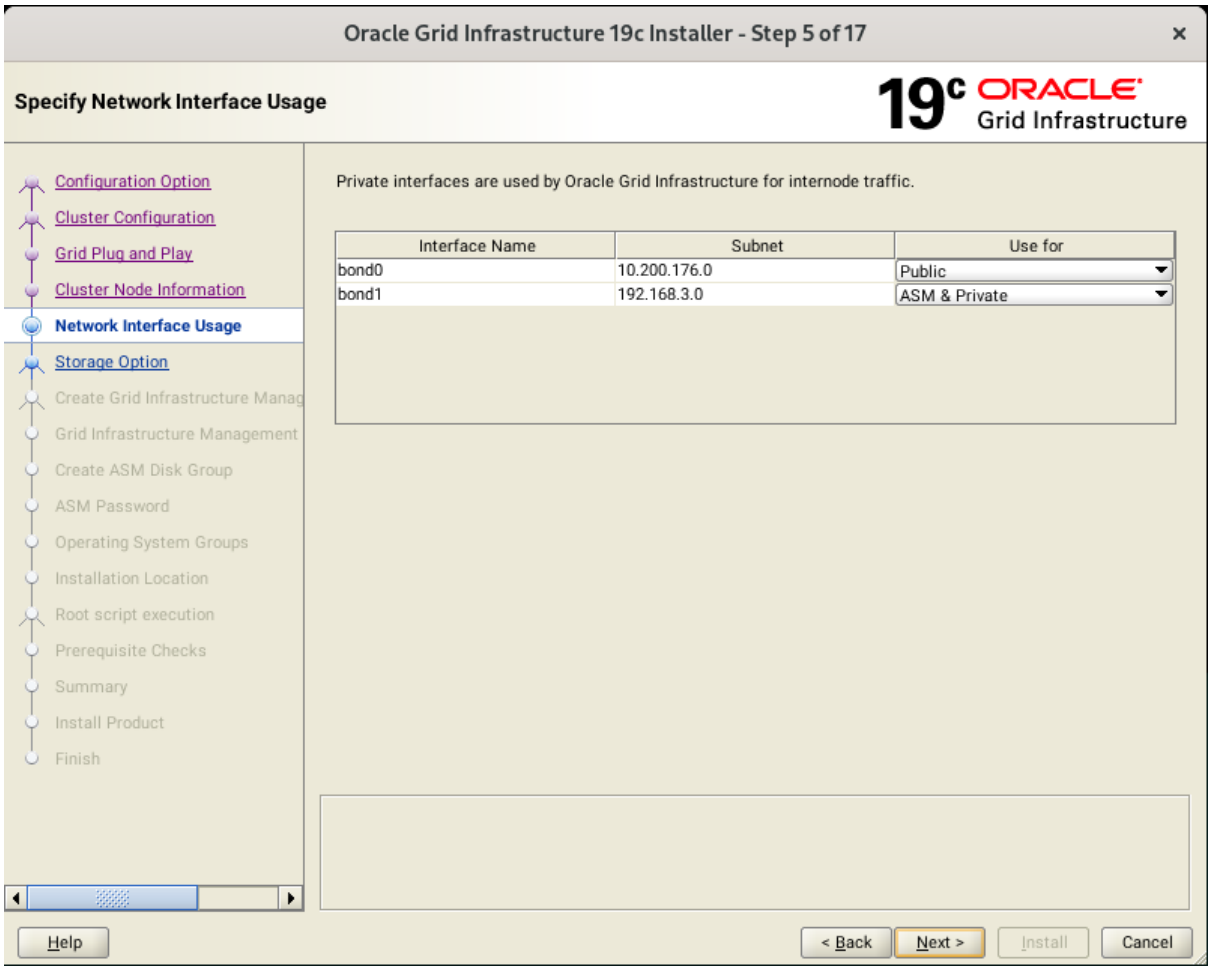
(More details for GNS configuration please see Oracle official document.)

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



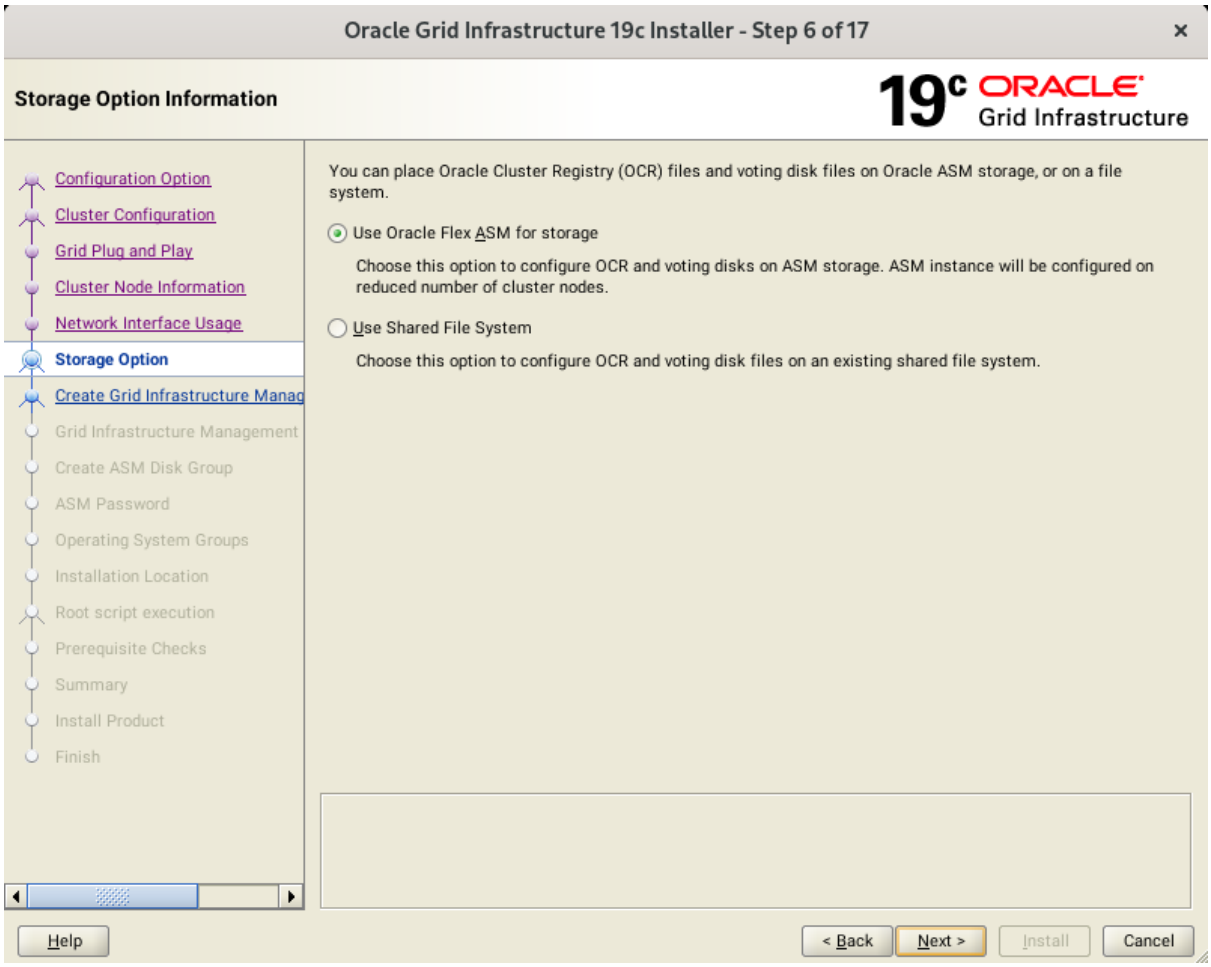
In the Public Hostname column of the table of cluster nodes, you should see your local node. Click **Add** to add another node to the cluster. Enter the second node's public name(node2), and virtual IP name (node2-vip), then click OK. Make sure all nodes are selected, then click the SSH Connectivity 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.



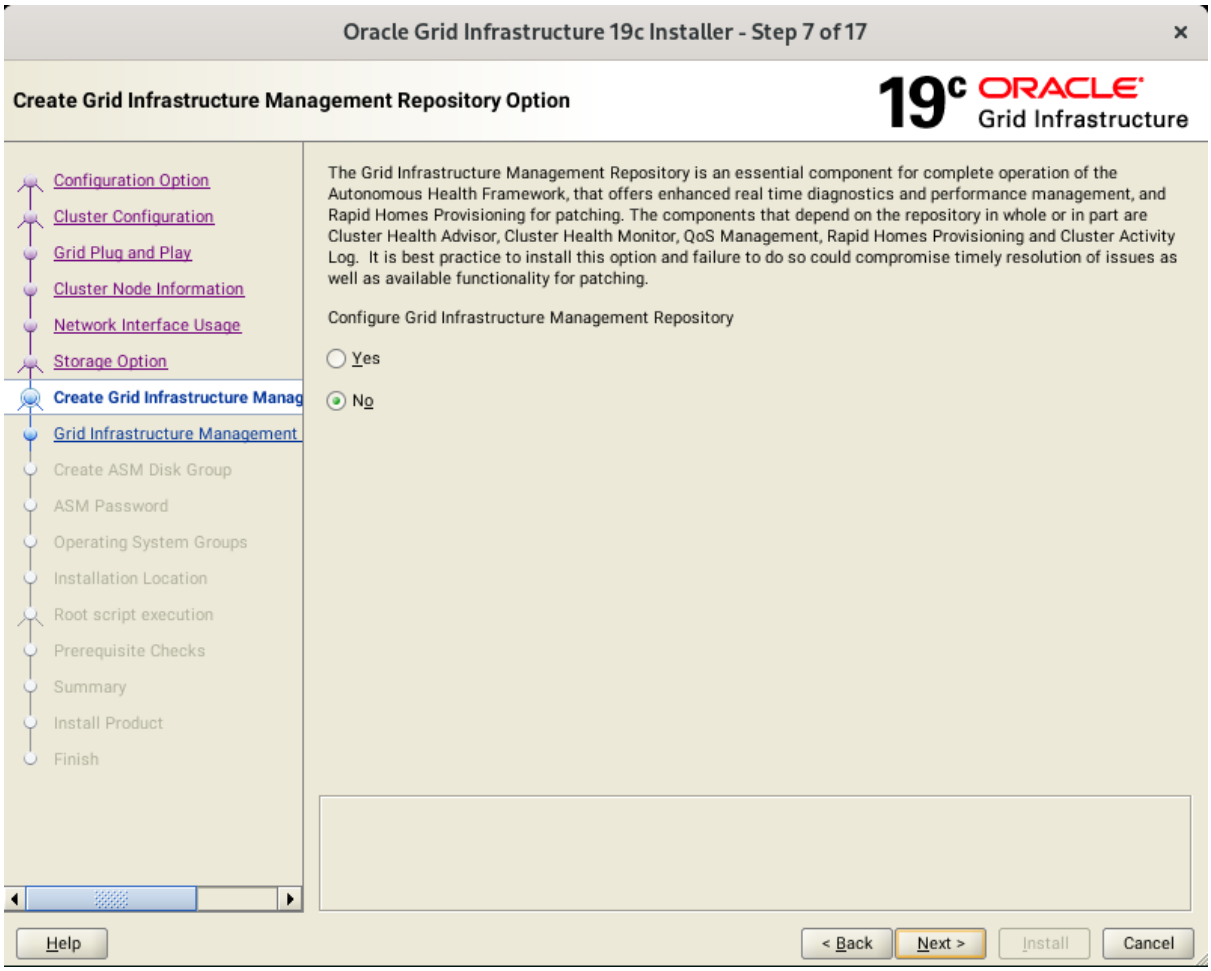
Verify that each interface has the correct interface type associated with it. If you have network interfaces that should not be used by Oracle Clusterware, then set the network interface type to **Do Not Use**. For example, if you have only two network interfaces, then set the public interface to have 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.



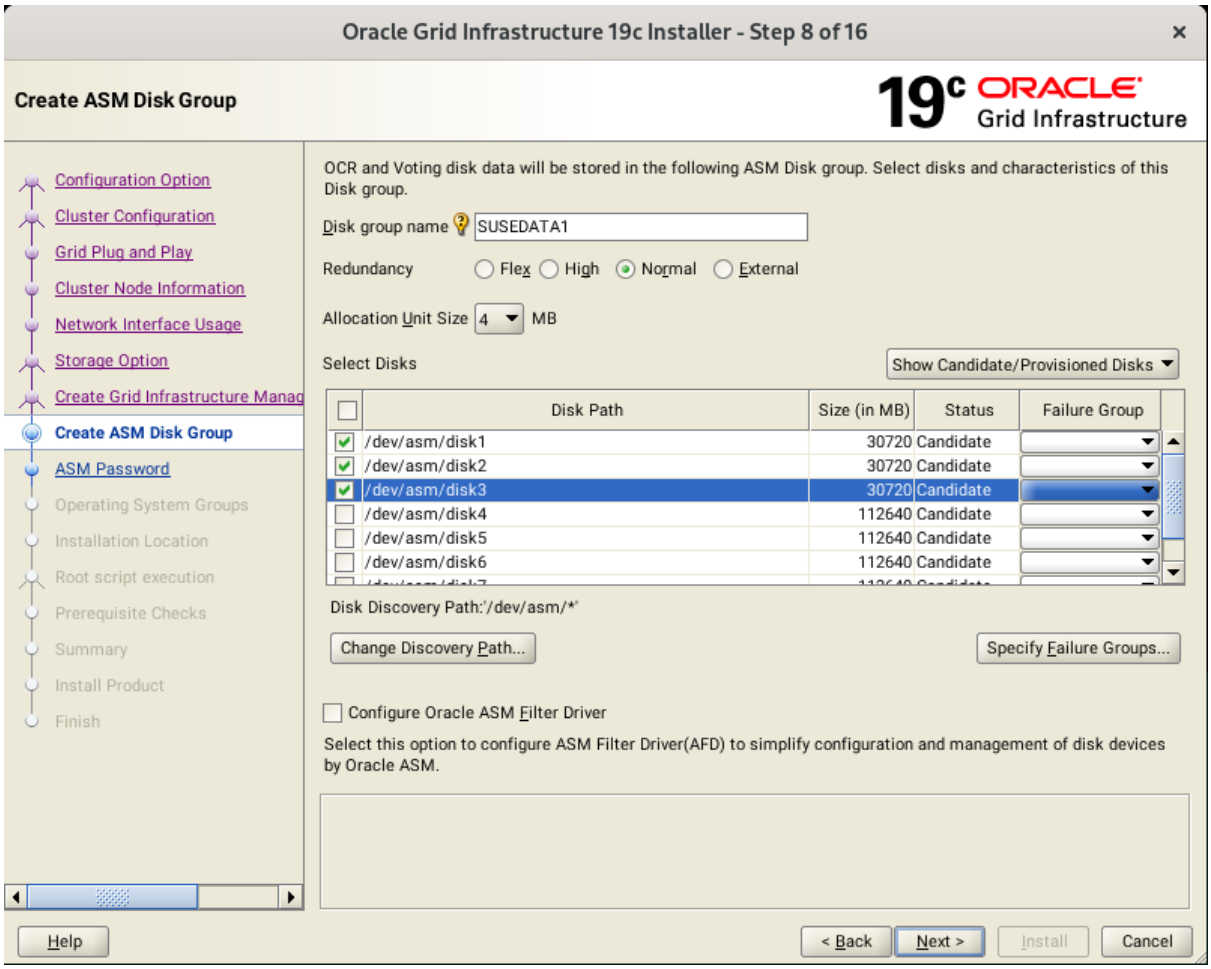
Choose option "**Use Oracle Flex ASM for storage**", then click **Next** to continue.

7). Grid Infrastructure Management Repository Option.



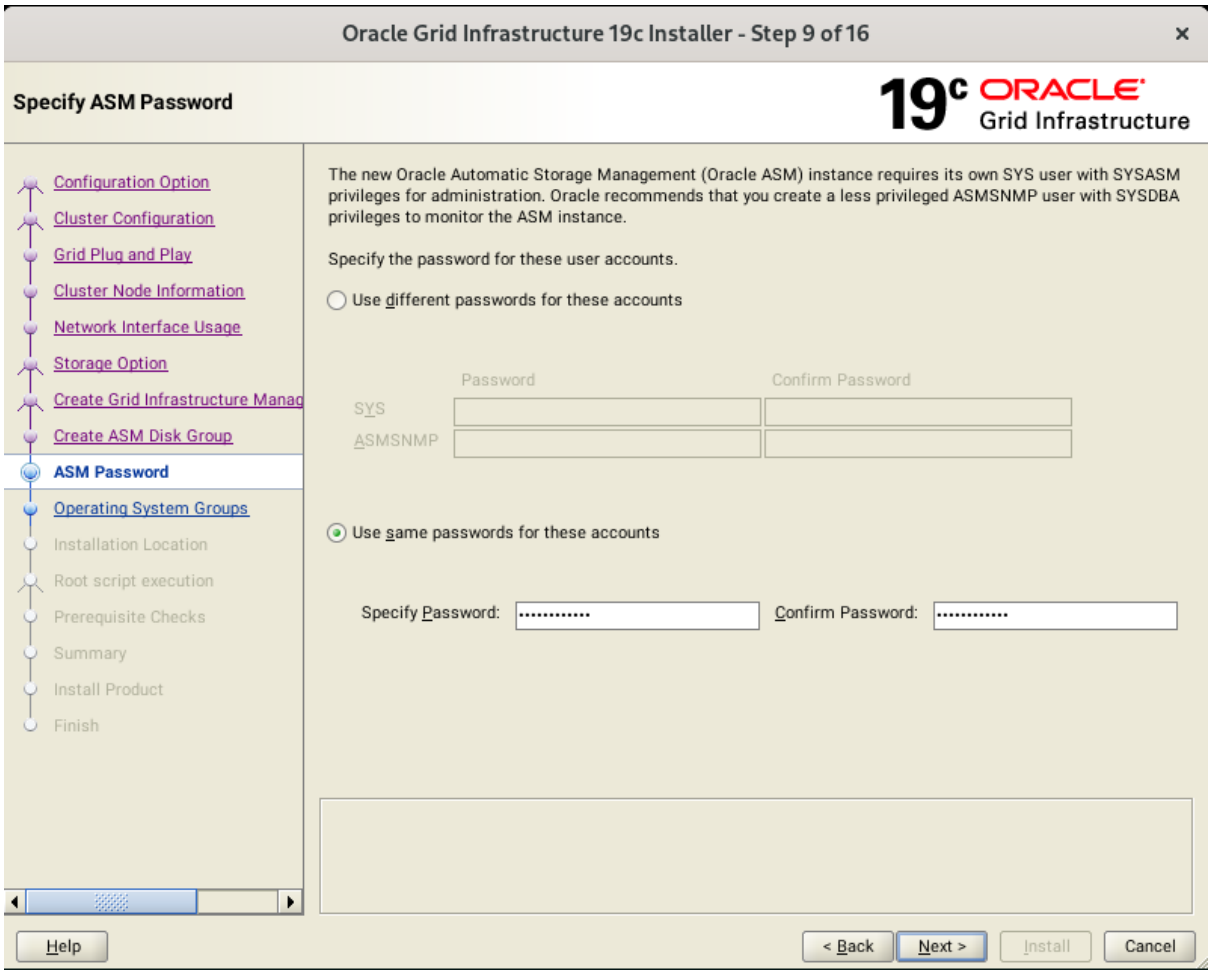
Choose whether you want to store the Grid Infrastructure Management Repository in a separate Oracle ASM disk group, then click **Next** to continue.

8). Create ASM Disk Group.



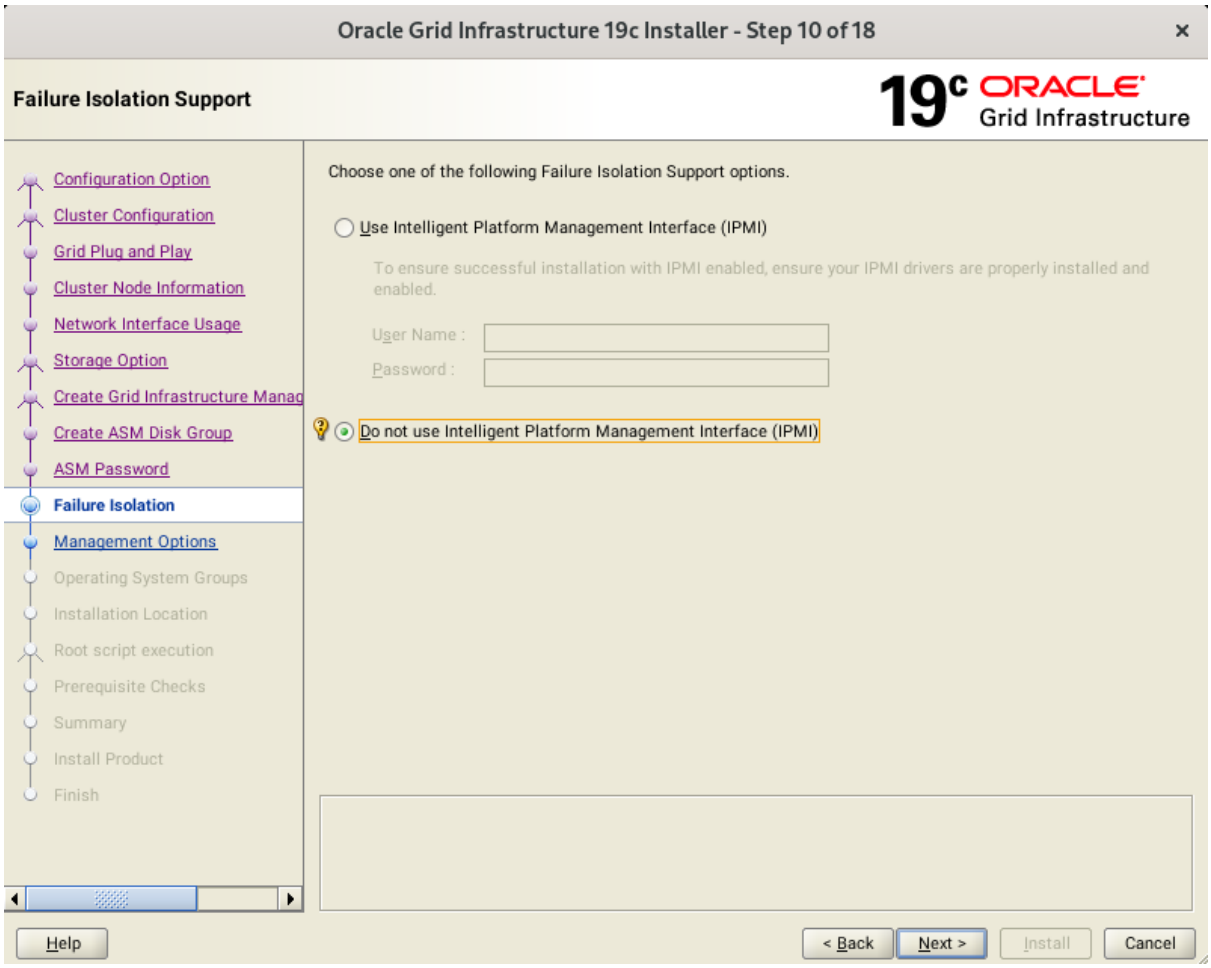
Depending on your needs to creat ASM Disk Group, then click **Next** to continue.

9). Specify ASM Password.



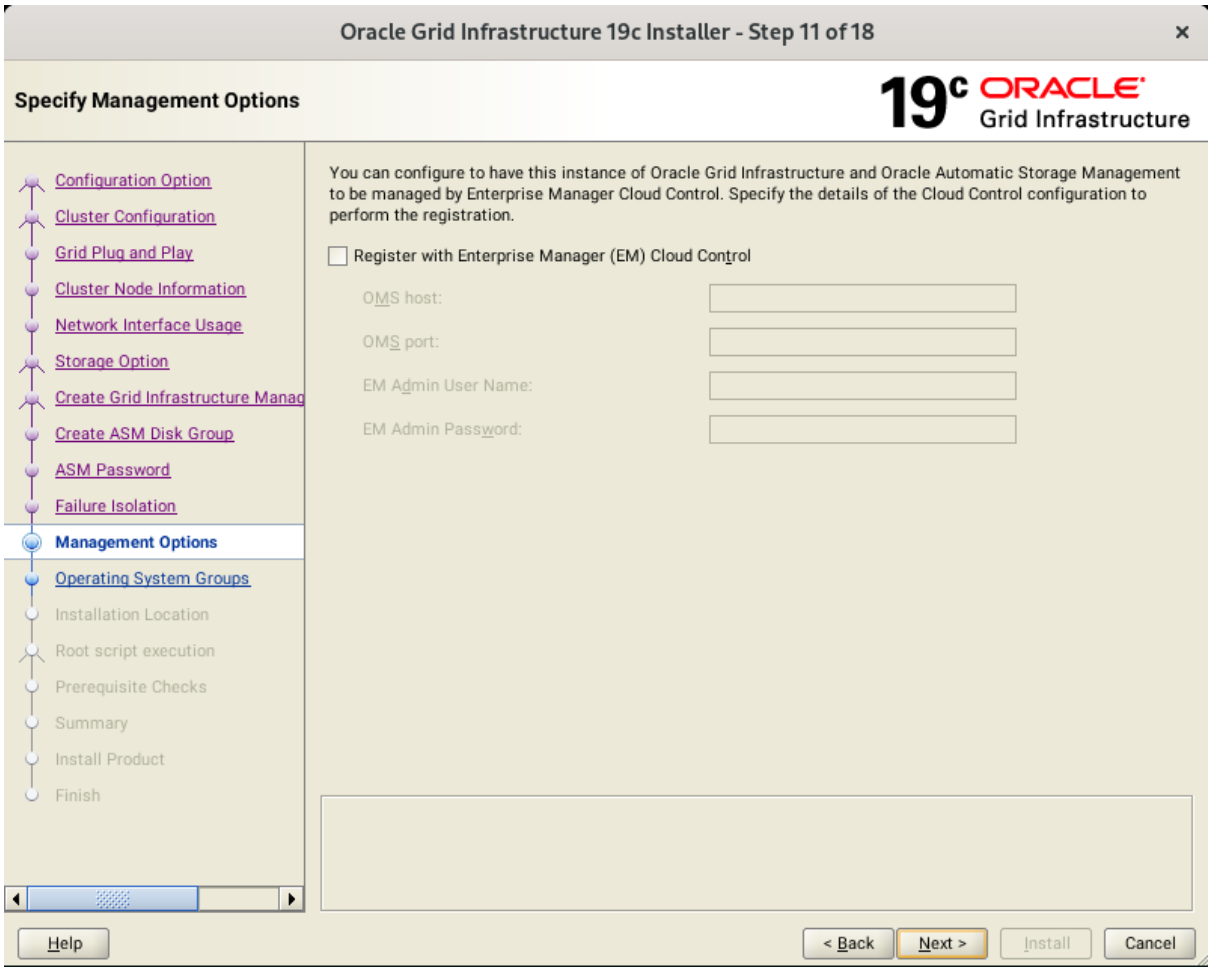
Choose the same password for the Oracle ASM SYS and ASMSNMP account, or specify different passwords for each account, then click **Next** to continue.

10). Failure Isolation Support.



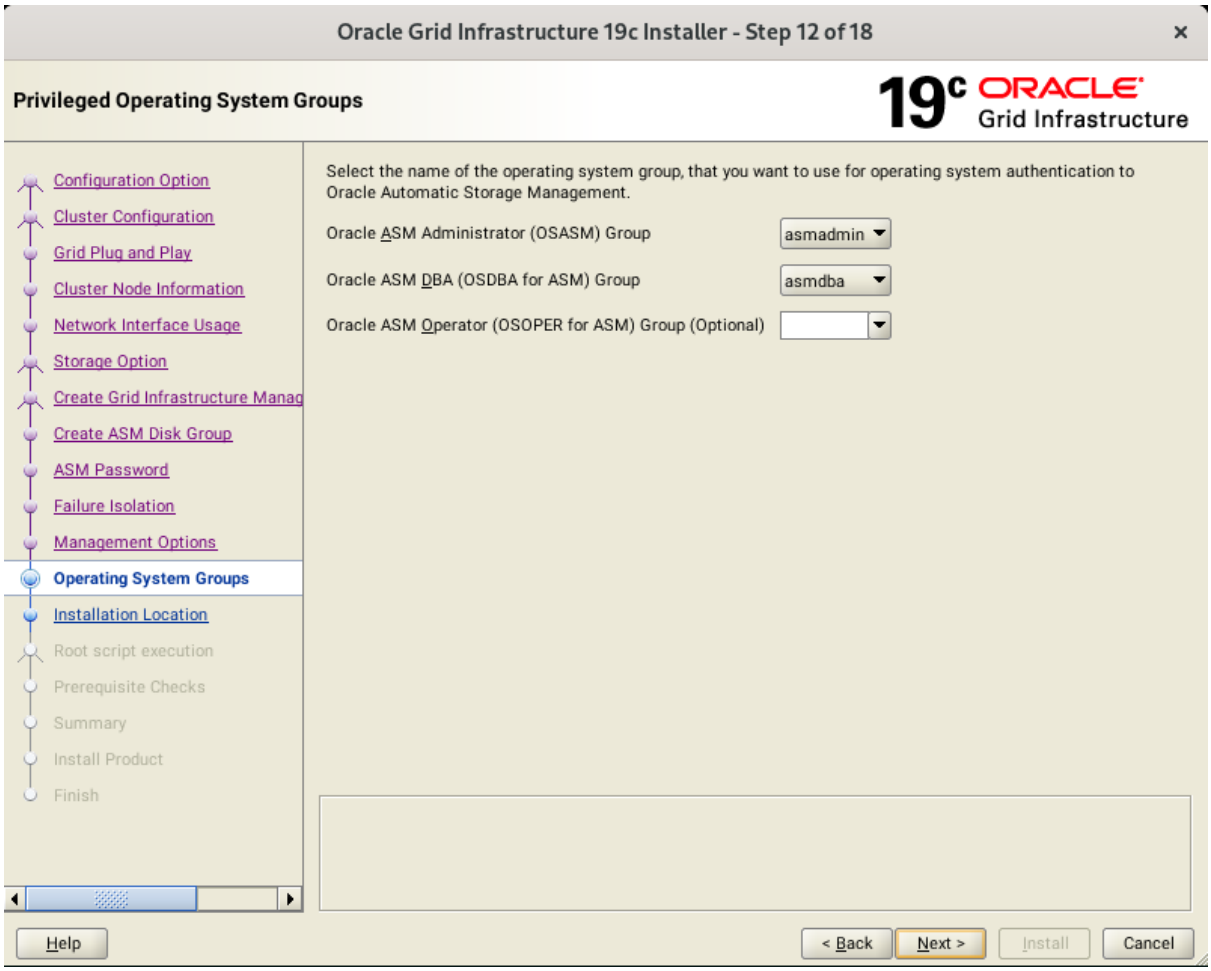
Select the option "**Do not use Intelligent Platform Management Interface** (IPMI)", then click **Next** to continue.

11). Specify Management Options.



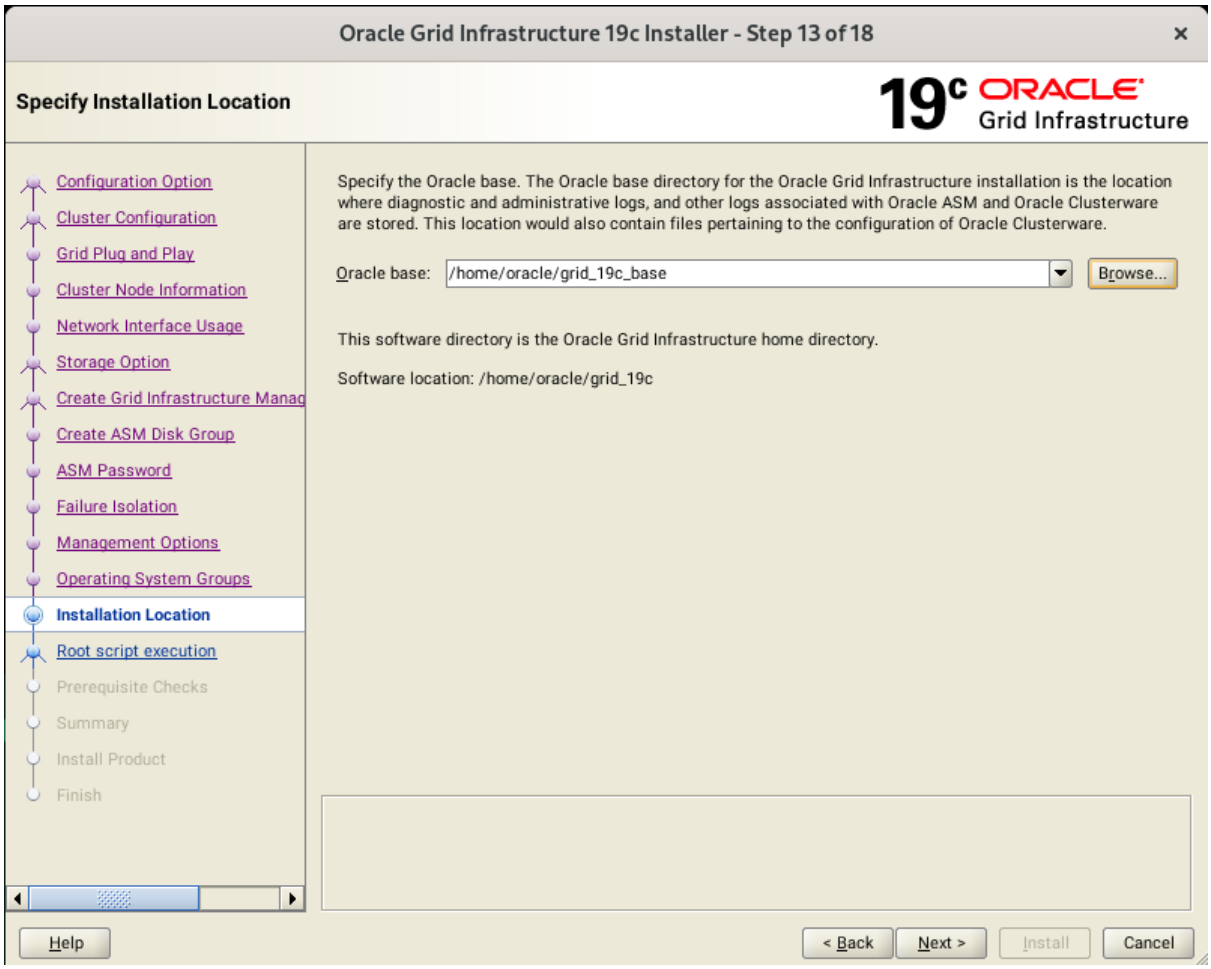
Selected/Deselected the option "**Register with EM...**", then click **Next** to continue.

12). Privileged Operating System Groups.



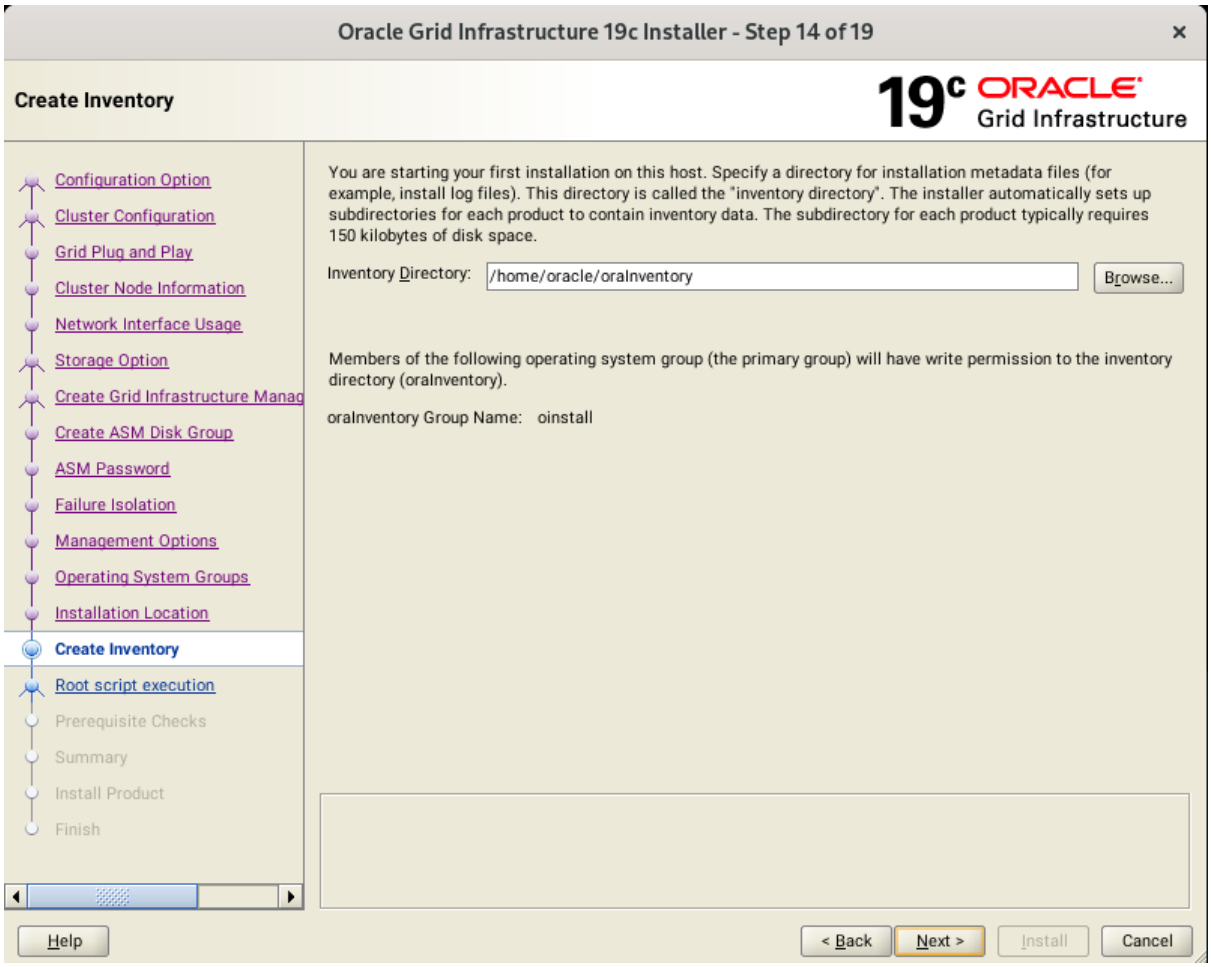
Accept the default operating system group names for Oracle ASM administration, then click **Next** to continue.

13). Specify Installation Location.



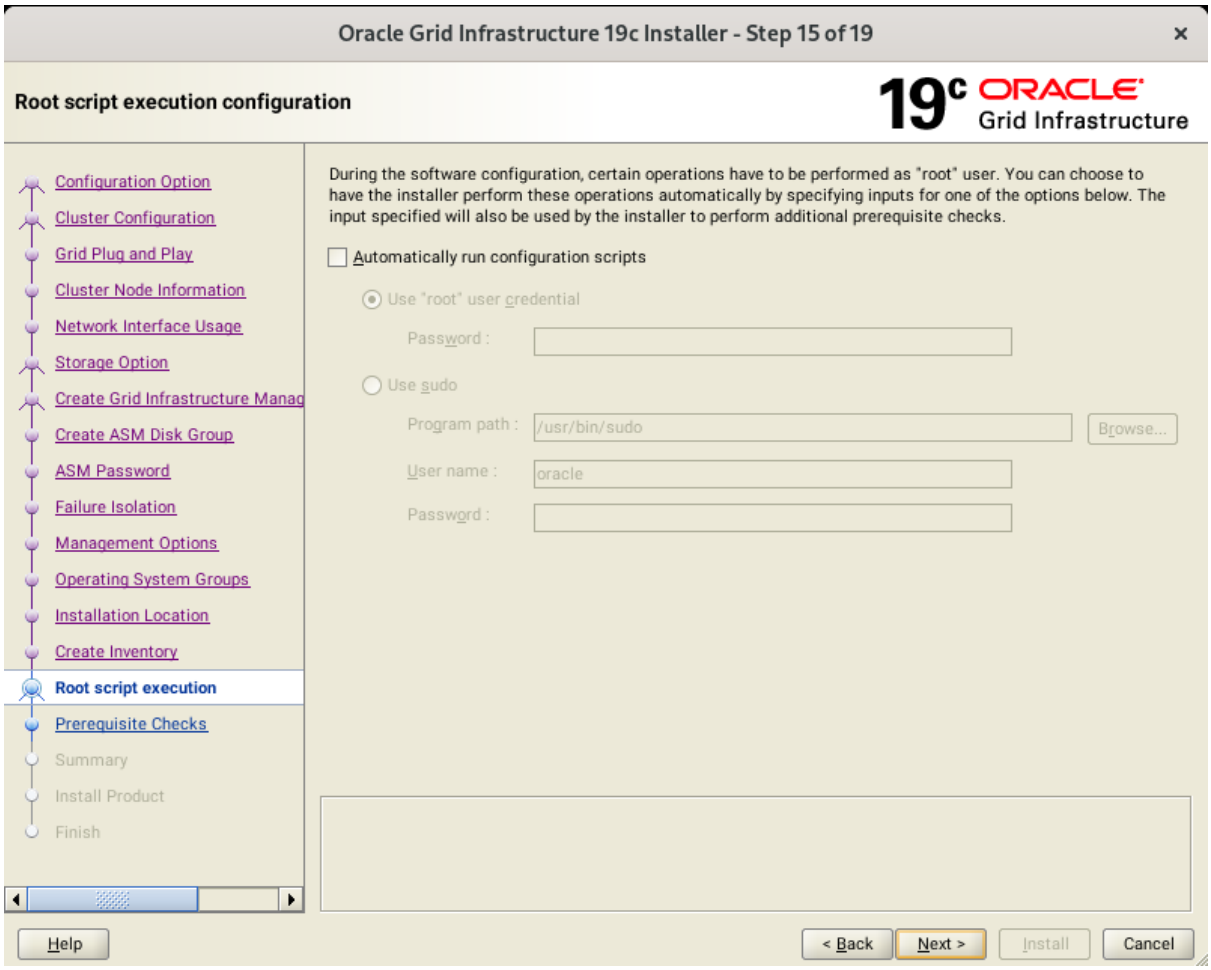
Specify the directory to use for the Oracle base for the Oracle Grid Infrastructure installation, then click **Next** to continue. The Oracle base directory must be different from the Oracle home directory.

14). Create Inventory



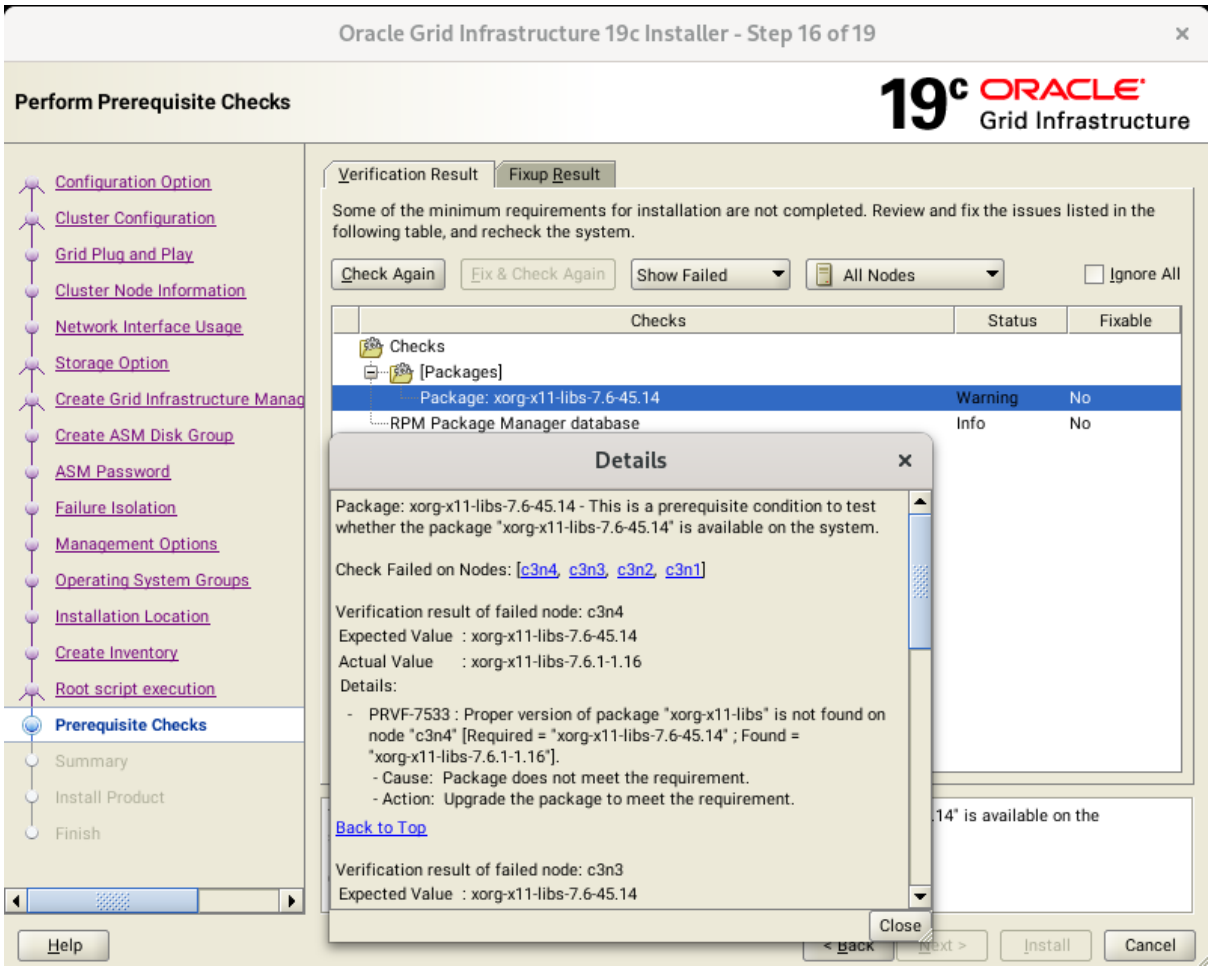
Specify a directory for installation metadata files, and then click **Next** to continue.

15). Root script execution configuration.



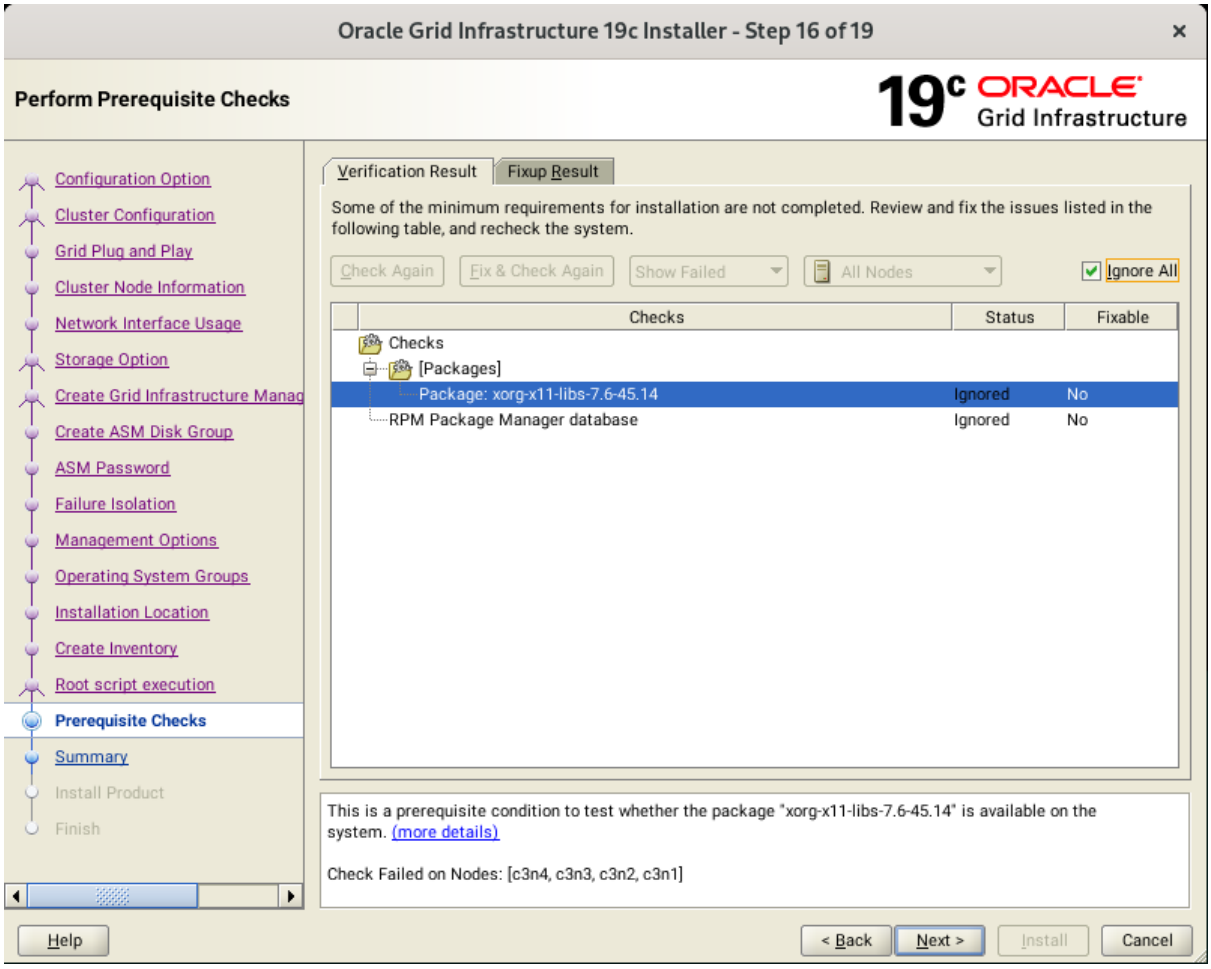
If select the option **Automatically run configuration scripts**, enter the credentials for the root user or a sudo account. Alternatively, run the scripts manually as the root user at the installation process when prompted by the installer. Click **Next** to continue.

16). Perform Prerequisite Checks.



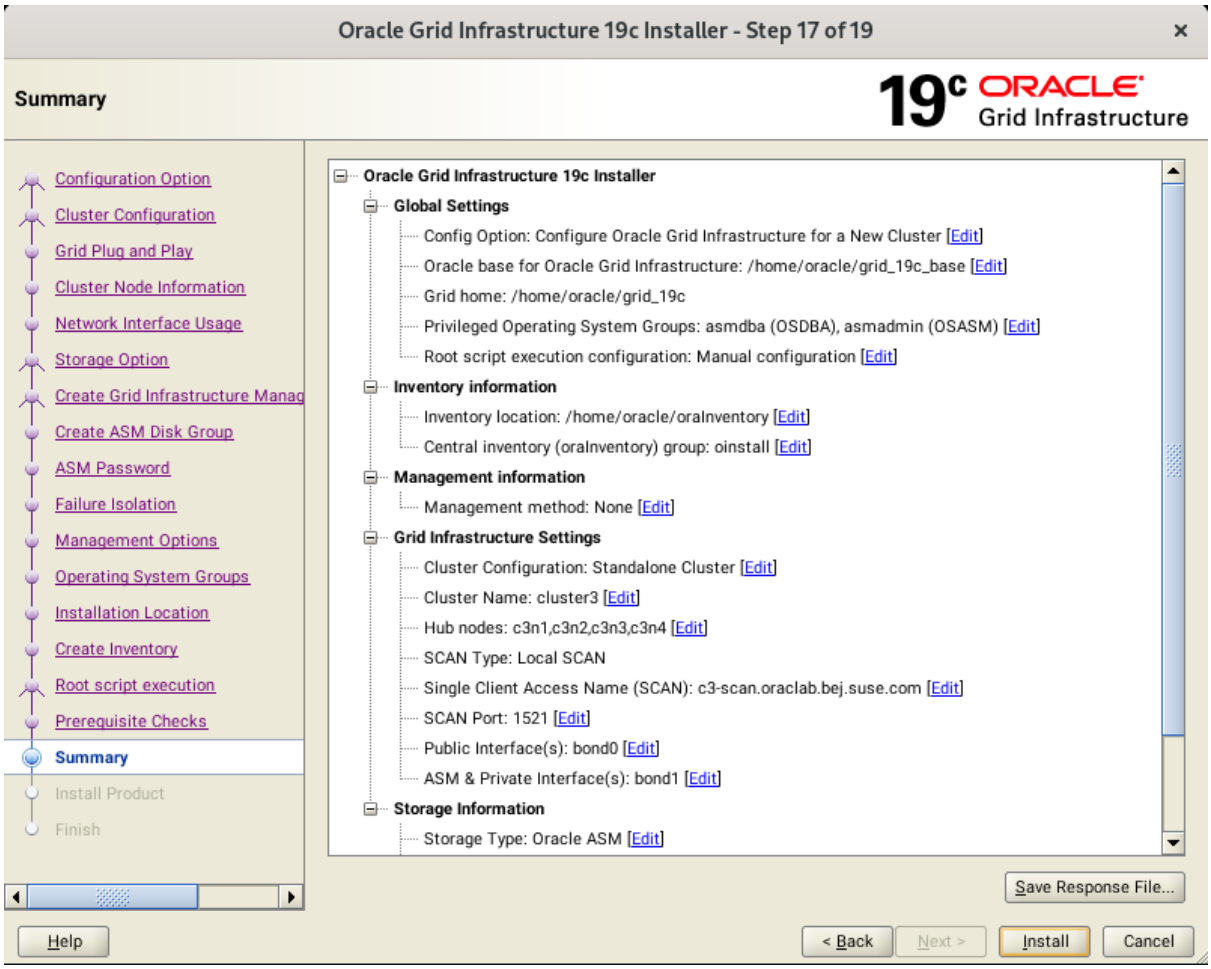
Resolve all the errors and warnings on all nodes in the cluster & run “**Fix & Check Again**”. If the “**Fix & check again**” button is not available, try to fix manually.

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



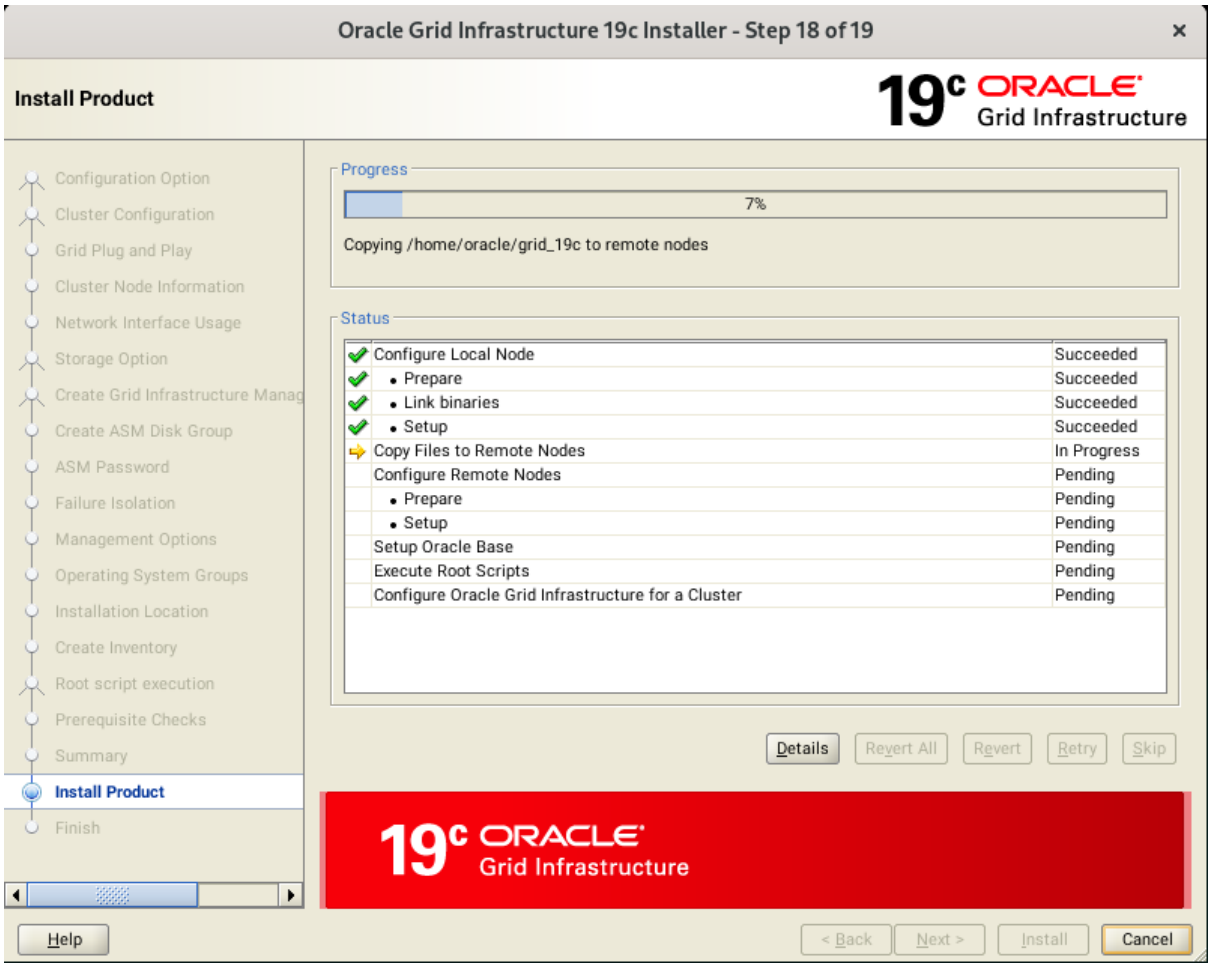
(**Note**: The version of xorg-x11-libs in SLES15 SP6 is 7.6.1-1.16.)

16). Summary.

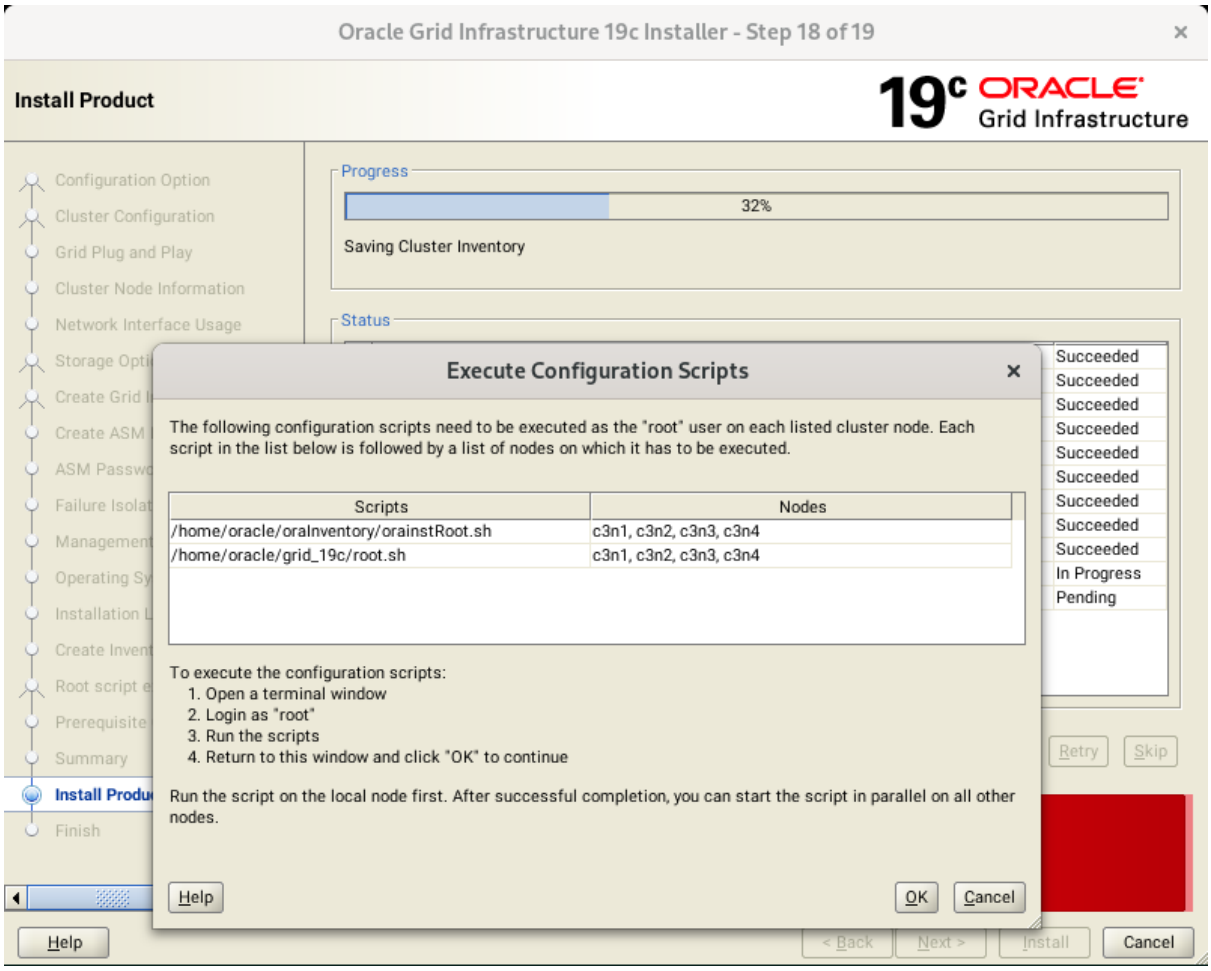


Installation Summary as shown above, click **Install** to continue.

17). Install Product.



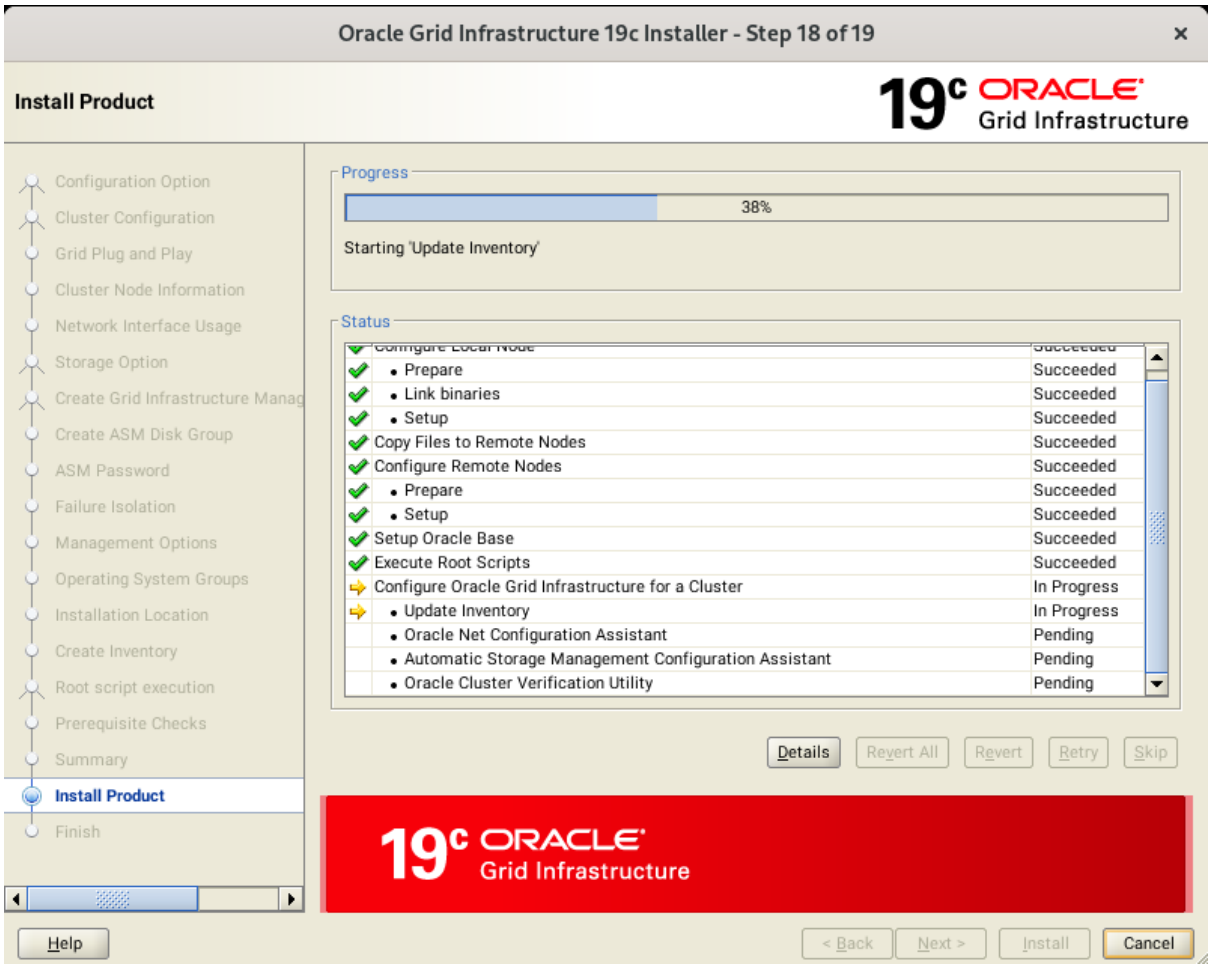
Installer prompted you to run the orainstRoot.sh and root.sh scripts.



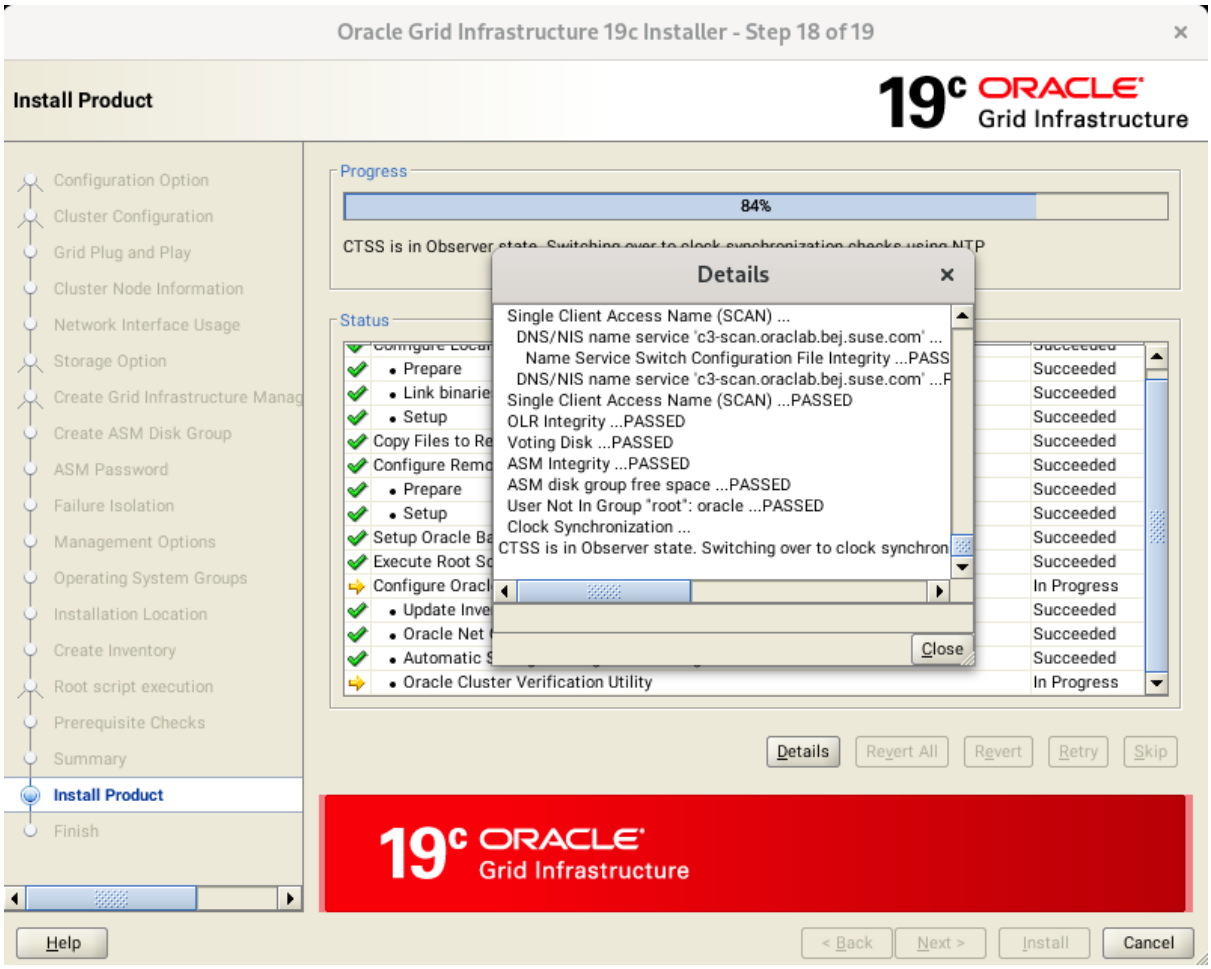

```
c3n1:/home/oracle # /home/oracle/oraInventory/orainstRoot.sh
Changing permissions of /home/oracle/oraInventory.
Adding read,write permissions for group.
Removing read,write,execute permissions for world.

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

```
c3n1:/home/oracle # /home/oracle/grid_19c/root.sh
Performing root user operation.

The following environment variables are set as:
    ORACLE_OWNER= oracle
    ORACLE_HOME=  /home/oracle/grid_19c

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.
Relinking oracle with rac_on option
Using configuration parameter file: /home/oracle/grid_19c/crs/install/crsconfig_params
The log of current session can be found at:
  /home/oracle/grid_19c_base/crsdata/c3n1/crsconfig/rootcrs_c3n1_2024-07-31_04-21-51PM.log
2024/07/31 16:21:57 CLSRSC-594: Executing installation step 1 of 19: 'ValidateEnv'.
2024/07/31 16:21:57 CLSRSC-594: Executing installation step 2 of 19: 'CheckFirstNode'.
2024/07/31 16:22:00 CLSRSC-594: Executing installation step 3 of 19: 'GenSiteGUIDs'.
2024/07/31 16:22:01 CLSRSC-594: Executing installation step 4 of 19: 'SetupOSD'.
2024/07/31 16:22:02 CLSRSC-594: Executing installation step 5 of 19: 'CheckCRSConfig'.
2024/07/31 16:22:02 CLSRSC-594: Executing installation step 6 of 19: 'SetupLocalGPNP'.
2024/07/31 16:22:16 CLSRSC-594: Executing installation step 7 of 19: 'CreateRootCert'.
2024/07/31 16:22:26 CLSRSC-594: Executing installation step 8 of 19: 'ConfigOLR'.
2024/07/31 16:22:47 CLSRSC-594: Executing installation step 9 of 19: 'ConfigCHMOS'.
2024/07/31 16:23:19 CLSRSC-594: Executing installation step 10 of 19: 'CreateOHASD'.
2024/07/31 16:23:26 CLSRSC-594: Executing installation step 11 of 19: 'ConfigOHASD'.
2024/07/31 16:23:26 CLSRSC-330: Adding Clusterware entries to file 'oracle-ohasd.service'
2024/07/31 16:23:55 CLSRSC-594: Executing installation step 12 of 19: 'SetupTFA'.
2024/07/31 16:23:55 CLSRSC-594: Executing installation step 13 of 19: 'InstallAFD'.
2024/07/31 16:23:55 CLSRSC-594: Executing installation step 14 of 19: 'InstallACFS'.
2024/07/31 16:24:03 CLSRSC-594: Executing installation step 15 of 19: 'InstallKA'.
2024/07/31 16:24:11 CLSRSC-594: Executing installation step 16 of 19: 'InitConfig'.

ASM has been created and started successfully.

[DBT-30001] Disk groups created successfully. Check /home/oracle/grid_19c_base/cfgtoollogs/asmca/asmca-240731PM042443.log for details.

2024/07/31 16:25:24 CLSRSC-482: Running command: '/home/oracle/grid_19c/bin/ocrconfig -upgrade oracle oinstall'
CRS-4256: Updating the profile
Successful addition of voting disk 06961cfd41524fb7bfc2c63ab431adf9.
Successful addition of voting disk 2ba9f3aef1274f56bf437a6a571c0340.
Successful addition of voting disk e8aee5064ff34fdcbff7dc3c64aff4bb.
Successfully replaced voting disk group with +SUSEDATA1.
CRS-4256: Updating the profile
CRS-4266: Voting file(s) successfully replaced
##  STATE    File Universal Id               File Name Disk group
--  -----    -----------------               --------- ---------
 1. ONLINE   06961cfd41524fb7bfc2c63ab431adf9 (/dev/asm/disk1) [SUSEDATA1]
 2. ONLINE   2ba9f3aef1274f56bf437a6a571c0340 (/dev/asm/disk2) [SUSEDATA1]
 3. ONLINE   e8aee5064ff34fdcbff7dc3c64aff4bb (/dev/asm/disk3) [SUSEDATA1]
Located 3 voting disk(s).
2024/07/31 16:26:06 CLSRSC-4002: Successfully installed Oracle Trace File Analyzer (TFA) Collector.
2024/07/31 16:26:38 CLSRSC-594: Executing installation step 17 of 19: 'StartCluster'.
2024/07/31 16:27:41 CLSRSC-343: Successfully started Oracle Clusterware stack
2024/07/31 16:27:41 CLSRSC-594: Executing installation step 18 of 19: 'ConfigNode'.
2024/07/31 16:28:51 CLSRSC-594: Executing installation step 19 of 19: 'PostConfig'.
2024/07/31 16:29:13 CLSRSC-325: Configure Oracle Grid Infrastructure for a Cluster ... succeeded
c3n1:/home/oracle #
```

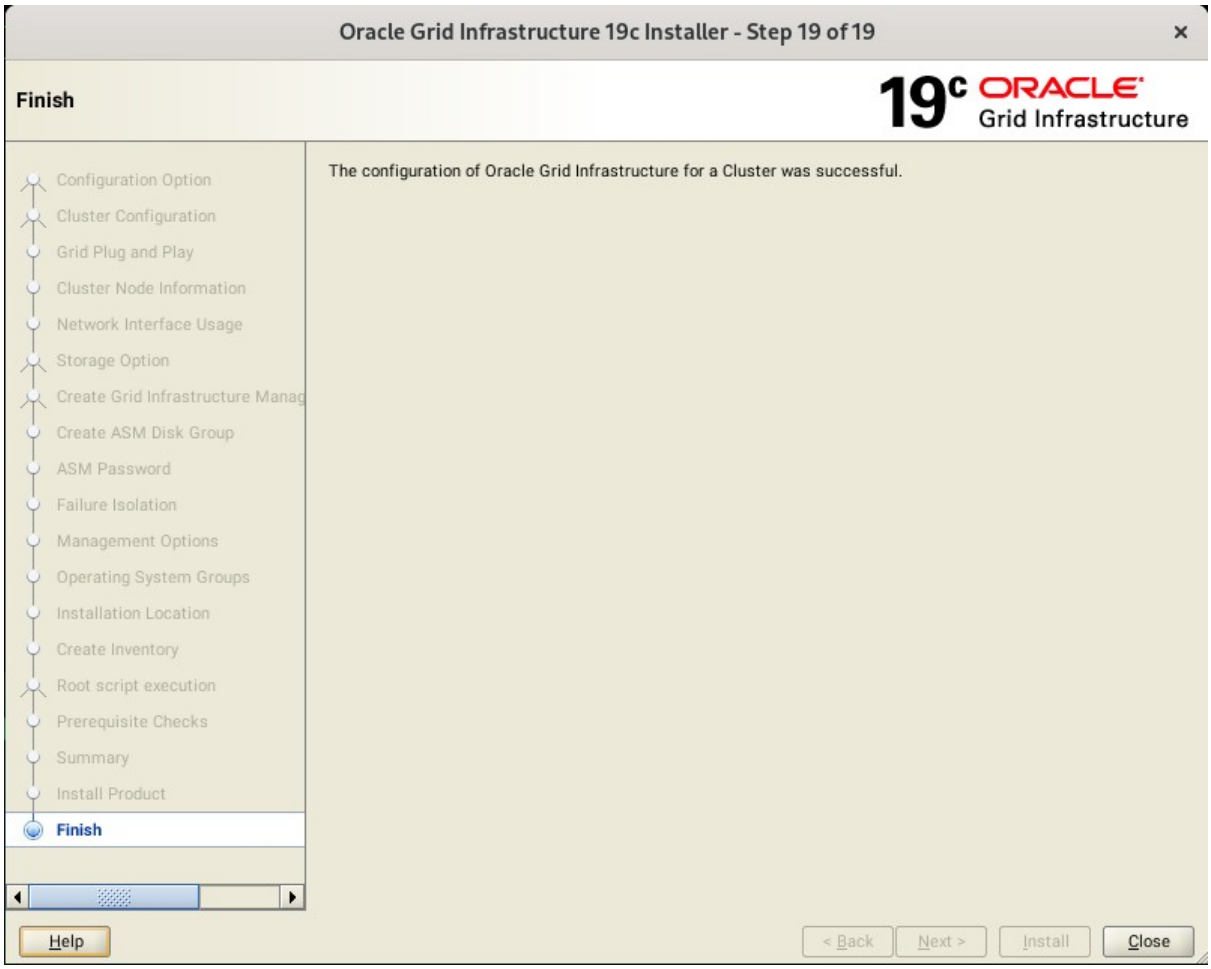
After successfully executing the above script on each node, click **OK** to continue.



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(19.24.0.0.0) Grid Infrastructure Post-Install Checks.

1).Check Oracle Clusterware health and resources.

```
oracle@c3n1:~> /home/oracle/grid_19c/bin/crsctl check cluster -all
**************************************************************
c3n1:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
c3n2:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
c3n3:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
c3n4:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
oracle@c3n1:~> /home/oracle/grid_19c/bin/srvctl status nodeapps
VIP 10.200.176.15 is enabled
VIP 10.200.176.15 is running on node: c3n1
VIP 10.200.176.16 is enabled
VIP 10.200.176.16 is running on node: c3n2
VIP 10.200.176.17 is enabled
VIP 10.200.176.17 is running on node: c3n3
VIP 10.200.176.18 is enabled
VIP 10.200.176.18 is running on node: c3n4
Network is enabled
Network is running on node: c3n1
Network is running on node: c3n2
Network is running on node: c3n3
Network is running on node: c3n4
ONS is enabled
ONS daemon is running on node: c3n1
ONS daemon is running on node: c3n2
ONS daemon is running on node: c3n3
ONS daemon is running on node: c3n4
oracle@c3n1:~>
```

2). Check status of designated resources.

```
oracle@c3n1:~> /home/oracle/grid_19c/bin/crsctl stat res -t
--------------------------------------------------------------------------------
Name           Target  State        Server                   State details
--------------------------------------------------------------------------------
Local Resources
--------------------------------------------------------------------------------
ora.LISTENER.lsnr
               ONLINE  ONLINE       c3n1                     STABLE
               ONLINE  ONLINE       c3n2                     STABLE
               ONLINE  ONLINE       c3n3                     STABLE
               ONLINE  ONLINE       c3n4                     STABLE
ora.chad
               ONLINE  ONLINE       c3n1                     STABLE
               ONLINE  ONLINE       c3n2                     STABLE
               ONLINE  ONLINE       c3n3                     STABLE
               ONLINE  ONLINE       c3n4                     STABLE
ora.net1.network
               ONLINE  ONLINE       c3n1                     STABLE
               ONLINE  ONLINE       c3n2                     STABLE
               ONLINE  ONLINE       c3n3                     STABLE
               ONLINE  ONLINE       c3n4                     STABLE
ora.ons
               ONLINE  ONLINE       c3n1                     STABLE
               ONLINE  ONLINE       c3n2                     STABLE
               ONLINE  ONLINE       c3n3                     STABLE
               ONLINE  ONLINE       c3n4                     STABLE
--------------------------------------------------------------------------------
```

```
Cluster Resources
--------------------------------------------------------------------------------
ora.ASMNET1LSNR_ASM.lsnr(ora.asmgroup)
      1        ONLINE  ONLINE       c3n1                     STABLE
      2        ONLINE  ONLINE       c3n2                     STABLE
      3        ONLINE  ONLINE       c3n3                     STABLE
ora.LISTENER_SCAN1.lsnr
      1        ONLINE  ONLINE       c3n2                     STABLE
ora.LISTENER_SCAN2.lsnr
      1        ONLINE  ONLINE       c3n3                     STABLE
ora.LISTENER_SCAN3.lsnr
      1        ONLINE  ONLINE       c3n1                     STABLE
ora.SUSEDATA1.dg(ora.asmgroup)
      1        ONLINE  ONLINE       c3n1                     STABLE
      2        ONLINE  ONLINE       c3n2                     STABLE
      3        ONLINE  ONLINE       c3n3                     STABLE
ora.asm(ora.asmgroup)
      1        ONLINE  ONLINE       c3n1                     Started,STABLE
      2        ONLINE  ONLINE       c3n2                     Started,STABLE
      3        ONLINE  ONLINE       c3n3                     Started,STABLE
ora.asmnet1.asmnetwork(ora.asmgroup)
      1        ONLINE  ONLINE       c3n1                     STABLE
      2        ONLINE  ONLINE       c3n2                     STABLE
      3        ONLINE  ONLINE       c3n3                     STABLE
ora.c3n1.vip
      1        ONLINE  ONLINE       c3n1                     STABLE
ora.c3n2.vip
      1        ONLINE  ONLINE       c3n2                     STABLE
ora.c3n3.vip
      1        ONLINE  ONLINE       c3n3                     STABLE
ora.c3n4.vip
      1        ONLINE  ONLINE       c3n4                     STABLE
ora.cvu
      1        ONLINE  ONLINE       c3n1                     STABLE
ora.qosmserver
      1        ONLINE  ONLINE       c3n1                     STABLE
ora.scan1.vip
      1        ONLINE  ONLINE       c3n2                     STABLE
ora.scan2.vip
      1        ONLINE  ONLINE       c3n3                     STABLE
ora.scan3.vip
      1        ONLINE  ONLINE       c3n1                     STABLE
--------------------------------------------------------------------------------
oracle@c3n1:~>
```

3).Check OCR and Voting disk files.

```
oracle@c3n1:~> /home/oracle/grid_19c/bin/ocrcheck
Status of Oracle Cluster Registry is as follows :
         Version                  :          4
         Total space (kbytes)     :     901284
         Used space (kbytes)      :      84324
         Available space (kbytes) :     816960
         ID                       :  870505982
         Device/File Name         : +SUSEDATA1
                                    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@c3n1:~> /home/oracle/grid_19c/bin/crsctl query css votedisk
##  STATE    File Universal Id                File Name Disk group
--  -----    -----------------                --------- ---------
 1. ONLINE   06961cfd41524fb7bfc2c63ab431adf9 (/dev/asm/disk1) [SUSEDATA1]
 2. ONLINE   2ba9f3aef1274f56bf437a6a571c0340 (/dev/asm/disk2) [SUSEDATA1]
 3. ONLINE   e8aee5064ff34fdcbff7dc3c64aff4bb (/dev/asm/disk3) [SUSEDATA1]
Located 3 voting disk(s).
oracle@c3n1:~>
```

2. Installing Oracle Database.

2-1. Login to the SLES 15 SP6 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 replace the OPatch directory located in the Database 19.3 ShipHome with OPatch version 12.2.0.1.43.

Also, export SRVM_DISABLE_MTTRANS=true.

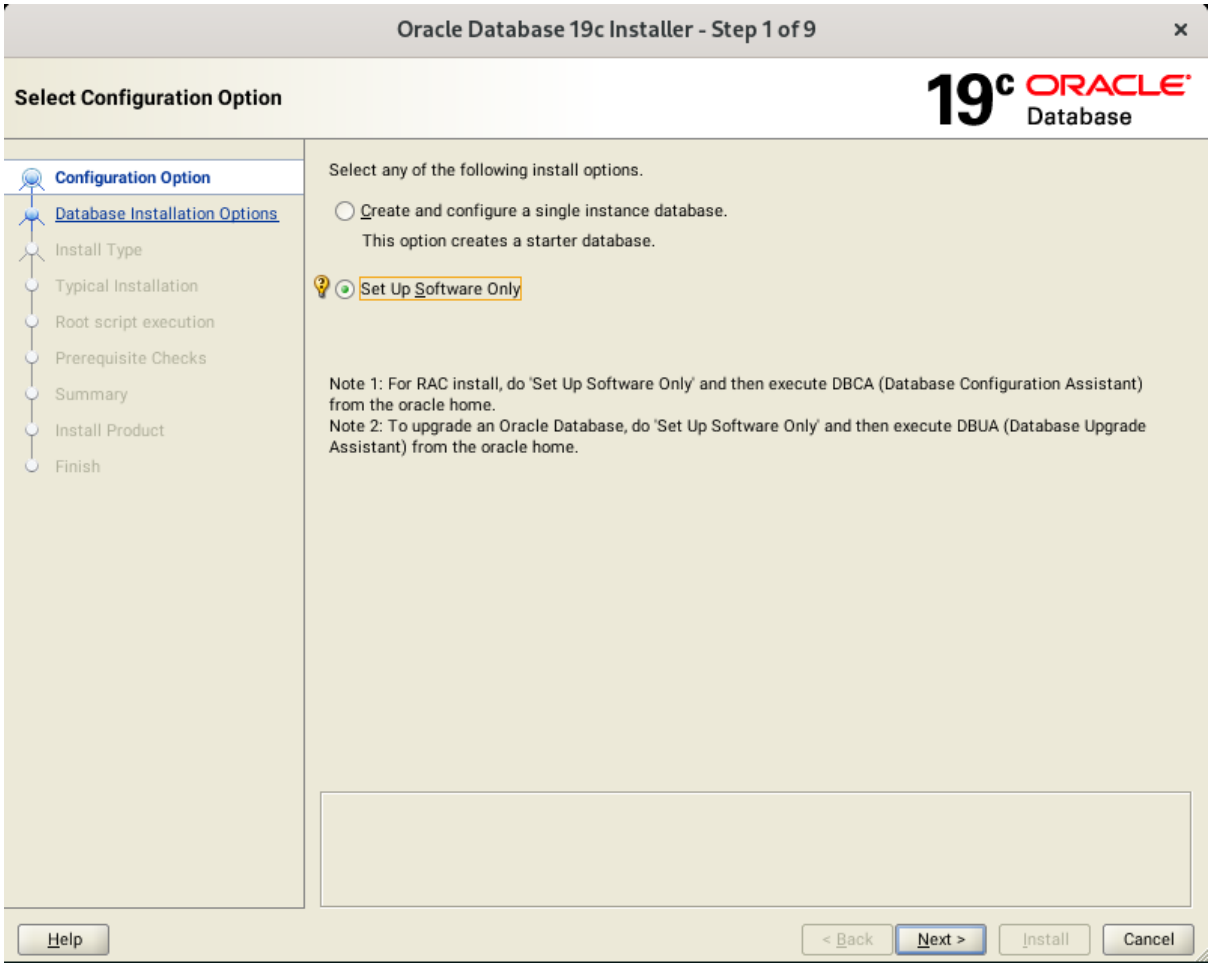
Then, run Oracle DB installer(runInstaller) from Database ShipHome with the parameters to apply the required patches:

-applyRU /home/ORACLE_SW/patch_RU_192400/36582629/36582781/
-applyOneOffs /home/ORACLE_SW/patch_RU_192400/36582629/36587798/

These parameters will apply the recommended 19.24.0.0.0 release updates (RUs) and one-off patches to the database.

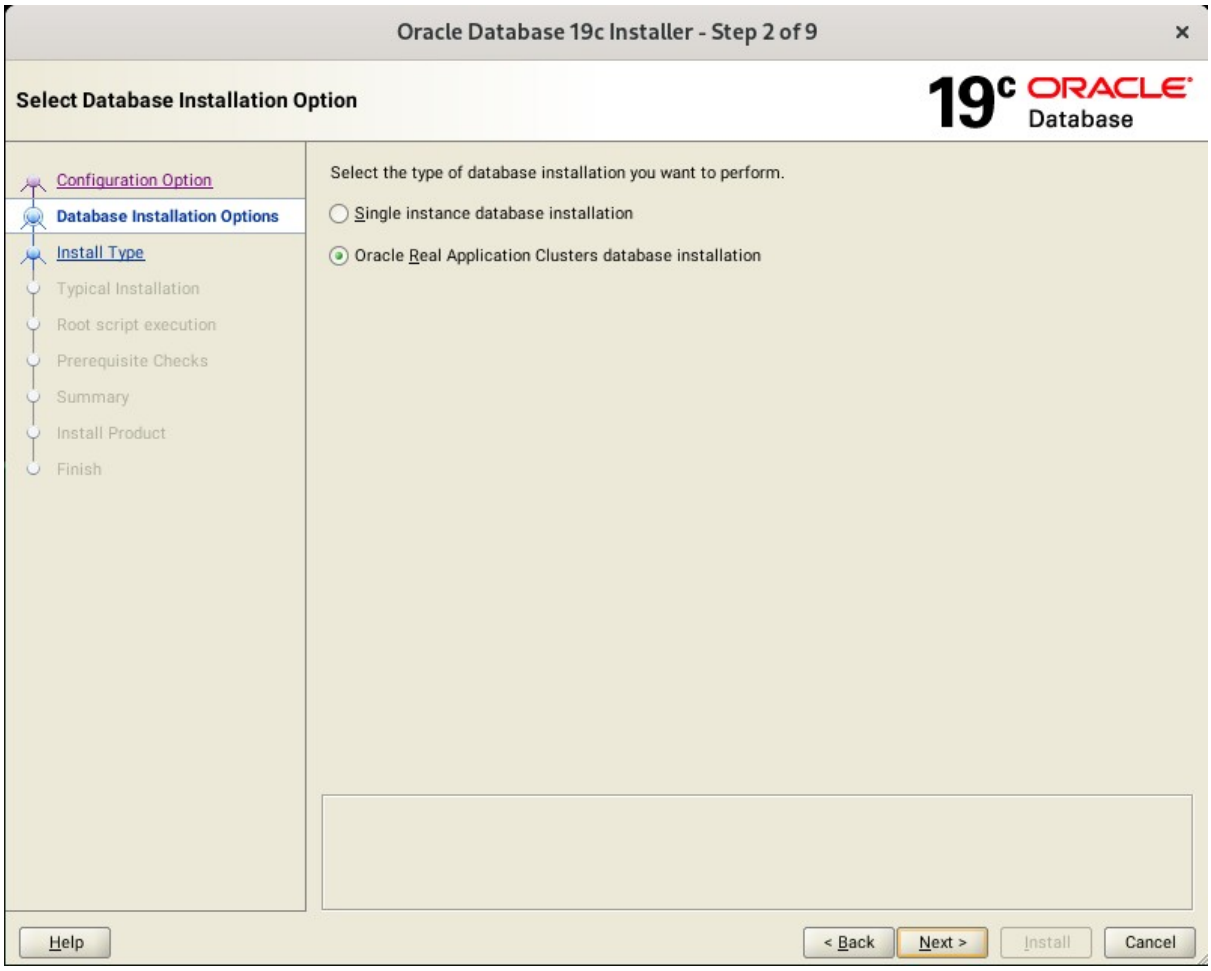
Install Flow:

1). Select Configuration Option.



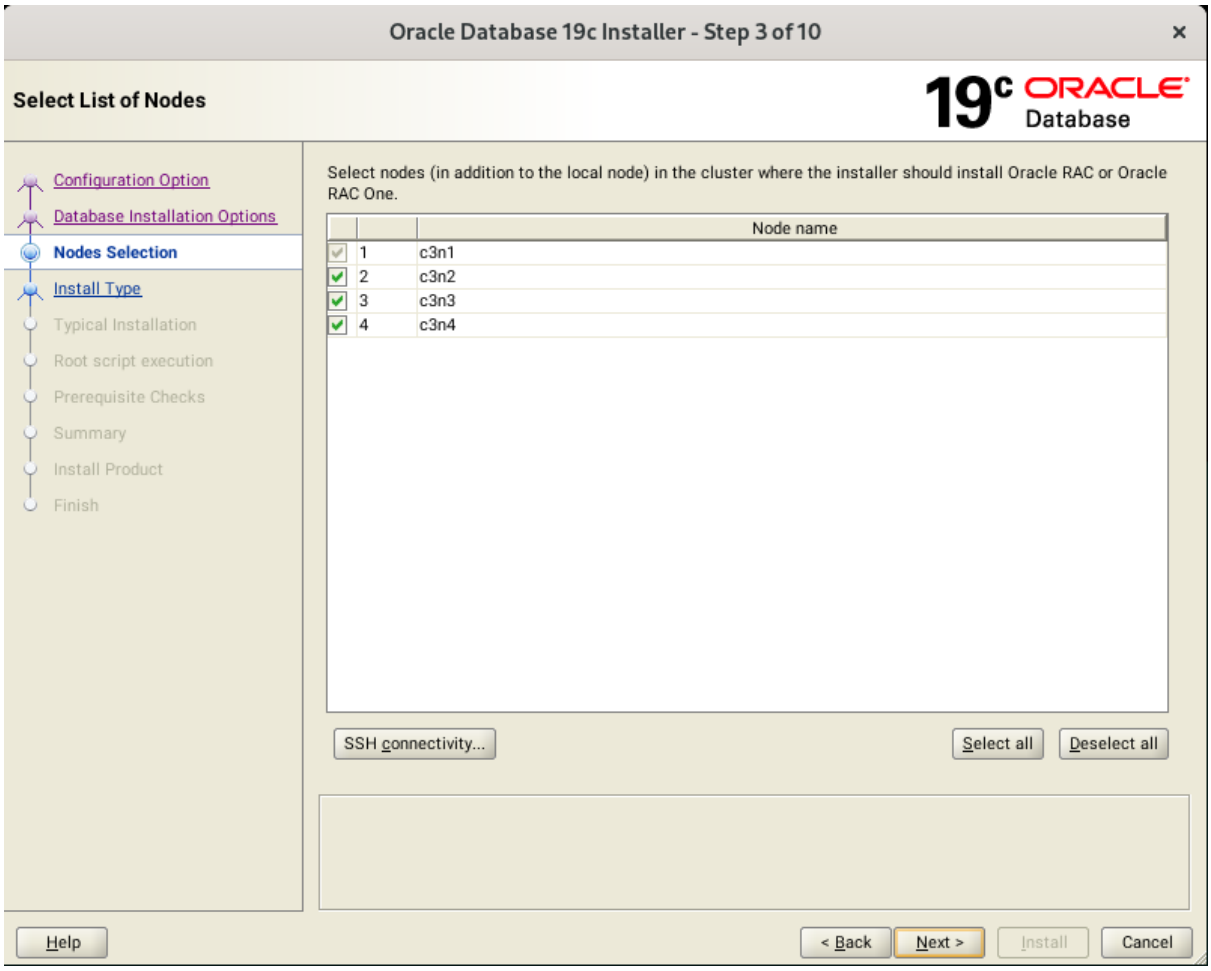
Select option "**Set Up Software Only**", then click **Next** to continue.

2). Select Database Installation Option.



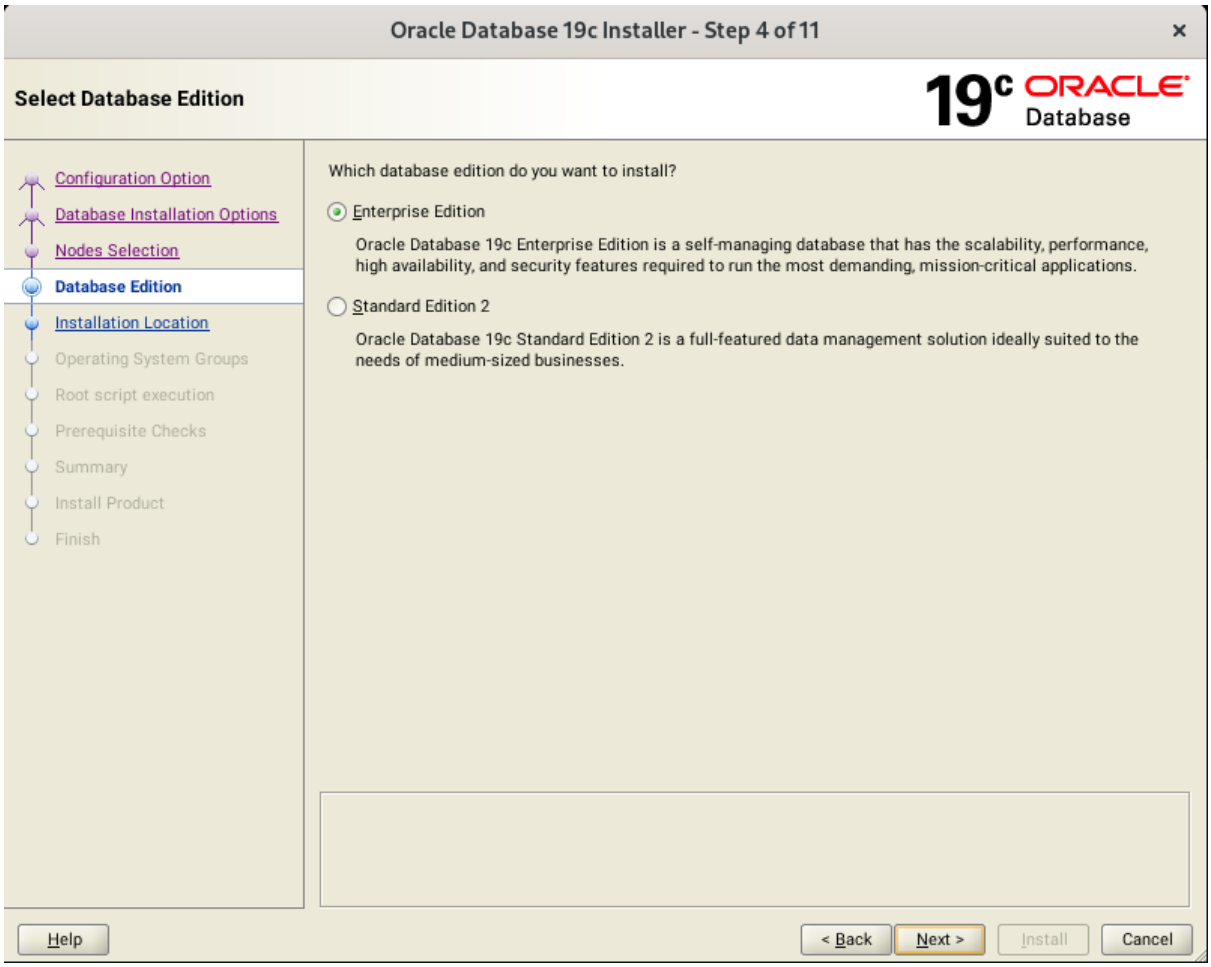
Choose option "**Oracle Real Application Clusters database installation**", then click **Next** to continue.

3). Select List of Nodes.



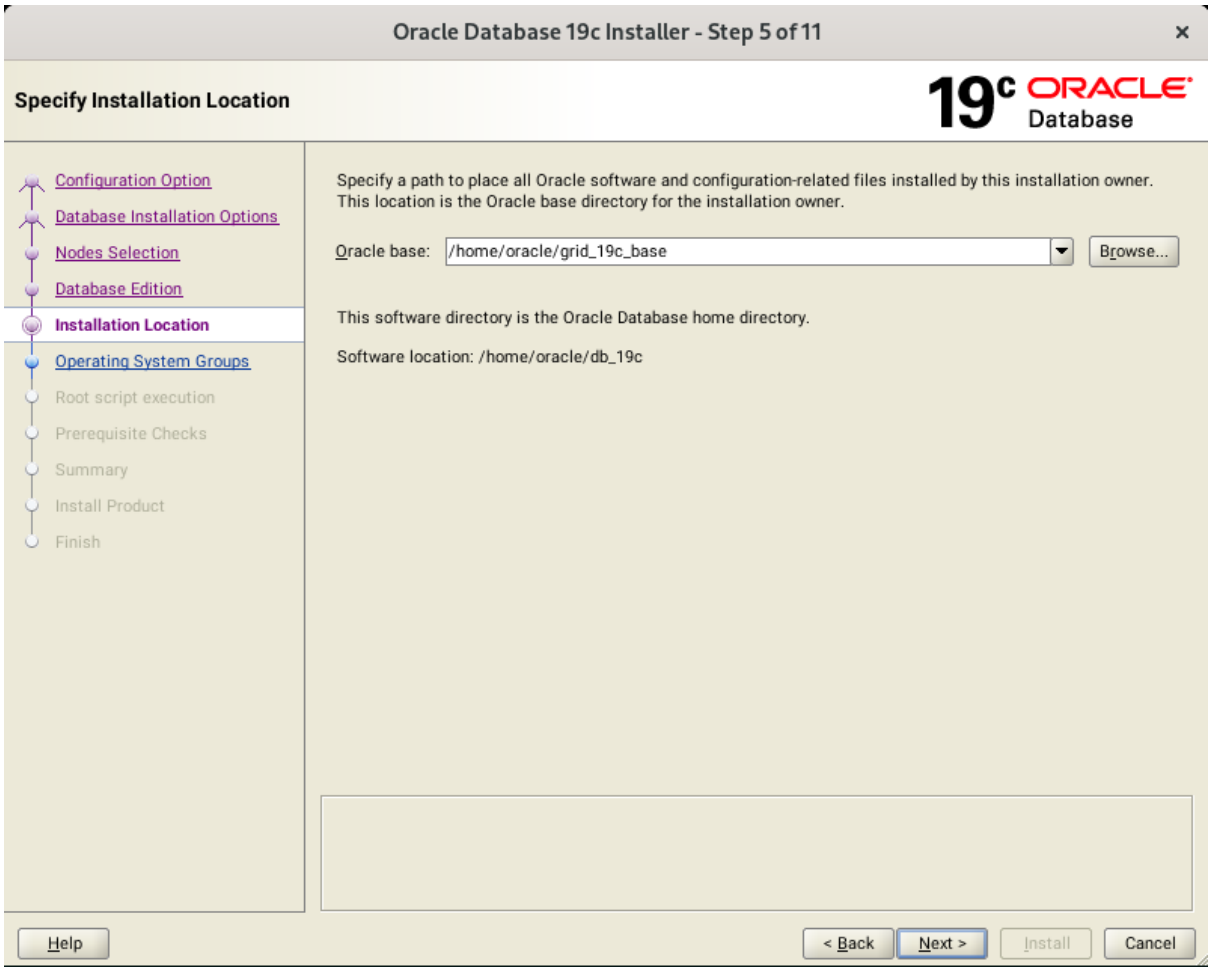
Select all nodes in the cluster, then click **Next** to continue.

4). Select Database Edition.



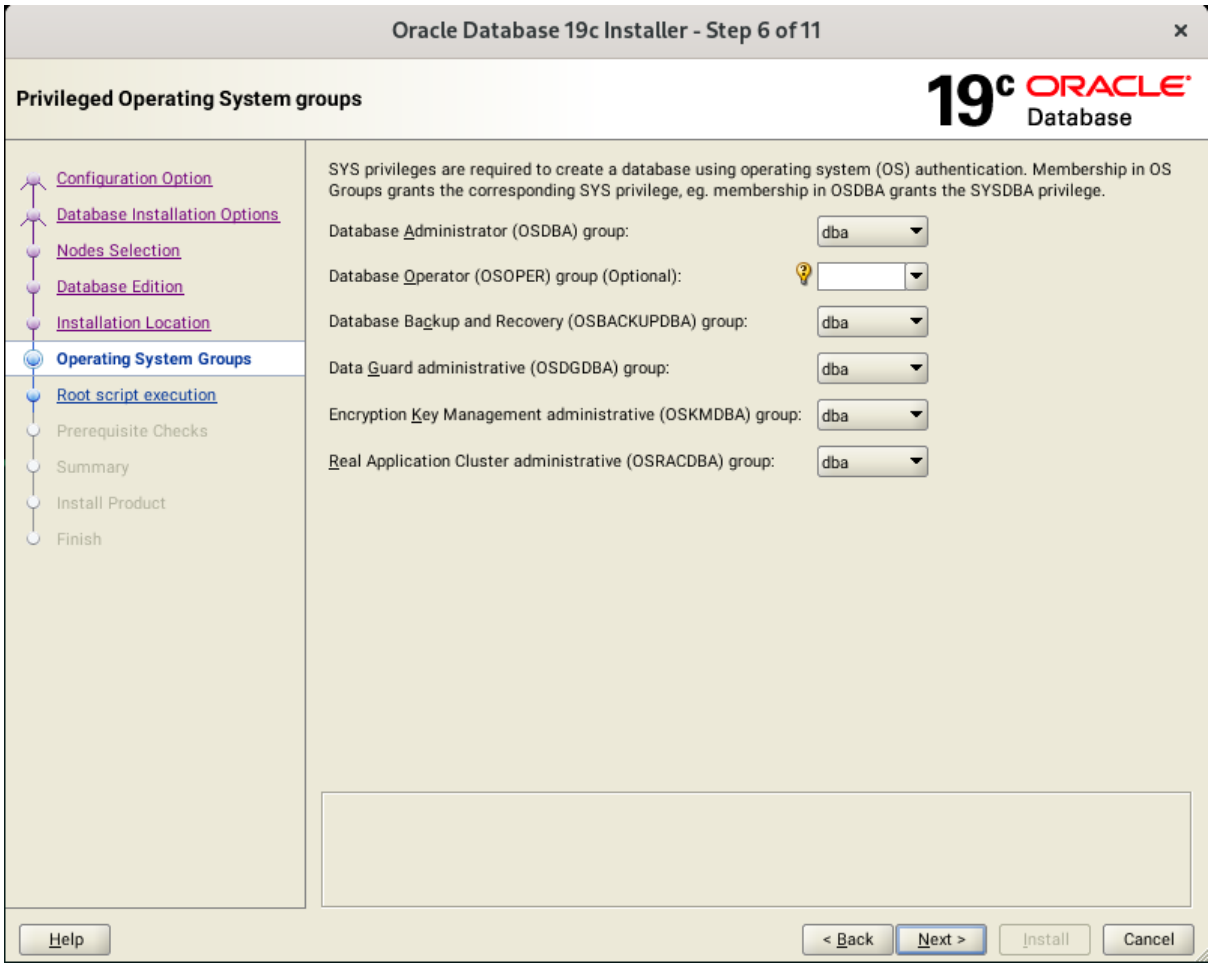
Choose option "**Enterprise Edition**", then click **Next** to continue.

5). Specify Installation Location.



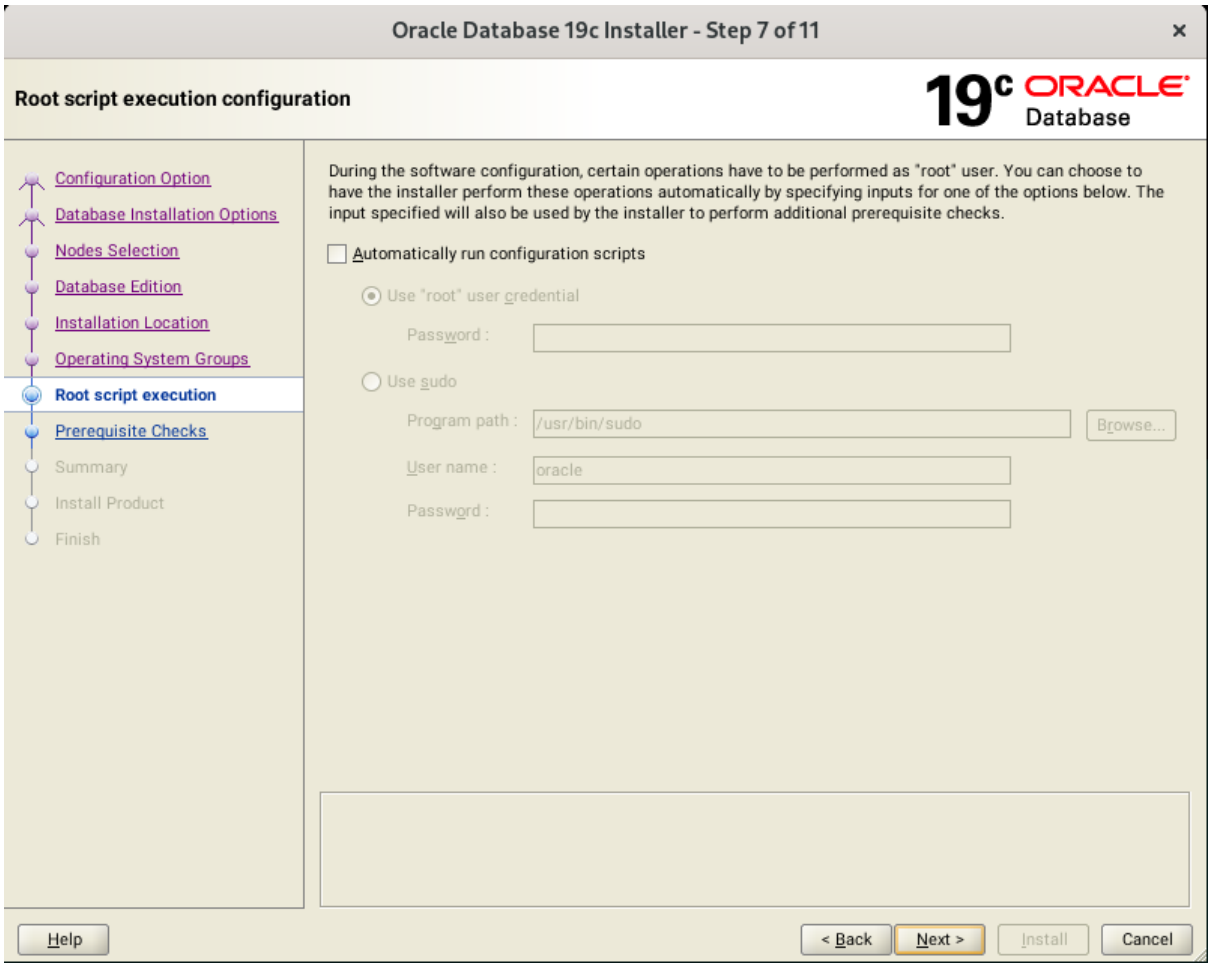
Fill in **Oracle base** as shown above, then click **Next** to continue.

6). Privileged Operating System groups.



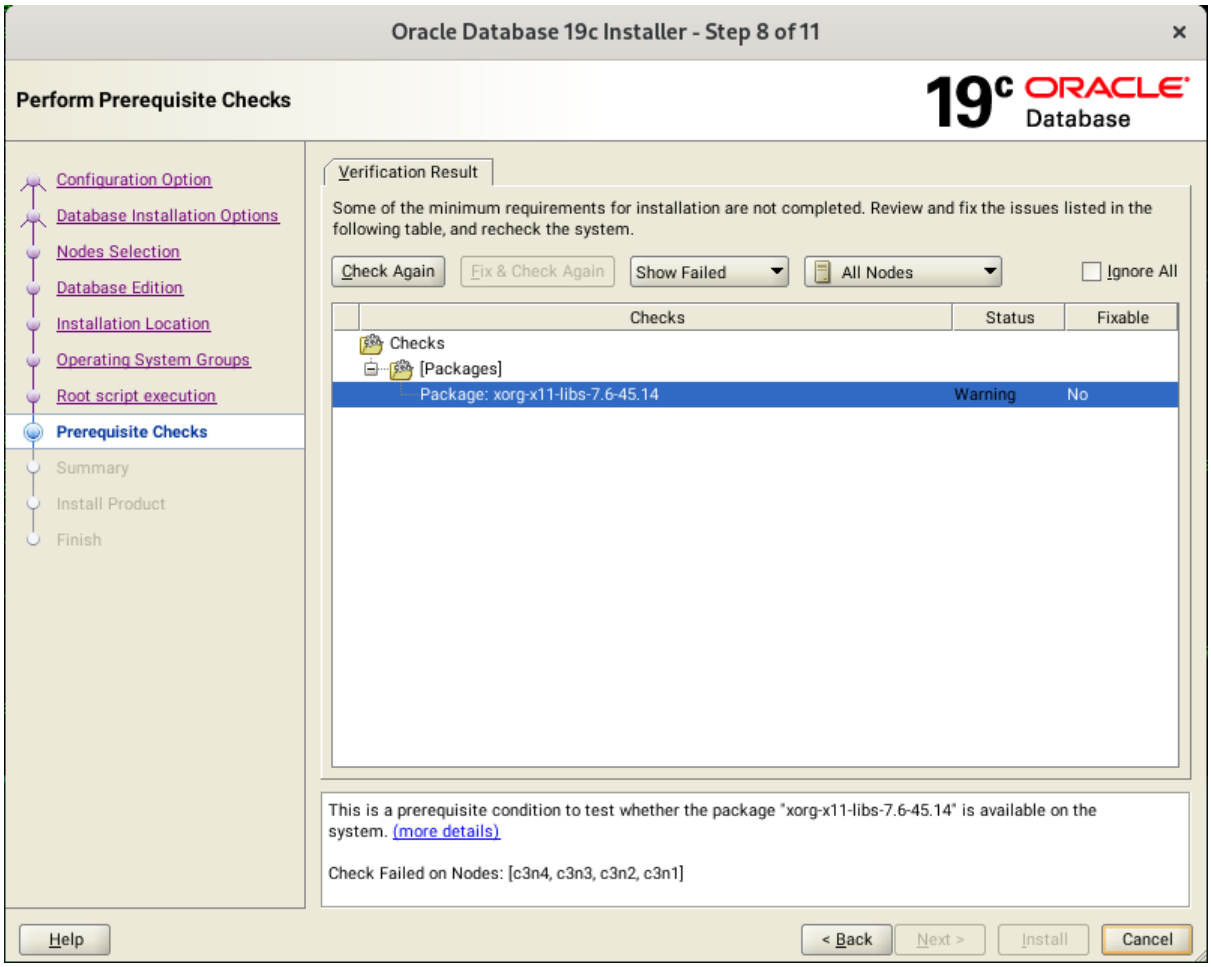
Selected by default, then click **Next** to continue.

7). Root script execution configuration.



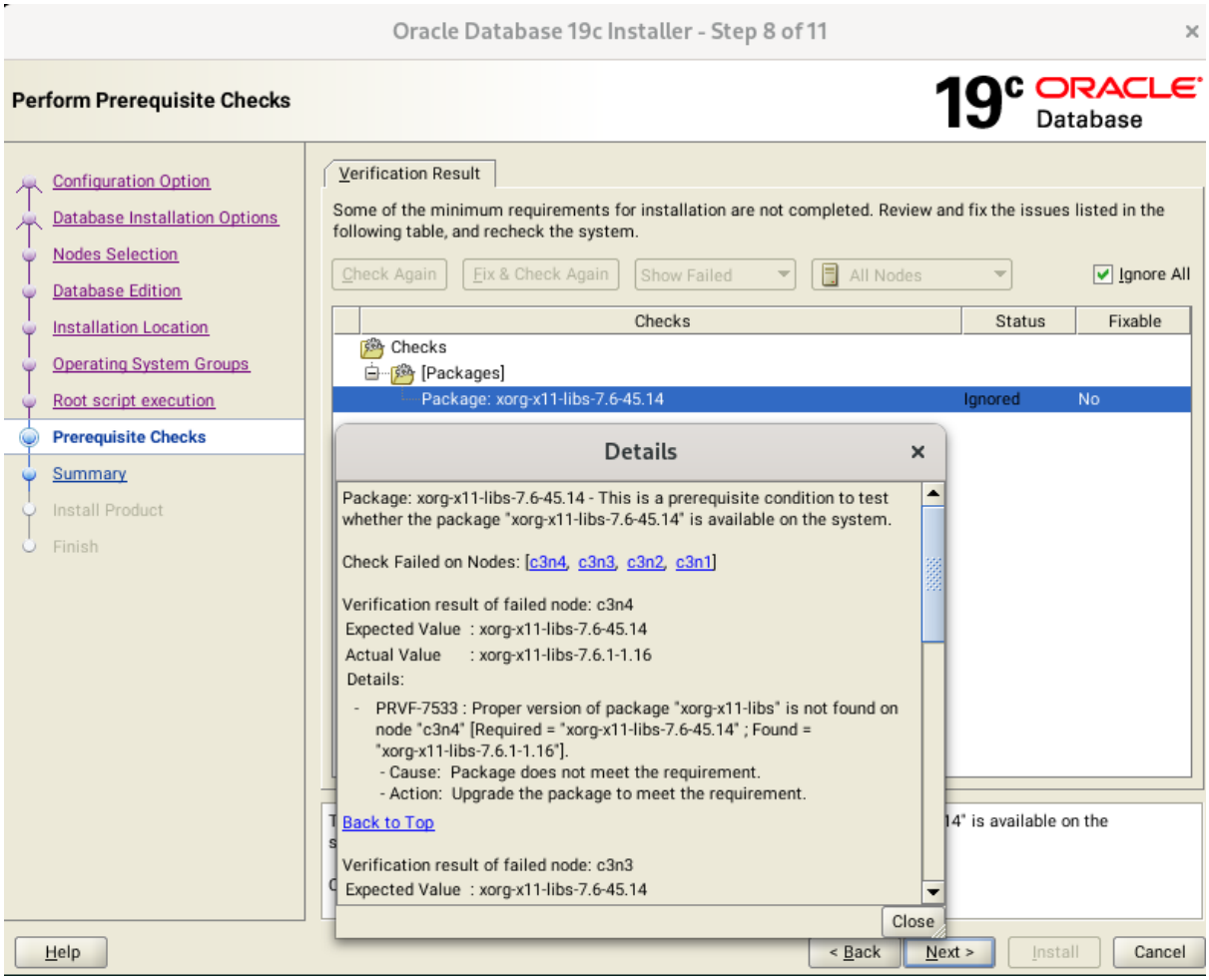
If select the option **Automatically run configuration scripts**, enter the credentials for the root user or a sudo account. Alternatively, run the scripts manually as the root user at the installation process when prompted by the installer. Click **Next** to continue.

8). Perform Prerequisite Checks.

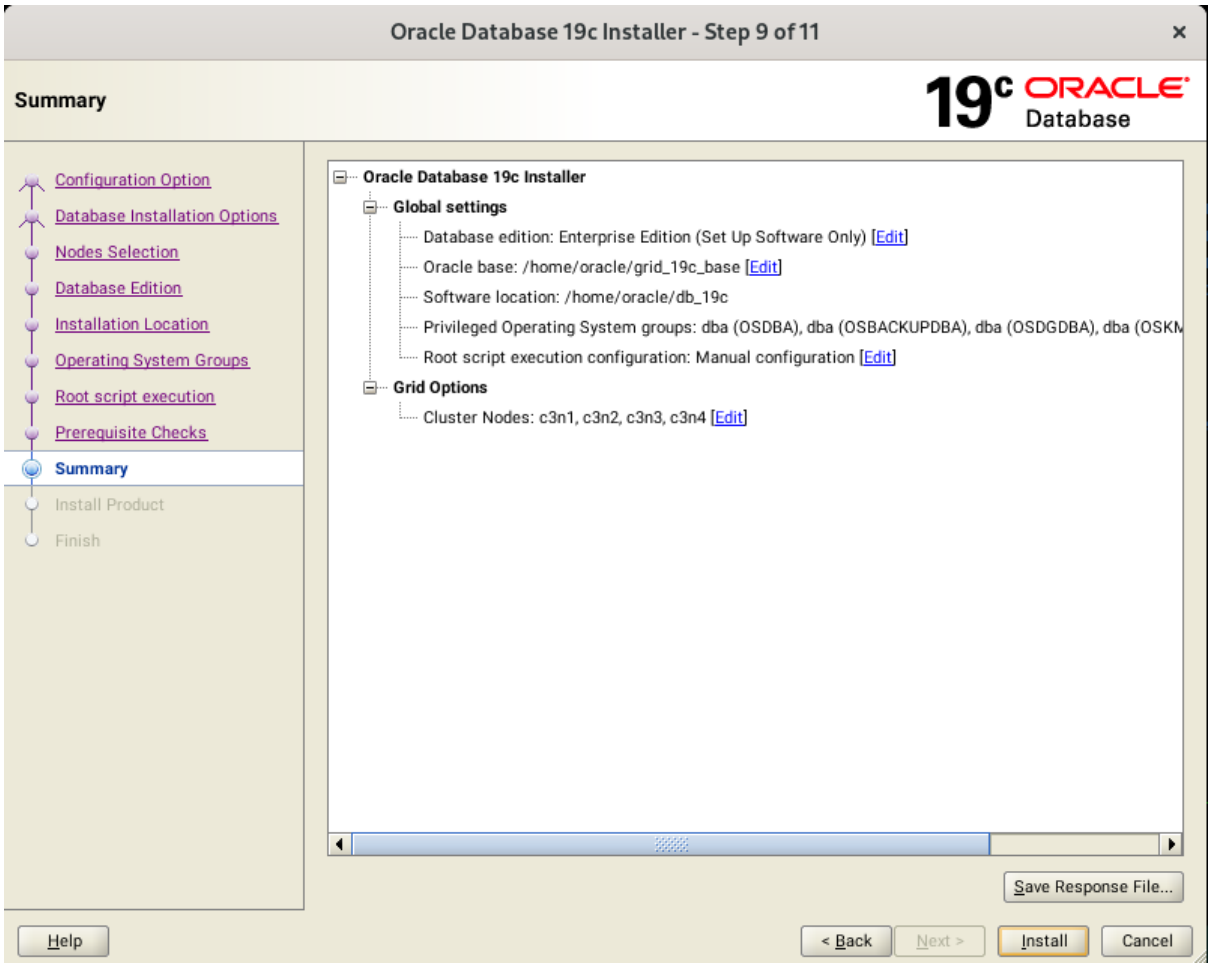


Perform Pre-Check as shown above. Resolve all the errors and warnings on all nodes in the cluster & run “**Fix & Check Again**”. If the “**Fix & check again**” button is not available, try to fix manually.

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

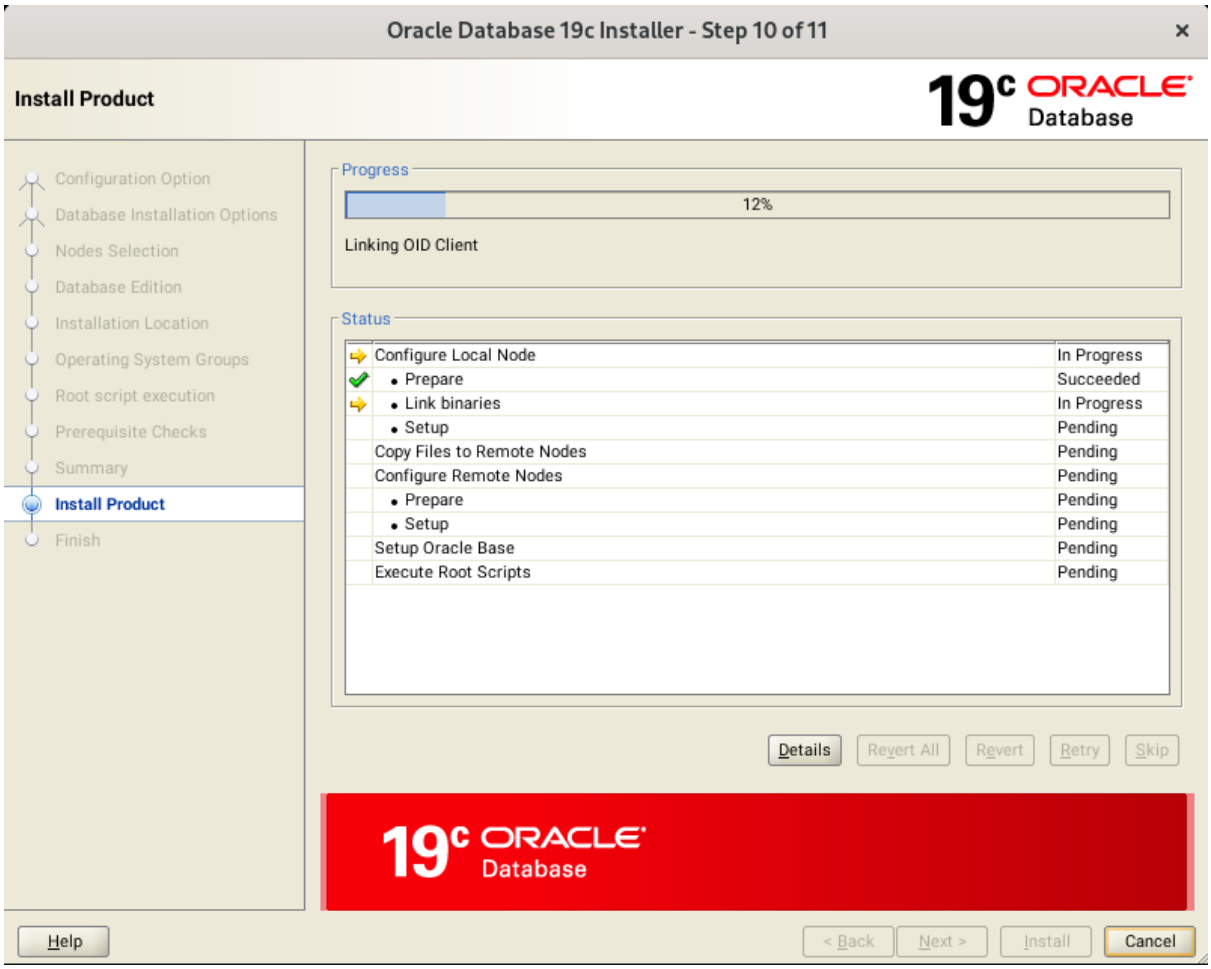


9). Summary.

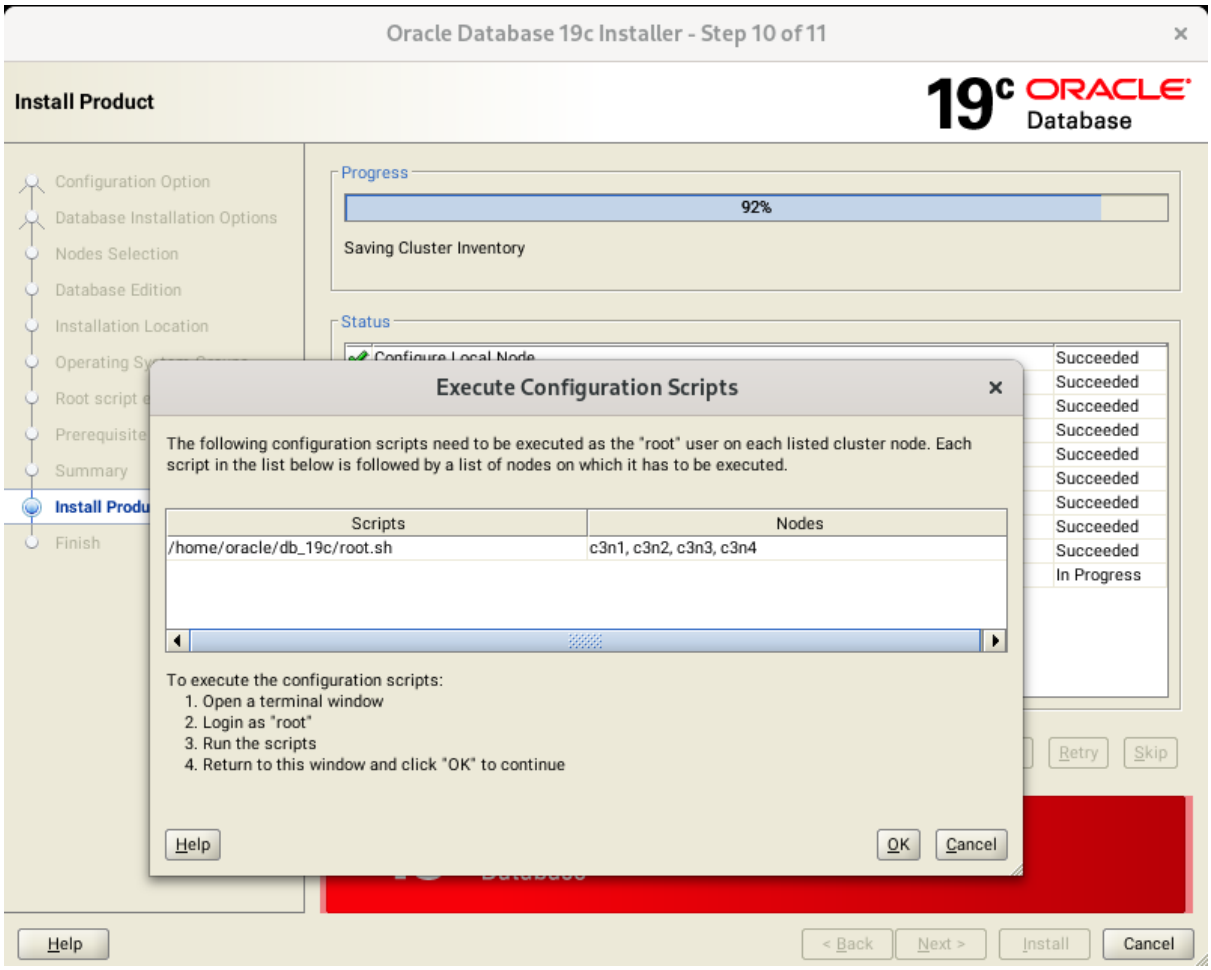


Installation Summary as shown above, click **Install** to continue.

10). Install Product.

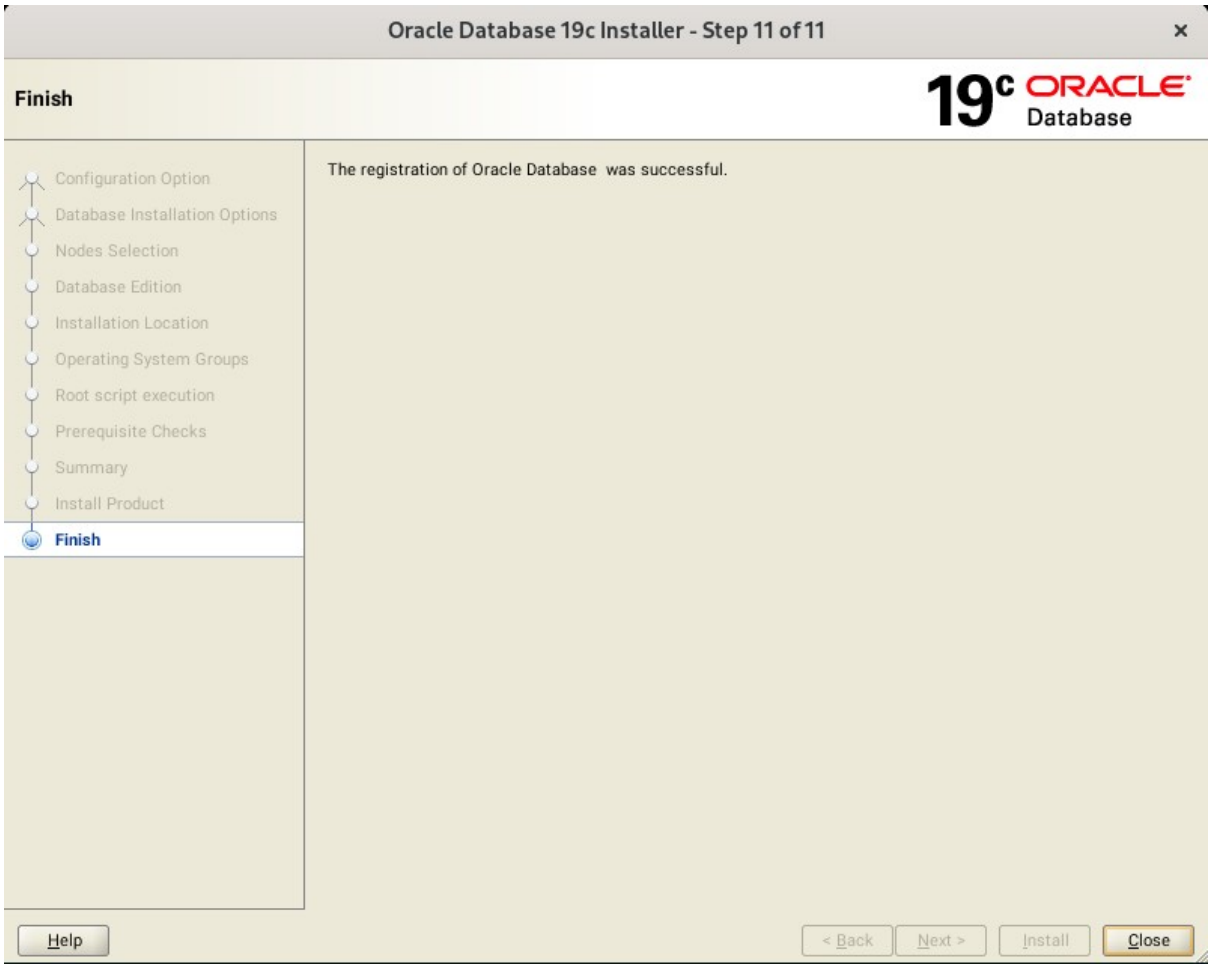


Installer prompted you to run the root.sh scripts.



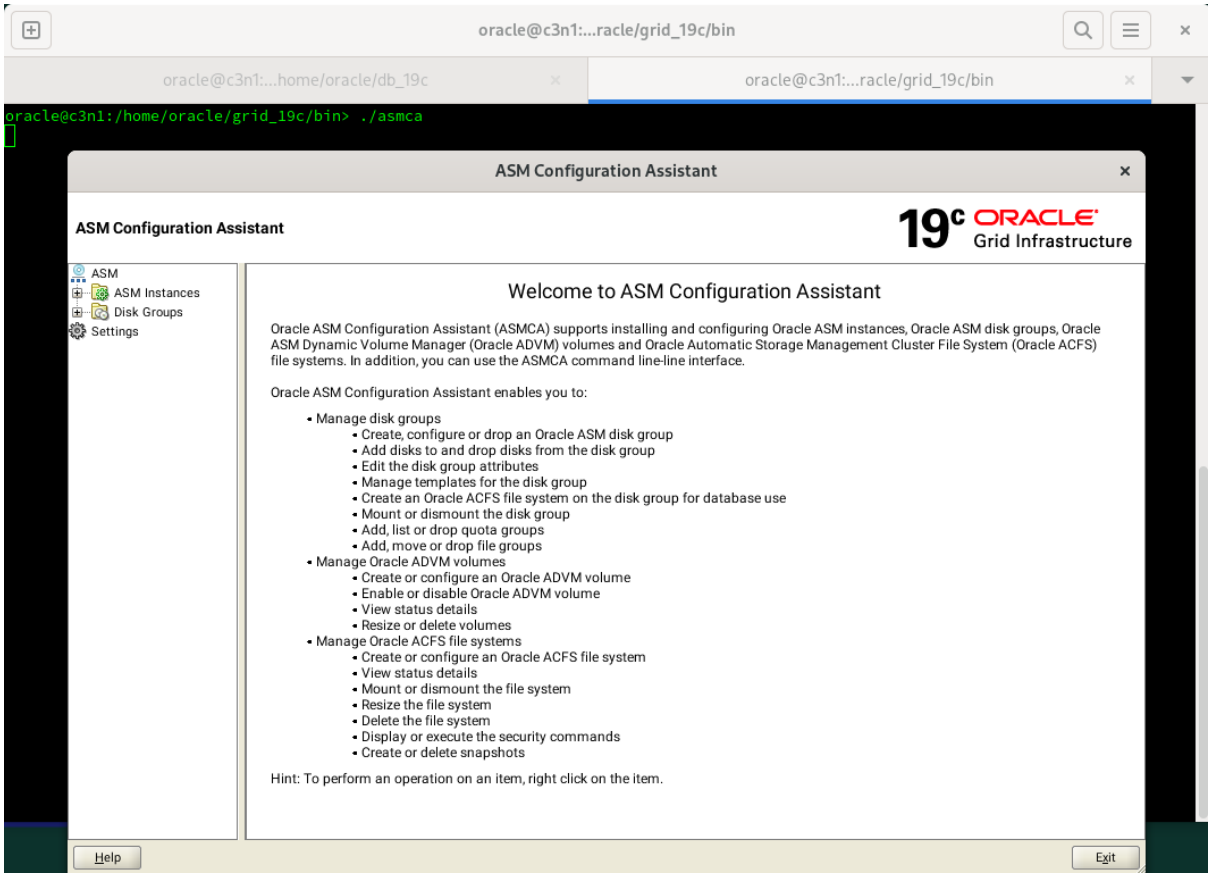
After successfully executing the above script on each node, click **OK** to continue. Monitoring the installation until the Finish window appears.

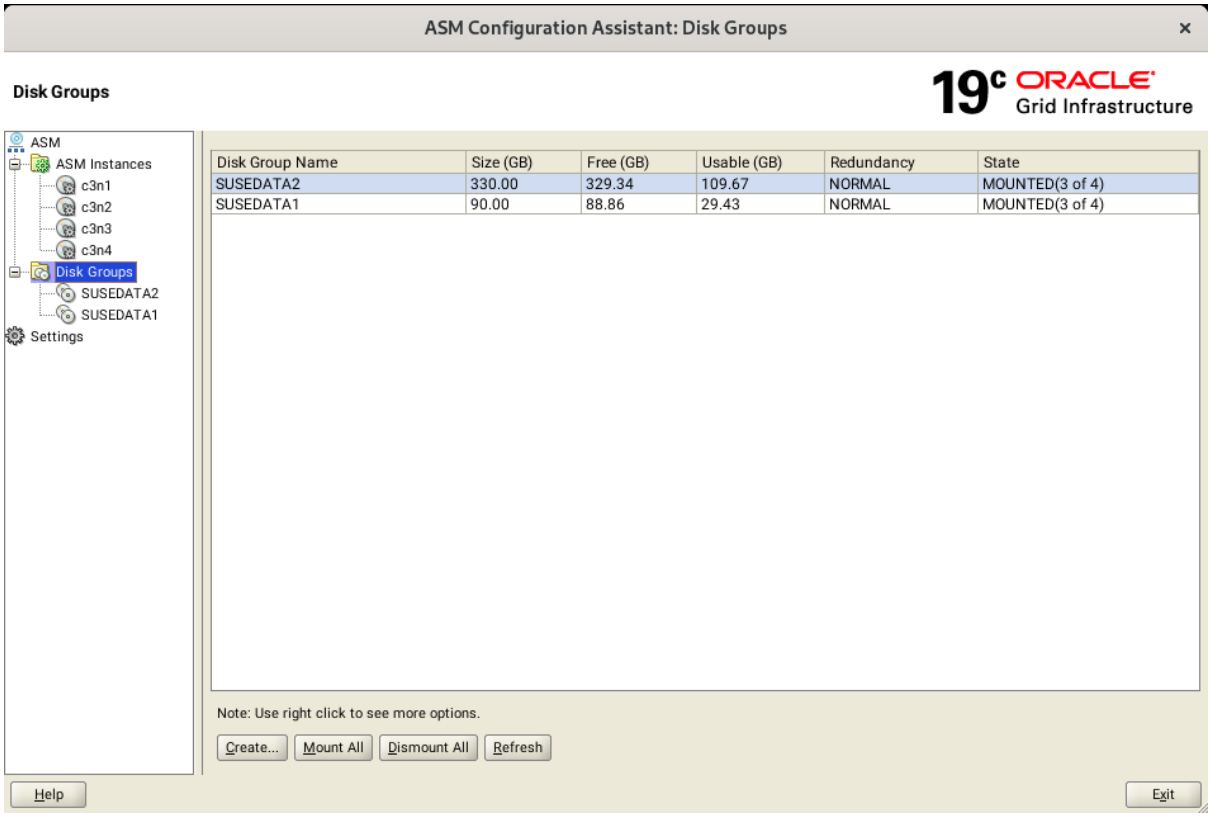
11). Finish



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

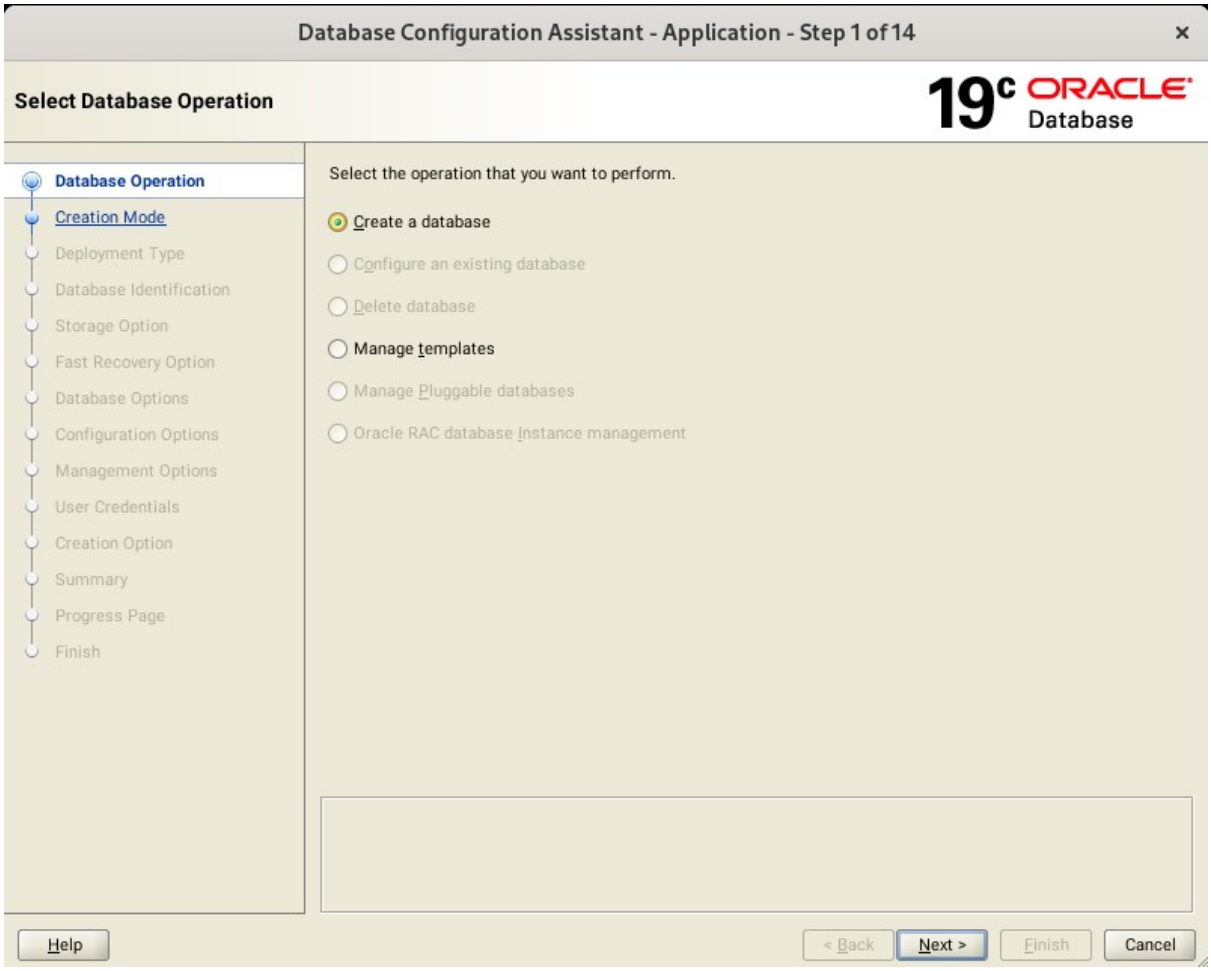
2-3. Using ASM Configuration Assistant to create ASM Disk Group for Database files.





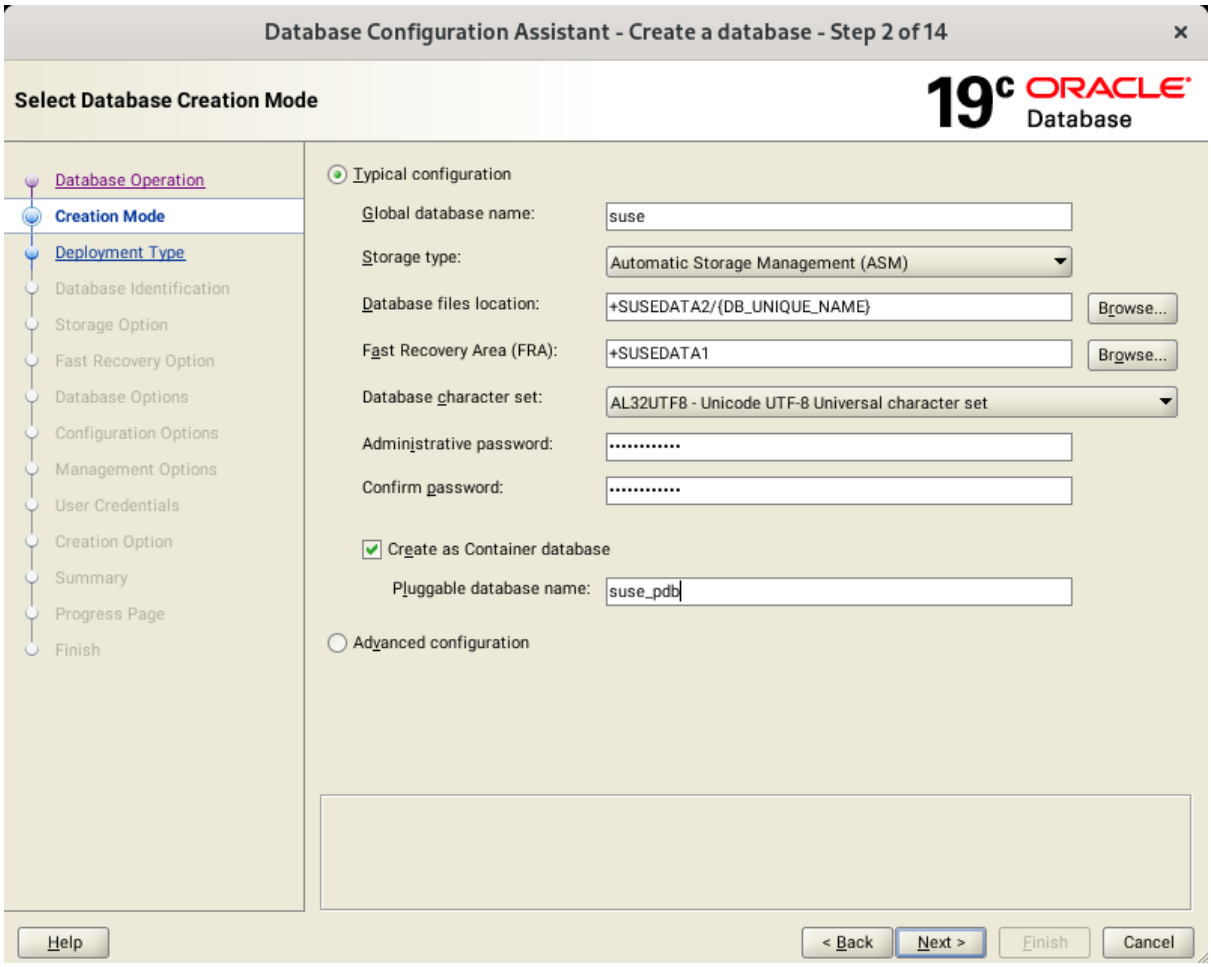
2-4. Using DBCA to create Oracle RAC DataBase.

1). Select Database Operation.



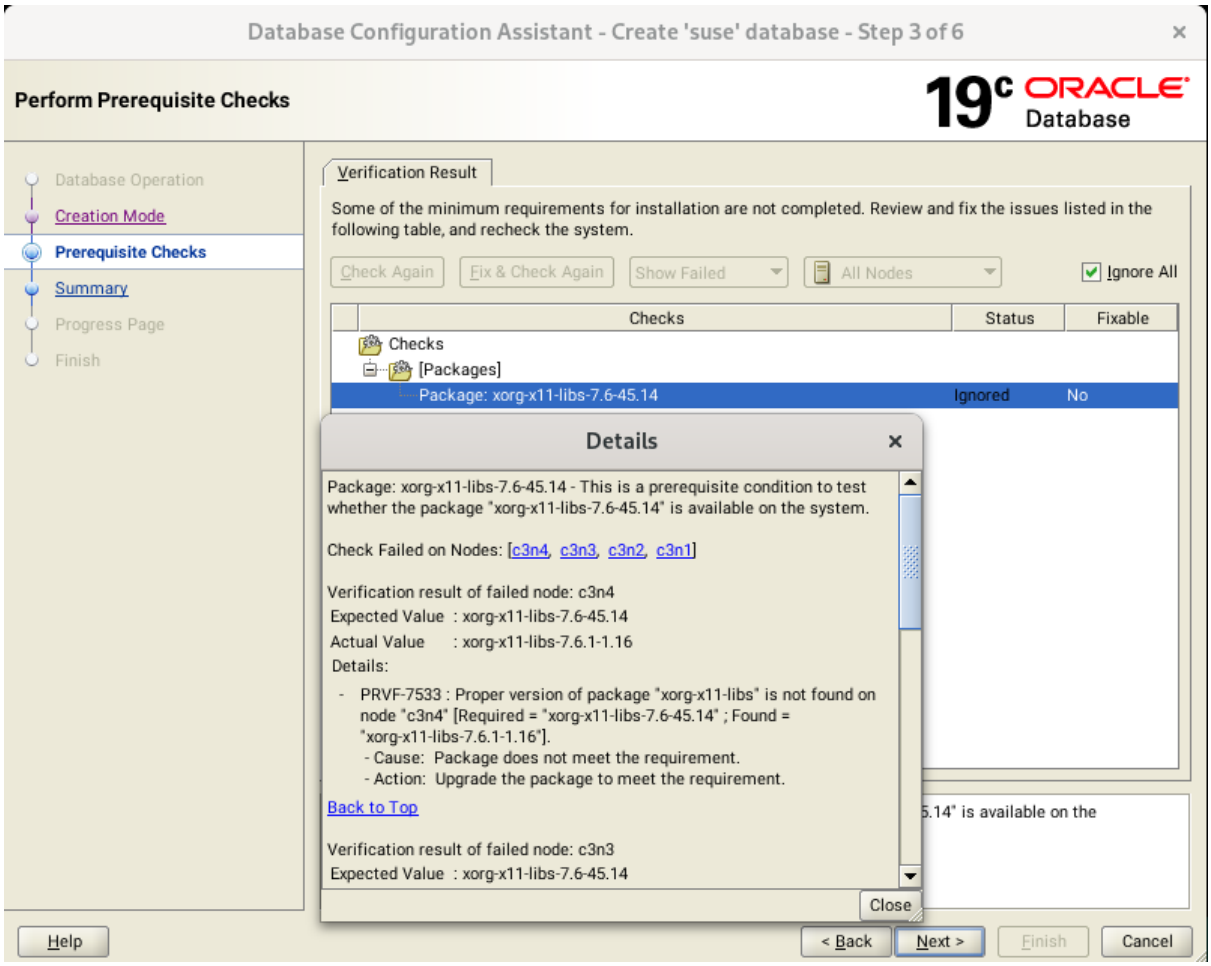
Select option "**Create a database**", then click **Next** to continue.

2). Select Database Creation Mode.



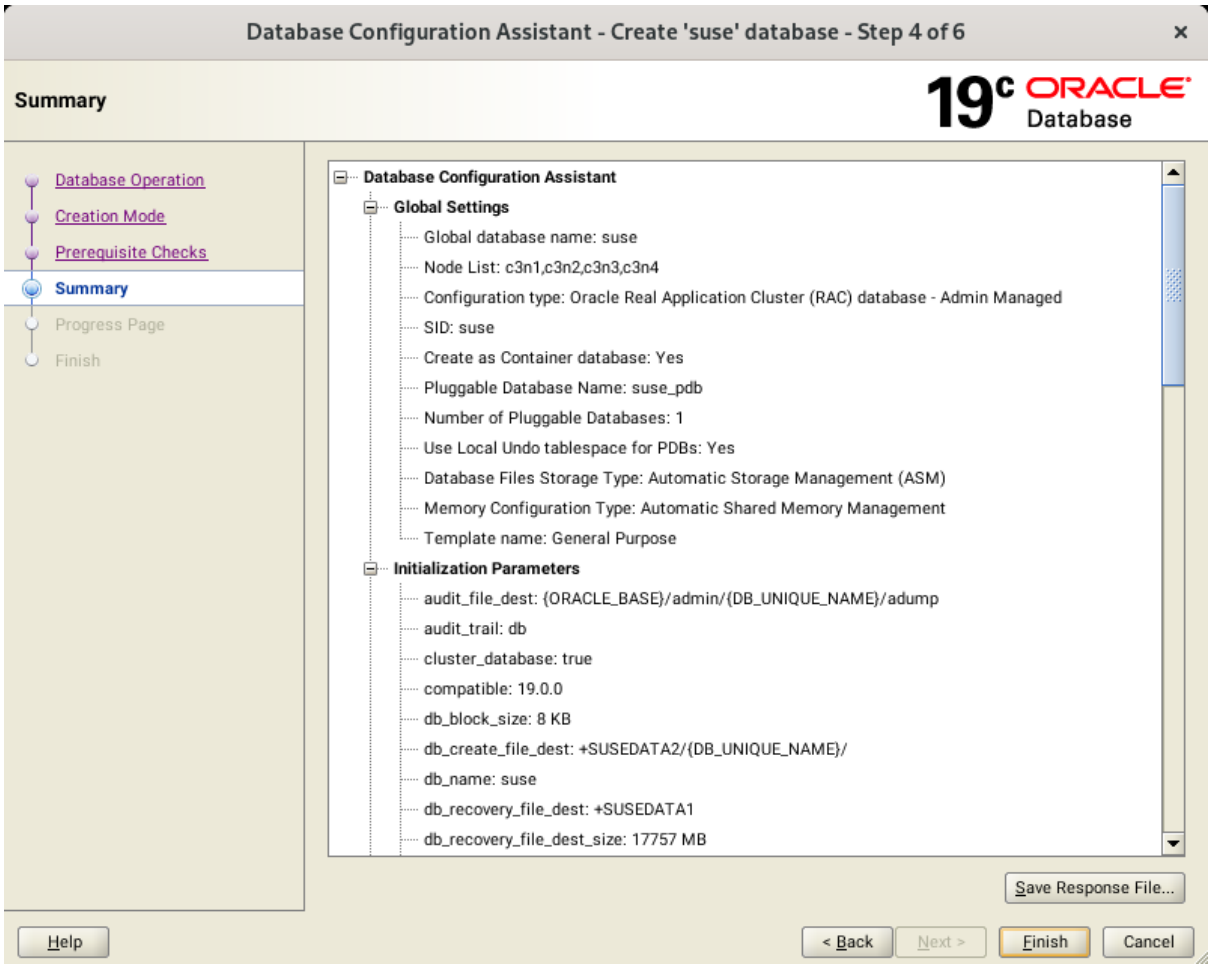
Select option "**Typical configuration**" and fill in administrator password. Then, click **Next** to continue.

3). Perform Prerequisite Checks.



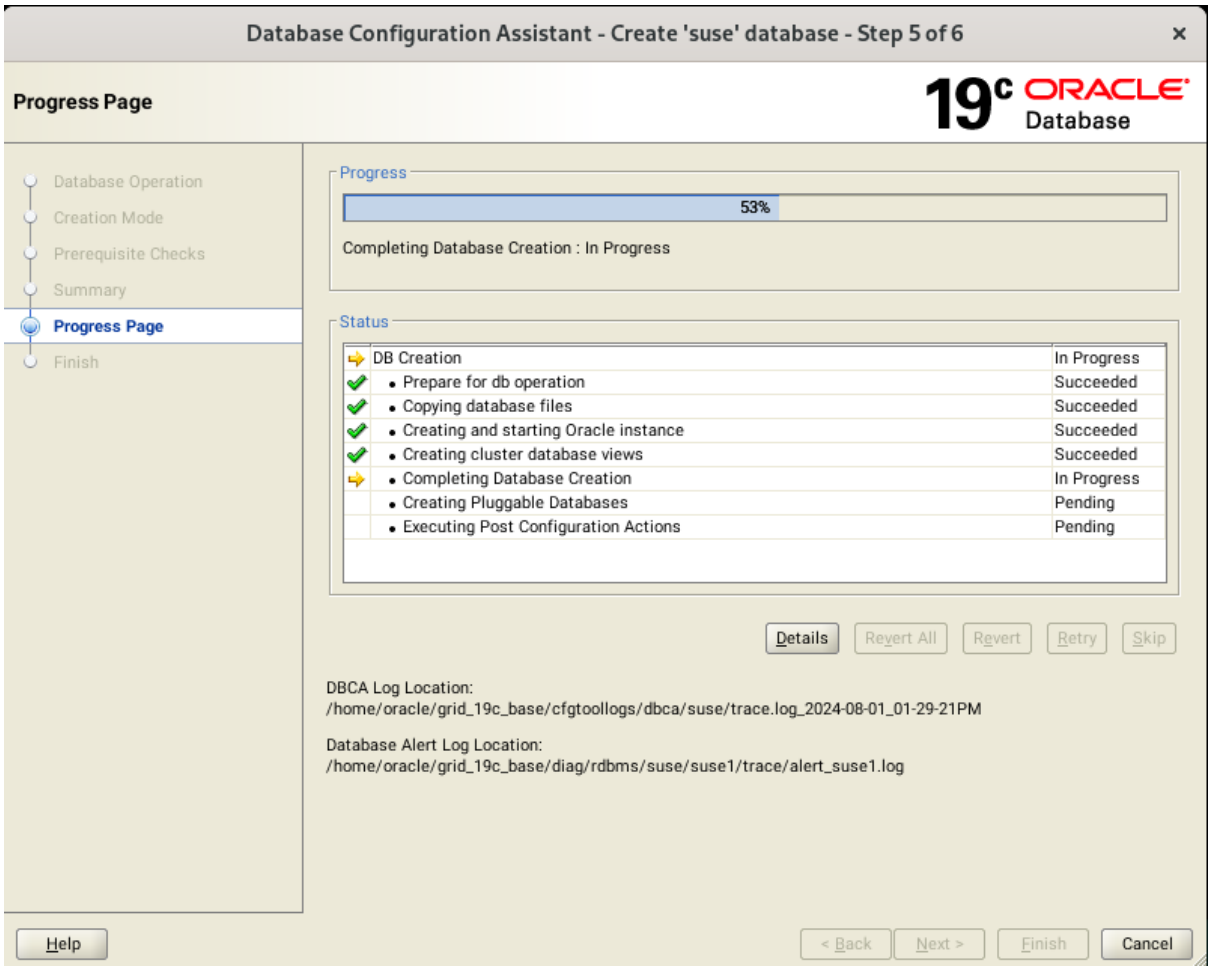
Perform Pre-Check as shown above. Select option "**Ignore All**", then click **Next** to continue.

4). Summary.



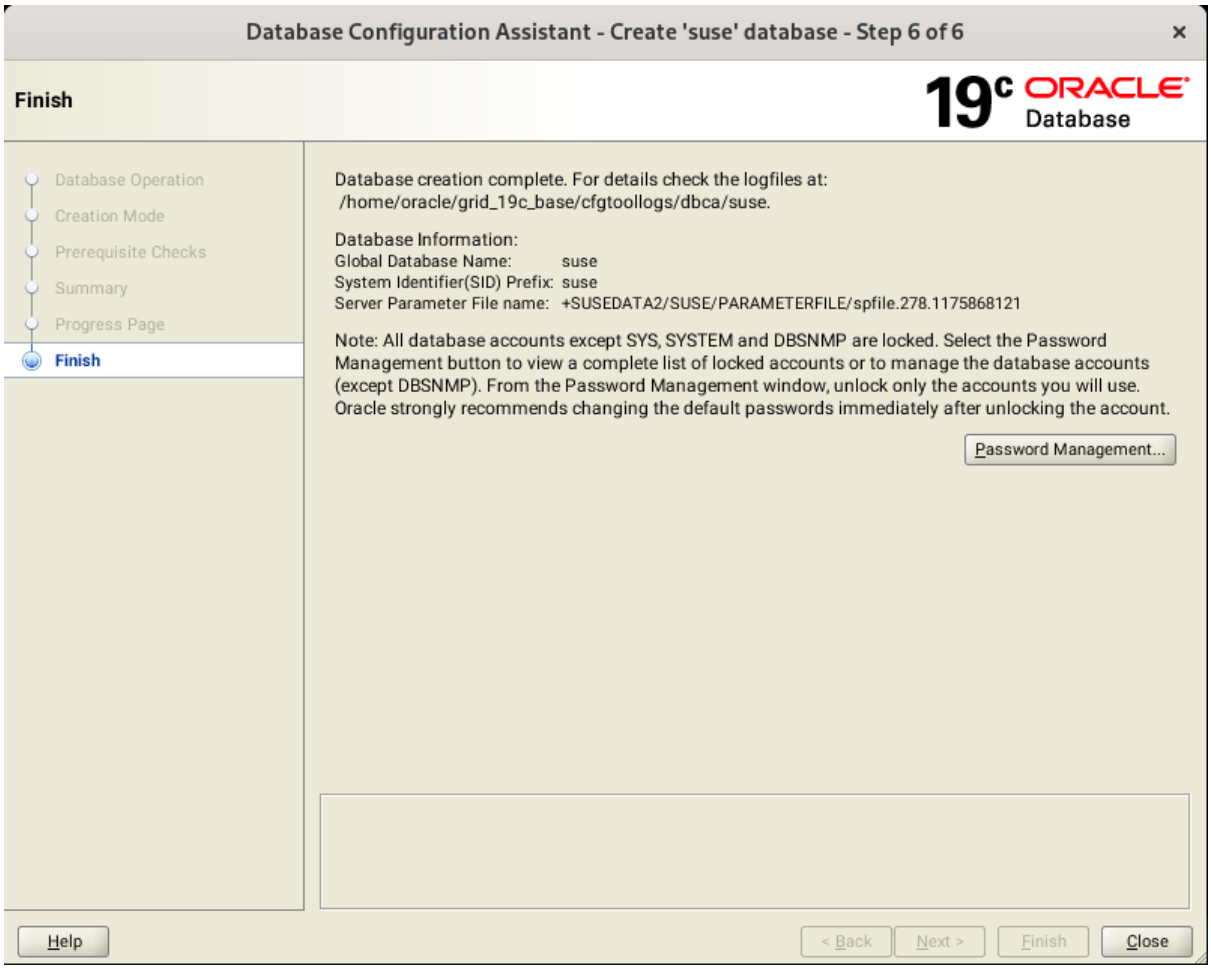
Database Configuration Summary as shown above, review the information, then click **Finish** to continue.

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(19.24.0.0.0) Post-Install Checks.

1). Checking database status and configuration.

```
oracle@c3n1:~> export ORACLE_HOME=/home/oracle/db_19c/
oracle@c3n1:~> /home/oracle/db_19c/bin/srvctl status database -d suse -a
Instance suse1 is running on node c3n1
Instance suse1 is connected to ASM instance +ASM1
Instance suse2 is running on node c3n2
Instance suse2 is connected to ASM instance +ASM2
Instance suse3 is running on node c3n3
Instance suse3 is connected to ASM instance +ASM3
Instance suse4 is running on node c3n4
Instance suse4 is connected to ASM instance +ASM3
oracle@c3n1:~> /home/oracle/db_19c/bin/srvctl config database -d suse -a
Database unique name: suse
Database name: suse
Oracle home: /home/oracle/db_19c
Oracle user: oracle
Spfile: +SUSEDATA2/SUSE/PARAMETERFILE/spfile.278.1175868121
Password file: +SUSEDATA2/SUSE/PASSWORD/pwdsuse.256.1175866793
Domain:
Start options: open
Stop options: immediate
Database role: PRIMARY
Management policy: AUTOMATIC
Server pools:
Disk Groups: SUSEDATA1,SUSEDATA2
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: suse1,suse2,suse3,suse4
Configured nodes: c3n1,c3n2,c3n3,c3n4
CSS critical: no
CPU count: 0
Memory target: 0
Maximum memory: 0
Default network number for database services:
Database is administrator managed
oracle@c3n1:~>
```

2-6. Oracle RAC 19c(19.24.0.0.0) Post-Install Checks.

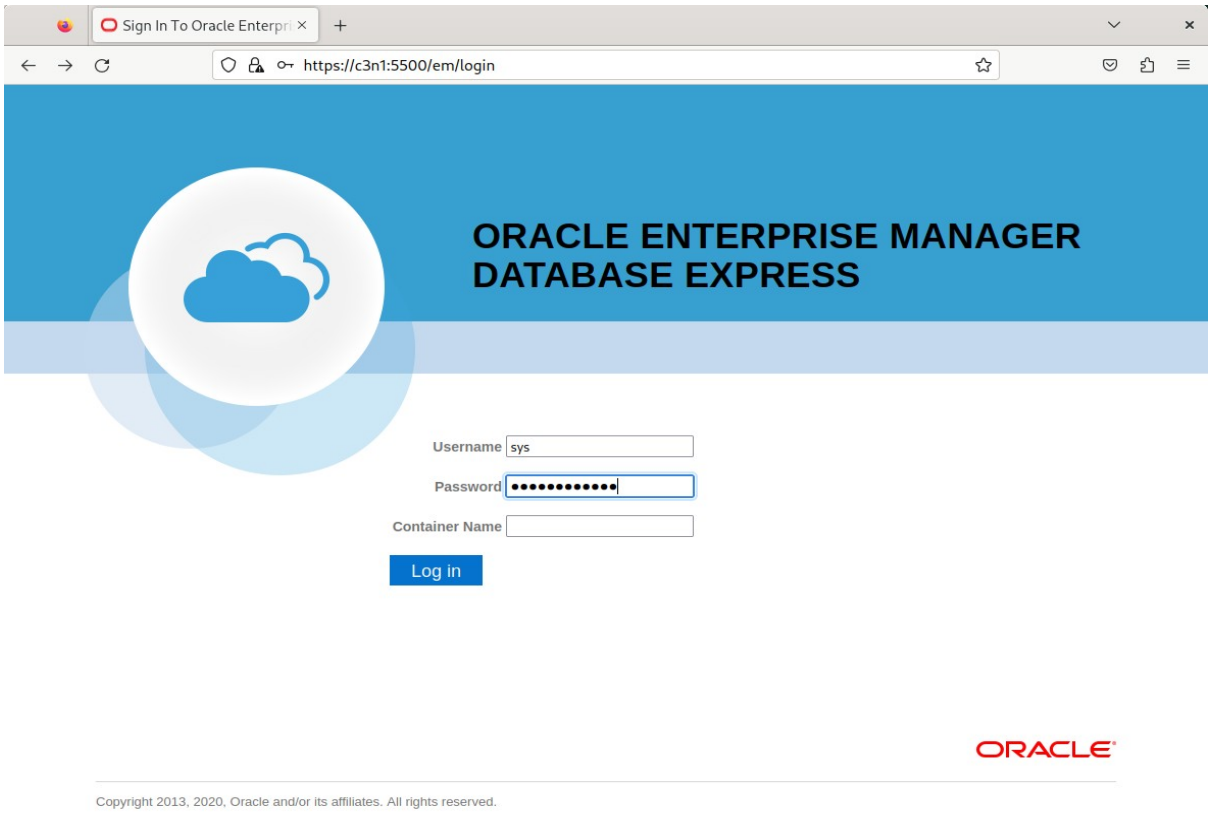
1). Checking Oracle RAC status and resources.

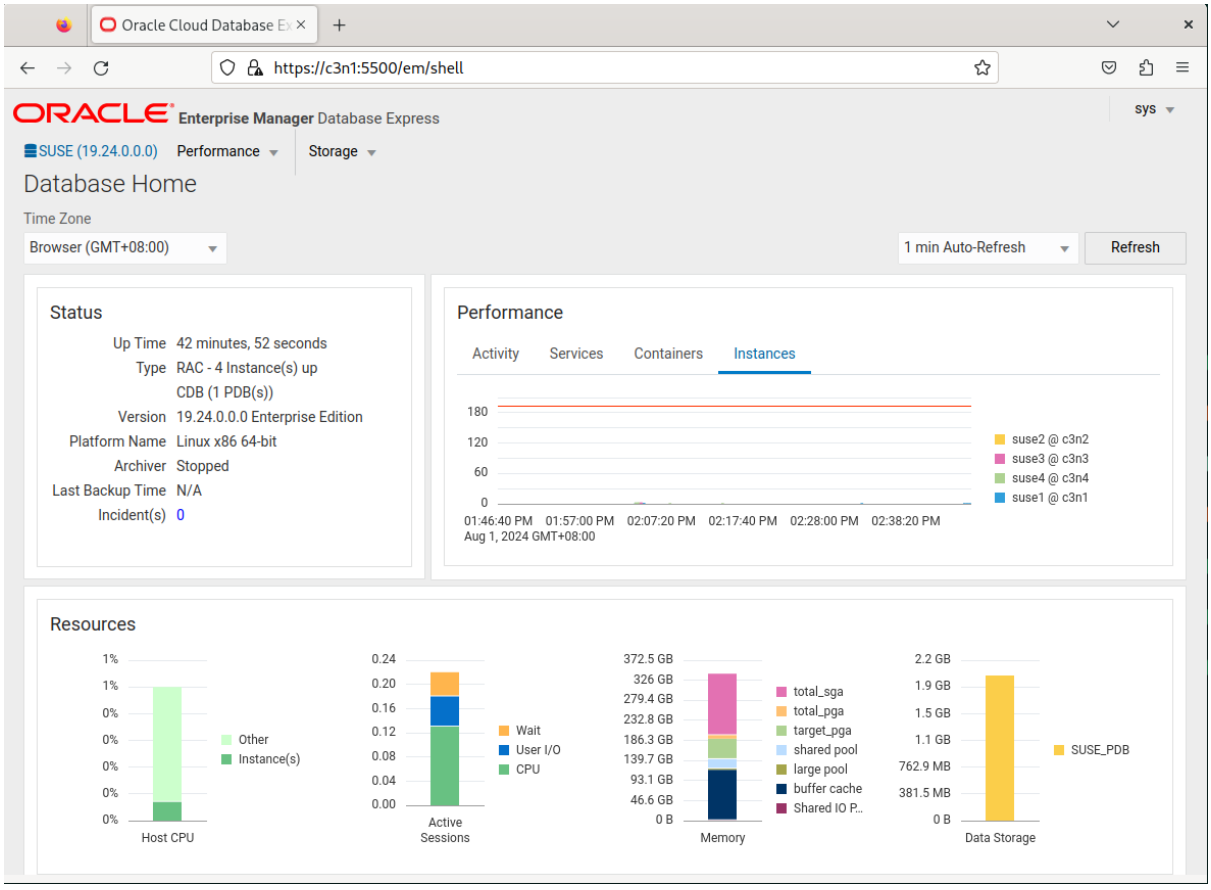
```
oracle@c3n1:~> /home/oracle/grid_19c/bin/crsctl check cluster -all
**************************************************************
c3n1:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
c3n2:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
c3n3:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
c3n4:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
oracle@c3n1:~> /home/oracle/grid_19c/bin/srvctl status nodeapps
VIP 10.200.176.15 is enabled
VIP 10.200.176.15 is running on node: c3n1
VIP 10.200.176.16 is enabled
VIP 10.200.176.16 is running on node: c3n2
VIP 10.200.176.17 is enabled
VIP 10.200.176.17 is running on node: c3n3
VIP 10.200.176.18 is enabled
VIP 10.200.176.18 is running on node: c3n4
Network is enabled
Network is running on node: c3n1
Network is running on node: c3n2
Network is running on node: c3n3
Network is running on node: c3n4
ONS is enabled
ONS daemon is running on node: c3n1
ONS daemon is running on node: c3n2
ONS daemon is running on node: c3n3
ONS daemon is running on node: c3n4
oracle@c3n1:~>
```

```
oracle@c3n1:~> /home/oracle/grid_19c/bin/crsctl stat res -t
--------------------------------------------------------------------------------
Name           Target  State        Server                   State details
--------------------------------------------------------------------------------
Local Resources
--------------------------------------------------------------------------------
ora.LISTENER.lsnr
               ONLINE  ONLINE       c3n1                     STABLE
               ONLINE  ONLINE       c3n2                     STABLE
               ONLINE  ONLINE       c3n3                     STABLE
               ONLINE  ONLINE       c3n4                     STABLE
ora.chad
               ONLINE  ONLINE       c3n1                     STABLE
               ONLINE  ONLINE       c3n2                     STABLE
               ONLINE  ONLINE       c3n3                     STABLE
               ONLINE  ONLINE       c3n4                     STABLE
ora.net1.network
               ONLINE  ONLINE       c3n1                     STABLE
               ONLINE  ONLINE       c3n2                     STABLE
               ONLINE  ONLINE       c3n3                     STABLE
               ONLINE  ONLINE       c3n4                     STABLE
ora.ons
               ONLINE  ONLINE       c3n1                     STABLE
               ONLINE  ONLINE       c3n2                     STABLE
               ONLINE  ONLINE       c3n3                     STABLE
               ONLINE  ONLINE       c3n4                     STABLE
--------------------------------------------------------------------------------
```

```
Cluster Resources
--------------------------------------------------------------------------------
ora.ASMNET1LSNR_ASM.lsnr(ora.asmgroup)
      1        ONLINE  ONLINE       c3n1                     STABLE
      2        ONLINE  ONLINE       c3n2                     STABLE
      3        ONLINE  ONLINE       c3n3                     STABLE
ora.LISTENER_SCAN1.lsnr
      1        ONLINE  ONLINE       c3n2                     STABLE
ora.LISTENER_SCAN2.lsnr
      1        ONLINE  ONLINE       c3n3                     STABLE
ora.LISTENER_SCAN3.lsnr
      1        ONLINE  ONLINE       c3n1                     STABLE
ora.SUSEDATA1.dg(ora.asmgroup)
      1        ONLINE  ONLINE       c3n1                     STABLE
      2        ONLINE  ONLINE       c3n2                     STABLE
      3        ONLINE  ONLINE       c3n3                     STABLE
ora.SUSEDATA2.dg(ora.asmgroup)
      1        ONLINE  ONLINE       c3n1                     STABLE
      2        ONLINE  ONLINE       c3n2                     STABLE
      3        ONLINE  ONLINE       c3n3                     STABLE
ora.asm(ora.asmgroup)
      1        ONLINE  ONLINE       c3n1                     Started,STABLE
      2        ONLINE  ONLINE       c3n2                     Started,STABLE
      3        ONLINE  ONLINE       c3n3                     Started,STABLE
ora.asmnet1.asmnetwork(ora.asmgroup)
      1        ONLINE  ONLINE       c3n1                     STABLE
      2        ONLINE  ONLINE       c3n2                     STABLE
      3        ONLINE  ONLINE       c3n3                     STABLE
ora.c3n1.vip
      1        ONLINE  ONLINE       c3n1                     STABLE
ora.c3n2.vip
      1        ONLINE  ONLINE       c3n2                     STABLE
ora.c3n3.vip
      1        ONLINE  ONLINE       c3n3                     STABLE
ora.c3n4.vip
      1        ONLINE  ONLINE       c3n4                     STABLE
ora.cvu
      1        ONLINE  ONLINE       c3n1                     STABLE
ora.qosmserver
      1        ONLINE  ONLINE       c3n1                     STABLE
ora.scan1.vip
      1        ONLINE  ONLINE       c3n2                     STABLE
ora.scan2.vip
      1        ONLINE  ONLINE       c3n3                     STABLE
ora.scan3.vip
      1        ONLINE  ONLINE       c3n1                     STABLE
ora.suse.db
      1        ONLINE  ONLINE       c3n1                     Open,HOME=/home/orac
                                                             le/db_19c,STABLE
      2        ONLINE  ONLINE       c3n2                     Open,HOME=/home/orac
                                                             le/db_19c,STABLE
      3        ONLINE  ONLINE       c3n3                     Open,HOME=/home/orac
                                                             le/db_19c,STABLE
      4        ONLINE  ONLINE       c3n4                     Open,HOME=/home/orac
                                                             le/db_19c,STABLE
--------------------------------------------------------------------------------
```

2). Access to Oracle Enterprise Manager.





2-7. View patch information on each node.

On c3n1:

```
oracle@c3n1:/home/oracle/grid_19c/OPatch> ./opatch lspatches
36758186;DBWLM RELEASE UPDATE 19.0.0.0.0 (36758186)
36648174;TOMCAT RELEASE UPDATE 19.0.0.0.0 (36648174)
36590554;ACFS RELEASE UPDATE 19.24.0.0.0 (36590554)
36587798;OCW RELEASE UPDATE 19.24.0.0.0 (36587798)
36582781;Database Release Update : 19.24.0.0.240716 (36582781)

OPatch succeeded.
oracle@c3n1:/home/oracle/grid_19c/OPatch> cd /home/oracle/db_19c/OPatch
oracle@c3n1:/home/oracle/db_19c/OPatch> ./opatch lspatches
36587798;OCW RELEASE UPDATE 19.24.0.0.0 (36587798)
36582781;Database Release Update : 19.24.0.0.240716 (36582781)

OPatch succeeded.
oracle@c3n1:/home/oracle/db_19c/OPatch>
```

On c3n2:

```
oracle@c3n2:/home/oracle/grid_19c/OPatch> ./opatch lspatches
36758186;DBWLM RELEASE UPDATE 19.0.0.0.0 (36758186)
36648174;TOMCAT RELEASE UPDATE 19.0.0.0.0 (36648174)
36590554;ACFS RELEASE UPDATE 19.24.0.0.0 (36590554)
36587798;OCW RELEASE UPDATE 19.24.0.0.0 (36587798)
36582781;Database Release Update : 19.24.0.0.240716 (36582781)

OPatch succeeded.
oracle@c3n2:/home/oracle/grid_19c/OPatch> cd /home/oracle/db_19c/OPatch
oracle@c3n2:/home/oracle/db_19c/OPatch> ./opatch lspatches
36587798;OCW RELEASE UPDATE 19.24.0.0.0 (36587798)
36582781;Database Release Update : 19.24.0.0.240716 (36582781)

OPatch succeeded.
oracle@c3n2:/home/oracle/db_19c/OPatch>
```

On c3n3:

```
oracle@c3n3:/home/oracle/grid_19c/OPatch> ./opatch lspatches
36758186;DBWLM RELEASE UPDATE 19.0.0.0.0 (36758186)
36648174;TOMCAT RELEASE UPDATE 19.0.0.0.0 (36648174)
36590554;ACFS RELEASE UPDATE 19.24.0.0.0 (36590554)
36587798;OCW RELEASE UPDATE 19.24.0.0.0 (36587798)
36582781;Database Release Update : 19.24.0.0.240716 (36582781)

OPatch succeeded.
oracle@c3n3:/home/oracle/grid_19c/OPatch> cd /home/oracle/db_19c/OPatch
oracle@c3n3:/home/oracle/db_19c/OPatch> ./opatch lspatches
36587798;OCW RELEASE UPDATE 19.24.0.0.0 (36587798)
36582781;Database Release Update : 19.24.0.0.240716 (36582781)

OPatch succeeded.
oracle@c3n3:/home/oracle/db_19c/OPatch>
```

On c3n4:

```
oracle@c3n4:/home/oracle/grid_19c/OPatch> ./opatch lspatches
36758186;DBWLM RELEASE UPDATE 19.0.0.0.0 (36758186)
36648174;TOMCAT RELEASE UPDATE 19.0.0.0.0 (36648174)
36590554;ACFS RELEASE UPDATE 19.24.0.0.0 (36590554)
36587798;OCW RELEASE UPDATE 19.24.0.0.0 (36587798)
36582781;Database Release Update : 19.24.0.0.240716 (36582781)

OPatch succeeded.
oracle@c3n4:/home/oracle/grid_19c/OPatch> cd /home/oracle/db_19c/OPatch
oracle@c3n4:/home/oracle/db_19c/OPatch> ./opatch lspatches
36587798;OCW RELEASE UPDATE 19.24.0.0.0 (36587798)
36582781;Database Release Update : 19.24.0.0.240716 (36582781)

OPatch succeeded.
oracle@c3n4:/home/oracle/db_19c/OPatch>
```

2-8. Checking database status by sqlplus.

```
oracle@c3n1:~> export ORACLE_HOME=/home/oracle/db_19c/
oracle@c3n1:~> export ORACLE_SID=suse
oracle@c3n1:~> /home/oracle/db_19c/bin/sqlplus /nolog

SQL*Plus: Release 19.0.0.0.0 - Production on Mon Aug 5 16:24:52 2024
Version 19.24.0.0.0

Copyright (c) 1982, 2024, Oracle.  All rights reserved.

SQL> conn sys/[redacted]@c3n1:1521/suse as sysdba
Connected.
SQL> show sga

Total System Global Area 4.0265E+10 bytes
Fixed Size                  37601016 bytes
Variable Size             6710886400 bytes
Database Buffers          3.3420E+10 bytes
Redo Buffers                96616448 bytes
SQL> show pdbs

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

Troubleshooting

- *GI&DB 19c(19.3) - GI/DB RunInstaller Fails with [INS-44000]&[INS-06006] Passwordless SSH connectivity not set up between the following node(s): [node1, node2...].*

  Workaround: Apply GI RELEASE UPDATE 19.24.0.0.0(Patch 36582629).

  #./gridSetup.sh -applyRU /home/ORACLE_SW/patch_RU_192400/36582629/
  # ./runInstaller -applyRU /home/ORACLE_SW/patch_RU_192400/36582629/36582781/ -applyOneOffs /home/ORACLE_SW/patch_RU_192400/36582629/36587798/

- *GI&DB 19c(19.24.0.0.0) - [INS-10113] Installer encountered errors while copying…*

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

- *GI 19c(19.24.0.0.0) root.sh failed with error: "/home/oracle/grid_19c/crs/utl/init.ohasd.sles: line 440: /bin/chrt: No such file or directory".*

  Workaround: ln -s /usr/bin/chrt /bin/chrt

- *GI 19c root.sh failed with CLSRSC-317: FAILED TO REGISTER ORACLE OHASD SERVICE IN SLES15.(or If using ASMLib)*

  Workaround: Install "insserv-compat" on the server.The package insserv-compat adds compatibility with System V init scripts to system.

- *GI 19c 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.

Additional Comments

This document provides a brief instruction to install Oracle RAC Database 19c on SLES 15 SP6. You can extend this topology to make it highly available and secure so it is suitable for a production system.

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