

Oracle Database 21c

on SUSE Linux Enterprise Server 15 SP4

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Introduction

This document is not a replacement for official Oracle install document, but to help you understand minor difference you may encounter while installing Oracle Database 21c on SUSE Linux Enterprise Server 15 SP4. This document covers x86_64 version but installation steps are same for other platforms.

Oracle Database Software

Oracle Database Enterprise Edition 21c is available for public download at:

<https://www.oracle.com/technetwork/database/enterprise-edition/downloads/index.html>

SUSE Linux Software

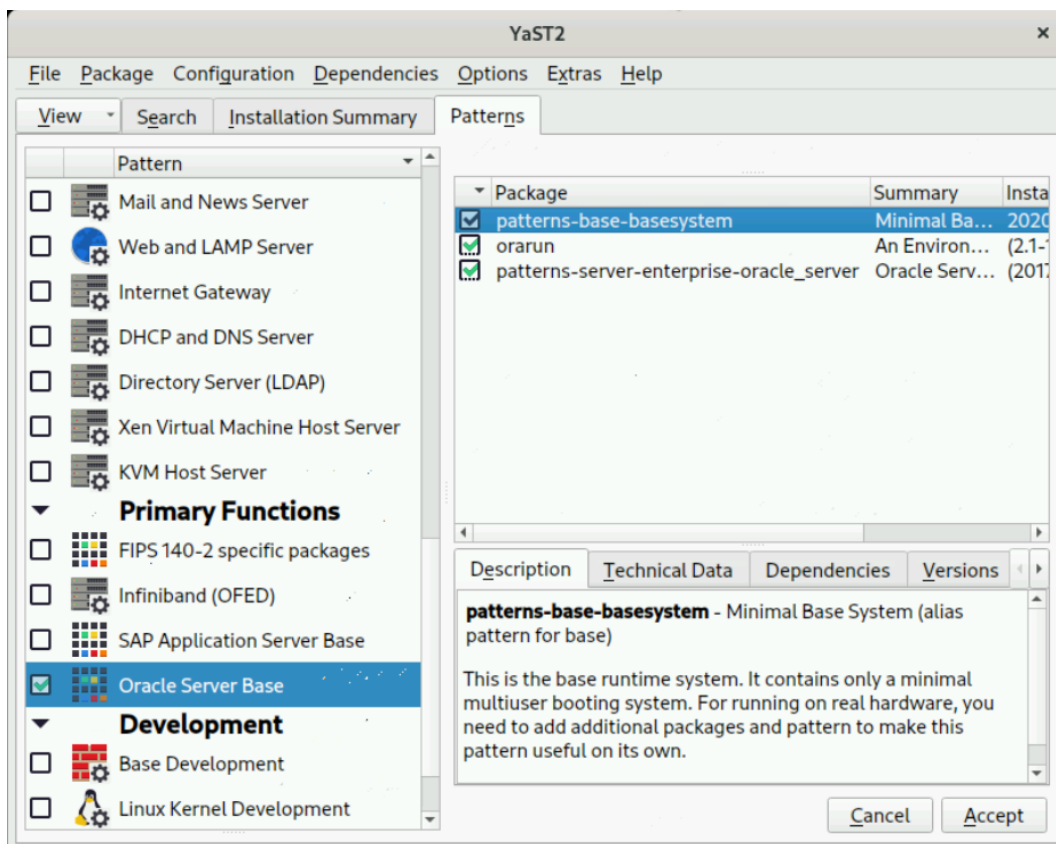
Download SUSE Linux Enterprise Server 15 SP4 here, you can use 60 Day's free trial:

<https://www.suse.com/products/server/download/>

SUSE Linux Installation

Install SUSE Linux Enterprise Server 15 SP4 with “**Enhanced Base System, Software Management, X Window System, Oracle Server Base**” pattern. It is useful to select “**32-Bit Runtime Environment**” to ensure some of the old Oracle applications works.

You can follow official Oracle Installation manual for required rpms, however **Oracle Server Base** pattern from SUSE will fulfil minimum setup required for Oracle Database Installation.



```

oracle@sles15-sp4:~
┌─┐ oracle@sles15-sp4:~
└─┘
oracle@sles15-sp4:~> uname -a
Linux sles15-sp4 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11
06:57:18 UTC 2022 (49db222) x86_64 x86_64 x86_64 GNU/Linux
oracle@sles15-sp4:~> cat /etc/os-release
NAME="SLES"
VERSION="15-SP4"
VERSION_ID="15.4"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp4"
DOCUMENTATION_URL="https://documentation.suse.com/"
oracle@sles15-sp4:~> env |grep ORA
ORA_NLS10=/opt/oracle/product/21c/nls/data
ORACLE_SID=orcl
ORACLE_BASE=/opt/oracle
ORACLE_HOME=/opt/oracle/product/21c
oracle@sles15-sp4:~>

```

Installing Oracle Database 21c (21.3)

Installing Oracle Database21c on SLES15 SP4 is straightforward, please follow:

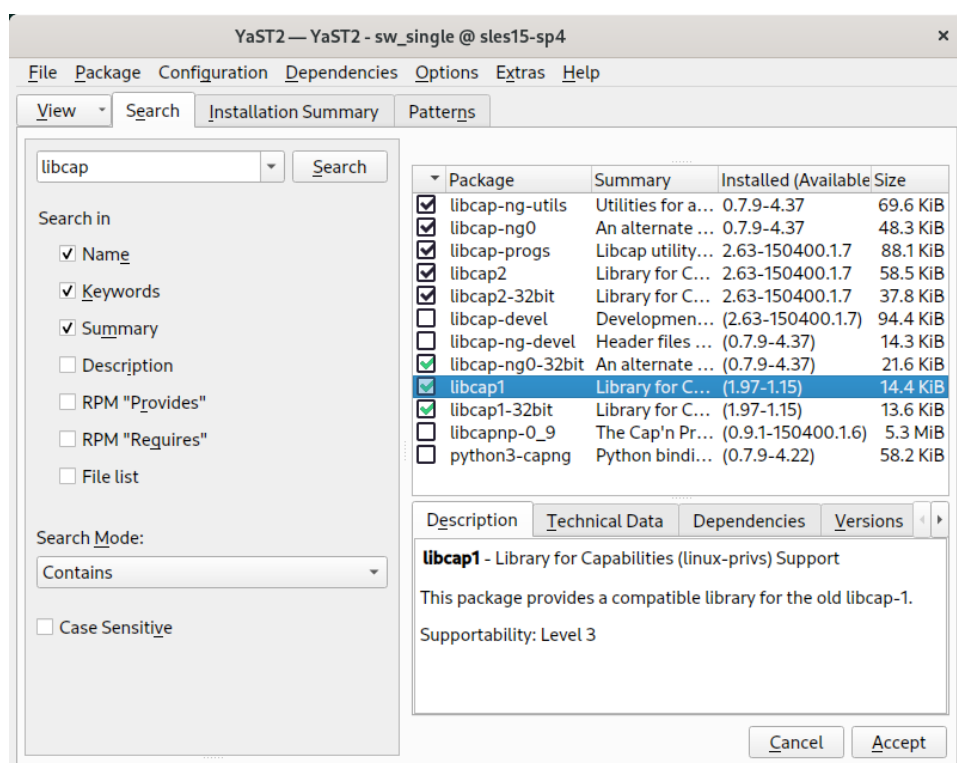
1. Download Oracle Database SW (LINUX.X64_213000_db_home.zip) and unzip in **\$ORACLE_HOME** directory.

Note: There is a change in Oracle Database 21c Installation process. Now runInstaller is a script, please check Oracle Official document for explanation.

2. Following adjustment will help to avoid error/warning messages during install process (**Fix before starting Oracle Installer**):

1. Make sure server is assigned static IP address.
2. Make sure you have enabled oracle user & logged-in as user **“oracle”**.
3. Install any missing packages (or manually verify newer versions is installed).

i.e. zypper in libcap1 libcap1-32bit libcap-ng-utils libcap-ng0-32bit libXtst6-32bit nfs-kernel-server



Note: libcap1 & libcap1-32bit are part of **SLES 15 Legacy Module**. Refer <https://documentation.suse.com/sles/15-SP3/html/SLES-all/cha-register-sle.html> on how to enable Legacy Module.

- DBCA Error:** ORA-27104: system-defined limits for shared memory was misconfigured

Fix: Increase kernel.shmmax & kernel.shmall based on your Server RAM in `/etc/sysconfig/oracle` & run “`systemctl restart oracle-setup`”.

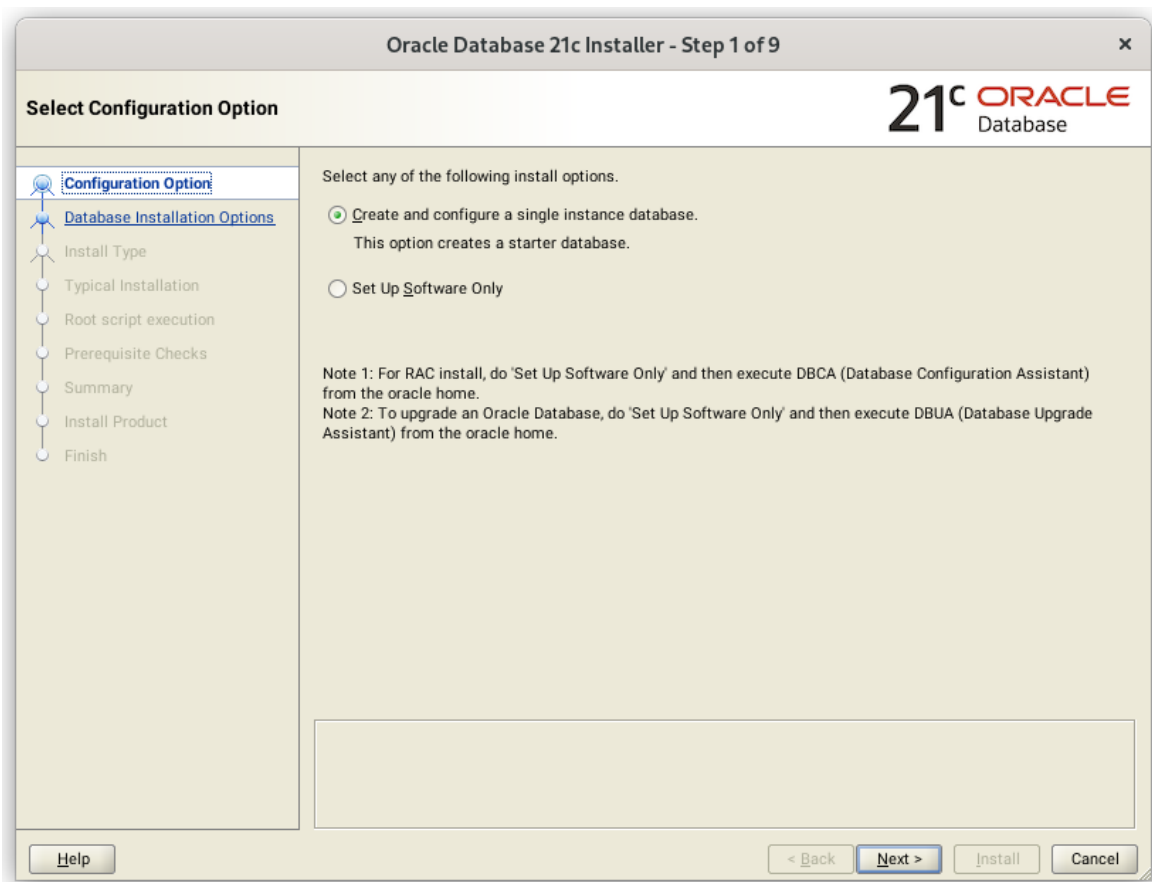
Please refer Oracle Metalink Note [ID 567506.1] - Maximum SHMMAX values for Linux x86 and x86-64.

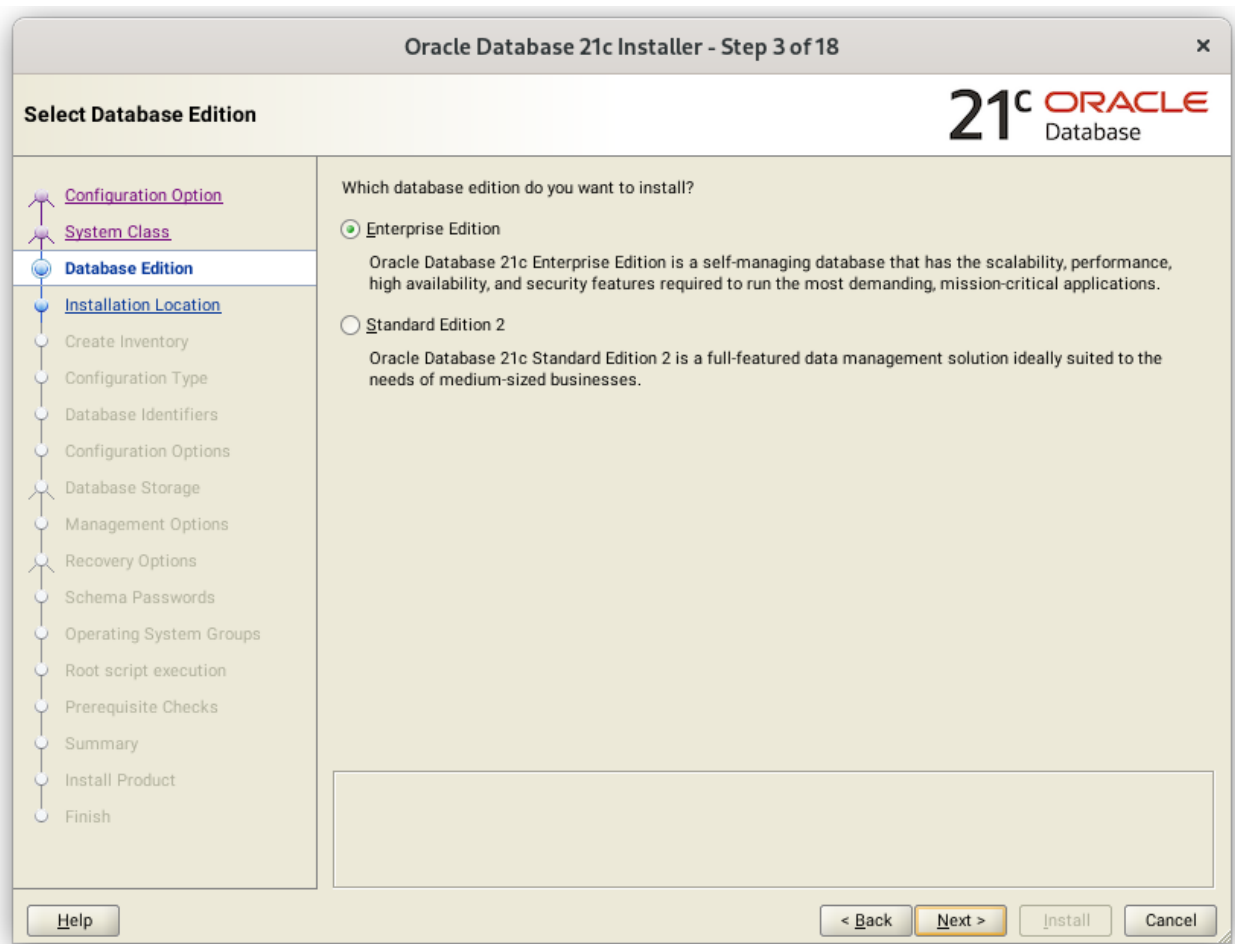
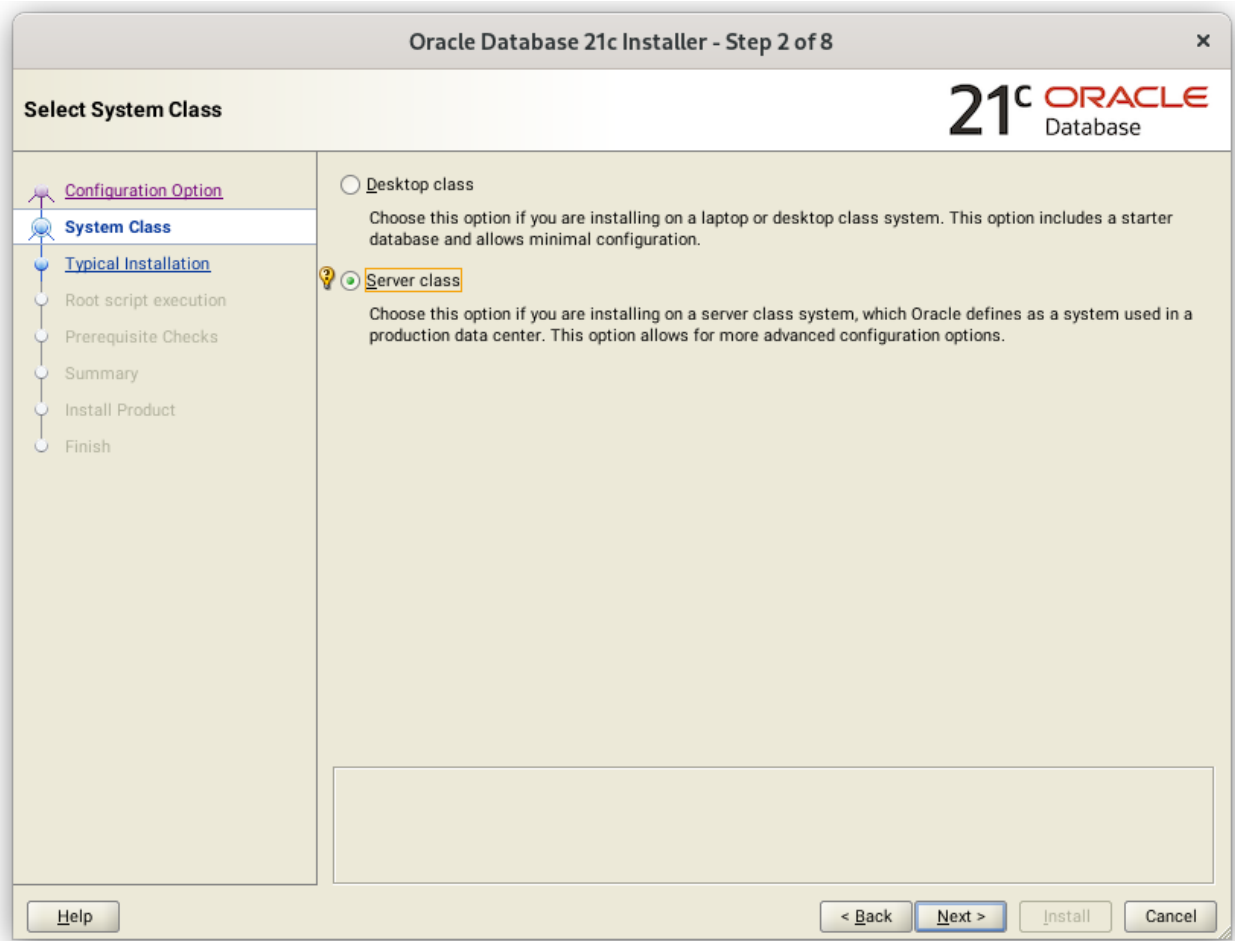
Following is an example for x86_64 Server with 32GB RAM:

```
shmmax=16833714176, shmall=3287834
```

- Login as user oracle and Start Oracle Universal Installer (OUI):

\$ORACLE_HOME/runInstaller





Oracle Database 21c Installer - Step 4 of 18

21c ORACLE
Database

Specify Installation Location

- Configuration Option
- System Class
- Database Edition
- Installation Location**
- Create Inventory
- Configuration Type
- Database Identifiers
- Configuration Options
- Database Storage
- Management Options
- Recovery Options
- Schema Passwords
- Operating System Groups
- Root script execution
- Prerequisite Checks
- Summary
- Install Product
- Finish

Specify a path to place all Oracle software and configuration-related files installed by this installation owner. This location is the Oracle base directory for the installation owner.

Oracle base:

This software directory is the Oracle Database home directory.

Software location: /opt/oracle/product/21c

Oracle Database 21c Installer - Step 5 of 18

21c ORACLE
Database

Create Inventory

- Configuration Option
- System Class
- Database Edition
- Installation Location
- Create Inventory**
- Configuration Type
- Database Identifiers
- Configuration Options
- Database Storage
- Management Options
- Recovery Options
- Schema Passwords
- Operating System Groups
- Root script execution
- Prerequisite Checks
- Summary
- Install Product
- Finish

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

Inventory Directory:

Specify an operating system group whose members have write permission to the inventory directory (oralInventory).

oralInventory Group Name:

Oracle Database 21c Installer - Step 6 of 18

Select Configuration Type

- [Configuration Option](#)
- [System Class](#)
- [Database Edition](#)
- [Installation Location](#)
- [Create Inventory](#)
- [Configuration Type](#)
- [Database Identifiers](#)
- [Configuration Options](#)
- [Database Storage](#)
- [Management Options](#)
- [Recovery Options](#)
- [Schema Passwords](#)
- [Operating System Groups](#)
- [Root script execution](#)
- [Prerequisite Checks](#)
- [Summary](#)
- [Install Product](#)
- [Finish](#)

Select the type of database that you want to create.

General Purpose / Transaction Processing
 A starter database designed for general purpose use, or for transaction-heavy applications.

Data Warehousing
 A starter database optimized for data warehousing applications.

Help
< Back
Next >
Install
Cancel

Oracle Database 21c Installer - Step 7 of 18

Specify Database Identifiers

- [Configuration Option](#)
- [System Class](#)
- [Database Edition](#)
- [Installation Location](#)
- [Create Inventory](#)
- [Configuration Type](#)
- [Database Identifiers](#)
- [Configuration Options](#)
- [Database Storage](#)
- [Management Options](#)
- [Recovery Options](#)
- [Schema Passwords](#)
- [Operating System Groups](#)
- [Root script execution](#)
- [Prerequisite Checks](#)
- [Summary](#)
- [Install Product](#)
- [Finish](#)

Provide the identifier information required to access the database uniquely. An Oracle database is uniquely identified by a Global database name, typically of the form "name.domain". A database is referenced by at least one Oracle instance which is uniquely identified from any other instance on this computer by an Oracle system identifier (SID).


Global database name:

Oracle system identifier (SID):

Pluggable database name:

Help
< Back
Next >
Install
Cancel

Oracle Database 21c Installer - Step 8 of 18

Specify Configuration Options


- [Configuration Option](#)
- [System Class](#)
- [Database Edition](#)
- [Installation Location](#)
- [Create Inventory](#)
- [Configuration Type](#)
- [Database Identifiers](#)
- [Configuration Options](#)
- [Database Storage](#)
- [Management Options](#)
- [Recovery Options](#)
- [Schema Passwords](#)
- [Operating System Groups](#)
- [Root script execution](#)
- [Prerequisite Checks](#)
- [Summary](#)
- [Install Product](#)
- [Finish](#)

Character sets

Enabling Automatic Memory Management allows the database to distribute memory automatically between the system global area (SGA) and the program global area (PGA), based on user-specified overall database memory target size. If automatic memory management is not enabled, then the SGA and PGA must be sized manually.

Enable Automatic Memory Management


Allocate memory:
256
63736
25495

 40 %

SGA target:	19121 MB
PGA aggregate target:	6374 MB
Target database memory:	25495 MB

Help
< Back
Next >
Install
Cancel

Oracle Database 21c Installer - Step 9 of 18

Specify Database Storage Options


- [Configuration Option](#)
- [System Class](#)
- [Database Edition](#)
- [Installation Location](#)
- [Create Inventory](#)
- [Configuration Type](#)
- [Database Identifiers](#)
- [Configuration Options](#)
- [Database Storage](#)
- [Management Options](#)
- [Recovery Options](#)
- [Schema Passwords](#)
- [Operating System Groups](#)
- [Root script execution](#)
- [Prerequisite Checks](#)
- [Summary](#)
- [Install Product](#)
- [Finish](#)

File system

Use a file system for database storage. For optimal database organization and performance, Oracle recommends that you install data files and the Oracle database software on different disks.

Specify database file location: Browse...

Oracle Automatic Storage Management

Oracle Automatic Storage Management (Oracle ASM) simplifies database storage administration, and places database files for optimal I/O performance. Select this option if you intend to use Oracle ASM.

Help
< Back
Next >
Install
Cancel

Oracle Database 21c Installer - Step 10 of 18

Specify Management Options

Oracle Database 21c is managed by Oracle Database Express by default. You can use Oracle Enterprise Manager 12c Cloud Control to manage each Oracle Database 21c centrally. Specify the details of the Cloud Control configuration to manage your database.

Register with Enterprise Manager (EM) Cloud Control

OMS Host:

OMS Port:

EM Admin User Name:

EM Admin Password:

Oracle Database 21c Installer - Step 11 of 18

Specify Recovery Options

Enable or disable recovery for your database. If you choose to enable recovery, then the location specified will be used as recovery area storage.

Enable Recovery

File system

Recovery area location:

Oracle Automatic Storage Management

Oracle Database 21c Installer - Step 12 of 18

Specify Schema Passwords

- [Configuration Option](#)
- [System Class](#)
- [Database Edition](#)
- [Installation Location](#)
- [Create Inventory](#)
- [Configuration Type](#)
- [Database Identifiers](#)
- [Configuration Options](#)
- [Database Storage](#)
- [Management Options](#)
- [Recovery Options](#)
- [Schema Passwords](#)
- [Operating System Groups](#)
- [Root script execution](#)
- [Prerequisite Checks](#)
- [Summary](#)
- [Install Product](#)
- [Finish](#)

21^c ORACLE
Database

The starter database contains pre-loaded schemas, most of which have passwords that are expired and locked at the end of installation. After installation is complete, you must unlock and set new passwords for those accounts you want to use. Schemas used for database management and postinstallation functions are left unlocked, and passwords for these accounts will not expire. Specify the passwords for these accounts.

Use different passwords for these accounts

	Password	Confirm password
SYS	<input type="text"/>	<input type="text"/>
SYSTEM	<input type="text"/>	<input type="text"/>
PDBADMIN	<input type="text"/>	<input type="text"/>

Use the same password for all accounts

Password: Confirm password:

Help
< Back
Next >
Install
Cancel

Oracle Database 21c Installer - Step 13 of 18

Privileged Operating System groups

- [Configuration Option](#)
- [System Class](#)
- [Database Edition](#)
- [Installation Location](#)
- [Create Inventory](#)
- [Configuration Type](#)
- [Database Identifiers](#)
- [Configuration Options](#)
- [Database Storage](#)
- [Management Options](#)
- [Recovery Options](#)
- [Schema Passwords](#)
- [Operating System Groups](#)
- [Root script execution](#)
- [Prerequisite Checks](#)
- [Summary](#)
- [Install Product](#)
- [Finish](#)

21^c ORACLE
Database

SYS privileges are required to create a database using operating system (OS) authentication. Membership in OS Groups grants the corresponding SYS privilege, eg. membership in OSDBA grants the SYSDBA privilege.

Database Administrator (OSDBA) group:

Database Operator (OSOPER) group (Optional):

Database Backup and Recovery (OSBACKUPDBA) group:

Data Guard administrative (OSDGDBA) group:

Encryption Key Management administrative (OSKMDBA) group:

Real Application Cluster administrative (OSRACDBA) group:

Help
< Back
Next >
Install
Cancel

Oracle Database 21c Installer - Step 14 of 18

Root script execution configuration

- Configuration Option
- System Class
- Database Edition
- Installation Location
- Create Inventory
- Configuration Type
- Database Identifiers
- Configuration Options
- Database Storage
- Management Options
- Recovery Options
- Schema Passwords
- Operating System Groups
- Root script execution**
- Prerequisite Checks
- Summary
- Install Product
- Finish

During the software configuration, certain operations have to be performed as "root" user. You can choose to have the installer perform these operations automatically by specifying inputs for one of the options below. The input specified will also be used by the installer to perform additional prerequisite checks.

Automatically run configuration scripts

Use "root" user credential

 Password :

Use sudo

 Program path :

 User name :

 Password :

Oracle Database 21c Installer - Step 15 of 18

Perform Prerequisite Checks

- Configuration Option
- System Class
- Database Edition
- Installation Location
- Create Inventory
- Configuration Type
- Database Identifiers
- Configuration Options
- Database Storage
- Management Options
- Recovery Options
- Schema Passwords
- Operating System Groups
- Root script execution
- Prerequisite Checks**
- Summary
- Install Product
- Finish

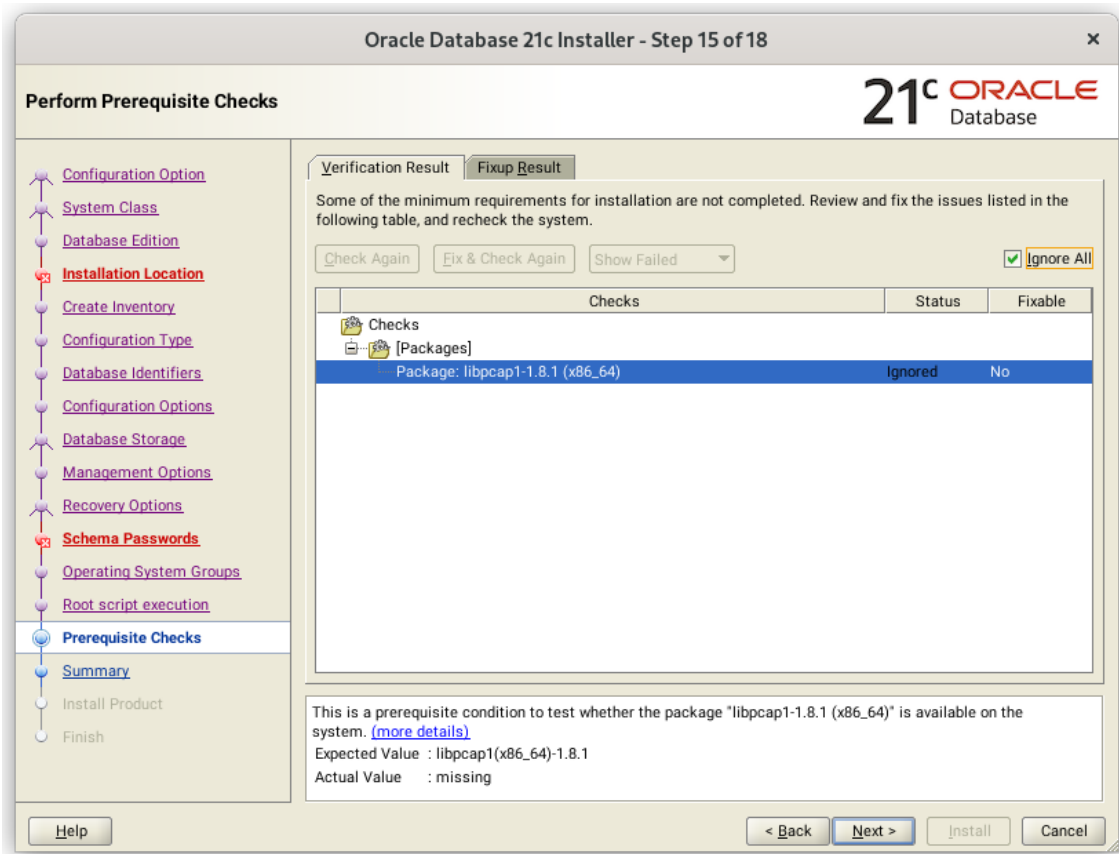
Verification Result

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

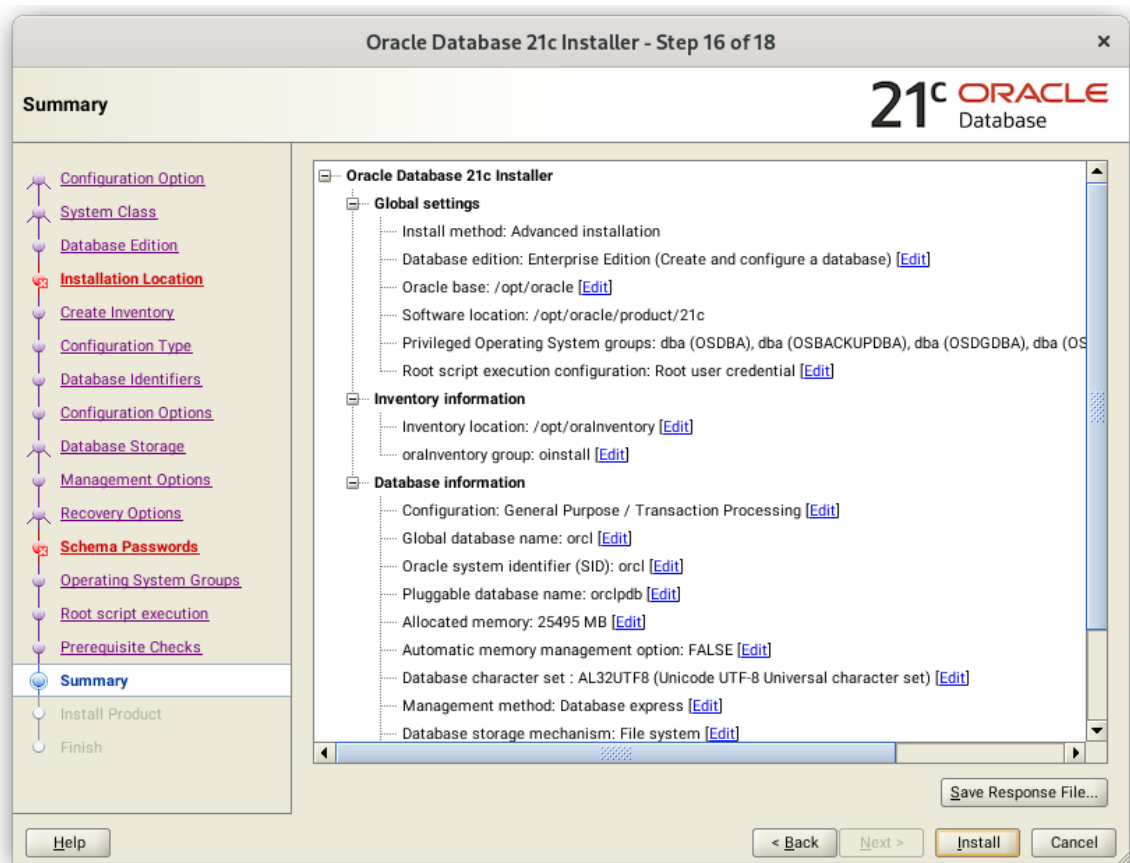
Ignore All

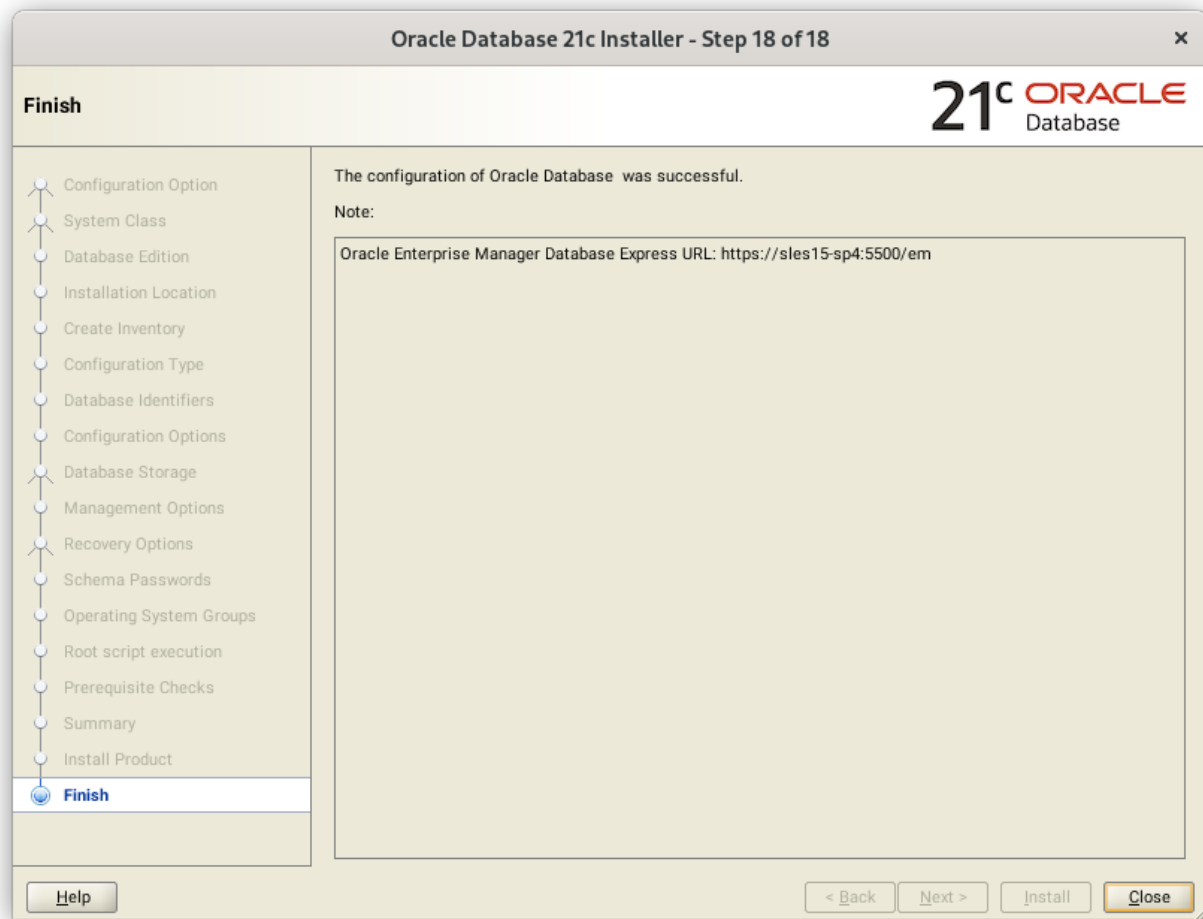
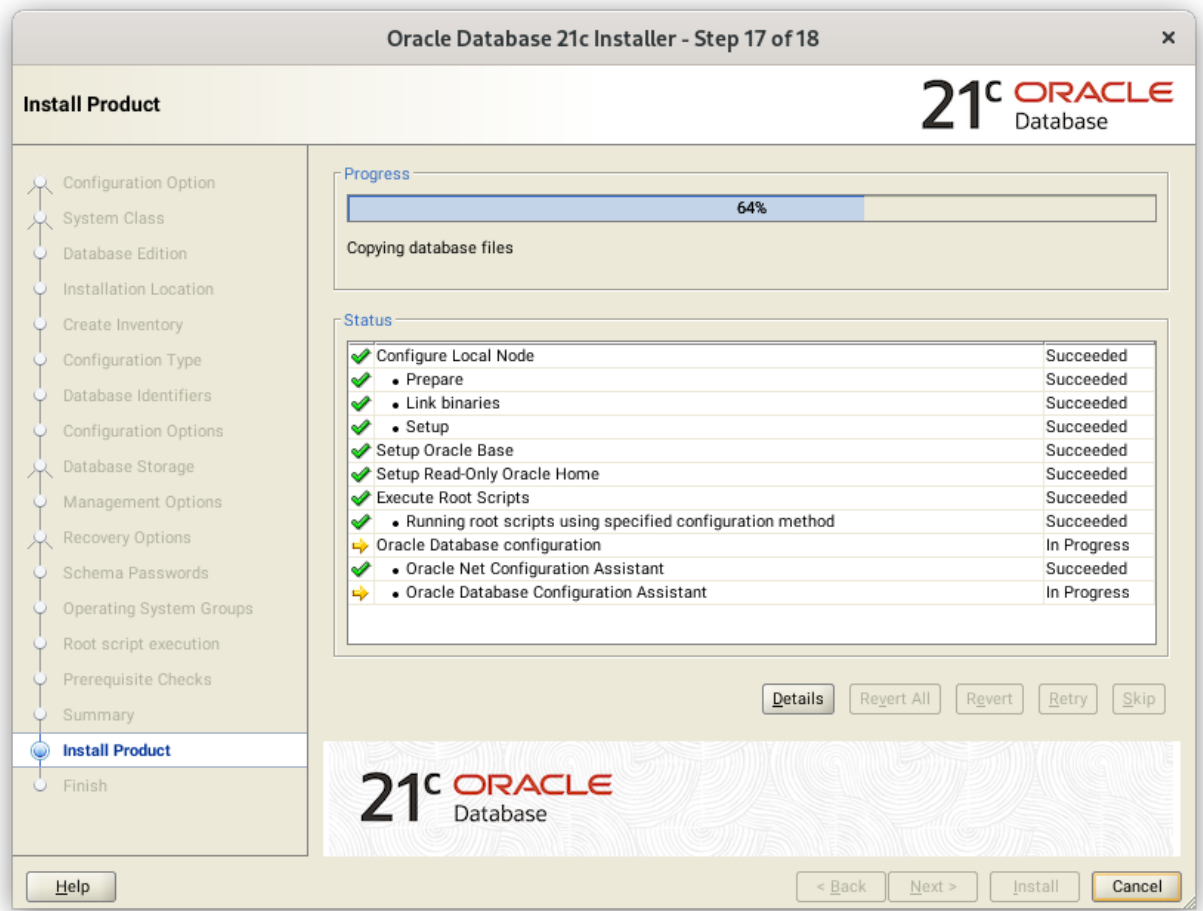
Checks	Status	Fixable
[OS Kernel Parameters]		
OS Kernel Parameter: shmall	Warning	Yes
[Packages]		
Package: libaio1-32bit-0.3.109 (x86_64)	Warning	No
Package: bc-1.07.1 (x86_64)	Warning	No
Package: libXext-devel-1.3.3 (x86_64)	Warning	No
Package: libXi-devel-1.7.9 (x86_64)	Warning	No
Package: libXi6-32bit-1.7.9 (x86_64)	Warning	No
Package: libXrender-devel-0.9.10 (x86_64)	Warning	No
Package: libXrender1-32bit-0.9.10 (x86_64)	Warning	No
Package: libpcap1-1.8.1 (x86_64)	Warning	No

This is a prerequisite condition to test whether the OS kernel parameter "shmall" is properly set. [\(more details\)](#)
 Expected Value : 8219587
 Actual Value : Current=6575668; Configured=undefined



Note: Please ignore Installer warning as libcap1-1.97-1.15.x86_64 is installed.





SUSE SLES 15 SP4 setup (After successful Oracle DB Install)

Please do following changes for successful Oracle Database start after reboot:

1. Edit “orcl:/opt/oracle/product/21c:Y” in /etc/oratab
2. Set START_ORACLE_DB & START_ORACLE_DB_LISTENER to “yes” in /etc/sysconfig/oracle setup file.
3. Restart Oracle database (or reboot) so correct status is reported via systemctl i.e. systemctl restart oracle
4. Check status using **systemctl** commands:

```
oracle@sles15-sp4:~
sles15-sp4:~ # systemctl status oracle-setup
● oracle-setup.service - Setup environment for the Oracle database
   Loaded: loaded (/usr/lib/systemd/system/oracle-setup.service; static)
   Active: active (exited) since Wed 2022-06-08 08:24:19 PDT; 2h 59min ago
   Process: 1573 ExecStart=/usr/lib/orarun/oracle-setup (code=exited, status=>
   Main PID: 1573 (code=exited, status=0/SUCCESS)

Jun 08 08:24:19 sles15-sp4 oracle-setup[1573]: Shared memory:      SHMMAX=3366>
Jun 08 08:24:19 sles15-sp4 oracle-setup[1573]: Semaphore values:  SEMMSL=1250>
Jun 08 08:24:19 sles15-sp4 oracle-setup[1573]: Other values:      FILE_MAX_KE>
Jun 08 08:24:19 sles15-sp4 oracle-setup[1573]: RMEM_DEFAULT=262144 WMEM_DEF>
Jun 08 08:24:19 sles15-sp4 oracle-setup[1573]: Huge Pages:      SHM_GROUP=d>
Jun 08 08:24:19 sles15-sp4 oracle-setup[1573]: ULIMIT values:    MAX_CORE_FI>
Jun 08 08:24:19 sles15-sp4 oracle-setup[1573]:                      FILE_MAX_SH>
Jun 08 08:24:19 sles15-sp4 oracle-setup[1573]: Checking sysctl.conf to overwri>
Jun 08 08:24:19 sles15-sp4 oracle-setup[1573]: Kernel parameters set for Oracl>
Jun 08 08:24:19 sles15-sp4 systemd[1]: Finished Setup environment for the Orac>
sles15-sp4:~ #
```

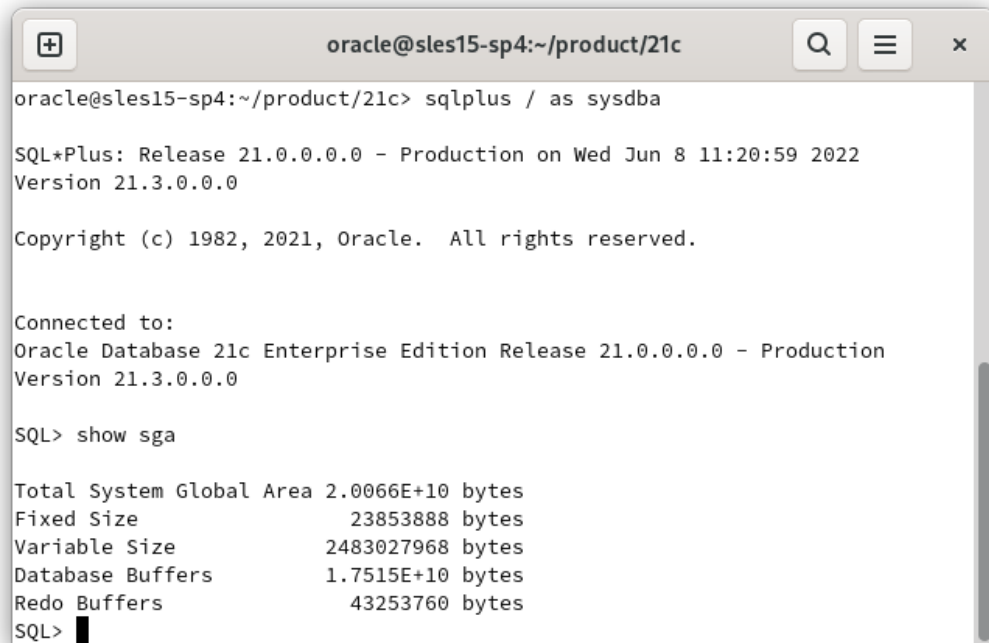
```
oracle@sles15-sp4:~
sles15-sp4:~ # systemctl status oracle
● oracle.service - Oracle Database
   Loaded: loaded (/usr/lib/systemd/system/oracle.service; enabled; vendor preset:>
   Active: active (running) since Wed 2022-06-08 11:26:01 PDT; 11s ago
   Process: 31345 ExecStart=/usr/lib/orarun/oracle start (code=exited, status=0/SUC>
   Tasks: 84
   CGroup: /system.slice/oracle.service
           └─31488 ora_pmon_orcl
             └─31492 ora_clmn_orcl
               └─31496 ora_osp0_orcl
                 └─31500 ora_vktm_orcl
                   └─31506 ora_gen0_orcl
                     └─31510 ora_mman_orcl
                       └─31516 ora_gen1_orcl
                         └─31518 ora_gen2_orcl
                           └─32080 ora_cl03_orcl
                             └─32082 ora_qm03_orcl
                               └─32084 ora_q002_orcl
                                 └─32086 ora_cl04_orcl
                                   └─32088 ora_q003_orcl
                                     └─32090 ora_w003_orcl
                                       └─32092 ora_s001_orcl
                                         └─32094 ora_w004_orcl
                                           └─32096 ora_w005_orcl

Jun 08 11:26:01 sles15-sp4 oracle[31345]: - Starting Application Server Console...>
Jun 08 11:26:01 sles15-sp4 oracle[31345]: - Starting Agent.....unused
Jun 08 11:26:01 sles15-sp4 oracle[31345]: - Starting Enterprise Manager.....skipped
Jun 08 11:26:01 sles15-sp4 oracle[31345]: - Starting iSQLPLUS Manager.....unused
Jun 08 11:26:01 sles15-sp4 oracle[31345]: - Starting Oracle Internet Filesystem...>
Jun 08 11:26:01 sles15-sp4 oracle[31345]: - Starting Oracle Internet Directory...>
Jun 08 11:26:01 sles15-sp4 oracle[31345]: #####
Jun 08 11:26:01 sles15-sp4 oracle[31345]: #                               End of  O R A C L >
Jun 08 11:26:01 sles15-sp4 oracle[31345]: #####
Jun 08 11:26:01 sles15-sp4 systemd[1]: Started Oracle Database.
sles15-sp4:~ #
```

Manage Oracle Database

You can use Oracle Enterprise Manager or sqlplus to monitor & manage your newly installed Oracle Database.

1. Sqlplus:



```

oracle@sles15-sp4:~/product/21c
oracle@sles15-sp4:~/product/21c> sqlplus / as sysdba

SQL*Plus: Release 21.0.0.0.0 - Production on Wed Jun 8 11:20:59 2022
Version 21.3.0.0.0

Copyright (c) 1982, 2021, Oracle. All rights reserved.

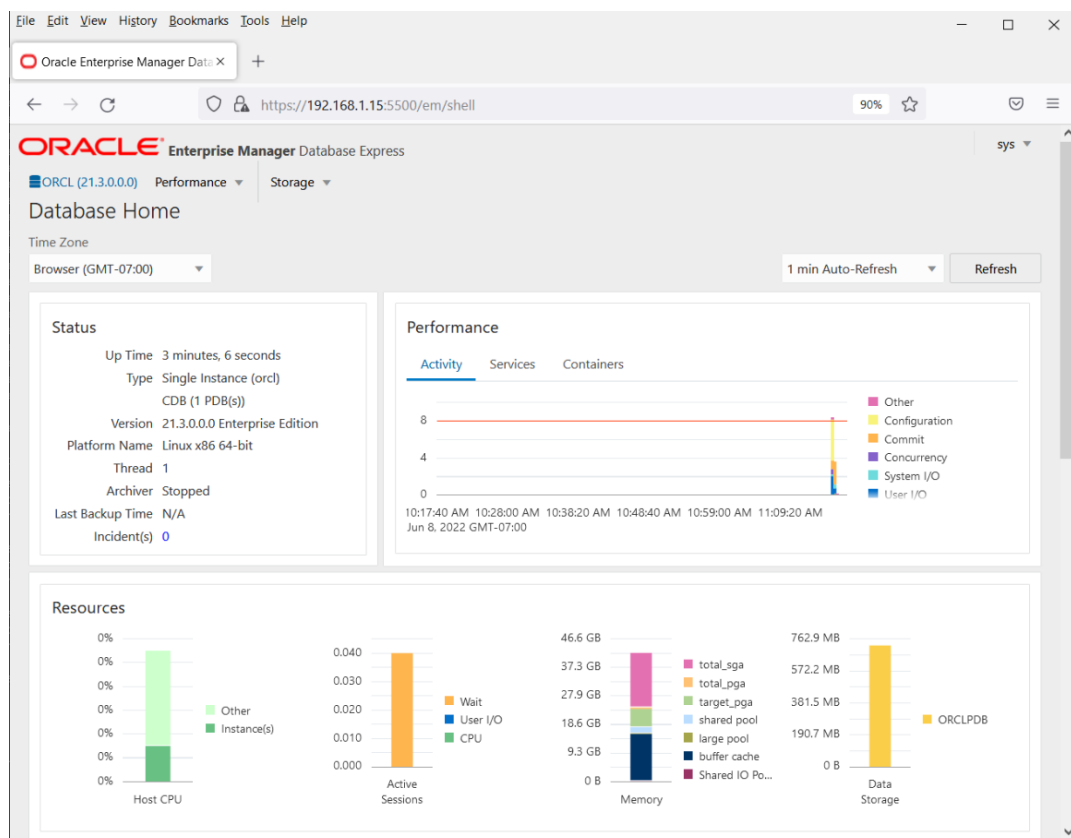
Connected to:
Oracle Database 21c Enterprise Edition Release 21.0.0.0.0 - Production
Version 21.3.0.0.0

SQL> show sga

Total System Global Area 2.0066E+10 bytes
Fixed Size                23853888 bytes
Variable Size             2483027968 bytes
Database Buffers         1.7515E+10 bytes
Redo Buffers              43253760 bytes
SQL>

```

2. Enterprise Manager



In production environment, please apply latest SUSE and Oracle Patches.

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