

# Oracle® Database

## Client Installation Guide



12c Release 2 (12.2) for Linux

E85761-06

November 2021

The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

ORACLE®

Oracle Database Client Installation Guide, 12c Release 2 (12.2) for Linux

E85761-06

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# Preface

This guide explains how to install and configure Oracle Database Client.

This guide also provides information about postinstallation tasks and how to remove the database client software.

- [Audience](#)  
This guide is intended for anyone responsible for installing Oracle Database Client 12c Release 2 (12.2).
- [Documentation Accessibility](#)
- [Command Syntax](#)  
Refer to these command syntax conventions to understand command examples in this guide.
- [Related Documentation](#)
- [Conventions](#)

## Audience

This guide is intended for anyone responsible for installing Oracle Database Client 12c Release 2 (12.2).

Additional installation guides for Oracle Database, Oracle Real Application Clusters, Oracle Clusterware, Oracle Database Examples, and Oracle Enterprise Manager Cloud Control are available at the following URL:

<http://docs.oracle.com>

## Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

### Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

## Command Syntax

Refer to these command syntax conventions to understand command examples in this guide.

Convention	Description
\$	Bourne or BASH shell prompt in a command example. Do not enter the prompt as part of the command.
%	C Shell prompt in a command example. Do not enter the prompt as part of the command.
#	Superuser (root) prompt in a command example. Do not enter the prompt as part of the command.
monospace	UNIX command syntax
backslash \	A backslash is the UNIX and Linux command continuation character. It is used in command examples that are too long to fit on a single line. Enter the command as displayed (with a backslash) or enter it on a single line without a backslash:  <pre>dd if=/dev/rdisk/c0t1d0s6 of=/dev/rst0 bs=10b \ count=10000</pre>
braces { }	Braces indicate required items:  <pre>.DEFINE {macro1}</pre>
brackets [ ]	Brackets indicate optional items:  <pre>cvtprt termname [outfile]</pre>
ellipses ...	Ellipses indicate an arbitrary number of similar items:  <pre>CHKVAL fieldname value1 value2 ... valueN</pre>
<i>italic</i>	Italic type indicates a variable. Substitute a value for the variable:  <pre><i>library_name</i></pre>
vertical line	A vertical line indicates a choice within braces or brackets:  <pre>FILE filesize [K M]</pre>

## Related Documentation

The related documentation for Oracle Database products includes the following manuals:

### Related Topics

- *Oracle Automatic Storage Management Administrator's Guide*
- *Oracle Application Express Installation Guide*
- *Oracle Clusterware Administration and Deployment Guide*



- *Oracle Database Concepts*
- *Oracle Database New Features Guide*
- *Oracle Database Licensing Information*
- *Oracle Database Readme*
- *Oracle Database Release Notes for Linux*
- *Oracle Database Installation Guide*
- *Oracle Database Examples Installation Guide*
- *Oracle Database Administrator's Reference for Linux and UNIX-Based Operating Systems*
- *Oracle Database Upgrade Guide*
- *Oracle Database 2 Day DBA*
- *Oracle Database 2 Day + Real Application Clusters Guide*
- *Oracle Grid Infrastructure Installation and Upgrade Guide*
- *Oracle Real Application Clusters Administration and Deployment Guide*
- *Oracle Real Application Clusters Installation Guide for Linux and UNIX*
- *Oracle SQL Developer Installation Guide*
- *Oracle Universal Installer User's Guide*

## Conventions

The following text conventions are used in this document:

Convention	Meaning
<b>boldface</b>	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

# 1

## Oracle Database Client Installation Checklist

Use checklists to review system requirements, and to plan and carry out Oracle Database Client installation.

Oracle recommends that you use checklists as part of your installation planning process. Using checklists can help you to confirm that your server hardware and configuration meet minimum requirements for this release and can help you carry out a successful installation.

- [Server Hardware Checklist for Oracle Database Client Installation](#)  
Use this checklist to check hardware requirements for Oracle Database Client installations.
- [Operating System Checklist for Oracle Database Client on Linux](#)  
Use this checklist to check minimum operating system requirements for Oracle Database Client.
- [Server Configuration Checklist for Oracle Database Client](#)  
Use this checklist to check minimum server configuration requirements for Oracle Database Client installations.
- [Oracle User Environment Configuration Checklist for Oracle Database Installation](#)  
Use this checklist to plan operating system users, groups, and environments for Oracle Database management.
- [Storage Checklist for Oracle Database Client](#)  
Use this checklist to review storage minimum requirements and assist with configuration planning.
- [Installer Planning Checklist for Oracle Database Client](#)  
Use this checklist to assist you to be prepared before starting Oracle Universal Installer.

## Server Hardware Checklist for Oracle Database Client Installation

Use this checklist to check hardware requirements for Oracle Database Client installations.

**Table 1-1 Server Hardware Checklist for Oracle Database Client Installations**

Check	Task
Server Make and Architecture	Confirm that server make, model, core architecture, and host bus adaptors (HBA) or network interface controllers (NICs) are supported to run with Oracle Database and Oracle Grid Infrastructure. Ensure the server has a DVD drive, if you are installing from a DVD.
Runlevel	3 or 5
Server Display Cards	At least 1024 x 768 display resolution, which Oracle Universal Installer requires.
Minimum network connectivity	Client is connected to a network.
Minimum RAM	At least 256 MB of RAM.

# Operating System Checklist for Oracle Database Client on Linux

Use this checklist to check minimum operating system requirements for Oracle Database Client.

**Table 1-2 Operating System General Checklist for Oracle Database Client on Linux**

Item	Task
Operating system general requirements	<p>OpenSSH installed manually, if you do not have it installed already as part of a default Linux installation.</p> <p>A Linux kernel in the list of supported kernels and releases listed in this guide.</p>
Linux x86-64 operating system requirements	<p>The following Linux x86-64 kernels are supported:</p> <ul style="list-style-type: none"> <li>• Oracle Linux 8.2 with the Unbreakable Enterprise Kernel 6: 5.4.17-2011.1.2.el8uek.x86_64 or later Oracle Linux 8.2 with the Red Hat Compatible Kernel: 4.18.0-193.19.1.el8_2.x86_64 or later</li> <li>• Oracle Linux 7 with the Unbreakable Enterprise Kernel 3: 3.8.13-35.3.1.el7uek.x86_64 or later Oracle Linux 7.2 with the Unbreakable Enterprise Kernel 4: 4.1.12-32.2.3.el7uek.x86_64 or later Oracle Linux 7 with the Red Hat Compatible kernel: 3.10.0-123.el7.x86_64 or later</li> <li>• Oracle Linux 6.4 with the Unbreakable Enterprise Kernel 2: 2.6.39-400.211.1.el6uek.x86_64 or later Oracle Linux 6.6 with the Unbreakable Enterprise Kernel 3: 3.8.13-44.1.1.el6uek.x86_64 or later Oracle Linux 6.8 with the Unbreakable Enterprise Kernel 4: 4.1.12-37.6.2.el6uek.x86_64 or later Oracle Linux 6.4 with the Red Hat Compatible kernel: 2.6.32-358.el6.x86_64 or later</li> <li>• Red Hat Enterprise Linux 8.2: 4.18.0-193.19.1.el8_2.x86_64 or later</li> <li>• Red Hat Enterprise Linux 7: 3.10.0-123.el7.x86_64 or later</li> <li>• Red Hat Enterprise Linux 6.4: 2.6.32-358.el6.x86_64 or later</li> <li>• SUSE Linux Enterprise Server 15: 4.12.14-25-default or later</li> <li>• SUSE Linux Enterprise Server 12 SP1: 3.12.49-11.1 or later</li> <li>• NeoKylin Linux Advanced Server 7: 3.10.0-693.el7.x86_64 or later</li> </ul> <p>Review the system requirements section for a list of minimum package requirements.</p>

**Table 1-2 (Cont.) Operating System General Checklist for Oracle Database Client on Linux**

Item	Task
IBM: Linux on System z operating system requirements	<p>The following IBM: Linux on System z kernels are supported:</p> <p>Red Hat Enterprise Linux 7.2: 3.10.0-327.el7.s390x or later</p> <p>Red Hat Enterprise Linux 6.6: 2.6.32-504.el6.s390x or later</p> <p>SUSE Linux Enterprise Server 12 SP1: 3.12.49-11-default s390x or later</p> <p>Review the system requirements section for a list of minimum package requirements.</p>
Oracle Preinstallation RPM for Oracle Linux	<p>If you use Oracle Linux, then Oracle recommends that you run an Oracle preinstallation RPM for your Linux release to configure your operating system for Oracle Database and Oracle Grid Infrastructure installations.</p>

## Server Configuration Checklist for Oracle Database Client

Use this checklist to check minimum server configuration requirements for Oracle Database Client installations.

**Table 1-3 Server Configuration Checklist for Oracle Database Client**

Check	Task
Disk space allocated to the <code>/tmp</code> directory	At least 400 MB of space in the temporary disk space ( <code>/tmp</code> ) directory.
Swap space allocation relative to RAM	<p>256 MB: 3 times the size of RAM</p> <p>Between 256 MB and 512 MB: 2 times the size of RAM</p> <p>Between 512 MB and 2 GB: 1.5 times the size of RAM</p> <p>Between 2 GB and 16 GB: Equal to the size of RAM</p> <p>More than 16 GB: 16 GB</p> <p><b>Note:</b> If you enable HugePages for your Linux servers, then you should deduct the memory allocated to HugePages from the available RAM before calculating swap space.</p>

**Table 1-3 (Cont.) Server Configuration Checklist for Oracle Database Client**

Check	Task
Oracle Inventory (oraInventory) and OINSTALL Group Requirements	<ul style="list-style-type: none"> <li>For new installs, if you have not configured an oraInventory directory, then the installer creates an Oracle inventory that is one directory level up from the Oracle base for the Oracle Grid Infrastructure install, and designates the installation owner's primary group as the Oracle Inventory group.</li> <li>For upgrades, Oracle Universal Installer (OUI) detects an existing oraInventory directory from the <code>/etc/oraInst.loc</code> file, and uses the existing oraInventory.</li> </ul> <p>The Oracle Inventory directory is the central inventory of Oracle software installed on your system. Users who have the Oracle Inventory group as their primary group are granted the OINSTALL privilege to write to the central inventory.</p> <p>The OINSTALL group must be the primary group of all Oracle software installation owners on the server. It should be writable by any Oracle installation owner.</p>
Groups and users	Oracle recommends that you create groups and user accounts required for your security plans before starting installation. Installation owners have resource limits settings and other requirements. Group and user names must use only ASCII characters.
Mount point paths for the software binaries	Oracle recommends that you create an Optimal Flexible Architecture configuration as described in the appendix "Optimal Flexible Architecture" in <i>Oracle Database Installation Guide</i> for your platform.
Ensure that the Oracle home (the Oracle home path you select for Oracle Database) uses only ASCII characters	The ASCII character restriction includes installation owner user names, which are used as a default for some home paths, as well as other directory names you may select for paths.
Determine <code>root</code> privilege delegation option for installation	<p>During installation, you are asked to run configuration scripts as the <code>root</code> user. You can either run these scripts manually as <code>root</code> when prompted, or you can provide configuration information and passwords using a <code>root</code> privilege delegation option such as Sudo.</p> <p>To enable Sudo, have a system administrator with the appropriate privileges configure a user that is a member of the sudoers list, and provide the username and password when prompted during installation.</p>
Set locale (if needed)	Specify the language and the territory, or locale, in which you want to use Oracle components. A locale is a linguistic and cultural environment in which a system or program is running. NLS (National Language Support) parameters determine the locale-specific behavior on both servers and clients. The locale setting of a component determines the language of the user interface of the component, and the globalization behavior, such as date and number formatting.
symlinks	Oracle home or Oracle base cannot be symlinks, nor can any of their parent directories, all the way to up to the <code>root</code> directory.

**Related Topics**

- Oracle Database Globalization Support Guide*

# Oracle User Environment Configuration Checklist for Oracle Database Installation

Use this checklist to plan operating system users, groups, and environments for Oracle Database management.

**Table 1-4 User Environment Configuration for Oracle Database**

Check	Task
Review Oracle Inventory (oraInventory) and OINSTALL Group Requirements	<p>The physical group you designate as the Oracle Inventory directory is the central inventory of Oracle software installed on your system. It should be the primary group for all Oracle software installation owners. Users who have the Oracle Inventory group as their primary group are granted the OINSTALL privilege to read and write to the central inventory.</p> <ul style="list-style-type: none"> <li>• If you have an existing installation, then OUI detects the existing oraInventory directory from the <code>/etc/oraInst.loc</code> file, and uses this location.</li> <li>• If you are installing Oracle software for the first time, then OUI creates an Oracle base and central inventory, and creates an Oracle inventory using information in the following priority: <ul style="list-style-type: none"> <li>– In the path indicated in the ORACLE_BASE environment variable set for the installation owner user account.</li> <li>– In an Optimal Flexible Architecture (OFA) path (<code>u[01–99]/app/owner</code> where <i>owner</i> is the name of the user account running the installation), if that user account has permissions to write to that path.</li> <li>– In the user home directory, in the path <code>/app/owner</code>, where <i>owner</i> is the name of the user account running the installation.</li> </ul> </li> </ul> <p>Ensure that the group designated as the OINSTALL group is available as the primary group for all planned Oracle software installation owners.</p>
Create operating system groups and users for standard or role-allocated system privileges	<p>Create operating system groups and users depending on your security requirements, as described in this install guide.</p> <p>Set resource limits settings and other requirements for Oracle software installation owners.</p> <p>Group and user names must use only ASCII characters.</p>
Unset Oracle Software Environment Variables	<p>If you have had an existing installation on your system, and you are using the same user account to install this installation, then unset the ORACLE_HOME, ORACLE_BASE, ORACLE_SID, TNS_ADMIN environment variables and any other environment variable set for the Oracle installation user that is connected with Oracle software homes.</p>
Configure the Oracle Software Owner Environment	<p>Configure the environment of the oracle or grid user by performing the following tasks:</p> <ul style="list-style-type: none"> <li>• Set the default file mode creation mask (umask) to 022 in the shell startup file.</li> <li>• Set the DISPLAY environment variable.</li> </ul>

## Storage Checklist for Oracle Database Client

Use this checklist to review storage minimum requirements and assist with configuration planning.

**Table 1-5 Storage Checklist for Oracle Database Client**

Check	Task
Minimum local disk storage space for Oracle Database Client software	<p>For Linux x86-64:</p> <p>At least 272 MB for an Instant Client installation.</p> <p>At least 2.2 GB for Administrator installation type.</p> <p>At least 1.8 GB for Runtime installation type.</p> <p>At least 2.2 GB for Custom installation type.</p> <p>For IBM: Linux on System z:</p> <p>At least 250 MB for an Instant Client installation.</p> <p>At least 1.8 GB for Administrator installation type.</p> <p>At least 1.5 GB for Runtime installation type.</p> <p>At least 1.8 GB for Custom installation type.</p>

## Installer Planning Checklist for Oracle Database Client

Use this checklist to assist you to be prepared before starting Oracle Universal Installer.

**Table 1-6 Oracle Universal Installer Planning Checklist for Oracle Database Client Installation**

Check	Task
Read the Release Notes	<p>Review release notes for your platform, which are available for your release at the following URL:</p> <p><a href="http://docs.oracle.com/en/database/database.html">http://docs.oracle.com/en/database/database.html</a></p>
Review the Licensing Information	<p>You are permitted to use only those components in the Oracle Database media pack for which you have purchased licenses. For more information about licenses, refer to the following URL:</p> <p><i>Oracle Database Licensing Information</i></p>
Review Oracle Support Certification Matrix	<p>New platforms and operating system software versions might be certified after this guide is published, review the certification matrix on the My Oracle Support website for the most up-to-date list of certified hardware platforms and operating system versions:</p> <p><a href="https://support.oracle.com/">https://support.oracle.com/</a></p> <p>You must register online before using My Oracle Support. After logging in, from the menu options, select the <b>Certifications</b> tab. On the Certifications page, use the <b>Certification Search</b> options to search by Product, Release, and Platform. You can also search using the <b>Certification Quick Link</b> options such as Product Delivery, and Lifetime Support.</p>

**Table 1-6 (Cont.) Oracle Universal Installer Planning Checklist for Oracle Database Client Installation**

Check	Task
Run OUI with CVU and use fixup scripts	<p>Oracle Universal Installer is fully integrated with Cluster Verification Utility (CVU), automating many CVU prerequisite checks. Oracle Universal Installer runs all prerequisite checks and creates fixup scripts when you run the installer. You can run OUI up to the Summary screen without starting the installation.</p> <p>You can also run CVU commands manually to check system readiness. For more information, see:</p> <p><i>Oracle Clusterware Administration and Deployment Guide</i></p>
Ensure <code>crontab</code> jobs do not run during installation	<p>If the installer is running when daily cron jobs start, then you may encounter unexplained installation problems if your cron job is performing cleanup, and temporary files are deleted before the installation is finished. Oracle recommends that you complete installation before daily cron jobs are run, or disable daily cron jobs that perform cleanup until after the installation is completed.</p>
Decide the client installation type	<p>You can choose one of the following installation types when installing Oracle Database Client:</p> <ul style="list-style-type: none"> <li>• <b>Instant Client:</b> Enables you to install only the shared libraries required by Oracle Call Interface (OCI), Oracle C++ Call Interface (OCCI), Pro*C, or Java database connectivity (JDBC) OCI applications. This installation type requires much less disk space than the other Oracle Database Client installation types. For more information about Oracle Database Instant Client see the following URL:  <a href="http://www.oracle.com/technetwork/database/features/instant-client/index.html">http://www.oracle.com/technetwork/database/features/instant-client/index.html</a></li> <li>• <b>Administrator:</b> Enables applications to connect to an Oracle Database instance on the local system or on a remote system. It also provides tools that enable you to administer Oracle Database.</li> <li>• <b>Runtime:</b> Enables applications to connect to an Oracle Database instance on the local system or on a remote system.</li> <li>• <b>Custom:</b> Enables you to select individual components from the list of Administrator and Runtime components.</li> </ul>
Obtain your My Oracle Support account information.	<p>During installation, you require a My Oracle Support user name and password to configure security updates, download software updates, and other installation tasks. You can register for My Oracle Support at the following URL:  <a href="https://support.oracle.com/">https://support.oracle.com/</a></p>
Decide if you need 32-bit client software	<p>The 64-bit Oracle Database Client software does not contain any 32-bit client binaries. If you require 32-bit client binaries on 64-bit platforms, then install the 32-bit binaries from the respective 32-bit client software into a separate Oracle home.</p> <p>The 64-bit Oracle Database Client preinstallation requirements apply to 32-bit Oracle Database Client also.</p> <p>For more information, refer to My Oracle Support note 883702.1:  <a href="https://support.oracle.com/rs?type=doc&amp;id=883702.1">https://support.oracle.com/rs?type=doc&amp;id=883702.1</a></p>



**Table 1-6 (Cont.) Oracle Universal Installer Planning Checklist for Oracle Database Client Installation**

Check	Task
Oracle Database Client and Oracle Database interoperability	For information about interoperability between Oracle Database Client and Oracle Database releases, see My Oracle Support Note 207303.1: <a href="https://support.oracle.com/rs?type=doc&amp;id=207303.1">https://support.oracle.com/rs?type=doc&amp;id=207303.1</a>

# 2

## Checking and Configuring Server Hardware for Oracle Database Client

Verify that servers where you install Oracle Database Client meet the minimum requirements for installation.

This section provides minimum server requirements to complete installation of Oracle Database Client. It does not provide system resource guidelines, or other tuning guidelines for particular workloads.

- [Logging In to a Remote System Using X Window System](#)  
Use this procedure to run Oracle Universal Installer (OUI) by logging on to a remote system where the runtime setting prohibits logging in directly to a graphical user interface (GUI).
- [Checking Server Hardware and Memory Configuration](#)  
Use this procedure to gather information about your server configuration.

### Logging In to a Remote System Using X Window System

Use this procedure to run Oracle Universal Installer (OUI) by logging on to a remote system where the runtime setting prohibits logging in directly to a graphical user interface (GUI).

OUI is a graphical user interface (GUI) application. On servers where the runtime settings prevent GUI applications from running, you can redirect the GUI display to a client system connecting to the server.



#### Note:

If you log in as another user (for example, `oracle` or `grid`), then repeat this procedure for that user as well.

1. Start an X Window System session. If you are using an X Window System terminal emulator from a PC or similar system, then you may need to configure security settings to permit remote hosts to display X applications on your local system.
2. Enter a command using the following syntax to enable remote hosts to display X applications on the local X server:

```
# xhost + RemoteHost
```

*RemoteHost* is the fully qualified remote host name. For example:

```
# xhost + somehost.example.com  
somehost.example.com being added to the access control list
```

3. If you are not installing the software on the local system, then use the `ssh` command to connect to the system where you want to install the software:

```
# ssh -Y RemoteHost
```

*RemoteHost* is the fully qualified remote host name. The `-Y` flag ("yes") enables remote X11 clients to have full access to the original X11 display. For example:

```
# ssh -Y somehost.example.com
```

4. If you are not logged in as the `root` user, and you are performing configuration steps that require `root` user privileges, then switch the user to `root`.

 **Note:**

For more information about remote login using X Window System, refer to your X server documentation, or contact your X server vendor or system administrator. Depending on the X server software that you are using, you may have to complete the tasks in a different order.

## Checking Server Hardware and Memory Configuration

Use this procedure to gather information about your server configuration.

1. Use the following command to determine physical RAM size on the server:

```
# grep MemTotal /proc/meminfo
```

If the size of the physical RAM installed in the system is less than the required size, then you must install more memory before continuing.

2. Determine the size of the configured swap space:

```
# grep SwapTotal /proc/meminfo
```

If necessary, see your operating system documentation for information about how to configure additional swap space.

3. Determine the amount of space available in the `/tmp` directory:

```
# df -h /tmp
```

If the free space available in the `/tmp` directory is less than what is required, then complete one of the following steps:

- Delete unused files from the `/tmp` directory to meet the disk space requirement.

 **Note:**

If you perform this step after installing Oracle software, then do not remove `/tmp/.oracle` or `/var/tmp/.oracle` directories or their files.

- When you set the Oracle user's environment, also set the `TMP` and `TMPDIR` environment variables to the directory you want to use instead of `/tmp`.

4. Determine the amount of free RAM and disk swap space on the system:

```
# free
```

5. Determine if the system architecture can run the software:

```
# uname -m
```

Verify that the processor architecture matches the Oracle software release to install. For example, you should see the following for a x86-64 bit system:

```
x86_64
```

If you do not see the expected output, then you cannot install the software on this system.

6. Verify that shared memory (`/dev/shm`) is mounted properly with sufficient size:

```
df -h /dev/shm
```

The `df-h` command displays the filesystem on which `/dev/shm` is mounted, and also displays in GB the total size and free size of shared memory.

# 3

## Configuring Operating Systems for Oracle Database Client on Linux

Complete operating system configuration requirements and checks for Linux operating systems before you start installation.

- [About Oracle Linux with the Unbreakable Enterprise Kernel](#)  
The Unbreakable Enterprise Kernel for Oracle Linux provides the latest innovations from upstream development to customers who run Oracle Linux in the data center.
- [Reviewing Operating System Security Common Practices](#)  
Secure operating systems are an important basis for general system security.
- [About Operating System Requirements](#)  
Depending on the products that you intend to install, verify that you have the required operating system kernel and packages installed.
- [Operating System Requirements for x86-64 Linux Platforms](#)  
The Linux distributions and packages listed in this section are supported for this release on x86-64.
- [Operating System Requirements for IBM: Linux on System z](#)  
The Linux distributions and packages listed in this section are supported for this release on IBM: Linux on System z.
- [Additional Drivers and Software Packages for Linux](#)  
Information about optional drivers and software packages.
- [Checking Kernel and Package Requirements for Linux](#)  
Verify your kernel and packages to see if they meet minimum requirements for installation.

### About Oracle Linux with the Unbreakable Enterprise Kernel

The Unbreakable Enterprise Kernel for Oracle Linux provides the latest innovations from upstream development to customers who run Oracle Linux in the data center.

The Unbreakable Enterprise Kernel is included and enabled by default in Oracle Linux kernels. It is based on a recent stable mainline development Linux kernel, and also includes optimizations developed in collaboration with Oracle Database, Oracle middleware, and Oracle hardware engineering teams to ensure stability and optimal performance for the most demanding enterprise workloads.

Oracle highly recommends deploying the Unbreakable Enterprise Kernel in your Oracle Linux environment, especially if you run enterprise applications. However, using Unbreakable Enterprise Kernel is optional. If you require strict Red Hat Enterprise Linux (RHEL) kernel compatibility, then Oracle Linux also includes a kernel compatible with the RHEL Linux kernel, compiled directly from the RHEL source code.

You can obtain more information about the Unbreakable Enterprise Kernel for Oracle Linux at the following URL:

<https://www.oracle.com/linux/>

The Unbreakable Enterprise Kernel for Oracle Linux is the standard kernel used with Oracle products. The build and QA systems for Oracle Database and other Oracle products use the Unbreakable Enterprise Kernel for Oracle Linux exclusively. The Unbreakable Enterprise Kernel for Oracle Linux is also the kernel used in Oracle Exadata and Oracle Exalogic systems. Unbreakable Enterprise Kernel for Oracle Linux is used in all benchmark tests on Linux in which Oracle participates, as well as in the Oracle Database Preinstallation RPM program for x86-64.

Oracle Ksplice, which is part of Oracle Linux, updates the Linux operating system (OS) kernel, while it is running, without requiring restarts or any interruption. Ksplice is available only with Oracle Linux.

## Reviewing Operating System Security Common Practices

Secure operating systems are an important basis for general system security.

Ensure that your operating system deployment is in compliance with common security practices as described in your operating system vendor security guide.

## About Operating System Requirements

Depending on the products that you intend to install, verify that you have the required operating system kernel and packages installed.

Requirements listed in this document are current as of the date listed on the title page.

Oracle Universal Installer performs checks on your system to verify that it meets the listed operating system package requirements. To ensure that these checks complete successfully, verify the requirements before you start OUI.



### Note:

Oracle does not support running different operating system versions on cluster members, unless an operating system is being upgraded. You cannot run different operating system version binaries on members of the same cluster, even if each operating system is supported.

## Operating System Requirements for x86-64 Linux Platforms

The Linux distributions and packages listed in this section are supported for this release on x86-64.

Identify the requirements for your Linux distribution, and ensure that you have a supported kernel and required packages installed before starting installation.

 **Note:**

- Oracle Universal Installer requires an X Window System (for example, `libx`). The `libx` packages are part of a default Linux installation. If you perform an installation on a system with a reduced set of packages, then you must ensure that `libx` or a similar X Window System package is installed.
- The Unbreakable Enterprise Kernel for Oracle Linux can be installed on x86-64 servers running either Oracle Linux or Red Hat Enterprise Linux. As of Oracle Linux 5 Update 6, the Unbreakable Enterprise Kernel is the default system kernel. An x86 (32-bit) release of Oracle Linux including the Unbreakable Enterprise Kernel is available with Oracle Linux 5 update 7 and later.
- 32-bit packages in these requirements lists are needed only if you intend to use 32-bit client applications to access 64-bit servers.
- Oracle Database 12c Release 2 (12.2) and later does not require the compiler packages `gcc` and `gcc-c++` on Oracle Linux and Red Hat Enterprise Linux for Oracle Database or Oracle Grid Infrastructure installations.

The platform-specific hardware and software requirements included in this guide were current when this guide was published. However, because new platforms and operating system software versions may be certified after this guide is published, review the certification matrix on the My Oracle Support website for the most up-to-date list of certified hardware platforms and operating system versions:

<https://support.oracle.com/>

- [Supported Oracle Linux 8 Distributions for x86-64](#)  
Use the following information to check supported Oracle Linux 8 distributions:
- [Supported Oracle Linux 7 Distributions for x86-64](#)  
Use the following information to check supported Oracle Linux 7 distributions:
- [Supported Oracle Linux 6 Distributions for x86-64](#)  
Use the following information to check supported Oracle Linux 6 distributions:
- [Supported Red Hat Enterprise Linux 8 Distributions for x86-64](#)  
Use the following information to check supported Red Hat Enterprise Linux 8 distributions:
- [Supported Red Hat Enterprise Linux 7 Distributions for x86-64](#)  
Use the following information to check supported Red Hat Enterprise Linux 7 distributions:
- [Supported Red Hat Enterprise Linux 6 Distributions for x86-64](#)  
Use the following information to check supported Red Hat Enterprise Linux 6 distributions:
- [Supported SUSE Linux Enterprise Server 15 Distributions for x86-64](#)  
Use the following information to check supported SUSE Linux Enterprise Server 15 distributions:
- [Supported SUSE Linux Enterprise Server 12 Distributions for x86-64](#)  
Use the following information to check supported SUSE Linux Enterprise Server 12 distributions:

- [Supported NeoKylin Linux Advanced Server 7 Distributions for x86-64](#)  
Use the following information to check supported NeoKylin Linux Advanced Server 7 distributions:



**See Also:**

If you currently use, or plan to upgrade to, Oracle Linux 7.2 or Red Hat Enterprise Linux 7.2, then see information about the RemoveIPC settings:

- My Oracle Support Note 2081410.1:  
<https://support.oracle.com/rs?type=doc&id=2081410.1>
- Oracle Linux 7 Update 2 Release Notes:  
<http://docs.oracle.com/en/operating-systems/>

## Supported Oracle Linux 8 Distributions for x86-64

Use the following information to check supported Oracle Linux 8 distributions:

**Table 3-1 x86-64 Oracle Linux 8 Minimum Operating System Requirements**

Item	Requirements
SSH Requirement	Ensure that OpenSSH is installed on your servers. OpenSSH is the required SSH software.
Oracle Linux 8	<p>Minimum supported versions:</p> <ul style="list-style-type: none"> <li>• Oracle Linux 8.2 with the Unbreakable Enterprise Kernel 6: 5.4.17-2011.1.2.el8uek.x86_64 or later</li> <li>• Oracle Linux 8.2 with the Red Hat Compatible Kernel: 4.18.0-193.19.1.el8_2.x86_64 or later</li> </ul> <p><b>Note:</b> Oracle recommends that you update Oracle Linux to the latest available version and release level.</p>



**Table 3-1 (Cont.) x86-64 Oracle Linux 8 Minimum Operating System Requirements**

Item	Requirements
Packages for Oracle Linux 8	<p data-bbox="625 367 1372 724">Subscribe to the Oracle Linux 8 channel on the Unbreakable Linux Network, or configure a yum repository from the Oracle Linux yum server website, and then install the Oracle Database Preinstallation RPM, <code>oracle-database-server-12cR2-preinstall</code>. The Oracle Database Preinstallation RPM, <code>oracle-database-server-12cR2-preinstall</code>, automatically installs all required packages listed in the table below, their dependencies for Oracle Grid Infrastructure and Oracle Database installations, and also performs other system configuration. If you install the Oracle Database Preinstallation RPM, <code>oracle-database-server-12cR2-preinstall</code>, then you do not have to install these packages, as the Oracle Database Preinstallation RPM automatically installs them.</p> <p data-bbox="625 787 844 1522"> <code>bc</code>  <code>binutils</code>  <code>compat-openssl10</code>  <code>elfutils-libelf</code>  <code>glibc</code>  <code>glibc-devel</code>  <code>ksh</code>  <code>libaio</code>  <code>libXrender</code>  <code>libX11</code>  <code>libXau</code>  <code>libXi</code>  <code>libXtst</code>  <code>libgcc</code>  <code>libnsl</code>  <code>libstdc++</code>  <code>libxcb</code>  <code>libibverbs</code>  <code>make</code>  <code>policycoreutils</code>  <code>policycoreutils-python-utils</code>  <code>smartmontools</code>  <code>sysstat</code> </p> <p data-bbox="625 1543 1372 1627"><b>Note:</b> If you intend to use 32-bit client applications to access 64-bit servers, then you must also install (where available) the latest 32-bit versions of the packages listed in this table.</p>
Optional Packages for Oracle Linux 8	<p data-bbox="625 1638 1372 1701">Based on your requirement, install the latest released versions of the following packages:</p> <p data-bbox="625 1753 1266 1911"> <code>ipmiutil</code> (for Intelligent Platform Management Interface)  <code>libnsl2</code> (for Oracle Database Client only)  <code>libnsl2-devel</code> (for Oracle Database Client only)  <code>net-tools</code> (for Oracle RAC and Oracle Clusterware)  <code>nfs-utils</code> (for Oracle ACFS)         </p>

 **Note:**

- See *Oracle Database Release Notes for Linux* for information about installing Oracle Database 12c Release 2 (12.2) or Oracle RAC 12c Release 2 (12.2) on Oracle Linux 8.
- You cannot install Oracle Grid Infrastructure 12c Release 2 (12.2) on Oracle Linux 8 or Red Hat Enterprise Linux 8. For Oracle RAC installations, first install Oracle Grid Infrastructure release update (RU) 19.13 or later, and then install Oracle RAC 12c Release 2 (12.2). See *Oracle Database Release Notes for Linux*.
- Oracle Database Client 12c Release 2 (12.2) supports both 32-bit and 64-bit versions on Oracle Linux 8.2 and Red Hat Enterprise Linux 8.2.

## Supported Oracle Linux 7 Distributions for x86-64

Use the following information to check supported Oracle Linux 7 distributions:

**Table 3-2 x86-64 Oracle Linux 7 Minimum Operating System Requirements**

Item	Requirements
SSH Requirement	Ensure that OpenSSH is installed on your servers. OpenSSH is the required SSH software.
Oracle Linux 7	<p>Subscribe to the Oracle Linux 7 channel on the Unbreakable Linux Network, or configure a yum repository from the Oracle Linux yum server website, and then install the Oracle Preinstallation RPM. This RPM installs all required kernel packages for Oracle Grid Infrastructure and Oracle Database installations, and performs other system configuration.</p> <p>Supported distributions:</p> <ul style="list-style-type: none"> <li>• Oracle Linux 7 with the Unbreakable Enterprise Kernel 3: 3.8.13-35.3.1.el7uek.x86_64 or later</li> <li>• Oracle Linux 7.2 with the Unbreakable Enterprise Kernel 4: 4.1.12-32.2.3.el7uek.x86_64 or later</li> <li>• Oracle Linux 7 with the Red Hat Compatible kernel: 3.10.0-123.el7.x86_64 or later</li> </ul>

**Table 3-2 (Cont.) x86-64 Oracle Linux 7 Minimum Operating System Requirements**

Item	Requirements
Packages for Oracle Linux 7	<p>The following packages (or later versions) must be installed:</p> <ul style="list-style-type: none"> <li>bc</li> <li>binutils-2.23.52.0.1-12.el7 (x86_64)</li> <li>compat-libcap1-1.10-3.el7 (x86_64)</li> <li>compat-libstdc++-33-3.2.3-71.el7 (i686)</li> <li>compat-libstdc++-33-3.2.3-71.el7 (x86_64)</li> <li>glibc-2.17-36.el7 (i686)</li> <li>glibc-2.17-36.el7 (x86_64)</li> <li>glibc-devel-2.17-36.el7 (i686)</li> <li>glibc-devel-2.17-36.el7 (x86_64)</li> <li>ksh</li> <li>libaio-0.3.109-9.el7 (i686)</li> <li>libaio-0.3.109-9.el7 (x86_64)</li> <li>libaio-devel-0.3.109-9.el7 (i686)</li> <li>libaio-devel-0.3.109-9.el7 (x86_64)</li> <li>libX11-1.6.0-2.1.el7 (i686)</li> <li>libX11-1.6.0-2.1.el7 (x86_64)</li> <li>libXau-1.0.8-2.1.el7 (i686)</li> <li>libXau-1.0.8-2.1.el7 (x86_64)</li> <li>libXi-1.7.2-1.el7 (i686)</li> <li>libXi-1.7.2-1.el7 (x86_64)</li> <li>libXtst-1.2.2-1.el7 (i686)</li> <li>libXtst-1.2.2-1.el7 (x86_64)</li> <li>libXrender (i686)</li> <li>libXrender (x86_64)</li> <li>libXrender-devel (i686)</li> <li>libXrender-devel (x86_64)</li> <li>libgcc-4.8.2-3.el7 (i686)</li> <li>libgcc-4.8.2-3.el7 (x86_64)</li> <li>libstdc++-4.8.2-3.el7 (i686)</li> <li>libstdc++-4.8.2-3.el7 (x86_64)</li> <li>libstdc++-devel-4.8.2-3.el7 (i686)</li> <li>libstdc++-devel-4.8.2-3.el7 (x86_64)</li> <li>libxcb-1.9-5.el7 (i686)</li> <li>libxcb-1.9-5.el7 (x86_64)</li> <li>make-3.82-19.el7 (x86_64)</li> <li>nfs-utils-1.3.0-0.21.el7.x86_64 (for Oracle ACFS)</li> <li>net-tools-2.0-0.17.20131004git.el7 (x86_64) (for Oracle RAC and Oracle Clusterware)</li> <li>smartmontools-6.2-4.el7 (x86_64)</li> <li>sysstat-10.1.5-1.el7 (x86_64)</li> </ul>

## Supported Oracle Linux 6 Distributions for x86-64

Use the following information to check supported Oracle Linux 6 distributions:

**Table 3-3 x86-64 Oracle Linux 6 Minimum Operating System Requirements**

Item	Requirements
SSH Requirement	Ensure that OpenSSH is installed on your servers. OpenSSH is the required SSH software.
Oracle Linux 6	<p>Subscribe to the Oracle Linux 6 channel on the Unbreakable Linux Network, or configure a yum repository from the Oracle Linux yum server website, and then install the Oracle Preinstallation RPM. This RPM installs all required kernel packages for Oracle Grid Infrastructure and Oracle Database installations, and performs other system configuration.</p> <p>Supported distributions:</p> <ul style="list-style-type: none"><li>• Oracle Linux 6.4 with the Unbreakable Enterprise Kernel 2: 2.6.39-400.211.1.el6uek.x86_64 or later</li><li>• Oracle Linux 6.6 with the Unbreakable Enterprise Kernel 3: 3.8.13-44.1.1.el6uek.x86_64 or later</li><li>• Oracle Linux 6.8 with the Unbreakable Enterprise Kernel 4: 4.1.12-37.6.2.el6uek.x86_64 or later</li><li>• Oracle Linux 6.4 with the Red Hat Compatible kernel: 2.6.32-358.el6.x86_64 or later</li></ul>

**Table 3-3 (Cont.) x86-64 Oracle Linux 6 Minimum Operating System Requirements**

Item	Requirements
Packages for Oracle Linux 6	<p>The following packages (or later versions) must be installed:</p> <p>bc  binutils-2.20.51.0.2-5.36.el6 (x86_64)  compat-libcap1-1.10-1 (x86_64)  compat-libstdc++-33-3.2.3-69.el6 (x86_64)  compat-libstdc++-33-3.2.3-69.el6 (i686)  e2fsprogs-1.41.12-14.el6 (x86_64)  e2fsprogs-libs-1.41.12-14.el6 (x86_64)  glibc-2.12-1.7.el6 (i686)  glibc-2.12-1.7.el6 (x86_64)  glibc-devel-2.12-1.7.el6 (x86_64)  glibc-devel-2.12-1.7.el6 (i686)  ksh  libgcc-4.4.4-13.el6 (i686)  libgcc-4.4.4-13.el6 (x86_64)  libstdc++-4.4.4-13.el6 (x86_64)  libstdc++-4.4.4-13.el6 (i686)  libstdc++-devel-4.4.4-13.el6 (x86_64)  libstdc++-devel-4.4.4-13.el6 (i686)  libaio-0.3.107-10.el6 (x86_64)  libaio-0.3.107-10.el6 (i686)  libaio-devel-0.3.107-10.el6 (x86_64)  libaio-devel-0.3.107-10.el6 (i686)  libXtst-1.0.99.2 (x86_64)  libXtst-1.0.99.2 (i686)  libX11-1.5.0-4.el6 (i686)  libX11-1.5.0-4.el6 (x86_64)  libXau-1.0.6-4.el6 (i686)  libXau-1.0.6-4.el6 (x86_64)  libxcb-1.8.1-1.el6 (i686)  libxcb-1.8.1-1.el6 (x86_64)  libXi-1.3 (x86_64)  libXi-1.3 (i686)  libXrender (i686)  libXrender (x86_64)  libXrender-devel (i686)  libXrender-devel (x86_64)  make-3.81-19.el6  net-tools-1.60-110.el6_2.x86_64 (for Oracle RAC and Oracle Clusterware)  nfs-utils-1.2.3-15.0.1 (for Oracle ACFS)  sysstat-9.0.4-11.el6 (x86_64)  smartmontools-5.43-1.el6.x86_64</p>

## Supported Red Hat Enterprise Linux 8 Distributions for x86-64

Use the following information to check supported Red Hat Enterprise Linux 8 distributions:

**Table 3-4 x86-64 Red Hat Enterprise Linux 8 Minimum Operating System Requirements**

Item	Requirements
SSH Requirement	Ensure that OpenSSH is installed on your servers. OpenSSH is the required SSH software.
Red Hat Enterprise Linux 8	Minimum supported versions: <ul style="list-style-type: none"> <li>Red Hat Enterprise Linux 8.2: 4.18.0-193.19.1.el8_2.x86_64 or later</li> </ul>
Packages for Red Hat Enterprise Linux 8	Install the latest released versions of the following packages: <p>bc binutils compat-openssl10 elfutils-libelf glibc glibc-devel ksh libaio libXrender libX11 libXau libXi libXtst libgcc libnsl libstdc++ libxcb libibverbs make smartmontools sysstat</p> <p><b>Note:</b> If you intend to use 32-bit client applications to access 64-bit servers, then you must also install (where available) the latest 32-bit versions of the packages listed in this table.</p>
Optional Packages for Red Hat Enterprise Linux 8	Based on your requirement, install the latest released versions of the following packages: <p>ipmiutil (for Intelligent Platform Management Interface) libnsl2 (for Oracle Database Client only) libnsl2-devel (for Oracle Database Client only) net-tools (for Oracle RAC and Oracle Clusterware) nfs-utils (for Oracle ACFS)</p>

 **Note:**

- See *Oracle Database Release Notes for Linux* for information about installing Oracle Database 12c Release 2 (12.2) or Oracle RAC 12c Release 2 (12.2) on Red Hat Enterprise Linux 8.
- You cannot install Oracle Grid Infrastructure 12c Release 2 (12.2) on Oracle Linux 8 or Red Hat Enterprise Linux 8. For Oracle RAC installations, first install Oracle Grid Infrastructure release update (RU) 19.13 or later, and then install Oracle RAC 12c Release 2 (12.2). See *Oracle Database Release Notes for Linux*.
- Oracle Database Client 12c Release 2 (12.2) supports both 32-bit and 64-bit versions on Oracle Linux 8.2 and Red Hat Enterprise Linux 8.2.

## Supported Red Hat Enterprise Linux 7 Distributions for x86-64

Use the following information to check supported Red Hat Enterprise Linux 7 distributions:

**Table 3-5 x86-64 Red Hat Enterprise Linux 7 Minimum Operating System Requirements**

Item	Requirements
SSH Requirement	Ensure that OpenSSH is installed on your servers. OpenSSH is the required SSH software.
Red Hat Enterprise Linux 7	Supported distributions: <ul style="list-style-type: none"> <li>• Red Hat Enterprise Linux 7: 3.10.0-123.el7.x86_64 or later</li> </ul>

**Table 3-5 (Cont.) x86-64 Red Hat Enterprise Linux 7 Minimum Operating System Requirements**

Item	Requirements
Packages for Red Hat Enterprise Linux 7	<p>The following packages (or later versions) must be installed:</p> <ul style="list-style-type: none"> <li>bc</li> <li>binutils-2.23.52.0.1-12.el7 (x86_64)</li> <li>compat-libcap1-1.10-3.el7 (x86_64)</li> <li>compat-libstdc++-33-3.2.3-71.el7 (i686)</li> <li>compat-libstdc++-33-3.2.3-71.el7 (x86_64)</li> <li>glibc-2.17-36.el7 (i686)</li> <li>glibc-2.17-36.el7 (x86_64)</li> <li>glibc-devel-2.17-36.el7 (i686)</li> <li>glibc-devel-2.17-36.el7 (x86_64)</li> <li>ksh</li> <li>libaio-0.3.109-9.el7 (i686)</li> <li>libaio-0.3.109-9.el7 (x86_64)</li> <li>libaio-devel-0.3.109-9.el7 (i686)</li> <li>libaio-devel-0.3.109-9.el7 (x86_64)</li> <li>libgcc-4.8.2-3.el7 (i686)</li> <li>libgcc-4.8.2-3.el7 (x86_64)</li> <li>libstdc++-4.8.2-3.el7 (i686)</li> <li>libstdc++-4.8.2-3.el7 (x86_64)</li> <li>libstdc++-devel-4.8.2-3.el7 (i686)</li> <li>libstdc++-devel-4.8.2-3.el7 (x86_64)</li> <li>libxcb-1.9-5.el7 (i686)</li> <li>libxcb-1.9-5.el7 (x86_64)</li> <li>libX11-1.6.0-2.1.el7 (i686)</li> <li>libX11-1.6.0-2.1.el7 (x86_64)</li> <li>libXau-1.0.8-2.1.el7 (i686)</li> <li>libXau-1.0.8-2.1.el7 (x86_64)</li> <li>libXi-1.7.2-1.el7 (i686)</li> <li>libXi-1.7.2-1.el7 (x86_64)</li> <li>libXtst-1.2.2-1.el7 (i686)</li> <li>libXtst-1.2.2-1.el7 (x86_64)</li> <li>libXrender (i686)</li> <li>libXrender (x86_64)</li> <li>libXrender-devel (i686)</li> <li>libXrender-devel (x86_64)</li> <li>make-3.82-19.el7 (x86_64)</li> <li>net-tools-2.0-0.17.20131004git.el7 (x86_64) (for Oracle RAC and Oracle Clusterware)</li> <li>nfs-utils-1.3.0-0.21.el7.x86_64 (for Oracle ACFS)</li> <li>smartmontools-6.2-4.el7 (x86_64)</li> <li>sysstat-10.1.5-1.el7 (x86_64)</li> </ul>

## Supported Red Hat Enterprise Linux 6 Distributions for x86-64

Use the following information to check supported Red Hat Enterprise Linux 6 distributions:



**Table 3-6 x86-64 Red Hat Enterprise Linux 6 Minimum Operating System Requirements**

Item	Requirements
SSH Requirement	Ensure that OpenSSH is installed on your servers. OpenSSH is the required SSH software.
Red Hat Enterprise Linux 6	Supported distributions: <ul style="list-style-type: none"> <li>Red Hat Enterprise Linux 6.4: 2.6.32-358.el6.x86_64 or later</li> </ul>
Packages for Red Hat Enterprise Linux 6	The following packages (or later versions) must be installed: <p>bc  binutils-2.20.51.0.2-5.36.el6 (x86_64)  compat-libcap1-1.10-1 (x86_64)  compat-libstdc++-33-3.2.3-69.el6 (x86_64)  compat-libstdc++-33-3.2.3-69.el6 (i686)  e2fsprogs-1.41.12-14.el6 (x86_64)  e2fsprogs-libs-1.41.12-14.el6 (x86_64)  glibc-2.12-1.107.el6 (i686)  glibc-2.12-1.107.el6 (x86_64)  glibc-devel-2.12-1.107.el6 (i686)  glibc-devel-2.12-1.107.el6 (x86_64)  ksh  libaio-0.3.107-10.el6 (x86_64)  libaio-0.3.107-10.el6 (i686)  libaio-devel-0.3.107-10.el6 (x86_64)  libaio-devel-0.3.107-10.el6 (i686)  libX11-1.5.0-4.el6 (i686)  libX11-1.5.0-4.el6 (x86_64)  libXau-1.0.6-4.el6 (i686)  libXau-1.0.6-4.el6 (x86_64)  libXi-1.6.1-3.el6 (i686)  libXi-1.6.1-3.el6 (x86_64)  libXtst-1.2.1-2.el6 (i686)  libXtst-1.2.1-2.el6 (x86_64)  libgcc-4.4.7-3.el6 (i686)  libgcc-4.4.7-3.el6 (x86_64)  libstdc++-4.4.7-3.el6 (i686)  libstdc++-4.4.7-3.el6 (x86_64)  libstdc++-devel-4.4.7-3.el6 (i686)  libstdc++-devel-4.4.7-3.el6 (x86_64)  libxcb-1.8.1-1.el6 (i686)  libxcb-1.8.1-1.el6 (x86_64)  libXrender (i686)  libXrender (x86_64)  libXrender-devel (i686)  libXrender-devel (x86_64)  make-3.81-20.el6 (x86_64)  net-tools-1.60-110.el6_2 (x86_64) (for Oracle RAC and Oracle Clusterware)  nfs-utils-1.2.3-36.el6 (x86_64) (for Oracle ACFS)  smartmontools-5.43-1.el6 (x86_64)  sysstat-9.0.4-20.el6 (x86_64)</p>

## Supported SUSE Linux Enterprise Server 15 Distributions for x86-64

Use the following information to check supported SUSE Linux Enterprise Server 15 distributions:

**Table 3-7 x86-64 SUSE Linux Enterprise Server 15 Minimum Operating System Requirements**

Item	Requirements
SSH Requirement	Ensure that OpenSSH is installed on your servers. OpenSSH is the required SSH software.
SUSE Linux Enterprise Server	Supported distributions: SUSE Linux Enterprise Server 15: 4.12.14-25-default or later
Package requirements for SUSE Linux Enterprise Server 15	Install the following packages (or later versions): binutils-2.31-6.3.1.x86_64 gcc-7-1.563.x86_64 glibc-2.26-13.8.1.x86_64 glibc-32bit-2.26-13.8.1.x86_64 glibc-devel-2.26-13.8.1.x86_64 libaio-devel-0.3.109-1.25.x86_64 libaio1-0.3.109-1.25.x86_64 libcap1-1.97-1.15.x86_64 libstdc++6-devel-gcc7-7.4.0+r266845-4.3.4.x86_64 libstdc++6-8.2.1+r264010-1.3.7.x86_64 libgcc_s1-8.2.1+r264010-1.3.7.x86_64 libgcc_s1-32bit-8.2.1+r264010-1.3.7.x86_64 make-4.2.1-7.3.2.x86_64 mksh-56c-1.10.x86_64 sysstat-12.0.2-3.3.1.x86_64 xorg-x11-fonts-core-7.6-3.9.noarch xorg-x11-server-extra-1.19.6-8.6.1.x86_64 xorg-x11-Xvnc-1.8.0-13.8.5.x86_64 xorg-x11-server-1.19.6-8.6.1.x86_64 xorg-x11-libs-7.6.1-1.16.noarch xorg-x11-essentials-7.6_1-1.22.noarch xorg-x11-fonts-7.6-3.9.noarch xorg-x11-7.6_1-1.22.noarch xorg-x11-driver-video-7.6_1-2.30.x86_64

 **Note:**

If you intend to use 32-bit client applications to access 64-bit servers, then you must also install the latest 32-bit versions of the packages listed in this table.

## Supported SUSE Linux Enterprise Server 12 Distributions for x86-64

Use the following information to check supported SUSE Linux Enterprise Server 12 distributions:

**Table 3-8 x86-64 SUSE Linux Enterprise Server 12 Minimum Operating System Requirements**

Item	Requirements
SSH Requirement	Ensure that OpenSSH is installed on your servers. OpenSSH is the required SSH software.
SUSE Linux Enterprise Server	Supported distributions: SUSE Linux Enterprise Server 12 SP1: 3.12.49-11.1 or later

**Table 3-8 (Cont.) x86-64 SUSE Linux Enterprise Server 12 Minimum Operating System Requirements**

Item	Requirements
Package requirements for SUSE Linux Enterprise Server 12	<p>The following packages (or later versions) must be installed:</p> <ul style="list-style-type: none"> <li>bc</li> <li>binutils-2.24-2.165.x86_64</li> <li>gcc-c++-32bit-4.8-6.189.x86_64</li> <li>gcc-c++-4.8-6.189.x86_64</li> <li>gcc48-c++-4.8.3+r212056-6.3.x86_64</li> <li>gcc-32bit-4.8-6.189.x86_64</li> <li>gcc-4.8-6.189.x86_64</li> <li>gcc-info-4.8-6.189.x86_64</li> <li>gcc-locale-4.8-6.189.x86_64</li> <li>gcc48-32bit-4.8.3+r212056-6.3.x86_64</li> <li>gcc48-4.8.3+r212056-6.3.x86_64</li> <li>gcc48-info-4.8.3+r212056-6.3.noarch</li> <li>gcc48-locale-4.8.3+r212056-6.3.x86_64</li> <li>glibc-2.19-17.72.x86_64</li> <li>glibc-devel-2.19-17.72.x86_64</li> <li>libaio-devel-0.3.109-17.15.x86_64</li> <li>libaio1-0.3.109-17.15.x86_64</li> <li>libaio1-32bit-0.3.109-17.15.x86_64</li> <li>libgfortran3-4.8.3+r212056-6.3.x86_64</li> <li>libX11-6-1.6.2-4.12.x86_64</li> <li>libX11-6-32bit-1.6.2-4.12.x86_64</li> <li>libXau6-1.0.8-4.58.x86_64</li> <li>libXau6-32bit-1.0.8-4.58.x86_64</li> <li>libXtst6-1.2.2-3.60.x86_64</li> <li>libXtst6-32bit-1.2.1-2.4.1.x86_64</li> <li>libcap-ng-utils-0.7.3-4.125.x86_64</li> <li>libcap-ng0-0.7.3-4.125.x86_64</li> <li>libcap-ng0-32bit-0.7.3-4.125.x86_64</li> <li>libcap-progs-2.22-11.709.x86_64</li> <li>libcap1-1.10-59.61.x86_64</li> <li>libcap1-32bit-1.10-59.61.x86_64</li> <li>libcap2-2.22-11.709.x86_64</li> <li>libcap2-32bit-2.22-11.709.x86_64</li> <li>libgcc_s1-32bit-4.8.3+r212056-6.3.x86_64</li> <li>libgcc_s1-4.8.3+r212056-6.3.x86_64</li> <li>libpcap1-1.5.3-2.18.x86_64</li> <li>libstdc++6-32bit-4.8.3+r212056-6.3.x86_64</li> <li>libstdc++6-4.8.3+r212056-6.3.x86_64</li> <li>libstdc++33-3.3.3-62.1.x86_64.rpm</li> <li>make-4.0-2.107.x86_64</li> <li>mksh-50-2.13.x86_64</li> <li>net-tools-1.60-764.185.x86_64 (for Oracle RAC and Oracle Clusterware)</li> <li>nfs-kernel-server-1.3.0-6.9.x86_64 (for Oracle ACFS)</li> <li>smartmontools-6.2-4.33.x86_64</li> <li>sysstat-8.1.5-7.32.1.x86_64</li> <li>xorg-x11-libs-7.6-45.14</li> </ul>

## Supported NeoKylin Linux Advanced Server 7 Distributions for x86-64

Use the following information to check supported NeoKylin Linux Advanced Server 7 distributions:

**Table 3-9 x86-64 NeoKylin Linux Advanced Server 7 Minimum Operating System Requirements**

Item	Requirements
SSH Requirement	Ensure that OpenSSH is installed on your servers. OpenSSH is the required SSH software.
NeoKylin Linux Advanced Server	Supported distribution: NeoKylin Linux Advanced Server 7: 3.10.0-693.el7.x86_64 or later
Packages for NeoKylin Linux Advanced Server 7	Install the following packages (or later versions): binutils-2.25.1-31.base.el7.x86_64 compat-libcap1-1.10-7.el7.x86_64 gcc-4.8.5-16.el7.ns7.02.x86_64 gcc-c++-4.8.5-16.el7.ns7.02.x86_64 glibc-2.17-196.el7.ns7.01.x86_64 glibc-devel-2.17-196.el7.ns7.01.x86_64 ksh-20120801-34.el7.x86_64 libaio-0.3.109-13.el7.x86_64 libaio-devel-0.3.109-13.el7.x86_64 libgcc-4.8.5-16.el7.ns7.02.x86_64 libstdc++-4.8.5-16.el7.ns7.02.x86_64 libstdc++-devel-4.8.5-16.el7.ns7.02.x86_64 libXi-1.7.9-1.el7.x86_64 libXtst-1.2.3-1.el7.x86_64 make-3.82-23.el7.x86_64 sysstat-10.1.5-12.el7.x86_64

## Operating System Requirements for IBM: Linux on System z

The Linux distributions and packages listed in this section are supported for this release on IBM: Linux on System z.

Identify the requirements for your IBM: Linux on System z distribution, and ensure that you have a supported kernel and required packages installed before starting installation.



### Note:

32-bit packages in these requirements lists are needed only if you intend to use 32-bit client applications to access 64-bit servers.

The platform-specific hardware and software requirements included in this guide were current when this guide was published. However, because new platforms and operating system software versions may be certified after this guide is published, review the certification matrix

on the My Oracle Support website for the most up-to-date list of certified hardware platforms and operating system versions:

<https://support.oracle.com/>

- [Supported Red Hat Enterprise Linux 7 Distributions for IBM: Linux on System z](#)  
 Use the following information to check supported Red Hat Enterprise Linux 7 distributions:
- [Supported Red Hat Enterprise Linux 6 Distributions for IBM: Linux on System z](#)  
 Use the following information to check supported Red Hat Enterprise Linux 6 distributions:
- [Supported SUSE Linux Enterprise Server 12 Distributions for IBM: Linux on System z](#)  
 Use the following information to check supported SUSE Linux Enterprise Server 12 distributions:

## Supported Red Hat Enterprise Linux 7 Distributions for IBM: Linux on System z

Use the following information to check supported Red Hat Enterprise Linux 7 distributions:

**Table 3-10 Red Hat Enterprise Linux 7 Minimum Operating System Requirements**

Item	Requirements
SSH Requirement	Ensure that OpenSSH is installed on your servers. OpenSSH is the required SSH software.
Red Hat Enterprise Linux 7	Red Hat Enterprise Linux 7.2: 3.10.0-327.el7.s390x or later

**Table 3-10 (Cont.) Red Hat Enterprise Linux 7 Minimum Operating System Requirements**

Item	Requirements
Packages for Red Hat Enterprise Linux 7	The following packages (or later versions) must be installed: binutils-2.23.52.0.1-55.el7 (s390x) compat-libcap1-1.10-7.el7 (s390x) gcc-4.8.5-4.el7 (s390x) gcc-c++-4.8.5-4.el7 (s390x) glibc-2.17-105.el7 (s390) glibc-2.17-105.el7 (s390x) glibc-devel-2.17-105.el7 (s390) glibc-devel-2.17-105.el7 (s390x) ksh-20120801-22.el7_1.2 (s390x) libXaw-1.0.12-5.el7 (s390) libXft-2.3.2-2.el7 (s390) libXi-1.7.4-2.el7 (s390) libXi-1.7.4-2.el7 (s390x) libXmu-1.1.2-2.el7 (s390) libXp-1.0.2-2.1.el7 (s390) libXtst-1.2.2-2.1.el7 (s390) libXtst-1.2.2-2.1.el7 (s390x) libaio-0.3.109-13.el7 (s390) libaio-0.3.109-13.el7 (s390x) libaio-devel-0.3.109-13.el7 (s390x) libgcc-4.8.5-4.el7 (s390) libgcc-4.8.5-4.el7 (s390x) libgfortran-4.8.5-4.el7 (s390x) libstdc++-4.8.5-4.el7 (s390x) libstdc++-devel-4.8.5-4.el7 (s390x) make-3.82-21.el7 (s390x) sysstat-10.1.5-7.el7 (s390x)

## Supported Red Hat Enterprise Linux 6 Distributions for IBM: Linux on System z

Use the following information to check supported Red Hat Enterprise Linux 6 distributions:

**Table 3-11 Red Hat Enterprise Linux 6 Minimum Operating System Requirements**

Item	Requirements
SSH Requirement	Ensure that OpenSSH is installed on your servers. OpenSSH is the required SSH software.
Red Hat Enterprise Linux 6	Red Hat Enterprise Linux 6.6: 2.6.32-504.el6.s390x or later

**Table 3-11 (Cont.) Red Hat Enterprise Linux 6 Minimum Operating System Requirements**

Item	Requirements
Packages for Red Hat Enterprise Linux 6	The following packages (or later versions) must be installed: binutils-2.20.51.0.2-5.42.el6 (s390x) compat-libcap1-1.10-1 (s390x) compat-libstdc++-33-3.2.3-69.el6 (s390) compat-libstdc++-33-3.2.3-69.el6 (s390x) gcc-4.4.7-11.el6 (s390x) gcc-c++-4.4.7-11.el6 (s390x) glibc-static-2.12-1.149.el6 (s390x) glibc-2.12-1.149.el6 (s390) glibc-2.12-1.149.el6 (s390x) glibc-devel-2.12-1.149.el6 (s390) glibc-devel-2.12-1.149.el6 (s390x) ksh-20120801-21.el6 (s390x) libXaw-1.0.11-2.el6 (s390) libXft-2.3.1-2.el6 (s390) libXi-1.7.2-2.2.el6 (s390) libXi-1.7.2-2.2.el6 (s390x) libXmu-1.1.1-2.el6 (s390) libXp-1.0.2-2.1.el6 (s390) libXtst-1.2.2-2.1.el6 (s390) libXtst-1.2.2-2.1.el6 (s390x) libaio-0.3.107-10.el6 (s390) libaio-0.3.107-10.el6 (s390x) libaio-devel-0.3.107-10.el6 (s390x) libgcc-4.4.7-11.el6 (s390) libgcc-4.4.7-11.el6 (s390x) libstdc++-4.4.7-11.el6 (s390) libstdc++-4.4.7-11.el6 (s390x) libstdc++-devel-4.4.7-11.el6 (s390x) make-3.81-20.el6 (s390x) sysstat-9.0.4-27.el6 (s390x)

## Supported SUSE Linux Enterprise Server 12 Distributions for IBM: Linux on System z

Use the following information to check supported SUSE Linux Enterprise Server 12 distributions:

**Table 3-12 SUSE Linux Enterprise Server 12 Minimum Operating System Requirements**

Item	Requirements
SSH Requirement	Ensure that OpenSSH is installed on your servers. OpenSSH is the required SSH software.



**Table 3-12 (Cont.) SUSE Linux Enterprise Server 12 Minimum Operating System Requirements**

Item	Requirements
SUSE Linux Enterprise Server 12	SUSE Linux Enterprise Server 12 SP1: 3.12.49-11-default s390x or later
Packages for SUSE Linux Enterprise Server 12	The following packages (or later versions) must be installed: binutils-2.25.0-13.1 (s390x) gcc-4.8-6.189 (s390x) gcc-c++-4.8-6.189 (s390x) glibc-2.19-31.9 (s390x) glibc-32bit-2.19-31.9 (s390x) glibc-devel-2.19-31.9 (s390x) glibc-devel-32bit-2.19-31.9 (s390x) libaio-devel-0.3.109-17.15 (s390x) libaio-devel-32bit-0.3.109-17.15 (s390x) libaio1-0.3.109-17.15 (s390x) libaio1-32bit-0.3.109-17.15 (s390x) libX11-6-1.6.2-4.12 (s390x) libX11-6-32bit-1.6.2-4.12 (s390x) libXau6-1.0.8-4.58 (s390x) libXau6-32bit-1.0.8-4.58 (s390x) libXaw7-1.0.12-3.62 (s390x) libXext6-1.3.2-3.61 (s390x) libXext6-32bit-1.3.2-3.61 (s390x) libXft2-2.3.1-9.32 (s390x) libXft2-32bit-2.3.1-9.32 (s390x) libXi6-1.7.4-9.2.s390x libXi6-1.7.4-9.2 (s390x ) libXi6-32bit-1.7.4-9.2 (s390x) libXmu6-1.1.2-3.60 (s390x) libXp6-1.0.2-3.58 (s390x) libXp6-1.0.2-3.58.s390x (32bit) libXtst6-1.2.2-3.60 (s390x) libXtst6-32bit-1.2.2-3.60 (s390x) libXmu6-1.1.2-3.60 (s390x) (32bit) libcap2-2.22-11.709 (s390x) libstdc++48-devel-32bit-4.8.5-24.1 (s390x) libstdc++48-devel-4.8.5-24.1 (s390x) libstdc++6-32bit-5.2.1+r226025-4.1 (s390x) libstdc++6-5.2.1+r226025-4.1 (s390x) libxcb1-1.10-1.21 (s390x) libxcb1-32bit-1.10-1.21 (s390x) make-4.0-4.1 (s390x) mksh-50-2.13 (s390x)

## Additional Drivers and Software Packages for Linux

Information about optional drivers and software packages.

You are not required to install additional drivers and packages, but you may choose to install or configure these drivers and packages.

- [Installing PAM for Login Authentication on Linux](#)  
Pluggable Authentication Modules (PAM) is a system of libraries that handle user authentication tasks for applications.
- [Installing Oracle Messaging Gateway](#)  
Oracle Messaging Gateway is installed with Enterprise Edition of Oracle Database. However, you may require a CSD or Fix Packs.
- [Installation Requirements for ODBC and LDAP](#)  
Review these topics to install Open Database Connectivity (ODBC) and Lightweight Directory Access Protocol (LDAP).
- [Installation Requirements for Programming Environments for Linux](#)  
Review the following section to install programming environments:
- [Installation Requirements for Web Browsers](#)  
Web browsers are required only if you intend to use Oracle Enterprise Manager Database Express and Oracle Enterprise Manager Cloud Control. Web browsers must support JavaScript, and the HTML 4.0 and CSS 1.0 standards.

## Installing PAM for Login Authentication on Linux

Pluggable Authentication Modules (PAM) is a system of libraries that handle user authentication tasks for applications.

On Linux, external scheduler jobs require PAM. Oracle strongly recommends that you install the latest Linux-PAM library for your Linux distribution.

Use a package management system (`yum`, `up2date`, `YaST`) for your distribution to install the latest `pam` (Pluggable Authentication Modules for Linux) library.

## Installing Oracle Messaging Gateway

Oracle Messaging Gateway is installed with Enterprise Edition of Oracle Database. However, you may require a CSD or Fix Packs.

If you require a CSD or Fix Packs for IBM WebSphere MQ, then see the following website for more information:

<http://www.ibm.com>



### Note:

Oracle Messaging Gateway does not support the integration of Advanced Queuing with TIBCO Rendezvous on IBM: Linux on System z.

### Related Topics

- *Oracle Database Advanced Queuing User's Guide*

## Installation Requirements for ODBC and LDAP

Review these topics to install Open Database Connectivity (ODBC) and Lightweight Directory Access Protocol (LDAP).

- [About ODBC Drivers and Oracle Database](#)  
Open Database Connectivity (ODBC) is a set of database access APIs that connect to the database, prepare, and then run SQL statements on the database.
- [Installing ODBC Drivers for Linux x86-64](#)  
If you intend to use ODBC, then install the most recent ODBC Driver Manager for Linux.
- [About LDAP and Oracle Plug-ins](#)  
Lightweight Directory Access Protocol (LDAP) is an application protocol for accessing and maintaining distributed directory information services over IP networks.
- [Installing the LDAP Package](#)  
LDAP is included in a default Linux operating system installation.

## About ODBC Drivers and Oracle Database

Open Database Connectivity (ODBC) is a set of database access APIs that connect to the database, prepare, and then run SQL statements on the database.

An application that uses an ODBC driver can access non-uniform data sources, such as spreadsheets and comma-delimited files.

## Installing ODBC Drivers for Linux x86-64

If you intend to use ODBC, then install the most recent ODBC Driver Manager for Linux.

Download and install the ODBC Driver Manager and Linux RPMs from the following website:

<http://www.unixodbc.org>

Review the minimum supported ODBC driver releases, and install ODBC drivers of the following or later releases for all Linux distributions:

unixODBC-2.3.1 or later

## About LDAP and Oracle Plug-ins

Lightweight Directory Access Protocol (LDAP) is an application protocol for accessing and maintaining distributed directory information services over IP networks.

You require the LDAP package if you want to use features requiring LDAP, including the Oracle Database scripts `odisrvreg` and `oidca` for Oracle Internet Directory, or `schemasync` for third-party LDAP directories.

## Installing the LDAP Package

LDAP is included in a default Linux operating system installation.

If you did not perform a default Linux installation, and you intend to use Oracle scripts requiring LDAP, then use a package management system (`up2date`, `YaST`) for your distribution to install a supported LDAP package for your distribution, and install any other required packages for that LDAP package.

## Installation Requirements for Programming Environments for Linux

Review the following section to install programming environments:

- [Installation Requirements for Programming Environments for Linux x86-64](#)  
Ensure that your system meets the requirements for the programming environment you want to configure:
- [Installation Requirements for Programming Environments for IBM: Linux on System z](#)  
Ensure that your system meets the requirements for the programming environment you want to configure:

## Installation Requirements for Programming Environments for Linux x86-64

Ensure that your system meets the requirements for the programming environment you want to configure:

**Table 3-13 Requirements for Programming Environments for Linux X86-64**

Programming Environments	Support Requirements
Java Database Connectivity (JDBC) / Oracle Call Interface (OCI)	JDK 8 (Java SE Development Kit) with the JNDI extension with Oracle Java Database Connectivity.
Oracle C++ Call Interface Pro*C/C++	Intel C/C++ Compiler 14.0.3 or later, or the version of GNU C and C++ compilers listed in the software requirements section in this document for your platform.  Oracle C++ Call Interface (OCCI) applications can be built only with Intel C++ Compiler 14.0.3 used with the standard template libraries of the gcc versions listed in the software requirements section in this document for your platform.
Oracle XML Developer's Kit (XDK)	Oracle XML Developer's Kit is supported with the same compilers as OCCI.
Pro*COBOL	Micro Focus Server Express 5.1 Micro Focus Visual COBOL for Eclipse 2.2 - Update 2

## Installation Requirements for Programming Environments for IBM: Linux on System z

Ensure that your system meets the requirements for the programming environment you want to configure:

**Table 3-14 Requirements for Programming Environments for IBM: Linux on System z**

Programming Environments	Support Requirements
Java Database Connectivity (JDBC) / Oracle Call Interface (OCI)	JDK 8 (Java SE Development Kit) with the JNDI extension with Oracle Java Database Connectivity.
Pro*COBOL	Micro Focus Server Express 5.1

## Installation Requirements for Web Browsers

Web browsers are required only if you intend to use Oracle Enterprise Manager Database Express and Oracle Enterprise Manager Cloud Control. Web browsers must support JavaScript, and the HTML 4.0 and CSS 1.0 standards.

<https://support.oracle.com>

### Related Topics

- *Oracle Enterprise Manager Cloud Control Basic Installation Guide*

## Checking Kernel and Package Requirements for Linux

Verify your kernel and packages to see if they meet minimum requirements for installation.

1. To determine the distribution and version of Linux installed, enter one of the following commands:

```
# cat /etc/oracle-release
# cat /etc/redhat-release
# cat /etc/SuSE-release
# lsb_release -id
```

2. To determine if the required kernel errata is installed, enter the following command:

```
# uname -r
```

The following is an example of the output this command displays on an Oracle Linux 6 system:

```
2.6.39-100.7.1.el6uek.x86_64
```

Review the required errata level for your distribution. If the errata level is previous to the required minimum errata update, then obtain and install the latest kernel update from your Linux distributor.

3. To determine whether the required packages are installed, enter commands similar to the following:

```
# rpm -q package_name
```

Alternatively, if you require specific system architecture information, then enter the following command:

```
# rpm -qa --queryformat "%{NAME}-%{VERSION}-%{RELEASE} (%{ARCH})\n" | grep package_name
```

You can also combine a query for multiple packages, and review the output for the correct versions. For example:

```
# rpm -q binutils compat-libstdc++ gcc glibc libaio libgcc libstdc++ \
make sysstat unixodbc
```

If a package is not installed, then install it from your Linux distribution media or download the required package version from your Linux distributor's website.

# 4

## Configuring Users, Groups and Environments for Oracle Database Client

Before installation, create operating system groups and users, and configure user environments.

- [Required Operating System Groups and Users](#)  
Oracle software installations require an installation owner, an Oracle Inventory group, which is the primary group of all Oracle installation owners, and at least one group designated as a system privileges group.
- [Creating Operating System Oracle Installation User Accounts](#)  
Before starting installation, create Oracle software owner user accounts, and configure their environments.
- [Unsetting Oracle Installation Owner Environment Variables](#)  
Unset Oracle installation owner environment variables before you start the installation.

### Required Operating System Groups and Users

Oracle software installations require an installation owner, an Oracle Inventory group, which is the primary group of all Oracle installation owners, and at least one group designated as a system privileges group.

Review group and user options with your system administrator. If you have system administration privileges, then review the topics in this section and configure operating system groups and users as needed.

- [Determining If an Oracle Inventory and Oracle Inventory Group Exist](#)  
Determine if you have an existing Oracle central inventory, and ensure that you use the same Oracle Inventory for all Oracle software installations. Also, ensure that all Oracle software users you intend to use for installation have permissions to write to this directory.
- [Creating the Oracle Inventory Group If an Oracle Inventory Does Not Exist](#)  
Create an Oracle Inventory group manually as part of a planned installation, particularly where more than one Oracle software product is installed on servers.
- [About Oracle Installation Owner Accounts](#)  
Select or create an Oracle installation owner for your installation, depending on the group and user management plan you want to use for your installations.
- [Identifying an Oracle Software Owner User Account](#)  
You must create at least one software owner user account the first time you install Oracle software on the system. Either use an existing Oracle software user account, or create an Oracle software owner user account for your installation.

## Determining If an Oracle Inventory and Oracle Inventory Group Exist

Determine if you have an existing Oracle central inventory, and ensure that you use the same Oracle Inventory for all Oracle software installations. Also, ensure that all Oracle software users you intend to use for installation have permissions to write to this directory.

When you install Oracle software on the system for the first time, OUI creates the `oraInst.loc` file. This file identifies the name of the Oracle Inventory group (by default, `oinstall`), and the path of the Oracle central inventory directory. If you have an existing Oracle central inventory, then ensure that you use the same Oracle Inventory for all Oracle software installations, and ensure that all Oracle software users you intend to use for installation have permissions to write to this directory.

```
oraInst.loccentral_inventory_locationgroup  
  
inventory_loc=central_inventory_location  
inst_group=group
```

Use the `more` command to determine if you have an Oracle central inventory on your system. For example:

```
# more /etc/oraInst.loc  
  
inventory_loc=/u01/app/oraInventory  
inst_group=oinstall
```

Use the command `grep groupname /etc/group` to confirm that the group specified as the Oracle Inventory group still exists on the system. For example:

```
$ grep oinstall /etc/group  
oinstall:x:54321:grid,oracle
```



### Note:

Do not put the `oraInventory` directory under the Oracle base directory for a new installation, because that can result in user permission errors for other installations.

## Creating the Oracle Inventory Group If an Oracle Inventory Does Not Exist

Create an Oracle Inventory group manually as part of a planned installation, particularly where more than one Oracle software product is installed on servers.

By default, if an `oraInventory` group does not exist, then the installer uses the primary group of the installation owner for the Oracle software being installed as the `oraInventory` group. Ensure that this group is available as a primary group for all planned Oracle software installation owners.



```
oraInst.loc

# /usr/sbin/groupadd -g 54321 oinstall
```

## About Oracle Installation Owner Accounts

Select or create an Oracle installation owner for your installation, depending on the group and user management plan you want to use for your installations.

You must create a software owner for your installation in the following circumstances:

- If an Oracle software owner user does not exist; for example, if this is the first installation of Oracle software on the system.
- If an Oracle software owner user exists, but you want to use a different operating system user, with different group membership, to separate Oracle Grid Infrastructure administrative privileges from Oracle Database administrative privileges.

In Oracle documentation, a user created to own only Oracle Grid Infrastructure software installations is called the Grid user (`grid`). This user owns both the Oracle Clusterware and Oracle Automatic Storage Management binaries. A user created to own either all Oracle installations, or one or more Oracle database installations, is called the Oracle user (`oracle`). You can have only one Oracle Grid Infrastructure installation owner, but you can have different Oracle users to own different installations.

Oracle software owners must have the Oracle Inventory group as their primary group, so that each Oracle software installation owner can write to the central inventory (`oraInventory`), and so that OCR and Oracle Clusterware resource permissions are set correctly. The database software owner must also have the OSDBA group and (if you create them) the OSOPER, OSBACKUPDBA, OSDGDBA, OSRACDBA, and OSKMDBA groups as secondary groups.

## Identifying an Oracle Software Owner User Account

You must create at least one software owner user account the first time you install Oracle software on the system. Either use an existing Oracle software user account, or create an Oracle software owner user account for your installation.

To use an existing user account, obtain from your system administrator the name of an existing Oracle installation owner. Confirm that the existing owner is a member of the Oracle Inventory group.

```
oinstalloinstall

$ grep "oinstall" /etc/group
oinstall:x:54321:oracle
```

You can then use the `ID` command to verify that the Oracle installation owners you intend to use have the Oracle Inventory group as their primary group. For example:

```
$ id oracle
uid=54321(oracle) gid=54321(oinstall) groups=54321(oper),54322(dba)
```

After you create operating system groups, create or modify Oracle user accounts in accordance with your operating system authentication planning.

# Creating Operating System Oracle Installation User Accounts

Before starting installation, create Oracle software owner user accounts, and configure their environments.

Oracle software owner user accounts require resource settings and other environment configuration. To protect against accidents, Oracle recommends that you create one software installation owner account for each Oracle software program you install.

- [Creating an Oracle Software Owner User](#)  
If the Oracle software owner user (`oracle`) does not exist, or if you require a new Oracle software owner user, then create it as described in this section.
- [Environment Requirements for Oracle Software Owners](#)  
You must make the following changes to configure Oracle software owner environments:
- [Procedure for Configuring Oracle Software Owner Environments](#)  
Configure each Oracle installation owner user account environment:
- [Setting Remote Display and X11 Forwarding Configuration](#)  
If you are on a remote terminal, and the local system has only one visual (which is typical), then use the following syntax to set your user account `DISPLAY` environment variable:

## Creating an Oracle Software Owner User

If the Oracle software owner user (`oracle`) does not exist, or if you require a new Oracle software owner user, then create it as described in this section.

The following example shows how to create the user `oracle` with the user ID 54321; with the primary group `oinstall`; and with secondary group `dba`.

```
# /usr/sbin/useradd -u 54321 -g oinstall -G dba oracle
```

You must note the user ID number for installation users, because you need it during preinstallation.

For Oracle Grid Infrastructure Installations, user IDs and group IDs must be identical on all candidate nodes.

## Environment Requirements for Oracle Software Owners

You must make the following changes to configure Oracle software owner environments:

- Set the installation software owner user (`grid, oracle`) default file mode creation mask (`umask`) to 022 in the shell startup file. Setting the mask to 022 ensures that the user performing the software installation creates files with 644 permissions.
- Set `ulimit` settings for file descriptors and processes for the installation software owner (`grid, oracle`).

- Set the DISPLAY environment variable in preparation for running an Oracle Universal Installer (OUI) installation.

**▲ Caution:**

If you have existing Oracle installations that you installed with the user ID that is your Oracle Grid Infrastructure software owner, then unset all Oracle environment variable settings for that user.

## Procedure for Configuring Oracle Software Owner Environments

Configure each Oracle installation owner user account environment:

1. Start an X terminal session (`xterm`) on the server where you are running the installation.
2. Enter the following command to ensure that X Window applications can display on this system, where `hostname` is the fully qualified name of the local host from which you are accessing the server:

```
$ xhost + hostname
```

3. If you are not logged in as the software owner user, then switch to the software owner user you are configuring. For example, with the user `grid`:

```
$ su - grid
```

On systems where you cannot run `su` commands, use `sudo` instead:

```
$ sudo -u grid -s
```

4. To determine the default shell for the user, enter the following command:

```
$ echo $SHELL
```

5. Open the user's shell startup file in any text editor:

- Bash shell (`bash`):

```
$ vi .bash_profile
```

- Bourne shell (`sh`) or Korn shell (`ksh`):

```
$ vi .profile
```

- C shell (`csh` or `tcsh`):

```
% vi .login
```

6. Enter or edit the following line, specifying a value of 022 for the default file mode creation mask:

```
umask 022
```

7. If the `ORACLE_SID`, `ORACLE_HOME`, or `ORACLE_BASE` environment variables are set in the file, then remove these lines from the file.
8. Save the file, and exit from the text editor.
9. To run the shell startup script, enter one of the following commands:

- Bash shell:

```
$ . ~/.bash_profile
```

- Bourne, Bash, or Korn shell:

```
$ . ~/.profile
```

- C shell:

```
% source ~/.login
```

10. Use the following command to check the `PATH` environment variable:

```
$ echo $PATH
```

Remove any Oracle environment variables.

11. Unset any Oracle environment variables.

If you have an existing Oracle software installation, and you are using the same user to install this installation, then unset the `$ORACLE_HOME`, `$ORA_NLS10`, and `$TNS_ADMIN` environment variables.

If you have set `$ORA_CRS_HOME` as an environment variable, then unset it before starting an installation or upgrade. Do not use `$ORA_CRS_HOME` as a user environment variable, except as directed by Oracle Support.

12. If you are not installing the software on the local system, then enter a command similar to the following to direct X applications to display on the local system:

- Bourne, Bash, or Korn shell:

```
$ export DISPLAY=local_host:0.0
```

- C shell:

```
% setenv DISPLAY local_host:0.0
```

In this example, `local_host` is the host name or IP address of the system (your workstation, or another client) on which you want to display the installer.

13. If the `/tmp` directory has less than 1 GB of free space, then identify a file system with at least 1 GB of free space and set the `TMP` and `TMPDIR` environment variables to specify a temporary directory on this file system:

 **Note:**

You cannot use a shared file system as the location of the temporary file directory (typically `/tmp`) for Oracle RAC installations. If you place `/tmp` on a shared file system, then the installation fails.

- a. Use the `df -h` command to identify a suitable file system with sufficient free space.
- b. If necessary, enter commands similar to the following to create a temporary directory on the file system that you identified, and set the appropriate permissions on the directory:

```
$ sudo -s
# mkdir /mount_point/tmp
# chmod 775 /mount_point/tmp
# exit
```

- c. Enter commands similar to the following to set the `TMP` and `TMPDIR` environment variables:

Bourne, Bash, or Korn shell:

```
$ TMP=/mount_point/tmp
$ TMPDIR=/mount_point/tmp
$ export TMP TMPDIR
```

C shell:

```
% setenv TMP /mount_point/tmp
% setenv TMPDIR /mount_point/tmp
```

14. To verify that the environment has been set correctly, enter the following commands:

```
$ umask
$ env | more
```

Verify that the `umask` command displays a value of 22, 022, or 0022 and that the environment variables you set in this section have the correct values.

## Setting Remote Display and X11 Forwarding Configuration

If you are on a remote terminal, and the local system has only one visual (which is typical), then use the following syntax to set your user account `DISPLAY` environment variable:

### Remote Display

Bourne, Korn, and Bash shells

```
$ export DISPLAY=hostname:0
```

```
C shell

% setenv DISPLAY hostname:0
```

For example, if you are using the Bash shell and if your host name is `local_host`, then enter the following command:

```
$ export DISPLAY=node1:0
```

### X11 Forwarding

To ensure that X11 forwarding does not cause the installation to fail, use the following procedure to create a user-level SSH client configuration file for Oracle installation owner user accounts:

1. Using any text editor, edit or create the software installation owner's `~/.ssh/config` file.
2. Ensure that the `ForwardX11` attribute in the `~/.ssh/config` file is set to `no`. For example:

```
Host *
    ForwardX11 no
```

3. Ensure that the permissions on `~/.ssh` are secured to the Oracle installation owner user account. For example:

```
$ ls -al .ssh
total 28
drwx----- 2 grid oinstall 4096 Jun 21 2020
drwx----- 19 grid oinstall 4096 Jun 21 2020
-rw-r--r-- 1 grid oinstall 1202 Jun 21 2020 authorized_keys
-rwx----- 1 grid oinstall 668 Jun 21 2020 id_dsa
-rwx----- 1 grid oinstall 601 Jun 21 2020 id_dsa.pub
-rwx----- 1 grid oinstall 1610 Jun 21 2020 known_hosts
```

## Unsetting Oracle Installation Owner Environment Variables

Unset Oracle installation owner environment variables before you start the installation.

The environment variables you have set for the Oracle installation owner account you use to run the installation can cause issues if they are set to values that conflict with the values needed for installation.

If you have set `ORA_CRS_HOME` as an environment variable, following instructions from Oracle Support, then unset it before starting an installation or upgrade. You should never use `ORA_CRS_HOME` as an environment variable except under explicit direction from Oracle Support.

If you have had an existing installation on your system, and you are using the same user account to install this installation, then unset the following environment variables: `ORA_CRS_HOME`, `ORACLE_HOME`, `ORA_NLS10`, `TNS_ADMIN`, and any other environment variable set for the Oracle installation user that is connected with Oracle software homes.

Also, ensure that the `$ORACLE_HOME/bin` path is removed from your `PATH` environment variable.

# 5

## Installing Oracle Database Client

Oracle Database Client installation software is available in multiple media, and can be installed using several options.

The Oracle Database Client software is available on installation media, or you can download it from the Oracle Technology Network website, or the Oracle Software Delivery Cloud portal. In most cases, you use the graphical user interface (GUI) provided by Oracle Universal Installer (OUI) to install the software. However, you can also use Oracle Universal Installer to complete silent mode installations, without using the GUI.

### Note:

You cannot use Oracle Universal Installer from an earlier Oracle release to install components from this release.

- [Accessing the Installation Software](#)  
Oracle Database software is available on installation media, or you can download it from the Oracle Technology Network website, or the Oracle Software Delivery Cloud portal.
- [Installing the Oracle Database Client Software](#)  
These topics explain how to run Oracle Universal Installer to perform most database client installations.
- [About Character Set Selection During Installation](#)  
Review character set options before you start installation.
- [Running Oracle Universal Installer in Different Languages](#)  
Describes how to run Oracle Universal Installer in other languages.

## Accessing the Installation Software

Oracle Database software is available on installation media, or you can download it from the Oracle Technology Network website, or the Oracle Software Delivery Cloud portal.

To install the software from the hard disk, you must either download it and unpack it, or copy it from the installation media, if you have it.

- [Downloading Oracle Software](#)  
Select the method you want to use to download the software.
- [Downloading the Installation Archive Files from OTN](#)  
Download installation archive files from Oracle Technology Network.
- [Downloading the Software from Oracle Software Delivery Cloud Portal](#)  
You can download the software from Oracle Software Delivery Cloud.
- [Copying the Software to the Hard Disk](#)  
Oracle recommends that you copy the installation software to the hard disk to enable the installation to run faster.



## Downloading Oracle Software

Select the method you want to use to download the software.

You can download Oracle Database software from the Oracle website or the Oracle Software Delivery Cloud portal and extract them on your hard disk. Ensure that you review and understand the terms of the license.

## Downloading the Installation Archive Files from OTN

Download installation archive files from Oracle Technology Network.

1. Use any browser to access the software download page from Oracle Technology Network:

<http://www.oracle.com/technetwork/indexes/downloads/index.html>

2. Go to the download page for the product to install.
3. On the download page, identify the required disk space by adding the file sizes for each required file.

The file sizes are listed next to the file names.

4. Select a file system with enough free space to store and expand the archive files.  
In most cases, the available disk space must be at least twice the size of all of the archive files.
5. On the file system, , create a parent directory for each product (for example, `Oradb12c`) to hold the installation directories.
6. Download all of the installation archive files to the directory you created for the product.
7. Verify that the files you downloaded are the same size as the corresponding files on Oracle Technology Network. Also verify the checksums are the same as noted on Oracle Technology Network using a command similar to the following, where *filename* is the name of the file you downloaded:

```
cksum filename.zip
```

8. Extract the files in each directory that you just created.

## Downloading the Software from Oracle Software Delivery Cloud Portal

You can download the software from Oracle Software Delivery Cloud.

1. Use a browser to access the Oracle Software Delivery Cloud portal:  
<https://edelivery.oracle.com/>
2. Click **Sign In** and enter your Oracle account username and password.
3. Type **Oracle Database** in the search bar. Click the **Add to Cart** button corresponding to the Oracle Database version that you want to download.
4. In the Checkout page, click **Checkout** and deselect any products that you do not want to download.

5. Select the operating system platform on which you want to install the software from the **Platform/Languages** column.
6. Click **Continue**.
7. Review the license agreement.
8. Select the **I reviewed and accept the Oracle License Agreement** checkbox. Click **Continue**.
9. Click **Download** to start downloading the software.
10. After you download the files, click **View Digest** to verify that the checksum matches the value listed on the download page.

## Copying the Software to the Hard Disk

Oracle recommends that you copy the installation software to the hard disk to enable the installation to run faster.

Before copying the installation media content to the hard disk, you must mount the disk. Review these sections if you need instructions for how to mount the installation media and copy its contents to the hard disk.

- [Mounting Disks on Linux Systems](#)  
On most Linux systems, the disk mounts automatically when you insert it into the disk drive. If the disk does not mount automatically, then follow these steps to mount it.

## Mounting Disks on Linux Systems

On most Linux systems, the disk mounts automatically when you insert it into the disk drive. If the disk does not mount automatically, then follow these steps to mount it.

1. If necessary, log in as the `root` user and enter a command similar to one of the following to eject the currently mounted disk, then remove it from the drive:

- Oracle Linux and Red Hat Enterprise Linux:

```
# eject /mnt/dvd
```

- SUSE Linux Enterprise Server:

```
# eject /media/dvd
```

In these examples, `/mnt/dvd` and `/media/dvd` are the mount point directories for the installation media.

2. Insert the appropriate installation media into the disk drive.
3. To verify if the disk is mounted automatically, enter one of the following commands depending on the platform:

- Oracle Linux and Red Hat Enterprise Linux:

```
# ls /mnt/dvd
```

- SUSE Linux Enterprise Server:

```
# ls /media/dvd
```

If this command fails to display the contents of the installation media, then enter a command similar to the following to mount it, depending on the platform:

- Oracle Linux and Red Hat Enterprise Linux:

```
# mount -t iso9660 /dev/dvd /mnt/dvd
```

- SUSE Linux Enterprise Server:

```
# mount -t iso9660 /dev/dvd /media/dvd
```

In these examples, `/mnt/dvd` and `/media/dvd` are the mount point directories for the installation media.

 **Note:**

Ensure that the `/mnt/dvd` directory exists on Red Hat Enterprise Linux. If it does not, then create the `/mnt/dvd` mount point to mount the installation media.

## Installing the Oracle Database Client Software

These topics explain how to run Oracle Universal Installer to perform most database client installations.

 **Note:**

- You can install Oracle Database client by using the silent or response file installation method, without the GUI.
- You can install Oracle Connection Manager, Oracle Net Listener, and Oracle Scheduler Agent using the Custom installation option.

- [Running Oracle Universal Installer to Install Oracle Database Client](#)  
Use the `runInstaller` command to start the Oracle Database Client installation.
- [Using Oracle Net Configuration Assistant](#)  
In Custom Oracle Database Client installations, if you select Oracle Net Listener, then Oracle Universal Installer (OUI) starts Oracle Net Configuration Assistant.

## Running Oracle Universal Installer to Install Oracle Database Client

Use the `runInstaller` command to start the Oracle Database Client installation.

Have all the information you need to provide regarding users groups, and storage paths before you start the installation.

Oracle recommends that you have your My Oracle Support credentials available during installation.

During installation, you are asked to run configuration scripts as the `root` user. You can either run these scripts manually as `root` when prompted, or you can provide configuration information and passwords using a root privilege delegation option such as `Sudo`.

1. Log in as the Oracle installation owner user account that you want to own the software binaries.
2. On the installation media, or where you have downloaded the installation binaries, run the `runInstaller` command to start Oracle Universal Installer.

For example:

- On installation media:

```
/dev/dvd-rw/media/runInstaller
```

- On a hard disk:

```
$ cd /home/oracle_sw/  
$ ./runInstaller
```

 **Note:**

Run the `runInstaller` command from the Oracle home directory only. Do not use the `runInstaller` command that resides at `$ORACLE_HOME/oui/bin/`, or any other location, to install Oracle Database, Oracle Database Client, or Oracle Grid Infrastructure.

3. Select your installation type.

Installation screens vary depending on the installation option you select. Respond to the configuration prompts as needed.

4. During a Custom Oracle Database Client installation, if you select Oracle Net Listener from the list of components to install, then Oracle Universal Installer automatically starts Oracle Net Configuration Assistant as part of the Oracle Database Client installation.

 **Note:**

At any time during installation, if you have a question about what you are being asked to do, click **Help**.

## Using Oracle Net Configuration Assistant

In Custom Oracle Database Client installations, if you select Oracle Net Listener, then Oracle Universal Installer (OUI) starts Oracle Net Configuration Assistant.

Oracle recommends that you have information ready about the host name of the computer where the Oracle database is installed.

Perform the following steps to configure the listener and naming methods using Oracle Net Configuration Assistant:

1. In the Welcome screen, click **Next**.  
You can also select **Perform typical configuration** for default network configuration.
2. Respond to the configuration prompts and screens as needed. The screens vary depending on the options you select. At any time during installation, if you have a question about what you are being asked to do, click **Help**.
3. You can also run Oracle Net Configuration Assistant in standalone mode after the database client installation is complete to configure the listener, naming methods, net service names, and directory server usage. To start Oracle Net Configuration Assistant in standalone mode run `netca` from the `ORACLE_HOME/bin` directory.

#### Related Topics

- *Oracle Database Net Services Administrator's Guide*

## About Character Set Selection During Installation

Review character set options before you start installation.

After a database is created, changing its character set is usually very expensive in terms of time and resources. Such operations may require converting all character data by exporting the whole database and importing it back. Therefore, it is important that you carefully select the database character set at installation time.

Oracle Database uses character sets for the following:

- Data stored in SQL character data types (`CHAR`, `VARCHAR2`, `CLOB`, and `LONG`).
- Identifiers such as table names, column names, and PL/SQL variables.
- Stored SQL and PL/SQL source code, including text literals embedded in this code.

Starting with Oracle Database 12c Release 2 (12.2), the default database character set of a database created from the General Purpose/Transaction Processing or the Data Warehousing template is Unicode AL32UTF8. Oracle recommends that you use Unicode AL32UTF8 as the database character set.

Unicode is the universal character set that supports most of the currently spoken languages of the world. It also supports many historical scripts (alphabets). Unicode is the native encoding of many technologies, including Java, XML, XHTML, ECMAScript, and LDAP. Unicode is ideally suited for databases supporting the Internet and the global economy.

Because AL32UTF8 is a multibyte character set, database operations on character data may be slightly slower when compared to single-byte database character sets, such as WE8ISO8859P1 or WE8MSWIN1252. Storage space requirements for text in most languages that use characters outside of the ASCII repertoire are higher in AL32UTF8 compared to legacy character sets supporting the language. English data may require more space only if stored in `CLOB` (character large object) columns. Storage for non-character data types, such as `NUMBER` or `DATE`, does not depend on a character set. The universality and flexibility of Unicode usually outweighs these additional costs.

Consider legacy character sets only when the database need to support a single group of languages and the use of a legacy character set is critical for fulfilling compatibility,

storage, or performance requirements. The database character set to be selected in this case is the character set of most clients connecting to this database.

The database character set of a multitenant container database (CDB) determines which databases can be plugged in later. Ensure that the character set you choose for the CDB is compatible with the database character sets of the databases to be plugged into this CDB.

 **See Also:**

*Oracle Database Globalization Support Guide* for more information about choosing a database character set for a multitenant container database (CDB)

## Running Oracle Universal Installer in Different Languages

Describes how to run Oracle Universal Installer in other languages.

Your operating system locale determines the language in which Oracle Universal Installer runs. You can run Oracle Universal Installer in one of these languages:

- Brazilian Portuguese (pt\_BR)
- French (fr)
- German (de)
- Italian (it)
- Japanese (ja)
- Korean (ko)
- Simplified Chinese (zh\_CN)
- Spanish (es)
- Traditional Chinese (zh\_TW)

To run Oracle Universal Installer in a supported language, change the locale in which your operating system session is running before you start Oracle Universal Installer.

If the selected language is not one of the supported languages, then Oracle Universal Installer runs in English.

# 6

## Oracle Database Client Postinstallation Tasks

Complete configuration tasks after you install Oracle Database.

You are required to complete some configuration tasks after Oracle Database Client is installed. In addition, Oracle recommends that you complete additional tasks immediately after installation. You must also complete product-specific configuration tasks before you use those products.

### Note:

This chapter describes basic configuration only. Refer to product-specific administration and tuning guides for more detailed configuration and tuning information.

- [Required Postinstallation Tasks](#)  
Download and apply required patches for your software release after completing your initial installation.
- [Recommended Postinstallation Tasks](#)  
Oracle recommends that you complete these tasks after installation.

### Required Postinstallation Tasks

Download and apply required patches for your software release after completing your initial installation.

- [Downloading and Installing Patch Updates](#)  
Download and install patch updates for your Oracle software after you complete installation.

### Downloading and Installing Patch Updates

Download and install patch updates for your Oracle software after you complete installation.

Check the My Oracle Support website for required patch updates for your installation.

1. Use a web browser to view the My Oracle Support website:  
<https://support.oracle.com>
2. Log in to My Oracle Support website.

### Note:

If you are not a My Oracle Support registered user, then click **Register for My Oracle Support** and register.

3. On the main My Oracle Support page, click **Patches & Updates**.
4. In the **Patch Search** region, select **Product or Family (Advanced)**.
5. On the **Product or Family (Advanced)** display, provide information about the product, release, and platform for which you want to obtain patches, and click **Search**.  
The Patch Search pane opens, displaying the results of your search.
6. Select the patch number and click **ReadMe**.  
The README page is displayed. It contains information about the patch set and how to apply the patches to your installation.
7. Use the unzip utility provided with the software to uncompress the Oracle patch updates that you downloaded from My Oracle Support. The unzip utility is located in the `$ORACLE_HOME/bin` directory.

## Recommended Postinstallation Tasks

Oracle recommends that you complete these tasks after installation.

- [Creating a Backup of the root.sh Script](#)  
Oracle recommends that you back up the `root.sh` script after you complete an installation.
- [Setting Language and Locale Preferences for Client Connections](#)  
Configure client applications connecting to an Oracle Database according to your locale preferences and your I/O device character set.

### Creating a Backup of the root.sh Script

Oracle recommends that you back up the `root.sh` script after you complete an installation.

If you install other products in the same Oracle home directory subsequent to this installation, then Oracle Universal Installer updates the contents of the existing `root.sh` script during the installation. If you require information contained in the original `root.sh` script, then you can recover it from the backed up `root.sh` file.

### Setting Language and Locale Preferences for Client Connections

Configure client applications connecting to an Oracle Database according to your locale preferences and your I/O device character set.

You must configure client applications connecting to an Oracle Database according to your locale preferences and your I/O device character set. If your applications do not have their own specific methods to configure locale preferences, then the method you use to configure an Oracle database client connection depends on the access API you use to connect to the database. Check your application documentation, before you configure locale preferences for your applications.

For applications that connect to Oracle Databases using Oracle Call Interface (OCI) use `NLS_LANG` and other client settings with names that start with `NLS_` to set the locale conventions and client character set for Oracle Database sessions. It is important that you set the character set part of the `NLS_LANG` value properly. The character set you set must correspond to the character set used by your I/O devices,



which in case of Microsoft Windows is either the ANSI Code Page (for GUI applications), such as WE8MSWIN1252, or the OEM Code Page (for Console mode applications), such as US8PC437. By doing this, the OCI API is notified about the character set of data that it receives from the application. OCI can then convert this data correctly to and from the database character set.

NLS\_LANG and the other NLS settings can be specified either as environment variables or as Windows Registry settings. Environment variable values take precedence over Registry values.

Oracle Universal Installer sets a default value for the NLS\_LANG setting in Registry when it creates a new Oracle home on Microsoft Windows. The NLS\_LANG value is based on the language of the Windows user interface, which is the language of Windows menu items and dialog box labels.

 **Caution:**

Failure to set the client character set correctly can cause data loss.

Java applications that connect to Oracle Databases by using Oracle JDBC do not use NLS\_LANG. Instead, Oracle JDBC maps the default locale of the Java VM in which the application runs to the Oracle Database language and territory settings. Oracle JDBC then configures the connected database session using these settings. Because Java works internally in Unicode, the client character set is always set to Unicode. Unless an application explicitly changes it, the default locale of the Java VM is set based on the locale of the user operating system on which the Java VM runs. Check your Java VM documentation for information about configuring the Java VM default locale.

 **Note:**

In 3-tier architecture deployments, application servers that are database clients can have settings in their configuration files that specify the NLS\_LANG value or the Java VM locale. Check the documentation accompanying these servers.

 **See Also:**

*Oracle Database Globalization Support Guide* for more information about configuring user locale preferences

# 7

## Removing Oracle Database Software

These topics describe how to remove Oracle software and configuration files.

You can remove Oracle software in one of two ways: Use Oracle Universal Installer with the `deinstall` option, or use the deinstallation tool (`deinstall`) that is included in Oracle homes. Oracle does not support the removal of individual products or components.

### ▲ Caution:

If you have a standalone database on a node in a cluster, and if you have multiple databases with the same global database name (GDN), then you cannot use the `deinstall` tool to remove one database only.

- [About Oracle Deinstallation Options](#)  
You can stop and remove Oracle Database software and components in an Oracle Database home with Oracle Universal Installer.
- [Oracle Deinstallation Tool \(Deinstall\)](#)  
The `deinstall` tool is a script that you can run separately from Oracle Universal Installer (OUI).
- [Deinstallation Examples for Oracle Database Client](#)  
Use these examples to help you understand how to run deinstallation using OUI (`runInstaller`) or as a standalone tool (`deinstall`).

## About Oracle Deinstallation Options

You can stop and remove Oracle Database software and components in an Oracle Database home with Oracle Universal Installer.

You can remove the following software using Oracle Universal Installer or the Oracle deinstallation tool:

- Oracle Database
- Oracle Grid Infrastructure, which includes Oracle Clusterware and Oracle Automatic Storage Management (Oracle ASM)
- Oracle Real Application Clusters (Oracle RAC)
- Oracle Database Client

Starting with Oracle Database 12c, the deinstallation tool is integrated with the database installation media. You can run the deinstallation tool using the `runInstaller` command with the `-deinstall` and `-home` options from the base directory of the Oracle Database or Oracle Database Client installation media.

The deinstallation tool is also available as a separate command (`deinstall`) in Oracle home directories after installation. It is located in the `$ORACLE_HOME/deinstall` directory.

The deinstallation tool creates a response file by using information in the Oracle home and using the information you provide. You can use a response file that you generated previously by running the `deinstall` command using the `-checkonly` option. You can also edit the response file template.

If you run the deinstallation tool to remove an Oracle Grid Infrastructure installation, then the deinstaller prompts you to run the deinstall script as the `root` user. For Oracle Grid Infrastructure for a cluster, the script is `rootcrs.sh`, and for Oracle Grid Infrastructure for a standalone server (Oracle Restart), the script is `roothas.sh`.

 **Note:**

- You must run the deinstallation tool from the same release to remove Oracle software. Do not run the deinstallation tool from a later release to remove Oracle software from an earlier release. For example, do not run the deinstallation tool from the 12.2 installation media to remove Oracle software from an existing 11.2.0.4 Oracle home.
- Starting with Oracle Database 12c Release 1 (12.1.0.2), the `roothas.sh` script replaces the `roothas.pl` script in the Oracle Grid Infrastructure home for Oracle Restart, and the `rootcrs.sh` script replaces the `rootcrs.pl` script in the Grid home for Oracle Grid Infrastructure for a cluster.

If the software in the Oracle home is not running (for example, after an unsuccessful installation), then the deinstallation tool cannot determine the configuration, and you must provide all the configuration details either interactively or in a response file.

In addition, before you run the deinstallation tool for Oracle Grid Infrastructure installations:

- Dismount Oracle Automatic Storage Management Cluster File System (Oracle ACFS) and disable Oracle Automatic Storage Management Dynamic Volume Manager (Oracle ADVM).
- If Grid Naming Service (GNS) is in use, then notify your DNS administrator to delete the subdomain entry from the DNS.

### Files Deleted by the Deinstallation Tool

When you run the deinstallation tool, if the central inventory (`oraInventory`) contains no other registered homes besides the home that you are deconfiguring and removing, then the `deinstall` command removes the following files and directory contents in the Oracle base directory of the Oracle Database installation owner:

- `admin`
- `cfgtoollogs`
- `checkpoints`
- `diag`
- `oradata`
- `fast_recovery_area`

Oracle strongly recommends that you configure your installations using an Optimal Flexible Architecture (OFA) configuration, and that you reserve Oracle base and Oracle home paths for exclusive use of Oracle software. If you have any user data in these locations in the Oracle base that is owned by the user account that owns the Oracle software, then the deinstallation tool deletes this data.

**▲ Caution:**

The deinstallation tool deletes Oracle Database configuration files, user data, and fast recovery area (FRA) files even if they are located outside of the Oracle base directory path.

## Oracle Deinstallation Tool (Deinstall)

The `deinstall` tool is a script that you can run separately from Oracle Universal Installer (OUI).

### Purpose

The `deinstall` tool stops Oracle software, and removes Oracle software and configuration files on the operating system for a specific Oracle home.

### Syntax

The standalone deinstallation tool uses the following syntax:

```
(./deinstall [-silent] [-checkonly] [-paramfile complete path of input  
response file]  
[-params name1=value name2=value . . .]  
[-o complete path of directory for saving files]  
[-tmpdir complete path of temporary directory to use]  
[-logdir complete path of log directory to use] [-help]
```

The `deinstall` tool run as a command option from OUI uses the following syntax, where *path* is the complete path to the home or file you specify:

```
./runInstaller -deinstall -home path [-silent] [-checkonly]  
[-paramfile path] [-params name1=value name2=value . . .]  
[-o path] [-tmpdir complete path of temporary directory to use]  
[-logdir complete path of log directory to use] [-help]
```

## Parameters

Parameter	Description
-home	<p>Use this flag to indicate the home path of the Oracle home to check or deinstall.</p> <p>To deinstall Oracle software using the <code>deinstall</code> command, located in the Oracle home you plan to deinstall, provide a response file located outside the Oracle home, and do not use the <code>-home</code> flag.</p> <p>If you run the deinstallation tool from the <code>\$ORACLE_HOME/deinstall</code> path, then the <code>-home</code> flag is not required because the tool identifies the location of the home where it is run. If you use <code>runInstaller -deinstall</code> from the installation media, then <code>-home</code> is mandatory.</p>
-silent	<p>Use this flag to run the deinstallation tool in noninteractive mode. This option requires one of the following:</p> <ul style="list-style-type: none"><li>• A working system that it can access to determine the installation and configuration information. The <code>-silent</code> flag does not work with failed installations.</li><li>• A response file that contains the configuration values for the Oracle home that is being deinstalled or deconfigured.</li></ul> <p>You can generate a response file to use or modify by running the tool with the <code>-checkonly</code> flag. The tool then discovers information from the Oracle home to deinstall and deconfigure. It generates the response file that you can then use with the <code>-silent</code> option.</p> <p>You can also modify the template file <code>deinstall.rsp.tmpl</code>, located in the <code>\$ORACLE_HOME/deinstall/response</code> directory.</p>
-checkonly	<p>Use this flag to check the status of the Oracle software home configuration. Running the deinstallation tool with the <code>-checkonly</code> flag does not remove the Oracle configuration. The <code>-checkonly</code> flag generates a response file that you can use with the deinstallation tool and <code>-silent</code> option.</p>

Parameter	Description
<code>-paramfile</code> <i>complete path of input response file</i>	Use this flag to run the deinstallation tool with a response file in a location other than the default. When you use this flag, provide the complete path where the response file is located.  The default location of the response file depends on the location of the deinstallation tool: <ul style="list-style-type: none"> <li>From the installation media or stage location: <code>/response</code></li> <li>After installation from the installed Oracle home: <code>\$ORACLE_HOME/deinstall/response</code></li> </ul>
<code>-params</code> [ <i>name1=value name2=value name3=value . . .</i> ]	Use this flag with a response file to override one or more values to change in a response file you have created.
<code>-o</code> <i>complete path of directory for saving response files</i>	Use this flag to provide a path other than the default location where the response file ( <code>deinstall.rsp.tmpl</code> ) is saved.  The default location of the response file depends on the location of the deinstallation tool: <ul style="list-style-type: none"> <li>From the installation media or stage location: <code>/response</code></li> <li>After installation from the installed Oracle home: <code>\$ORACLE_HOME/deinstall/response</code></li> </ul>
<code>-tmpdir</code> <i>complete path of temporary directory to use</i>	Use this flag to specify a non-default location where Oracle Deinstallation Tool writes the temporary files for the deinstallation.
<code>-logdir</code> <i>complete path of log directory to use</i>	Use this flag to specify a non-default location where Oracle Deinstallation Tool writes the log files for the deinstallation.
<code>-local</code>	Use this flag on a multinode environment to deinstall Oracle software in a cluster.  When you run <code>deinstall</code> with this flag, it deconfigures and deinstalls the Oracle software on the local node (the node where <code>deinstall</code> is run). On remote nodes, it deconfigures Oracle software, but does not deinstall the Oracle software.
<code>-help</code>	Use this option to obtain additional information about the command option flags.

## Deinstallation Examples for Oracle Database Client

Use these examples to help you understand how to run deinstallation using OUI (`runInstaller`) or as a standalone tool (`deinstall`).

If you run the deinstallation tool from the installation media using `runInstaller -deinstall`, then help is displayed that guides you through the deinstallation process. You

can also use the `-home` flag and provide a path to the home directory of the Oracle software to remove from your system. If you have a response file, then use the optional flag `-paramfile` to provide a path to the response file.

You can generate a deinstallation response file by running the deinstallation tool with the `-checkonly` flag. Alternatively, you can use the response file template located at `$ORACLE_HOME/deinstall/response/deinstall.rsp.tmpl`.

In the following example, the `runInstaller` command is in the path/`directory_path`, where `/directory_path` is the path to the database directory on the installation media, and `/u01/app/oracle/product/12.2.0/client_1/` is the path to the Oracle home you want to remove:

```
$ cd /directory_path/
$ ./runInstaller -deinstall -home /u01/app/oracle/product/12.2.0/
client_1/
```

The following example uses a response file called `my_db_paramfile.tmpl` in the software owner location `/home/usr/oracle`:

```
$ cd /directory_path/
$ ./runInstaller -deinstall -paramfile /home/usr/oracle/
my_db_paramfile.tmpl
```

If you run the deinstallation tool using `deinstall` from the `$ORACLE_HOME/deinstall` directory, then the deinstallation starts without prompting you for the Oracle home path.

```
$ ./deinstall
```

In the following example, the `deinstall` command is in the path `/u01/app/oracle/product/12.2.0/client_1/deinstall`. It uses a response file called `my_db_paramfile.tmpl` in the software owner location `/home/usr/oracle`:

```
$ cd /u01/app/oracle/product/12.2.0/client_1/deinstall
$ ./deinstall -paramfile /home/usr/oracle/my_db_paramfile.tmpl
```

# A

## Installing and Configuring Oracle Database Using Response Files

Review the following topics to install and configure Oracle products using response files.

- [How Response Files Work](#)  
Response files can assist you with installing an Oracle product multiple times on multiple computers.
- [Reasons for Using Silent Mode or Response File Mode](#)  
Review this section for use cases for running the installer in silent mode or response file mode.
- [Using Response Files](#)  
Review this information to use response files.
- [Preparing Response Files](#)  
Review this information to prepare response files for use during silent mode or response file mode installations.
- [Running Oracle Universal Installer Using a Response File](#)  
After creating the response file, run Oracle Universal Installer at the command line, specifying the response file you created, to perform the installation.

### How Response Files Work

Response files can assist you with installing an Oracle product multiple times on multiple computers.

When you start Oracle Universal Installer (OUI), you can use a response file to automate the installation and configuration of Oracle software, either fully or partially. OUI uses the values contained in the response file to provide answers to some or all installation prompts.

Typically, the installer runs in interactive mode, which means that it prompts you to provide information in graphical user interface (GUI) screens. When you use response files to provide this information, you run the installer from a command prompt using either of the following modes:

- **Silent mode**  
If you include responses for all of the prompts in the response file and specify the `-silent` option when starting the installer, then it runs in silent mode. During a silent mode installation, the installer does not display any screens. Instead, it displays progress information in the terminal that you used to start it.
- **Response file mode**  
If you include responses for some or all of the prompts in the response file and omit the `-silent` option, then the installer runs in response file mode. During a response file mode installation, the installer displays all the screens, screens for which you specify information in the response file, and also screens for which you did not specify the required information in the response file.



You define the settings for a silent or response file installation by entering values for the variables listed in the response file. For example, to specify the Oracle home name, provide the Oracle home path for the `ORACLE_HOME` environment variable:

```
ORACLE_HOME=/u01/app/oracle/product/12.2.0/dbhome_1
```

Another way of specifying the response file variable settings is to pass them as command-line arguments when you run the installer. For example:

```
-silent directory_path
```

In this command, *directory\_path* is the path of the database directory on the installation media, or the path of the directory on the hard drive.

## Reasons for Using Silent Mode or Response File Mode

Review this section for use cases for running the installer in silent mode or response file mode.

Mode	Uses
Silent	<p>Use silent mode for the following installations:</p> <ul style="list-style-type: none"> <li>• Complete an unattended installation, which you schedule using operating system utilities such as <code>at</code>.</li> <li>• Complete several similar installations on multiple systems without user interaction.</li> <li>• Install the software on a system that does not have X Window System software installed on it.</li> </ul> <p>The installer displays progress information on the terminal that you used to start it, but it does not display any of the installer screens.</p>
Response file	<p>Use response file mode to complete similar Oracle software installations on more than one system, providing default answers to some, but not all of the installer prompts.</p>

## Using Response Files

Review this information to use response files.

Use the following general steps to install and configure Oracle products using the installer in silent or response file mode:



### Note:

You must complete all required preinstallation tasks on a system before running the installer in silent or response file mode.

1. Prepare a response file.
2. Run the installer in silent or response file mode.

3. Run the root scripts as prompted by Oracle Universal Installer.
4. If you completed a software-only installation, then run Net Configuration Assistant and Oracle DBCA in silent or response file mode to create the database listener and an Oracle Database instance respectively.

## Preparing Response Files

Review this information to prepare response files for use during silent mode or response file mode installations.

- [Editing a Response File Template](#)  
For Oracle Database Client, response files are located in the database/response directory on the installation media or in the *Oracle\_home/inventory/response* directory after the software has been installed.
- [Recording Response Files](#)  
You can use Oracle Universal Installer (OUI) in interactive mode to record response files, which you can then edit and use to complete silent mode or response file mode installations.

## Editing a Response File Template

For Oracle Database Client, response files are located in the database/response directory on the installation media or in the *Oracle\_home/inventory/response* directory after the software has been installed.



### Note:

If you copied the software to a hard disk, then the response files are located in the directory */response*.

All response file templates contain comment entries, sample formats, examples, and other useful instructions. Please read these instructions as they help you specify values for the variables listed in the response files and customize your installation.

The following table lists the response files provided with this software:

**Table A-1 Response Files for Oracle Database Client**

Response File	Description
<code>client_install.rsp</code>	Silent installation of Oracle Database Client
<code>netca.rsp</code>	Silent configuration of Oracle Net using Oracle Net Configuration Assistant.

 **Caution:**

When you modify a response file template and save a file for use, the response file may contain plain text passwords. Ownership of the response file should be given to the Oracle software installation owner only, and permissions on the response file should be changed to 600. Oracle strongly recommends that database administrators or other administrators delete or secure response files when they are not in use.

To copy and modify a response file:

1. Copy the response file from the response file directory to a directory on your system:

```
$ cp /directory_path/response/response_file.rsp local_directory
```

In this example, `directory_path` is the path to the `database` directory on the installation media. If you have copied the software to a hard drive, then you can edit the file in the `response` directory if you prefer.

2. Open the response file in a text editor:

```
$ vi /local_dir/response_file.rsp
```

3. Follow the instructions in the file to edit it.

 **Note:**

The installer or configuration assistant fails if you do not correctly configure the response file. Also, ensure that your response file name has the `.rsp` suffix.

4. Secure the response file by changing the permissions on the file to 600:

```
$ chmod 600 /local_dir/response_file.rsp
```

Ensure that only the Oracle software owner user can view or modify response files or consider deleting them after the installation succeeds.

 **Note:**

A fully-specified response file for an Oracle Database Client installation contains the passwords for database administrative accounts and for a user who is a member of the OSDBA group (required for automated backups).

**Related Topics**

- *Oracle Universal Installer User's Guide*

## Recording Response Files

You can use Oracle Universal Installer (OUI) in interactive mode to record response files, which you can then edit and use to complete silent mode or response file mode installations.

You can save all the installation steps into a response file during installation by clicking **Save Response File** on the Summary page. You can use the generated response file for a silent installation later.

When you record the response file, you can either complete the installation, or you can exit from the installer on the Summary page, before OUI starts to copy the software to the system.

If you use record mode during a response file mode installation, then the installer records the variable values that were specified in the original source response file into the new response file.

 **Note:**

You cannot save passwords while recording the response file.

To record a response file:

1. Complete preinstallation tasks for an Oracle Database Client installation.

When you run the installer to record a response file, it checks the system to verify that it meets the requirements to install the software. For this reason, Oracle recommends that you complete all of the required preinstallation tasks and record the response file while completing an installation.

2. Ensure that the Oracle software owner user (typically `oracle`) has permissions to create or write to the Oracle home path that you will specify when you run the installer.
3. On each installation screen, specify the required information.
4. When OUI displays the Summary screen, perform the following steps:
  - a. Click **Save Response File**. In the window, specify a file name and location for the new response file. Click Save to write the responses you entered to the response file.
  - b. Click **Finish** to continue with the installation.

Click **Cancel** if you do not want to continue with the installation. The installation stops, but the recorded response file is retained.

 **Note:**

Ensure that your response file name has the `.rsp` suffix.

5. If you do not complete the installation, then delete the Oracle home directory that the installer created using the path you specified in the Specify File Locations screen.
6. Before you use the saved response file on another system, edit the file and make any required changes. Use the instructions in the file as a guide when editing it.

## Running Oracle Universal Installer Using a Response File

After creating the response file, run Oracle Universal Installer at the command line, specifying the response file you created, to perform the installation.

Run Oracle Universal Installer at the command line, specifying the response file you created. The Oracle Universal Installer executable, `runInstaller`, provides several options. For help information on the full set of these options, run the `runInstaller` command with the `-help` option. For example:

```
$ directory_path/runInstaller -help
```

The help information appears in a window after some time.

To run the installer using a response file:

1. Complete the preinstallation tasks as for a normal installation
2. Log in as the software installation owner user.
3. If you are completing a response file mode installation, then set the operating system `DISPLAY` environment variable for the user running the installation.

 **Note:**

You do not have to set the `DISPLAY` environment variable if you are completing a silent mode installation.

4. To start the installer in silent or response file mode, enter a command similar to the following:

```
$ /directory_path/runInstaller [-silent] [-noconfig] \  
-responseFile responsefilename
```

 **Note:**

Do not specify a relative path to the response file. If you specify a relative path, then the installer fails.

In this example:

- `directory_path` is the path of the directory where you have copied the installation binaries.
  - `-silent` runs the installer in silent mode.
  - `-noconfig` suppresses running the configuration assistants during installation, and a software-only installation is performed instead.
  - `responsefilename` is the full path and file name of the installation response file that you configured.
5. If this is the first time you are installing Oracle software on your system, then Oracle Universal Installer prompts you to run the `oraInstRoot.sh` script.

Log in as the `root` user and run the `orainstRoot.sh` script:

```
$ su root
password:
# /u01/app/oraInventory/orainstRoot.sh
```

 **Note:**

You do not have to manually create the `oraInst.loc` file. Running the `orainstRoot.sh` script is sufficient as it specifies the location of the Oracle Inventory directory.

6. When the installation completes, log in as the `root` user and run the `root.sh` script. For example

```
$ su root
password:
# /oracle_home_path/root.sh
```

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