Contents

Preface

Audience xiii
Documentation Accessibility xiii
Set Up Java Access Bridge to Implement Java Accessibility xiv
Related Documentation xiv
Conventions xiv

Changes in this Release for Oracle Database Installation Guide

Changes in Oracle Database 19c xvi

1 Oracle Database Installation Checklist

Server Hardware Checklist for Oracle Database Installation 1-1
Operating System Checklist for Oracle Database Installation on Microsoft Windows 1-2
Server Configuration Checklist for Oracle Database Installation 1-2
Storage Checklist for Oracle Database Installation 1-3
Oracle User Environment Configuration Checklist for Oracle Database Installation 1-4
Installer Planning Checklist for Oracle Database Installation 1-5

2 Oracle Database Preinstallation Tasks

Oracle Database Minimum Hardware Requirements 2-1
   Hardware Component Requirements for Windows x64 2-1
   Hard Disk Space Requirements 2-2
   Verifying Hardware Requirements 2-3
Oracle Database Software Requirements 2-3
Windows Certification and Web Browser Support 2-5
   Remote Desktop Services 2-5
   Microsoft Windows Servicing Options 2-6
   Installation Requirements for Web Browsers 2-6
   Default Share Configuration Requirement 2-7
   Reviewing Operating System Security Common Practices 2-7
Confirming Host Name Resolution 2-7
Individual Component Requirements 2-7
  Configuring Disk Storage for Oracle Data Files and Recovery Files 2-8
  Choosing a Storage Option for Oracle Database and Recovery Files 2-8
  Creating Directories for Oracle Data Files or Recovery Files 2-8
    Guidelines for Placing Oracle Database Files on a File System or Logical
    Volume 2-9
    Guidelines for Placing Oracle Recovery Files on a File System 2-9
    Creating Required Directories 2-10
  Oracle Database Security Strong Authentication Requirements 2-11
  Oracle Enterprise Manager Requirements 2-11
  Oracle-Managed Files Requirements 2-11
  Oracle Volume Shadow Copy Service (VSS) Writer 2-12

3 Overview of Oracle Database Installation

Installation Considerations 3-1
  Oracle Base Directory 3-1
  Oracle Home Directory 3-2
    Contents of the Oracle Home Environment 3-3
    Multiple Oracle Home Components 3-3
  Oracle Inventory Directory 3-3
  Installing Oracle Database Vault in an Oracle Data Guard Environment 3-3
  Oracle Database Vault Default Audit Policy and Initialization Parameters 3-4
  Consider Memory Allocation and Automatic Memory Management 3-4
Database Configuration Options 3-4
  Creating a Database After Installation 3-5
    Creating an Oracle Database on Direct NFS 3-5

4 Configuring Users, Groups and Environments for Oracle Database

Creating Required Operating System Groups and Users 4-1
  About the Oracle Installation User 4-2
  Creating Oracle Home User 4-2
  Understanding the Oracle Inventory Directory and the Oracle Inventory Group 4-3
  Operating System Groups Created During Oracle Database Installation 4-4
  Operating System Groups and Users for Job Role Separation 4-7
    About Job Role Separation Operating System Privileges Groups and Users 4-7
    Oracle Software Owner For Each Oracle Software Product 4-8
    Standard Oracle Database Groups for Job Role Separation for Oracle
    Database 4-8
    Extended Oracle Database Groups for Job Role Separation 4-9
5 Installing and Configuring Oracle Grid Infrastructure for a Standalone Server

Requirements for an Oracle Restart Installation 5-3
  System Requirements 5-3
  Memory Requirements 5-4
  Disk Space Requirements 5-4
Oracle ACFS and Oracle ADVM 5-4
Oracle Automatic Storage Management Storage Configuration 5-6
  About Managing Disk Groups for Older Database Versions 5-6
  Oracle Automatic Storage Management Installation Considerations 5-7
Configuring Storage for Oracle Automatic Storage Management 5-8
  Identifying Storage Requirements for Oracle Automatic Storage Management 5-8
  Oracle ASM Disk Space Requirements 5-11
  ASM Disk Group Options for Interactive and Noninteractive Installation 5-12
  Configuring Disks Manually for Oracle Automatic Storage Management 5-14
About Upgrading Existing Oracle Automatic Storage Management Instances 5-16
Configuring Oracle Automatic Storage Management Disk Groups Manually Using Oracle ASMCA 5-17
About Image-Based Oracle Grid Infrastructure Installation 5-17
Setup Wizard Installation Options for Creating Images 5-18
Installing Oracle Grid Infrastructure for a Standalone Server with a New Database Installation 5-19
Installing Oracle Grid Infrastructure for a Standalone Server for an Existing Database 5-20
Installing Oracle Grid Infrastructure for a Standalone Server Using a Software-Only Installation 5-20
  Installing Software Binaries for Oracle Grid Infrastructure for a Standalone Server 5-21
  Configuring Software Binaries for Oracle Grid Infrastructure for a Standalone Server 5-21
Testing the Oracle Automatic Storage Management Installation 5-22
Modifying Oracle Grid Infrastructure for a Standalone Server Binaries After Installation 5-23

6

Installing Oracle Database

Setup Wizard Installation Options for Creating Images 6-1
Preinstallation Considerations for Installing Oracle Database 6-2
  Installation Consideration on Windows 6-3
  Performing Multiple Oracle Database Installations 6-3
  Installing on Systems That Already Have Oracle Components 6-3
  Installing with Minimum Memory Requirements 6-4
Reviewing Component-Specific Installation Guidelines 6-4
Using an Oracle Automatic Storage Management Disk Group 6-5
About Character Set Selection During Installation 6-6
Accessing the Installation Software 6-7
  Downloading Oracle Software 6-7
    Downloading the Installation Archive Files from Oracle Technology Network 6-8
    Downloading the Software from Oracle Software Delivery Cloud 6-8
    Extracting the Installation File 6-9
  Installing on Remote Computers Through Remote Access Software 6-9
    Installing on Remote Computers from a Hard Drive 6-10
    Installing on Remote Computers from a Remote DVD Drive 6-10
  Installing from a Remote DVD Drive 6-10
    Step 1: On the Remote Computer, Share the DVD Drive 6-10
    Step 2: On the Local Computer, Map the DVD Drive 6-11
  Copying the Oracle Database Software to a Hard Disk 6-11
Installing and Using Oracle Components in Different Languages 6-12
  Configuring Oracle Components to Run in Different Languages 6-12
    Determining the Operating System Locale 6-13
    Configuring Locale and Character Sets Using the NLS_LANG Environment Variable 6-13
    NLS_LANG Settings in Console Mode and Batch Mode 6-14
  Installing Translation Resources 6-15
Running Oracle Universal Installer in Different Languages 6-16
About Image-Based Oracle Database Installation 6-17
Installing the Oracle Database Software 6-17
Cloning an Oracle Home 6-19

7

Oracle Database Postinstallation Tasks

Using Oracle9i Language and Definition Files with Oracle Database 19c 7-2
Downloading and Installing Release Update Patches 7-2
Requirements for Database Password 7-3
Updating the Oracle ORAchk Health Check Tool 7-3
Recompiling Invalid Objects on Windows Systems 7-4
Configuring the Secure Sockets Layer 7-5
Configuring Oracle Components 7-5
Configuring Direct NFS Client 7-6
  About Direct NFS Client Storage 7-7
  About the oranfstab File for Direct NFS Client 7-8
  Mounting NFS Storage Devices with Direct NFS Client 7-8
  Specifying Network Paths for a NFS Server 7-8
  Creating an oranfstab File for Direct NFS Client 7-9
  Performing Basic File Operations Using the ORADNFS Utility 7-11
  Monitoring Direct NFS Client Usage 7-12
  Enabling Direct NFS Client 7-12
  Disabling Direct NFS Client 7-12
  Enabling HCC on Direct NFS Client 7-13
Configuring Oracle Messaging Gateway 7-13
Configuring Oracle Label Security 7-13
Configuring the OraClrAgnt Service for Oracle Database Extensions for .NET 7-14
Configuring Oracle Database Vault 7-14
Configuring Oracle Net Services 7-14
Installing Oracle Text Supplied Knowledge Bases 7-15
Installing the Oracle Text Filtering Component 7-15
Configuring or Reinstalling Oracle XML DB 7-16
Configuring PL/SQL External Procedures 7-16
Configuring Shared Server Support 7-16
Setting Credentials for the Job System to Work with Oracle Enterprise Manager 7-16
Configuring Oracle Database to Communicate with Oracle Automatic Storage Management 7-17
  Installing Oracle Database Examples 7-18
  Creating the OraMTS Service for Microsoft Transaction Server 7-18
Creating a Fast Recovery Area Disk Group 7-18
  About the Fast Recovery Area and the Fast Recovery Area Disk Group 7-19
  Creating the Fast Recovery Area Disk Group 7-19
Enabling and Disabling Database Options After Installation 7-20
Changing the Oracle Home User Password 7-21

8 Getting Started with Oracle Database

Checking the Installed Oracle Database Contents and Directory Location 8-2
Logging In to Oracle Enterprise Manager Database Express 19c 8-2
Managing Oracle Automatic Storage Management 8-3
C  Installing and Configuring Oracle Database Using Response Files

Reasons for Using Silent Mode or Response File Mode  C-1  
How Response Files Work  C-2  
Using Response Files  C-3  
Preparing a Response File  C-3  
   Editing a Response File Template  C-3  
   Saving a Response File  C-4  
Running Oracle Universal Installer Using the Response File  C-6  
Running Net Configuration Assistant Using a Response File  C-7  
Running Oracle Database Configuration Assistant Using a Response File  C-7  
   Silent Mode of Database Configuration Assistant  C-8  
   Running Database Configuration Assistant in Response File Mode  C-8  
Postinstallation Configuration Using Response File Created During Installation  C-9  
   About the Postinstallation Configuration File  C-9  
   Running Postinstallation Configuration Using Response File  C-10   
Postinstallation Configuration Using the ConfigToolAllCommands Script  C-11   
Using the Installation Response File for Postinstallation Configuration  C-11

D  Configuring Read-Only Oracle Homes

Understanding Read-Only Oracle Homes  D-1  
   About Read-Only Oracle Homes  D-1  
   About Oracle Base Homes  D-2  
   About Oracle Base Config  D-3  
   About orabasetab  D-3  
Enabling a Read-Only Oracle Home  D-4  
Copying demo Directories to Oracle Base Home  D-6  
Determining if an Oracle Home is Read-Only  D-8  
File Path and Directory Changes in Read-Only Oracle Homes  D-9

E  Configuring Networks for Oracle Database

Installing Oracle Database on Computers with Multiple IP Addresses  E-1  
Installing Oracle Database on Computers with Multiple Aliases  E-2  
Installing Oracle Database on Nonnetworked Computers  E-2  
Installing a Loopback Adapter  E-3  
   Checking if a Loopback Adapter is Installed on Your Computer  E-3  
   Installing a Loopback Adapter  E-4  
   Removing a Loopback Adapter  E-5
Managing Oracle Database Port Numbers

About Managing Ports F-1
Oracle Database Component Port Numbers and Protocols F-1
Changing the Oracle Services for Microsoft Transaction Server Port F-3

Index
List of Examples

<table>
<thead>
<tr>
<th>Example</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-1</td>
<td>Using the asmtool Utility (Command Line)</td>
<td>5-15</td>
</tr>
<tr>
<td>5-2</td>
<td>Enabling Oracle ACFS on Oracle Restart Configurations</td>
<td>5-24</td>
</tr>
<tr>
<td>7-1</td>
<td>Using Local and Path NFS Server Entries</td>
<td>7-10</td>
</tr>
<tr>
<td>7-2</td>
<td>Using Names in Place of IP Addresses, with Multiple Exports, management and community</td>
<td>7-11</td>
</tr>
<tr>
<td>7-3</td>
<td>Using Kerberos Authentication with Direct NFS Export</td>
<td>7-11</td>
</tr>
<tr>
<td>7-4</td>
<td>Running the Chopt Tool</td>
<td>7-21</td>
</tr>
<tr>
<td>C-1</td>
<td>Password response file for Oracle Grid Infrastructure for a Standalone Server</td>
<td>C-10</td>
</tr>
<tr>
<td>C-2</td>
<td>Password response file for Oracle Database</td>
<td>C-11</td>
</tr>
<tr>
<td>C-3</td>
<td>Response File Passwords for Oracle Grid Infrastructure</td>
<td>C-12</td>
</tr>
<tr>
<td>C-4</td>
<td>Response File Passwords for Oracle Grid Infrastructure for a Standalone Server (Oracle Restart)</td>
<td>C-12</td>
</tr>
<tr>
<td>C-5</td>
<td>Response File Passwords for Oracle Database</td>
<td>C-12</td>
</tr>
</tbody>
</table>
## List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>Server Hardware Checklist for Oracle Database Installation</td>
<td>1-1</td>
</tr>
<tr>
<td>1-2</td>
<td>Operating System General Checklist for Oracle Database on Microsoft Windows</td>
<td>1-2</td>
</tr>
<tr>
<td>1-3</td>
<td>Server Configuration Checklist for Oracle Database</td>
<td>1-2</td>
</tr>
<tr>
<td>1-4</td>
<td>Storage Checklist for Oracle Database</td>
<td>1-4</td>
</tr>
<tr>
<td>1-5</td>
<td>User Environment Configuration for Oracle Database</td>
<td>1-5</td>
</tr>
<tr>
<td>1-6</td>
<td>Oracle Universal Installer Planning Checklist for Oracle Database Installation</td>
<td>1-5</td>
</tr>
<tr>
<td>2-1</td>
<td>Windows x64 Minimum Hardware Requirements</td>
<td>2-2</td>
</tr>
<tr>
<td>2-2</td>
<td>Windows x64 Minimum Disk Space Requirements on NTFS</td>
<td>2-2</td>
</tr>
<tr>
<td>2-3</td>
<td>Windows x64 Software Requirements</td>
<td>2-4</td>
</tr>
<tr>
<td>4-1</td>
<td>User Groups Created During Oracle Database Installation</td>
<td>4-4</td>
</tr>
<tr>
<td>5-1</td>
<td>Oracle ASM Disk Number and Minimum Space Requirements for an Oracle database (non-CDB)</td>
<td>5-11</td>
</tr>
<tr>
<td>5-2</td>
<td>Oracle ASM Disk Number and Minimum Space Requirements for a multitenant container database (CDB) with one pluggable database (PDB)</td>
<td>5-11</td>
</tr>
<tr>
<td>5-3</td>
<td>Image-Creation Options for Setup Wizard</td>
<td>5-18</td>
</tr>
<tr>
<td>6-1</td>
<td>Image-Creation Options for Setup Wizard</td>
<td>6-2</td>
</tr>
<tr>
<td>6-2</td>
<td>Oracle Character Sets for Console Mode (OEM) Code Pages</td>
<td>6-15</td>
</tr>
<tr>
<td>7-1</td>
<td>Database Options for Chopt Tool Command</td>
<td>7-20</td>
</tr>
<tr>
<td>8-1</td>
<td>Partial List of Oracle Database System Privileges Accounts Locked After Installation</td>
<td>8-7</td>
</tr>
<tr>
<td>8-2</td>
<td>Tablespaces and Data Files</td>
<td>8-14</td>
</tr>
<tr>
<td>A-1</td>
<td>Copy Files to JDK Directory on Windows 64-Bit</td>
<td>A-2</td>
</tr>
<tr>
<td>B-1</td>
<td>Examples of OFA-Compliant Oracle Base Directory Names</td>
<td>B-3</td>
</tr>
<tr>
<td>B-2</td>
<td>Optimal Flexible Architecture Hierarchical File Path Examples</td>
<td>B-4</td>
</tr>
<tr>
<td>C-1</td>
<td>Reasons for Using Silent Mode or Response File Mode</td>
<td>C-2</td>
</tr>
<tr>
<td>C-2</td>
<td>Response Files</td>
<td>C-4</td>
</tr>
<tr>
<td>D-1</td>
<td>read/write and Read-Only Oracle Home File Path Examples</td>
<td>D-9</td>
</tr>
<tr>
<td>F-1</td>
<td>Ports Used in Oracle Components</td>
<td>F-2</td>
</tr>
</tbody>
</table>
Preface

Learn how to install and configure Oracle Database, perform postinstallation tasks, and how to remove the database software.

The following topics are covered:

• Audience
• Documentation Accessibility
• Set Up Java Access Bridge to Implement Java Accessibility
  Install Java Access Bridge so that assistive technologies on Microsoft Windows systems can use the Java Accessibility API.
• Related Documentation
• Conventions

Audience

This guide is intended for anyone responsible for installing Oracle Database 19c.

To use this document, you need the following:

• A supported Microsoft Windows operating system installed and tested on your computer system
• Administrative privileges on the computer where you are installing the Oracle Database software
• Familiarity with object-relational database management concepts

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.
Set Up Java Access Bridge to Implement Java Accessibility

Install Java Access Bridge so that assistive technologies on Microsoft Windows systems can use the Java Accessibility API.

Java Access Bridge is a technology that enables Java applications and applets that implement the Java Accessibility API to be visible to assistive technologies on Microsoft Windows systems.

Refer to Java Platform, Standard Edition Accessibility Guide for information about the minimum supported versions of assistive technologies required to use Java Access Bridge. Also refer to this guide to obtain installation and testing instructions, and instructions for how to use Java Access Bridge.

Related Topics

- Java Platform, Standard Edition Java Accessibility Guide

Related Documentation

For more information, see these Oracle resources:

- Oracle Database Concepts
- Oracle Database Examples Installation Guide
- Oracle Real Application Clusters Installation Guide
- Oracle Grid Infrastructure Installation Guide
- Oracle Enterprise Manager Cloud Control Basic Installation Guide
- Oracle Database Upgrade Guide
- Oracle Database 2 Day DBA
- Oracle Database Administrator’s Reference for Microsoft Windows
- Oracle Database Sample Schemas
- Oracle Database Error Messages

Oracle error message documentation is available only in HTML. If you only have access to the Oracle Database 19c Online Documentation Library, you can browse the error messages by range. Once you find the specific range, use your browser's “find in page” feature to locate the specific message. When connected to the Internet, you can search for a specific error message using the error message search feature of the Oracle online documentation.

Many books in the documentation set use the sample schemas of the seed database, which is installed by default when you install Oracle.

To download free release notes, installation documentation, white papers, or other collateral, please visit the following website:


Conventions

The following text conventions are used in this document:
<table>
<thead>
<tr>
<th>Convention</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>boldface</strong></td>
<td>Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.</td>
</tr>
<tr>
<td><em>italic</em></td>
<td>Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.</td>
</tr>
<tr>
<td><strong>monospace</strong></td>
<td>Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.</td>
</tr>
</tbody>
</table>
Changes in this Release for Oracle Database Installation Guide

Changes in Oracle Database Installation Guide for Oracle Database 19c.

• Changes in Oracle Database 19c
  New features, deprecated features, and desupported features in this release.

Changes in Oracle Database 19c

New features, deprecated features, and desupported features in this release.

The following are changes in Oracle Database Installation Guide for Oracle Database 19c:

• New Features
  Review new features available with Oracle Database installation in Oracle Database 19c.

• Deprecated Features
  Review features that are deprecated starting with Oracle Database 19c.

• Desupported Features for Oracle Database 19c
  There are no desupported features at the time of release.

New Features

Review new features available with Oracle Database installation in Oracle Database 19c.

• Simplified Image Based Oracle Database Client Installation

Simplified Image Based Oracle Database Client Installation

Starting with Oracle Database 19c, the Oracle Database Client software is available as an image file for download and installation. You must extract the image software into a directory where you want your Oracle home to be located, and then run the runInstaller script to start the Oracle Database Client installation. Oracle Database Client installation binaries continue to be available in the traditional format as non-image zip files.

As with Oracle Database and Oracle Grid Infrastructure image file installations, Oracle Database Client image installations simplify Oracle Database Client installations and ensure best practice deployments.
Deprecated Features

Review features that are deprecated starting with Oracle Database 19c.

The following feature is deprecated in this release, and may be desupported in another release. For more information about deprecated and desupported features, parameters and views, refer to Oracle Database Upgrade Guide.

- Deprecation of clone.pl

  The `clone.pl` script is deprecated in Oracle Database 19c. The functionality of performing a software-only installation, using the gold image, is available in the installer wizard.
  The `clone.pl` script can be removed in a future release. Instead of using the `clone.pl` script, Oracle recommends that you install the extracted gold image as a home, using the installer wizard.

Related Topics

- Oracle Database Upgrade Guide

Desupported Features for Oracle Database 19c

There are no desupported features at the time of release.
Oracle Database Installation Checklist

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

Oracle recommends that you use checklists as part of your installation planning process. Using a checklist ensures that your server hardware and configuration meets minimum requirements for this release, and enables you to carry out a successful installation.

- **Server Hardware Checklist for Oracle Database Installation**
  Use this checklist to check hardware requirements for Oracle Database.

- **Operating System Checklist for Oracle Database Installation on Microsoft Windows**
  Use this checklist to check minimum operating system requirements for Oracle Database.

- **Server Configuration Checklist for Oracle Database Installation**
  Use this checklist to check minimum server configuration requirements for Oracle Database installations.

- **Storage Checklist for Oracle Database Installation**
  Use this checklist to review storage minimum requirements and assist with configuration planning.

- **Oracle User Environment Configuration Checklist for Oracle Database Installation**
  Use this checklist to plan operating system users, groups, and environments for Oracle Database management.

- **Installer Planning Checklist for Oracle Database Installation**
  Use the checklist to assist you to be prepared before starting Oracle Universal Installer.

### Server Hardware Checklist for Oracle Database Installation

Use this checklist to check hardware requirements for Oracle Database.

#### Table 1-1  Server Hardware Checklist for Oracle Database Installation

<table>
<thead>
<tr>
<th>Check</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server Make and Architecture</td>
<td>Confirm that server make, model, core architecture, and host bus adaptors (HBA) or network interface controllers (NIC) 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.</td>
</tr>
<tr>
<td>Minimum RAM</td>
<td>2 GB RAM recommended</td>
</tr>
<tr>
<td>Minimum network connectivity</td>
<td>Server is connected to a network</td>
</tr>
<tr>
<td>Video Adapter</td>
<td>256 colors</td>
</tr>
</tbody>
</table>
Table 1-1  (Cont.) Server Hardware Checklist for Oracle Database Installation

<table>
<thead>
<tr>
<th>Check</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server Display Cards</td>
<td>At least 1024 x 768 display resolution, which Oracle Universal</td>
</tr>
<tr>
<td></td>
<td>Installer requires.</td>
</tr>
</tbody>
</table>

Operating System Checklist for Oracle Database Installation on Microsoft Windows

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

Table 1-2  Operating System General Checklist for Oracle Database on Microsoft Windows

<table>
<thead>
<tr>
<th>Item</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system general</td>
<td>Oracle Database for Windows x64 is supported on the following operating system versions:</td>
</tr>
<tr>
<td>requirements</td>
<td>• Windows 8.1 x64 - Pro and Enterprise editions</td>
</tr>
<tr>
<td></td>
<td>• Windows 10 x64 - Pro, Enterprise, and Education editions</td>
</tr>
<tr>
<td></td>
<td>• Windows Server 2012 R2 x64 - Standard, Datacenter, Essentials, and Foundation editions</td>
</tr>
<tr>
<td></td>
<td>• Windows Server 2016 x64 - Standard, Datacenter, and Essentials editions</td>
</tr>
<tr>
<td></td>
<td>• Windows Server 2019 x64 - Standard, Datacenter, and Essentials editions</td>
</tr>
</tbody>
</table>

Server Configuration Checklist for Oracle Database Installation

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

Table 1-3  Server Configuration Checklist for Oracle Database

<table>
<thead>
<tr>
<th>Check</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk space allocated to the temporary file system</td>
<td>At least 1 GB of space in the temporary directory. Oracle recommends 2 GB or more</td>
</tr>
<tr>
<td>Swap space allocation relative to RAM</td>
<td>• If physical memory is between 2 GB and 16 GB, then set virtual memory to 1 times the size of the RAM</td>
</tr>
<tr>
<td></td>
<td>• If physical memory is more than 16 GB, then set virtual memory to 16 GB</td>
</tr>
</tbody>
</table>
Table 1-3  (Cont.) Server Configuration Checklist for Oracle Database

<table>
<thead>
<tr>
<th>Check</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Inventory and ORA_INSTALL Group Requirements</td>
<td>The Oracle Inventory directory is the central inventory of Oracle software installed on your system. You do not need to create the Oracle central inventory or the ORA_INSTALL group as Oracle Universal Installer creates it for you.</td>
</tr>
<tr>
<td>Groups and Users</td>
<td>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.</td>
</tr>
<tr>
<td>Mount point paths for the software binaries</td>
<td>Oracle recommends that you create an Optimal Flexible Architecture configuration as described in this guide.</td>
</tr>
<tr>
<td>Ensure that the Oracle home (the Oracle home path that you select for Oracle Database) uses only ASCII characters.</td>
<td>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 must select for paths.</td>
</tr>
<tr>
<td>Set locale (if needed)</td>
<td>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. National Language Support (NLS) 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.</td>
</tr>
</tbody>
</table>

Storage Checklist for Oracle Database Installation

Use this checklist to review storage minimum requirements and assist with configuration planning.
### Table 1-4  Storage Checklist for Oracle Database

<table>
<thead>
<tr>
<th>Check</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum local disk storage space for Oracle software</td>
<td>At least 6.0 GB for Oracle Database Enterprise Edition</td>
</tr>
<tr>
<td></td>
<td>At least 5.5 GB for Oracle Database Standard Edition 2</td>
</tr>
<tr>
<td></td>
<td>At least 7.0 GB for an Oracle Restart installation</td>
</tr>
</tbody>
</table>

#### Note:

Oracle recommends that you allocate approximately 100 GB to allow additional space for applying any future patches on top of the existing Oracle home. For specific patch-related disk space requirements, please refer to your patch documentation.

<table>
<thead>
<tr>
<th>Recommended file system</th>
<th>Ensure that you have one of the following storage options available:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Oracle ASM Cluster File System (Oracle ACFS)</td>
</tr>
<tr>
<td></td>
<td>• Oracle Automatic Storage Management (Oracle ASM)</td>
</tr>
<tr>
<td></td>
<td>• NTFS File System or Resilient File System (ReFS)</td>
</tr>
<tr>
<td></td>
<td>The database files must be placed on Oracle ASM if you are using Oracle ACFS; otherwise they can be placed on NTFS or ReFS.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Select Database File Storage Option</th>
<th>Ensure that you have one of the following storage options available:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• File System</td>
</tr>
<tr>
<td></td>
<td>Oracle recommends that the file system be separate from the file systems used by the operating system or the Oracle software. The file system can be any of the following:</td>
</tr>
<tr>
<td></td>
<td>- A file system on a disk that is physically attached to the system</td>
</tr>
<tr>
<td></td>
<td>- A file system on a logical volume manager (LVM) volume or a redundant array of independent disks (RAID) device</td>
</tr>
<tr>
<td></td>
<td>• Oracle Automatic Storage Management (Oracle ASM)</td>
</tr>
<tr>
<td></td>
<td>Oracle ASM is installed as part of an Oracle Grid Infrastructure installation. If you plan to use Oracle ASM, then you must install Oracle Grid Infrastructure before you install and create the database.</td>
</tr>
</tbody>
</table>

| Determine your recovery plan         | Review the storage configuration sections of this document for more information about configuring recovery. |
Table 1-5  User Environment Configuration for Oracle Database

<table>
<thead>
<tr>
<th>Check</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create operating system groups and users</td>
<td>Create operating system groups and users depending on your security requirements, as described in this install guide.</td>
</tr>
<tr>
<td>Configure the Oracle Software Owner Environment</td>
<td>Set the TEMP environment variable.</td>
</tr>
<tr>
<td>Unset Oracle Software Environment Variables</td>
<td>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.</td>
</tr>
<tr>
<td>Manage User Account Control</td>
<td>If you have enabled the User Account Control security feature, then Oracle Universal Installer prompts you for either your consent or your credentials when installing Oracle Database. Provide either the consent or your Windows Administrator credentials as appropriate.</td>
</tr>
</tbody>
</table>

Installer Planning Checklist for Oracle Database Installation

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

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

<table>
<thead>
<tr>
<th>Check</th>
<th>Task</th>
</tr>
</thead>
</table>
| Review the Documentation | • Review the Oracle Database Release Notes, which is available at the following location: Oracle Database Release Notes
• Be familiar with the installation steps for Oracle RAC software and creating an Oracle RAC database. |
| Review the Licensing Information | 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: Oracle Database Licensing Information |
| Obtain your My Oracle Support account information. | 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: https://support.oracle.com/ |
Table 1-6  (Cont.) Oracle Universal Installer Planning Checklist for Oracle Database Installation

<table>
<thead>
<tr>
<th>Check</th>
<th>Task</th>
</tr>
</thead>
</table>
| Review Oracle Support Certification Matrix | New platforms and operating system software versions can 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/](https://support.oracle.com/)  
  You must register online before using My Oracle Support. After logging in, from the menu options, select the Certifications tab. On the Certifications page, use the Certification Search options to search by Product, Release, and Platform. You can also search using the Certification Quick Link options such as Product Delivery, and Lifetime Support. |
| Review online information to assist with installation | • Log on to My Oracle Support to access certifications for your installation for your platform.  
  • Refer to Oracle.com ([http://www.oracle.com](http://www.oracle.com)) for additional resources about planning for specific implementation scenarios, best practices, and other information that can help you with your installation plan. In particular, refer to the Oracle Real Application Clusters pages on the Oracle Technology Network at [http://www.oracle.com/goto/rac](http://www.oracle.com/goto/rac) |
| Run Oracle Universal Installer (OUI) with CVU and use fixup scripts | 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.  
  • Obtain the latest version of CVU at the following URL:  
  • You can also run CVU commands manually to check that your system is prepared for installation before you start an Oracle RAC installation. If you have vendors performing hardware or operating system configuration steps, then ask the vendors to complete the relevant CVU checks of the cluster after they complete their work to ensure that your system is configured correctly.  
  • Run OUI and DBCA from a node where an Oracle RAC Oracle database instance is located.  
  • In case of an upgrade failure, follow common industry standards for data recovery planning, including backing up your existing database. |
### Table 1-6 (Cont.) Oracle Universal Installer Planning Checklist for Oracle Database Installation

<table>
<thead>
<tr>
<th>Check</th>
<th>Task</th>
</tr>
</thead>
</table>
| Download and run Oracle ORAchk for runtime and upgrade checks, or runtime health checks | The Oracle ORAchk utility provides system checks that can help to prevent issues before and after installation. These checks include kernel requirements, operating system resource allocations, and other system requirements. Use the Oracle ORAchk Upgrade Readiness Assessment to obtain an automated upgrade-specific system health check for upgrades to 11.2.0.3, 11.2.0.4, 12.1.0.1, 12.2, 18c, and 19c. For example:  
  - Before you perform a fresh database installation:  
    ```bash 
    %ORACLE-HOME%\suptools\orachk>orachk.bat -profile preinstall 
    ```
  - To upgrade your existing database to a higher version or release:  
    ```bash 
    %ORACLE-HOME%\suptools\orachk>orachk.bat -o pre 
    ```
  The Oracle ORAchk Upgrade Readiness Assessment automates many of the manual pre- and post-upgrade checks described in Oracle upgrade documentation. Oracle ORAchk is supported on Windows 2008 and Windows 2012 on a Cygwin environment only. For more information refer to the following URL:  
  [https://support.oracle.com/rs?type=doc&id=1268927.1](https://support.oracle.com/rs?type=doc&id=1268927.1) |
| Verify if Oracle Grid Infrastructure is installed | • If you want to use Oracle ASM or Oracle Restart, then install Oracle Grid Infrastructure for a standalone server before you install and create the database. Otherwise, to use Oracle ASM, you must complete an Oracle Grid Infrastructure installation, and then manually register the database with Oracle Restart.  
  • To install Oracle Real Applications Cluster (Oracle RAC), you must have Oracle Grid Infrastructure (Oracle Clusterware and Oracle ASM) installed on your cluster. The Oracle Clusterware version must be equal to or greater than the Oracle RAC version that you plan to install.  
  • Currently, there are no supported clusterware products other than Oracle Clusterware for the Microsoft Windows platforms. If you intend to install Oracle RAC, then you must first install Oracle Grid Infrastructure for a cluster, which includes Oracle Clusterware. |
| Check running Oracle processes, and shut down if necessary | • On a standalone database not using Oracle ASM: You do not need to shut down the database while you install Oracle Grid Infrastructure.  
  • On a standalone database using Oracle ASM: Stop the existing Oracle ASM instances. The Oracle ASM instances are restarted during installation.  
  • On an Oracle RAC Database node: This installation requires an upgrade of Oracle Clusterware, as Oracle Clusterware is required to run Oracle RAC. As part of the upgrade, you must shut down the database one node at a time as the rolling upgrade proceeds from node to node. |
### Table 1-6  (Cont.) Oracle Universal Installer Planning Checklist for Oracle Database Installation

<table>
<thead>
<tr>
<th>Check</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure Task Scheduler jobs do not run during installation</td>
<td>If the installer is running when daily scheduled jobs start, then you may encounter unexplained installation problems if your scheduled job is performing cleanup, and temporary files are deleted before the installation is finished. Oracle recommends that you complete installation before daily scheduled jobs are run, or disable daily scheduled jobs that perform cleanup until after the installation is completed.</td>
</tr>
</tbody>
</table>
| Decide on an Oracle Database management tool | By default, Oracle Database is managed by Oracle Enterprise Manager Database Express. If you have an existing Oracle Management Agent, and decide to use Oracle Enterprise Manager Cloud Control to centrally manage your database, then obtain the following information to enter during the database installation:  
- OMS host  
- OMS port  
- EM admin username  
- EM admin password  
- Specify password of ASMSNMP user  
You need a web browser to access documentation, to use Oracle Enterprise Manager Database Express, and to use Oracle Application Express. Web browsers must support JavaScript and the HTML 4.0 and Cascading Style Sheets (CSS) 1.0 standards. |
| Review memory allocation and Automatic Memory Management feature | You can enable automatic memory management either during, or after Oracle Database installation. If you enable automatic memory management after installation, then you must shut down and restart the database.  
With Automatic Memory Management, Oracle Database instances automatically manage and tune memory. You choose a memory target, and the instance automatically distributes memory between the system global area (SGA) and the instance program global area (instance PGA). As memory requirements change, the instance dynamically redistributes memory between the SGA and instance PGA. |

**Related Topics**

- *Oracle Grid Infrastructure Installation and Upgrade Guide for Microsoft Windows x64 (64-Bit)*

**Related Topics**

- *Oracle Enterprise Manager Cloud Control Administrator's Guide*

**Related Topics**

- *Oracle Database Administrator's Guide*

**Related Topics**

- *Oracle Clusterware Administration and Deployment Guide*
Oracle Database Preinstallation Tasks

Review the preinstallation tasks before you start Oracle Universal Installer.

Learn about the information required to install Oracle Database 19c. Ensure that you review information related to the platform on which you intend to install Oracle Database 19c.

- **Oracle Database Minimum Hardware Requirements**
  Learn about the hardware component and hard disk space requirements.

- **Oracle Database Software Requirements**
  The following table lists the software requirements for Oracle Database on Windows x64:

- **Windows Certification and Web Browser Support**
  Review the Windows Certification and Web Browser Support information.

- **Reviewing Operating System Security Common Practices**
  Secure operating systems are an important basis for general system security.

- **Confirming Host Name Resolution**
  Before you start installation, use the ping command to ensure that your computer hostname is resolvable. Typically, the computer on which you want to install Oracle Database is connected to a network.

- **Individual Component Requirements**
  Review the individual component requirements.

Oracle Database Minimum Hardware Requirements

Learn about the hardware component and hard disk space requirements.

- **Hardware Component Requirements for Windows x64**
  The following table lists the hardware components that are required for Oracle Database on Windows x64.

- **Hard Disk Space Requirements**
  Learn about the system requirements for Windows platforms that use the NT File System (NTFS).

- **Verifying Hardware Requirements**
  Use this procedure to gather information about your server configuration.

Hardware Component Requirements for Windows x64

The following table lists the hardware components that are required for Oracle Database on Windows x64.
Table 2-1  Windows x64 Minimum Hardware Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Architecture</td>
<td>Processor: AMD64 and Intel EM64T</td>
</tr>
<tr>
<td>Physical memory (RAM)</td>
<td>2 GB minimum</td>
</tr>
</tbody>
</table>
| Virtual memory (swap)| • If physical memory is between 2 GB and 16 GB, then set virtual memory to 1 times the size of the RAM  
                          • If physical memory is more than 16 GB, then set virtual memory to 16 GB |
| Disk space           | • Typical Install Type total: 10 GB                                  
                          • Advanced Install Types total: 10 GB                             |
| Video adapter        | 256 colors                                                           |
| Screen Resolution    | 1024 X 768 minimum                                                   |

Hard Disk Space Requirements

Learn about the system requirements for Windows platforms that use the NT File System (NTFS).

Oracle strongly recommends that you install the Oracle database home (Oracle database binaries, trace files, and so on) on Oracle ACFS or NTFS.

The database files themselves must be placed on Oracle ASM if using Oracle ACFS; otherwise they can be placed on NTFS. Usage of Oracle ACFS and Oracle ASM or NTFS is recommended to ensure security of these files.

The NTFS system requirements are accurate than the hard disk values reported by the Oracle Universal Installer Summary window. The Summary window does not include accurate values for disk space, the space required to create a database, or the size of compressed files that are expanded on the hard drive.

The hard disk requirements for Oracle Database components include 32 MB to install Java Runtime Environment (JRE) and Oracle Universal Installer on the partition where the operating system is installed. If sufficient space is not detected, then the installation fails and an error message appears.

The following table lists the disk space requirements on NTFS for Windows x64. The starter database requires 720 MB of disk space.

The values in this table include the starter database.

Table 2-2  Windows x64 Minimum Disk Space Requirements on NTFS

<table>
<thead>
<tr>
<th>Installation Type</th>
<th>TEMP Space</th>
<th>SYSTEM_DRIVE|Program Files|Oracle Inventory</th>
<th>Oracle Home</th>
<th>Data Files *</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise Edition</td>
<td>595 MB</td>
<td>4.55 MB</td>
<td>6.00 GB</td>
<td>4.38 GB **</td>
<td>10.38 GB**</td>
</tr>
<tr>
<td>Standard Edition 2</td>
<td>595 MB</td>
<td>4.55 MB</td>
<td>5.50 GB</td>
<td>4.24 GB **</td>
<td>9.74 GB  **</td>
</tr>
</tbody>
</table>

* Refers to the contents of the admin, cfgtoollogs, flash_recovery_area, and oradata directories in the ORACLE_BASE directory.
** This size can be higher depending on the installation options selected, such as languages or additional components. If you choose to install Oracle Database with customized backups enabled, then include at least 2 GB extra for data file disk space.

Verifying Hardware Requirements

Use this procedure to gather information about your server configuration.

To ensure that the system meets these requirements, follow these steps:

1. Determine the physical RAM size.
   
   For example, on a computer running Windows Server 2012 R2, click **System and Security**, then click **System**.
   
   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 virtual memory (also known as paging file size).
   
   For example, on a computer running Windows Server 2012 R2, click **System and Security**, then click **System**, click **Advanced System Settings**, click the **Advanced** tab on System Properties page, and then click **Settings** in the Performance section. Then select the **Advanced** tab on Performance Options page.
   
   The virtual memory is listed in the Virtual Memory section.
   
   If necessary, see your operating system documentation for information about how to configure additional virtual memory.

3. Determine the amount of free disk space on the system.
   
   For example, on a computer running Windows Server 2012 R2, right-click **My Computer** and click **Open**.

4. Determine the amount of disk space available in the temp directory. This is equivalent to the total amount of free disk space, minus what is required for the Oracle software to be installed.
   
   On Windows x64, if there is less than 125 MB of disk space available in the temp directory, then delete all unnecessary files. If the temp disk space is still less than 125 MB, then set the TEMP or TMP environment variable to point to a different hard drive location.
   
   For example, to change the environment variables on a computer running Windows Server 2012 R2, click **System and Security**, then click **System**, click **Advanced System Settings**, then click the **Advanced** tab on System Properties page, and then click **Environment Variables**.

Oracle Database Software Requirements

The following table lists the software requirements for Oracle Database on Windows x64:
### Table 2-3  Windows x64 Software Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating System</strong></td>
<td>Oracle Database for Windows x64 is supported on the following operating systems:</td>
</tr>
<tr>
<td></td>
<td>• Windows 8.1 x64 - Pro and Enterprise editions</td>
</tr>
<tr>
<td></td>
<td>• Windows 10 x64 - Pro, Enterprise, and Education editions</td>
</tr>
<tr>
<td></td>
<td>• Windows Server 2012 R2 x64 - Standard, Datacenter, Essentials, and Foundation editions</td>
</tr>
<tr>
<td></td>
<td>• Windows Server 2016 x64 - Standard, Datacenter, and Essentials editions</td>
</tr>
<tr>
<td></td>
<td>• Windows Server 2019 x64 - Standard, Datacenter, and Essentials editions</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td>• Windows Multilingual User Interface Pack is supported.</td>
</tr>
<tr>
<td></td>
<td>• The Server Core option is not supported.</td>
</tr>
<tr>
<td><strong>Virtualization</strong></td>
<td>Oracle certifies the following virtualization technologies with Oracle Database on Windows:</td>
</tr>
<tr>
<td></td>
<td>• Oracle VM Server</td>
</tr>
<tr>
<td></td>
<td>• Microsoft Hyper-V</td>
</tr>
<tr>
<td></td>
<td>For more detailed information on certified Oracle VM Server combinations, check My Oracle Support note 464754.1. For more information on certified Hyper-V combinations, you can visit:</td>
</tr>
<tr>
<td><strong>Compiler and SDK</strong></td>
<td>The following component is supported with Microsoft Visual C++ 2013 Update 5:</td>
</tr>
<tr>
<td></td>
<td>• Pro<em>C/C++ : The Pro</em>C/C++ uses Microsoft Visual C++ 2013, to convert the Pro*C/C++ files into C/C++ files, and then uses Microsoft Visual C++ 2017, Update 6 or later to further build them.</td>
</tr>
<tr>
<td></td>
<td>The following components are supported with the Microsoft Visual C++ 2017 Update 6 or later, and Intel 17.8 C compilers:</td>
</tr>
<tr>
<td></td>
<td>• Oracle Call Interface</td>
</tr>
<tr>
<td></td>
<td>• External callouts</td>
</tr>
<tr>
<td></td>
<td>• Oracle XML Developer's Kit (XDK)</td>
</tr>
<tr>
<td></td>
<td>Oracle C++ Call Interface supports:</td>
</tr>
<tr>
<td></td>
<td>• Microsoft Visual C++ 2017 Update 6 or later</td>
</tr>
<tr>
<td></td>
<td>• Microsoft Visual C++ 2017 Update 6 compiler or later and Intel 17.8 C compiler with Microsoft Visual Studio 2017 STLS</td>
</tr>
<tr>
<td></td>
<td>Pro*COCOBOL supports:</td>
</tr>
<tr>
<td></td>
<td>• Micro Focus Visual COBOL 2.2 - Update 2</td>
</tr>
<tr>
<td><strong>Network Protocol</strong></td>
<td>The Oracle Net foundation layer uses Oracle protocol support to communicate with the following industry-standard network protocols:</td>
</tr>
<tr>
<td></td>
<td>• TCP/IP</td>
</tr>
<tr>
<td></td>
<td>• TCP/IP with SSL</td>
</tr>
<tr>
<td></td>
<td>• Named Pipes</td>
</tr>
</tbody>
</table>
Table 2-3  (Cont.) Windows x64 Software Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
</table>
| Oracle Database Client | To connect to Oracle Database 19c, the following are required:  
• Oracle Database Client is version 11.2.0.4 or later.  
• If the earlier Oracle Database Client is running on the same computer as Oracle Database 19c, then you cannot use a bequeath connection.  
Oracle recommends upgrading Oracle Database Client to the latest patchset (11.2.0.4 or later). You can download the patchset from the Patches and Updates section of My Oracle Support at  
https://support.oracle.com |

Windows Certification and Web Browser Support

Review the Windows Certification and Web Browser Support information.

• **Remote Desktop Services**  
Oracle supports installing, configuring, and running Oracle Database through Remote Desktop Services on Windows.

• **Microsoft Windows Servicing Options**  
On Microsoft Windows 10 systems, Microsoft introduced new servicing options.

• **Installation Requirements for Web Browsers**  
You require Web browsers to use Oracle Enterprise Manager Database Express and Oracle Enterprise Manager Cloud Control.

• **Default Share Configuration Requirement**  
The prerequisite checks during Oracle Database installation require that the system drive on your computer has default share configured on it.

Remote Desktop Services

Oracle supports installing, configuring, and running Oracle Database through Remote Desktop Services on Windows.

To install Oracle Database, Oracle recommends that you start all configuration tools from the Remote Desktop console session of the server.

Platform-specific support information is as follows:

• Windows client operating systems: The Remote Desktop is only available in Single User Mode.

• Windows server operating systems: You can have multiple Remote Desktop sessions.
See Also:

- The Microsoft website for more information about Remote Desktop Services
  http://www.microsoft.com/
- The My Oracle Support website for the latest Terminal Services and Remote Desktop Services information
  https://support.oracle.com/

Microsoft Windows Servicing Options

On Microsoft Windows 10 systems, Microsoft introduced new servicing options. Oracle Database supports the following servicing options:

- Semi-Annual Channel
- Long-Term Servicing Channel

Other servicing options, such as Semi-Annual Channel (Targeted) are not supported. Oracle previously supported the former Windows servicing options, such as the Current Branch for Business (CBB) and Long-Term Servicing Branch (LTSB).

Note:

Oracle supports its database products on these channel releases that become generally available for as long as Microsoft supports the channel version. Once Microsoft support ends for a specific channel version, Oracle’s support ends for that version as well. Oracle may recommend that customers wait until relevant Oracle patches have been released before upgrading to a particular channel version. Oracle may recommend or discourage the installation of a specific channel version if it significantly affects the operation of Oracle software, either positively or negatively. If such a statement is deemed necessary, Oracle will disseminate this statement on My Oracle Support.

Installation Requirements for Web Browsers

You require Web browsers to use Oracle Enterprise Manager Database Express and Oracle Enterprise Manager Cloud Control.

Web browsers must support Java Script, and the HTML 4.0 and CSS 1.0 standards. For a list of browsers that meet these requirements, see the Oracle Enterprise Manager certification matrix on My Oracle Support:

https://support.oracle.com/CSP/main/article
Default Share Configuration Requirement

The prerequisite checks during Oracle Database installation require that the system drive on your computer has default share configured on it.

Use the `net use` command to verify, for example:

```bash
C:/> net use \\hostname\c$
```

The command completed successfully

Ensure that the current user, the user in the Administrator group, has all the privileges on the default share.

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.

Confirming Host Name Resolution

Before you start installation, use the `ping` command to ensure that your computer hostname is resolvable. Typically, the computer on which you want to install Oracle Database is connected to a network.

Ensure that the computer host name is resolvable through a Domain Name System (DNS), a network information service (NIS), or a centrally-maintained TCP/IP host file, such as `/etc/hosts`. Use the `ping` command to ensure that your computer host name is resolvable. For example:

```bash
ping myhostname
```

```text
pinging myhostname.example.com [192.0.2.2] with 32 bytes of data:
Reply from 192.0.2.2: bytes=32 time=138ms TTL=56
```

If your computer host name does not resolve, then contact your System Administrator.

Individual Component Requirements

Review the individual component requirements.

- **Configuring Disk Storage for Oracle Data Files and Recovery Files**
  Learn about the storage options for storing Oracle data files and, optionally, Oracle database recovery files.

- **Creating Directories for Oracle Data Files or Recovery Files**
  If you decide to place the Oracle Database files on a file system, then use the following guidelines when deciding where to place them:
• **Oracle Database Security Strong Authentication Requirements**
  Ensure that you meet the hardware and software requirements so that you can use strong authentication (Kerberos, PKI) with Oracle Database.

• **Oracle Enterprise Manager Requirements**
  All Oracle Enterprise Manager products must belong to the same release.

• **Oracle-Managed Files Requirements**
  If you choose the Advanced database creation option, then you can use the Oracle-managed files feature with the new database.

• **Oracle Volume Shadow Copy Service (VSS) Writer**
  Oracle Volume Shadow Copy Service Writer is supported on Windows Server operating systems.

### Configuring Disk Storage for Oracle Data Files and Recovery Files

Learn about the storage options for storing Oracle data files and, optionally, Oracle database recovery files.

• **Choosing a Storage Option for Oracle Database and Recovery Files**
  Oracle Database files include data files, control files, redo log files, the server parameter file, and the password file.

### Choosing a Storage Option for Oracle Database and Recovery Files

Oracle Database files include data files, control files, redo log files, the server parameter file, and the password file.

For all installations, you must choose the storage option to use for Oracle Database files. During the database installation, you must choose the storage option to use for recovery files (the fast recovery area). You do not have to use the same storage option for each file type.

**Note:**

Database files and recovery files are supported on file systems and Oracle ASM.

The storage option that you choose for recovery files can be the same as or different to the option you choose for the data files. The recovery files must be placed on Oracle ASM if using Oracle ACFS; otherwise they can be placed on NTFS.

### Creating Directories for Oracle Data Files or Recovery Files

If you decide to place the Oracle Database files on a file system, then use the following guidelines when deciding where to place them:

• **Guidelines for Placing Oracle Database Files on a File System or Logical Volume**
  Review the guidelines for placing Oracle Database files on a file system or logical volume.
Guidelines for Placing Oracle Recovery Files on a File System

Use the guidelines listed in this section to place Oracle recovery files on a file system.

Guidelines for Placing Oracle Database Files on a File System or Logical Volume

Review the guidelines for placing Oracle Database files on a file system or logical volume.

- Oracle Universal Installer indicates that the default path for the database file directory is a subdirectory of the Oracle base directory.
- You can choose either a single file system or more than one file system to store the database files:
  - If you want to use a single file system, then choose a file system on a physical device that is dedicated to the database.
    For best performance and reliability, choose a RAID device or a logical volume on multiple physical devices and implement a stripe-and-mirror everything (SAME) storage policy.
  - If you want to use more than one file system, then choose file systems on separate physical devices that are dedicated to the database.
    This method enables you to distribute physical input-output operations and create separate control files on different devices for increased reliability. It also enables you to fully implement Oracle Optimal Flexible Architecture (OFA) guidelines. Choose the Advanced database creation option to implement this method.
- If you intend to create a preconfigured database during the installation, then the file system (or file systems) that you choose must have at least 2 GB of free disk space.
  For production databases, you must estimate the disk space requirement depending on the use of the database.
- For optimum performance, the file systems that you choose must be on physical devices that are used only by the database.
- The Oracle user running the Oracle Database installation must have write permissions to create the files in the path that you specify.

Guidelines for Placing Oracle Recovery Files on a File System

Use the guidelines listed in this section to place Oracle recovery files on a file system.

Note:

You must choose a location for recovery files only if you intend to enable automated backups during the installation.
If you place the Oracle recovery files on a file system, use the following guidelines when deciding where to place them:

- To prevent disk failure from making both the data files and the recovery files unavailable, place the recovery files in a file system on a different physical disk from the data files.

  **Note:**
  Alternatively, for both data files and recovery files, use an Oracle Automatic Storage Management disk group.

- The file system that you choose must have at least 2 GB of free disk space. The disk space requirement is the default disk quota configured for the fast recovery area (specified by the `DB_RECOVERY_FILE_DEST_SIZE` initialization parameter).

  If you choose the Advanced database configuration option, you can specify a different disk quota value. After you create the database, you can also use Oracle Enterprise Manager Cloud Control or Oracle Enterprise Manager Database Express to specify a different value.

  **See Also:**
  *Oracle Database Backup and Recovery User's Guide*

- Oracle Universal Installer suggests that the default location for the database file directory is a subdirectory of the Oracle base directory. However, this default location is not recommended for production databases.

### Creating Required Directories

Use this procedure to create the required directories.

  **Note:**
  You must complete this procedure only to place the Oracle database or recovery files on a separate file system from the Oracle base directory.

To create directories for the Oracle database or recovery files on separate file systems from the Oracle base directory, follow these steps:

1. Use Windows Explorer to determine the free disk space on the file system.
2. From the display, identify the file systems to use:
File Type | File System Requirements
--- | ---
Data files | Select one of the following:
- A single file system with at least 950 MB of free disk space
- Two or more file systems with at least 950 MB of free disk space in total
Recovery files | Choose a file system with at least 2 GB of free disk space.

If you are using the same file system for multiple types of files, then add the disk space requirements for each type to determine the total disk space requirement.

3. Note the names of the directories for the file systems that you identified.

Oracle Database Security Strong Authentication Requirements

Ensure that you meet the hardware and software requirements so that you can use strong authentication (Kerberos, PKI) with Oracle Database.

Oracle Enterprise Manager Requirements

All Oracle Enterprise Manager products must belong to the same release.
Older versions of Enterprise Manager are not supported with the new release.

Note:

Oracle Enterprise Manager products are released on the Enterprise Manager Cloud Control installation media. Oracle Enterprise Manager Database Express is built into Oracle Database without any need for special installation or management.

See Also:

* Oracle Enterprise Manager Cloud Control Basic Installation Guide*
* Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*

Oracle-Managed Files Requirements

If you choose the Advanced database creation option, then you can use the Oracle-managed files feature with the new database.

If you use this feature, then specify only the database object name instead of file names when creating or deleting database files. You require configuration procedures to enable Oracle Managed Files.
Oracle Volume Shadow Copy Service (VSS) Writer

Oracle Volume Shadow Copy Service Writer is supported on Windows Server operating systems.

See Also:

Oracle Database Administrator's Guide

Oracle Database Platform Guide for Microsoft Windows
Overview of Oracle Database Installation

Learn about the different installation types of Oracle Database and issues to consider before you install Oracle Database.

• Installation Considerations
  Learn about the information that you must consider before deciding how to install this product.

• Database Configuration Options
  Review the different database configuration options.

Installation Considerations

Learn about the information that you must consider before deciding how to install this product.

• Oracle Base Directory
  If you install Oracle Database 19c on a computer with no other Oracle software installed, Oracle Universal Installer creates an Oracle base directory for you.

• Oracle Home Directory
  Learn about the Oracle Home directory.

• Oracle Inventory Directory
  The Oracle Inventory directory is the central inventory location for all Oracle software installed on a server.

• Installing Oracle Database Vault in an Oracle Data Guard Environment
  Starting with Oracle Database 12c, Oracle Database Vault is installed by default as part of the Oracle Database installation.

• Oracle Database Vault Default Audit Policy and Initialization Parameters
  Oracle Database Vault installs a baseline database auditing policy.

• Consider Memory Allocation and Automatic Memory Management
  During a Typical installation, you create your database with Database Configuration Assistant (DBCA), and automatic memory management is enabled. If you choose advanced installation, then you can either specify memory allocation manually, or enable automatic memory management.

Oracle Base Directory

If you install Oracle Database 19c on a computer with no other Oracle software installed, Oracle Universal Installer creates an Oracle base directory for you.

If Oracle software is installed, then one or more Oracle base directories exist. In the latter case, Oracle Universal Installer offers you a choice of Oracle base directories to install Oracle Database.
The Oracle Home User has complete control over the Oracle base for a particular home. For security reasons, different Windows User Accounts used as Oracle Home Users for different Oracle homes are not allowed to share the same Oracle base. However, to support Oracle Database upgrade, Oracle supports the sharing of an Oracle base between a Windows Built-in Account and a Windows User Account. This means that if you choose to reuse an Oracle base from an earlier release of Oracle Database in Oracle Database 19c, then the Oracle Home User of Oracle Database 19c Oracle home has complete control over the Oracle base of the earlier release.

See Also:

Oracle Database Platform Guide for Microsoft Windows

In a default Windows installation, the Oracle base directory appears as follows:

```
DRIVE_LETTER: \app\username
```

where `username` is the Oracle Installation User if you choose Windows Built-in Account, else it is the Oracle Home User (standard Windows User Account).

Caution:

After installing Oracle Database 19c with a Windows User Account used as the Oracle Home User, do not install older version of databases and share the same Oracle base directory. During the installation of older releases of Oracle Database, ACLs are reset corresponding to older releases. Thus Oracle Database 19c services may not be able to access the Oracle base directory and the files in it.

Note:

You can choose to create an Oracle base directory, even if the other Oracle base directories exist on the system.

Oracle Home Directory

Learn about the Oracle Home directory.

- **Contents of the Oracle Home Environment**
  The Oracle home directory is located under the Oracle base directory.

- **Multiple Oracle Home Components**
  You can install all Oracle components in multiple Oracle homes on the same computer.
Contents of the Oracle Home Environment

The Oracle home directory is located under the Oracle base directory.

For example, in a default Windows installation, if you name the Oracle home directory `dbhome_1`, it appears in the Oracle base directory as follows:

```
DRIVE_LETTER:\app\username\product\19.0.0\dbhome_1
```

where `username` is the installation user if you choose a Windows Built-in Account, else it is the Oracle Home User specified.

An Oracle home corresponds to the environment in which the Oracle components run. This environment includes the following:

- Location of the installed component files
- PATH variable pointing to the binary files of the installed components
- Registry entries
- Service names
- Program groups

Oracle homes also have a name associated with them, which is automatically assigned by the installer.

Multiple Oracle Home Components

You can install all Oracle components in multiple Oracle homes on the same computer.

However, some components can only support one active instance at a time. The current (latest) installation renders the previous one inactive. The component Oracle Provider for OLE DB supports one active instance at a time.

Oracle Inventory Directory

The Oracle Inventory directory is the central inventory location for all Oracle software installed on a server.

By default, the location of the Oracle Inventory directory is `C:\Program Files\Oracle\Inventory`. This directory is created by default the first time you install Oracle software on a Windows server.

Installing Oracle Database Vault in an Oracle Data Guard Environment

Starting with Oracle Database 12c, Oracle Database Vault is installed by default as part of the Oracle Database installation.

If you plan to use Oracle Data Guard with Oracle Database Vault, then see "Integrating Oracle Database Vault with Oracle Data Guard" in Oracle Database Vault Administrator’s Guide.
Oracle Database Vault Default Audit Policy and Initialization Parameters

Oracle Database Vault installs a baseline database auditing policy. This policy covers the access control configuration information stored in the following:

- Database Vault database tables
- Information stored in Oracle Catalog (rollback segments, tablespaces, and so on)
- Use of system privileges
- Oracle Label Security configuration

When you install Oracle Database Vault, the security specific database initialization parameters are initialized with the default values.

See Also:

Oracle Database Vault Administrator's Guide

Consider Memory Allocation and Automatic Memory Management

During a Typical installation, you create your database with Database Configuration Assistant (DBCA), and automatic memory management is enabled. If you choose advanced installation, then you can either specify memory allocation manually, or enable automatic memory management.

With automatic memory management, the Oracle Database instances automatically manage and tune memory for you. With automatic memory management, you choose a memory target, and the instance automatically distributes memory between the system global area (SGA) and the instance program global area (instance PGA). As memory requirements change, the instance dynamically redistributes memory between the SGA and instance PGA.

You can enable automatic memory management either during, or after the database installation. Enabling automatic memory management after installation involves a shutdown and restart of the database.

See Also:

Oracle Database Administrator's Guide

Database Configuration Options

Review the different database configuration options.
You can create an Oracle database during the installation process. If you choose to create an Oracle database, Oracle Universal Installer uses Oracle Database Configuration Assistant to create it. You can create one of the preconfigured database types, which are designed for a variety of different applications, modify one of the preconfigured database types, or create a customized database to suit your own requirements.

- Creating a Database After Installation
  You can create a database after installation by using Oracle Database Configuration Assistant (Oracle DBCA).

Creating a Database After Installation

You can create a database after installation by using Oracle Database Configuration Assistant (Oracle DBCA).

If you decide not to create a database during the installation, then you can use Oracle Database Configuration Assistant (Oracle DBCA) to create one after you have installed the software.

- Creating an Oracle Database on Direct NFS
  Learn how to install and create an Oracle Database that uses Direct NFS (dNFS) for storage.

Creating an Oracle Database on Direct NFS

Learn how to install and create an Oracle Database that uses Direct NFS (dNFS) for storage.

There are different configuration processes you must perform to use dNFS for your database file system. Following are the steps:

1. Perform a Software-Only Installation of Oracle Database
   In a software-only installation, you install the Oracle Database software but do not create a database as part of the installation process. You can install only the database software by selecting the Install Database Software only option provided on the Select Installation Option screen.

2. Use Oracle Database Configuration Assistant to Create and Configure the Database
   After the Prerequisite checks are complete, on the Summary screen, minimize the installation window. DO NOT click Finish at this point.

3. Enable the Direct NFS option.
   Return to the DBCA window and click Finish.

4. Map a drive letter to a CIFS share on the NFS server that represents the location of the database files.
   ```
   NET USE * \\filer\vol0\orcl
   ```
   After you complete this step, both Oracle and the Windows operating system can access the location where the database files reside. Oracle is using DNFS, but the Windows OS uses CIFS to access the same location on the NFS server.

5. Verify that the Direct NFS is configured for the database.
   a. Start SQL*Plus.
b. Connect to the newly created database as a DBA user.

c. Run the following SQL command:

```sql
SELECT * FROM v$dnfs_servers;
```
Configuring Users, Groups and Environments for Oracle Database

Learn about the users, groups, and environment settings to complete before you install Oracle Database and Grid Infrastructure for a standalone server.

- **Creating Required Operating System Groups and Users**
  If you are installing Oracle software for the first time, then create operating system groups and users to grant Oracle Database system privileges.

- **Stopping Existing Oracle Services**
  Learn how to stop all processes, including the listener and database, running in the Oracle home.

- **Configuring User Accounts**
  During installation, you can specify an Oracle Home User.

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**See Also:**

*Oracle Database Administrator's Reference for Microsoft Windows*

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**Creating Required Operating System Groups and Users**

If you are installing Oracle software for the first time, then create operating system groups and users to grant Oracle Database system privileges.

You can choose to create one administrative user and use one group for operating system authentication for all system privileges on the storage and database tiers. For example, you can designate the `oracle` user to be the Oracle Installation user for all Oracle software and use only the `ORA_DBA` group for authentication. You can also create custom configuration groups and users based on job role separation that divide access privileges.

Log in as an Administrator user, and use the following instructions to create the Oracle Installation user for Oracle Database.

- **About the Oracle Installation User**
  To install Oracle Restart or Oracle Database software, you must use either a local or a domain user that is also a member of the Administrators group.

- **Creating Oracle Home User**
  During Oracle Database installation, you can specify an optional Oracle home user associated with the Oracle home.

- **Understanding the Oracle Inventory Directory and the Oracle Inventory Group**
  The Oracle Inventory directory is the central inventory location for all Oracle software installed on a server.
• **Operating System Groups Created During Oracle Database Installation**
  During installation, the user groups listed in the following table are created, if they do not already exist.

• **Operating System Groups and Users for Job Role Separation**
  A job role separation configuration of Oracle Database and Oracle ASM is a configuration with groups and users to provide separate groups for operating system authentication.

### See Also:

*Oracle Database Platform Guide for Microsoft Windows*

### About the Oracle Installation User

To install Oracle Restart or Oracle Database software, you must use either a local or a domain user that is also a member of the Administrators group.

This user is the Oracle Installation User. The Oracle Installation User can be either a local user or a domain user.

### Creating Oracle Home User

During Oracle Database installation, you can specify an optional Oracle home user associated with the Oracle home.

For example, assume that you use an Administrator user named *OraSys* to install the software (Oracle Installation user), then you can specify the `ORADOMAIN\OraDb` domain user as the Oracle home user for this installation. The specified Oracle home domain user must exist before you install the Oracle Database software.

Oracle home user can be a Windows Built-in Account (LocalSystem for Server and LocalService for Client), Virtual Account, or a regular (not an administrator) Windows account. If you specify an existing user as the Oracle home user, then the Windows User Account you specify can either be a Windows Domain User or a Windows Local User.

A Windows User Account need not be created by the Administrator if a Virtual Account or a Windows Built-in Account is used during installation.

If you specify a non-existing user as the Oracle home user, then the Windows User Account you specify must be a Windows Local User. The installer creates this account automatically to run the Windows services for the Oracle home. Do not log in using this account to perform administrative tasks.

The Group Managed Services Account (gMSA) and Virtual Accounts enables you to install Oracle Database, create, and manage Database services without passwords. The gMSA is a domain level account that can be used by multiple servers in a domain to run the services using this account. Windows User Account can be a Windows Local User, Windows Domain User, Managed Services Account (MSA), or Group Managed Services Account (gMSA).

If you want to create a new user during installation, then it can only be a Windows Local User. It cannot be a Windows Domain User, an MSA, or a gMSA. The new user
that is created is denied interactive logon privileges to the Windows computer. However, a Windows administrator can manage this account like any other Windows account. Oracle recommends that you use Virtual Account or a standard Windows User Account (instead of Windows Built-in Account) as the Oracle Home User for enhanced security.

Note:
You cannot change the Oracle Home User after the installation is complete. If you must change the Oracle Home User, then you must reinstall the Oracle Database software.

When you specify an Oracle Home user, the installer configures that user as the Oracle Service user for all software services that run from the Oracle home. The Oracle Service user is the operating system user that the Oracle software services run as, or the user from which the services inherit privileges.

Silent installation is enhanced to support password prompt for the Oracle home user. So, customers and independent software vendors (ISV) can use response files without hard coding the password into the source code.

Oracle recommends using Virtual Account or a standard Windows User Account (not an Administrator account) as the Oracle Home User for typical installation, software-only installation, and cloning.

If an existing Windows User Account is used as the Oracle home user for software-only installation, then a password is not required. Thus, you can perform a silent, software-only installation using Windows User Account.

If you use a Windows User Account as the Oracle home user for cloning individual Oracle Database installations, then a password is not required.

Virtual Account is the Oracle home user for Oracle Database Single Instance database installation. The account enables you to install Oracle Database, create, and manage Database services without passwords. The gMSA is a domain level account that can be used by multiple servers in a domain to run the services using this account. The gMSA is a low privilege user account.

Understanding the Oracle Inventory Directory and the Oracle Inventory Group

The Oracle Inventory directory is the central inventory location for all Oracle software installed on a server.

By default, the location of the Oracle Inventory directory is `C:\Program Files\Oracle\Inventory`.

When you install Oracle software on the system for the first time, Oracle Universal Installer creates the directories for the Oracle central inventory and the Oracle Inventory group, ORA_INSTALL. The ORA_INSTALL group contains all the Oracle Home Users for all Oracle homes on the server.

Whether you are performing the first installation of Oracle software on this server, or are performing an installation of additional Oracle software on the server, you do not
need to create the Oracle central inventory or the `ORA_INSTALL` group; the Oracle Universal Installer creates them automatically. You cannot change the name of the Oracle Inventory group - it is always `ORA_INSTALL`.

Operating System Groups Created During Oracle Database Installation

During installation, the user groups listed in the following table are created, if they do not already exist.

The `HOMENAME` variable refers to the generated `HOMENAME` for a software installation, which is of the form `OraproducemajorVersionHomenumber`. For example, `OraDB19cHome1`.

### Table 4-1 User Groups Created During Oracle Database Installation

<table>
<thead>
<tr>
<th>Operating System Group Name</th>
<th>Related System Privilege</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORA_DBA</td>
<td>SYSDBA system privileges for all Oracle Database installations on the server</td>
<td>A special OSDBA group for the Windows operating system. Members of this group are granted SYSDBA system privileges for all Oracle Databases installed on the server.</td>
</tr>
<tr>
<td>ORA_OPER</td>
<td>SYSOPER system privileges for all Oracle databases installed on the server</td>
<td>A special OSOPER group for the Windows operating system. Members of this group are granted SYSOPER system privileges all Oracle Databases installed on the server. This group does not have any members after installation, but you can manually add users to this group after the installation completes.</td>
</tr>
<tr>
<td>ORA_ASMADMIN</td>
<td>SYSASM system privileges for Oracle ASM administration</td>
<td>The OSASM group for the Oracle ASM instance. Using this group and the SYSASM system privileges enables the separation of SYSDBA database administration privileges from Oracle ASM storage administration privileges. Members of the OSASM group are authorized to connect using the SYSASM privilege and have full access to Oracle ASM, including administrative access to all disk groups that the Oracle ASM instance manages.</td>
</tr>
<tr>
<td>ORA_ASMDBA</td>
<td>SYSDBA system privileges on the Oracle ASM instance</td>
<td>The OSDBA group for the Oracle ASM instance. This group grants access for the database to connect to Oracle ASM. During installation, the Oracle Installation Users are configured as members of this group. After you create an Oracle Database, this group contains the Oracle Home Users of those database homes.</td>
</tr>
<tr>
<td>Operating System Group Name</td>
<td>Related System Privilege</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>ORA_ASMOPER</td>
<td>SYSOPER for ASM system privileges</td>
<td>The OSOPER group for the Oracle ASM instance. Members of this group are granted SYSOPER system privileges on the Oracle ASM instance, which permits a user to perform operations such as startup, shutdown, mount, dismount, and check disk group. This group has a subset of the privileges of the OSASM group. Similar to the ORA_HOMENAME_OPER group, this group does not have any members after installation, but you can manually add users to this group after the installation completes.</td>
</tr>
<tr>
<td>ORA_HOMENAME_DBA</td>
<td>SYSDBA system privileges for all instances that run from the Oracle home with the name HOMENAME</td>
<td>An OSDBA group for a specific Oracle home with a name of HOMENAME. Members of this group can use operating system authentication to gain SYSDBA system privileges for any database that runs from the specific Oracle home. If you specified an Oracle Home User during installation, the user is added to this group during installation.</td>
</tr>
<tr>
<td>ORA_HOMENAME_OPER</td>
<td>SYSOPER system privileges for all instances that run from the Oracle home with a name HOMENAME</td>
<td>An OSDBA group for the Oracle home with a name of HOMENAME. Members of this group can use operating system authentication to gain SYSOPER system privileges for any database that runs from the specific Oracle home. This group does not have any members after installation, but you can manually add users to this group after the installation completes.</td>
</tr>
<tr>
<td>ORA_HOMENAME_SYSBACKUP</td>
<td>SYSBACKUP system privileges for all instances that run from the Oracle home with a name HOMENAME</td>
<td>OSBACKUPDBA group for a specific Oracle home with a name of HOMENAME. Members of this group have privileges necessary for performing database backup and recovery tasks on all database instances that run from the specified Oracle home directory.</td>
</tr>
<tr>
<td>ORA_HOMENAME_SYSDG</td>
<td>SYSDG system privileges for all instances that run from the Oracle home with a name HOMENAME</td>
<td>OSDGDBA group for a specific Oracle home with a name of HOMENAME. Members of this group have privileges necessary for performing Data Guard administrative tasks on all database instances that run from the specified Oracle home directory.</td>
</tr>
</tbody>
</table>
During the installation of Oracle Database, all groups mentioned in the table are populated for proper operation of Oracle products. You must not remove any group member populated by Oracle. However, if you want to assign specific database privileges to new Windows operating system users, then you can manually add users to these groups after the installation completes.

Oracle creates other groups, such as, ORA_INSTALL, ORA_CLIENT_LISTENERS, ORA_GRID_LISTENERS, ORA_HOMENAME_SVCSIDS, ORA_HOMENAME_SVCACCTS, and
ORA_DBSVCACCTS during installation and you must not change these groups, memberships, and ACLs associated with various Oracle created groups.

See Also:

- Oracle Database Administrator's Guide
- Oracle Automatic Storage Management Administrator's Guide

Operating System Groups and Users for Job Role Separation

A job role separation configuration of Oracle Database and Oracle ASM is a configuration with groups and users to provide separate groups for operating system authentication.

- About Job Role Separation Operating System Privileges Groups and Users
  During the Oracle Database installation, the ORA_DBA, ORA_OPER, ORA_HOMENAME_DBA, ORA_HOMENAME_OPER, ORA_HOMENAME_SYSBACKUP, ORA_HOMENAME_SYSG, ORA_HOMENAME_SYSKM, and ORA_HOMENAME_SYSRAC groups are created and users assigned to these groups.

- Oracle Software Owner For Each Oracle Software Product
  You can create a single user (for example, oracle) to own both Oracle Database, and Oracle Restart installations.

- Standard Oracle Database Groups for Job Role Separation for Oracle Database
  Review the standard Oracle Database groups.

- Extended Oracle Database Groups for Job Role Separation
  In addition to the SYSOPER privilege to start up and shut down the database, you can create new administrative privileges that are more task-specific and less privileged than the ORA_DBA(SYSDBA) system privileges to support specific administrative privileges tasks required for everyday database operation.

- Oracle Automatic Storage Management Groups for Job Role Separation
  Review the operating system groups.

- Windows Group Managed Service Accounts and Virtual Accounts
  Group Managed Services Account (gMSA) and Virtual Accounts are now supported and enable you to create and manage Database services without passwords.

- Microsoft Hyper-V Requirements
  Microsoft Hyper-V enables you to create and manage a virtualized computing environment by running multiple operating systems simultaneously on a single computer and isolate operating systems from each other.

About Job Role Separation Operating System Privileges Groups and Users

During the Oracle Database installation, the ORA_DBA, ORA_OPER, ORA_HOMENAME_DBA, ORA_HOMENAME_OPER, ORA_HOMENAME_SYSBACKUP, ORA_HOMENAME_SYSG, ORA_HOMENAME_SYSKM, and ORA_HOMENAME_SYSRAC groups are created and users assigned to these groups.
Members of these groups are granted operating system authentication for the set of database system privileges each group authorizes. Oracle recommends that you use different operating system groups for each set of system privileges.

**Oracle Software Owner For Each Oracle Software Product**

You can create a single user (for example, oracle) to own both Oracle Database, and Oracle Restart installations.

However, Oracle recommends that you create one software owner to own each Oracle software installation (typically, oracle, for the database software and grid for the Oracle Restart owner user).

You must create at least one software owner the first time you install Oracle software on the system.

---

**Note:**

In Oracle documentation, a user created to own only Oracle Grid Infrastructure software installations is called the grid user. A user created to own either all Oracle installations, or only Oracle database installations, is called the oracle user.

---

**Standard Oracle Database Groups for Job Role Separation for Oracle Database**

Review the standard Oracle Database groups.

The following is a list of standard Oracle Database groups. These groups provide operating system authentication for database administration system privileges:

---

**Note:**

All these groups are automatically created as a part of Oracle Database installation on Windows.

---

- **The OSDBA group (ORA_DBA)**
  
  Use this group the first time you install Oracle Database software on the system. This group identifies operating system user accounts that have database administrative privileges (the SYSDBA privilege) for all database instances running on the server.

  Members of the ORA_DBA group do not have SYSASM privileges on Oracle ASM instances, which are needed for mounting and dismounting disk groups.

- **The OSOPER group for Oracle Database (ORA_OPER)**
  
  Use this group if you want a separate group of operating system users to have a limited set of database administrative privileges for starting up and shutting down the database (the SYSOPER privilege).
• The OSDBA group for a particular Oracle home (ORA_HOMENAME_DBA)

This group is created the first time you install Oracle Database software into a new Oracle home. This group identifies operating system user accounts that have database administrative privileges (the SYSDBA privilege) for the database instances that run from that Oracle home.

• The OSOPER group for a particular Oracle home (ORA_HOMENAME_OPER)

Use this group if you want a separate group of operating system users to have a limited set of database administrative privileges for starting up and shutting down the database instances that run from a particular Oracle home (the SYSOPER privilege).

Extended Oracle Database Groups for Job Role Separation

In addition to the SYSOPER privilege to start up and shut down the database, you can create new administrative privileges that are more task-specific and less privileged than the ORA_DBA/SYSDBA system privileges to support specific administrative privileges tasks required for everyday database operation.

Users granted these system privileges are also authenticated through operating system group membership.

During installation, you are prompted to provide operating system groups whose members are granted access to these system privileges. You can assign the same group to provide authentication for these privileges (for example, ORA_DBA), but Oracle recommends that you provide a unique group to designate each privilege.

The OSDBA subset job role separation privileges and groups consist of the following:

• The OSBACKUPDBA group for Oracle Database (ORA_HOMENAME_SYSBACKUP)

Use this group if you want a separate group of operating system users to have a limited set of database backup and recovery related administrative privileges (the SYSBACKUP privilege).

• The OSDGDBA group for Oracle Data Guard (ORA_HOMENAME_SYSDG)

Use this group if you want a separate group of operating system users to have a limited set of privileges to administer and monitor Oracle Data Guard (the SYSDG privilege).

• The OSKMDBA group for encryption key management (ORA_HOMENAME_SYSKM)

Use this group if you want a separate group of operating system users to have a limited set of privileges for encryption key management such as Oracle Wallet Manager management (the SYSKM privilege).

• The OSRACDBA group for Oracle Real Application Clusters Administration (ORA_HOMENAME_SYSRAC)

Use this group if you want a separate group of operating system users to have a limited set of Oracle Real Application Clusters (RAC) administrative privileges (the SYSRAC privilege). To use this privilege:

– Add the Oracle Database installation owners as members of this group.
Oracle Automatic Storage Management Groups for Job Role Separation

Review the operating system groups.

Create the following operating system groups if you are installing Oracle Grid Infrastructure:

- **The OSDBA group for Oracle ASM (ORA_ASMDBA)**
  
  This group grants access for the database to connect to Oracle ASM. During installation, the Oracle Installation Users are configured as members of this group. After you create an Oracle Database, this group contains the Oracle Home Users of those database homes. Any client of Oracle ASM that needs to access storage managed by Oracle ASM needs to be in this group.

- **The OSASM group for Oracle ASM Administration (ORA_ASMADMIN)**
  
  Use this separate group to have separate administration privilege groups for Oracle ASM and Oracle Database administrators. Members of this group are granted the SYSASM system privilege to administer Oracle ASM. In Oracle documentation, the operating system group whose members are granted privileges is called the OSASM group. During installation, the Oracle Installation User for Oracle Grid Infrastructure and Oracle Database Service IDs are configured as members of this group. Membership in this group also grants database access to the Oracle ASM disks.

  Members of the OSASM group can use SQL to connect to an Oracle ASM instance as SYSASM using operating system authentication. The SYSASM privilege permits mounting and dismounting disk groups, and other storage administration tasks. SYSASM system privileges do not grant access privileges on an Oracle Database instance.

- **The OSOPER group for Oracle ASM (ORA_ASMOPER)**
  
  This is an optional group. Create this group if you want a separate group of operating system users to have a limited set of Oracle ASM instance administrative privileges (the SYSOPER for ASM privilege), including starting up and stopping the Oracle ASM instance. By default, members of the OSASM group also have all privileges granted by the SYSOPER for ASM privilege.

  To use the Oracle ASM Operator group to create an Oracle ASM administrator with fewer privileges than those granted by the SYSASM system privilege you must assign the user to this group after installation.
Windows Group Managed Service Accounts and Virtual Accounts

Group Managed Services Account (gMSA) and Virtual Accounts are now supported and enable you to create and manage Database services without passwords.

Microsoft Hyper-V Requirements

Microsoft Hyper-V enables you to create and manage a virtualized computing environment by running multiple operating systems simultaneously on a single computer and isolate operating systems from each other.

Microsoft Hyper-V enables built-in integration services for supported guest operating systems to improve the integration between a computer and a virtual machine.

Oracle Database supports Hyper-V Dynamic Memory.

Note:

Microsoft Hyper-V for specific Oracle Database and Microsoft Hyper-V certified combinations

Stopping Existing Oracle Services

Learn how to stop all processes, including the listener and database, running in the Oracle home.

Caution:

If you are installing additional Oracle Database 19c products in an existing Oracle home, then stop all processes, including the listener and database, running in the Oracle home. You cannot install into an existing Oracle home other than 19c. You must complete this task to enable Oracle Universal Installer to relink certain executables and libraries.

Consider the following before you install Oracle Restart or Oracle Database:

- If you intend to use Oracle Restart, then you must install the Oracle Restart before you install and create the database. When you perform a database installation, the database must use the same listener created during the Oracle Restart installation, thereafter you do not have to perform the steps listed in this section.
The default listener and any additional listeners must run from the Oracle Grid Infrastructure home.

• If you have an existing Oracle Database 19c running on Oracle ASM, then stop any existing Oracle ASM instances. After you finish installing Oracle Restart, start the Oracle ASM instance again.

If you choose to create a database during the installation, then most installation types configure and start a default Oracle Net listener using TCP/IP port 1521 and the IPC key value EXTPROC. However, if an existing Oracle Net listener process is using the same port or key value, Oracle Universal Installer looks for the next available port (for example, 1522) and configures and starts the new listener on this available port.

Configuring User Accounts

During installation, you can specify an Oracle Home User.

Before starting the installation, perform the following checks for the Oracle Installation users to ensure the installation succeeds:

• **Configuring Environment Variables for the Software Installation Owner**
  Before starting the Oracle Database installation, ensure that the TEMP environment variable is set correctly.

• **Managing User Accounts with User Account Control**
  To ensure that only trusted applications run on your computer, the Windows operating systems that support Oracle Database, provide User Account Control.

Configuring Environment Variables for the Software Installation Owner

Before starting the Oracle Database installation, ensure that the TEMP environment variable is set correctly.

Managing User Accounts with User Account Control

To ensure that only trusted applications run on your computer, the Windows operating systems that support Oracle Database, provide User Account Control.

If you have enabled this security feature, then, depending on the configuration, Oracle Universal Installer prompts you for either your consent or your credentials when installing Oracle Database.

You must have Administrator privileges to run Oracle tools, such as Database Configuration Assistant, Net Configuration Assistant, and OPatch, or to run any tool or application that writes to any directory within the Oracle home. If User Account Control is enabled, and you are logged in as the local Administrator, then you can successfully run each of these commands. However, if you are logged in as a member of the Administrator group, then you must explicitly start these tasks with Windows Administrator privileges. All the Oracle shortcuts that require Administrator privileges start as Administrator by default when you click the shortcuts. However, if you run the above tools from a Windows command prompt, you must run them from an Administrator command prompt. OPatch does not have a shortcut and has to be run from an Administrator command prompt.
To start a command prompt window with Windows Administrator privileges:

1. On your desktop, create a shortcut for the command prompt window. An icon for that shortcut appears on the desktop.

2. Right-click the icon for the newly created shortcut, and specify **Run as administrator**.

When you open this window, the title bar reads Administrator: Command Prompt. Run commands from within this window using Administrator privileges.
If you intend to use Oracle Automatic Storage Management (Oracle ASM), then you must install Oracle Restart before installing your database.

Oracle Grid Infrastructure for a standalone server is a version of Oracle Grid Infrastructure that supports single instance databases. This support includes volume management, file system, and automatic restart capabilities. Oracle Grid Infrastructure for a standalone server includes Oracle Restart and Oracle Automatic Storage Management. Oracle combined the two infrastructure products into a single set of binaries that is installed into an Oracle Restart home.

Oracle Restart is a feature provided as part of Oracle Grid Infrastructure. Oracle Restart monitors and can restart Oracle Database instances, Oracle Net Listeners, and Oracle ASM instances. Oracle Restart is currently restricted to manage single instance Oracle Databases and Oracle ASM instances only, and is subject to desupport in future releases. Oracle continues to provide Oracle ASM as part of the Oracle Grid Infrastructure installation for a standalone server and Cluster deployments.

Oracle Automatic Storage Management is a volume manager and a file system for Oracle Database files that supports single-instance Oracle Database and Oracle Real Application Clusters (Oracle RAC) configurations. Oracle Automatic Storage Management also supports a general purpose file system for your application needs, including Oracle Database binaries. Oracle Automatic Storage Management is Oracle’s recommended storage management solution that provides an alternative to conventional volume managers and file systems.

Oracle Restart improves the availability of your Oracle database because of the following:

- When there is a hardware or a software failure, Oracle Restart automatically starts all Oracle components, including the Oracle database instance, Oracle Net Listener, database services, and Oracle ASM.
- Oracle Restart starts components in the proper order when the database host is restarted.
- Oracle Restart runs periodic checks to monitor the status of Oracle components. If a check operation fails for a component, then the component is shut down and restarted.
Note:

- You can neither install Oracle Restart on an Oracle Grid Infrastructure cluster member node, nor add an Oracle Restart server to an Oracle Grid Infrastructure cluster member node. Oracle Restart supports single-instance databases on one server, while Oracle Grid Infrastructure for a Cluster supports single-instance or Oracle RAC databases on a cluster.

- If you install Oracle Grid Infrastructure for a standalone server on a host computer on which a database already exists, then you must manually add the database, the listener, the Oracle ASM instance, and other components to the Oracle Restart configuration before you are able to configure automatic database restarts.

- You can use the Oracle Restart implementation of Oracle Grid Infrastructure only in single-instance (nonclustered) environments. Use Oracle Grid Infrastructure with Oracle Clusterware for clustered environments.

- Oracle Grid Infrastructure for a standalone server can support multiple single-instance databases on a single host computer.

• Requirements for an Oracle Restart Installation
Before you install Oracle Restart, ensure that your system meets the following requirements:

• Oracle ACFS and Oracle ADVM
Oracle Automatic Storage Management Cluster File System (Oracle ACFS) is a multi-platform, scalable file system, and storage management technology that extends Oracle Automatic Storage Management (Oracle ASM) functionality to support all file types.

• Oracle Automatic Storage Management Storage Configuration
Review the following sections for information on Oracle Automatic Storage Management (Oracle ASM) storage configuration:

• About Upgrading Existing Oracle Automatic Storage Management Instances
Oracle Automatic Storage Management (Oracle ASM) upgrades are carried out during an Oracle Grid Infrastructure upgrade.

• Configuring Oracle Automatic Storage Management Disk Groups Manually Using Oracle ASMCA
The Oracle Automatic Storage Management Configuration Assistant utility creates a new Oracle Automatic Storage Management instance if there is no Oracle Automatic Storage Management instance currently configured on this computer.

• About Image-Based Oracle Grid Infrastructure Installation
Starting with Oracle Grid Infrastructure 12c Release 2 (12.2), installation and configuration of Oracle Grid Infrastructure software is simplified with image-based installation.

• Setup Wizard Installation Options for Creating Images
Before you start the setup wizards for your Oracle Database or Oracle Grid Infrastructure installation, decide if you want to use any of the available image-creation options.
• Installing Oracle Grid Infrastructure for a Standalone Server with a New Database Installation
  Complete these steps to install Oracle Restart and then create a database that is managed by Oracle Restart.

• Installing Oracle Grid Infrastructure for a Standalone Server for an Existing Database
  Follow the high-level instructions in this section to install Oracle Grid Infrastructure and configure it for an existing Oracle database.

• Installing Oracle Grid Infrastructure for a Standalone Server Using a Software-Only Installation
  A software-only installation only installs the Oracle Restart binaries at the specified location. You must complete a few manual configuration steps to enable Oracle Grid Infrastructure after you install the software.

• Testing the Oracle Automatic Storage Management Installation
  After installing Oracle Grid Infrastructure for a single instance, use the ASMCMD command-line utility to test the Oracle ASM installation.

• Modifying Oracle Grid Infrastructure for a Standalone Server Binaries After Installation
  After installation, you must first stop the Oracle Restart stack to modify the software installed in your Grid home.

See Also:
https://support.oracle.com/rs?type=doc&id=1584742.1

Requirements for an Oracle Restart Installation

Before you install Oracle Restart, ensure that your system meets the following requirements:

• System Requirements
  Oracle Restart has similar system requirements as Oracle Grid Infrastructure for a cluster, such as requiring 64-bit Windows server operating system.

• Memory Requirements
  At least 1 GB of RAM for Oracle Restart installations, including installations where you plan to install Oracle Database.

• Disk Space Requirements
  The disk space requirements for installing Oracle Restart are:

System Requirements

Oracle Restart has similar system requirements as Oracle Grid Infrastructure for a cluster, such as requiring 64-bit Windows server operating system.

Components included with Oracle Grid Infrastructure, such as Oracle ASM, have the same system requirements as Oracle Grid Infrastructure.
Memory Requirements

At least 1 GB of RAM for Oracle Restart installations, including installations where you plan to install Oracle Database.

Disk Space Requirements

The disk space requirements for installing Oracle Restart are:

- At least 7 GB of disk space
- The amount of disk space available in the %TEMP% directory is equivalent to the total amount of free disk space, minus what is required to install Oracle Restart.

If the free disk space is less than 1 GB in the %TEMP% directory, then:

- Delete unnecessary files from the %TEMP% directory to meet the disk space requirement.
- Set TEMP environment variable. Go to System Properties, then Environment Variables, "TEMP=C:\Temp."

Oracle ACFS and Oracle ADVM

Oracle Automatic Storage Management Cluster File System (Oracle ACFS) is a multi-platform, scalable file system, and storage management technology that extends Oracle Automatic Storage Management (Oracle ASM) functionality to support all file types.

Oracle ACFS and Oracle ADVM are supported on Windows Server 2012 x64, Windows Server 2012 R2 x64, and Windows 2016 x64.

Oracle ACFS extends Oracle ASM technology to support all of your application data in both single instance and cluster configurations. Oracle ADVM provides volume management services and a standard disk device driver interface to clients. Oracle Automatic Storage Management Cluster File System communicates with Oracle ASM through the Oracle Automatic Storage Management Dynamic Volume Manager interface.

Oracle ACFS can provide optimized storage for all Oracle files, including Oracle Database binaries. Files supported by Oracle ACFS include application executable files, data files, and application reports. Other supported files are video, audio, text, images, engineering drawings, and other general-purpose application file data.

You can place the Oracle home for Oracle Database 12c release 1 (12.1) or later software on Oracle ACFS, but you cannot place Oracle Clusterware binaries or Oracle Clusterware files on Oracle ACFS.
Restrictions and Guidelines for Oracle ACFS

Review these guidelines and restrictions as part of your storage plan for using Oracle ACFS for single instance and cluster configurations.

• Oracle Automatic Storage Management Cluster File System (Oracle ACFS) provides a general purpose file system.

• You can only use Oracle ACFS when Oracle ASM is configured.

• You must use a domain user when installing Oracle Grid Infrastructure if you plan to use Oracle ACFS.

• When creating Oracle ACFS file systems on Windows, log on as a Windows domain user. Also, when creating files in an Oracle ACFS file system on Windows, you should be logged in as a Windows domain user to ensure that the files are accessible by all nodes.

When using a file system across cluster nodes, the best practice is to mount the file system using a domain user, to ensure that the security identifier is the same across cluster nodes. Windows security identifiers, which are used in defining access rights to files and directories, use information which identifies the user. Local users are only known in the context of the local node. Oracle ACFS uses this information during the first file system mount to set the default access rights to the file system.

Note the following general guidelines and restrictions for placing Oracle Database and Oracle Grid Infrastructure files on Oracle ACFS:

• Starting with Oracle Grid Infrastructure 12c Release 1 (12.1) for a cluster, you can place Oracle Database binaries, data files, and administrative files (for example, trace files) on Oracle ACFS.

• Oracle ACFS does not support replication or encryption with Oracle Database data files, tablespace files, control files, and redo logs.

• You can place Oracle Database homes on Oracle ACFS only if the database release is Oracle Database 11g release 2 or later. You cannot install earlier releases of Oracle Database on Oracle ACFS.

• For installations of Oracle Clusterware, you cannot place Oracle Clusterware files on Oracle ACFS.

• For policy-managed Oracle Flex Cluster databases, Oracle ACFS can run on Hub Nodes.

The following restrictions apply if you run Oracle ACFS in an Oracle Restart configuration:

• Starting with Oracle Database 18c, configuration assistants do not allow the creation of Oracle Database homes on Oracle ACFS in an Oracle Restart configuration.

• Oracle Restart does not support Oracle ACFS resources on all platforms.

• Starting with Oracle Database 12c, Oracle Restart configurations do not support the Oracle ACFS registry.

• You must manually load Oracle ACFS drivers after a system restart.

• You must manually mount an Oracle ACFS file system, and unmount it after the Oracle ASM instance has finished running.
• Creating Oracle data files on an Oracle ACFS file system is not supported in Oracle Restart configurations. Creating Oracle data files on an Oracle ACFS file system is supported on Oracle Grid Infrastructure for a cluster configurations.

See Also:

• My Oracle Support Note 1369107.1 for more information about platforms and releases that support Oracle ACFS and Oracle ADVM: https://support.oracle.com/rs?type=doc&id=1369107.1
• My Oracle Support Note 854428.1, Patch Set Updates for Oracle Products, for current release and support information: https://support.oracle.com/epmos/faces/DocumentDisplay?id=854428.1
• Oracle Automatic Storage Management Administrator's Guide for more information about Oracle ACFS and Oracle ADVM

Oracle Automatic Storage Management Storage Configuration

Review the following sections for information on Oracle Automatic Storage Management (Oracle ASM) storage configuration:

• About Managing Disk Groups for Older Database Versions
  Use Oracle ASM Configuration Assistant (Oracle ASMCA) to create and modify disk groups when you install earlier Oracle databases on Oracle Grid Infrastructure installations.

• Oracle Automatic Storage Management Installation Considerations
  In previous releases, Oracle Automatic Storage Management (Oracle ASM) was installed as part of the Oracle Database installation. Starting with Oracle Database 11g Release 2 (11.2), Oracle Automatic Storage Management is part of an Oracle Grid Infrastructure installation, either for a cluster, or for a standalone server.

• Configuring Storage for Oracle Automatic Storage Management
  Identify storage requirements and ASM disk group options.

About Managing Disk Groups for Older Database Versions

Use Oracle ASM Configuration Assistant (Oracle ASMCA) to create and modify disk groups when you install earlier Oracle databases on Oracle Grid Infrastructure installations.

Releases prior to Oracle Database 11g Release 2 used Oracle Database Configuration Assistant (Oracle DBCA) to perform administrative tasks on Oracle ASM. Starting with Oracle Database 11g Release 2 (11.2), Oracle ASM is installed as part of an Oracle Grid Infrastructure installation. You can no longer use Oracle DBCA to perform administrative tasks on Oracle ASM.
Oracle Automatic Storage Management Installation Considerations

In previous releases, Oracle Automatic Storage Management (Oracle ASM) was installed as part of the Oracle Database installation. Starting with Oracle Database 11g Release 2 (11.2), Oracle Automatic Storage Management is part of an Oracle Grid Infrastructure installation, either for a cluster, or for a standalone server.

If you want to upgrade an existing Oracle Automatic Storage Management installation, then you must upgrade Oracle Automatic Storage Management by running an Oracle Grid Infrastructure upgrade (upgrades of existing Oracle Automatic Storage Management installations). If you do not have Oracle Automatic Storage Management installed and you want to use Oracle Automatic Storage Management as your storage option, then you must complete an Oracle Restart installation before you start your Oracle Database installation.

You must run Oracle Automatic Storage Management Configuration Assistant for installing and configuring Oracle ASM instances, disk groups, volumes, and Oracle Automatic Storage Management Cluster File System (Oracle ACFS). In addition, you can use the ASMCA command-line interface.

Apply the following guidelines when you install Oracle Automatic Storage Management:

• You must complete the steps listed under the Configuring Storage for Oracle Automatic Storage Management section to prepare a disk partition to use for the Oracle Automatic Storage Management disk groups.
• Ensure that at least one disk is configured appropriately in an Oracle ASM disk group before beginning the installation.
• When you install Oracle Automatic Storage Management, Oracle Automatic Storage Management Configuration Assistant creates a separate server parameter file (SPFILE) and password file for the Oracle Automatic Storage Management instance. As soon as Oracle Automatic Storage Management is installed, ASMSNMP schema and user are created.
• The Oracle Automatic Storage Management instance that manages the existing disk group runs in the Oracle Grid Infrastructure home directory.

See Also:

Oracle Automatic Storage Management Administrator’s Guide for more information about:

• Performance and Scalability Considerations for Disk Groups
• Password File Authentication for Oracle ASM
Configuring Storage for Oracle Automatic Storage Management

Identify storage requirements and ASM disk group options.

- **Identifying Storage Requirements for Oracle Automatic Storage Management**
  To identify the storage requirements for using Oracle ASM, you must determine the number of devices and the amount of free disk space that you require. To complete this task, follow these steps:

- **Oracle ASM Disk Space Requirements**
  Determine the total amount of Oracle Automatic Storage Management (Oracle ASM) disk space that you require for the database files and recovery files.

- **ASM Disk Group Options for Interactive and Noninteractive Installation**
  You can select new disk groups during interactive installations, but you must use existing disk groups for noninteractive installations.

- **Configuring Disks Manually for Oracle Automatic Storage Management**
  To use Oracle Automatic Storage Management with direct attached storage (DAS) or storage area network (SAN), the disks must be stamped with a header.

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**See Also:**

*Oracle Automatic Storage Management Administrator's Guide*

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**Identifying Storage Requirements for Oracle Automatic Storage Management**

To identify the storage requirements for using Oracle ASM, you must determine the number of devices and the amount of free disk space that you require. To complete this task, follow these steps:

1. Determine whether you want to use Oracle ASM for Oracle Database files, recovery files, or both. Oracle Database files include data files, control files, redo log files, the server parameter file, and the password file.

   During the database installation, you have the option to select either a file system or Oracle ASM as the storage mechanism for Oracle Database files. Similarly, you also have the option to select either a file system or Oracle ASM as the storage mechanism for your recovery files.

   **Note:**

   You do not have to use the same storage mechanism for both Oracle Database files and recovery files. You can use a file system for one file type and Oracle ASM for the other.

   If you select Oracle ASM as your storage option for Oracle Database files, then depending on your choice in the Specify Recovery Options screen, you have the following recovery options:
• If you select the Oracle ASM option for your recovery files, then Oracle Universal
Installer provides you with only the option to use the same disk group for both Oracle
Database files and recovery files.

• If you decide not to enable recovery during the database installation, then, after
the database installation, you can modify the `DB_RECOVERY_FILE_DEST`
parameter to enable the fast recovery area.

2. Choose the Oracle ASM redundancy level to use for each Oracle ASM disk group
that you create.

The redundancy level that you choose for the Oracle ASM disk group determines
how Oracle ASM mirrors files in the disk group and determines the number of
disks and amount of disk space that you require, as follows:

• **External redundancy**

  This option does not allow Oracle ASM to mirror the contents of the disk
group. Oracle recommends that you select this redundancy level either when
the disk group contains devices, such as RAID devices, that provide their own
data protection or when the database does not require uninterrupted access to
data.

• **Normal redundancy**

  To optimize performance and reliability in a normal redundancy disk group,
Oracle ASM uses two-way mirroring for data files and three-way mirroring for
control files, by default. In addition, you can choose the mirroring
characteristics for individual files in a disk group.

  A normal redundancy disk group requires a minimum of two failure groups (or
two disk devices) if you are using two-way mirroring. The effective disk space
in a normal redundancy disk group is half the sum of the disk space of all of its
devices.

  For most installations, Oracle recommends that you use normal redundancy
disk groups. On Oracle Exadata, Oracle recommends that you use high
redundancy disk groups for added protection against failure.

• **High redundancy**

  The contents of the disk group are three-way mirrored by default. To create a
disk group with high redundancy, you must specify at least three failure groups
(a minimum of three devices).

  Although high-redundancy disk groups provide a high level of data protection,
you must consider the higher cost of additional storage devices before
deciding to use this redundancy level.

• **Flex redundancy**

  A flex redundancy disk group is a new disk group type with features such as
flexible file redundancy, mirror splitting, and redundancy change. A flex disk
group can consolidate files with different redundancy requirements into a
single disk group. It also provides the capability for databases to change the
redundancy of its files.

  For database data, you can choose no mirroring (unprotected), two-way
mirroring (mirrored), or three-way mirroring (high). A flex redundancy disk
group requires a minimum of three disk devices (or three failure groups).

3. Determine the total amount of disk space that you require for the database files
and recovery files.
If an Oracle ASM instance is running on the system, then you can use an existing disk group to meet these storage requirements. If necessary, you can add disks to an existing disk group during the database installation.

See, "Oracle ASM Disk Space Requirements" in Oracle Database Installation Guide for the Oracle ASM disk space requirements.

**Note:**

- The disk devices must be owned by the user performing the grid installation.
  
  Check with your system administrator to determine if the disks used by Oracle ASM are mirrored at the storage level. If so, select External for the redundancy. If the disks are not mirrored at the storage level, then select Normal for the redundancy.

- Every Oracle ASM disk is divided into allocation units (AU). An allocation unit is the fundamental unit of allocation within a disk group. You can select the AU Size value from 1, 2, 4, 8, 16, 32 or 64 MB, depending on the specific disk group compatibility level. The default value is 4 MB for flex disk group and 1 MB for all other disk group types. On engineered systems, the default value is 4 MB.

4. Optionally, identify failure groups for the Oracle ASM disk group devices.

   If you intend to use a normal, high or flex redundancy disk group, then you can further protect your database against hardware failure by associating a set of disk devices in a custom failure group. By default, each device comprises its own failure group. However, if two disk devices in a normal redundancy disk group are attached to the same SCSI controller, then the disk group becomes unavailable if the controller fails. The controller in this example is a single point of failure.

   To protect against failures of this type, use two SCSI controllers, each with two disks, and define a failure group for the disks attached to each controller. This configuration enables the disk group to tolerate the failure of one SCSI controller.

   Consider the following guidelines while defining custom failure groups:

   - Starting with release 12.2, you can specify custom failure groups in the Create ASM Disk Group screen during an Oracle Grid Infrastructure installation.

   - You can also define custom failure groups after installation, using the GUI tool ASMCA, the command line tool `asmcmd`, or SQL commands.

   - If you define custom failure groups, then for failure groups containing database files only, you must specify a minimum of two failure groups for normal redundancy disk groups and three failure groups for high redundancy disk groups.

5. If you are sure that a suitable disk group does not exist on the system, then install or identify appropriate disk devices to add to a new disk group.

   Use the following guidelines when identifying appropriate disk devices:

   - The disk devices must be owned by the user performing the Oracle Grid Infrastructure installation.
• All the devices in an Oracle ASM disk group must be the same size and have the same performance characteristics.

• Do not specify multiple partitions on a single physical disk as a disk group device. Oracle ASM expects each disk group device to be on a separate physical disk.

• Although you can specify a logical volume as a device in an Oracle ASM disk group, Oracle does not recommend their use because it adds a layer of complexity that is unnecessary with Oracle ASM. Oracle recommends that if you choose to use a logical volume manager, then use the logical volume manager to represent a single logical unit number (LUN) without striping or mirroring, so that you can minimize the effect on storage performance of the additional storage layer.

Related Topics
• Oracle Automatic Storage Management Administrator's Guide

Oracle ASM Disk Space Requirements

Determine the total amount of Oracle Automatic Storage Management (Oracle ASM) disk space that you require for the database files and recovery files.

Table 5-1  Oracle ASM Disk Number and Minimum Space Requirements for an Oracle database (non-CDB)

<table>
<thead>
<tr>
<th>Redundancy Level</th>
<th>Minimum Number of Disks</th>
<th>Data Files</th>
<th>Recovery Files</th>
<th>Both File Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>External</td>
<td>1</td>
<td>2.7 GB</td>
<td>8.1 GB</td>
<td>10.8 GB</td>
</tr>
<tr>
<td>Normal or Flex with two-way mirroring</td>
<td>2</td>
<td>5.2 GB</td>
<td>15.6 GB</td>
<td>20.8 GB</td>
</tr>
<tr>
<td>High or Flex with three-way mirroring</td>
<td>3</td>
<td>7.8 GB</td>
<td>23.4 GB</td>
<td>31.2 GB</td>
</tr>
</tbody>
</table>

Table 5-2  Oracle ASM Disk Number and Minimum Space Requirements for a multitenant container database (CDB) with one pluggable database (PDB)

<table>
<thead>
<tr>
<th>Redundancy Level</th>
<th>Minimum Number of Disks</th>
<th>Data Files</th>
<th>Recovery Files</th>
<th>Both File Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>External</td>
<td>1</td>
<td>4.4 GB</td>
<td>13.2 GB</td>
<td>17.6 GB</td>
</tr>
<tr>
<td>Normal or Flex with two-way mirroring</td>
<td>2</td>
<td>8.6 GB</td>
<td>25.8 GB</td>
<td>34.4 GB</td>
</tr>
<tr>
<td>High or Flex with three-way mirroring</td>
<td>3</td>
<td>12.9 GB</td>
<td>38.7 GB</td>
<td>51.6 GB</td>
</tr>
</tbody>
</table>
Note:

- If an Oracle ASM instance is running on the system, then you can use an existing disk group to meet these storage requirements. If necessary, you can add disks to an existing disk group during the database installation.
- The disk devices must be owned by the user performing the grid installation.
  
  Check with your system administrator to determine if the disks used by Oracle ASM are mirrored at the storage level. If so, select External for the redundancy. If the disks are not mirrored at the storage level, then select Normal for the redundancy.
- Every Oracle ASM disk is divided into allocation units (AU). An allocation unit is the fundamental unit of allocation within a disk group. You can select the AU Size value from 1, 2, 4, 8, 16, 32 or 64 MB, depending on the specific disk group compatibility level. The default value is 4 MB for flex disk group and 1 MB for all other disk group types. On engineered systems, the default value is 4 MB.

ASM Disk Group Options for Interactive and Noninteractive Installation

You can select new disk groups during interactive installations, but you must use existing disk groups for noninteractive installations.

Select from the following choices to store either database or recovery files in an existing Oracle ASM disk group, depending on installation method:

- Installation method that runs Database Configuration Assistant in an interactive mode (either during installation or after installation)
  - Select new Disk Group
  - Select existing Disk Group
- Installation method that runs Database Configuration Assistant in a noninteractive mode (either during installation or after installation)

Select an existing Disk Group only. You cannot create a disk group during noninteractive installations. You can add disk devices to an existing disk group if it has insufficient free space.

Note:

The Oracle ASM instance that manages the existing disk group can be running in a different Oracle home directory.
Step 1: Enabling Disk Automounting

Before you can configure partitions or logical drives on Windows, you must enable disk automounting. Enable disk automounting when using:

- Disk partitions on both single-instance and Oracle RAC installations
- Cluster file system for Oracle RAC
- Oracle Clusterware
- Raw partitions for a single-node database installation
- Primary or logical partitions for Oracle Automatic Storage Management

To enable automounting:

1. Enter the following commands at a command prompt:
   
   
   DRIVE_LETTER:\> diskpart
   DISKPART> automount enable
   DISKPART> exit

2. Restart your computer.

Step 2: Creating the Disk Partitions

To create disk partitions, use the disk administration tools provided by the operating system or third party vendors. The following administration tools are provided by the operating system:

- The graphical user interface Disk Management snap-in to manage disks.
  
  To access this tool, type `diskmgmt.msc` at the command prompt. (Optional) From the Start menu, select All Programs, then Administrative Tools, then Computer Management. Then select the Disk Management node in the Storage tree.

  Create primary partitions and logical drives in the extended partitions by selecting the New Simple Volume option. To create a raw device, assign a drive letter and remove the letter after the partition is created. You must select Do not format this partition to specify a raw partition. Do not use spanned volumes or striped volumes. These options convert the volume to a dynamic disk. Oracle Automatic Storage Management does not support dynamic disks.

  For other Windows, create primary partitions by selecting the New Partition option. Create the logical drives by selecting the New Logical Drive option.

- The command-line tool `diskpart.exe`, which lets you create primary partitions, extended partitions, and logical drives.

  To access this tool, enter `diskpart.exe` at the command prompt. The syntax for using `diskpart.exe` for the procedures in this section is as follows:

  
  DRIVE_LETTER:\> diskpart
  DISKPART> select disk diskn
  DISKPART> create partition primary | extended | logical size=sizen
  DISKPART>

  where:

  - `diskpart.exe` is the command-line tool for managing disks.
  - `diskn` is the disk number where the partitions are created.
– \textit{sizen} is the size of the partition, for example 500 represents 500 MB.

\begin{quote}
\textbf{See Also:}

The online help or documentation for the administration tool that you are using
\end{quote}

You can enter the \texttt{diskpart.exe} commands directly at the command line. Alternatively, you can enter the commands in a text file, and then run \texttt{diskpart /s} using this file as a script.

You cannot create more than four primary disk partitions per disk. If you need more, you can get around this limitation by creating three primary partitions and then the fourth as an extended partition with as many logical partitions.

For example, to create the disk partitions on Disk 5 and assign them each a size:

\begin{verbatim}
DISKPART> select disk 5
DISKPART> create partition primary size=500
DISKPART> ...
DISKPART> create partition extended
DISKPART> create partition logical size=800
DISKPART> ...
DISKPART> create partition logical size=500
\end{verbatim}

\section*{Configuring Disks Manually for Oracle Automatic Storage Management}

To use Oracle Automatic Storage Management with direct attached storage (DAS) or storage area network (SAN), the disks must be stamped with a header.

If you install Oracle Restart in an interactive mode, Oracle Universal Installer configures the headers of the disk during the installation process. However, if you intend to install Oracle Restart in a response file mode, then you must manually configure the disks before installation by using either \texttt{asmtoolg} (GUI version) or \texttt{asmtool} (command-line version). You can also use these tools to reconfigure the disks after installation. The \texttt{asmtoolg} and \texttt{asmtool} utilities work only on partitioned disks: you cannot use Oracle Automatic Storage Management on unpartitioned disks.

The \texttt{asmtoolg} and \texttt{asmtool} tools associate meaningful, persistent names with disks to facilitate using those disks with Oracle Automatic Storage Management. Oracle Automatic Storage Management uses disk strings to more easily operate on groups of disks at once, so the names that \texttt{asmtoolg} or \texttt{asmtool} creates make this easier than using Windows drive letters.

All disk names created by \texttt{asmtoolg} or \texttt{asmtool} begin with the prefix \texttt{ORCLDISK} followed by a user-defined prefix (the default is \texttt{DATA}) and a disk number for identification purposes.

\section*{Using the asmtoolg Tool (Graphical User Interface)}

The \texttt{asmtoolg} tool is a graphical interface for creating device names. Use \texttt{asmtoolg} to add, change, delete, and examine the devices available for use in Oracle Automatic Storage Management.

To add or change disk stamps:
1. In the installation media labeled Oracle Grid Infrastructure 19c, from the media root, go to `asmtool` directory and double-click `asmtoolg.exe`.

   If Oracle Database is installed, go to `ORACLE_HOME\bin` and double-click `asmtoolg.exe`.

   If User Account Control is enabled, then create a shortcut for the command prompt window on your desktop. An icon for that shortcut appears on the desktop. Right-click the icon for the newly created shortcut, and specify "Run as administrator." When the command window opens, go to `ORACLE_HOME\bin`, and then type `asmtoolg`.

2. Select the **Add or change label** option, then click **Next**.

   The `asmtoolg` tool shows the devices available on the system. Unrecognized disks are labeled as "Candidate device", stamped Oracle Automatic Storage Management disks as "Stamped ASM disk", and unstamped Oracle Automatic Storage Management disks as "Unstamped ASM disks." The tool also shows disks that are recognized by Windows as a file system (such as NTFS). These are not available for use as disks and cannot be selected. In addition, Microsoft Dynamic disks are not available for use as Oracle Automatic Storage Management disks.

3. In the Stamp Disks window, select the disks to stamp.

   Oracle Automatic Storage Management can generate unique stamps for all of the devices selected for a given prefix. The stamps are generated by concatenating a number with the prefix specified. For example, if the prefix is `DATA`, then the first Oracle Automatic Storage Management link name is `ORCLDISKDATA0`.

   You can also specify the stamps of individual devices.

4. (Optional) Select a disk to edit the individual stamp (Oracle Automatic Storage Management link name).

5. Click **Next**.

6. Click **Finish**.

To delete disk stamps:

1. Select the **Delete labels** option, then click **Next**.

   The delete option is only available if disks exist with stamps. The delete window shows all stamped Oracle Automatic Storage Management disks.

2. In the Delete Stamps window, select the disks to unstamp.

3. Click **Next**.

4. Click **Finish**.

**Example 5-1 Using the asmtool Utility (Command Line)**

The `asmtool` utility is a command-line interface for stamping disks. If User Account Control is enabled, then you can create a shortcut for the command prompt window on your desktop. An icon for that shortcut appears on the desktop. Right-click the icon for the newly created shortcut, and select "Run as administrator." Then start `asmtool`.

It has the following options:
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| -add     | Adds or changes stamps. You must specify the hard disk, partition, and new stamp name. If the disk is a raw device or has an existing Oracle Automatic Storage Management stamp, then you must specify the -force option. Also sets Oracle Automatic Storage Management instances to rescan the available disks. Example: 
  `asmtool -add [-force] \Device\Harddisk1\Partition1 ORCLDISKASM0 \Device\Harddisk2\Partition1 ORCLDISKASM2...`
| -addprefix | Adds or changes stamps using a common prefix to generate stamps automatically. The stamps are generated by adding a number with the prefix specified. If the disk is a raw device or has an existing Oracle Automatic Storage Management stamp, then you must specify the -force option. Also sets Oracle Automatic Storage Management instances to rescan the available disks. Example: 
  `asmtool -addprefix ORCLDISKASM [-force] \Device\Harddisk1\Partition1 \Device\Harddisk2\Partition1...`
| -list    | Lists available disks. The stamp, windows device name, and disk size in megabytes are shown. Some disks may be file systems, and cannot be stamped. If the disk is a raw device or has an existing Oracle Automatic Storage Management stamp, then you must specify the -force option. Example: 
  `asmtool -list [-force]`
| -delete  | Removes existing stamps from disks. Also sets Oracle Automatic Storage Management instances to rescan the available disks. Example: 
  `asmtool -delete ORCLDISKASM0 ORCLDISKASM1...`

---

### About Upgrading Existing Oracle Automatic Storage Management Instances

Oracle Automatic Storage Management (Oracle ASM) upgrades are carried out during an Oracle Grid Infrastructure upgrade.

If you are upgrading from Oracle ASM 11g Release 2 (11.2.0.4) or later, then Oracle ASM is always upgraded with Oracle Grid Infrastructure as part of the upgrade, and Oracle Automatic Storage Management Configuration Assistant (Oracle ASMCA) is started by the root scripts during upgrade. Subsequently, you can use Oracle ASMCA (located in `Grid_home/bin`) to configure failure groups, Oracle ASM volumes, and Oracle Automatic Storage Management Cluster File System (Oracle ACFS).
Oracle ASMCA cannot perform a separate upgrade of Oracle ASM from a prior release to the current release.

Upgrades of Oracle ASM from releases prior to 11g Release 2 (11.2) are not supported.

Related Topics
- Oracle Automatic Storage Management Administrator's Guide
- Oracle Database Upgrade Guide

Configuring Oracle Automatic Storage Management Disk Groups Manually Using Oracle ASMCA

The Oracle Automatic Storage Management Configuration Assistant utility creates a new Oracle Automatic Storage Management instance if there is no Oracle Automatic Storage Management instance currently configured on this computer.

After installing Oracle Restart, you can also use Oracle Automatic Storage Management Configuration Assistant to create and configure disk groups, Oracle Automatic Storage Management Dynamic Volume Manager (Oracle ADVM), and Oracle Automatic Storage Management Cluster File System (Oracle ACFS).

If you want to create additional disk groups or manually configure Oracle Automatic Storage Management disks, then you can run the Oracle Automatic Storage Management Configuration Assistant as follows:

```
DRIVE_LETTER:\> cd ORACLE_HOME\bin
DRIVE_LETTER:\> asmca.bat
```

See Also:
Oracle Automatic Storage Management Administrator's Guide

About Image-Based Oracle Grid Infrastructure Installation

Starting with Oracle Grid Infrastructure 12c Release 2 (12.2), installation and configuration of Oracle Grid Infrastructure software is simplified with image-based installation.

To install Oracle Grid Infrastructure, create the new Grid home with the necessary user group permissions, and then extract the image file into the newly-created Grid home, and run the setup wizard to register the Oracle Grid Infrastructure product.

Using image-based installation, you can do the following:
- Configure Oracle Grid Infrastructure for a new cluster.
- Configure Oracle Grid Infrastructure for a standalone server (Oracle Restart).
- Upgrade Oracle Grid Infrastructure.
- Setup software only.
Add or remove nodes from your existing cluster, if the Oracle Grid Infrastructure software is already installed or configured.

This installation feature streamlines the installation process and supports automation of large-scale custom deployments. You can also use this installation method for deployment of customized images, after you patch the base-release software with the necessary Release Updates (RUs) or Release Update Revisions (RURs).

**Note:**

You must extract the image software into the directory where you want your Grid home to be located, and then run the `%ORACLE_HOME%\setup.exe` script to start the Oracle Grid Infrastructure Setup Wizard. Ensure that the Grid home directory path you create is in compliance with the Oracle Optimal Flexible Architecture recommendations.

### Setup Wizard Installation Options for Creating Images

Before you start the setup wizards for your Oracle Database or Oracle Grid Infrastructure installation, decide if you want to use any of the available image-creation options.

In image-based installations, you can start your Oracle Database installation or Oracle Grid Infrastructure installation by running the setup wizard `setup.exe`. This wizard comes with the following image-creation options:

**Note:**

`setup.exe` is the recommended setup wizard for installing both Oracle Database and Oracle Grid Infrastructure.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-createGoldImage</td>
<td>Creates a gold image from the current Oracle home.</td>
</tr>
<tr>
<td>-destinationLocation</td>
<td>Specify the complete path, or location, where the gold image will be created.</td>
</tr>
<tr>
<td>-exclFiles</td>
<td>Specify the complete paths to the files to be excluded from the newly created gold image.</td>
</tr>
<tr>
<td>-help</td>
<td>Displays help for all the available options.</td>
</tr>
</tbody>
</table>

For example:

```
setup.exe -createGoldImage -destinationLocation c:\my_images
```

Where:

`c:\my_images` is the file location where the image zip file is created.
Installing Oracle Grid Infrastructure for a Standalone Server with a New Database Installation

Complete these steps to install Oracle Restart and then create a database that is managed by Oracle Restart.

Install Oracle Restart, which installs Oracle Restart and Oracle ASM, and creates one disk group.

1. Log in as the Oracle Restart software owner user (grid).
2. Download the Oracle Grid Infrastructure installation image files, create the Grid home directory, and extract the image files in this Grid home directory.

For example:

C:\> mkdir \app\oracle\product\18.0.0\grid
C:\> icacls grid:oinstall \app\oracle\product\18.0.0\grid
C:\> cd \app\oracle\product\18.0.0\grid
C:\> unzip -q download_location\grid_home.zip

Note:
Ensure that the Grid home directory path you create is in compliance with the Oracle Optimal Flexible Architecture recommendations. Also, unzip the installation image files only in this Grid home directory that you created.

3. Run setup.exe to start the Oracle Grid Infrastructure installation wizard.

C:> Grid_home\setup.exe

4. In the Select Configuration Option screen, select the Configure Oracle Restart option to install and configure Oracle Restart and Oracle ASM. Click Next.

5. During installation, disk paths mounted on Oracle ASM and registered on Oracle ASMFD with the string ORCL:* are listed as default database storage candidate disks.

6. Configure Oracle ASM as needed with additional disk groups.

   • The default Disk Group Name is DATA. You can enter a new name for the disk group, or use the default name.

   • Any additional disk devices that you create must be owned by the user performing the grid installation.

7. Respond to the configuration prompts as needed to configure Oracle Grid Infrastructure. Click Help for information.

8. Provide information to automate root scripts, or run scripts as root when prompted by Oracle Universal Installer.

   If you configure automation for running root scripts, and a root script fails, then you can fix the problem manually, and click Retry to run the root script again.
9. Start the Oracle Database installation, and select Oracle ASM disk groups for Oracle Database files storage. For assistance during installation, click Help on the Oracle Universal Installer page where you need more information.

Installing Oracle Grid Infrastructure for a Standalone Server for an Existing Database

Follow the high-level instructions in this section to install Oracle Grid Infrastructure and configure it for an existing Oracle database.

Oracle Restart can manage resources from the same release and releases up to one version lower than Oracle Restart. For this reason, you can install Oracle Restart to provide services only for Oracle Database 19c. However, previous release Oracle Databases can coexist on the same server without being managed by Oracle Restart.

To install Oracle Restart for a database that is already installed:

1. On the same host computer as the database, install Oracle Restart, and select Configure Oracle Grid Infrastructure for a Standalone Server (Oracle Restart) as the installation option. See, Installing Oracle Restart with a New Database Installation in Oracle Database Installation Guide.

The Oracle Restart components are installed in an Oracle Grid Infrastructure Oracle home (Grid home), which is in a different location from existing Oracle Database homes.

2. If you have an existing Oracle Database, then register it for High Availability with Oracle Restart using the srvctl command:

```
DRIVE_LETTER:\> cd ORACLE_HOME\bin
DRIVE_LETTER:\> srvctl add database -db dbname -o oracle_home_path - dbtype SINGLE
```

Installing Oracle Grid Infrastructure for a Standalone Server Using a Software-Only Installation

A software-only installation only installs the Oracle Restart binaries at the specified location. You must complete a few manual configuration steps to enable Oracle Grid Infrastructure after you install the software.

**Note:**

Oracle recommends that only advanced users perform the software-only installation, because this installation method provides no validation of the installation and this installation option requires manual postinstallation steps to enable the Oracle Restart software.

- **Installing Software Binaries for Oracle Grid Infrastructure for a Standalone Server**
  Use this procedure to do a software-only installation of Oracle Grid Infrastructure for a standalone server.
Configuring Software Binaries for Oracle Grid Infrastructure for a Standalone Server

Use this procedure to configure and activate a software-only Oracle Restart without Oracle Automatic Storage Management (Oracle ASM).

Installing Software Binaries for Oracle Grid Infrastructure for a Standalone Server

Use this procedure to do a software-only installation of Oracle Grid Infrastructure for a standalone server.

1. Log in to Windows as an Administrator user.
2. Download the Oracle Grid Infrastructure installation image files, create the Grid home directory, and extract the image files in this Grid home directory.

   For example:

   C:\> mkdir \app\oracle\product\19.0.0\grid
   C:\> cd \app\oracle\product\19.0.0\grid
   C:\> unzip -q download_location\grid.zip

3. Verify that the server meets the installation requirements using the command runcluvfy.bat stage -pre hacfg. Ensure that you have completed all storage and server preinstallation requirements.

   For Example:

   C:\> app\oracle\product\19.0.0\grid\runcluvfy.bat

4. Log in as the Oracle Restart software owner user and run setup.exe to start the Oracle Grid Infrastructure installation wizard.

   C:\> app\oracle\product\19.0.0\grid\setup.exe

5. In the Select Configuration Option screen, select the **Set Up Software Only** option to perform a software-only installation of Oracle Restart. Click Next.

6. Respond to the prompts as needed to set up Oracle Grid Infrastructure. Click Help for information.

Configuring Software Binaries for Oracle Grid Infrastructure for a Standalone Server

Use this procedure to configure and activate a software-only Oracle Restart without Oracle Automatic Storage Management (Oracle ASM).

1. Log in as a member of the Administrators group and run the roothas.bat script from the Grid_home, using the following syntax:

   ```
   DRIVE_LETTER:\Grid_home\crs\install>roothas.bat
   Grid_home\crs\install\roothas.pl
   ```

   For example, if your Grid home is `C:\app\oracle\product\19.0.0\grid`, then run the following script:
2. Change the home directory to the path of the Oracle Restart home as follows:
Grid_home\oui\bin, where Grid_home is the path of the Oracle Restart home.

3. Enter the following command:
```
setup.exe -updateNodeList ORACLE_HOME=Grid_home
CLUSTER_NODES= CRS=TRUE
```
For example:
```
C:\app\oracle\product\19.0.0\grid> setup.exe -updateNodeList ORACLE_HOME=C:\app
\oracle\product\18.0.0\grid
CLUSTER_NODES= CRS=TRUE
```

4. Use the SRVCTL utility along with Network Configuration Assistant and Oracle Automatic Storage Management Configuration Assistant to add the listener, the Oracle Automatic Storage Management instance, and all Oracle Automatic Storage Management disk groups to the Oracle Restart configuration.

See Also:
- Oracle Database Net Services Administrator's Guide
- Oracle Automatic Storage Management Administrator's Guide
- Oracle Database Administrator's Guide

Testing the Oracle Automatic Storage Management Installation

After installing Oracle Grid Infrastructure for a single instance, use the ASMCMD command-line utility to test the Oracle ASM installation.

To test the Oracle Automatic Storage Management installation:

1. Use SQL*Plus to connect to the Oracle Automatic Storage Management instance as the SYS user with SYSASM privilege and start the instance if necessary:
```
DRIVE_LETTER:\>sqlplus /nolog
SQL> CONNECT SYS as SYSASM
Enter password: SYS_password
SQL> STARTUP
```

2. Enter the following command to view the existing disk groups, their redundancy level, and the amount of free disk space in each one:
```
SQL> SELECT NAME, TYPE, TOTAL_MB, FREE_MB FROM V$ASM_DISKGROUP;
```
After installation, you must first stop the Oracle Restart stack to modify the software installed in your Grid home.

For example, to apply a one-off patch or modify any of the DLLs used by Oracle Restart or Oracle ASM, you must follow these steps to stop and restart the Oracle Restart stack.

**Caution:**

Before relinking executables, you must shut down all executables that run in the Oracle home directory that you are relinking. In addition, shut down applications linked with Oracle shared libraries.

Prepare the Oracle Restart home for modification using the following procedure:

1. Log in using a member of the Administrators group and go to the directory `Grid_home\bin`, where `Grid_home` is the path to the Oracle Restart home.

2. Shut down the Oracle Restart stack using the following command:
   
   ```bash
   DRIVE_LETTER:\Grid_home\bin> crsctl stop has -f
   
   Alternatively, you can use the `roothas.bat` script to stop Oracle Restart, as shown in the following example:
   
   ```bash
   DRIVE_LETTER:\Grid_home\crs\install> roothas.bat -unlock
   
   **Note:**

   Starting with Oracle Database 12c Release 1 (12.1.0.2), the `roothas.bat` script replaces the `roothas.pl` script in the Oracle Grid Infrastructure home.

   The `roothas.bat` script stops Oracle Restart and then verifies that it is stopped.

3. After the Oracle Restart stack is completely shut down, perform the changes to the software installed in the Grid home.

   **Apply the patches using `opatch apply`**

4. Lock the Grid home:

   ```bash
   DRIVE_LETTER:\Grid_home\crs\install> roothas.bat -lock
5. Use the following command to restart the Oracle Restart stack:

   \texttt{DRIVE\_LETTER:}\textbackslash Grid\_home\textbackslash bin\textgreater crsctl start has

**Example 5-2  Enabling Oracle ACFS on Oracle Restart Configurations**

To use Oracle ACFS on Oracle Restart configurations, you must first enable Administrator access for Oracle ACFS using the following command:

   \texttt{DRIVE\_LETTER:cd Grid\_home\textbackslash crs\textbackslash install}
   \texttt{DRIVE\_LETTER:Grid\_home\textbackslash crs\textbackslash install\textgreater roothas.bat -lockacfs}

\begin{center}
\textit{See Also:}
\end{center}

\begin{center}
\textit{Oracle OPatch User's Guide for Windows and UNIX}
\end{center}
Installing Oracle Database

Oracle Database and Oracle Grid Infrastructure installation software is available as image-based zip files in multiple media, and can be installed using several options.

- Preinstallation Considerations for Installing Oracle Database
  The Oracle Database software is available on the installation media or you can download it from the Oracle Technology Network (OTN) website.

- Reviewing Component-Specific Installation Guidelines
  Review the following guidelines before starting Oracle Universal Installer:

- Using an Oracle Automatic Storage Management Disk Group
  Learn how to identify disk groups and determine the available free disk space.

- About Character Set Selection During Installation
  Before you create the database, decide the character set that you want to use.

- Accessing the Installation Software
  The Oracle software is available on the installation media or you can download it from the Oracle Technology Network website, or Oracle Software Delivery Cloud website.

- Installing and Using Oracle Components in Different Languages
  Learn about installing and using Oracle components in different languages.

- Running Oracle Universal Installer in Different Languages
  Describes how to run Oracle Universal Installer in other languages.

- About Image-Based Oracle Database Installation
  Starting with Oracle Database 18c, installation and configuration of Oracle Database software is simplified with image-based installation.

- Setup Wizard Installation Options for Creating Images
  Before you start the setup wizards for your Oracle Database or Oracle Grid Infrastructure installation, decide if you want to use any of the available image-creation options.

- Installing the Oracle Database Software
  This topic explains how to run Oracle Universal Installer to perform most database installations.

- Cloning an Oracle Home
  Follow these steps to clone an Oracle home.

Setup Wizard Installation Options for Creating Images

Before you start the setup wizards for your Oracle Database or Oracle Grid Infrastructure installation, decide if you want to use any of the available image-creation options.

In image-based installations, you can start your Oracle Database installation or Oracle Grid Infrastructure installation by running the setup wizard setup.exe. This wizard comes with the following image-creation options:
setup.exe is the recommended setup wizard for installing both Oracle Database and Oracle Grid Infrastructure.

Table 6-1 Image-Creation Options for Setup Wizard

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-createGoldImage</td>
<td>Creates a gold image from the current Oracle home.</td>
</tr>
<tr>
<td>-destinationLocation</td>
<td>Specify the complete path, or location, where the gold image will be created.</td>
</tr>
<tr>
<td>-exclFiles</td>
<td>Specify the complete paths to the files to be excluded from the newly created gold image.</td>
</tr>
<tr>
<td>-help</td>
<td>Displays help for all the available options.</td>
</tr>
</tbody>
</table>

For example:

```
setup.exe -createGoldImage -destinationLocation c:\my_images
```

Where:

c:\my_images is the file location where the image zip file is created.

Preinstallation Considerations for Installing Oracle Database

The Oracle Database software is available on the installation media or you can download it from the Oracle Technology Network (OTN) website.

In most cases, Oracle Universal Installer provides a graphical user interface (GUI) to install the software. However, you can also use Oracle Universal Installer without the GUI by supplying a response file with silent or response file mode.

Note: Windows requires Administrator privileges at the command prompt.

- Installation Consideration on Windows
  On Windows, open command prompts with the Administrator privileges.

- Performing Multiple Oracle Database Installations
  To perform multiple installations of Oracle Database, use either of the following methods to install Oracle Database:

- Installing on Systems That Already Have Oracle Components
  Perform the following steps when other components exist on your computer:
• **Installing with Minimum Memory Requirements**

Installations of Oracle Database on computers with RAM and virtual memory lesser than the minimum required have the following limitations:

**Installation Consideration on Windows**

On Windows, open command prompts with the Administrator privileges.

**Performing Multiple Oracle Database Installations**

To perform multiple installations of Oracle Database, use either of the following methods to install Oracle Database:

• **Response files**: At each node, you run Oracle Universal Installer from the command line using silent or response file mode and you supply a response file to provide information Oracle Universal Installer needs. The response file is a text file containing the settings you normally enter in the Oracle Universal Installer GUI dialog boxes.

• **Cloning the Oracle home of an existing Oracle Database installation**: With this method, install one instance of Oracle Database, and then clone its Oracle home for each additional installation.

**Installing on Systems That Already Have Oracle Components**

Perform the following steps when other components exist on your computer:

1. Log on as a member of the Administrators group for the computer on which you want to install Oracle components.

   If you are installing on a Primary Domain Controller (PDC) or a Backup Domain Controller (BDC), log on as a member of the Domain Administrators group.

2. Delete the ORACLE_HOME environment variable if it exists. See the Microsoft online help for more information about deleting environment variables.

   **Note:**

   The ORACLE_HOME environment variable is automatically set in the registry. Manually setting this variable prevents installation.

3. Back up any databases you must upgrade.

   **See Also:**

   *Oracle Real Application Clusters Installation Guide for Linux and UNIX*
Installing with Minimum Memory Requirements

Installations of Oracle Database on computers with RAM and virtual memory lesser than the minimum required have the following limitations:

• Computers cannot run Oracle Database Upgrade Assistant, Oracle Database Configuration Assistant, or Oracle Net Services Configuration Assistant during an Oracle Universal Installer installation session.

• Depending on how many applications run on the computer, you must further increase the paging file size or reduce the size of the System Global Area (SGA) if you run out of virtual memory. If temporary files and the paging file are both stored on the same physical drive, the space requirements for one can limit the size of the other. If your system has limited free space, first install the Oracle Database software. After the installation is finished, create a database with Oracle Database Configuration Assistant.

Note:

Do not install the database on computer systems that barely meet the minimum memory and virtual memory requirements of 1 GB.

You can install only the database software by selecting the Install Database Software only option provided on the Select Installation Option screen.

After installation, run the appropriate configuration assistant for your needs:

• To create a new database, run Oracle Database Configuration Assistant. From the Start menu, select All Programs, then Oracle - HOMENAME, then Configuration and Migration Tools, then Database Configuration Assistant.

• To upgrade an existing database, run Oracle Database Upgrade Assistant. From the Start menu, select All Programs, then Oracle - HOMENAME, then Configuration and Migration Tools, then Database Upgrade Assistant.

Reviewing Component-Specific Installation Guidelines

Review the following guidelines before starting Oracle Universal Installer:

• Oracle Universal Installer

Do not use Oracle Universal Installer from an earlier Oracle release to install components from this release.

• Oracle Automatic Storage Management

In previous releases, Oracle Automatic Storage Management (Oracle ASM) was installed as part of the Oracle Database installation. With Oracle Database 11g Release 2 (11.2), Oracle Automatic Storage Management is part of an Oracle Grid Infrastructure installation, either for a cluster, or for a standalone server.

If you want to upgrade an existing Oracle Automatic Storage Management installation, then you must upgrade Oracle Automatic Storage Management by
running an Oracle Grid Infrastructure upgrade. If you do not have Oracle Automatic Storage Management installed and you want to use Oracle Automatic Storage Management as your storage option, then you must complete an Oracle Grid Infrastructure for a standalone server installation before you start your Oracle Database installation.

- Installations on a cluster

If Oracle Clusterware or Oracle RAC is installed on the system, then Oracle Universal Installer displays the Grid Installation Options page. You must select **Single instance database installation**, unless you want to install Oracle RAC. The other options on the page are Oracle Real Application Clusters database installation and Oracle RAC One Node database installation.

See Also:

* Oracle Real Application Clusters Installation Guide for Linux and UNIX*

Using an Oracle Automatic Storage Management Disk Group

Learn how to identify disk groups and determine the available free disk space.

You can store either database or recovery files in an existing Oracle Automatic Storage Management disk group that you created during the Oracle Grid Infrastructure for a standalone server installation.

Note:

The Oracle Automatic Storage Management instance that manages the existing disk group runs in a different Oracle home directory.

1. In the **Services** Control Panel, ensure that the **OracleASMService+ASM** service has started.

2. Open command prompt and temporarily set the **ORACLE_SID** environment variable to specify the appropriate value for the Oracle Automatic Storage Management instance.

For example, if the Oracle Automatic Storage Management SID, which is named +ASM, is located in the asm directory, then enter the following setting:

```
DRIVE_LETTER:\>set ORACLE_SID=+ASM
```

3. Connect to the Oracle Automatic Storage Management instance as the **SYS** user with the **SYSASM** privilege and start the instance if necessary:

```
DRIVE_LETTER:\>sqlplus /nolog
SQL> CONNECT SYS as SYSASM
Enter password: SYS_password
SQL> STARTUP
```
4. Enter the following command to view the existing disk groups, their redundancy level, and the amount of free disk space in each one:

```
SQL> SELECT NAME, TYPE, TOTAL_MB, FREE_MB FROM V$ASM_DISKGROUP;
```

5. From the output, identify a disk group with the appropriate redundancy level and note the free space that it contains.

6. If necessary, install, or identify the additional disk devices required to meet the storage requirements.

---

**Note:**

If you are adding devices to an existing disk group, then Oracle recommends that you use devices that have the same size and performance characteristics as the existing devices in that disk group.

---

### About Character Set Selection During Installation

Before you create the database, decide the character set that you want to use. 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**.

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 needs 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. If you use Unicode AL32UTF8 as your CDB character set, then you can plug in a pluggable database (PDB) in any database character set supported by Oracle Database (with the exception of EBCDIC-based character sets).

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

Accessing the Installation Software

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

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.

You can access and install Oracle Database by using one of the following methods:

- **Downloading Oracle Software**
  You can download the trial version of the installation files from the Oracle Technology Network (OTN) or the Oracle Software Delivery Cloud portal and extract them on your hard disk.

- **Installing on Remote Computers Through Remote Access Software**
  If you want to install and run Oracle Database on a remote computer (that is, the remote computer has the hard drive and runs Oracle Database components), but you do not have physical access to the computer, you still can perform the installation on the remote computer if it is running remote access software such as VNC or Symantec pcAnywhere.

- **Installing from a Remote DVD Drive**
  If the computer where you want to install Oracle Database does not have a DVD drive, you can perform the installation from a remote DVD drive.

- **Copying the Oracle Database Software to a Hard Disk**
  To copy the contents of the installation media to a hard disk:

  **Downloading Oracle Software**

  You can download the trial version of the installation files from the Oracle Technology Network (OTN) or the Oracle Software Delivery Cloud portal and extract them on your hard disk.

  Select the method that you want to use to download the software. Ensure that you review and understand the terms of the license. Most downloads include the development license.
• **Downloading the Installation Archive Files from Oracle Technology Network**
  To download the installation archive files from Oracle Technology Network:

• **Downloading the Software from Oracle Software Delivery Cloud**

• **Extracting the Installation File**
  Use this procedure to extract the installation archive file:

### Downloading the Installation Archive Files from Oracle Technology Network

To download the installation archive files from Oracle Technology Network:

1. Use any browser to access the software download page from OTN.
2. Navigate 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 that you selected in step 4, create a parent directory for each product, for example OraDB19c, to hold the installation directories.
6. Download all of the installation archive files to the directory that you created in step 5.
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 OTN.
8. Extract the files in each directory that you just created.

### Downloading the Software from Oracle Software Delivery Cloud

You can download the software from Oracle Software Delivery Cloud as Media Packs. A Media Pack is an electronic version of the software that is also available to Oracle customers on CD-ROM or DVD. To download the Media Pack:

1. Use any browser to access the Oracle Software Delivery Cloud website:
   [http://edelivery.oracle.com/](http://edelivery.oracle.com/)
2. Complete the Export Validation process by entering information (name, company, e-mail address, and country) in the online form.
3. In the Media Pack Search page, specify the Product Pack and Platform to identify the Media Pack you want to download. If you do not know the name of the Product Pack, you can search for it using the License List.
4. Optionally, select the relevant product to download from the Results list.
5. In the search results page, click **Readme** to download and review the Readme file for download instructions and product information.
6. After you review the Readme, choose the appropriate Media Pack from the search results to download the individual zip files. Follow the Download Notes instructions in this page. Once you download and extract the contents of the required zip files, proceed with the installation of the software.
7. After you download the files, click **View Digest** to verify that the MD5 or SHA-1 checksum matches with what is listed in the media download page.

**See Also:**

- My Oracle Support note 549617.1 for information on how to verify the integrity of a software download at:
  
  https://support.oracle.com/CSP/main/article?cmd=show&type=NOT&id=549617.1

- **Frequently Asked Questions** section on the Oracle Software Delivery Cloud website for more information about Media Packs

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### Extracting the Installation File

Use this procedure to extract the installation archive file:

1. If necessary, change to the directory that contains the downloaded installation archive file.
2. Extract the zip file contents to a desired destination directory.

### Installing on Remote Computers Through Remote Access Software

If you want to install and run Oracle Database on a remote computer (that is, the remote computer has the hard drive and runs Oracle Database components), but you do not have physical access to the computer, you still can perform the installation on the remote computer if it is running remote access software such as VNC or Symantec pcAnywhere.

You also need the remote access software running on your local computer.

You can install Oracle Database on the remote computer in one of two ways:

- If you have copied the contents of the Oracle Database installation software to a hard drive, you can install the software from the hard drive.

- You can insert the Oracle Database DVD into a drive on your local computer, and install the software from the DVD.

- **Installing on Remote Computers from a Hard Drive**
  If you have copied the contents of the Oracle Database installation software to a hard drive, you can install the software from the hard drive.
Installing on Remote Computers from a Remote DVD Drive

You can insert the DVD into a drive on your local computer, and install from the DVD.

Installing on Remote Computers from a Hard Drive

If you have copied the contents of the Oracle Database installation software to a hard drive, you can install the software from the hard drive.

To install the software on a remote computer from a hard drive:

1. Ensure that the remote access software is installed and running on the remote and local computers.
2. Share the hard drive that contains the Oracle Database installation software.
3. On the remote computer, map a drive letter to the shared hard drive. You use the remote access software to do this on the remote computer.
4. Through the remote access software, run Oracle Universal Installer on the remote computer. You access Oracle Universal Installer from the shared hard drive.

Installing on Remote Computers from a Remote DVD Drive

You can insert the DVD into a drive on your local computer, and install from the DVD.

To install the software on a remote computer from a remote DVD drive:

1. Ensure that the remote access software is installed and running on the remote and local computers.
2. On the local computer, share the DVD drive.
3. On the remote computer, map a drive letter to the shared DVD drive. You use the remote access software to do this on the remote computer.
4. Through the remote access software, run Oracle Universal Installer on the remote computer. You can access Oracle Universal Installer from the shared DVD drive.

Installing from a Remote DVD Drive

If the computer where you want to install Oracle Database does not have a DVD drive, you can perform the installation from a remote DVD drive.

- **Step 1: On the Remote Computer, Share the DVD Drive**
  The remote DVD drive must allow shared access.

- **Step 2: On the Local Computer, Map the DVD Drive**
  Perform these steps on the local computer to map a remote DVD drive and to run Oracle Universal Installer from the mapped drive.

Step 1: On the Remote Computer, Share the DVD Drive

The remote DVD drive must allow shared access.

To set this up, perform these steps on the remote computer that has the DVD drive:

1. Log in to the remote computer as an Administrator user.
2. Start Windows Explorer.
3. Right-click the DVD drive letter and select **Sharing** (or **Sharing and Security**).
4. Click the **Sharing** tab and do the following:
   a. Select **Share this folder**.
   b. In **Share name**, give it a share name such as **dvd**. You use this name when you map the DVD drive on the local computer in step 1.d of "Step 2: On the Local Computer, Map the DVD Drive".
   c. Click **Permissions**. You need at least read permission for the user who accesses the drive to install Oracle Database.
   d. Click **OK** when you are finished.
5. Insert the Oracle Database installation media into the DVD drive.

**Step 2: On the Local Computer, Map the DVD Drive**

Perform these steps on the local computer to map a remote DVD drive and to run Oracle Universal Installer from the mapped drive.

1. Map the remote DVD drive.
   a. Start Windows Explorer on the local computer.
   b. From the **Tools** menu, select **Map Network Drive** to display the Map Network Drive dialog box.
   c. Select a drive letter to use for the remote DVD drive.
   d. In **Folder**, enter the location of the remote DVD drive using the following format:
      \remote_hostname\share_name
   where:
   - **remote_hostname** is the name of the remote computer with the DVD drive.
   - **share_name** is the share name that you entered in step 4 of the previous procedure. For example:
     \computer2\dvd
   e. If you must connect to the remote computer as a different user, click **different user name**, and enter the user name.
   f. Click **Finish**.
2. Run Oracle Universal Installer from the mapped DVD drive.

**Copying the Oracle Database Software to a Hard Disk**

To copy the contents of the installation media to a hard disk:

1. Create a directory on your hard drive. For example:
   C:\> mkdir \install
   C:\> mkdir \install\database
2. Copy the contents of the installation media to the directory that you just created.
Installing and Using Oracle Components in Different Languages

Learn about installing and using Oracle components in different languages.

• **Configuring Oracle Components to Run in Different Languages**
  You can specify the language and the territory, or locale, in which you want to use the Oracle components.

• **Installing Translation Resources**
  To view the user interface of Oracle components in different languages, you must install the appropriate language translations along with the component.

### Configuring Oracle Components to Run in Different Languages

You can specify the language and the territory, or locale, in which you want to use the Oracle components.

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. Depending on the Oracle component, the locale of the component is either inherited from the operating system session that started the component, or is defined by the `NLS_LANG` environment variable.

The operating system locale usually influences Oracle components that are based on Java technology. The `NLS_LANG` environment variable usually influences Oracle components that use Oracle Client libraries such as OCI.

**Note:**

The user interface of an Oracle component is displayed in a selected language only if the appropriate translation is available and has been installed. Otherwise, the user interface is displayed in English.

• **Determining the Operating System Locale**
  The locale setting of your operating system session determines the language of the user interface and the globalization behavior for components such as Oracle Universal Installer, Oracle Net Configuration Assistant, and Oracle Database Configuration Assistant.

• **Configuring Locale and Character Sets Using the NLS_LANG Environment Variable**
  The `NLS_LANG` environment variable determines the language of the user interface and the globalization behavior for components such as SQL*Plus, `exp`, and `imp`.

• **NLS_LANG Settings in Console Mode and Batch Mode**
  Before you can use Oracle utilities such as SQL*Plus, SQL Loader, Import, and Export from the command prompt, you may have to set the character set in the parameter `NLS_LANG` to a different value from the one used in the registry.
Determining the Operating System Locale

The locale setting of your operating system session determines the language of the user interface and the globalization behavior for components such as Oracle Universal Installer, Oracle Net Configuration Assistant, and Oracle Database Configuration Assistant.

It also determines the globalization behavior of Oracle Database sessions created by a user application through Oracle JDBC driver, unless overridden by the application.

Open the Control Panel from the Start menu to modify the operating system locale settings. In the classic view of the Control Panel on Windows, click **Regional and Language Options**. In the default view of the Control Panel on Windows, click **Change keyboards or other input methods**.

To set locale for the current operating system user on Windows, select the desired locale from the Current format pop-up list on the Formats tab.

Some of the locales may be unavailable until you install required operating system support files.

Some Oracle components, such as SQL*Plus, require that the Windows System Locale is also set to the language in which the components are to be run. System Locale is called Language for non-Unicode programs on Windows. On Windows, click the **Change system locale** button on the Administrative tab, accept the use of administrative privileges, if User Account Control is active, and select the locale from the pop-up list in the opened dialog box.

> **Note:**

The operating system must be restarted after the System Locale is changed. See the operating system documentation for further information about Windows locale settings.

Configuring Locale and Character Sets Using the NLS_LANG Environment Variable

The **NLS_LANG** environment variable determines the language of the user interface and the globalization behavior for components such as SQL*Plus, exp, and imp.

It sets the language and territory used by the client application and the database user session. It also declares the character set for entering and displaying data by the client application.

The **NLS_LANG** environment variable uses the following format:

```
NLS_LANG=language_territory.charset
```

In this format:

- **language** specifies the language used for displaying Oracle messages, sorting, day names, and month names
territory specifies the conventions for default date, monetary and numeric formats

characterset specifies the encoding used by the client application

In most cases, this is the Oracle character set that corresponds to the Windows ANSI Code Page as determined by the System Locale.

The NLS_LANG parameter on Windows can be set

- in Registry under the subkey corresponding to a given Oracle home,
- as an environment variable.

When you install Oracle Database components and the NLS_LANG parameter is not yet set in the Registry subkey of the target Oracle home, Oracle Universal Installer sets the NLS_LANG parameter to a default value derived from the operating system locale for the current user.

See Also:

- Oracle Database Globalization Support Guide for information about the NLS_LANG parameter and Globalization Support initialization parameters

For example:

- Arabic (U.A.E.) - ARABIC_UNITED ARAB EMIRATES.AR8MSWIN1256
- Chinese (PRC) - SIMPLIFIED CHINESE_CHINA.ZHS16GBK
- Chinese (Taiwan) - TRADITIONAL CHINESE_TAIWAN.ZHT16MSWIN950
- English (United Kingdom) - ENGLISH_UNITED KINGDOM.WE8MSWIN1252
- English (United States) - AMERICAN_AMERICA.WE8MSWIN1252
- French (Canada) - CANADIAN FRENCH_CANADA.WE8MSWIN1252
- French (France) - FRENCH_FRANCE.WE8MSWIN1252
- German (Germany) - GERMAN_GERMANY.WE8MSWIN1252
- Hebrew - HEBREW_ISRAEL.IW8MSWIN1255
- Japanese - JAPANESE_JAPAN.JA16SJISTILDE
- Russian - RUSSIAN RUSSIA.CL8MSWIN1251
- Spanish (Spain) - SPANISH_SPAIN.WE8MSWIN1252
- Spanish (Mexico) - MEXICAN SPANISH_MEXICO.WE8MSWIN1252
- Spanish (Venezuela) - LATIN AMERICAN SPANISH_VENEZUELA.WE8MSWIN1252

NLS_LANG Settings in Console Mode and Batch Mode

Before you can use Oracle utilities such as SQL*Plus, SQL Loader, Import, and Export from the command prompt, you may have to set the character set in the parameter NLS_LANG to a different value from the one used in the registry.
You may need to set a different character set for console mode utilities, because programs running in console mode use, with a few exceptions, a different code page (character set) from programs running in GUI mode. The default Oracle home NLS_LANG parameter in the Registry is always set to the appropriate GUI code page. If you do not set the NLS_LANG parameter for the console mode session correctly, incorrect character conversion can corrupt error messages and data.

For Japanese, Korean, Simplified Chinese, Traditional Chinese, Thai, and Vietnamese, the console (OEM) code page is identical to the GUI (ANSI) code page. In this case, you are not required to set the NLS_LANG parameter. For other languages, set the correct character set value of NLS_LANG by issuing a SET NLS_LANG command in the same Command Prompt window in which you want to start the affected utility.

Similarly, in batch mode, set the correct character set value of NLS_LANG by inserting a SET NLS_LANG command at the start of the batch procedure, according to the character set of the files to be processed in the procedure.

To find the current console code page, issue the CHCP command in the Command Prompt window. Use the reported code page number to look up the corresponding Oracle character set name in the following table:

<table>
<thead>
<tr>
<th>OEM Code Page</th>
<th>Oracle Character Set for Console Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>437 (US)</td>
<td>US8PC437</td>
</tr>
<tr>
<td>737 (Greek)</td>
<td>EL8PC737</td>
</tr>
<tr>
<td>775 (Baltic)</td>
<td>BLT8PC775</td>
</tr>
<tr>
<td>850 (Multilingual Latin I)</td>
<td>WE8PC850</td>
</tr>
<tr>
<td>852 (Latin II)</td>
<td>EE8PC852</td>
</tr>
<tr>
<td>855 (Cyrillic)</td>
<td>RU8PC855</td>
</tr>
<tr>
<td>857 (Turkish)</td>
<td>TR8PC857</td>
</tr>
<tr>
<td>858 (Multilingual Latin I + Euro)</td>
<td>WE8PC858</td>
</tr>
<tr>
<td>866 (Russian)</td>
<td>RU8PC866</td>
</tr>
<tr>
<td>874 (Thai)</td>
<td>TH8TISASCII</td>
</tr>
<tr>
<td>932 (Japanese Shift-JIS)</td>
<td>JA16SJSTILDE</td>
</tr>
<tr>
<td>936 (Simplified Chinese GBK)</td>
<td>ZHS16GBK</td>
</tr>
<tr>
<td>949 (Korean)</td>
<td>KO16MSWIN949</td>
</tr>
<tr>
<td>950 (Traditional Chinese Big5)</td>
<td>ZHT16MSWIN950</td>
</tr>
<tr>
<td>1258 (Vietnam)</td>
<td>VN8MSWIN1258</td>
</tr>
</tbody>
</table>

### Installing Translation Resources

To view the user interface of Oracle components in different languages, you must install the appropriate language translations along with the component.
Part of Oracle Database Vault user interface text is stored in database tables in the DVSYS schema. By default, only the English language is loaded into these tables. You can use Oracle Database Vault Configuration Assistant to add more languages to Oracle Database Vault.

To install translation resources:

1. Start Oracle Universal Installer.
2. In the Select Installation Option screen, select the installation option and click Next.
3. In the System Class screen, select the type of system class for installing the database, and click Next.
4. In the Grid Installation Options screen, select the type of database installation you want to perform, and click Next.

See Also:

Oracle Database Vault Administrator’s Guide

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.

1. Change the locale for the operating system user and the System Locale.
2. Run Oracle Universal Installer.
About Image-Based Oracle Database Installation

Starting with Oracle Database 18c, installation and configuration of Oracle Database software is simplified with image-based installation.

To install Oracle Database, create the new Oracle home, extract the image file into the newly-created Oracle home, and run the setup wizard to register the Oracle Database product.

Using image-based installation, you can install and upgrade Oracle Database for single-instance and cluster configurations.

This installation feature streamlines the installation process and supports automation of large-scale custom deployments. You can also use this installation method for deployment of customized images, after you patch the base-release software with the necessary Release Updates (Updates) or Release Update Revisions (Revisions).

Note:

You must extract the image software (db_home.zip) into the directory where you want your Oracle Database home to be located, and then run the Oracle Database Setup Wizard to start the Oracle Database installation and configuration. Oracle recommends that the Oracle home directory path you create is in compliance with the Oracle Optimal Flexible Architecture recommendations.

Installing the Oracle Database Software

This topic explains how to run Oracle Universal Installer to perform most database installations.

Note:

- If you plan to use Oracle Restart or Oracle ASM, then you must install Oracle Grid Infrastructure for a standalone server before you install and create the database. Otherwise, you must manually register the database with Oracle Restart.
- You may have to shut down existing Oracle processes before you start the database installation.
- You can install Oracle Database by using the silent or response file installation method, without the GUI. This method is useful to perform multiple installations of Oracle Database.

To install the Oracle Database software:

1. Log in to Windows as an Administrator user.
If you are installing on a Primary Domain Controller (PDC) or a Backup Domain Controller (BDC), log on as a member of the Domain Administrators group.

2. If you are installing Oracle Database on a computer with multiple Network Interface Cards or multiple aliases, use System in the Control Panel to create the ORACLE_HOSTNAME system environment variable. Set this variable to point to the host name of the computer on which you are installing Oracle Database.

3. Navigate to the location for Oracle Database 19c, open a command prompt with administrator privileges, and run the setup.exe command.

4. Follow these guidelines to complete the installation:
   - Do not install Oracle Database 19c software into an existing Oracle home.
   - Follow the instructions displayed in the Oracle Universal Installer. If you need additional information, click Help.
   - Do not modify the Java Runtime Environment (JRE) except by using a patch provided by Oracle Support Services. Oracle Universal Installer automatically installs the Oracle-supplied version of the JRE. This version is required to run Oracle Universal Installer and several Oracle assistants.
   - If you encounter errors while installing the software, see for information about troubleshooting.
   - If you chose an installation type that runs Oracle Database Configuration Assistant in interactive mode, then you must provide detailed information about configuring your database and network.

   If you need help when using the Oracle Database Configuration Assistant in interactive mode, click Help on any screen.

   \[\text{Note:}\]
   \[\text{If you chose a default installation, Oracle Database Configuration Assistant does not run interactively.}\]

5. When the Configuration Assistant tasks are complete, click Finish, click Exit, then click Yes to exit from Oracle Universal Installer.

6. Optionally, delete the OraInstall\date_time directory to remove the temporary files that were created during the installation process. The OraInstall\date_time directory holds about 45 MB of files. This directory is created in the location set by the TEMP environment variable setting.

   Restarting your computer also removes the OraInstall\date_time directory.

7. See for information about tasks that you must complete after you have installed Oracle Database.
Cloning an Oracle Home

Follow these steps to clone an Oracle home.

**Note:**

During cloning, Oracle Universal Installer (OUI) prompts you to run scripts that require root privileges.

1. Verify that the installation of Oracle Database to clone is successful.
   You can do this by reviewing the `installActions<date_time>.log` file for the installation session, which is typically located in the following directory:
   ```
   C:\Program Files\Oracle\Inventory\logs
   ```
   If you have installed patches, you can check their status by running the following commands at a command prompt:
   ```
   C:\ORACLE_HOME\OPatch> set ORACLE_HOME=ORACLE_HOME_using_patch
   C:\ORACLE_HOME\OPatch> opatch lsinventory
   ```

2. Stop all processes related to the Oracle home. You can stop Oracle services by the following method:
   **Microsoft Windows Services utility:** From the **Start** menu, select **Control Panel**, then **Administrative Tools**, then **Services**. Right-click any service that begins with **Oracle**, and then from the menu, select **Stop**.

3. Create a ZIP file with the Oracle home (but not Oracle base) directory.
   For example, if the source Oracle installation is in `C:\app\username\product\19.0.0\dbhome_1` you zip the `dbhome_1` directory, leaving out the `admin`, `flash_recovery_area`, and `oradata` directories that are under `19.0.0`. These directories are created in the target installation later on when you create a new database there.

4. Copy the ZIP file to the root directory of the target computer. If you use File Transfer Protocol (FTP), then transfer the ZIP file in binary mode only.

5. Extract the ZIP file contents, selecting the **Use folder names** option.

6. Repeat steps 4 and 5 for each computer where you want to clone the Oracle home, unless the Oracle home is on a shared storage device.

7. In the source Oracle home, restart the services that you stopped in step 2.

8. On the target computer, `cd` to the unzipped Oracle home directory, and perform the following steps:
   a. Remove the `*.ora` files that are present in unzipped `ORACLE_HOME\network\admin` directory, such as `listener.ora`, `sqlnet.ora`, and `tnsnames.ora`.
   b. Delete unnecessary files from the unzipped Oracle home directory.

   The unzipped Oracle home directory contains files that are relevant only to the source Oracle home. Remove the unnecessary files from the unzipped Oracle home in the `log`, `crs/init`, `crf`, and `cdata` directories. The following
example shows how to remove these unnecessary files from the unzipped Oracle home directory:

```
[grid_home]# cd copy_path
[grid_home]# rm -rf host_name
[grid_home]# rm -rf log/host_name
[grid_home]# rm -rf gpnp/host_name
[grid_home]# rm -rf find gpnp -type f and delete these files.
  gpnp/init/host_name
  gpnp/init/host_name.pid
  gpnp/profiles/peer/profile.xml
  gpnp/profiles/peer/profile_orig.xml
  gpnp/host_name/profiles/peer/profile.old
  gpnp/host_name/profiles/peer/profile.xml
  gpnp/host_name/profiles/peer/profile_orig.xml
  gpnp/host_name/wallets/peer/cwallet.sso
  gpnp/host_name/wallets/prdr/cwallet.sso
  gpnp/host_name/wallets/root/ewallet.p12
  gpnp/wallets/pa/cwallet.sso
  gpnp/wallets/peer/cwallet.sso
  gpnp/wallets/prdr/cwallet.sso
  gpnp/wallets/root/ewallet.p12

  [grid_home]# find cfgtoollogs -type f and delete these files.
  [grid_home]# rm -rf crs/init/*
  [grid_home]# rm -rf cdata/*
  [grid_home]# rm -rf crf/*
  [grid_home]# rm -rf network/admin/*.ora
```

9. From the ORACLE_HOME\clone\bin directory, run clone.pl for the unzipped Oracle home.

Use the following syntax:

```
C:\ORACLE_HOME\clone\bin>target_home\perl\bin\perl.exe clone.pl
ORACLE_HOME="target location" ORACLE_BASE="target Base location"
ORACLE_HOME_USER="Windows User Account" OSDBA_GROUP=OSDBA_privileged_group
OSPER_GROUP=OSOPER_privileged_group
OSBACKUPDBA_GROUP=OSBACKUPDBA_privileged_group
OSDGDBA_GROUP=OSDGDBA_privileged_group
OSKMDBA_GROUP=OSKMDBA_privileged_group
OSRACDBA_GROUP=OSRACDBA_privileged_group
```

where ORACLE_HOME_USER="Windows User Account" is the Oracle Home User for the cloned home.

Windows Built-in Account is used as the Oracle Home User if the parameter for ORACLE_HOME_USER is not specified.

For example:

```
C:\ORACLE_HOME\clone\bin>target_home\perl\bin\perl.exe clone.pl
```

ORACLE_HOME="C:\app\username\product\19.0.0\dbhome_1"
ORACLE_BASE="C:\app\username"
ORACLE_HOME_USER="mydomain\username" -defaultHomeName
OSDBA_GROUP=dba OSOPER_GROUP=oper OSBACKUPDBA_GROUP=backupdba
OSDGDBA_GROUP=dgdba OSKMDBA_GROUP=kmdba OSRACDBA_GROUP=racdba -defaultHomeName
Oracle Universal Installer starts, and then records the cloning actions in the `cloneActions.timestamp.log` file. This log file is normally located in `C:\Program Files\Oracle\Inventory\logs`.

**Note:**

- Run `\ORACLE_HOME\clone\bin\target_home\perl\bin\perl.exe clone.pl -help` command for more information about the command option flags.
- Oracle recommends that you use the software-only installation option, available in the database installer, instead of `clone.pl` to clone your database.

10. To configure connection information for the new database, run Net Configuration Assistant.

To start Net Configuration Assistant, select **Start**, then **All Programs**, then **Oracle - HOMENAME**, then **Configuration and Migration Tools**, and then **Net Configuration Assistant**.

11. To create a new database for the newly cloned Oracle home, run Oracle Database Configuration Assistant.

To start Oracle Database Configuration Assistant, select **Start**, then **All Programs**, then **Oracle - HOMENAME**, then **Configuration and Migration Tools**, and then **Database Configuration Assistant**.

**See Also:**

*Oracle Database Administrator's Guide*
Oracle Database Postinstallation Tasks

Complete configuration tasks after you install Oracle Database.

Oracle recommends that you complete additional tasks immediately after installation. You must also complete product-specific configuration tasks before you use those products.

- **Using Oracle9i Language and Definition Files with Oracle Database 19c**
  Changes are made to the content of some of the language and territory definition files in Oracle Database 10g and later releases.

- **Downloading and Installing Release Update Patches**
  Download and install Release Updates (RU) and Release Update Revisions (RUR) patches for your Oracle software after you complete installation.

- **Requirements for Database Password**
  To secure your database, every password must satisfy the Oracle recommended password requirements, even the passwords for predefined user accounts.

- **Updating the Oracle ORAchk Health Check Tool**
  Update the existing version of your Oracle ORAchk utility to perform proactive health checks for the Oracle software stack.

- **Recompiling Invalid Objects on Windows Systems**
  Run the utlrp.sql script after you install, patch, or upgrade a database, to identify, and recompile invalid objects.

- **Configuring the Secure Sockets Layer**
  Oracle highly recommends that you configure and use a Secure Sockets Layer (SSL) to ensure that passwords and other sensitive data are not transmitted in clear text in HTTP requests.

- **Configuring Oracle Components**
  Many Oracle products and options must be configured before you use them for the first time.

- **Creating a Fast Recovery Area Disk Group**
  During installation, by default you can create multiple disk groups.

- **Enabling and Disabling Database Options After Installation**
  When you install Oracle Database, some options are enabled and the others disabled. You can view the enabled Oracle Database options by querying the V$OPTION view using SQL*Plus.

- **Changing the Oracle Home User Password**
  Oracle Home User Control is a command-line utility that allows an administrator to update the password for an Oracle Home User.
Using Oracle9i Language and Definition Files with Oracle Database 19c

Changes are made to the content of some of the language and territory definition files in Oracle Database 10g and later releases.

Changes are made to the content of some of the language and territory definition files in Oracle Database 10g and later releases. These updates are necessary to correct the legacy definitions that no longer meet the local conventions in some of the languages and territories that Oracle Database supports.

Oracle Database 19c customers must review their existing application code to ensure that the correct cultural conventions, which were introduced and defined in Oracle Database 10g, are being used.

For customers who are not able to make the necessary code changes to support their applications, Oracle Database offers Oracle9i locale definition files with this release of Oracle Database. If the Oracle Database server installation has been configured to use the Oracle9i files, then you must enable this functionality in each client installation as well.

To enable this functionality, perform the following steps:

1. Run the `cr9idata.pl` script, which by default is in the following location:
   ```
   ORACLE_HOME
   
   
s\data\old
   
   ```
   If the installation type you chose does not include this directory, you can find the `cr9idata.pl` script in the same directory path in a default Oracle Database Client installation.

2. Set the `ORA_NLS10` environment variable to point to the directory `ORACLE_HOME\nls\data\9idata`, into which `cr9idata.pl` copies the new language and territory definition files. `ORA_NLS10` must have this value each time the affected client programs are started. Therefore, set the variable permanently in a startup script or, on the Microsoft Windows platform, set it in the Windows Registry.

Downloading and Installing Release Update Patches

Download and install Release Updates (RU) and Release Update Revisions (RUR) patches for your Oracle software after you complete installation.

Starting with Oracle Database 18c, Oracle provides quarterly updates in the form of Release Updates (RU) and Release Update Revisions (RUR). Oracle no longer releases patch sets. For more information, see My Oracle Support Note 2285040.1.

Check the My Oracle Support website for required 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.
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 and how to apply the patches to your installation.
7. Uncompress the Oracle patch updates that you downloaded from My Oracle Support.

Related Topics

• My Oracle Support note 2285040.1

Requirements for Database Password

To secure your database, every password must satisfy the Oracle recommended password requirements, even the passwords for predefined user accounts.

Oracle Database provides a set of predefined user accounts. You must create passwords in a secure fashion. If you have default passwords, you must change these.

You can manage the security for Oracle Database users by enforcing restrictions on the passwords that are created, creating user profiles, and using user resource limits to further secure user accounts.

See Also:

Oracle Database Security Guide

Updating the Oracle ORAchk Health Check Tool

Update the existing version of your Oracle ORAchk utility to perform proactive health checks for the Oracle software stack.

Oracle ORAchk replaces the RACCheck utility. Oracle ORAchk extends health check coverage to the entire Oracle software stack, and identifies and addresses top issues reported by Oracle users. Oracle ORAchk proactively scans for known problems with Oracle products and deployments, including the following:
Recompiling Invalid Objects on Windows Systems

Run the utlrp.sql script after you install, patch, or upgrade a database, to identify, and recompile invalid objects.

The utlrp.sql script recompiles all invalid objects, including packages, procedures, and types. Run the script immediately after installation, to ensure that users do not encounter invalid objects.

1. Log in as an Administrator user, or as the Oracle Home user.
2. Start SQL*Plus and log in as a SYSDBA user:
   a. Click Start.
   b. Select Programs (or All Programs).
   c. Select Oracle - HOME_NAME.
   d. Select Application Development.
   e. Select SQL*Plus.
3. Run the utlrp.sql script, where Oracle_home is the Oracle home path:

   SQL> @Oracle_home\rdbms\admin\utlrp.sql
The utlrp.sql script automatically recompiles invalid objects in either serial or parallel recompilation, based on the number of invalid objects, and on the number of CPUs available. CPUs are calculated using the number of CPUs (cpu_count) multiplied by the number of threads for each CPU (parallel_threads_per_cpu). On Oracle Real Application Clusters (Oracle RAC), this number is added across all Oracle RAC nodes.

**Configuring the Secure Sockets Layer**

Oracle highly recommends that you configure and use a Secure Sockets Layer (SSL) to ensure that passwords and other sensitive data are not transmitted in clear text in HTTP requests.

> **See Also:**
> Oracle Database Security Guide

**Configuring Oracle Components**

Many Oracle products and options must be configured before you use them for the first time.

Before using individual Oracle products or options, refer to the appropriate manual in the product documentation library.

> **Note:**
> Perform postinstallation tasks only for the components that you intend to use.

- **Configuring Direct NFS Client**
  Direct NFS Client is an alternative to using kernel-managed NFS.

- **Configuring Oracle Messaging Gateway**
  Oracle Messaging Gateway, an Oracle Database Advanced Queuing feature, requires additional configuration after you install Oracle Database if you plan to use Oracle Database Advanced Queuing.

- **Configuring Oracle Label Security**
  You must configure Oracle Label Security in a database to use it.

- **Configuring the OraClrAgnt Service for Oracle Database Extensions for .NET**
  Oracle Database Extensions for .NET depends on a Windows service to operate properly. This service is called the OraClrAgnt service, which can be accessed through the Service Control Panel, as `OracleORACLE_HOMEClrAgent`, where `ORACLE_HOME` represents an Oracle home name.

- **Configuring Oracle Database Vault**
  Oracle Database includes Database Vault by default, but you must register it before you can use it.
• **Configuring Oracle Net Services**
  Describes how to configure Oracle Net Services.

• **Installing Oracle Text Supplied Knowledge Bases**
  An Oracle Text knowledge base is a hierarchical tree of concepts used for theme indexing, ABOUT queries, and deriving themes for document services.

• **Installing the Oracle Text Filtering Component**
  Oracle Text Filtering Technology requires the Visual C++ libraries included in the Visual C++ Redistributable Package provided by Microsoft.

• **Configuring or Reinstalling Oracle XML DB**
  Oracle XML DB is a component of the Oracle Database installation.

• **Configuring PL/SQL External Procedures**
  Configuring PL/SQL depends on the network configuration files used.

• **Configuring Shared Server Support**
  The default setup for using the Shared Server mode depends on how the software has been installed.

• **Setting Credentials for the Job System to Work with Oracle Enterprise Manager**
  Windows systems require that you set the correct credentials for the Jobs system to work properly in Oracle Enterprise Manager.

• **Configuring Oracle Database to Communicate with Oracle Automatic Storage Management**
  On Windows, Oracle Database installations that use Oracle Automatic Storage Management must use Windows native authentication.

• **Installing Oracle Database Examples**
  If you plan to use the following products or features, then download and install the products from the Oracle Database Examples media:

• **Creating the OraMTS Service for Microsoft Transaction Server**
  Oracle Services for Microsoft Transaction Server (OraMTS) permit Oracle databases to be used as resource managers in Microsoft application coordinated transactions.

**Related Topics**

• Oracle Application Express Installation Guide

• Oracle Configuration Manager Installation and Administration Guide

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### Configuring Direct NFS Client

Direct NFS Client is an alternative to using kernel-managed NFS.

• **About Direct NFS Client Storage**
  With Oracle Database, you can store data files on a supported NFS system. You can configure Oracle Database to access NFS servers directly using an Oracle internal Direct NFS Client.

• **About the Oranfstab File for Direct NFS Client**
  To enable the Direct NFS Client, you must add an `oranfstab` file to `ORACLE_HOME\dbs`.

• **Mounting NFS Storage Devices with Direct NFS Client**
  Direct NFS Client determines the mount point settings for the NFS storage devices based on the configuration information in `oranfstab`.
• **Specifying Network Paths for a NFS Server**
  Direct NFS Client can use up to four network paths defined in the oranfstab file for an NFS server.

• **Creating an oranfstab File for Direct NFS Client**
  Direct NFS uses a configuration file, oranfstab, to determine the available mount points.

• **Performing Basic File Operations Using the ORADNFS Utility**
  ORADNFS is a utility which enables the database administrators to perform basic file operations over Direct NFS Client on Microsoft Windows platforms.

• **Monitoring Direct NFS Client Usage**
  Use the following views for Direct NFS Client management:

• **Enabling Direct NFS Client**
  To enable Direct NFS Client, you must add an oranfstab file to the Oracle_home \dbs directory and modify the related DLL files used by the Oracle Database software.

• **Disabling Direct NFS Client**
  Complete the following steps to disable the Direct NFS Client:

• **Enabling HCC on Direct NFS Client**
  To enable Hybrid Columnar Compression (HCC) on Direct NFS Client, perform the following steps:

### About Direct NFS Client Storage

With Oracle Database, you can store data files on a supported NFS system. You can configure Oracle Database to access NFS servers directly using an Oracle internal Direct NFS Client.

Direct NFS Client supports NFSv3, NFSv4, NFSv4.1, and pNFS protocols to access the NFS server. If Oracle Database cannot open an NFS server using Direct NFS Client, then an informational message is logged into the Oracle alert and trace files indicating that Direct NFS Client could not be established.

Starting with Oracle Database 12c Release 2, when you enable Direct NFS, you can access Direct NFS dispatcher. The Direct NFS dispatcher consolidates the number of TCP connections that are created from a database instance to the NFS server. In large database deployments, using Direct NFS dispatcher improves scalability and network performance. Parallel NFS deployments also require a large number of connections. Hence, the Direct NFS dispatcher is recommended with Parallel NFS deployments too.

Direct NFS Client supports Dispatcher or the Input/Output (I/O) infrastructure. Dispatcher enables database processes to use I/O slave processes to perform I/O operations. This limits the number of sockets and Transmission Control Protocol (TCP) connections that the Direct NFS Client requires to connect to the NFS server.

Starting with Oracle Database 12c Release 2 (12.2), Windows Direct NFS Client supports all widely accepted NFS path formats including UNIX-style NFS paths, NFS version 4, and NFS version 4.1 protocols.

The Oracle database files resident on the NFS server that are served by the Direct NFS Client can also be accessed through a third party NFS client. The volume must be mounted through CIFS or kernel NFS to enable regular windows utilities and commands, such as copy, and so on, access the database files in the remote location.
Volumes mounted through CIFS cannot be used for database file storage without configuring Direct NFS Client. The atomic write requirements required for database access are not guaranteed by CIFS protocol. Consequently, CIFS can only be used for the operating system level commands, such as copy, move, and so on.

Some NFS file servers require NFS clients to connect using reserved ports. If your filer is running with reserved port checking, then you must disable it for Direct NFS Client to operate. To disable reserved port checking, consult your NFS file server documentation.

See Also:

- Oracle Database Reference
- Oracle Database Performance Tuning Guide
- Oracle Database Administrator's Guide

About the Oranfstab File for Direct NFS Client

To enable the Direct NFS Client, you must add an oranfstab file to ORACLE_HOME\dbs.

When oranfstab is placed in this directory, the entries in this file are specific to a single database.

Mounting NFS Storage Devices with Direct NFS Client

Direct NFS Client determines the mount point settings for the NFS storage devices based on the configuration information in oranfstab.

Direct NFS Client looks for the mount point entries in ORACLE_HOME\dbs\oranfstab. It uses the first matched entry as the mount point.

Specifying Network Paths for a NFS Server

Direct NFS Client can use up to four network paths defined in the oranfstab file for an NFS server.

The Direct NFS Client performs load balancing across all specified paths. If a specified path fails, then Direct NFS Client reissues I/O commands over any remaining paths.

Direct NFS Client requires an NFS server supporting NFS read/write buffers of at least 16384 bytes.

Direct NFS Client issues writes at \texttt{wtmax} granularity to the NFS server. Direct NFS Client does not serve an NFS server with a \texttt{wtmax} less than 16384. Oracle recommends that you use the value 32768.

For NFS servers that restrict port range, you can use the \texttt{insecure} option to enable clients other than \texttt{root} to connect to the NFS server. Alternatively, you can disable Direct NFS Client.
Creating an oranfstab File for Direct NFS Client

Direct NFS uses a configuration file, oranfstab, to determine the available mount points.

Create an oranfstab file with the following attributes for each NFS server that you want to access using Direct NFS Client:

- **server**
  The NFS server name.

- **local**
  Up to four paths on the database host, specified by IP address or by name, as displayed using the ifconfig command run on the database host.

- **path**
  Up to four network paths to the NFS server, specified either by IP address, or by name, as displayed using the ifconfig command on the NFS server.

- **export**
  The exported path from the NFS server. Use UNIX-style path.

- **mount**
  The corresponding local mount point for the exported volume. Use WINDOWS-style path.

- **Dontroute**
  Specifies that the outgoing messages must not be routed by the operating system, but sent using the IP address to which they are bound.

- **mnt_timeout**
  Specifies (in seconds) the time Direct NFS Client should wait for a successful mount before timing out. This parameter is optional. The default timeout is 10 minutes (600).

- **uid (Optional)**
  The UNIX user ID to be used by Direct NFS Client to access all NFS servers listed in oranfstab. The default value is uid:65534, which corresponds to user:nobody on the NFS server.

- **gid (Optional)**
  The UNIX group ID to be used by Direct NFS Client to access all the NFS servers listed in oranfstab. The default value is gid:65534, which corresponds to group:nogroup on the NFS server.

- **nfs_version**

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Note:

Use NFS servers supported for Oracle Database. See the My Oracle Support website for support information:

https://support.oracle.com
Specifies the NFS protocol version used by Direct NFS Client. Possible values are NFSv3, NFSv4, NFSv4.1, and pNFS. The default version is NFSv3. If you select NFSv4.x, then you must configure the value in `oranfstab` for `nfs_version`. Specify `nfs_version` as `pNFS`, if you want to use Direct NFS with Parallel NFS.

- **security_default** (Optional)

  Specifies the default security mode applicable for all the exported NFS server paths for a server entry. The default value is `sys`. See the description of the `security` parameter for the supported security levels for the `security_default` parameter.

- **security** (Optional)

  Specifies the security level, to enable security using Kerberos authentication protocol with Direct NFS Client. Specify `security` per export-mount pair. The supported security levels for the `security_default` and `security` parameters are:

  - **sys**: UNIX level security AUTH_UNIX authentication based on user identifier (UID) and group identifier (GID) values. This is the default value for security parameters.
  - **krb5**: Direct NFS runs with plain Kerberos authentication. Server is authenticated as the real server which it claims to be.
  - **krb5i**: Direct NFS runs with Kerberos authentication and NFS integrity. Server is authenticated and each of the message transfers is checked for integrity.
  - **krb5p**: Direct NFS runs with Kerberos authentication and NFS privacy. Server is authenticated, and all data is completely encrypted.

  The `security` parameter, if specified, takes precedence over the `security_default` parameter. If neither of these parameters are specified, then `sys` is the default authentication.

  For NFS server Kerberos security setup, review the relevant NFS server documentation. For Kerberos client setup, review the relevant operating system documentation.

- **management**

  Enables Direct NFS Client to use the management interface for SNMP queries. You can use this parameter if SNMP is running on separate management interfaces on the NFS server. The default value is the server parameter value.

- **community**

  Specifies the community string for use in SNMP queries. Default value is `public`.

The following examples show three possible NFS server entries in `oranfstab`. A single `oranfstab` can have multiple NFS server entries.

### Example 7-1  Using Local and Path NFS Server Entries

The following example uses both local and path. Because they are in different subnets, you do not have to specify `dontroute`.

```
server: MyDataServer1
local: 192.0.2.0
path: 192.0.2.1
local: 192.0.100.0
```
Example 7-2 Using Names in Place of IP Addresses, with Multiple Exports, management and community

server: MyDataServer2
local: LocalPath1
path: NfsPath1
local: LocalPath2
path: NfsPath2
local: LocalPath3
path: NfsPath3
local: LocalPath4
path: NfsPath4
nfs_version: nfsv3
dontroute
export: /vol/oradata1 mount: C:\APP\ORACLE\ORADATA\ORCL
export: /vol/oradata2 mount: C:\APP\ORACLE\ORADATA\ORCL2
export: /vol/oradata3 mount: C:\APP\ORACLE\ORADATA\ORCL3
export: /vol/oradata4 mount: C:\APP\ORACLE\ORADATA\ORCL4
export: /vol/oradata5 mount: C:\APP\ORACLE\ORADATA\ORCL5
management: MgmtPath1
community: private

Example 7-3 Using Kerberos Authentication with Direct NFS Export

The security parameter overrides security_default:

server: nfsserver
local: 192.0.2.0
path: 192.0.2.2
local: 192.0.2.3
path: 192.0.2.4
export: /vol/oradata2 mount: C:\APP\ORACLE\ORADATA\ORCL2 security: krb5
export: /vol/oradata3 mount: C:\APP\ORACLE\ORADATA\ORCL3 security: krb5p
export: /vol/oradata4 mount: C:\APP\ORACLE\ORADATA\ORCL4 security: sys
export: /vol/oradata5 mount: C:\APP\ORACLE\ORADATA\ORCL5
security_default: krb5i

Performing Basic File Operations Using the ORADNFS Utility

ORADNFS is a utility which enables the database administrators to perform basic file operations over Direct NFS Client on Microsoft Windows platforms.

ORADNFS is a multi-call binary, a single binary that acts like several utilities. This allows ORADNFS to be smaller since all the built-in commands can leverage DNFS code for many common operations. ORADNFS is run by issuing a command as an argument on the command line.

For example, C:\> ORADNFS help causes ORADNFS to print a list of built-in commands, and C:\> ORADNFS ls C:\ORACLE\ORADATA\ORCL causes ORADNFS to behave as an ls command of C:\ORACLE\ORADATA\ORCL remote directory, where C:\ORACLE\ORADATA is a DNFS virtual mount point specified in the oranfstab configuration file.
Monitoring Direct NFS Client Usage

Use the following views for Direct NFS Client management:

- **v$dnfs_servers**: Shows a table of servers accessed using Direct NFS Client.
- **v$dnfs_files**: Shows a table of files currently open using Direct NFS Client.
- **v$dnfs_channels**: Shows a table of open network paths (or channels) to servers for which Direct NFS Client is providing files.
- **v$dnfs_stats**: Shows a table of performance statistics for Direct NFS Client.

Enabling Direct NFS Client

To enable Direct NFS Client, you must add an oranfstab file to the Oracle_home\dbs directory and modify the related DLL files used by the Oracle Database software.

1. Create an oranfstab file.
2. Replace the standard ODM library, oraodm19.dll, with the ODM NFS library Oracle Database uses the ODM library, oranfsodm19.dll, to enable Direct NFS Client. To replace the ODM library, complete the following steps:
   a. Change directory to Oracle_home\bin.
   b. Shut down the Oracle Database instance on a node using the Server Control Utility (SRVCTL).
   c. Enter the following commands:

      ```
      copy oraodm19.dll oraodm19.dll.orig
      copy /Y oranfsodm19.dll oraodm19.dll
      ```
   d. Restart the Oracle Database instance using SRVCTL.
   e. Repeat Step 2.a to Step 2.d for each node in the cluster.

Disabling Direct NFS Client

Complete the following steps to disable the Direct NFS Client:

1. Log in as the Oracle Grid Infrastructure software owner.
2. Set ORACLE_HOME to Oracle home for which the Direct NFS Client must be disabled.
3. Change directory to ORACLE_HOME\bin.

4. Shut down the Oracle database.

5. Run the batch file, disable_dnfs.bat to delete ORACLE_HOME\rdbms\lib\odm\oranfsodm18.dll.

6. Remove the oranfstab file.

---

**Note:**

If you remove an NFS path that an Oracle Database is using, then you must restart the database for the change to take effect.

---

**Enabling HCC on Direct NFS Client**

To enable Hybrid Columnar Compression (HCC) on Direct NFS Client, perform the following steps:

1. Ensure that SNMP is enabled on the ZFS storage server. For example:
   ```
   C:\>snmpget -v1 -c public server_name .1.3.6.1.4.1.42.2.225.1.4.2.0
   SNMPv2-SMI::enterprises.42.2.225.1.4.2.0 = STRING: "Sun Storage 7410"
   ```

2. If SNMP is enabled on an interface other than the NFS server, then configure oranfstab using the management parameter.

3. If SNMP is configured using a community string other than public, then configure the oranfstab file using the community parameter.

4. Ensure that Wsnmp32.dll and snmpapi.dll are installed by checking if snmpget is available.

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**Configuring Oracle Messaging Gateway**

Oracle Messaging Gateway, an Oracle Database Advanced Queuing feature, requires additional configuration after you install Oracle Database if you plan to use Oracle Database Advanced Queuing.

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**See Also:**

*Oracle Database Advanced Queuing User's Guide*

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**Configuring Oracle Label Security**

You must configure Oracle Label Security in a database to use it.
Configuring the OraClrAgnt Service for Oracle Database Extensions for .NET

Oracle Database Extensions for .NET depends on a Windows service to operate properly. This service is called the OraClrAgnt service, which can be accessed through the Service Control Panel, as Oracle\$ORACLE_HOME\ClrAgent, where ORACLE_HOME represents an Oracle home name.

In earlier versions of Oracle Database, the OraClrAgnt service was automatically created by the installer. Starting with Oracle Database 12c Release 2 (12.2), after installation you use the OraClrCtl.exe utility to create, start, stop, and delete the OraClrAgnt service. The OraClrAgnt service is configured by this tool using the Oracle Home User account specified during the Oracle Database installation.

Configuring Oracle Database Vault

Oracle Database includes Database Vault by default, but you must register it before you can use it.

You must create the Database Vault Owner user and, optionally, the Database Vault Account Manager administrative user accounts.

Configuring Oracle Net Services

Describes how to configure Oracle Net Services.

If you have a previous release of Oracle software installed on this system, you can copy information from the Oracle Net tnsnames.ora and listener.ora configuration files from the previous release to the corresponding files for the new release.
Modifying the listener.ora File

If you are upgrading from a previous release of Oracle Database, Oracle recommends that you use the current release of Oracle Net listener instead of the listener from the previous release.

If you have referenced the previous Oracle home directory names in the static listener information, then these directory names must be modified before the listener.ora file can be used in the 19c environment.

To use the listener from the current release, you must copy static service information from the listener.ora file from the previous release to the version of that file used by the new release.

For any database instances earlier than release 8.0.3, add static service information to the listener.ora file. Oracle Database releases later than release 8.0.3 do not require static service information.

Modifying the tnsnames.ora File

Unless you are using a central tnsnames.ora file, copy Oracle Net service names and connect descriptors from the previous release tnsnames.ora file to the version of that file used by the new release.

If necessary, you can also add the connection information for additional database instances to the new file.

Installing Oracle Text Supplied Knowledge Bases

An Oracle Text knowledge base is a hierarchical tree of concepts used for theme indexing, ABOUT queries, and deriving themes for document services.

If you plan to use any of these Oracle Text features, you can install two supplied knowledge bases (English and French) from the Oracle Database Examples media.

See Also:

Oracle Text Reference

Installing the Oracle Text Filtering Component

Oracle Text Filtering Technology requires the Visual C++ libraries included in the Visual C++ Redistributable Package provided by Microsoft.

You can download the 2005 SP1 Redistributable Package version at:
Run the vcredist_x64.exe file.

**See Also:**

*Oracle Text Reference*

### Configuring or Reinstalling Oracle XML DB

Oracle XML DB is a component of the Oracle Database installation. However, you must manually configure the FTP and HTTP ports for Oracle XML DB.

**See Also:**

*Oracle XML DB Developer's Guide*

### Configuring PL/SQL External Procedures

Configuring PL/SQL depends on the network configuration files used.

In nearly all cases, configuration is automatic. However, if you are using pre-8.0.3 tnsnames.ora and listener.ora files with your 19c database, then you must manually configure them.

### Configuring Shared Server Support

The default setup for using the Shared Server mode depends on how the software has been installed.

If you install Oracle Database using Oracle Universal Installer, then shared support is not configured. If you created your database through Oracle Database Configuration Assistant, then you were offered a choice of shared or dedicated server support.

### Setting Credentials for the Job System to Work with Oracle Enterprise Manager

Windows systems require that you set the correct credentials for the Jobs system to work properly in Oracle Enterprise Manager.

By default, the Management Agent service is installed as a LocalSystem user. When submitting jobs, such as stopping or starting the database, the operating system user submitting the job must have the **Log on as a batch job** privilege enabled.

Perform the following steps to establish that privilege for any operating system user who must submit an Oracle Enterprise Manager job.
1. Under the Security Settings list, expand the list to **Local Policies**.

2. Under Local Policies, double-click **User Rights Assignment**.

3. Under Policy, search for the **Log on as a batch job** policy.

   If the Management Agent service is installed as any other user (that is, not **LocalSystem**), then, in addition to granting the **Log on as a batch job** privilege, you must grant the Windows service user the following three privileges:
   - Act as part of the operating system
   - Adjust memory quotas for a process
   - Replace a process level token

   The service under the "Windows service" user runs at the operating system level.

4. With each policy, perform the following steps:
   a. Double-click the policy name.
   b. In the Properties dialog box, click **Add User or Group**.
   c. In the Select Users or Groups dialog box, enter the name of the user (for example, **jsmith**, **administrator**, and so on.)

   **Note:**
   On Windows Server 2008, the name of the dialog box is Select Users, Computers, or Groups.

   d. Click **Check Names** to check that you have entered the name correctly.
   e. Click **OK**.

5. Click **OK** to exit the Properties dialog box, then exit Local Security Settings and Administrative Tools.

6. Restart your computer.

   If a user exists locally and at the domain level, Windows gives the local user precedence. To use the domain user, qualify the user name with the domain name. For example, to use the user **joe** in the **ACCOUNTS** domain specify the user name as **ACCOUNTS\joe**.

### Configuring Oracle Database to Communicate with Oracle Automatic Storage Management

On Windows, Oracle Database installations that use Oracle Automatic Storage Management must use Windows native authentication.

By default, Windows native authentication is enabled. To ensure that Windows native authentication is enabled, check the **sqlnet.ora** file, which by default is located in **ORACLE_HOME\network\admin**, and ensure that it has NTS enabled. For example:

```sql
sqlnet.authentication_services=(NTS)
```
Installing Oracle Database Examples

If you plan to use the following products or features, then download and install the products from the Oracle Database Examples media:

- Oracle Database Examples
- Oracle JDBC Development Drivers
- Oracle Text Knowledge Base

See Also:
Oracle Database Examples Installation Guide

Creating the OraMTS Service for Microsoft Transaction Server

Oracle Services for Microsoft Transaction Server (OraMTS) permit Oracle databases to be used as resource managers in Microsoft application coordinated transactions.

OraMTS acts as a proxy for the Oracle database to the Microsoft Distributed Transaction Coordinator (MSDTC). As a result, OraMTS provides client-side connection pooling and allows client components that leverage Oracle to participate in promotable and distributed transactions. In addition, OraMTS can operate with Oracle databases running on any operating system, given that the services themselves are run on Windows.

On releases before Oracle Database 12c, the OraMTS service was created as part of a software-only installation. Starting with Oracle Database 12c, you must use a configuration tool to create this service.

To create the OraMTS service after performing a software-only installation for Oracle Database, perform the following steps:

1. Open a command window.
2. Change directories to ORACLE_HOME\bin.
3. Run the OraMTSCtl utility to create the OraMTS Service:
   
   C:\ORACLE_HOME\bin> oramtsctl.exe -new

See Also:
Oracle Services for Microsoft Transaction Server Developer’s Guide for Microsoft Windows

Creating a Fast Recovery Area Disk Group

During installation, by default you can create multiple disk groups.
If you plan to add an Oracle Database for a standalone server, then you must create the fast recovery area for database files.

- **About the Fast Recovery Area and the Fast Recovery Area Disk Group**
  The fast recovery area is a unified storage location for all Oracle Database files related to recovery. Enabling rapid backups for recent data can reduce requests to system administrators to retrieve backup tapes for recovery operations.

- **Creating the Fast Recovery Area Disk Group**
  Use this procedure to create the fast recovery area disk group.

### About the Fast Recovery Area and the Fast Recovery Area Disk Group

The fast recovery area is a unified storage location for all Oracle Database files related to recovery. Enabling rapid backups for recent data can reduce requests to system administrators to retrieve backup tapes for recovery operations.

Database administrators can define the `DB_RECOVERY_FILE_DEST_SIZE` parameter to the path for the fast recovery area to enable on-disk backups, and rapid recovery of data.

When you enable fast recovery in the `init.ora` file, it writes all RMAN backups, archive logs, control file automatic backups, and database copies to the fast recovery area. RMAN automatically manages files in the fast recovery area by deleting obsolete backups and archive files no longer required for recovery.

Oracle recommends that you create a fast recovery area disk group. Oracle Clusterware files and Oracle Database files can be placed on the same disk group, and you can also place fast recovery files in the same disk group. However, Oracle recommends that you create a separate fast recovery disk group to reduce storage device contention.

The fast recovery area is enabled by setting `DB_RECOVERY_FILE_DEST_SIZE`. The size of the fast recovery area is set with `DB_RECOVERY_FILE_DEST_SIZE`. As a general rule, the larger the fast recovery area, the more useful it becomes. For ease of use, Oracle recommends that you create a fast recovery area disk group on storage devices that can contain at least three days of recovery information. Ideally, the fast recovery area must be large enough to hold a copy of all of your data files and control files, the online redo logs, and the archived redo log files needed to recover your database using the data file backups kept under your retention policy.

Multiple databases can use the same fast recovery area. For example, assume you have created one fast recovery area disk group on disks with 150 GB of storage, shared by three different databases. You can set the size of the fast recovery for each database depending on the importance of each database. For example, if `database1` is your least important database, `database2` is of greater importance and `database3` is of greatest importance, then you can set different `DB_RECOVERY_FILE_DEST_SIZE` settings for each database to meet your retention target for each database: 30 GB for `database1`, 50 GB for `database2`, and 70 GB for `database3`.

### Creating the Fast Recovery Area Disk Group

Use this procedure to create the fast recovery area disk group.
1. Navigate to the Grid home bin directory, and start ASM Configuration Assistant (ASMCA). For example:

```
DRIVE_LETTER:/> cd \app\oracle\product\18.0.0\grid\bin
DRIVE_LETTER:/> asmca
```

2. ASMCA opens at the Disk Groups tab. Click **Create** to create a disk group.

3. The Create Disk Groups window opens.
   - In the Disk Group Name field, enter a descriptive name for the fast recovery area group. For example: FRA.
   - In the Redundancy section, select the level of redundancy you want to use.
   - In the Select Member Disks field, select the eligible disks to be added to the fast recovery area, and click **OK**.

4. The Diskgroup Creation window opens to inform you when the disk group creation is complete. Click **OK**.

5. Click **Exit**.

---

**See Also:**

- *Oracle Database Backup and Recovery User’s Guide*
- *Oracle Automatic Storage Management Administrator’s Guide*

---

### Enabling and Disabling Database Options After Installation

When you install Oracle Database, some options are enabled and the others disabled. You can view the enabled Oracle Database options by querying the **V$OPTION** view using SQL*Plus.

---

**See Also:**

*Oracle Database Administrator’s Guide*

---

If you need to enable or disable a particular database feature for an Oracle home, then use the `chopt` tool. The `chopt` tool is a command-line utility that is located in the `ORACLE_HOME\bin` directory. The syntax for `chopt` is as follows:

```
chopt [ enable | disable ] db_option
```

The possible values for `db_option` described in the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>oaa</td>
<td>Oracle Advanced Analytics</td>
</tr>
</tbody>
</table>
Table 7-1  (Cont.) Database Options for Chopt Tool Command

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>olap</td>
<td>Oracle OLAP</td>
</tr>
<tr>
<td>rat</td>
<td>Oracle Real Application Testing</td>
</tr>
</tbody>
</table>

Example 7-4  Running the Chopt Tool

To enable the Oracle Data Mining RDBMS Files option in your Oracle binary files:

1. Shut down the database with `srvctl` or SQL*Plus:
   ```
srvctl stop database -d myDb
   ```

2. Stop the database service, `OracleServiceSID`, using the Services program in Control Panel.

3. Run the following commands:
   ```
cd ORACLE_HOME/bin
chopt enable rat
   ```

4. Start the database service, `OracleServiceSID`, using the Services program in Control Panel.

5. Start up the database:
   ```
srvctl start database -d myDb
   ```

Changing the Oracle Home User Password

Oracle Home User Control is a command-line utility that allows an administrator to update the password for an Oracle Home User.

This tool updates the password for Windows services in the Oracle home. The input password must match the password for the Windows User Account used as the Oracle Home User. So, first use the Windows operating system tools to change the Windows password and then use this tool to update the Windows services in the Oracle home to use the same password.

>Note:

You must have the Administrator privileges to run this Oracle Home User Control utility.

Syntax Overview:

The following is the command syntax:

```
orahomeuserctl list | updpwd [-user username] [-host hostname1, hostname2, ..] [-log logfilename]
```
where:

- `orahomeuserctl` is used to display the Oracle Home User name associated with the current Oracle home or to update the Oracle Home User password.

- `list` displays the Oracle Home User name associated with the current Oracle home.

- `updpwd` prompts for the new password and updates the password for the named Oracle Service User. The following are the options for `updpwd`:
  
  - `-user username`
    
    This option determines the Oracle Home User name. If this option is not present, then the user name associated with the current Oracle home is used. If the named user, be it the username or user of the current Oracle home, is an MSA or Windows Built-in account, then an error message is displayed and the command is terminated.

  - `-host hostname1, hostname2,...`
    
    When this option is present, the utility updates the passwords for all the services belonging to the named Oracle Home User on the specified hosts. Otherwise, the Oracle Home User Control utility updates the passwords for all the services belonging to the named Oracle Home User on a specified host with single instance installation, or updates the passwords for all services belonging to the named Oracle Home User on all the specified hosts.

    When the update completes, the utility displays the number of successful updates and any services that failed to update with the new password.

  - `-log logfilename`
    
    This option adds the password update operation results to a log file for every service name receiving the new password. By default, the log files are located in the `ORACLE_HOME\log` directory. If `logfilename` specifies only a file name, then the log is stored in the named file in the default directory. However, if the `logfilename` contains a path, then that path is used without modification.
Learn how to check the installed contents, start various tools, identify, and locate various files after completing Oracle Database installation.

- **Checking the Installed Oracle Database Contents and Directory Location**
  Use Oracle Universal Installer to check the contents and directory location of your Oracle Database installation.

- **Logging In to Oracle Enterprise Manager Database Express 19c**
  To start Oracle Enterprise Manager Database Express, use the EM Express URL provided by Oracle Database Configuration Assistant (Oracle DBCA) during the database installation and creation.

- **Managing Oracle Automatic Storage Management**
  Describes about starting and stopping Oracle Automatic Storage Management.

- **Starting and Stopping an Oracle Database**
  Describes about starting and stopping an Oracle database by using any of the following methods:

- **Accessing Oracle Database with SQL*Plus**
  You can use SQL*Plus to issue SQL and PL/SQL statements to the Oracle Database.

- **Accessing Oracle Database with Oracle SQL Developer**
  You can use SQL Developer to issue SQL and PL/SQL statements. All SQL and PL/SQL commands are supported as they are passed directly from the SQL Worksheet to the Oracle Database.

- **Reviewing User Accounts and Passwords**
  All databases created by the Oracle Database Configuration Assistant include the SYS, SYSTEM, and DBSNMP database accounts.

- **Identifying Databases**
  The Oracle Database software identifies a database by its global database name.

- **Locating the Server Parameter File**
  The starter database contains one database initialization response file. The initialization response file, init.ora.xxx, must exist for an instance to start.

- **Identifying Tablespaces and Data Files**
  An Oracle Database is divided into smaller logical areas of space known as tablespaces.

- **Locating Redo Log Files**
  The preconfigured database uses three redo log files. Redo log files record all changes made to data in the database buffer cache.

- **Locating Control Files**
  The preconfigured database contains two control files located in the ORACLE_BASE \oradata\DB_NAME directory.
Understanding Oracle Database Services on Windows
The following Oracle services are automatically started after installation when you create a database:

Checking the Installed Oracle Database Contents and Directory Location

Use Oracle Universal Installer to check the contents and directory location of your Oracle Database installation.

Follow these steps:

1. From the Start menu, select All Programs, then Oracle - HOMENAME, then Oracle Installation Products, then Universal Installer.
2. In the Welcome window, click Installed Products to display the Inventory dialog box.
3. To check the installed contents, find the Oracle Database product in the list. To find additional information about an installed product, click Details.
4. To check the directory location of the installed contents, click the Environment tab.
5. Click Close to exit the Inventory dialog box.
6. Click Cancel to exit Oracle Universal Installer, then click Yes to confirm.

Logging In to Oracle Enterprise Manager Database Express 19c

To start Oracle Enterprise Manager Database Express, use the EM Express URL provided by Oracle Database Configuration Assistant (Oracle DBCA) during the database installation and creation.

If Oracle DBCA did not provide the EM Express URL during the database installation and creation, or if you need to change the EM Express port later on, then see the following:

See Also:

- Oracle Database 2 Day DBA for information about “Starting EM Express”
- Oracle Database 2 Day DBA for information about “Accessing the Database Home Page”
- Oracle Database 2 Day DBA for information about “Configuring the HTTP Port for EM Express”
Managing Oracle Automatic Storage Management

Describes about starting and stopping Oracle Automatic Storage Management.

- **Starting and Stopping Oracle Automatic Storage Management**
  To start and stop Oracle Automatic Storage Management, in addition to using SQL*Plus, you can use the `srvctl` utility.

- **Oracle Automatic Storage Management Utilities**
  To manage Oracle Automatic Storage Management, you can use the following tools:

## Starting and Stopping Oracle Automatic Storage Management

To start and stop Oracle Automatic Storage Management, in addition to using SQL*Plus, you can use the `srvctl` utility.

To start Oracle Automatic Storage Management instance using the `srvctl` utility, run the following command:

```
srvctl start asm
```

To stop Oracle Automatic Storage Management instance using the `srvctl` utility, run the following command:

```
srvctl stop asm
```

### See Also:

*Oracle Automatic Storage Management Administrator's Guide*

## Oracle Automatic Storage Management Utilities

To manage Oracle Automatic Storage Management, you can use the following tools:

- **asmcmd**: This command-line tool lets you manage Oracle Automatic Storage Management disk group files and directories.

- **asmttoll**: This command-line tool is required to stamp the disks to create or modify disk groups later on after the database installation.

- **Oracle Automatic Storage Management Configuration Assistant**: Oracle Automatic Storage Management Configuration Assistant (ASMCA) is an interactive utility that enables you to create an Oracle Automatic Storage Management instance or upgrade existing Oracle Automatic Storage Management instances. It also enables you to create and configure disk groups, Oracle Automatic Storage
Management volumes and Oracle Automatic Storage Management File Systems (ASMFS).

- Oracle Enterprise Manager Cloud Control: If you have Oracle Enterprise Manager installed, you can use Cloud Control to manage Oracle ASM functions, such as migrating an existing database to Oracle ASM, checking the status of the Oracle ASM instance, checking the performance of the Oracle ASM disk groups, and creating or dropping Oracle ASM disk groups.

- Oracle Enterprise Manager Database Express 19c. This utility enables you to perform basic administrative tasks such as user, performance, memory, and space management.

- SQL*Plus: You can use Oracle Automatic Storage Management-specific commands from this tool. To connect to the Oracle Automatic Storage Management instance, you use the same methods that you use to connect to an Oracle Database instance.

See Also:
Oracle Automatic Storage Management Administrator's Guide

Starting and Stopping an Oracle Database

Describes about starting and stopping an Oracle database by using any of the following methods:

- Starting and Stopping the Database from the Microsoft Windows Services Utility
  You can use SQL or srvctl utility to start or stop the database instance. SRVCTL starts the service automatically.

Starting and Stopping the Database from the Microsoft Windows Services Utility

You can use SQL or srvctl utility to start or stop the database instance. SRVCTL starts the service automatically.

To use SQL to start the database instance, start the Windows services:

1. From the Start menu, select All Programs, then Administrative Tools, and then Services.
2. In the Services dialog box, locate the name of the database you want to start or stop.
3. Right-click the name of the database, and from the menu, select either Start, Stop, or Pause.

To set its startup properties, right-click Properties, and in the dialog box, select either Automatic, Manual, or Disabled from the Startup type list.
Accessing Oracle Database with SQL*Plus

You can use SQL*Plus to issue SQL and PL/SQL statements to the Oracle Database. This tool enables you to perform the same database management operations, and query, insert, update, or delete data directly in the database.

To start SQL*Plus, from the Start menu, select All Programs, then Oracle - HOMENAME, then Application Development, and then SQL Plus.

Alternatively, at the command line, you can enter the following command at a Windows command prompt:

```
C:\> sqlplus /nolog
SQL> CONNECT user_name
Enter password: password
```

For example, to log on as SYSTEM using the password password, you enter:

```
C:\> sqlplus /nolog
SQL> CONNECT SYSTEM
Enter password: password
```

If you are logging on as SYS, you must connect as SYSDBA:

```
C:\> sqlplus /nolog
SQL> CONNECT SYS AS SYSDBA
Enter password: password
```

See Also:

- SQL*Plus User's Guide and Reference
- SQL*Plus Quick Reference
- Oracle Database Administrator's Guide

Accessing Oracle Database with Oracle SQL Developer

You can use SQL Developer to issue SQL and PL/SQL statements. All SQL and PL/SQL commands are supported as they are passed directly from the SQL Worksheet to the Oracle Database.

All SQL and PL/SQL commands are supported as they are passed directly from the SQL Worksheet to the Oracle Database.

To start SQL Developer:

1. From the Start menu, select All Programs, then Oracle - HOMENAME, then Application Development, and then SQL Developer.
2. If you are prompted to enter the full path name for java.exe, click Browse and find java.exe. For example, C:\Program Files\Java\jdk1.6.0_25\bin\java.exe.
3. Once SQL Developer starts, perform the following steps:
Right-click **Connections**.

Select **New Connection**.

In the New/Select Database Connection dialog box, enter a Connection name, username, password, and for the host string, the name of the database to which you want to connect.

Click **Connect**.

Once connected, you can view, create, modify, and delete the database objects using the Connection Navigator or issue any SQL or PL/SQL command using a SQL Worksheet (From the **Tools** menu, select **SQL Worksheet**).

SQL*Plus commands have to be interpreted by the SQL Worksheet before being passed to the database. The SQL Worksheet currently supports many SQL*Plus commands. SQL*Plus commands which are not supported by the SQL Worksheet are ignored and are not sent to the Oracle Database.

### See Also:

*Oracle SQL Developer User's Guide*

---

# Reviewing User Accounts and Passwords

All databases created by the Oracle Database Configuration Assistant include the **SYS**, **SYSTEM**, and **DBSNMP** database accounts.

In addition, Oracle provides several other administrative accounts. Before using these other accounts, you must unlock them and reset their passwords.

### Note:

Use Oracle Enterprise Manager Database Express 18c to view the complete list of database accounts.

---

- **Oracle Database System Privileges Accounts and Passwords**
  Review these system privileges accounts after installation in preparation for unlocking accounts and changing passwords.

- **Unlocking and Resetting User Passwords**
  Passwords for all Oracle system administration accounts except **SYS**, **SYSTEM**, and **DBSNMP** are revoked after installation.

### See Also:

*Oracle Database Administrator's Guide*
Oracle Database System Privileges Accounts and Passwords

Review these system privileges accounts after installation in preparation for unlocking accounts and changing passwords.

All databases created by the Database Configuration Assistant (DBCA) include the SYS, SYSTEM, and DBSNMP database accounts. In addition, Oracle Database provides several other administrative accounts. Before using these accounts, you must unlock them and reset their passwords.

Starting with Oracle Database 12c Release 2 (12.2), only the HR sample schema is automatically installed after a database installation. All sample schemas, including HR, are distributed on GitHub:

https://github.com/oracle/db-sample-schemas

Note:
This list contains some of the important system privileges user accounts, but it is not complete. Use Oracle Enterprise Manager Database Express 12c to view the complete list of database accounts.

Table 8-1 Partial List of Oracle Database System Privileges Accounts Locked After Installation

<table>
<thead>
<tr>
<th>User Name</th>
<th>Description</th>
<th>For More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANONYMOUS</td>
<td>Enables HTTP access to Oracle XML DB.</td>
<td>Oracle XML DB Developer’s Guide</td>
</tr>
<tr>
<td>APEX_050100</td>
<td>The account that owns the Oracle Application Express schema and metadata.</td>
<td>Oracle Application Express App Builder User’s Guide</td>
</tr>
<tr>
<td>APEX_PUBLIC_USER</td>
<td>The minimally privileged account used for Oracle Application Express configuration with Oracle Application Express Listener or Oracle HTTP Server and mod_plsql.</td>
<td>Oracle Application Express App Builder User’s Guide</td>
</tr>
<tr>
<td>APPQOSSYS</td>
<td>Used for storing and managing all data and metadata required by Oracle Quality of Service Management.</td>
<td>None</td>
</tr>
<tr>
<td>AUDSYS</td>
<td>The account where the unified audit data trail resides.</td>
<td>Oracle Database Security Guide</td>
</tr>
<tr>
<td>CTXSYS</td>
<td>The Oracle Text account.</td>
<td>Oracle Text Application Developer’s Guide</td>
</tr>
<tr>
<td>DBFWUSER</td>
<td>The account used to run the DBMS_SFW_ACL_ADMIN package.</td>
<td>Oracle Database PL/SQL Packages and Types Reference</td>
</tr>
<tr>
<td>DBSNMP</td>
<td>The account used by the Management Agent component of Oracle Enterprise Manager to monitor and manage the database.</td>
<td>Oracle Enterprise Manager Cloud Control Administrator’s Guide</td>
</tr>
<tr>
<td>User Name</td>
<td>Description</td>
<td>For More Information</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>DIP</td>
<td>The account used by the Directory Integration Platform (DIP) to synchronize the changes in Oracle Internet Directory with the applications in the database.</td>
<td>None</td>
</tr>
<tr>
<td>DVSYS</td>
<td>There are two roles associated with this account. The Database Vault owner role manages the Database Vault roles and configurations. The Database Vault Account Manager is used to manage database user accounts.</td>
<td>Oracle Database Vault Administrator’s Guide</td>
</tr>
<tr>
<td>DVF</td>
<td>The account owned by Database Vault that contains public functions to retrieve the Database Vault Factor values.</td>
<td>Oracle Database Vault Administrator’s Guide</td>
</tr>
<tr>
<td>FLOWS_FILES</td>
<td>The account owns the Oracle Application Express uploaded files.</td>
<td>Oracle Application Express App Builder User’s Guide</td>
</tr>
<tr>
<td>GGSYS</td>
<td>The internal account used by Oracle GoldenGate. It should not be unlocked or used for a database login.</td>
<td>None</td>
</tr>
<tr>
<td>GSMADMIN_INTERNALSES</td>
<td>The internal account that owns the Global Data Services schema. It should not be unlocked or used for a database login.</td>
<td>Oracle Database Global Data Services Concepts and Administration Guide</td>
</tr>
<tr>
<td>GSMCATUSER</td>
<td>The account used by Global Service Manager to connect to the Global Data Services catalog.</td>
<td>Oracle Database Global Data Services Concepts and Administration Guide</td>
</tr>
<tr>
<td>GSMUSER</td>
<td>The account used by Global Service Manager to connect to the database.</td>
<td>Oracle Database Global Data Services Concepts and Administration Guide</td>
</tr>
<tr>
<td>HR</td>
<td>The account that owns the Human Resources schema included in the Oracle Sample Schemas.</td>
<td>Oracle Database Sample Schemas</td>
</tr>
<tr>
<td>LBACSYS</td>
<td>The Oracle Label Security administrator account. Starting with Oracle Database 18c, the LBACSYS user account is created as a schema-only account.</td>
<td>Oracle Label Security Administrator’s Guide</td>
</tr>
<tr>
<td>MDDATA</td>
<td>The schema used by Oracle Spatial and Graph for storing geocoder and router data.</td>
<td>Oracle Spatial and Graph Developer’s Guide</td>
</tr>
<tr>
<td>MDSYS</td>
<td>The Oracle Spatial and Graph administrator account.</td>
<td>Oracle Spatial and Graph Developer’s Guide</td>
</tr>
<tr>
<td>User Name</td>
<td>Description</td>
<td>For More Information</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>OUTLN</td>
<td>The account that supports plan stability. Plan stability enables you to maintain the same execution plans for the same SQL statements. OUTLN acts as a role to centrally manage metadata associated with stored outlines.</td>
<td>None</td>
</tr>
<tr>
<td>ORACLE_OCM</td>
<td>This account contains the instrumentation for configuration collection used by the Oracle Configuration Manager.</td>
<td>None</td>
</tr>
<tr>
<td>REMOTE_SCHEDULER_AGENT</td>
<td>The account to disable remote jobs on a database. This account is created during the remote scheduler agent configuration. You can disable the capability of a database to run remote jobs by dropping this user.</td>
<td>Oracle Database Administrator’s Guide</td>
</tr>
<tr>
<td>SYS</td>
<td>The account used to perform database administration tasks.</td>
<td>Oracle Database Administrator’s Guide</td>
</tr>
<tr>
<td>SYSTEM</td>
<td>Another account used to perform database administration tasks.</td>
<td>Oracle Database Administrator’s Guide</td>
</tr>
<tr>
<td>SYSBACKUP</td>
<td>The account used to perform backup and recovery tasks.</td>
<td>Oracle Database Administrator’s Guide</td>
</tr>
<tr>
<td>SYSKM</td>
<td>The account used to perform encryption key management.</td>
<td>Oracle Database Administrator’s Guide</td>
</tr>
<tr>
<td>SYSDG</td>
<td>The account used to administer and monitor Oracle Data Guard.</td>
<td>Oracle Database Administrator’s Guide</td>
</tr>
<tr>
<td>SYSRAC</td>
<td>The account used to administer Oracle Real Application Clusters (RAC).</td>
<td>Oracle Database Administrator’s Guide</td>
</tr>
<tr>
<td>SYS$UMF</td>
<td>The account used to administer Remote Management Framework, including the remote Automatic Workload Repository (AWR).</td>
<td>Oracle Database Performance Tuning Guide</td>
</tr>
<tr>
<td>WMSYS</td>
<td>The account used to store the metadata information for Oracle Workspace Manager.</td>
<td>Oracle Database Workspace Manager Developer’s Guide</td>
</tr>
<tr>
<td>XDB</td>
<td>The account used for storing Oracle XML DB data and metadata.</td>
<td>Oracle XML DB Developer’s Guide</td>
</tr>
<tr>
<td>XS$NULL</td>
<td>The internal account that represents the absence of a database schema user in a session, and indicates an application user session is in use. XS$NULL cannot be authenticated to a database, nor can it own any database schema objects, or possess any database privileges.</td>
<td>Oracle Database Real Application Security Administrator’s and Developer’s Guide</td>
</tr>
</tbody>
</table>

Except for the accounts provided with the Oracle Sample Schemas, most of these database accounts are locked by default and created without passwords as schema only. This prevents malicious users from logging into these accounts using the default password set during catalog creation. To find the status of an account, query the
AUTHENTICATION_TYPE column of the DBA_USERS data dictionary view. If AUTHENTICATION_TYPE is schema only, then the status is NONE.

Many of these accounts are automatically created when you run standard scripts such as the various cat*.sql scripts. To find user accounts that are created and maintained by Oracle, query the USERNAME and ORACLE_MAINTAINED columns of the ALL_USERS data dictionary view. If the output for ORACLE_MAINTAINED is Y, then you must not modify the user account except by running the script that was used to create it.

Related Topics
- Oracle Database Security Guide
- Oracle Database Sample Schemas

Unlocking and Resetting User Passwords

Passwords for all Oracle system administration accounts except SYS, SYSTEM, and DBSNMP are revoked after installation.

Before you use a locked account, you must unlock it and reset its password. If you created a preconfigured database during the installation, but you did not unlock accounts required to use the database, then you must unlock and reset those accounts using these procedures.

Apply the following guidelines when specifying passwords:

- Passwords must be between 8 and 30 characters long.
- Passwords must not start with a numeral.
- Password cannot contain invalid characters: ! @ % ^ & * ( ) + = \`~{[]}';":",< > ?
- Passwords must not be the same as the user name.
- Passwords must not be Oracle reserved words.
- The SYS account password cannot be change_on_install (case-insensitive)
- The SYSTEM account password cannot be manager (case-insensitive).
- The SYSMAN account password cannot be sysman (case-insensitive).
- The DBSNMP account password cannot be dbsnmp (case-insensitive).
- If you choose to use the same password for all the accounts, then that password cannot be change_on_install, manager, sysman, or dbsnmp (case-insensitive).
- Passwords must have at least one alphabetic, one numeric, and one special character.
- Passwords must not be simple or obvious words, such as welcome, account, database, and user.
Note:
If you select the option to create the database as a multitenant container database, then you must provide the pluggable database administrator password.

If you created a starter database during the installation, but you did not unlock the required account, unlock the account using one of the following methods:

- Using Enterprise Manager Database Express 19c to Unlock Accounts and Reset Passwords
  To unlock and reset user account passwords using Oracle Enterprise Manager Database Express 19c, click Help in the Oracle Enterprise Manager Database Express 18c window.

- Using SQL*Plus to Unlock and Change Passwords
  Use this SQL*Plus procedure to unlock and reset user account passwords.

See Also:
Oracle Database Administrator's Guide

Using Enterprise Manager Database Express 19c to Unlock Accounts and Reset Passwords
To unlock and reset user account passwords using Oracle Enterprise Manager Database Express 19c, click Help in the Oracle Enterprise Manager Database Express 18c window.

See Also:
Oracle Database 2 Day DBA

Using SQL*Plus to Unlock and Change Passwords
Use this SQL*Plus procedure to unlock and reset user account passwords.

To change a password after installation:

1. Start SQL*Plus:
   ```
   C:\> sqlplus /nolog
   ```

2. Connect as SYSDBA:
SQL> CONNECT SYS AS SYSDBA
Enter password: SYS_password

3. Enter a command similar to the following, where account is the user account to unlock and password is the new password:

   SQL> ALTER USER account IDENTIFIED BY password ACCOUNT UNLOCK;

---

See Also:

- Oracle Database Security Guide
- Oracle Database SQL Language Reference
- Oracle Database Administrator's Guide

---

Identifying Databases

The Oracle Database software identifies a database by its global database name.

A global database name consists of the database name and database domain. Usually, the database domain is the same as the network domain, but it need not be. The global database name uniquely distinguishes a database from any other database in the same network. You specify the global database name when you create a database during the installation, or when using Oracle Database Configuration Assistant.

The database name input field is used to set the DB_NAME, DB_UNIQUE_NAME, and DB_DOMAIN Oracle initialization parameter values.

For example:

sales_world.example.com

In this example:

- sales_world is the name of the database. The database name (DB_UNIQUE_NAME) portion is a string of no more than 30 characters that can contain ASCII alphanumeric, underscore (_), dollar ($), and pound (#) characters but must begin with an alphabetic character. No other special characters are permitted in a database name.

- sales_wo is the DB_NAME. The DB_NAME initialization parameter specifies a database identifier of up to eight characters.

- example.com is the network domain in which the database is located. Together, the database name and the network domain make the global database name unique. The domain portion is a string of no more than 128 characters that can contain alphanumeric, underscore (_), and pound (#) characters. The DB_DOMAIN initialization parameter specifies the domain name.

However, the DB_NAME parameter need not necessarily be the first eight characters of DB_UNIQUE_NAME.
The DB_UNIQUE_NAME parameter and the DB_DOMAIN name parameter combine to create the global database name value assigned to the SERVICE_NAMES parameter in the initialization parameter file.

The System Identifier (SID) identifies a specific database instance. The SID uniquely distinguishes the instance from any other instance on the same computer. Each database instance requires a unique SID and database name.

For example, if the SID and database name for an Oracle database are ORCL, then each database file is located in the ORACLE_BASE\oradata\orcl directory, and the initialization response file is located in the ORACLE_BASE\admin\orcl\pfile directory.

**See Also:**

*Oracle Database Reference*

---

### Locating the Server Parameter File

The starter database contains one database initialization response file. The initialization response file, init.ora.xxxxx, must exist for an instance to start.

A response file is a text file that contains a list of instance configuration parameters. The starter database init.ora file has preconfigured parameters. You must not edit this file to use the starter database.

The server parameter file (SPFILE) is created from the initialization response file, then the initialization response file is renamed. The SPFILE file name is spfileSID.ora and is located in the ORACLE_HOME\database directory.

To use Oracle Enterprise Manager Database Express 18c to view the location of the server parameter file and list the initialization parameters, see the "Viewing and Modifying Initialization Parameters" section in *Oracle Database 2 Day DBA*.

**See Also:**

Click Help in the Oracle Enterprise Manager Database Express 18c window for more information

**See Also:**

*Oracle Database 2 Day DBA*
### Identifying Tablespaces and Data Files

An Oracle Database is divided into smaller logical areas of space known as tablespaces.

Each tablespace corresponds to one or more physical data files. Data files contain the contents of logical database structures such as tables and indexes. A data file can be associated with only one tablespace and database.

**Note:**

The **SYSAUX** and **SYSTEM** tablespaces must be present in all Oracle Database 18c databases.

The following table lists the tablespaces and data files in the Oracle Database. By default, the data files are located in the `ORACLE_BASE\oradata\DB_NAME` directory:

#### Table 8-2 Tablespaces and Data Files

<table>
<thead>
<tr>
<th>Tablespace</th>
<th>Data File</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXAMPLE</td>
<td>EXAMPLE01.DBF</td>
<td>Stores the Sample Schemas, if you included them.</td>
</tr>
<tr>
<td>SYSAUX</td>
<td>SYSAUX01.DBF</td>
<td>Serves as an auxiliary tablespace to the <strong>SYSTEM</strong> tablespace. Some products and options that previously used the <strong>SYSTEM</strong> tablespace now use the <strong>SYSAUX</strong> tablespace to reduce the load on the <strong>SYSTEM</strong> tablespace.</td>
</tr>
<tr>
<td>SYSTEM</td>
<td>SYSTEM01.DBF</td>
<td>Stores the data dictionary, including definitions of tables, views, and stored procedures needed by the Oracle Database. Information in this area is maintained automatically.</td>
</tr>
<tr>
<td>TEMP</td>
<td>TEMP01.DBF</td>
<td>Stores temporary tables and indexes created during the processing of your SQL statement. If you run a SQL statement that involves a lot of sorting, such as the constructs GROUP BY, ORDER BY, or DISTINCT, then you must expand this tablespace.</td>
</tr>
<tr>
<td>UNDOTBS</td>
<td>UNDOTBS01.DBF</td>
<td>Stores undo information. This contains one or more undo segments that maintain transaction history that is used to roll back, or undo, changes to the database. All starter databases are configured to run in automatic undo management mode.</td>
</tr>
<tr>
<td>USERS</td>
<td>USERS01.DBF</td>
<td>Stores database objects created by database users.</td>
</tr>
</tbody>
</table>
Locating Redo Log Files

The preconfigured database uses three redo log files. Redo log files record all changes made to data in the database buffer cache.

If an instance fails, then Oracle Database uses the redo log files to recover the modified data in memory.

Oracle Database uses redo log files in a cyclical fashion. For example, if three files constitute the online redo log, Oracle Database fills the first file, then the second file, and then the third file. In the next cycle, it reuses and fills the first file, the second file, and so on.

Locating Control Files

The preconfigured database contains two control files located in the ORACLE_BASE \oradata\DB_NAME directory.

The preconfigured database contains two control files located in the ORACLE_BASE \oradata\DB_NAME directory. Oracle recommends that you keep at least two control files (on separate physical drives) for each database, and set the CONTROL_FILES initialization parameter to list each control file.

A control file is an administrative file. Oracle Database requires a control file to start and run the database. The control file defines the physical structure of the database. For example, it defines the database name and the names and locations of the database data files and redo log files.
For more information about using Oracle Enterprise Manager Database Express to perform various tasks related to tablespaces and data files, redo log files, and control files, click Help in the Oracle Enterprise Manager Database Express window.

Understanding Oracle Database Services on Windows

The following Oracle services are automatically started after installation when you create a database:

- OracleServiceSID (Oracle Database service)
- OracleHOMENAME_TNSListener (Oracle Database listener service)

If you configured Oracle Automatic Storage Management, then the OracleOHService and OracleASMService+ASM services are listed as well. However, other services for networking or other individual components may not automatically start.
Removing Oracle Database Software

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

Use the `deinstall` command that is included in Oracle homes to remove Oracle software. 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 you have multiple databases with the same global database name (GDN), then you cannot use the deinstallation tool to remove one database only.

- **About Oracle Deinstallation Options**
  The `deinstall.bat` command stops Oracle software, and removes Oracle software and configuration files on the operating system.

- **Files Deleted by the Deinstall Command**
  The `deinstall` command removes Oracle software and files from your system.

- **Deinstallation Examples for Oracle Database**
  Use these examples to help you understand how to run the `deinstall` command.

### See Also:
- *Oracle Grid Infrastructure Installation and Upgrade Guide for Microsoft Windows x64 (64-Bit)*
- *Oracle Real Application Clusters Installation Guide for Microsoft Windows x64 (64-Bit)*
- *Oracle Automatic Storage Management Administrator’s Guide*

---

**About Oracle Deinstallation Options**

The `deinstall.bat` command stops Oracle software, and removes Oracle software and configuration files on the operating system.

You can remove the following software using `deinstall`:

- **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

The deinstall command is available in Oracle home directories after installation. It is located in the `ORACLE_HOME\deinstall` directory.

The deinstallation tool uses the information you provide, plus information gathered from the software home to create a response file. You can alternatively supply a response file generated previously by the `deinstall` command using the `-checkonly` option, or by editing the response file template.

**Note:**

- You must run the `deinstall` command from the same release to remove Oracle software. Do not run the `deinstall` command from a later release to remove Oracle software from an earlier release. For example, do not run the `deinstall` command from the 19c Oracle home to remove Oracle software from an existing 12.2 Oracle home.
- Starting with Oracle Database 12c Release 1 (12.1.0.2), the `roothas.bat` script replaces the `roothas.pl` script in the Oracle Grid Infrastructure home for Oracle Restart, and the `rootcrs.bat` 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 `deinstall` 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.

**See Also:**

*Oracle Real Application Clusters Installation Guide for Microsoft Windows x64 (64-Bit)* for information about the `-local` option

**Files Deleted by the Deinstall Command**

The `deinstall` command removes Oracle software and files from your system.

When you run `deinstall`, if the central inventory (Inventory) contains no other registered homes besides the home that you are deconfiguring and removing, then the
**deinstall** 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 **deinstall** deletes this data.

**Caution:**

The **deinstall** command 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.

---

**Deinstallation Examples for Oracle Database**

Use these examples to help you understand how to run the **deinstall** command.

Run **deinstall** from the `ORACLE_HOME\deinstall` directory. The deinstallation starts without prompting you for the Oracle home path.

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

In the following example, the **deinstall** command is in the path `C:\app\oracle\product\19.0.0\dbhome_1\deinstall`, and it uses a response file in the software owner location `C:\Documents and Settings\oracle`:

```plaintext
DRIVE_LETTER:\> cd \app\oracle\product\19.0.0\dbhome_1\deinstall
DRIVE_LETTER:\> deinstall.bat -paramfile %HOMEPATH%\my_db_paramfile.tmpl
```

For the grid infrastructure home, use (**deinstall.bat**) in the Oracle Grid Infrastructure home. In this example, the Oracle Grid Infrastructure home is `C:\app\oracle\product\19.0.0\grid`:

```plaintext
DRIVE_LETTER:\> cd \app\oracle\product\19.0.0\grid\deinstall
DRIVE_LETTER:\> deinstall.bat -paramfile %HOMEPATH%\my_grid_paramfile.tmpl
```

- **Downgrading Oracle Restart**
  Use this procedure to deconfigure and downgrade Oracle Restart, or to troubleshoot Oracle Restart if you receive an error during installation.
Downgrading Oracle Restart

Use this procedure to deconfigure and downgrade Oracle Restart, or to troubleshoot Oracle Restart if you receive an error during installation.

To downgrade Oracle Restart, you must first downgrade Oracle Database, deconfigure Oracle Restart, and then reconfigure Oracle Restart.

Also, running the `perl.exe roothas.pl-deconfig -force` with the command flags `deconfig -force` enables you to deconfigure Oracle Restart without removing the installed binaries. By running `perl.exe roothas.pl-deconfig -force`, you can deconfigure Oracle Restart.

**Note:**

Stop any databases, services, and listeners that may be installed and running before deconfiguring and downgrading Oracle Restart.

1. Log in as a member of the Administrators group and go to the directory `Grid_home\bin`, where `Grid_home` is the path to the Oracle Restart home.
2. Downgrade the Oracle Restart resources:
   
   `srvctl downgrad e database -d db_unique_name -o oracle_home -t to_version`
3. Go to the `Grid_home\crs\install` directory:
   
   `C: \app\oracle\product\19.0.0\grid\crs\install`
4. Run `perl.exe roothas.pl -deconfig -force` with the `-deconfig -force` flags to deconfigure Oracle Restart.
   
   `roothas.pl -deconfig -force`
5. Deinstall Oracle Restart using the `deinstall` command.
6. Run `perl.exe root.pl` manually in the earlier release Oracle Restart home to configure Oracle Restart.
   
   If you do not have an earlier release Oracle Restart on your system, then perform an Oracle Restart installation for the respective release to install Oracle Restart.
Installing Java Access Bridge

Learn how to install Java Access Bridge 2.0.2. Java Access Bridge 2.0.2 enables use of a screen reader with Oracle components:

- **Overview of Java Access Bridge 2.0.2**
  Java Access Bridge 2.0.2 enables assistive technologies to read Java applications running on the Windows platform.

- **Setting Up Java Access Bridge 2.0.2**
  Learn how to install and configure Java Access Bridge 2.0.2 for Windows after installing Oracle components.

**Overview of Java Access Bridge 2.0.2**

Java Access Bridge 2.0.2 enables assistive technologies to read Java applications running on the Windows platform.

Assistive technologies can read Java-based interfaces, such as Oracle Universal Installer and Oracle Enterprise Manager Database Express.

For a list of supported system configurations, including supported versions of Microsoft Windows and Java SE, see section "Supported System Configuration" available at the following link location:

http://docs.oracle.com

During installation, Oracle Universal Installer uses the Java Runtime Environment (JRE) 1.8 contained in an Oracle Database installation media. The JRE enables the use of Java Access Bridge during installation.

**Setting Up Java Access Bridge 2.0.2**

Learn how to install and configure Java Access Bridge 2.0.2 for Windows after installing Oracle components.

To set up Java Access Bridge 2.0.2 on a Windows 64-bit operating system, follow these steps:

1. Go to Java Standard Edition 2 (Java SE) Downloads page to download the latest build of JDK 8:
   http://docs.oracle.com

2. Install JDK 8 after accepting the Oracle license agreement.
You must have administrator privileges to install JDK on Windows.

3. Download and install screen reader, JAWS:

4. Press Windows key+U to open the Ease of Access Center, and select **Use the computer without a display**.

5. Select **Enable Accessbridge** check box. Click **Save** to save the changes.

6. Download Java Access Bridge 2.0.2:
   http://docs.oracle.com

   Download the `accessbridge-2_0_2-fcs-bin-b06.zip` file, after accepting the Oracle license agreement.

7. Extract `accessbridge-2.0.2` to a directory on your system where you plan to install Java Access Bridge. For example, name the directory as follows:
   
   `AB_HOME`

8. Copy `AB_HOME\WindowsAccessBridge-64.dll` to `c:\windows\system32` and start the screen reader.

9. Open the command prompt and navigate to `setup.exe` file.

10. Run the following command once you are in the `Disk1` directory:

    `setup.exe`

    Oracle Universal Installer starts and JAWS is able to read all prompts and controls on the screen.

11. Once you click the **Install** button, you must open Windows Explorer to see the directory where the database is installed (`DRIVE LETTER:\app\username\product\19.0.0\dbhome_1`), until the JDK folder is created. Once the JDK folder is created, you must copy the files from the Java Access Bridge source location to the JDK destination folder. Copying these files enables accessibility for both the Oracle Database Configuration Assistant and Oracle Net Configuration Assistant.

### Table A-1  Copy Files to JDK Directory on Windows 64-Bit

<table>
<thead>
<tr>
<th>Copy</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>AB_HOME\JavaAccessBridge-64.dll</code></td>
<td><code>dbhome_1\jdk\jre\bin</code></td>
</tr>
<tr>
<td><code>AB_HOME\JAWTAccessBridge-64.dll</code></td>
<td><code>dbhome_1\jdk\jre\bin</code></td>
</tr>
<tr>
<td><code>AB_HOME\Accessibility.properties</code></td>
<td><code>dbhome_1\jdk\jre\lib</code></td>
</tr>
<tr>
<td><code>AB_HOME\Access-bridge-64.jar</code></td>
<td><code>dbhome_1\jdk\jre\lib\ext</code></td>
</tr>
<tr>
<td><code>AB_HOME\jaccess.jar</code></td>
<td><code>dbhome_1\jdk\jre\lib\ext</code></td>
</tr>
</tbody>
</table>
Optimal Flexible Architecture

Oracle Optimal Flexible Architecture (OFA) rules are a set of configuration guidelines created to ensure well-organized Oracle installations, which simplifies administration, support and maintenance.

- **About the Optimal Flexible Architecture Standard**
  Oracle Optimal Flexible Architecture (OFA) rules help you to organize database software and configure databases to allow multiple databases, of different versions, owned by different users to coexist.

- **About Multiple Oracle Homes Support**
  Oracle Database supports multiple Oracle homes. You can install this release or earlier releases of the software more than once on the same system, in different Oracle home directories.

- **Oracle Base Directory Naming Convention**
  This section describes what the Oracle base is, and how it functions.

- **Oracle Home Directory Naming Convention**
  By default, Oracle Universal Installer configures Oracle home directories using these Oracle Optimal Flexible Architecture conventions.

- **Optimal Flexible Architecture File Path Examples**
  This topic shows examples of hierarchical file mappings of an Optimal Flexible Architecture-compliant installation.

About the Optimal Flexible Architecture Standard

Oracle Optimal Flexible Architecture (OFA) rules help you to organize database software and configure databases to allow multiple databases, of different versions, owned by different users to coexist.

In earlier Oracle Database releases, the OFA rules provided optimal system performance by isolating fragmentation and minimizing contention. In current releases, OFA rules provide consistency in database management and support, and simplifies expanding or adding databases, or adding additional hardware.

By default, Oracle Universal Installer places Oracle Database components in directory locations and with permissions in compliance with OFA rules. Oracle recommends that you configure all Oracle components on the installation media in accordance with OFA guidelines.

Oracle recommends that you accept the OFA default. Following OFA rules is especially of value if the database is large, or if you plan to have multiple databases.
About Multiple Oracle Homes Support

Oracle Database supports multiple Oracle homes. You can install this release or earlier releases of the software more than once on the same system, in different Oracle home directories.

Careful selection of mount point names can make Oracle software easier to administer. Configuring multiple Oracle homes in compliance with Optimal Flexible Architecture (OFA) rules provides the following advantages:

- You can install this release, or earlier releases of the software, more than once on the same system, in different Oracle home directories. However, you cannot install products from one release of Oracle Database into an Oracle home directory of a different release. For example, you cannot install Oracle Database 19c software into an existing Oracle 18c Oracle home directory.
- Multiple databases, of different versions, owned by different users can coexist concurrently.
- You must install a new Oracle Database release in a new Oracle home that is separate from earlier releases of Oracle Database.

You cannot install multiple releases in one Oracle home. Oracle recommends that you create a separate Oracle Database Oracle home for each release, in accordance with the Optimal Flexible Architecture (OFA) guidelines.

- In production, the Oracle Database server software release must be the same as the Oracle Database dictionary release through the first four digits (the major, maintenance, and patch release number).
- Later Oracle Database releases can access earlier Oracle Database releases. However, this access is only for upgrades. For example, Oracle Database 19c can access an Oracle Database 18c if the 18c database is started up in upgrade mode.
- Oracle Database Client can be installed in the same Oracle Database home if both products are at the same release level. For example, you can install Oracle Database Client 12.2.0.1 into an existing Oracle Database 12.2.0.1 home but you cannot install Oracle Database Client 12.2.0.1 into an existing Oracle Database 12.1.0.2 home. If you apply a patch set before installing the client, then you must apply the patch set again.
- Structured organization of directories and files, and consistent naming for database files simplify database administration.
- Login home directories are not at risk when database administrators add, move, or delete Oracle home directories.
- You can test software upgrades in an Oracle home in a separate directory from the Oracle home where your production database is located.
Oracle Base Directory Naming Convention

This section describes what the Oracle base is, and how it functions.

The Oracle Base directory is the database home directory for Oracle Database installation owners and the log file location for Oracle Grid Infrastructure owners. You should name Oracle base directories using the syntax `pm\h\u`, where `pm` is a string mount point name, `h` is selected from a small set of standard directory names, and `u` is the name of the owner of the directory.

You can use the same Oracle base directory for multiple installations. If different operating system users install Oracle software on the same system, then you must create a separate Oracle base directory for each installation owner. For ease of administration, Oracle recommends that you create a unique owner for each Oracle software installation owner, to separate log files.

Because all Oracle installation owners write to the central Oracle inventory file, and that file mount point is in the same mount point path as the initial Oracle installation, Oracle recommends that you use the same `pm\h` path for all Oracle installation owners.

<table>
<thead>
<tr>
<th>Example</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>C:\app\oracle</code></td>
<td>Oracle base directory for Oracle Database, where the Oracle Database software installation owner name is <code>oracle</code>. The Oracle Database binary home is located underneath the Oracle base path.</td>
</tr>
<tr>
<td><code>C:\app\grid</code></td>
<td>Oracle base directory for Oracle Grid Infrastructure, where the Oracle Grid Infrastructure software installation owner name is <code>grid</code>.</td>
</tr>
</tbody>
</table>

**Caution:**

The Oracle Grid Infrastructure Oracle base should not contain the Oracle Grid Infrastructure binaries for an Oracle Grid Infrastructure for a cluster installation. Permissions for the file path to the Oracle Grid Infrastructure binary home is changed to `LocalSystem` or the Oracle Home User, if specified, during installation.

Oracle Home Directory Naming Convention

By default, Oracle Universal Installer configures Oracle home directories using these Oracle Optimal Flexible Architecture conventions.

The directory pattern syntax for Oracle homes is `pm\s\u\product\v\type_[n]`. The following table describes the variables used in this syntax:
Variable Description
---
*pm* | A mount point name.
*s* | A standard directory name.
*u* | The name of the owner of the directory.
*v* | The version of the software.
*type* | The type of installation. For example: Database (*dbhome*), Client (*client*), or Oracle Grid Infrastructure (*grid*).
*n* | An optional counter, which enables you to install the same product more than once in the same Oracle base directory. For example: Database 1 and Database 2 (*dbhome_1*, *dbhome_2*).

For example, the following path is typical for the first installation of Oracle Database on this system:

C:\app\oracle\product\19.0.0\dbhome_1

### Optimal Flexible Architecture File Path Examples

This topic shows examples of hierarchical file mappings of an Optimal Flexible Architecture-compliant installation.

D:\E:\F:\

**Note:**

- The Grid homes are examples of Grid homes used for an Oracle Grid Infrastructure for a standalone server deployment (Oracle Restart), or a Grid home used for an Oracle Grid Infrastructure for a cluster deployment (Oracle Clusterware). You can have either an Oracle Restart deployment, or an Oracle Clusterware deployment. You cannot have both options deployed at the same time.
- Oracle Automatic Storage Management (Oracle ASM) is included as part of an Oracle Grid Infrastructure installation. Oracle recommends that you use Oracle ASM to provide greater redundancy and throughput.

| Table B-2 Optimal Flexible Architecture Hierarchical File Path Examples |
|-----------------------------|-----------------------------|
| **Directory**               | **Description**             |
| C:\                          | System directory           |
| C:\app\                     | Subtree for application software |

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Appendix B
Optimal Flexible Architecture

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Appendix B
Optimal Flexible Architecture
## Table B-2  (Cont.) Optimal Flexible Architecture Hierarchical File Path Examples

<table>
<thead>
<tr>
<th>Directory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C:\app\oraInventory</td>
<td>Central OraInventory directory, which maintains information about Oracle installations on a server. Members of the group designated as the OINSTALL group have permissions to write to the central inventory. All Oracle software installation owners must have the OINSTALL group as their primary group, and be able to write to this group.</td>
</tr>
<tr>
<td>C:\app\oracle\</td>
<td>Oracle base directory for user oracle. There can be many Oracle Database installations on a server, and many Oracle Database software installation owners. Oracle software homes that an Oracle installation owner owns should be located in the Oracle base directory for the Oracle software installation owner, unless that Oracle software is Oracle Grid Infrastructure deployed for a cluster.</td>
</tr>
<tr>
<td>C:\app\grid\username</td>
<td>Oracle base directory for the Oracle Grid Infrastructure software, where username is the name of the user that performed the software installation. The Oracle home (Grid home) for Oracle Grid Infrastructure for a cluster installation is located outside of the Grid user. There can be only one Grid home on a server, and only one Grid software installation owner. The Grid home contains log files and other administrative files.</td>
</tr>
<tr>
<td>C:\app\oracle\admin\</td>
<td>Subtree for database administration files</td>
</tr>
<tr>
<td></td>
<td>Subtree for support log files</td>
</tr>
<tr>
<td></td>
<td>admin subtree for database named “sales”</td>
</tr>
<tr>
<td></td>
<td>admin subtree for database named “dwh”</td>
</tr>
<tr>
<td>C:\app\oracle\admin\</td>
<td>Subtree for recovery files</td>
</tr>
<tr>
<td></td>
<td>Recovery files for database named “sales”</td>
</tr>
<tr>
<td>Directory</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>C:\app\oracle\fast_recovery_area\db_dwh</td>
<td>Recovery files for database named “dwh”</td>
</tr>
<tr>
<td>D:\app\oracle\oradata</td>
<td>Oracle data file directories</td>
</tr>
<tr>
<td>E:\app\oracle\oradata</td>
<td></td>
</tr>
<tr>
<td>F:\app\oracle\oradata</td>
<td></td>
</tr>
<tr>
<td>C:\app\oracle\product\19.0.0\dbhome_1</td>
<td>Common path for Oracle software products other than Oracle Grid Infrastructure for a cluster.</td>
</tr>
<tr>
<td>C:\app\oracle\product\19.0.0\dbhome_2</td>
<td>Oracle home directory for Oracle Database 1, owned by Oracle Database installation owner account oracle.</td>
</tr>
<tr>
<td>C:\app\oracle\product\19.0.0\grid</td>
<td>Oracle home directory for Oracle Database 2, owned by Oracle Database installation owner account oracle.</td>
</tr>
<tr>
<td>C:\app\oradbowner\product\19.0.0\dbhome_2</td>
<td>Oracle home directory for Oracle Database 2, owned by Oracle Database installation owner account oradbowner.</td>
</tr>
<tr>
<td>C:\app\oracle\product\19.0.0\grid</td>
<td>Oracle home directory for Oracle Grid Infrastructure for a standalone server, owned by Oracle Database and Oracle Grid Infrastructure installation owner oracle.</td>
</tr>
<tr>
<td>C:\app\19.0.0\grid</td>
<td>Oracle home directory for Oracle Grid Infrastructure for a cluster (Grid home), owned by user grid before installation, and owned by root after installation.</td>
</tr>
<tr>
<td>C:\app\grid\username\diag\crs\hostname\crs\trace</td>
<td>Oracle Clusterware log files</td>
</tr>
</tbody>
</table>
Installing and Configuring Oracle Database Using Response Files

Learn how 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 a Response File**
  Learn about the methods that you can use to prepare a response file for use during silent-mode or response file-mode installations.

- **Running Oracle Universal Installer Using the Response File**
  At this stage, you are ready to run Oracle Universal Installer at the command line, specifying the response file you created, to perform the installation.

- **Running Net Configuration Assistant Using a Response File**
  When you run Net Configuration Assistant with a response file, you run it in a silent mode.

- **Running Oracle Database Configuration Assistant Using a Response File**
  You can run Oracle Database Configuration Assistant in a silent or a response file mode to configure and start an Oracle database on your system.

- **Postinstallation Configuration Using Response File Created During Installation**
  To run a response file configuration after installing Oracle software:

- **Postinstallation Configuration Using the ConfigToolAllCommands Script**
  You can create and run a response file configuration after installing Oracle software. The configToolAllCommands script requires users to create a second response file, of a different format than the one used for installing the product.

- **Using the Installation Response File for Postinstallation Configuration**
  Starting with Oracle Database 12c release 2 (12.2), you can use the response file created during installation to also complete postinstallation configuration.

**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.
Table C-1  Reasons for Using Silent Mode or Response File Mode

<table>
<thead>
<tr>
<th>Mode</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silent</td>
<td>Use silent mode to:</td>
</tr>
<tr>
<td></td>
<td>• Complete an unattended installation, which you schedule using operating system utilities.</td>
</tr>
<tr>
<td></td>
<td>• Complete several similar installations on multiple systems without user interaction.</td>
</tr>
<tr>
<td></td>
<td>• Install the software on a system that does not have X Window System software installed on it.</td>
</tr>
<tr>
<td></td>
<td>The installer displays progress information on the terminal that you used to start it, but it does not display any of the installer screens.</td>
</tr>
<tr>
<td>Response file</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>If you do not specify information required for a particular installer screen in the response file, then the installer displays that screen. It suppresses screens for which you have provided all of the required information.</td>
</tr>
</tbody>
</table>

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 an interactive mode, which means that it prompts you to provide information on the graphical user interface (GUI). When you use response files to provide this information, you run Oracle Universal Installer at 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 the 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 the response file mode. During a response file mode installation, the installer displays all the screens. The screens for which you specify information in the response file, and for those which you did not specify the required information in the response file. To use the response file mode, run `setup.exe` without the `-silent` parameter, but include the response file or any other parameters that apply.

You define the settings for a silent or a response file installation by entering values for the variables listed in the response file. For instance, to specify the Oracle home, provide the appropriate value for the `ORACLE_HOME` variable, as in the following example:

```bash
ORACLE_HOME=C:\app\product
```
Another way of specifying the response file variable settings is to pass them as command-line arguments when you run Oracle Universal Installer. For example:

```
DRIVE_LETTER: \setup.exe_location> setup -silent "ORACLE_HOME=C:\app\product" ...
```

This method supports only the Oracle Home User passwords.

### 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:

1. If you plan to use Oracle Automatic Storage Management and configure new disks, then you must perform the following steps:
   a. Create partitions for DAS or SAN disks.
   b. Manually configure the disks using the `asmtoolg` or `asmtool` utility.
2. Customize or create a response file for the installation settings that you need. You can create the response file by using one of the following methods:
   • Modify one of the sample response files that is provided with the installation.
   • Run Oracle Universal Installer at a command prompt and save the inputs by selecting the Save Response File option.
3. Run Oracle Universal Installer from a command prompt, specifying the response file, using either silent or response file mode.

**Note:**

Windows requires Administrator privileges at the command prompt.

### Preparing a Response File

Learn about the methods that you can use to prepare a response file for use during silent-mode or response file-mode installations.

- Editing a Response File Template
- Saving a Response File

### Editing a Response File Template

Oracle provides response file templates for each product and the installation type, and for each configuration tool. These files are located in the `ORACLE_BASE\ORACLE_HOME\assistants\templates` directory, and the `database\response` directory on the Oracle Database installation media.
The following table lists the available sample response files:

All response file templates contain comment entries, sample formats, examples, and other useful instructions. Read the response file instructions to understand how to specify values for the response file variables, so that you can customize your installation.

### Table C-2  Response Files

<table>
<thead>
<tr>
<th>Response File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>db_install.rsp</td>
<td>Silent installation of Oracle Database 18c</td>
</tr>
<tr>
<td>grid_install.rsp</td>
<td>Silent installation of Oracle Grid Infrastructure</td>
</tr>
<tr>
<td>dbca.rsp</td>
<td>Silent installation of Database Configuration Assistant</td>
</tr>
<tr>
<td>netca.rsp</td>
<td>Silent installation of Oracle Net Configuration Assistant</td>
</tr>
</tbody>
</table>

### 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 must be given to the Oracle software installation owner only. 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 appropriate response files from the database\response directory on the Oracle Database media to your hard drive.
2. Modify the response files with a text file editor.

### Saving a Response File

You can use the Oracle Universal Installer in an interactive mode to save a response file, which you can edit and then use to complete a silent mode or a response file mode installation.

Starting with Oracle Database 11g Release 2 (11.2), 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 save the response file, you can either complete the installation, or you can exit from Oracle Universal Installer on the Summary page, before it starts to copy the software to the system.

**Note:**

Oracle Universal Installer does not save passwords in the response file.

To save a response file:

1. Ensure that the computer on which you are creating the response file has met the requirements described in Oracle Database Preinstallation Tasks.
   
   When you run Oracle Universal Installer to save 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 save the response file while completing an installation.
   
2. At the command prompt, use the `cd` command to change to the directory that contains the Oracle Universal Installer `setup.exe` executable.

   **Note:**
   
   Windows requires the Administrator privileges at the command prompt.

   On the installation DVD, `setup.exe` is located in the `database` directory. Alternatively, navigate to the directory where you downloaded or copied the installation files.

3. Run `setup.exe`.

4. After Oracle Universal Installer starts, enter the installation settings, to save the response file.

5. When the installer displays the Summary screen, perform the following:
   
   a. Click **Save Response File** and specify a file name and location for the response file. Then, click **Save** to save the values to the 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 saved response file is retained.

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 the Response File

At this stage, you are ready to run Oracle Universal Installer at the command line, specifying the response file you created, to perform the installation.

On Windows, open the command prompt with Administrator privileges. The Oracle Universal Installer executable, `setup.exe`, provides several options. For help information about the full set of these options, run `setup.exe` with the `-help` option, for example:

```
DRIVE_LETTER:\setup.exe_location setup -help
```

A new command window with the "Preparing to launch..." message appears.

To run Oracle Universal Installer, and specify a response file:

1. Place the response file on the computer where you want to install Oracle Database.
2. At a command prompt, run Oracle Universal Installer with the appropriate response file. On Windows, you must open command prompt with the Administrator privileges. For example:

```
```

where:

- `filename`: Identifies the full path of the response file.
- `setup.exe_location`: Indicates the location of `setup.exe`.
- `-silent`: Runs Oracle Universal Installer in silent mode and suppresses the Welcome window.
- "`variable=setting"`: refers to a variable within the response file that you may prefer to run at the command line rather than set in the response file. Enclose the variable and its setting in quotes.
- `-noconfig`: Suppresses running the configuration assistants during installation, performing a software-only installation instead.
- `-nowait`: Closes the console window when the silent installation completes.

If you save a response file during a silent installation, then Oracle Universal Installer saves the variable values that were specified in the original source response file into the new response file.

---

**See Also:**

`Oracle Universal Installer and OPatch User's Guide for Windows and UNIX`
Running Net Configuration Assistant Using a Response File

When you run Net Configuration Assistant with a response file, you run it in a silent mode.

This lets you configure and start an Oracle Net listener on the system, configure naming methods, and configure Oracle Net service names. To run NetCA in a silent mode, use the netca.rsp response file in the ORACLE_BASE\ORACLE_HOME\assistants\netca directory, and the response directory in the database\response directory on the DVD.

> Note:
If you copied the software to a hard disk, the response files are located in the stage_area\database\response directory.

On Windows, you must open command prompt with the Administrator privileges.

To create a Net Configuration Assistant response file:

1. Copy the netca.rsp response file template from the response file directory to a directory on your system.
   
   The netca.rsp is located in the database\response directory on the Oracle Database installation media.

2. Open the response file in a text editor.

3. Edit the file, following the instructions in the file.
   
   Net Configuration Assistant fails if you do not correctly configure the netca.rsp response file.

To run Net Configuration Assistant using the response file you just created, run Net Configuration Assistant in silent mode as follows, replacing local_dir with the directory where you placed your version of the netca.rsp response file:

```
C: \ORACLE_HOME\bin> netca /silent /responsefile local_dir\netca.rsp
```

For example:

```
C: \ORACLE_HOME\bin> netca /silent /responsefile
C: \oracle_response_files\mynetca.rsp
```

Running Oracle Database Configuration Assistant Using a Response File

You can run Oracle Database Configuration Assistant in a silent or a response file mode to configure and start an Oracle database on your system.

To run Oracle Database Configuration Assistant in silent or response file mode, use the dbca.rsp response file in the ORACLE_BASE\ORACLE_HOME\assistants\netca directory, and the response directory in the database\response directory on the DVD.
To run Database Configuration Assistant in a response file mode, you must use the \-responseFile flag in combination with either the \-silent or \-progressOnly flag. To run Database Configuration Assistant in response file mode, you must use a graphical display and set the DISPLAY environment variable.

On Windows, you must open the command prompt with Administrator privileges.

- **Silent Mode of Database Configuration Assistant**
  Use the \-silent flag in combination with the \-responseFile flag to set the mode to silent.

- **Running Database Configuration Assistant in Response File Mode**
  Use this procedure to run Database Configuration Assistant in response file mode.

**See Also:**
- *Oracle Database Administrator's Guide*
- *Oracle Automatic Storage Management Administrator's Guide*

**Silent Mode of Database Configuration Assistant**

Use the \-silent flag in combination with the \-responseFile flag to set the mode to silent.

In the silent mode, Database Configuration Assistant uses values that you specify, in the response file or as command-line options, to create a database. No window or user interface is displayed in the silent mode.

**Running Database Configuration Assistant in Response File Mode**

Use this procedure to run Database Configuration Assistant in response file mode.

To create an Oracle Database Configuration Assistant response file:

1. Copy the dbca.rsp response file template from the response file directory to a directory on your system.
   The dbca.rsp response file is located in the database\response directory on the Oracle Database installation media.

2. Open the dbca.rsp response file in a text editor.

3. Edit the dbca.rsp file, following the instructions in the file.
   Oracle Database Configuration Assistant fails if you do not correctly configure the dbca.rsp response file.
To run the Oracle Database Configuration Assistant using the response file you just created, run Oracle Database Configuration Assistant in a silent or a response file mode using the following syntax:

C:\ORACLE_HOME\bin> dbca {-progressOnly | -silent} -responseFile local_dir/dbca.rsp

where:

- -silent runs Oracle Database Configuration Assistant in the silent mode
- -progressOnly runs Oracle Database Configuration Assistant in the response file mode
- local_dir is the full path of the directory where you copied the dbca.rsp response file template.

For example:

C:\> ORACLE_HOME\bin> dbca -progressOnly -responseFile C:\oracle_response_files\mydbca.rsp

As an alternative to creating a database using a response file, you can run dbca at the command line by specifying all the required information as command line options. Database Configuration Assistant writes progress messages to stdout. For information about the list of options supported, enter the following command:

C:\ORACLE_HOME\bin\dbca -help

Postinstallation Configuration Using Response File Created During Installation

To run a response file configuration after installing Oracle software:

- **About the Postinstallation Configuration File**
  When you run a silent or a response file installation, you provide information about your servers in a response file that you otherwise provide manually during a graphical user interface installation.

- **Running Postinstallation Configuration Using Response File**
  Use this procedure to run postinstallation configuration using response file.

**About the Postinstallation Configuration File**

When you run a silent or a response file installation, you provide information about your servers in a response file that you otherwise provide manually during a graphical user interface installation.

However, the response file does not contain passwords for user accounts that configuration assistants require after software installation is complete. The configuration assistants are started with a script called configToolAllCommands. You can run this script in the response file mode by using a password response file. The script uses the passwords to run the configuration tools in succession to complete the configuration.

If you keep the password file to use for clone installations, then Oracle strongly recommends that you store it in a secure location. In addition, if you must stop an
installation to fix an error, you can run the configuration assistants using configToolAllCommands and a password response file.

The configToolAllCommands password response file consists of the following syntax options:

- **internal_component_name** is the name of the component that the configuration assistant configures
- **variable_name** is the name of the configuration file variable
- **value** is the desired value of the configuration.

The command syntax is as follows:

```
internal_component_name|variable_name=value
```

For example:

```
oracle.crs|S_ASMPASSWORD=PassWord
```

Oracle strongly recommends that you maintain security with a password response file:

- Permissions on the response file must be set to 600.
- The owner of the response file must be the installation owner user, with the group set to the central inventory (oraInventory) group.

### Running Postinstallation Configuration Using Response File

Use this procedure to run postinstallation configuration using response file. To run configuration assistants with the executeConfigTools script:

1. Create a response file using the syntax `filename.properties`. For example:
   ```
   C:\> copy nul cfgrsp.properties
   ```
2. Open the file with a text editor, and cut and paste the password template, modifying as needed.
3. Secure the cfgrsp.properties file by changing permissions in Properties page. Right-click the file to open the Properties page. Select the Security tab, click the Edit button, select a group or user, then select Deny check box against Read permissions to remove read access for unwanted users.
4. Change directory to `ORACLE_HOME\cfgtoollogs`
5. Before running configToolAllCommands, rename it using the following command:
   ```
   copy configToolAllCommands configToolAllCommands.bat
   ```
6. Run the configuration script using the following syntax:
   ```
   configToolAllCommands.bat RESPONSE_FILE=\path\name.properties
   ```
   for example:
   ```
   C:\> configToolAllCommands.bat RESPONSE_FILE=C:\oracle\cfgrsp.properties
   ```

**Example C-1  Password response file for Oracle Grid Infrastructure for a Standalone Server**

Oracle Grid Infrastructure requires passwords for Oracle Automatic Storage Management Configuration Assistant (ASMCA), and for Intelligent Platform
Management Interface Configuration Assistant (IPMICA) if you have a BMC card and you want to enable this feature. Provide the following response file:

```
oracle.crs|S_ASMPASSWORD=password
oracle.crs|S_ASMONITORPASSWORD=password
oracle.crs|S_OMSPASSWORD=password
oracle.crs|S_BMCPASSWORD=password
oracle.crs|S_WINSERVICEUSERPASSWORD=password
```

**Example C-2 Password response file for Oracle Database**

Oracle Database configuration requires the SYS, SYSTEM, and DBSNMP passwords for use with Database Configuration Assistant (DBCA). The S_ASMSNMPASSWORD password is necessary only if the database is using Oracle ASM for storage. Similarly, the S_PDBADMINPASSWORD password is necessary only if you create a multitenant container database (CDB) with one or more pluggable databases (PDBs). Also, if you select configure Oracle Enterprise Manager, then provide the password for the Oracle software installation owner for the S_EMADMINPASSWORD password.

```
oracle.server|S_SYSPASSWORD=password
oracle.server|S_SYSTEMPASSWORD=password
oracle.server|S_DBSNMPPASSWORD=password
oracle.server|S_PDBADMINPASSWORD=password
oracle.server|S_EMADMINPASSWORD=password
oracle.server|S_ASMSNMPASSWORD=password
```

If you do not want to enable Oracle Enterprise Manager or Oracle ASM, then leave those password fields blank.

**Postinstallation Configuration Using the ConfigToolAllCommands Script**

You can create and run a response file configuration after installing Oracle software. The configToolAllCommands script requires users to create a second response file, of a different format than the one used for installing the product.

Starting with Oracle Database 12c Release 2 (12.2), the configToolAllCommands script is deprecated and may be desupported in a future release.

**Using the Installation Response File for Postinstallation Configuration**

Starting with Oracle Database 12c release 2 (12.2), you can use the response file created during installation to also complete postinstallation configuration.

Run the installer with the -executeConfigTools option to configure configuration assistants after installing Oracle Grid Infrastructure or Oracle Database. You can use the response file located at %ORACLE_HOME%\install\response \grid_timestamp.rsp to obtain the passwords required to run the configuration tools. You must update the response file with the required passwords before running the -executeConfigTools command.

Oracle strongly recommends that you maintain security with a password response file. The owner of the response file must be the installation owner user.
Example C-3  Response File Passwords for Oracle Grid Infrastructure

```
oracle.install.crs.config.ipmi.bmcPassword=password
oracle.install.asm.SYSASMPassword=GRID_HOME\gridSetup.bat -executeConfigTools -responseFile %ORACLE_HOME%\install\response\grid_time_stamp.rsporacle.install.asm.monitorPassword=password
oracle.install.config.emAdminPassword=password
oracle.install.OracleHomeUserPassword=password
```

If you do not have a BMC card, or you do not want to enable IPMI, then leave the `ipmi.bmcPassword` input field blank.

If you do not want to enable Oracle Enterprise Manager for management, then leave the `emAdminPassword` password field blank.

If you did not specify an Oracle Home user for the Oracle Grid Infrastructure installation, then leave the `OracleHomeUserPassword` field blank.

Example C-4  Response File Passwords for Oracle Grid Infrastructure for a Standalone Server (Oracle Restart)

```
oracle.install.asm.SYSASMPassword=password
oracle.install.asm.monitorPassword=password
oracle.install.config.emAdminPassword=password
oracle.install.OracleHomeUserPassword=password
```

If you do not want to enable Oracle Enterprise Manager for management, then leave the `emAdminPassword` password field blank.

If you did not specify an Oracle Home user for the Oracle Grid Infrastructure for a Standalone Server (Oracle Restart) installation, then leave the `OracleHomeUserPassword` field blank.

Example C-5  Response File Passwords for Oracle Database

This example illustrates the passwords to specify for use with the database configuration assistants.

```
oracle.install.db.config.starterdb.password.SYS=password
oracle.install.db.config.starterdb.password.SYSTEM=password
oracle.install.db.config.starterdb.password.DBSNMP=password
oracle.install.db.config.starterdb.password.PDBADMIN=password
oracle.install.db.config.asm.ASMSNMPPassword=password
oracle.install.OracleHomeUserPassword=password
```

You can also specify `oracle.install.db.config.starterdb.password.ALL=password` to use the same password for all database users.

Oracle Database configuration assistants require the SYS, SYSTEM, and DBSNMP passwords for use with Oracle Database Configuration Assistant (DBCA). Specify the following passwords, depending on your system configuration:
• If the database uses Oracle ASM for storage, then you must specify a password for the `ASMSNMPPassword` variable. If you are not using Oracle ASM, then leave the value for this password variable blank.

• If you create a multitenant container database (CDB) with one or more pluggable databases (PDBs), then you must specify a password for the `PDBADMIN` variable. If you are not using Oracle ASM, then leave the value for this password variable blank.

• If you did not specify an Oracle Home user for the Oracle Database installation, then leave the `OracleHomeUserPassword` field blank.
Configuring Read-Only Oracle Homes

Understand how read-only Oracle homes work and how you can configure read-only Oracle homes.

- **Understanding Read-Only Oracle Homes**
  Learn about read-only Oracle home concepts like Oracle base home, Oracle base config, and orabasetab.

- **Enabling a Read-Only Oracle Home**
  Configure your Oracle home as a read-only Oracle home after you have performed a software-only Oracle Database installation.

- **Copying demo Directories to Oracle Base Home**
  In a read-only mode ORACLE_HOME, you must copy the demo directories listed in this topic from ORACLE_HOME to ORACLE_BASE_HOME.

- **Determining if an Oracle Home is Read-Only**
  Run the orabasehome command to determine if your Oracle home is a read/write or read-only Oracle home.

- **File Path and Directory Changes in Read-Only Oracle Homes**
  Examples of hierarchical file mappings in a read-only Oracle home as compared to a read/write Oracle home.

**Understanding Read-Only Oracle Homes**

Learn about read-only Oracle home concepts like Oracle base home, Oracle base config, and orabasetab.

- **About Read-Only Oracle Homes**
  Starting with Oracle Database 18c, you can configure an Oracle home in read-only mode.

- **About Oracle Base Homes**
  Both, in a read-only ORACLE_HOME and read/write ORACLE_HOME, the user-specific files, instance-specific files, and log files reside in a location known as the ORACLE_BASE_HOME.

- **About Oracle Base Config**
  Both, in a read-only ORACLE_HOME and read/write ORACLE_HOME, the configuration files reside in a location known as ORACLE_BASE_CONFIG.

- **About orabasetab**
  The orabasetab file is used to define fundamental directories based on $ORACLE_HOME: ORACLE_BASE, ORACLE_BASE_HOME and ORACLE_BASE_CONFIG.

**About Read-Only Oracle Homes**

Starting with Oracle Database 18c, you can configure an Oracle home in read-only mode.
In a read-only Oracle home, all the configuration data and log files reside outside of the read-only Oracle home. This feature allows you to use the read-only Oracle home as a software image that can be distributed across multiple servers.

Apart from the traditional ORACLE_BASE and ORACLE_HOME directories, the following directories contain files that used to be in ORACLE_HOME:

- ORACLE_BASE_HOME
- ORACLE_BASE_CONFIG

**Benefits of a Read-Only Oracle Home**

- Enables seamless patching and updating of Oracle databases without extended downtime.
- Simplifies patching and mass rollout as only one image needs to be updated to distribute a patch to many servers.
- Simplifies provisioning by implementing separation of installation and configuration.

**Note:**

This feature does not affect how database administrators monitor, diagnose, and tune their system performance.

---

**About Oracle Base Homes**

Both, in a read-only ORACLE_HOME and read/write ORACLE_HOME, the user-specific files, instance-specific files, and log files reside in a location known as the ORACLE_BASE_HOME.

In a read/write ORACLE_HOME, the ORACLE_BASE_HOME path is the same as the ORACLE_HOME directory. However, in a read-only ORACLE_HOME, the ORACLE_BASE_HOME directory is not co-located with ORACLE_HOME but is located at ORACLE_BASE\homes\HOME_NAME.

Where, HOME_NAME is the internal name for ORACLE_HOME.

For example, the networking directories `network\admin`, `network\trace`, and `network\log` are located in the ORACLE_BASE_HOME directory. In a read/write ORACLE_HOME the networking directories appear to be in ORACLE_HOME because ORACLE_BASE_HOME is co-located with ORACLE_HOME, whereas in a read-only ORACLE_HOME the networking directories are located in ORACLE_BASE\homes \HOME_NAME.

To print the ORACLE_BASE_HOME path, run the `orabasehome` command from the ORACLE_HOME\bin directory:

```bash
set ORACLE_HOME C:\app\oracle\product\19.0.0\dbhome_1
cd ORACLE_HOME\bin
orabasehome
```
For example:

```
orabasehome
C:\app\oracle\homes\OraDB19Home1
```

Where, \texttt{C:\app\oracle} is \texttt{ORACLE\_BASE} and \texttt{OraDB19Home1} is \texttt{HOME\_NAME}

### About Oracle Base Config

Both, in a read-only ORACLE\_HOME and read/write ORACLE\_HOME, the configuration files reside in a location known as ORACLE\_BASE\_CONFIG.

In a read/write ORACLE\_HOME, the ORACLE\_BASE\_CONFIG path is the same as the ORACLE\_HOME path because it is located at ORACLE\_HOME. However, in a read-only ORACLE\_HOME, the ORACLE\_BASE\_CONFIG path is the same as ORACLE\_BASE.

\texttt{ORACLE\_BASE\_CONFIG\dbs} contains the configuration files for ORACLE\_HOME. Each file in the \texttt{dbs} directory contains \texttt{ORACLE\_SID} so that the directory can be shared by many different ORACLE\_SIDs.

To print the ORACLE\_BASE\_CONFIG path, run the \texttt{orabaseconfig} command from the ORACLE\_HOME\bin directory:

```
C:\> set ORACLE\_HOME C:\app\oracle\product\19.0.0\dbhome\_1
C:\> cd ORACLE\_HOME\bin
orabaseconfig
```

For example:
```
orabaseconfig
C:\> C:\app\oracle
```

Where, \texttt{C:\app\oracle} is \texttt{ORACLE\_BASE}.

### About orabasetab

The \texttt{orabasetab} file is used to define fundamental directories based on \texttt{$\text{ORACLE\_HOME}$}: \texttt{ORACLE\_BASE}, \texttt{ORACLE\_BASE\_HOME} and \texttt{ORACLE\_BASE\_CONFIG}.

The \texttt{orabasetab} file resides in \texttt{ORACLE\_HOME\install\orabasetab} and can be used to determine if an ORACLE\_HOME is read-only or read/write. It also defines the ORACLE\_BASE and the HOME\_NAME of the Oracle home. HOME\_NAME is the internal name for ORACLE\_HOME.

The last line in the \texttt{orabasetab} file, which starts with \texttt{$\text{ORACLE\_HOME}$}, defines the directories for \texttt{$\text{ORACLE\_HOME}$}. The last line consists of four fields, each separate by a colon delimiter(:).

1. The first field matches the current \texttt{$\text{ORACLE\_HOME}$}.
2. The second field defines the ORACLE\_BASE for the current ORACLE\_HOME.
3. The third field defines the HOME_NAME which is used in constructing the ORACLE_BASE_HOME path in a read-only ORACLE_HOME.

4. The fourth field displays N in a read/write ORACLE_HOME and Y in a read-only ORACLE_HOME.

In a read-only ORACLE_HOME, the ORACLE_BASE_HOME path is ORACLE_BASE\homes\HOME_NAME and ORACLE_BASE_CONFIG is the same as ORACLE_BASE.

In a read/write ORACLE_HOME, ORACLE_HOME, ORACLE_BASE_HOME and ORACLE_BASE_CONFIG are all the same.

**Viewing an orabasetab File**

1. Log in as the Oracle installation owner user account (oracle).
2. Go to the ORACLE_HOME\install directory.
   
   C:\> cd \app\oracle\product\19.0.0\dbhome_1\install

3. View the contents of the orabasetab file.
   
   C:\> cat orabasetab

   C:\> \app\oracle\product\19.0.0\dbhome_1:\app\oracle:OraDB19Home1:Y:

   In this example, a Y in the fourth field at the end of the line indicates you have a read-only Oracle home.

**Enabling a Read-Only Oracle Home**

Configure your Oracle home as a read-only Oracle home after you have performed a software-only Oracle Database installation.

To enable a read-only Oracle home:

1. Perform a software-only Oracle Database installation.
2. Run the roohctl -enable script.
3. Run Oracle Database Configuration Assistant (Oracle DBCA) to create a database.

**Software-Only Database Installation**

1. Log in as the Oracle installation owner user account (oracle) that you want to own the software binaries.
2. Download the Oracle Database installation image files (db_home.zip) to a directory of your choice. For example, you can download the image files to the \tmp directory.
3. Create the Oracle home directory and extract the image files that you have downloaded in to this Oracle home directory. For example:

   mkdir -p C:\app\oracle\product\19.0.0\dbhome_1
   chown oracle:oinstall C:\app\oracle\product\19.0.0\dbhome_1
   cd C:\app\oracle\product\19.0.0\dbhome_1
   unzip -q \tmp\db_home.zip
4. From the Oracle home directory, run the `setup.exe` command to start the Oracle Database installer.

5. In the Select Configuration Option screen, select **Set Up Software Only**.

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

**Note:**

Click **Help** if you have any questions about the information you are asked to submit during installation.

---

**Run the roohctl Script**

1. Go to the `bin` directory

   ```
   cd C:\app\oracle\product\19.0.0\dbhome_1\bin
   ```

2. Run the `roohctl` script to enable read-only Oracle home.

   ```
   roohctl.bat -enable
   ```

**Run Oracle Database Configuration Assistant**

1. Ensure that you are still in the `bin` directory and run Oracle DBCA.

   ```
   dbca
   ```

2. In the Select Database Operation screen, select **Create a Database**.

3. The configuration screens vary depending on the options you select. Respond to the prompts as needed.

**Note:**

Click **Help** if you have any questions about the information you are asked to submit during database creation.

---

**Related Topics**

- *Oracle Database 2 Day DBA*
Copying demo Directories to Oracle Base Home

In a read-only mode ORACLE_HOME, you must copy the demo directories listed in this topic from ORACLE_HOME to ORACLE_BASE_HOME.

Oracle Database contains various demo directories that include a variety of examples and product demonstrations that you can use to learn about the products, options, and features of Oracle Database. In a read-only mode ORACLE_HOME, you cannot use these demo directories in ORACLE_HOME because writes are performed to these demo directories when they are used.

Many of the demo directories are not available by default. You must install Oracle Database Examples to view and use the examples and product demonstrations.

Copy the respective demo directory to the corresponding location in ORACLE_BASE_HOME. Now, you can use this copy of the demo directory. You must create symbolic link to some of the demo directories.

You must copy the following demo directories from ORACLE_HOME to ORACLE_BASE_HOME:

- jdbc\demo
- odbc\demo
- ord\http\demo
- precomp\demo
- rdbms\demo
- sqlplus\demo
- xdk\demo

Copying demo Directories

For example, to copy the rdbms\demo directory from ORACLE_HOME to ORACLE_BASE_HOME, perform the following:

1. Login as the Oracle installation user (oracle).
2. Check if the rdbms\demo directory is copied to ORACLE_BASE_HOME and whether the symbolic link has already been set up.

   ls -l -d %ORACLE_HOME%\rdbms\demo %ORACLE_BASE_HOME%\rdbms\demo

3. If the rdbms\demo directory is not copied to ORACLE_BASE_HOME, then copy the rdbms\demo directory to ORACLE_BASE_HOME.

   cp -r %ORACLE_HOME%\rdbms\demo %ORACLE_BASE_HOME%\rdbms\demo

Similarly, copy all the demo directories listed earlier from ORACLE_HOME to ORACLE_BASE_HOME.
Creating Symbolic Links

You must create symbolic links for the rdbms/demo, odbc/demo, precomp/demo, and xdk/demo demo directories.

Before you create symbolic links, you must identify the ORACLE_BASE_HOME path. Run the orabasehome command from the %ORACLE_HOME%\bin directory:

```
set ORACLE_HOME=C:\app\oracle\product\19.0.0\dbhome_1
cd %ORACLE_HOME%\bin
orabasehome
```

For rdbms\demo, replace %ORACLE_HOME%\rdbms\demo with a symbolic link to the copy.

1. Ensure that the symbolic link does not already exist.

```
ls -l -d %ORACLE_HOME%\rdbms\demo
```

2. If %ORACLE_HOME%\rdbms\demo is still the original demo directory, rename it and replace it with the symbolic link.

```
cd %ORACLE_HOME%\rdbms
mv demo demo.installed
set ORACLE_BASE_HOME=\output_of_the_orabasehome_command
mklink/D %ORACLE_HOME%\rdbms\demo %ORACLE_BASE_HOME%\rdbms\demo
```

For odbc\demo, replace %ORACLE_HOME%\odbc\demo with a symbolic link to the copy.

1. Ensure that the symbolic link does not already exist.

```
ls -l -d %ORACLE_HOME%\odbc\demo
```

2. If %ORACLE_HOME%\odbc\demo is still the original demo directory, rename it and replace it with the symbolic link.

```
cd %ORACLE_HOME%\odbc
mv demo demo.installed
set ORACLE_BASE_HOME=\output_of_the_orabasehome_command
mklink/D %ORACLE_HOME%\odbc\demo %ORACLE_BASE_HOME%\odbc\demo
```

For precomp\demo, replace %ORACLE_HOME%\precomp\demo with a symbolic link to the copy.

1. Ensure that the symbolic link does not already exist.

```
ls -l -d %ORACLE_HOME%\precomp\demo
```

2. If %ORACLE_HOME%\precomp\demo is still the original demo directory, rename it and replace it with the symbolic link.

```
cd %ORACLE_HOME%\precomp
mv demo demo.installed
```
The xdk\demo directory requires a symbolic link at \%ORACLE_HOME%\xdk\include pointing to \%ORACLE_BASE_HOME%\xdk\include after you copy the xdk\demo directory.

1. Ensure that the symbolic link does not already exist:

   `ls -l -d \%ORACLE_HOME%\xdk\include`

2. If the symbolic link does not exist, then, run the following command:

   ```
   set ORACLE_BASE_HOME=output_of_the_orabasehome_command
   mklink/D \%ORACLE_BASE_HOME%\xdk\include \%ORACLE_HOME%\xdk\include
   ```

   **Note:**

   In the plsql\demo directory, ncmpdemo.sql is unusable in read-only mode.

Copying the init.ora File

Copy the init.ora file from ORACLE_HOME to ORACLE_BASE_HOME.

1. Log in as the Oracle software owner user (oracle).

2. Check if the init.ora file exists in ORACLE_BASE_HOME.

   ```
   set ORACLE_BASE_HOME=output_of_the_orabasehome_command
   ls \%ORACLE_BASE_HOME%\dbs\init.ora
   ```

   If an init.ora file exists in ORACLE_BASE_HOME, then update this init.ora file to be in-sync with the \%ORACLE_HOME%\dbs\init.ora file.

3. If the init.ora file does not exist in ORACLE_BASE_HOME, then copy it from ORACLE_HOME.

   ```
   mkdir \%ORACLE_BASE_HOME%\dbs
   cp \%ORACLE_HOME%\dbs\init.ora \%ORACLE_BASE_HOME%\dbs\init.ora
   ```

Related Topics

- *Oracle Database Examples Installation Guide*

Determining if an Oracle Home is Read-Only

Run the orabasehome command to determine if your Oracle home is a read/write or read-only Oracle home.

If the output of the orabasehome command is the same as \%ORACLE_HOME%, then your Oracle home is in read/write mode. If the output displays the path \ORACLE_BASE\homes\HOME_NAME, then your Oracle home is in read-only mode.
1. Set the ORACLE_HOME environment variable:

   C:\> set ORACLE_HOME=C:\app\oracle\product\19.0.0\dbhome_1

2. Go to the bin directory and run the orabasehome command:

   C:\> cd %ORACLE_HOME%\bin
   orabasehome

   C:\> C:\app\oracle\homes\OraDB19Home1

In this example, the Oracle home is in read-only mode.

File Path and Directory Changes in Read-Only Oracle Homes

Examples of hierarchical file mappings in a read-only Oracle home as compared to a read/write Oracle home.

This example shows an Optimal Flexible Architecture-compliant Oracle Database installation, for the user oracle, with the ORACLE_HOME, ORACLE_BASE, ORACLE_BASE_HOME, and ORACLE_BASE_CONFIG logical locations. The database files are under oraclebase\oradata.

This example also shows the changes in the Oracle Database software defined paths of configuration files, log files, and other directories in a read-only Oracle home when compared to a read/write Oracle home.

**Table D-1  read/write and Read-Only Oracle Home File Path Examples**

<table>
<thead>
<tr>
<th>Directory</th>
<th>Read/Write Oracle Home File Path</th>
<th>Read-Only Oracle Home File Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORACLE_HOME</td>
<td>C:\app\oracle \product \19.0.0\dbhome_1</td>
<td>C:\app\oracle \product \19.0.0\dbhome_1</td>
</tr>
<tr>
<td>ORACLE_BASE</td>
<td>C:\app\oracle</td>
<td>C:\app\oracle</td>
</tr>
<tr>
<td>ORACLE_BASE_HOME</td>
<td>ORACLE_HOME (or) C:\app\oracle \product \19.0.0\dbhome_1</td>
<td>ORACLE_BASE\homes \HOME_NAME. (or) C:\app\oracle\homes \OraDB19Home1</td>
</tr>
<tr>
<td>ORACLE_BASE_CONFIG</td>
<td>ORACLE_HOME (or) C:\app\oracle \product \19.0.0\dbhome_1</td>
<td>ORACLE_BASE (or) C:\app\oracle</td>
</tr>
<tr>
<td>Directory</td>
<td>Read/Write Oracle Home File Path</td>
<td>Read-Only Oracle Home File Path</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>network</td>
<td>ORACLE_HOME\network (or) C:\app\oracle \product \19.0.0\dbhome_1\network</td>
<td>ORACLE_BASE_HOME \network (or) C:\app\oracle\homes \OraDB19Home1\network</td>
</tr>
<tr>
<td>dbs</td>
<td>ORACLE_HOME\dbs (or) C:\app\oracle \product \19.0.0\dbhome_1\dbs</td>
<td>ORACLE_BASE\dbs (or) C:\app\oracle\dbs</td>
</tr>
</tbody>
</table>
Configuring Networks for Oracle Database

Typically, the computer on which you want to install Oracle Database is connected to the network, has a local storage to contain the Oracle Database installation, has a display monitor, and has a media drive.

Configuring networks for Oracle Database describes how to install Oracle Database on computers that do not meet the typical scenario.

• Installing Oracle Database on Computers with Multiple IP Addresses
  Use this procedure to set the ORACLE_HOSTNAME environment variable.

• Installing Oracle Database on Computers with Multiple Aliases
  A computer with multiple aliases is registered with the naming service under a single IP address but with multiple aliases.

• Installing Oracle Database on Nonnetworked Computers
  You can install Oracle Database on non-networked computers.

• Installing a Loopback Adapter
  A loopback adapter is required if you are installing on a non-networked computer to connect the computer to a network after the installation.

Installing Oracle Database on Computers with Multiple IP Addresses

Use this procedure to set the ORACLE_HOSTNAME environment variable.

Clients must be able to access the computer using its host name, or using aliases for its host name. To check access, ping the host name from the client computers using the short name (host name only) and the fully qualified domain name (FQDN, host name and domain name). Both must work.

1. Display System in the Windows Control Panel.
2. In the System Properties dialog box, click Advanced.
3. In the Advanced tab, click Environment Variables.
4. In the Environment Variables dialog box, under System Variables, click New.
5. In the New System Variable dialog box, enter the following information:
   • Variable name: ORACLE_HOSTNAME
   • Variable value: The host name of the computer to use.
6. Click OK, then in the Environment Variables dialog box, click OK.
7. Click OK in the Environment Variables dialog box, then in the System Properties dialog box, click OK.
Installing Oracle Database on Computers with Multiple Aliases

A computer with multiple aliases is registered with the naming service under a single IP address but with multiple aliases.

The naming service resolves any of those aliases to the same computer. Before installing Oracle Database on such a computer, set the `ORACLE_HOSTNAME` environment variable to the computer whose host name you want to use.

Installing Oracle Database on Nonnetworked Computers

You can install Oracle Database on non-networked computers.

If the computer, such as a laptop, is configured for DHCP and you plan to connect the computer to the network after the Oracle Database installation.

Perform these steps before you install Oracle Database on the non-networked computer:

1. **Install a loopback adapter on the computer.**
   
   The loopback adapter and the local IP address simulate a networked computer. If you connect the computer to the network, Oracle Database still uses the local IP address and host name.

2. **Ping the computer from itself, using only the host name and using the fully qualified name, which is in the `DRIVE_LETTER:\system32\drivers\etc\hosts` file.**
   
   For example, if you installed a loopback adapter on a computer called `mycomputer` on the `mydomain.com` domain, check the following:

   ```
   DRIVE_LETTER:\>ping mycomputer
   Ping itself using just the hostname.
   
   Reply from 10.10.10.10
   Returns local IP.
   
   DRIVE_LETTER:\>ping mycomputer.mydomain.com
   Ping using a fully qualified name.
   
   Reply from 10.10.10.10
   Returns local IP.
   ```

**Note:**

When you ping a computer from itself, the `ping` command must return the local IP address (the IP address of the loopback adapter).

If the `ping` command fails, contact your network administrator.

If you connect the computer to a network after installation, the Oracle Database instance on your computer can work with other instances on the network. Remember that you must have installed a loopback adapter on your computer. Your computer can use a static IP or DHCP, depending on the network to which you are connected.
Installing a Loopback Adapter

A loopback adapter is required if you are installing on a non-networked computer to connect the computer to a network after the installation.

When you install a loopback adapter, the loopback adapter assigns a local IP address for your computer. After the loopback adapter is installed, there are at least two network adapters on your computer: your own network adapter and the loopback adapter. To run Oracle Database on Windows, set the loopback adapter as the primary adapter.

You can change the bind order for the adapters without reinstalling the loopback adapter. The bind order of the adapters to the protocol indicates the order in which the adapters are used. When the loopback adapter is used first for the TCP/IP protocol, all programs that access TCP/IP first probe the loopback adapter. The local address is used for tools, such as Oracle Enterprise Manager. Applications that use a different Ethernet segment are routed to the network card.

- **Checking if a Loopback Adapter is Installed on Your Computer**
  Review this section to verify if a loopback adapter is installed on your computer by running the `ipconfig /all` command.

- **Installing a Loopback Adapter**
  Use this procedure to install a Loopback Adapter or a Microsoft KM-TEST Loopback Adapter on different Windows versions.

- **Removing a Loopback Adapter**
  Use this procedure to remove a Loopback Adapter or a Microsoft KM-TEST Loopback Adapter on different Windows versions.

Related Topics

- Installing Oracle Database on Nonnetworked Computers

Checking if a Loopback Adapter is Installed on Your Computer

Review this section to verify if a loopback adapter is installed on your computer by running the `ipconfig /all` command.

To check if a loopback adapter is installed on your computer, run the `ipconfig /all` command:

```
DRIVE_LETTER:\>ipconfig /all
```

- **Note:**
  Loopback Adapter installed on the computer must be the Primary Network Adapter.

If there is a loopback adapter installed, you see a section that lists the values for the loopback adapter. For example:

```
Ethernet adapter Local Area Connection 2:
Connection-specific DNS Suffix . :
```
Installing a Loopback Adapter

Use this procedure to install a Loopback Adapter or a Microsoft KM-TEST Loopback Adapter on different Windows versions.

The Microsoft Loopback Adapter in Microsoft Windows 7 is renamed to Microsoft KM-TEST Loopback Adapter in Microsoft Windows 8.1 and later releases.

To install a Loopback Adapter on Microsoft Windows 7 or to install Microsoft KM-Test Loopback Adapter on Microsoft Windows 8.1, Microsoft Windows Server 2012, Microsoft Windows Server 2012 R2, and Microsoft Windows Server 2016 perform the following steps:

1. Click Start and enter hdwwiz in the Search box. Click hdwwiz to start the Add Hardware wizard.
   For Microsoft Windows 8.1 and later releases, open the Windows Control Panel and double-click Add Hardware to start the Add Hardware wizard.

2. In the Welcome window, click Next.

3. In the The wizard can help you install other hardware window, select Install the hardware that I manually select from a list, and click Next.

4. From the list of hardware types, select the type of hardware you are installing, select Network adapters, and click Next.

5. In the Select Network Adapter window, make the following selections:
   - Manufacturer: Select Microsoft.
   - Network Adapter: Select Microsoft Loopback Adapter for Microsoft Windows 7 and Microsoft KM-TEST Loopback Adapter for Microsoft Windows Server 8.1 and later releases.

6. Click Next.

7. In the The wizard is ready to install your hardware window, click Next.

8. In the Completing the Add Hardware Wizard window, click Finish.

9. Click Manage Network Connections. This displays the Network Connections Control Panel item.

10. Right-click the connection that was just created. This is usually named “Local Area Connection 2”. Choose Properties.

11. On the General tab, select Internet Protocol (TCP/IP), and click Properties.

12. In the Properties dialog box, click Use the following IP address and do the following:
   a. IP Address: Enter a non-routable IP for the loopback adapter. Oracle recommends the following non-routable addresses:
      • 192.168.x.x (x is any value between 0 and 255)
      • 10.10.10.10
b. **Subnet mask**: Enter 255.255.255.0.

c. Record the values you entered, which you need later in this procedure.

d. Leave all other fields empty.

e. Click **OK**.

13. Click **Close**.

14. Close **Network Connections**.

15. Restart the computer.

16. Add a line to the **DRIVE_LETTER**:` \WINDOWS\system32\drivers\etc\hosts` file with the following format, after the `localhost` line:

```
IP_address  hostname.domainname  hostname
```

where:

- **IP_address** is the non-routable IP address.
- **hostname** is the name of the computer.
- **domainname** is the name of the domain.

For example:

```
10.10.10.10  mycomputer.mydomain.com  mycomputer
```

17. Check the network configuration:

   a. Open **System** in the Control Panel, and verify that **Full computer name** displays the host name and the domain name, for example, sales.us.example.com.

   b. Click **Change**. In **Computer name**, you must see the host name, and in **Full computer name**, you must see the host name and domain name. Using the previous example, the host name must be sales and the domain must be us.example.com.

   c. Click **More**. In **Primary DNS suffix of this computer**, you must see the domain name, for example, us.example.com.

---

**Removing a Loopback Adapter**

Use this procedure to remove a Loopback Adapter or a Microsoft KM-TEST Loopback Adapter on different Windows versions.

To remove a Loopback Adapter on Microsoft Windows 7 or to remove Microsoft KM-TEST Loopback Adapter on Microsoft Windows 8.1, Microsoft Windows Server 2012, Microsoft Windows Server 2012 R2, and Microsoft Windows Server 2016, perform the following steps:

1. Display **System** in the Windows Control Panel.

2. In the Hardware tab, click **Device Manager**.

3. For Microsoft Windows 7, in the Device Manager window, expand **Network adapters**. You must see **Microsoft Loopback Adapter**. For Microsoft Windows 8.1 and later releases, you must see **Microsoft KM-TEST Loopback Adapter**.
4. For Microsoft Windows 7, right-click **Microsoft Loopback Adapter** and select **Uninstall**. For Microsoft Windows 8.1 and later releases, right-click **Microsoft KM-TEST Loopback Adapter** and select **Uninstall**.

5. Click **OK**.

6. Restart the computer.

7. Remove the line from the `DRIVE_LETTER:\WINDOWS\system32\drivers\etc\hosts` file, added after the localhost line while installing the loopback adapter on other Windows operating systems.
Managing Oracle Database Port Numbers

Review default port numbers.
If needed, use these steps to change assigned ports after installation.

- **About Managing Ports**
  During installation, Oracle Universal Installer assigns port numbers to the components from a set of default port numbers.

- **Oracle Database Component Port Numbers and Protocols**
  This table lists the port numbers and protocols configured for Oracle Database components during a single-instance installation.

- **Changing the Oracle Services for Microsoft Transaction Server Port**
  In most cases, you need not reconfigure the port number.

### About Managing Ports

During installation, Oracle Universal Installer assigns port numbers to the components from a set of default port numbers.

Many Oracle Database components and services use ports. As an administrator, it is important to know the port numbers used by these services, and to ensure that the same port number is not used by two services on your host.

Most port numbers are assigned during installation. Every component and service has an allotted port range, which is the set of port numbers Oracle Database attempts to use when assigning a port. Oracle Database starts with the lowest number in the range and performs the following checks:

- **Is the port used by another Oracle Database installation on the host?**
  The installation may be up or down at the time; Oracle Database can still detect if the port is used.

- **Is the port used by a process that is currently running?**
  This could be any process on the host, even a non-Oracle Database process.

- **Is the port listed in the `/etc/services` file?**
  If the answer to any of the preceding questions is yes, then Oracle Database moves to the next highest port in the allotted port range, and continues checking until it finds a free port.

### Oracle Database Component Port Numbers and Protocols

This table lists the port numbers and protocols configured for Oracle Database components during a single-instance installation.

By default, the first port in the range is assigned to the component, if it is available.
## Table F-1 Ports Used in Oracle Components

<table>
<thead>
<tr>
<th>Component and Description</th>
<th>Default Port Number</th>
<th>Port Range</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Net Listener&lt;br&gt;Enables Oracle client connections to the database by using Oracle Net services. You can configure this port number during installation. To reconfigure this port, use Net Configuration Assistant.</td>
<td>1521</td>
<td>Port number changes to the next available port. Modifiable manually to any available port.</td>
<td>TCP</td>
</tr>
<tr>
<td>Oracle Connection Manager&lt;br&gt;Listening port for Oracle client connections. It is not configured during installation, but can be configured manually by editing the cman.ora parameter file. You can find the file under /network/admin directory.</td>
<td>1630</td>
<td>1630</td>
<td>TCP</td>
</tr>
<tr>
<td>Oracle XML DB&lt;br&gt;The Oracle XML DB HTTP port is used if web-based applications need to access an Oracle database from an HTTP listener. It is configured during installation, but you cannot view it afterward.</td>
<td>0</td>
<td>Configured Manually</td>
<td>HTTP</td>
</tr>
<tr>
<td>Oracle XML DB Developer's Guide&lt;br&gt;The Oracle XML DB FTP is used when applications need to access an Oracle database from an FTP listener. It is configured during installation, but you cannot view it afterward.</td>
<td>0</td>
<td>Configured Manually</td>
<td>FTP</td>
</tr>
<tr>
<td>Oracle Services for Microsoft Transaction Server&lt;br&gt;The port number for Microsoft Transaction Server is configured when you enter its value in the Oracle Universal Installer the first time you install the software on a particular server. If you install the software in multiple Oracle homes on the same server, then Oracle Universal Installer uses the same port number that you specified during the first installation. In most cases, you do not have to reconfigure the port number.</td>
<td>Dynamic</td>
<td>49152-65535</td>
<td>TCP</td>
</tr>
</tbody>
</table>

**See Also:**

- Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide for information on Oracle Management Agent ports
- Oracle Real Application Clusters Installation Guide for Microsoft Windows x64 (64-Bit) for a list of clusterware ports used in Oracle components
Changing the Oracle Services for Microsoft Transaction Server Port

In most cases, you need not reconfigure the port number.

If you must, then you can use the Registry Editor to edit its value in the
HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\OracleMTSRecoveryService\Protid_0
Registry Editor key to any available port within the range 1024 to 65535.

During installation, Oracle Universal Installer takes the value for the port from the key,
if it exists. Otherwise, a free port ranging from 49152 to 65535 is chosen.
Index

Numerics

19c deprecated features, xvii

A

accessibility software, Java Access Bridge, A-1
account control, 4-12
Administrators group, requirements for Oracle installations, 6-3
aliases, multiple on computers, E-2
ASMCA, 8-3
asmcmd utility, 5-22
asmtool utility, 5-15
asmtoolg utility, 5-14
authentication support
  preinstallation requirements, 2-11
Automatic Diagnostic Repository (ADR), B-1
Automatic Memory Management, 3-4
  about, 1-5
Automatic Storage Management (Oracle ASM)
  configuring Oracle Database to communicate with, 7-17

B

backups of database
  perform before upgrading, 6-3
bind order of the adapters
  about, E-3

C

CDBs, 8-11, C-11
  character sets, 6-6
central inventory, B-4
  See also OINSTALL directory
certification matrix, 1-5
character sets, 6-6, 6-14
client-server configurations, B-2
Cluster Verification Utility
  download location, 1-5
  incorporated into OUI, 1-5
  overview, 1-5
clusters
  installation guidelines, 6-4
commands
  runcluvfy.bat, 5-21
  setup.exe, 5-21
components
  for single Oracle homes, 3-3
  installation of single Oracle home components, 3-3
computers with multiple aliases, E-2
computers, non-networked, E-2
configuration assistants, 3-5
  suppressing during silent or response file installation, C-6
  See also Oracle Database Configuration Assistant (DBCA), Net Configuration Assistant (NetCA)
configuring disks for Oracle Automatic Storage Management, 6-5
Connection Manager
  ports, ranges and protocol, F-2
console mode, 6-14
control files
  about, 8-15
  using Oracle Enterprise Manager Database Control with, 8-15
copying demo directory, D-6
cron jobs, 1-5
custom database
  failure groups for Oracle Automatic Storage Management, 5-8
  requirements when using Oracle Automatic Storage Management, 5-8

D

data files
  about, 8-14
  creating separate directories for, 2-10
  minimum disk space for, 2-9
  options for placing on file systems, 2-8
  recommendations for file system, 2-9
data loss
  minimizing with Oracle ASM, 5-8
Database Security
preinstallation requirements, 2-11
Database Upgrade Assistant, computers with minimum memory, 6-4
databases
control files, 8-15
data files, 8-14
initialization parameter file, 8-13
Oracle Automatic Storage Management requirements, 5-8
redo log files, 8-15
starting, 8-4
stopping, 8-4
tablespaces, 8-14
DB_DOMAIN parameter, 8-12
DB_NAME parameter, 8-12
DBCA
See Oracle Database Configuration Assistant
dbca.rsp file
about, C-4
using, C-8
default control files, 8-15
default data files, 8-14
default initialization parameter file, init.ora, 8-13
default tablespaces, 8-14
deinstallation
files removed, 9-2
Deinstallation Tool
about, 9-1
demo directory, D-6
deprecated features, xviii
description
database restart, 5-1
Oracle Restart, 5-1
device names
creating with asmtool, 5-15
creating with asmtooog, 5-14
diagnostic data, B-1
Direct NFS
orangfstab file, 7-9
Direct NFS Client
enabling, 7-12
Enabling HCC, 7-13
SNMP support, 7-13
directory
creating separate data file directories, 2-10
database file directory, 2-9
disk group
Oracle ASM, 5-8
disk groups
recommendations for, 5-8
disk space
checking, 2-3
Oracle ASM, 5-11
disk space (continued)
requirements for preconfigured database in Oracle Automatic Storage Management, 5-8
diskpart.exe tool,
about, 5-13
syntax, 5-13
disks
configuring for Oracle Automatic Storage Management, 6-5
documentation
additional Oracle documentation, xiv
DVD drive, installing from, 6-10
E
environment variables
NLS_LANG, 6-13
ORACLE_HOME
preventing installation, 6-3
TEMP and TMP
hardware requirements, 2-3
TMP and TMPDIR, 5-4
example01.DBF data file, 8-14
deprecated features, xvii
examples
Oracle ASM failure groups, 5-8
executable files, 5-4
executeConfigTools, C-11
external redundancy
Oracle Automatic Storage Management level, 5-8
F
failure group
characteristics of Oracle ASM failure group, 5-8
examples of Oracle Automatic Storage Management failure groups, 5-8
Oracle ASM, 5-8
fast recovery area
filepath, B-4
Grid home
filepath, B-4
Fast Recovery Area, 7-18
file paths, D-9
file systems
data file and recovery file placement options, 2-8
system requirements, 2-2
using for data files, 2-9
files
removed by deinstallation, 9-2
tnsnames.ora, 7-15
Flash Recovery Area
See Fast Recovery Area

G
generic documentation references
  Windows-specific parameter file name and location, 8-13
  Windows-specific redo log file location, 8-15
  Windows-specific redo log file size, 8-15
global database name
  about, 8-12
  identifying, 8-12
global database name, defined, 8-12
globalization, 1-5

H
  host name, setting before installation, E-1

I
  image
    install, 5-17, 6-17
  initialization parameter file
    about, 8-13
    in database, 8-13
    init.ora, 8-13
  installation
    completing, 6-18
    component-specific guidelines, 6-4
    computer aliases, multiple, E-2
    configuration options, about, 3-5
    downloading software from Oracle Technology Network, 6-7
    DVD drive, 6-10
    guidelines, 6-18
    Java Access Bridge, A-2
    laptops, E-2
    Oracle Automatic Storage Management, 5-8
    overview, 3-1
    postinstallation tasks, 7-1
    preinstallation considerations, 6-2
    remote installation with remote access software, 6-9
    remote installation, DVD drive, 6-10
    single Oracle home components, 3-3
  installation types
    and Oracle Automatic Storage Management, 5-8

  Installing
    Oracle restart, 5-19
    invalid objects
      recompiling, 7-4

J
Java Access Bridge
  about, A-1
  installing, A-2
  Jobs system, 7-16
  JRE (Java Runtime Environment)
    requirements, 2-2

K
  Kerberos Based Authentication for Direct NFS, 7-12

L
  languages
    installing Oracle components in different languages, 6-16
    using Oracle components in different languages, 6-15
  laptops, installing Oracle Database on, E-2
  licensing, 1-5
  listeners
    stopping existing listener process, 4-12
  local device, using for data files, 2-9
  loopback adapters, E-3
    about, E-3
    checking if installed, E-3
    computers with multiple aliases, E-2
    installing, E-3
    installing on Windows Server 2008, E-4
    non-networked computers, E-2
    removing, E-5
    See also network adapters, primary network adapters
LVM
  recommendations for Oracle Automatic Storage Management, 5-8

M
multihomed computers, installing on, E-1
multiple aliases, computers with, E-2
multiple Oracle homes
  setting, E-1
  System Identifier (SID), 8-13
Multiple Oracle Homes Support
  advantages, B-2
multitenant container database
  character sets, 6-6
multiversioning, B-2
My Oracle Support website
  about, 1-5
  accessing, 1-5
Net Configuration Assistant (NetCA)
response files, C-7
running at command prompt, C-7
suppressing during silent or response file installation, C-6
Net Services Configuration Assistant, computers with minimum memory, 6-4
netca.rsp file
about, C-4
using, C-7
network adapters, E-2
computers with multiple aliases, E-2
how primary adapter is determined, E-3
non-networked computers, E-2
primary, on computers with multiple aliases, E-2
See also loopback adapters, primary network adapters
network cards, multiple, E-1
network protocols, supported, 2-4
network topics
computers with multiple aliases, E-2
laptops, E-2
listed, E-1
loopback adapters, E-3
multiple network cards, E-1
non-networked computers, E-2
NLS_LANG environment variable, 6-13
non-networked computers, E-2
NTFS system requirements, 2-2

O

OEM
See Oracle Enterprise Manager
OFA, B-1
See also Optimal Flexible Architecture
OINSTALL directory, B-4
operating system
reviewing common practices, 2-7
operating systems, supported, 2-4
Optimal Flexible Architecture, B-1
about, B-1
orabasehome, D-8
orabasetab, D-3
ORAchkl
and Upgrade Readiness Assessment, 1-5
Oracle ACFS
and Oracle Clusterware files, 5-4
enabling, 5-23
restrictions and guidelines for usage, 5-4
Oracle ADVM, 5-4
Oracle ASM, 5-8
disk groups, 5-8
disk space, 5-11
failure groups, 5-8
recommendations for disk groups, 5-8
See also Oracle Automatic Storage Management
Oracle ASM disk space, 5-11
Oracle Automatic Storage Management, 5-8
allocation units (AU) and ASM disks, 5-8
asmcmd utility, 5-22
characteristics of failure groups, 5-8
configuring disks, 6-5
considerations before installing, 5-7
disk space, 5-11
failure groups
examples, 5-8
identifying, 5-8
installation, testing, 5-22
part of Oracle Grid Infrastructure installation, 5-16
password file, 5-7
redundancy levels, 5-8
space required for preconfigured database, 5-8
SPFILE server parameter file, 5-7
Oracle Automatic Storage Management (Oracle ASM)
asmtool utility, 5-15
asmtoolg utility, 5-14
DAS disks, 5-12
getting started using, 8-3
managing, 8-3
Oracle ASM asmcmd utility, 8-3
Oracle ASM disk groups
managing, 8-3
partition creation, 5-12
SAN disks, 5-12
silent or response file mode installations, C-3
starting and stopping, 8-3
Oracle Automatic Storage Management Configuration Assistant, 8-3
Oracle base, B-1, B-4
Oracle base config, D-3
Oracle base directory
about, 3-1
installation, 3-1
Oracle base home, D-2
Oracle Clusterware
installed before Oracle Database, 6-4
Oracle Clusterware files
and Oracle ACFS, 5-4
Oracle components
using in different languages, 6-15
Oracle Database, 7-17
  Automatic Storage Management, configuring communication with, 7-17
  checking installed contents, 8-2
  creating data file directories, 2-10
  getting started using, 8-1
  accessing, 8-5
  starting and stopping database, 8-5
  minimum disk space requirements, 2-9
  requirements with Oracle Automatic Storage Management, 5-8
  starting and stopping, 8-4
  Windows Terminal Services support, 2-5
  See also installation, postinstallation, removing, requirements
Oracle Database Advanced Queuing, 7-13
Oracle Database Client
  requirements, 2-5
Oracle Database Configuration Assistant (DBCA)
  about, 3-5
  computers with minimum memory, 6-4
  response files, C-7
  suppressing during silent or response file installation, C-6
Oracle Database Upgrade Assistant, computers with minimum memory, 6-4
Oracle Database Vault
  audit policy, 3-4
  postinstallation task, 7-14
Oracle Disk Manager (ODM)
  library file, 7-12
Oracle Enterprise Manager,
  Database Control
    using to modify control files, 8-15
    using to modify redo log files, 8-15
    using to view control files, 8-15
    using to view redo log files, 8-15
Oracle Enterprise Manager (OEM)
  jobs system, setting correct credentials, 7-16
  preinstallation requirements, 2-11
Oracle Enterprise Manager Database Express
  logging into, 8-2
  password management, 8-11
  port number, 8-2
Oracle home
  file path, B-4
  Grid home
  filepath, B-4
  naming conventions, B-3
Oracle home directory
  about, 3-2
  multiple homes, network considerations, E-1
  multiple homes, precedence of components, 3-3
  single Oracle home components, 3-3
Oracle host name, setting before installation, E-1
Oracle Messaging Gateway feature, 7-13
Oracle Net Listener
  ports
    ranges and protocol, F-2
Oracle Net Services
  configuring, 7-14
  postinstallation task, 7-14
  stopping existing listener, 4-12
Oracle Net Services Configuration Assistant, computers with minimum memory, 6-4
Oracle Optimal Flexible Architecture
  See Optimal Flexible Architecture
Oracle Oracle Services for Microsoft Transaction Server
  ports
    changing, F-3
Oracle Provider for OLE DB
  behavior with multiple Oracle homes, 3-3
Oracle Real Application Clusters (RAC)
  installed before Oracle Database, 6-4
Oracle Restart
  description, 5-1
  Installing, 5-19
  password file, C-11
Oracle Schemas, xiv
oracle service user, 4-3
Oracle Services for Microsoft Transaction Server
  ports
    ranges and protocol, F-2
Oracle SQL Developer
  accessing, 8-5
Oracle Technology Network (OTN)
  downloading software from, 6-7
Oracle Text knowledge base, 7-15
Oracle Universal Installer
  location of executable, C-6
  running in different languages, 6-16
Oracle Universal Installer (OUI),
  guidelines in using, 6-4
  installation guidelines, 6-4
  response files, C-1
  running at command line, C-6
Oracle XML DB
  ports, ranges and protocol, F-2
  ORACLE_BASE_CONFIG, D-3, D-9
  ORACLE_BASE_HOME, D-2, D-9
  ORACLE_HOME, D-9
  ORACLE_HOME environment variable
    preventing installation, 6-3
  ORACLE_HOSTNAME environment variable
    computers with multiple aliases, E-2
    setting before installation, E-1
Oracle-managed files feature, 2-11
oraInventory, B-4
oranfstab configuration file, 7-9

P
partition using with Oracle Automatic Storage Management, 5-8
partitions, 5-13
See also diskpart.exe tool
password file for Oracle Automatic Storage Management, 5-7
passwords change after install, 8-7
for administrative accounts, 8-6
guidelines, 8-10
managing in SQL*Plus, 8-11
patch updates, 7-2
PDBs, C-11
PGA and memory management, 1-5
PL/SQL external procedures postinstallation task, 7-16
ports Connection Manager, ranges and protocol, F-2
default ranges, F-1
Oracle Net Listener ranges and protocol, F-2
Oracle Services for Microsoft Transaction Server changing, F-3
Oracle Services for Microsoft Transaction Server, ranges and protocol, F-2
Oracle XML DB, ranges and protocol, F-2
postinstallation configuration of Oracle software, C-11
postinstallation tasks, 7-1
changing passwords, 8-10
configuring secure sockets layer, 7-5
database-to-Automatic Storage Management communication, 7-17
getting started using Oracle Database, 8-1
Jobs system, 7-16
Oracle Messaging Gateway feature, 7-13
Oracle Net Services, 7-14
Oracle Text knowledge base, 7-15
PL/SQL external procedures, 7-16
setting job system credentials for Enterprise Manager, 7-16
shared server support, 7-16
preconfigured database Oracle Automatic Storage Management disk space requirements, 5-8

preconfigured database (continued)
requirements when using Oracle Automatic Storage Management, 5-8
preinstallation perform database backup, 6-3
requirements for Oracle Database Security, 2-11
requirements for Oracle Enterprise Manager, 2-11
preinstallation considerations, 6-2
primary network adapters, E-3
how determined, E-3
See also loopback adapters, network adapters process, stopping existing listener process, 4-12
proxy realm, 1-5

R
RAID (Redundant Array of Independent Disks) using for Oracle data files, 2-9
read only Oracle home, D-4
read-only oracle home, D-1, D-2, D-9
read-only Oracle home, D-1, D-3, D-6, D-8
read/write oracle home, D-9
recommendations on performing software-only installations, 5-20
recovery files, options for placing on file system, 2-8
redo log files in starter database, 8-15
using Oracle Enterprise Manager Database Control with, 8-15
redundancy level and space requirements for preconfigured database, 5-8
for Oracle Automatic Storage Management, 5-8
Redundant Array of Independent Disks See RAID
release update revisions, 7-2
release updates, 7-2
releases multiple, B-2
remote access software, 6-9
remote installations DVD drive, 6-10
remote access software, 6-9
requirements, 5-8
for JRE, 2-2
for Oracle Enterprise Manager, 2-11
hard disk space, 2-2
hardware, verifying, 2-3
Oracle Database Client, 2-5
software, 2-3
requirements (continued)

Web browser support, 2-6
Windows Terminal Services, 2-5
response file mode, C-2
about, C-2
reasons for using, C-2
See also response file mode
See also response files, silent mode

response files
about, C-2
creating
with record mode, C-4
with template, C-3
dbca.rsp, C-4
general procedure, C-3
Net Configuration Assistant, C-7
netca.rsp, C-4
Oracle Database Configuration Assistant (DBCA), C-7
passing values at command line, C-2
specifying with Oracle Universal Installer, C-6
using, C-1

response files installation
about, C-1
roohctl-enable, D-4
root user, 6-18
running multiple Oracle releases, B-2

SQL Developer
accessing, 8-5
SQL*Plus
accessing, 8-5
password management, 8-11
sqlnet.ora file, enabling Windows native authentication, 7-17
SSL, 7-5
stopping existing services, 4-11
SYSTEM
tablespace, description, 8-14
system privileges accounts locked after install, 8-7
system requirements
on NTFS file systems, 2-2
system01.dbf data file, 8-14

T

Tablespaces, 8-14
expanding for large sorts, 8-14
in database, 8-14
SYSTEM, 8-14
TEMP, 8-14
UNDOTBS, 8-14
USERS, 8-14

TEMP
tablespace (temp01.dbf), 8-14
TEMP environment variable, hardware requirements, 2-3
temp01.dbf data file, 8-14
temporary directory, 2-3
temporary disk space
checking, 2-3
freeing, 2-3
tmp directory
checking space in, 2-3
freeing space in, 2-3
TMP environment variable, 5-4
hardware requirements, 2-3
TMPDIR environment variable, 5-4
tnsnames.ora file, 7-15
troubleshooting
cron jobs and installation, 1-5

U

UNDOTBS
tablespace (undotbs01.dbf), 8-14
unsupported components
on Windows Terminal Services, 2-5
upgrade
Oracle Automatic Storage Management, 5-16

Sample Schemas
tablespace and data files, 8-14

schemas
Oracle Schemas, about, xiv
Sample Schemas tablespace and data files, 8-14

seamless patching, D-1

security
Oracle Database Security Strong Authentication requirements, 2-11
server parameter file (SPFILE), 5-7
SERVICE_NAMES parameter, 8-12
services, stopping, 4-11
setup.exe
See Oracle Universal Installer (OUI)
SGA
and memory management, 1-5
shared server support, 7-16
silent mode, C-2
about, C-2
reasons for using, C-2
See also response file mode, response files
single Oracle home components, 3-3
SPFILE server parameter file, 5-7
upgrading
  and ORAchk Upgrade Readiness Assessment, 1-5
  backing up before upgrading, 6-3
user account control, 4-12
user accounts, managing, 4-12
user names
  changing passwords, 8-10
USERS
  tablespace (users01.dbf), 8-14
utlrp.sql, 7-4

W
Web browser support, 2-6
Windows
  compilers, supported, 2-4
Windows (continued)
  credentials for job system, 7-16
  network protocol, supported, 2-4
  operating systems, supported, 2-4
Windows 7
  user account control, 4-12
Windows 8
  user account control, 4-12
Windows Server 2008
  user account control, 4-12
Windows Server 2008 R2
  user account control, 4-12
Windows Services utility, starting and stopping databases, 8-4
Windows Terminal Services support, 2-5
  unsupported components, 2-5