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Installation Guide

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Oracle Database Installation Guide, 12c Release 1 (12.1) for Microsoft Windows

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Preface

This preface contains these topics:

- Audience
- Documentation Accessibility
- Accessing Documentation
- Related Documentation
- Conventions

Audience

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

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

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at

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Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit

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Accessing Documentation

The documentation for this release includes platform-specific documentation and generic product documentation.

Platform-Specific Documentation

Platform-specific documentation includes information about installing and using Oracle products on particular platforms.

The platform-specific documentation for this product is available in both Adobe portable document format (PDF) and HTML format on Oracle Technology Network at:

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

Product Documentation

Product documentation includes information about configuring, using, or administering Oracle products on any platform. The product documentation for Oracle Database 12c Release 1 (12.1) is available in both HTML and PDF formats on Oracle Technology Network (OTN) at:

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

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*

For information about Oracle error messages, see *Oracle Database Error Messages*. Oracle error message documentation is available only in HTML. If you only have access to the Oracle Database 12c Release 1 (12.1) 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. For information about how these schemas were created and how you can use them yourself, see *Oracle Database Sample Schemas*.

To download free release notes, installation documentation, white papers, or other collateral, visit the Oracle Technology Network. You must register online before using Oracle Technology Network; registration is free and can be done at

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Conventions

The following text conventions are used in this document:

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

Changes in This Release for Oracle Database Installation Guide

This preface contains:

[Changes in Oracle Database 12c Release 1 \(12.1\)](#)

See Also: *Oracle Database New Features Guide*

Changes in Oracle Database 12c Release 1 (12.1)

The following are changes in *Oracle Database Installation Guide* for Oracle Database 12c Release 1 (12.1):

- [New Features](#)
- [Deprecated Features](#)
- [Desupported Features](#)

New Features

- Oracle Home User Support for Database

Starting with Oracle Database 12c Release 1 (12.1), Oracle Database supports the use of Oracle Home User, which can be specified at installation time. The Oracle Home User can be a Windows Built-in Account or a standard Windows User Account (not an Administrator account). This account is used for running Windows services for Oracle home. For enhanced security, Oracle recommends that you use a standard Windows User Account (instead of Windows Built-in Account).

See Also: ■

- ["Recommended File System"](#) on page 2-4
- ["Configuring Environment Variables for the Software Installation Owner"](#) on page 4-9
- ["Managing User Accounts with User Account Control"](#) on page 4-9
- ["Operating System Groups Created During Oracle Database Installation"](#) on page 4-3
- ["Managing Oracle Home User"](#) section in *Oracle Database Platform Guide for Microsoft Windows*

- Oracle ASM File Access Control on Windows

This feature provides access control to separate the roles on Windows. With Oracle database services running as users rather than Local System, the Oracle ASM access control feature must be enabled to support role separation on Windows. In previous releases, this feature was disabled on Windows because all Oracle services run as Local System.

See Also:

- "Oracle Automatic Storage Management File Access Control" in *Oracle Database Platform Guide for Microsoft Windows*
- "Managing Oracle ASM File Access Control for Disk Groups" in *Oracle Automatic Storage Management Administrator's Guide*
- "Operating System Groups Created During Oracle Database Installation" on page 4-3
- "Configuring Storage for Oracle Automatic Storage Management" on page 5-6

- Oracle Flex ASM

Oracle Flex ASM enables an Oracle ASM instance to run on a separate physical server from the database servers. Any number of Oracle ASM servers can be clustered to support much larger number of database clients.

Oracle Database instances can be set up as clients to Oracle Flex ASM where metadata is provided to the database instance by an Oracle Flex ASM instance that may be on a different node than the database instance.

Note that Oracle Flex ASM can apply to a collection of databases, each one a single instance but running in a Flex ASM Cluster.

See Also: *Oracle Automatic Storage Management Administrator's Guide* for more information about Oracle Flex ASM

- Deinstallation Tool Integrated with Installation Media

See Also:

- "About the Deinstallation Tool" on page 9-2
- "Change for Standalone Deinstallation Tool" in *Oracle Database Upgrade Guide*

- Simplified Oracle Label Security Installation

See Also:

- "Configuring Oracle Label Security" on page 7-8
- *Oracle Label Security Administrator's Guide*

- Simplified Oracle Database Vault Installation
- Unified Database Audit Configuration

Starting with Oracle Database 12c Release 1 (12.1), you can create named audit policies. An audit policy contains a set of audit options and it is stored in the database as an object. The advantage of creating a named audit policy is that it reduces the number of commands that are required to create a database audit policy, and it simplifies the implementation of an audit configuration for security and compliance with conditional auditing.

This new audit policy framework is included with the database installation.

See Also: "Auditing Activities with Unified Audit Policies and the AUDIT Statement" in *Oracle Database Security Guide*

- Oracle Enterprise Manager Database Express 12c
- Support for Separation of Database Administration Duties

See Also:

- "About Job Role Separation Operating System Privileges Groups and Users" on page 4-5
- "Extended Oracle Database Groups for Job Role Separation" on page 4-6
- "Creating Job Role Separation Operating System Privileges Groups and Users" in *Oracle Grid Infrastructure Installation Guide*
- "Database Administrator Authentication" in *Oracle Database Administrator's Guide*
- "Managing Administrative Privileges" in *Oracle Database Advanced Security Administrator's Guide*

- Oracle DBCA Support for CDBs and PDBs

Starting with Oracle Database 12c Release 1 (12.1), Oracle Database Configuration Assistant (Oracle DBCA) allows you to create either a non-CDB or a multitenant container database (CDB). You can create the CDB with zero, one, or more user-created pluggable databases (PDBs).

You can also create a CDB with one PDB during database installation.

- Support for NFS Version in Direct NFS Client

Starting with Oracle Database 12c Release 1 (12.1), you can specify the NFS protocol version to be used by the Direct NFS Client.

See Also: "Enabling Direct NFS Client" on page 7-5.

- Configuring the OraClrAgnt Service for Oracle Database Extensions for .NET

Starting with Oracle Database 12c Release 1 (12.1), after installation you use the OraClrCtl.exe utility to create, start, stop, and delete the OraClrAgnt service.

See Also: "Configuring the OraClrAgnt Service for Oracle Database Extensions for .NET" on page 7-8.

Deprecated Features

The following features are deprecated in this release, and may be desupported in a future release. See *Oracle Database Upgrade Guide* for a complete list of deprecated features in this release.

- Deprecation Announcement for Oracle Restart

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 Standalone and Cluster deployments.

See Also: My Oracle Support Note 1584742.1 for more information about the Oracle Restart deprecation announcement and its replacement:

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=1584742.1&displayIndex=1>

- Change for Standalone Deinstallation Tool

The deinstallation tool is now integrated with the database installation media. See "[Deinstallation Tool Integrated with Installation Media](#)".

- Deprecation of `-cleanup0Base`

The `-cleanup0Base` flag of the deinstallation tool is deprecated in this release. There is no replacement for this flag.

- Windows NTS Authentication Using the NTLM Protocol

The NTS authentication adapter no longer supports the use of the NT LAN Manager (NTLM) protocol to authenticate Windows domain users. Thus, the NTS adapter cannot be used to authenticate users in old Windows NT domains or domains with old Windows NT domain controllers. However, local connections and Oracle Database services running as a Windows Local User continues to be authenticated using NTLM. A new client-side `sqlnet.ora` boolean parameter, `no_ntlm` (default value is `FALSE`) allows you to control if NTLM can be used in NTS authentication. When the parameter is set to `TRUE`, NTLM cannot be used in NTS authentication.

Desupported Features

The following features are no longer supported by Oracle. See *Oracle Database Upgrade Guide* for a complete list of desupported features in this release.

- Oracle Enterprise Manager Database Control
- `CLEANUP_ORACLE_BASE` Property Removed
- Oracle COM Automation
- Oracle Objects for OLE
- Oracle Counters for Windows Performance Monitor
- Raw Devices

Oracle Database Installation Checklist

The following checklists provide a list of required preinstallation steps:

- [Hardware Checklist for Oracle Database Installation](#)
- [Operating System Checklist for Oracle Database Installation](#)
- [Oracle User Environment Configuration Checklist for Oracle Database Installation](#)
- [Storage and Recovery Checklist for Oracle Database Installation](#)
- [OUI Checklist for Single Instance Oracle Database Installation](#)
- [Planning Checklist for Oracle Database Installation](#)

Use these checklists to coordinate tasks to help ensure that all system and storage preparation, and configuration tasks are completed before starting an Oracle Database or an Oracle Grid Infrastructure for a standalone server installation.

1.1 Hardware Checklist for Oracle Database Installation

Review the following hardware checklist for all installations:

Table 1–1 Server Hardware Checklist for Oracle Database

Check	Task
	<p>Confirm Server Make and Architecture:</p> <p>Confirm that server make, model, core architecture, and host bus adaptors (HBA) are supported to run with Oracle Database and Oracle Grid Infrastructure for a standalone server.</p>
	<p>Check Display and Network Setup:</p> <ul style="list-style-type: none"> ■ Server display cards provide at least 1024 x 768 display resolution. ■ Server is connected to the network, contains a display monitor and DVD drive.
	<p>Allocate Local Disk Space for Oracle Software:</p> <ul style="list-style-type: none"> ■ Based on the Oracle Database edition you intend to install, server meets the disk space requirements listed in Table 0–2. ■ At least 4.5 GB of disk space for an Oracle Grid Infrastructure for a standalone server installation.
	<p>Random Access Memory (RAM):</p> <ul style="list-style-type: none"> ■ At least 4 GB RAM for Oracle Database installations. See Table 0–1. ■ At least 4 GB of RAM for Oracle Grid Infrastructure for a standalone server including installations where you plan to install Oracle Database.
	<p>Temporary Disk Space Allocation:</p> <p>At least 500 MB allocated to <code>TEMP</code>.</p>
	<p>Check Storage Hardware:</p> <p>Either Storage Area Network (SAN) or Network-Attached Storage (NAS).</p>

1.2 Operating System Checklist for Oracle Database Installation

Review the following software checklist for all installations:

Table 1–2 *Operating System Checklist for Oracle Database*

Check	Task
	Operating System: Supported in the list of supported releases listed in Table 0–3 .

1.3 Oracle User Environment Configuration Checklist for Oracle Database Installation

Review the following user environment checklist for all installations:

Table 1–3 *User Environment Configuration for Oracle Database*

Check	Task
	<p>Create Groups and Users.</p> <p>Review "Creating Required Operating System Groups and Users" on page 4-1 for information about the groups and users you need to create for the kind of deployment you want to do. Oracle Installation users have different requirements from Oracle Home users. User names must use only ASCII characters.</p>
	<p>Create mount point paths for the software executable files.</p> <p>Oracle recommends that you follow the guidelines for an Optimal Flexible Architecture configuration, as described in the appendix "Optimal Flexible Architecture" on page B-1.</p>
	<p>Unset Oracle Software Environment Variables.</p> <p>If you have had an existing installation on your system, and you are using the same user account to install this installation, then unset the ORACLE_HOME, ORACLE_BASE, ORACLE_SID, TNS_ADMIN environment variables and any other environment variable set for the Oracle installation user that is connected with Oracle software homes.</p>
	<p>Ensure that the Database home (the Oracle home path you select for Oracle Database) uses only ASCII characters.</p> <p>This restriction includes Oracle Installation user names, which are used as a default for some home paths, as well as other directory names you may select for paths.</p>

1.4 Storage and Recovery Checklist for Oracle Database Installation

Review the following storage configuration task checklist for all installations:

Table 1–4 Storage Configuration Checks for Oracle Database

Check	Task
	<p>Decide the Database Storage Option</p> <p>During the database installation, you must specify one of the following storage options for database files:</p> <ul style="list-style-type: none"> ▪ File System Oracle Database Configuration Assistant (Oracle DBCA) creates the database files in a directory on a file system mounted on the computer. 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: <ul style="list-style-type: none"> - A file system on a disk that is physically attached to the system - A file system on a logical volume manager (LVM) volume or a RAID device - A network file system (NFS) mounted from a certified network-attached storage (NAS) device. ▪ Oracle Automatic Storage Management Oracle Automatic Storage Management (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. <p>See "Database Storage Options" on page 2-13.</p>
	<p>Decide If You Want to Enable Recovery</p> <p>If you decide to enable recovery during the database installation, then select one of the following options:</p> <ul style="list-style-type: none"> ▪ File System: Oracle Universal Installer (OUI) provides you with an option to configure the fast recovery area location. ▪ Oracle Automatic Storage Management: This option allows you only to use the same disk group for both Oracle Database files and recovery files.. <p>See "Identifying Storage Requirements for Oracle Automatic Storage Management" on page 5-6 and "Creating the Fast Recovery Area Disk Group" on page 7-13.</p>

1.5 OUI Checklist for Single Instance Oracle Database Installation

Review the following task checklist before you start Oracle Universal Installer (OUI) for single instance Oracle Database installations:

Table 1–5 Oracle Database Checks Before Starting OUI

Check	Task
	<p>Verify if Oracle Grid Infrastructure Exists</p> <p>If you want to use Oracle ASM or Oracle Restart, 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.</p>
	<p>Check Running Oracle Processes, and Shut Down if Necessary:</p> <ul style="list-style-type: none"> ▪ 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. <p>See "Stopping Existing Oracle Services" on page 4-8.</p>

Table 1–5 (Cont.) Oracle Database Checks Before Starting OUI

Check	Task
	<p>Decide if You Want to Install Other Languages</p> <p>During installation, you are asked if you want translation of user interface text into languages other than the default, which is English. If the language set for the operating system is not supported by the installer, then by default the installer runs in the English language.</p> <p>See <i>Oracle Database Globalization Support Guide</i> for detailed information about character sets and language configuration.</p>
	<p>Decide Your Management Option</p> <p>By default, Oracle Database 12c is managed by Oracle Enterprise Manager Database Express.</p> <p>However, 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:</p> <ul style="list-style-type: none"> ▪ OMS host ▪ OMS port ▪ EM admin username ▪ EM admin password <p>See Also:</p> <ul style="list-style-type: none"> ▪ <i>Oracle Database 2 Day DBA</i> for configuring EM Express ▪ <i>Oracle Enterprise Manager Cloud Control Administrator's Guide</i> for information about how to use Oracle Enterprise Manager Cloud Control to discover targets
	<p>Consider Memory Allocation and Automatic Memory Management</p> <p>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.</p> <p>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.</p> <p>See Also: <i>Oracle Database Administrator's Guide</i></p>

1.6 Planning Checklist for Oracle Database Installation

Review the following general tasks checklist for all installations:

Table 1–6 Recommended Planning Checks for Oracle Database

Check	Task
	<p>Read the Release Notes:</p>
	<p>Review the Licensing Information</p> <p>Although the installation media in the media pack contain many Oracle components, you are permitted to use only those components for which you have purchased licenses.</p> <p>Oracle Support Services does not provide support for components for which licenses have not been purchased.</p> <p>Read <i>Oracle Database Licensing Information</i>.</p>

Table 1–6 (Cont.) Recommended Planning Checks for Oracle Database

Check	Task
	<p>Obtain Your My Oracle Support Information</p> <p>You will need your My Oracle Support username and password to perform various installation related tasks such as configuring security updates, downloading software updates, and reviewing certification.</p> <p>The My Oracle Support website is available at: https://support.oracle.com/</p>
	<p>Review Oracle Support Certification Matrix</p> <p>New platforms and operating system software versions might be certified after this guide is published, review the certification matrix on the My Oracle Support website for the most up-to-date list of certified hardware platforms and operating system versions: https://support.oracle.com/</p> <p>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.</p>
	<p>Review OUI Installation Tutorial</p> <p>Review the following step-by-step installation tutorial to understand OUI installation options: https://apex.oracle.com/pls/apex/f?p=44785:24:0::NO:24:P24_CONTENT_ID,P24_PREV_PAGE:6281,1</p> <p>Note: You can also run OUI up to the Summary screen, and either save a response file for review, or cancel the installation and run it at another time.</p>

Overview of Oracle Database Installation

This chapter describes the different installation types of Oracle Database and issues to consider before you install Oracle Database:

- [New Oracle Products and Features Installed with This Release](#)
- [Planning Your Installation](#)
- [Installation Considerations](#)
- [Oracle Database Installation Methods](#)
- [Oracle Database Editions](#)
- [Database Security Notification Options](#)
- [Database Configuration Options](#)
- [Database Storage Options](#)
- [Database Management Options](#)
- [Database Backup and Recovery Options](#)
- [Upgrade Considerations](#)
- [Migration Considerations](#)

2.1 New Oracle Products and Features Installed with This Release

There are many new features and products installed with this release. See the [Changes in This Release for Oracle Database Installation Guide](#) chapter.

2.2 Planning Your Installation

The Oracle Database installation process consists of six steps:

1. **Read the release notes:** Read the Oracle Database release notes before you begin the installation. The release notes are available with the platform-specific documentation. The latest version of the release notes is available on Oracle Technology Network at <http://www.oracle.com/technetwork/indexes/documentation/index.html>
2. **Review the licensing information:** Although the installation media in your media pack contain many Oracle components, you are permitted to use only those components for which you have purchased licenses.

Oracle Support Services does not provide support for components for which licenses have not been purchased.

See Also: *Oracle Database Licensing Information*

3. **Plan the installation:** This overview chapter describes the Oracle products that you can install and issues that you must consider before starting the installation.

You also may want to see [Appendix H](#), which covers frequently asked questions about installing Oracle Database components, such as how to install Oracle Database if your site uses Oracle applications or if you need multiple Oracle Database client connections.

If you plan to perform multiple installations, see [Appendix C](#) for information about silent or response file installations, and cloning the Oracle home.

Oracle Database Client is installed separately. You cannot install Oracle Database Client during an Oracle Database installation.
4. **Complete preinstallation tasks:** [Chapter 3](#) describes tasks that you must complete before installing Oracle Database. Additionally, see [Chapter 5](#) for Oracle Restart preinstallation tasks.
5. **Install the software:** Use the following sections to install Oracle Database:
 - [Chapter 5](#) describes how to use Oracle Universal Installer to install Oracle Grid Infrastructure for a standalone server.
 - [Chapter 6](#) describes how to use Oracle Universal Installer to install Oracle Database and how to clone an Oracle home.
 - [Appendix C](#) describes how to perform silent or response file installations, which you may want to use to perform multiple installations of Oracle Database.
 - [Appendix E](#) describes how to install and use Oracle components in different languages.
 - [Appendix G](#) provides troubleshooting advice in case you encounter problems with the installation.
6. **Complete postinstallation tasks:** [Chapter 7](#) describes postinstallation tasks.
7. **Get started using Oracle Database:** Use the following sections to get started using Oracle Database:
 - [Chapter 8](#) describes how to check the contents of the installed Oracle Database, how to start the database and various other Oracle tools, and how to locate various files.
 - "Cloning an Oracle Home" on page 6-18 describes how you can clone an existing Oracle Database home.
 - [Appendix B](#) on the Optimal Flexible Architecture, which is a set of guidelines that ensure reliable Oracle installations that require little maintenance.
 - [Appendix E](#) describes globalization support information.
 - [Appendix F](#) explains how to manage Oracle Database port numbers.
8. **Remove Oracle Database software:** [Chapter 9](#) describes how to remove Oracle Database software.

2.3 Installation Considerations

This section contains information that you should consider before deciding how to install this product. It contains the following sections:

- Installation Differences Between Windows and UNIX Systems
- Recommended File System
- Hardware and Software Certification
- Multiple Oracle Homes Support
- Oracle Grid Infrastructure for a Standalone Server
- Oracle Cluster Synchronization Services
- Oracle Universal Installer Overview
- Oracle Base Directory
- Oracle Home Directory
- Oracle Inventory Directory
- Installing Oracle Database Vault in an Oracle Data Guard Environment
- Oracle Database Vault Default Audit Policy and Initialization Parameters
- Consider Memory Allocation and Automatic Memory Management

2.3.1 Installation Differences Between Windows and UNIX Systems

If you are experienced with installing Oracle components in UNIX environments, note that many manual setup tasks required on UNIX are not required on Windows. The key differences between UNIX and Windows installations are:

- Startup and shutdown services

With Windows, you log in to a user account with Administrator privileges to install the Oracle Database software. You can also specify an Oracle Home User (standard Windows User Account, not an Administrator account) during installation. On Linux and UNIX systems, you must create and use a software owner user account, and this user must belong to the Oracle Inventory group.

- Environment variables

With Windows, Oracle Universal Installer sets environment variables such as *PATH*, *ORACLE_BASE*, *ORACLE_HOME*, and *ORACLE_SID* in the registry. In UNIX systems, you must manually set these environment variables.

If you have multiple Oracle databases in an Oracle home, then only the *SID* of the last Oracle database is set in the registry. See *Oracle Universal Installer and OPatch User's Guide for Windows and UNIX* for more information about managing Oracle homes.

- Operating System Groups

On Windows systems, Oracle Universal Installer creates *ORA_DBA*, *ORA_OPER*, *ORA_SID_DBA*, *ORA_SID_OPER*, *ORA_HOMENAME_DBA*, *ORA_HOMENAME_OPER* and other groups, which are used for operating system authentication for Oracle Database and Oracle ASM instances. On Linux and UNIX systems, you must create these operating system groups manually, and they are used for granting permission to access various Oracle software resources and for operating system authentication.

- Account for running Oracle Universal Installer

With Windows, you log in to a user account with Administrator privileges to install the Oracle Database software. You can also specify an Oracle Home User (standard Windows User Account, not Administrator account) during installation.

On Linux and UNIX systems, you must create and use a software owner user account, and this user must belong to the Oracle Inventory group.

2.3.2 Recommended File System

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.

See Also: "Setting File Permissions" in *Oracle Database Platform Guide for Microsoft Windows* for information about the default permissions when using Oracle Universal Installer and Database Configuration Assistant to install the Oracle Database software

2.3.3 Hardware and Software Certification

The platform-specific hardware and software requirements included in this installation guide were current at the time this guide was published. However, because new platforms and operating system software versions might be certified after this guide is published, review the certification matrix on the My Oracle Support website for the most up-to-date list of certified hardware platforms and operating system versions. This website also provides compatible client and database versions, patches, and workaround information for bugs. The My Oracle Support website is available at

<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 Links** options such as **Product Delivery**, and **Lifetime Support**.

See Also: "Windows Certification and Web Browser Support" on page 3-2

2.3.3.1 Third-Party Database Certification for Oracle SQL Developer

You can use Oracle SQL Developer to view metadata and data of several non-Oracle databases. Refer to "Database Certification for SQL Developer (Oracle and Third-Party)" in *Oracle SQL Developer Installation Guide* for more information.

2.3.4 Multiple Oracle Homes Support

Oracle Database supports multiple Oracle homes. You can install this release or previous releases of the software more than once on the same system, in different Oracle home directories. This allows flexibility in deployment and maintenance of the database software. For example, it enables you to run different versions of the database simultaneously on the same system, or it enables you to upgrade specific database instances on a system without affecting other running databases. However, when you have installed multiple Oracle homes on a single system, there is also some added complexity introduced that you must consider allowing these Oracle homes to coexist.

See Also:

- "Using Oracle Home User In Case of Multiple Oracle Home Directories" in *Oracle Database Platform Guide for Microsoft Windows*
- My Oracle Support Note 460054.1 for more details about multiple Oracle home environment issues

2.3.4.1 Installing the Software on a System with an Existing Oracle Installation

You must install this product into a new Oracle home directory. You cannot install products from one release of Oracle Database into an Oracle home directory of a different release. For example, you cannot install release 12.1 software into an existing Oracle9i Oracle home directory.

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 12.1.0.1 into an existing Oracle Database 12.1.0.1 home but you cannot install Oracle Database Client 12.1.0.1 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.

You can install this release more than once on the same system if each installation is installed in a separate Oracle home directory.

2.3.5 Oracle Grid Infrastructure for a Standalone Server

The Oracle Grid Infrastructure for a standalone server provides the infrastructure to include your single instance database in an enterprise grid architecture. Oracle Database 12c Release 1 (12.1) combines these infrastructure products into one software installation called the Oracle Grid Infrastructure home. On a single instance database, the Oracle Grid Infrastructure home includes Oracle Restart and Oracle Automatic Storage Management (Oracle ASM) software.

To use Oracle Automatic Storage Management or Oracle Restart, you must first 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.

See Also: [Chapter 5, "Oracle Grid Infrastructure for a Standalone Server"](#) for more information about installing Oracle Grid Infrastructure for a standalone server

2.3.6 Oracle Cluster Synchronization Services

When you install the Oracle Grid Infrastructure for a standalone server, Oracle Universal Installer configures the single-node version of Oracle Cluster Synchronization Services (CSS).

The CSS service is required to enable synchronization between an Oracle ASM instance and the database instances that rely on it for database file storage. Because the service must be running before an Oracle ASM instance or database instance starts, it is configured to start automatically by Oracle Restart before the Oracle ASM instance is started. It must be running if an Oracle database is using Oracle ASM for database file storage.

For single-instance installations, the CSS is installed-in and runs from the Oracle Grid Infrastructure home which is the same home that runs Oracle ASM.

Note: On cluster systems with Oracle RAC installations, the CSS is configured during the Oracle Clusterware installation. If the system is running Oracle Clusterware, then refer to *Oracle Real Application Clusters Installation Guide* for information about removing Oracle RAC or Oracle Clusterware.

See Also: "Oracle Automatic Storage Management" on page 2-14

2.3.7 Oracle Universal Installer Overview

Oracle Universal Installer is a Java-based graphical user interface (GUI) tool that enables you to install Oracle software. Oracle Universal Installer provides the following capabilities:

- Component and suite installations
- Globalization support
- Distributed installation support
- Unattended silent installations using response files
- Removal of installed components
- Multiple Oracle homes support

Oracle Universal Installer can run a silent or response file installation of Oracle software using response files. See [Appendix C, "Installing and Configuring Oracle Database Using Response Files"](#) for more information.

You must use the Oracle Universal Installer 12c to install components into an Oracle Database 12c Oracle home directory.

Oracle Universal Installer automatically installs the Oracle version of the Java Runtime Environment (JRE). This version is required to run Oracle Universal Installer and several Oracle assistants. Do *not* modify the JRE, unless doing so with a patch provided by My Oracle Support. Visit the following site to find Oracle patches to download:

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

When Oracle Universal Installer runs, it creates an *dbhome_n* directory, which keeps track of the components you are installing. Do not modify the contents of this directory. By default, this directory is located at the same directory level as *ORACLE_HOME*.

2.3.8 Oracle Base Directory

If you install Oracle Database 12c 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 reasons of security, 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 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 12c, then the Oracle Home User of Oracle Database 12c Oracle home has complete control over the Oracle Base of the earlier release.

See Also: "Managing Oracle Home User" in *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 12c or later 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 12c or later services might 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 other Oracle base directories exist on the system.

2.3.9 Oracle Home Directory

This section covers the following topics:

- [Contents of the Oracle Home Environment](#)
- [Multiple Oracle Home Components](#)

2.3.9.1 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\12.1.0\dbhome_1
```

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

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

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

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

2.3.9.2 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. These components are:

- Oracle Administration Assistant for Windows
- Oracle Provider for OLE DB

2.3.10 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 automatically the first time you install Oracle software on a Windows server.

2.3.11 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*.

2.3.12 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 Database Vault database tables, information stored in Oracle Catalog (rollback segments, tablespaces, and so on), the use of system privileges, and Oracle Label Security configuration. When you install Oracle Database Vault, the security specific database initialization parameters are initialized with default values.

See Also: *Oracle Database Vault Administrator's Guide* for more information about the database audit policy

2.3.13 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: "Managing Memory" in *Oracle Database Administrator's Guide*

2.4 Oracle Database Installation Methods

You can choose different installation methods to install Oracle Database, which are as follows:

- [Interactive Installation Types](#)
- [Automated Installation Methods Using Response Files](#)

2.4.1 Interactive Installation Types

When you use the interactive method to install Oracle Database by selecting the **Create and configure** a database option, Oracle Universal Installer displays a series of screens that enable you to specify all the required information to install the Oracle Database software and create a database.

Oracle Universal Installer provides you the following options:

- **Desktop Class:** Select this option if you are installing on a laptop or desktop class system. This option includes a starter database and allows minimal configuration. This option is designed for those who want to quickly set up a database.
- **Server Class:** Select this option if you are installing on a server class system, such as what you would use when deploying Oracle in a production data center. This option allows for more advanced configuration options. Advanced configuration options available using this option include Oracle RAC, Oracle Automatic Storage Management, backup and recovery configuration, integration with Enterprise Manager Cloud Control, and more fine-grained memory tuning, among others.

Furthermore, the Server Class option provides you with the following installation types:

- **Typical:** Select this installation method to quickly install Oracle Database. This installation type requires minimal user input. It installs the software and optionally creates a general-purpose database using the information that you specify on the screen. It is the default installation type.
- **Advanced:** Select this installation type to complete any of the following tasks:
 - Select a database character set or different product languages
 - Create the EXAMPLE tablespace during the installation
 - Create a database on a different file system from the software
 - Specify different passwords for administrative schemas
 - Configure recovery options
 - Configure Oracle Configuration Manager
 - In the Select Database Edition screen, if you select **Enterprise Edition**, then Oracle Universal Installer automatically selects the components most customers need for their Oracle Database installation.

See Also: "[Reviewing Component-Specific Installation Guidelines](#)" on page 6-3

2.4.2 Automated Installation Methods Using Response Files

By creating a response file and specifying this file when you start Oracle Universal Installer, you can automate some or all of the Oracle Database installation. These

automated installation methods are useful if you must perform multiple installations on similarly configured systems.

When you use a response file, you can run Oracle Universal Installer in the following modes, depending on whether you specify all of the required information or not:

- **Silent Mode:** Oracle Universal Installer runs in silent mode if you use a response file that specifies all required information, and specify the `-silent` option when starting Oracle Universal Installer. None of the Oracle Universal Installer screens are displayed.
- **Response File Mode:** Oracle Universal Installer runs in response file mode if you do not specify all required information in the response file.

For more information about these modes and about how to complete an installation using response files, see [Appendix C](#).

2.5 Oracle Database Editions

You can choose one of the following installation types when installing Oracle Database 12c:

- **Enterprise Edition:** Installs licensable Oracle Database options, and database configuration and management tools in addition to all of the products that are installed during a Standard Edition installation. It also installs products most commonly used for data warehousing and transaction processing. This option also permits you to enable or disable individual components from a components list.
- **Standard Edition:** This installation type is designed for department or workgroup-level applications and for small and medium-sized enterprises (SMEs). It is engineered to provide core relational database management services and options. It installs an integrated set of management tools, full distribution, replication, web features, and facilities for building business-critical applications.
- **Standard Edition One:** This installation type is designed for department, workgroup-level, or web applications. From single instance environments for small business to highly distributed branch environments, Oracle Database Standard Edition One includes all the facilities necessary to build business-critical applications.
- **Standard Edition 2:** This installation type is designed for department or workgroup-level applications and for small and medium-sized enterprises (SMEs). It is engineered to provide core relational database management services and options. It installs an integrated set of management tools, full distribution, replication, web features, and facilities for building business-critical applications.
- **Personal Edition:** Installs the same software as the Enterprise Edition installation type, but supports only a single user development and deployment environment that requires full compatibility with Enterprise Edition and Standard Edition. Oracle RAC is not installed with Personal Edition.

Note:

- The installation process is the same for all the database editions.
 - Ensure that you install only those products for which you have a valid license.
-
-

2.6 Database Security Notification Options

Oracle issues security alerts as needed for vulnerability fixes that are determined to be too critical to wait for distribution in the next Critical Patch Update.

During the database installation, in the Configure Security Updates screen, Oracle Universal Installer prompts you to provide a security contact. Select one of the following options:

- Provide an email address to receive security information for your installation.
- Provide a My Oracle Support email address or account name to receive security information for your installation, and to enroll your system for Security Updates. You can receive information about alerts through My Oracle Support.

You can choose not to provide this information, but Oracle strongly recommends that you configure a security notification contact.

The information collected by Security Updates is limited to configuration information. The data collected does not include personally identifiable information (with the exception of a local contact name in case of transmission problems). You may still use all licensed Oracle functionality if you decline to enable Security Updates.

To choose not to receive security notifications, leave all fields in the Configure Security Updates screen blank, and click **Next** to continue.

If you provide your My Oracle Support credentials, then Security Updates automatically gathers configuration information regarding your installed Oracle products and uploads it to Oracle's support systems. You can access the information it collects through your My Oracle Support account, and review health check recommendations, patch recommendations and other recommendations for your system in addition to security alerts.

See Also: The Oracle Security Policies page, which is available from the following URL:

<http://www.oracle.com/us/support/assurance/fixing-policies/index.html>

2.7 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.

This section describes the following database configuration options:

- [Preconfigured Database Types](#)
- [Installation Choices That Affect Database Creation](#)
- [Creating a Database After Installation](#)

2.7.1 Preconfigured Database Types

Oracle provides the following preconfigured database types that you can create or customize during the installation:

- General Purpose/Transaction Processing

- Data Warehouse

See the online help provided by either Oracle Universal Installer or Oracle Database Configuration Assistant for a description of these preconfigured database types.

2.7.2 Installation Choices That Affect Database Creation

Oracle Universal Installer runs Oracle Database Configuration Assistant in one of two modes, depending on the choices that you make during the installation:

- Noninteractive mode

During an Oracle Database installation, if you choose to create a preconfigured database type, then Oracle Universal Installer prompts you for the minimum amount of information required to create a database of the type you choose. It then runs Oracle Database Configuration Assistant in silent or response file mode to create the database after it installs the software.

Note: Oracle recommends that you use this method to create a database if you have not previously created one.

- Interactive mode

Install the database using Oracle Universal Installer and start Oracle Database Configuration Assistant from Oracle home. Oracle Database Configuration Assistant runs in interactive mode. Using the screens in Oracle Database Configuration Assistant, you can either modify one of the preconfigured database types or customize the database.

Note: If you choose this method to create a database, click the **Help** button on any of the Oracle Database Configuration Assistant screens for a description of the information that you must specify on that screen.

2.7.3 Creating a Database After Installation

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

See Also: *Oracle Database 2 Day DBA* for more information about using Oracle Database Configuration Assistant to create a database after installation

2.7.3.1 Creating an Oracle Database on Direct NFS

This section describes 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. See "[Installing the Oracle Database Software](#)" on page 6-10. 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

Follow steps 1 through 12 provided in section, "Creating a Database Using DBCA" in *Oracle Database 2 Day DBA*.

After the Prerequisite checks complete, on the Summary screen, minimize the installation window. DO NOT click Finish at this point.

3. Enable the Direct NFS option as described in "Enabling Direct NFS Client" on page 7-5.
4. Return to the DBCA window and click **Finish**.
5. 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.

6. Verify that the Direct NFS is configured for the database.
 1. Start SQL*Plus.
 2. Connect to the newly created database as a DBA user.
 3. Run the following SQL command:

```
SELECT * FROM v$dnfs_servers;
```

2.8 Database Storage Options

If you choose to create a database during the installation, you can specify the following storage options for database files:

- [File System](#)
- [Oracle Automatic Storage Management](#)

Note: Installing files on raw devices is no longer an option during installation. You must use a file system, or use Oracle Automatic Storage Management.

2.8.1 File System

If you choose the file system option, then Oracle Database Configuration Assistant creates the database files in a directory on a file system on your computer. Oracle recommends that the file system you choose be separate from the file systems used by the operating system or the Oracle software. The file system that you choose can be any of the following:

- A file system on a disk that is physically attached to the system

If you are creating a database on basic disks that are not logical volumes or RAID devices, then follow the Optimal Flexible Architecture (OFA) recommendations and distribute the database files over multiple disks.

- A file system on a logical volume manager (LVM) or a RAID device

If you are using multiple disks in an LVM or RAID configuration, then Oracle recommends that you use the stripe-and-mirror-everything (SAME) methodology to increase performance and reliability. Using this methodology, you must not specify multiple file system mounting points for database storage.

- A network file system (NFS) mounted from a certified network attached storage (NAS) device. You also have the option to use the Direct NFS Client feature, which simplifies the administration of NFS configurations and also offers performance improvements.

See Also: ["Configuring Direct NFS Client"](#) for more information about the Direct NFS Client feature

If the NAS device is certified by Oracle, then you can store the database files on them.

If you choose the Advanced database creation option, then you can also choose to use the Oracle-managed files feature with the new database. If you use this feature, then you must specify only the database object name instead of file names when creating or deleting database files.

See Also: *Oracle Database Administrator's Guide* for more information about Oracle-managed files

2.8.2 Oracle Automatic Storage Management

Oracle Automatic Storage Management is a high-performance storage management solution. For Oracle Database files, it simplifies the management of a dynamic database environment, such as creating and laying out databases and managing disk space.

Oracle Automatic Storage Management can be used with single database installations, multiple database installations, and in Oracle RAC environments. It can be used with databases created in Oracle Database 10g Release 1 (10.1.0.3 or later). However, Oracle Database 12c must use Oracle Automatic Storage Management from Oracle Database 12c or later. Oracle Automatic Storage Management is installed as part of the Oracle Grid Infrastructure installation. If you plan to use Oracle Automatic Storage Management, then you must install Oracle Grid Infrastructure before you install and create the database. 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.

See Also: [Chapter 5, "Oracle Grid Infrastructure for a Standalone Server"](#) for more information about installing the Oracle Grid Infrastructure software

Oracle Automatic Storage Management manages the storage of all database files, such as redo logs, control files, and data pump export files. Oracle Automatic Storage Management can manage the Oracle Database executable binary files and any other database file by creating a file system with Oracle Automatic Storage Management Cluster File System. Though Oracle Automatic Storage Management Cluster File System is cluster aware, it works as a file system on a single instance database also.

To use Oracle Automatic Storage Management, you allocate partitioned disks to Oracle with preferences for striping and mirroring. Oracle Automatic Storage Management manages the disk space for you, thus eliminating the need for traditional disk management tools such as logical volume managers (LVM), file systems, and the numerous commands necessary to manage both. The synchronization between Oracle

Automatic Storage Management and the database instance is handled by Oracle Cluster Synchronization Services (CSS).

See Also: *Oracle Automatic Storage Management Administrator's Guide* for more information about Oracle Automatic Storage Management Cluster File System

2.8.2.1 Oracle Automatic Storage Management Components

Oracle Automatic Storage Management uses the following components:

- [Oracle Automatic Storage Management Disk Groups](#)
- [Oracle Automatic Storage Management Instance](#)

Oracle Automatic Storage Management Disk Groups

A disk group is a set of disk devices that Oracle Automatic Storage Management manages as a unit. Each disk device can be an individual physical disk, a multiple disk device such as a RAID storage array or a logical volume, or a partition on a physical disk. However, mostly, disk groups consist of one or more individual physical disks. To enable Oracle Automatic Storage Management to balance I/O and storage appropriately within the disk group, ensure that all devices in the disk group have similar, if not identical, storage capacity and performance.

You can set the redundancy and striping attributes of individual file types within a disk group by using Oracle Automatic Storage Management disk group templates. When you create a disk group, Oracle Automatic Storage Management creates a set of default templates for that disk group. Default template settings depend on the disk group type. For example, the default template for control files for a normal redundancy disk group sets three-way mirroring. All other files are configured with two-way mirroring for normal redundancy, or three-way mirroring when configured for high redundancy. For a high redundancy disk group, the default mirroring cannot be changed, which implies that all files are always three-way mirrored in a high redundancy disk group. You can modify the default templates to suit the unique needs of your site. See *Oracle Automatic Storage Management Administrator's Guide* for more information.

Oracle Automatic Storage Management spreads data evenly across all of the devices in the disk group to optimize performance and utilization. You can add or remove disk devices from a disk group without shutting down the database. When you add or remove disks, Oracle Automatic Storage Management rebalances the data files across the disk group. You can create multiple disk groups to handle specific tasks, such as backup and recovery operations, in addition to routine file storage activities.

When you add a device to a disk group, you can specify a failure group for that device. Failure groups identify disk devices that have common failure characteristics, for example, devices that are attached to the same controller. If the controller fails, then all devices attached to it become unavailable. By default, each device also belongs to its own failure group. By using the failure groups you specify, Oracle Automatic Storage Management can distribute data among the devices in the disk group to help minimize the risk of data loss caused by component failures.

Oracle Automatic Storage Management Instance

The Oracle Automatic Storage Management instance is a special Oracle instance that manages Oracle Automatic Storage Management disk groups. The Oracle ASM instance and the ASMSNMP account are created and started, if necessary, when you install Oracle Grid Infrastructure. Oracle Enterprise Manager uses this account to monitor Oracle ASM instances to retrieve data from Oracle ASM-related data

dictionary views. The ASMSNMP account status is set to OPEN upon creation, and it is granted the SYSDBA privilege.

There is only one Oracle ASM instance per host regardless of the number of database instances running on that host.

See Also:

- "Configuring Disks Manually for Oracle Automatic Storage Management" on page 5-10
- "Managing Oracle ASM Users with Oracle Enterprise Manager" in *Oracle Automatic Storage Management Administrator's Guide* for more information about ASMSNMP user

2.9 Database Management Options

To simplify database administration, Oracle provides a web-based management tool called Oracle Enterprise Manager.

- Deploy Oracle Enterprise Manager centrally in your environment.

To deploy Oracle Enterprise Manager centrally, you must install at least one Oracle Management Repository and at least one Oracle Management Service within the environment, then install an Oracle Enterprise Management Agent on every computer. You then can use a single HTML interface to manage and monitor software and hardware targets on all of those systems. Targets can include Oracle databases, application servers, Net listeners, and third-party software. This single interface is called Oracle Enterprise Manager Cloud Control.

Note:

- Oracle Enterprise Manager Cloud Control is available separately on the Oracle Enterprise Manager Cloud Control installation media, and on the Oracle Technology Network website at:

<http://www.oracle.com/technetwork/oem/enterprise-manager/overview/index.html>

- For the latest Oracle Enterprise Manager certification information see the My Oracle Support certification page at:

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

See Also: *Oracle Enterprise Manager Cloud Control Basic Installation Guide*

- Oracle Enterprise Manager Database Express locally on the database system

Oracle Enterprise Manager Database Express 12c is a web-based management tool built into Oracle Database without any need for special installation or management.

Oracle Enterprise Manager Database Express can manage only a single database. If you want to administer multiple databases on a system, then you must either configure a separate Oracle Enterprise Manager Database Express for each database, or you must install Oracle Enterprise Manager Cloud Control.

This section contains the following topics:

- [Management Options for Preconfigured Databases](#)
- [Management Options for Custom Databases](#)
- [Features Provided by Oracle Enterprise Manager Database Express 12c](#)

2.9.1 Management Options for Preconfigured Databases

When you create a preconfigured database during the installation, you must select the Oracle Enterprise Manager interface to manage the database. The following options are available:

- Use Oracle Enterprise Manager Cloud Control for central database management

This option is available only if an Oracle Management Agent is installed on the system. When Oracle Universal Installer (OUI) detects an Oracle Management Agent on the system, you can choose this option and specify the Oracle Management Service to use to manage the database.

If an Oracle Management Agent is not installed, then you must use Oracle Enterprise Manager Database Express to manage the database. However, if Oracle Management Agent is installed after Oracle Database, then you can use Oracle Enterprise Manager Cloud Control to manage this database.

- Use Oracle Enterprise Manager Database Express for local database management

Oracle Enterprise Manager Database Express is built into Oracle Database without any need for special installation or management. Oracle Enterprise Manager Database Express is available and configured by default during the database installation, and is not displayed as an option in Oracle Universal Installer during the database installation.

2.9.2 Management Options for Custom Databases

Install the database using Oracle Universal Installer and start Oracle Database Configuration Assistant from Oracle home. Oracle Database Configuration Assistant runs in interactive mode. Using a screen in Oracle Database Configuration Assistant, you can specify the Oracle Enterprise Manager interface to manage the database. Alternatively, you can choose not to configure the database with Enterprise Manager.

Oracle recommends that you configure the database to use Oracle Enterprise Manager during the database installation. However, if you do not do this, then see *Oracle Database 2 Day DBA* for configuring EM Express, or see *Oracle Enterprise Manager Cloud Control Administrator's Guide* for information about how to use Oracle Enterprise Manager Cloud Control to discover targets.

2.9.3 Features Provided by Oracle Enterprise Manager Database Express 12c

Oracle Enterprise Manager Database Express provides a web-based user interface that enables you to monitor, administer, and maintain an Oracle database.

You can use Oracle Enterprise Manager Database Express to perform basic database administration tasks, such as:

- Configuration and Administration
 - Initialization Parameters
 - Memory Management

- Database Feature Usage
- Database Properties
- Storage
 - Tablespaces Management
 - Undo Management
 - Redo Log Groups
 - Archive Logs
 - Control Files
- Security
 - Users Management
 - Roles Management
 - Profiles Management

You can also use Oracle Enterprise Manager Database Express to complete Performance Monitoring and Tuning tasks, such as:

- Performance Hub
 - Real Time SQL Monitoring
 - ASH (Active Session History) Analytics
 - ADDM (Automatic Database Diagnostic Monitor)
 - AWR (Automatic Workload Repository) Browser
 - Historical performance monitoring and tuning
- SQL Tuning Advisor

2.10 Database Backup and Recovery Options

To simplify the management of backup and recovery files, you can create a fast recovery area for your database. During the database installation, Oracle Universal Installer provides you with options to configure the fast recovery area location. However, to configure backups, and to implement a backup and recovery strategy, you must use either Recovery Manager (RMAN) or Oracle Enterprise Manager Cloud Control.

See Also:

- *Oracle Database Backup and Recovery User's Guide* for information about Oracle backup and recovery solutions using RMAN or Oracle Enterprise Manager Cloud Control
- *Oracle Database 2 Day DBA* for information about configuring customized backups and recovering a backed up database

2.10.1 Configuring Recovery

You can provide the location of the fast recovery area during the database installation.

You can use either a file system directory or an Oracle Automatic Storage Management disk group for the fast recovery area. The default disk quota configured for the fast recovery area is 2 GB. For Oracle Automatic Storage Management disk groups, the

required disk space depends on the redundancy level of the disk group that you choose. [Chapter 3](#) describes how to choose the location of the fast recovery area and identifies its disk space requirements.

2.11 Upgrade Considerations

For information about upgrading an earlier release of Oracle Database to Oracle Database 12c, see *Oracle Database Upgrade Guide*. The following sections provide additional platform-specific upgrade information that you must review before upgrading an existing database:

- [Upgrading Your Operating System Before a Database Upgrade](#)
- [Upgrading Oracle Automatic Storage Management](#)

2.11.1 Upgrading Your Operating System Before a Database Upgrade

When you upgrade to a new release of Oracle Database, the operating system requirements may have changed. If required, upgrade your operating system before upgrading Oracle Database. See [Chapter 3, "Oracle Database Preinstallation Tasks"](#) for a list of supported operating systems.

To upgrade the operating system and then perform a database upgrade, perform one of the following procedures:

- [Upgrading the Operating System](#)
- [Migrating to a New Computer](#)

2.11.1.1 Upgrading the Operating System

Upgrade the operating system. Then, upgrade the database either manually or by using Oracle Database Upgrade Assistant.

2.11.1.2 Migrating to a New Computer

Migrate to a new computer using one of the following methods:

- To upgrade the database on the new computer:
 1. Copy the database files from the computer running the previous operating system to the one running the supported operating system.
 2. Re-create the control files on the computer running the supported operating system.
 3. Manually upgrade the database using the method described in *Oracle Database Upgrade Guide*.

Note: You cannot use Oracle Database Upgrade Assistant if you use this method. However, this method lets you easily revert to the earlier database.

- You can also upgrade the database using the Export/Import utilities method described in *Oracle Database Upgrade Guide*.

See Also: The table on "Supported Upgrade Paths for Upgrading Oracle Database" in *Oracle Database Upgrade Guide* for information about upgrading your current database release

2.11.2 Upgrading Oracle Automatic Storage Management

In releases prior to Oracle Database 11g Release 2 (11.2), Oracle ASM was installed as part of the Oracle Database installation. In Oracle Database 11g Release 2 (11.2) and later releases, Oracle ASM 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 ASM installation, then you must upgrade Oracle ASM by running an Oracle Grid Infrastructure upgrade. If you do not have Oracle ASM installed and you want to use Oracle ASM as your storage option, then you must complete an Oracle Grid Infrastructure installation before you start your Oracle Database installation.

See Also:

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

2.12 Migration Considerations

You can migrate an existing Oracle Database 11g for 32-bit Windows to Oracle Database 12c for 64-bit Windows. See "Migrating an Oracle Database 11g Release 2 (11.2) or Earlier Database" section in the *Oracle Database Platform Guide for Microsoft Windows* for migration information.

Oracle Database Upgrade Assistant has an option, Move Database from a Different Release 12.1 Oracle home, which lets you move your database from a Windows Built-in Account secured home to a Windows User Account secured home. See the "Moving a Database from an Existing 12c Oracle Home to a New 12c Oracle Home" section in the *Oracle Database Upgrade Guide*.

See Also: "Using Oracle Home User During Oracle Database Upgrade" section in *Oracle Database Platform Guide for Microsoft Windows* for more information

Oracle Database Preinstallation Tasks

This guide contains information required to install Oracle Database 12c. Ensure that you review information related to the platform on which you intend to install Oracle Database 12c.

Note:

- To use Oracle Automatic Storage Management (Oracle ASM) or Oracle Restart, you must first 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. See ["Installing Oracle Grid Infrastructure for a Standalone Server for an Existing Database"](#)
 - To install Oracle Grid Infrastructure for a standalone server, see ["Requirements for an Oracle Grid Infrastructure for a Standalone Server Installation"](#) on page 5-2 and to install Oracle Grid Infrastructure for a cluster, see *Oracle Grid Infrastructure Installation Guide* before you proceed with the database preinstallation tasks.
-
-

This chapter includes information about the following topics:

- [Oracle Database Hardware Requirements](#)
- [Oracle Database Software Requirements](#)
- [Windows Certification and Web Browser Support](#)
- [Reviewing Operating System Security Common Practices](#)
- [Confirming Host Name Resolution](#)
- [Individual Component Requirements](#)

3.1 Oracle Database Hardware Requirements

This section describes hardware component and hard disk space requirements.

- [Hard Disk Space Requirements](#)
- [Verifying Hardware Requirements](#)

3.1.1 Verifying Hardware Requirements

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

1. Determine the physical RAM size.

For example, on a Windows Server 2008 R2 computer, click **System and Security** in the Windows Control Panel, 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 Windows Server 2008 R2 computer, 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 Windows Server 2008 R2 computer, 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.

For example, to change the environment variables on a Windows Server 2008 R2 computer, click **System and Security**, then click **System**, click **Advanced System Settings**, click the **Advanced** tab on System Properties page, and then click **Environment Variables**.

3.2 Oracle Database Software Requirements

3.3 Windows Certification and Web Browser Support

The following sections provide certification information:

- [Remote Desktop Services](#)
- [Installation Requirements for Web Browsers](#)
- [Default Share Configuration Requirement](#)

3.3.1 Remote Desktop Services

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/>

3.3.2 Installation Requirements for Web Browsers

Web browsers are required 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>

See Also: *Oracle Enterprise Manager Cloud Control Basic Installation Guide* for information on accessing the Oracle Enterprise Manager certification matrix

3.3.3 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:

```
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.

3.4 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.

3.5 Confirming Host Name Resolution

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:

```
ping myhostname
ping 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.

3.6 Individual Component Requirements

This section contains these topics:

- [Configuring Disk Storage for Oracle Data Files and Recovery Files](#)
- [Creating Directories for Oracle Data Files or Recovery Files](#)
- [Oracle Database Security Strong Authentication Requirements](#)
- [Oracle-Managed Files Requirements](#)
- [Oracle Real Application Clusters \(Oracle RAC\)](#)

- [Oracle Volume Shadow Copy Service \(VSS\) Writer](#)

See Also:

- Chapter 2, "Oracle Application Express Installation Requirements" and "Recommended Pre-installation Tasks" in *Oracle Application Express Installation Guide*
- "Pre-installation Requirements" section in *Oracle Configuration Manager Installation and Administration Guide* and *Oracle Configuration Manager Prerequisites* for preinstallation requirements for Oracle Configuration Manager
- Appendix B, "Country Codes", in *Oracle Configuration Manager Installation and Administration Guide* for a list of valid country codes that can be used while installing Oracle Configuration Manager.

3.6.1 Configuring Disk Storage for Oracle Data Files and Recovery Files

This section describes the storage options for storing Oracle data files and, optionally, Oracle database recovery files. After you choose the storage method to use for each file type, use the following sections to configure the required storage:

- [Choosing a Storage Option for Oracle Database and Recovery Files](#)
- [Configuring Disk Storage](#)

Note: You do not have to use the same storage option for each file type.

3.6.1.1 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.

3.6.1.2 Configuring Disk Storage

For more information about these options, see the "Database Storage Options" section on page 2-13. For information about how to configure disk storage before you start the installation, see one of the following sections depending on your choice:

- To use a file system for database or recovery file storage, see the "Creating Directories for Oracle Data Files or Recovery Files" section on page 3-5.
- To use Oracle Automatic Storage Management for database or recovery file storage, see the "Configuring Storage for Oracle Automatic Storage Management" section on page 5-6.

3.6.2 Creating Directories for Oracle Data Files or Recovery Files

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

- [Guidelines for Placing Oracle Data Files on a File System](#)
- [Guidelines for Placing Oracle Recovery Files on a File System](#)
- [Creating Required Directories](#)

3.6.2.1 Guidelines for Placing Oracle Data Files on a File System

- You can choose either a single file system or multiple file systems to store the data 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 redundant array of independent disks (RAID) device or a logical volume on multiple physical devices and implement the stripe and mirror everything (SAME) methodology.
 - If you want to use multiple file systems, then choose file systems on separate physical devices that are dedicated to the database.

Select this method to distribute physical I/O and create separate control files on different devices for increased reliability. You must choose the Advanced database creation option during the installation 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 950 MB 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 should be on physical devices that are used only by the database.
- The default location suggested by Oracle Universal Installer for the database file directory is a subdirectory of the Oracle base directory. However, this default location is not recommended for production databases.

3.6.2.2 Guidelines for Placing 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 should 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* for more information about the fast recovery area

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

3.6.2.3 Creating 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	Choose either: <ul style="list-style-type: none"> ■ 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.
4. If you also want to use Oracle Automatic Storage Management, see "[Configuring Storage for Oracle Automatic Storage Management](#)" on page 5-6 for instructions. Otherwise see the "[Stopping Existing Oracle Services](#)" section on page 4-8.

3.6.3 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.

3.6.4 Oracle-Managed Files Requirements

If you choose the Advanced database creation option, you can use the Oracle-managed files feature with the new database. If you use this feature, you need only specify the database object name instead of file names when creating or deleting database files. Configuration procedures are required to enable Oracle Managed Files.

See Also: "Using Oracle-Managed Files" in *Oracle Database Administrator's Guide*

3.6.5 Oracle Real Application Clusters (Oracle RAC)

If you plan to install Oracle RAC or a grid computing environment, then you must first install Oracle Grid Infrastructure for a Cluster.

See Also: *Oracle Real Application Clusters Installation Guide* and *Oracle Grid Infrastructure Installation Guide*

3.6.6 Oracle Volume Shadow Copy Service (VSS) Writer

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

See Also: "Performing Database Backup and Recovery with VSS" in *Oracle Database Platform Guide for Microsoft Windows*

Configuring Users, Groups and Environments for Oracle Database

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

This chapter contains the following topics:

- [Creating Required Operating System Groups and Users](#)
- [Stopping Existing Oracle Services](#)
- [Configuring User Accounts](#)

Sujatha: Added detailed description of "Authenticated User" group in Windows Platform Guide.

See Also: "About Windows Authenticated Users" in *Oracle Database Platform Guide for Microsoft Windows*

4.1 Creating Required Operating System Groups and Users

Depending on if this is the first time Oracle software is being installed on your system and on the products that you are installing, you may have to create several operating system groups and users.

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](#)
- [Creating Oracle Home User](#)
- [Understanding the Oracle Inventory Directory and the Oracle Inventory Group](#)
- [Operating System Groups Created During Oracle Database Installation](#)
- [Operating System Groups and Users for Job Role Separation](#)

See Also: *Oracle Database Platform Guide for Microsoft Windows* for information about configuring Oracle Database files, directories, and registry settings

4.1.1 About the Oracle Installation User

To install Oracle Grid Infrastructure for a standalone server or Oracle Database software, you must use either a local or 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.

4.1.2 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.

The Oracle Home User can be either the Windows built-in account (LocalSystem) or an existing user. 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. 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. This account is used for running the Windows services for the Oracle home. Do not log in using this account to perform administrative tasks. Windows User Account can be a Windows Local User, Windows Domain User or Managed Services Account (MSA). 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 or an MSA. 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 the 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 the 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 using a Windows User Account as the Oracle Home User for cloning individual Oracle Database installations, then a password is not required.

4.1.3 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, OUI 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`.

4.1.4 Operating System Groups Created During Oracle Database Installation

During installation, the user groups listed in [Table 4–1](#) are created, if they do not already exist. In the following table, the `HOMENAME` variable refers to the generated `HOMENAME` for a software installation, which is of the form `OraproductmajorVersionHomenumber`. For example, `OraDB12cHome1`.

Table 4–1 User Groups Created During Oracle Database Installation

Operating System Group Name	Related System Privilege	Description
<code>ORA_DBA</code>	<code>SYSDBA</code> system privileges for all Oracle Database installations on the server	A special <code>OSDBA</code> group for the Windows operating system. Members of this group are granted <code>SYSDBA</code> system privileges for all Oracle Databases installed on the server.
<code>ORA_OPER</code>	<code>SYSOPER</code> system privileges for all Oracle databases installed on the server	A special <code>OSOPER</code> group for the Windows operating system. Members of this group are granted <code>SYSOPER</code> 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.
<code>ORA_ASMADMIN</code>	<code>SYSASM</code> system privileges for Oracle ASM administration	The <code>OSASM</code> group for the Oracle ASM instance. Using this group and the <code>SYSASM</code> system privileges enables the separation of <code>SYSDBA</code> database administration privileges from Oracle ASM storage administration privileges. Members of the <code>OSASM</code> group are authorized to connect using the <code>SYSASM</code> privilege and have full access to Oracle ASM, including administrative access to all disk groups that the Oracle ASM instance manages.

Table 4–1 (Cont.) User Groups Created During Oracle Database Installation

Operating System Group Name	Related System Privilege	Description
ORA_ASMDBA	SYSDBA system privileges on the Oracle ASM instance	<p>The OSDBA group for the Oracle ASM instance.</p> <p>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 groups contains the contains Oracle Home Users of those database homes.</p>
ORA_ASMOPER	SYSOPER for ASM system privileges	<p>The OSOPER group for the Oracle ASM instance.</p> <p>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 <code>ORA_HOMENAME_OPER</code> group, this group does not have any members after installation, but you can manually add users to this group after the installation completes.</p>
ORA_HOMENAME_DBA	SYSDBA system privileges for all instances that run from the Oracle home with the name <i>HOMENAME</i>	<p>An OSDBA group for a specific Oracle home with a name of <i>HOMENAME</i>.</p> <p>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.</p>
ORA_HOMENAME_OPER	SYSOPER system privileges for all instances that run from the Oracle home with a name <i>HOMENAME</i>	<p>An OSDBA group for the Oracle home with a name of <i>HOMENAME</i>.</p> <p>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.</p>
ORA_HOMENAME_SYSPBACKUP	SYSPBACKUP system privileges for all instances that run from the Oracle home with a name of <i>HOMENAME</i>	<p>OSBACKUPDBA group for a specific Oracle home with a name of <i>HOMENAME</i>.</p> <p>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.</p>
ORA_HOMENAME_SYSDG	SYSDG system privileges for all instances that run from the Oracle home with a name of <i>HOMENAME</i>	<p>OSDGDBA group for a specific Oracle home with a name of <i>HOMENAME</i>.</p> <p>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.</p>

Table 4–1 (Cont.) User Groups Created During Oracle Database Installation

Operating System Group Name	Related System Privilege	Description
ORA_HOMENAME_SYSKM	SYSKM system privileges for all instances that run from the Oracle home with a name of <i>HOMENAME</i> .	OSKMDBA group for a specific Oracle home with a name of <i>HOMENAME</i> . Members of this group have privileges necessary for performing encryption key management tasks on all database instances that run from the specified Oracle home directory.

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.

See Also:

- "Database Administrator Authentication" section in *Oracle Database Administrator's Guide* for more information about database system privileges
- "Authentication for Accessing Oracle ASM Instances" section in *Oracle Automatic Storage Management Administrator's Guide* for more information about Oracle ASM system privileges

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

4.1.5 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.

This section contains the following topics:

- [About Job Role Separation Operating System Privileges Groups and Users](#)
- [Oracle Software Owner For Each Oracle Software Product](#)
- [Standard Oracle Database Groups for Job Role Separation for Oracle Database](#)
- [Extended Oracle Database Groups for Job Role Separation](#)
- [Oracle Automatic Storage Management Groups for Job Role Separation](#)

4.1.5.1 About Job Role Separation Operating System Privileges Groups and Users

During the Oracle Database installation, the OSDBA, OSOPER, OSBACKUPDBA, OSDGDBA and OSKMDBA 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.

4.1.5.2 Oracle Software Owner For Each Oracle Software Product

You can create a single user (for example, `oracle`) to own both Oracle Database, and Oracle Grid Infrastructure for a standalone server 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.

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

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).

4.1.5.4 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_SYSDG`)
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 `SYSDBG` 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).

Note: All these groups, `ORA_HOMENAME_SYSDG`, `ORA_HOMENAME_SYSDG`, and `ORA_HOMENAME_SYSKM`, are applicable only to the database instances running from that particular Oracle home.

4.1.5.5 Oracle Automatic Storage Management Groups for Job Role Separation

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.

See Also:

- *Oracle Database Administrator's Guide* for more information about the OSDBA, OSASM, OSOPER, OSBACKUPDBA, OSDGDBA, and OSKMDBA groups, and the SYSDBA, SYSASM, SYSOPER, SYSBACKUP, SYSDG, and SYSKM privileges
- The "Managing Administrative Privileges" section in *Oracle Database Security Guide*

4.2 Stopping Existing Oracle Services

Note: If you are installing additional Oracle Database 12c 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 12c. You must complete this task to enable Oracle Universal Installer to relink certain executables and libraries.

Consider the following before you install Oracle Grid Infrastructure for a standalone server or Oracle Database:

- If you plan to use Oracle Restart, then you must install the Oracle Grid Infrastructure for a standalone server before you install and create the database. When you perform a database installation, the database must use the same listener created during the Oracle Grid Infrastructure for a standalone server 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 12c running on Oracle ASM, then stop any existing Oracle ASM instances. After you finish installing Oracle Grid Infrastructure for a standalone server, 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.

4.3 Configuring User Accounts

During installation, you can specify an Oracle Home User. Before starting the installation, there are a few checks you must perform for the Oracle Installation users, to ensure the installation succeeds.

This section contains the following topics:

- [Configuring Environment Variables for the Software Installation Owner](#)
- [Managing User Accounts with User Account Control](#)

4.3.1 Configuring Environment Variables for the Software Installation Owner

Before starting the Oracle Database installation, ensure that the `TEMP` environment variable is set correctly. See "[Hard Disk Space Requirements](#)" on page 3-HIDDEN for more information.

4.3.2 Managing User Accounts with User Account Control

To ensure that only trusted applications run on your computer, the Windows operating systems supported for Oracle Database provide User Account Control. If you have enabled this security feature, then, depending on how you have configured it, 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.

You must have Administrator privileges to run some 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 in the usual way. 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" automatically 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.

See Also: "Running Tools with Windows User Account Control" in *Oracle Database Platform Guide for Microsoft Windows* for more information.

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. Commands run from within this window are run with Administrator privileges.

Oracle Grid Infrastructure for a Standalone Server

Oracle Grid Infrastructure for a standalone server, also known as Oracle Restart, provides system support for a single-instance Oracle Database. This support includes volume management, file system, and automatic restart capabilities. If you plan 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 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 should be installed before installing Oracle Database.

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, file systems, and raw devices.

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 want to use Oracle ASM or Oracle Restart, 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.
 - Oracle Restart is used in single-instance (nonclustered) environments only.
-
-

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.

This chapter contains the following sections:

- [Requirements for an Oracle Grid Infrastructure for a Standalone Server Installation](#)
- [Oracle ACFS and Oracle ADVM](#)
- [Oracle Automatic Storage Management Storage Configuration](#)
- [Installing Oracle Grid Infrastructure for a Standalone Server Using a Software-Only Installation](#)
- [Installing and Configuring Oracle Grid Infrastructure for a Standalone Server](#)
- [Modifying Oracle Grid Infrastructure for a Standalone Server Binaries After Installation](#)

5.1 Requirements for an Oracle Grid Infrastructure for a Standalone Server Installation

Before you install Oracle Grid Infrastructure for a standalone server, ensure that your system meets the following requirements:

- [System Requirements](#)
- [Memory Requirements](#)
- [Disk Space Requirements](#)

5.1.1 System Requirements

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

See Also: *Oracle Grid Infrastructure Installation Guide* for complete Oracle Grid Infrastructure system requirements

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

Note that specific system requirements for Oracle Grid Infrastructure for a standalone server are noted below.

5.1.2 Memory Requirements

At least 4 GB of RAM (for Oracle Grid Infrastructure for a Standalone Server installations, including installations where you plan to install Oracle Database).

5.1.3 Disk Space Requirements

The following are the disk space requirements for installing Oracle Grid Infrastructure for a standalone server:

At least 4.5 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 for Oracle Grid Infrastructure for a standalone server to be installed.

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

- 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\"

If you plan to install Oracle Database, then you must meet additional preinstallation requirements. See [Chapter 3, "Oracle Database Preinstallation Tasks."](#)

5.2 Oracle ACFS and Oracle ADVM

This section contains information about Oracle Automatic Storage Management Cluster File System (Oracle ACFS) and Oracle Automatic Storage Management Dynamic Volume Manager (Oracle ADVM). It contains the following topics:

- [About Oracle ACFS and Oracle ADVM](#)
- [Oracle ACFS and Oracle ADVM Support on Windows](#)
- [Restrictions and Guidelines for Oracle ACFS](#)

5.2.1 About Oracle ACFS and Oracle ADVM

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.

5.2.2 Oracle ACFS and Oracle ADVM Support on Windows

Oracle ACFS and Oracle ADVM are supported on Windows Server 2008 x64, Windows Server 2008 R2 x64, Windows Server 2012 x64, and Windows Server 2012 R2 x64.

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/CSP/main/article?cmd=show&type=NOT&id=1369107.1>

- Patch Set Updates for Oracle Products (My Oracle Support Note 854428.1 for current release and support information:

<https://support.oracle.com/CSP/main/article?cmd=show&type=NOT&id=854428.1>

5.2.3 Restrictions and Guidelines for Oracle ACFS

Oracle Restart does not support root-based Oracle Clusterware resources. For this reason, the following restrictions apply if you run Oracle ACFS on 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 datafiles on an Oracle ACFS file system is not supported in Oracle Restart configurations.

To enable Oracle ACFS on Oracle Restart see "[Enabling Oracle ACFS on Oracle Restart Configurations](#)" on page 5-20.

Note the following general restrictions and guidelines also about Oracle ACFS:

- Oracle ACFS can be used as an option only when Oracle ASM is configured.
- You can place Oracle database binaries and administrative files (for example, trace files) on Oracle ACFS.

Oracle Database homes can be stored on Oracle ACFS only if the database version is Oracle Database 11g Release 2 or higher. Earlier releases of Oracle Database cannot be installed on Oracle ACFS.

- Starting with Oracle Database release 12.1.0.2, you can also place Oracle database files on Oracle ACFS (except in Oracle Restart configurations as mentioned earlier).
- Oracle ACFS provides a general purpose file system for other files.

See Also:

- *Oracle Database Release Notes for Microsoft Windows* for latest information about supported platforms and releases
- "Introducing Oracle ACFS and Oracle ADVM" in *Oracle Automatic Storage Management Administrator's Guide*

5.3 Oracle Automatic Storage Management Storage Configuration

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

- [Managing Disk Groups for Older Database Versions](#)
- [Oracle Automatic Storage Management Installation Considerations](#)
- [Configuring Storage for Oracle Automatic Storage Management](#)
- [Configuring Oracle Automatic Storage Management Disk Groups Manually Using Oracle ASMCA](#)
- [Testing the Oracle Automatic Storage Management Installation](#)
- [Upgrading Existing Oracle Automatic Storage Management Instances](#)

5.3.1 Managing Disk Groups for Older Database Versions

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

Releases before Oracle Database 11g Release 2 used Database Configuration Assistant to perform administrative tasks on Oracle ASM. Starting with 11g Release 2 (11.2), Oracle ASM is installed with Oracle Restart. You can no longer use Oracle DBCA to perform administrative tasks on Oracle ASM.

See Also: *Oracle Automatic Storage Management Administrator's Guide* for details about configuring disk group compatibility for databases using Oracle Database 11g or earlier software with Oracle Grid Infrastructure 12c.

5.3.2 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 Grid Infrastructure for a standalone server 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.

See Also:

- "Managing Oracle Flex ASM" in *Oracle Automatic Storage Management Administrator's Guide*
- "Oracle ASM Configuration Assistant" in *Oracle Automatic Storage Management Administrator's Guide* for information about Oracle ASMCA

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. See *Oracle Automatic Storage Management Administrator's Guide* for more information.

- The Oracle Automatic Storage Management instance that manages the existing disk group runs in the Oracle Grid Infrastructure home directory.

5.3.3 Configuring Storage for Oracle Automatic Storage Management

If you plan to use Oracle Automatic Storage Management to manage database files for your databases, then use the procedures in this section to configure storage for use with Oracle Automatic Storage Management.

This section covers the following topics:

- [Identifying Storage Requirements for Oracle Automatic Storage Management](#)
- [Creating DAS or SAN Disk Partitions for an Oracle Automatic Storage Management Instance](#)
- [Configuring Disks Manually for Oracle Automatic Storage Management](#)

Note: Oracle does not recommend using identifiers for database object names that must be quoted. While these quoted identifiers may be valid as names in the SQL `CREATE` statement, such as `CREATE DISKGROUP "1data" . . .`, the names may not be valid when using other tools that manage the database object.

See Also: ["Configuring Disks Manually for Oracle Automatic Storage Management"](#) for more information about stamping the disks

5.3.3.1 Identifying Storage Requirements for Oracle Automatic Storage Management

To identify the storage requirements for using Oracle Automatic Storage Management, you must determine how many 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 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 set the `DB_RECOVERY_FILE_DEST` parameter to enable the fast recovery area.

See Also:

- "Oracle ASM Configuration Assistant Command-Line Interface" section in *Oracle Automatic Storage Management Administrator's Guide*
 - "Creating a Fast Recovery Area Disk Group" on page 7-12
2. Choose the Oracle Automatic Storage Management redundancy level for each Oracle Automatic Storage Management disk group you create.
- The redundancy level that you choose for the Oracle Automatic Storage Management disk group determines how Oracle Automatic Storage Management mirrors files in the disk group and determines the number of disks and amount of disk space that you require. The redundancy levels are as follows:
- External redundancy

An external redundancy disk group requires a minimum of one disk device. The effective disk space in an external redundancy disk group is the sum of the disk space in all of its devices.

Because Oracle Automatic Storage Management does not mirror data in an external redundancy disk group, Oracle recommends that you use only RAID or similar devices that provide their own data protection mechanisms as disk devices in this type of disk group.
 - Normal redundancy

To optimize performance and reliability in a normal redundancy disk group, Oracle Automatic Storage Management 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. Alternatively, you can use two-way mirroring or no mirroring.

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 in all of its devices.

For most installations, Oracle recommends that you use normal redundancy disk groups.
 - High redundancy

In a high redundancy disk group, Oracle Automatic Storage Management uses three-way mirroring to increase performance and provide the highest level of reliability. A high redundancy disk group requires a minimum of three disk devices (or three failure groups). The effective disk space in a high redundancy disk group is *one-third* the sum of the disk space in all of its devices.

While high redundancy disk groups do provide a high level of data protection, you must consider the higher cost of additional storage devices before deciding to use this redundancy level.
3. Determine the total amount of disk space that you require for the data files and recovery files.

Use the following table to determine the minimum number of disks and the minimum disk space requirements for the installation:

Redundancy Level	Minimum Number of Disks	Data Files	Recovery Files	Both File Types
External	1	1.6 GB	2.95 GB	4.55 GB
Normal	2	3.2 GB	5.90 GB	9.10 GB
High	3	4.8 GB	8.85 GB	13.65 GB

If an Oracle Automatic Storage Management instance is on the system, 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.

- Optionally identify failure groups for the Oracle Automatic Storage Management disk group devices.

Note: You must complete this step only if you intend to use an installation method that runs Oracle Automatic Storage Management Configuration Assistant in interactive mode, for example, if you intend to choose the Advanced database configuration option. Other installation types do not allow you to specify failure groups.

If you intend to use a normal or high redundancy disk group, 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, the disk group becomes unavailable if the controller fails. The controller in this example is a single point of failure.

For instance, to avoid failures of this type, you could use two SCSI controllers, each with two disks, and define a failure group for the disks attached to each controller. This configuration would enable the disk group to tolerate the failure of one SCSI controller.

Note: If you define custom failure groups, you must specify a minimum of two failure groups for normal redundancy disk groups and three failure groups for high redundancy disk groups.

- If you are sure that a suitable disk group does not exist on the system, install or identify appropriate disk devices to add to a new disk group. Use the following guidelines when identifying appropriate disk devices:
 - All of the devices in an Oracle Automatic Storage Management disk group should 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 Automatic Storage Management 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 Automatic Storage Management disk group, Oracle does not recommend their use. Logical volume managers can hide the physical disk architecture, preventing

Oracle Automatic Storage Management from optimizing I/O across the physical devices.

See Also: "Configuring Disks Manually for Oracle Automatic Storage Management" on page 5-10 for information about completing this task

5.3.3.2 Creating DAS or SAN Disk Partitions for an Oracle Automatic Storage Management Instance

In order to use a DAS or SAN disk in Oracle Automatic Storage Management, the disk must have a partition table. Oracle recommends creating exactly one partition for each disk containing the entire disk.

Note: You can use any physical disk for Oracle Automatic Storage Management, if it is partitioned. However, you cannot use NAS or Microsoft dynamic disks.

This section covers the following topics.

- [Step 1: Enabling Disk Automounting](#)
- [Step 2: Creating the Disk Partitions](#)

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. Alternatively, 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 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 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.
- `sizen` is the size of the partition, for example 500 represents 500 MB.

See Also: The online help or documentation for the administration tool you are using

You can enter the `diskpart.exe` commands directly at the command line; alternatively, you can enter the commands in a text file, and then run `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 creating the fourth partition as an extended partition with as many logical partitions within as you need.

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

```
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
```

5.3.3.3 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 Grid Infrastructure for a standalone server in interactive mode, Oracle Universal Installer configures the disks' headers during the installation process. However, if you plan to install Oracle Grid Infrastructure for a standalone server in response file mode, you must manually configure the disks before installation by using either `asmtoolg` (GUI version) or `asmtool` (command-line version). You can also use these tools to reconfigure the disks later on after installation. The `asmtoolg` and

asmtool utilities only work on partitioned disks—you cannot use Oracle Automatic Storage Management on unpartitioned disks.

The `asmtoolg` and `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 `asmtoolg` or `asmtool` creates make this easier than using Windows drive letters.

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

Using the `asmtoolg` Tool (Graphical User Interface)

The `asmtoolg` tool is a graphical interface for creating device names. Use `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 12c Release 1 (12.1), 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.

If necessary, follow the steps under "[Creating DAS or SAN Disk Partitions for an Oracle Automatic Storage Management Instance](#)" on page 5-9 to create a disk partition for the Oracle Automatic Storage Management instance.

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. Optionally, 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**.

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 specify "Run as administrator." Then start `asmtool`.

It has the following options:

Option	Description
<code>-add</code>	<p>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 <code>-force</code> option. Also sets Oracle Automatic Storage Management instances to rescan the available disks.</p> <p>If you must partition a disk, then follow the procedures under "Creating DAS or SAN Disk Partitions for an Oracle Automatic Storage Management Instance" on page 5-9.</p> <p>Example:</p> <pre>asmtool -add [-force] \Device\Harddisk1\Partition1 ORCLDISKASM0 \Device\Harddisk2\Partition1 ORCLDISKASM2...</pre>
<code>-addprefix</code>	<p>Adds or changes stamps using a common prefix to generate stamps automatically. The stamps are generated by concatenating 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 <code>-force</code> option. Also sets Oracle Automatic Storage Management instances to rescan the available disks.</p> <p>Example:</p> <pre>asmtool -addprefix ORCLDISKASM [-force] \Device\Harddisk1\Partition1 \Device\Harddisk2\Partition1...</pre>
<code>-list</code>	<p>List 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 <code>-force</code> option.</p> <p>Example:</p> <pre>asmtool -list [-force]</pre>
<code>-delete</code>	<p>Removes existing stamps from disks. Also sets Oracle Automatic Storage Management instances to rescan the available disks.</p> <p>Example:</p> <pre>asmtool -delete ORCLDISKASM0 ORCLDISKASM1...</pre>

5.4 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 the Oracle Grid Infrastructure for a standalone server, 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* for further information about Oracle Automatic Storage Management Configuration Assistant

5.5 Testing the Oracle Automatic Storage Management 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;
```

See Also: *Oracle Automatic Storage Management Administrator's Guide* for a more detailed description of Oracle Automatic Storage Management

5.6 Upgrading Existing Oracle Automatic Storage Management Instances

If you have an Oracle Automatic Storage Management installation from a previous release installed on your server, or in an existing Oracle Grid Infrastructure for a standalone server installation, you can use Oracle Automatic Storage Management Configuration Assistant to upgrade the existing Oracle Automatic Storage Management instance to 12c Release 1 (12.1), and subsequently configure disk groups, Oracle Automatic Storage Management volumes and Oracle Automatic Storage Management file systems.

Note: You must first shut down all databases and applications using an existing Oracle Automatic Storage Management instance before upgrading it.

During installation, if you chose to use Oracle Automatic Storage Management and Oracle Automatic Storage Management Configuration Assistant detects that there is an earlier Oracle Automatic Storage Management version installed in another Oracle Automatic Storage Management home, then after installing the Oracle Automatic Storage Management 12c Release 1 (12.1) binaries, you can start Oracle Automatic Storage Management Configuration Assistant to upgrade the existing Oracle Automatic Storage Management instance.

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

A software-only installation only copies the Oracle Grid Infrastructure for a standalone server binaries to the specified location. Configuring Oracle Grid Infrastructure for a standalone server and Oracle ASM must be done manually after the installation has finished.

When you perform a software-only installation of Oracle Grid Infrastructure software, you must complete a few manual configuration steps to enable Oracle Restart 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 Grid Infrastructure for a standalone server software.

Performing a software-only installation involves the following steps:

1. [Installing the Software Binaries](#)
2. [Configuring the Software Binaries](#)

5.7.1 Installing the Software Binaries

1. Log in to Windows as an Administrator user.
2. Navigate to the location of the installation media for Oracle Database 12c Release 1 (12.1), open a command prompt with administrator privileges, and run the `setup.exe` command.
3. Complete a software-only installation of Oracle Grid Infrastructure for a standalone server.
4. 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.
5. Configure the software binaries. See "[Configuring the Software Binaries](#)" on page 5-15 for information about configuring Oracle Grid Infrastructure for a standalone server after performing a software-only installation.

5.7.2 Configuring the Software Binaries

To configure and activate a software-only Oracle Grid Infrastructure for a standalone server installation for Oracle Restart, complete the following tasks:

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

```
Grid_home\perl\bin\perl -IGrid_home\perl\lib -IGrid_home\crs\install
Grid_home\crs\install\roothas.pl
```

For example, if your Grid home is `C:\app\oracle\product\12.1.0\grid`, then run the following script:

```
C:\app\oracle\product\12.1.0\grid\perl\bin\perl -I
C:\app\oracle\product\12.1.0\grid\perl\lib -I
C:\app\oracle\product\12.1.0\grid\crs\install
C:\app\oracle\product\12.1.0\grid\crs\install\roothas.pl
```

2. Change directory to `Grid_home\oui\bin`, where *Grid_home* is the path of the Oracle Grid Infrastructure for a standalone server home.
3. Enter the following command:

```
setup.exe -updateNodeList ORACLE_HOME=Grid_home
CLUSTER_NODES= CRS=TRUE
```

For example:

```
C:\app\oracle\product\12.1.0\grid> setup.exe -updateNodeList ORACLE_
HOME=C:\app\oracle\product\12.1.0\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* to configure a listener using Oracle Network Configuration Assistant
- *Oracle Automatic Storage Management Administrator's Guide* to create and add disk groups, and configure Oracle ASM using Oracle ASMCA
- *Oracle Database Administrator's Guide* to create and add an ASM instance using `SRVCTL`

5.8 Installing and Configuring Oracle Grid Infrastructure for a Standalone Server

If you install Oracle Restart and then create your database, the database is automatically added to the Oracle Restart configuration, and is then automatically restarted when required. However, if you install Oracle Restart on a host computer on which a database exists, you must manually add the database, the listener, the Oracle Automatic Storage Management (Oracle ASM) instance, and other components to the Oracle Restart configuration.

Note: Oracle Restart can accommodate multiple single-instance databases on a single host computer.

This section covers the following topics:

- [Installing Oracle Grid Infrastructure for a Standalone Server with a New Database Installation](#)
- [Installing Oracle Grid Infrastructure for a Standalone Server for an Existing Database](#)

5.8.1 Installing Oracle Grid Infrastructure for a Standalone Server with a New Database Installation

Perform the following steps to install the Oracle Grid Infrastructure for a standalone server and then create a database that is managed by Oracle Restart. First install Oracle Grid Infrastructure for a standalone server, which installs Oracle Restart and Oracle Automatic Storage Management, then configure Oracle Automatic Storage Management with at least one disk group, and then install Oracle database that stores database files in Oracle Automatic Storage Management disk groups. Click the help button on the Oracle Universal Installer page for page level assistance.

To install Oracle Grid Infrastructure for a standalone server with a new database installation:

1. Double-click `setup.exe` to start Oracle Universal Installer.

Note: You must install Oracle Grid Infrastructure for a standalone server from the Oracle Grid Infrastructure media.

2. The Select Installation Option screen appears. Select the **Install and Configure Oracle Grid Infrastructure for a Standalone Server** option, to install and configure Oracle Restart and Oracle Automatic Storage Management. Click **Next**.
3. On the Select Product Languages screen, select one or more languages. Move the languages from the Available Languages list to the Selected Languages list. Click **Next**.
4. Create ASM Disk Group screen lists all the stamped disks matching the default pattern, `\\.\ORCLDISK`. After you have created the disk partitions, the disks must be stamped with a header before they can be used by Oracle ASM. Click **Stamp Disk**.

Click **Change Discovery Path** to select any devices for use by Oracle Automatic Storage Management but are not listed. In the Change Discovery Path window, enter a string to use to search for devices that Oracle Automatic Storage Management uses, such as `\\.\ORCLDISK*`, and then click **OK**.

Note: 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.

Consider the following information about disk devices while performing this step:

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

Note: For normal redundancy, you require twice as much disk space to hold the same amount of data. For example, if your database is 100 GB, then you require approximately 200 GB of storage.

- 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 set to 1 MB.
5. In the Specify ASM Password screen, enter the password required to connect to the Oracle ASM instance. The Oracle Automatic Storage Management instance is managed by a privileged role called `SYSASM`, which grants full access to Oracle Automatic Storage Management disk groups. Oracle recommends that you create a less privileged user, `ASMSNMP`, with `SYSDBA` privileges to monitor the Oracle Automatic Storage Management instance.

Enter password for the `SYS` and `ASMSNMP` user accounts. The passwords should be at least eight characters in length and include at least one alphabetic, one numeric, and one of the following special characters: `#`, `_`, `-` (number sign, underscore, or dash). Only these three special characters are allowed. You can use no other special characters in passwords.

Optionally, you can use the same password for all accounts. However, Oracle recommends that you specify a different password for each account. You must remember the passwords that you specify.

6. On the Specify Installation Location screen, enter the following details and click **Next**:
- **Oracle base:** Enter the directory location for Oracle base. Do not include spaces in the path name.
 - **Software location:** This field is populated by default in concurrence with Oracle base location. Do not include spaces in the path name.
7. Perform Prerequisite Checks screen, checks if the minimum system requirements are met to perform the database installation. If all the system requirements are met, then you are directed to the Summary screen. However, in a failed installation, you can review the error.

To get a failed requirements list, click **Show Failed**. Click **Fix & Check Again**, if you want the installer to fix the problem and check the system requirements once more. If you click **Check Again**, then you can run the prerequisite check again to see if the minimum requirements are met to carry on with the database installation.

To get a list of failed requirements, select **Show Failed** from the list. To get a list of all the prerequisite checks run by the OUI, select **Show All**. To get a list of the prerequisite checks that are successful, select **Show Succeeded**.

Note:

- The Fix & Check Again option generates a script that sets some system parameters to Oracle-recommended values. Oracle recommends that you do not modify the contents of this script.
 - Oracle recommends that you use caution in checking the **Ignore All** option. If you check this option, then Oracle Universal Installer may not confirm that your system can install Oracle Database successfully.
-
-

8. Review contents of the Summary screen, click **Install**.

Starting with Oracle Database 11g Release 2 (11.2), you can save all the installation steps into a response file by clicking **Save Response File**. This file can be used for a silent installation.

9. The Install Product screen displays the progress of the Oracle Grid Infrastructure for a standalone server installation.
10. The Finish screen displays the installation status. Click **Close** to end the installation, then **Yes** to confirm you want to exit Oracle Universal Installer.

If you encounter any problems, refer to the configuration log for information. The path to the configuration log is displayed on the Configuration Assistants window.

11. Oracle ASMCA is installed as part of the Oracle Grid Infrastructure for a standalone server installation. To create additional disk groups, run the Oracle ASMCA utility. For example, you can create another disk group named `RECOVERY` to store the fast recovery area.

Note: To check if the Oracle High Availability Service is installed properly, run `crsctl check has` command from `Grid_home\bin` directory. `has` is a service that is installed with Oracle Restart, which is responsible for starting software services like Oracle Automatic Storage Management.

12. Install Oracle Database. Refer to "[Installing the Oracle Database Software](#)" on page 6-10 for information about installing Oracle Database.

Note:

- If a new database is installed after a grid infrastructure installation, then the listener runs from the Oracle Grid Infrastructure for a standalone server home. Because Oracle Automatic Storage Management is installed as part of the Oracle Grid Infrastructure for a standalone server, the default listener is created and runs from the Oracle Grid Infrastructure for a standalone server home. If you perform a database installation, then the database uses the same listener created during the Oracle Grid Infrastructure for a standalone server installation.
 - If you are using Oracle Restart, then the default listener and any additional listeners must run from the Oracle Grid Infrastructure for a standalone server home.
-
-

5.8.2 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 for a standalone server and configure it for an existing Oracle database. Oracle Restart can only manage existing 12.1 resources and hence you can install Oracle Grid Infrastructure for a standalone server only for an existing 12.1 database. However, Oracle database releases before 12.1 can coexist on the same server without being managed by Oracle Restart.

To install Oracle Restart for an Existing database:

- On the same host computer as the database, use Oracle Universal Installer to install the Oracle Grid Infrastructure for a standalone server, and select **Install and Configure Oracle Grid Infrastructure for a Standalone Server** as the installation option.

The Oracle Grid Infrastructure for a standalone server components are installed in a separate Oracle home.

Refer to "Installing Oracle Grid Infrastructure for a Standalone Server Using a Software-Only Installation" on page 5-14 for detailed instructions.

- Go to the Grid home's bin directory.

Use the `srvctl add database` command with the `-c SINGLE` flag to add the database in an Oracle Restart configuration. Also use the `srvctl add` command to add the listener, the Oracle ASM instance, all Oracle ASM disk groups, and any database services to the Oracle Restart configuration.

See Also: "srvctl add" in *Oracle Database Administrator's Guide* for more information

5.9 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. 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.

See Also: *Oracle OPatch User's Guide for Windows and UNIX* for information about using `opatchauto`

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 Grid Infrastructure for a standalone server 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 Grid Infrastructure for a standalone server home.
2. Shut down the Oracle Restart stack using the following command:

```
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:

```
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.
4. Use the following command to restart the Oracle Restart stack:

```
DRIVE_LETTER:\Grid_home\bin> crsctl start has
```

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:

```
DRIVE_LETTER:\cd Grid_home\crs\install  
DRIVE_LETTER:\Grid_home\crs\install>roothas.bat -lockacfs
```

Installing Oracle Database

- [Preinstallation Considerations for Installing Oracle Database](#)
- [Reviewing Component-Specific Installation Guidelines](#)
- [Accessing the Installation Software](#)
- [Installing the Oracle Database Software](#)
- [Cloning an Oracle Home](#)
- [Configuring Oracle Configuration Manager in a Cloned Oracle Home](#)

6.1 Preinstallation Considerations for Installing Oracle Database

The Oracle Database software is available on installation media or you can download it from the Oracle Technology Network (OTN) website. In most cases, you use the graphical user interface (GUI) provided by Oracle Universal Installer 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.

See Also: ["Managing User Accounts with User Account Control"](#)

Complete the requirements described in Chapter 3, "Oracle Database Preinstallation Tasks" and "Reviewing Component-Specific Installation Guidelines" on page 6-3 before you begin the installation.

Next, consider the following issues:

- [Installation Consideration on Windows](#)
- [Performing Multiple Oracle Database Installations](#)
- [Installing on Systems That Already Have Oracle Components](#)
- [Installing with Minimum Memory Requirements](#)

6.1.1 Installation Consideration on Windows

On Windows, command prompts should be opened with Administrator privileges.

6.1.2 Performing Multiple Oracle Database Installations

If you must perform multiple installations of Oracle Database, then you may want to 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.

See Also: [Appendix C, "Installing and Configuring Oracle Database Using Response Files"](#)

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

See Also: ["Cloning an Oracle Home"](#) on page 6-18

6.1.3 Installing on Systems That Already Have Oracle Components

See Also: ["Upgrade Considerations"](#) on page 2-19 before running Oracle Universal Installer

Follow these 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. Review ["Upgrade Considerations"](#) on page 2-19 for more information.

See Also: Chapter, "Preinstallation Checklist" in *Oracle Real Application Clusters Installation Guide* before running Oracle Universal Installer

6.1.4 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 may limit the size of another. 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**.

6.2 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.

See Also: "[Oracle Grid Infrastructure for a Standalone Server](#)" for information about Oracle Grid Infrastructure for a standalone server

- Installations on a cluster

If Oracle Clusterware or Oracle RAC is installed on the system, 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*

6.2.1 Selecting the Database Character Set

Oracle Database uses the database character set for:

- Data stored in SQL character datatypes (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.

Once a database is created, changing its character set is usually very expensive in terms of time and resources. Such operation 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 recommends Unicode AL32UTF8 as the database character set. Unicode is the universal character set that supports most of the currently spoken languages of the world. It also supports many historical scripts (alphabets). Unicode is the native encoding of many technologies, including Java, XML, XHTML, ECMAScript, LDAP. Unicode is ideally suited for databases supporting the Internet and the global economy.

As 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 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. Note that the increase in storage space concerns only character data and only data that is not in English. The universality and flexibility of Unicode usually outweighs these additional costs.

Legacy character sets should be considered when compatibility, storage requirements, or performance of text processing is critical and the database supports only a single group of languages. The database character set to be selected in such case is the character set of most clients connecting to this database.

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

See Also: "Choosing a Database Character Set for a Multitenant Container Database" in *Oracle Database Globalization Support Guide*

The default character set suggested or used by Oracle Universal Installer and Database Configuration Assistant in this release is based on the language configuration of the operating system.

For most languages, the default character set is one of the Microsoft Windows character sets, for example WE8MSWIN1252. It is noteworthy that the same default is used by the database installation process on UNIX-based platforms. This results from the assumption that most clients connecting to the database run under the Microsoft Windows operating system. As the database should be able to store all characters coming from the clients and Microsoft Windows character sets have richer character repertoire than the corresponding ISO 8859 character sets, the Microsoft Windows character sets are usually the better choice. For example, the EE8MSWIN1250 character set supports the Euro currency symbol and various smart quote characters, while the corresponding EE8ISO8859P2 character set does not support them. In any case, Oracle

converts the data between the database character set and the client character sets, which are declared by the NLS_LANG settings.

The list of database character sets that is presented to you for selection by Oracle Universal Installer contains only the recommended character sets. Even though Oracle Database supports many more character sets, they are either deprecated or they are binary subsets of another recommended character set. For example, WE8DEC is a deprecated character set and US7ASCII and WE8ISO8859P1 are both binary subsets of WE8MSWIN1252.

If, for compatibility reasons, you must create a database in one of the non-recommended character sets, choose the Advanced database configuration option. Database Configuration Assistant in the interactive mode gives you the opportunity to select any of the database character sets supported on Windows.

See Also: "Choosing a Character Set" in *Oracle Database Globalization Support Guide*

Caution: AL32UTF8 is the Oracle Database character set that is appropriate for XMLType data. It is equivalent to the IANA registered standard UTF-8 encoding, which supports all valid XML characters.

Do not confuse Oracle Database database character set UTF8 (no hyphen) with database character set AL32UTF8 or with character encoding UTF-8. Database character set UTF8 has been superseded by AL32UTF8. Do not use UTF8 for XML data. UTF8 supports only Unicode version 3.0 and earlier; it does not support all valid XML characters. AL32UTF8 has no such limitation.

Using database character set UTF8 for XML data could cause an irrecoverable error or affect security negatively. If a character that is not supported by the database character set appears in an input-document element name, a replacement character (usually a question mark) is substituted for it. This terminates parsing and raises an exception.

6.2.2 Using an Oracle Automatic Storage Management Disk Group

This section is optional and describes how to identify disk groups and determine the free disk space that they contain. 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, you would 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 listed in section "[Selecting the Database Character Set](#)".

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.

See Also: "[Upgrading Existing Oracle Automatic Storage Management Instances](#)"

6.3 Accessing the Installation Software

The Oracle software is available on 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:

- [Installing from a Remote DVD Drive](#)
- [Installing on Remote Computers Through Remote Access Software](#)
- [Downloading Oracle Software](#)
- [Copying the Oracle Database Software to a Hard Disk](#)

6.3.1 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. You must complete the following steps:

- [Step 1: On the Remote Computer, Share the DVD Drive](#)
- [Step 2: On the Local Computer, Map the DVD Drive](#)

6.3.1.1 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 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.

6.3.1.2 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.
3. Go to the "Installing the Oracle Database Software" section on page 6-10.

6.3.2 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 DVD to a hard drive, you can install the software from the hard drive.
- You can insert the DVD into a drive on your local computer, and install the software from the DVD.

6.3.2.1 Installing on Remote Computers from a Hard Drive

If you have copied the contents of the Oracle Database DVD 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 DVD.
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.
5. Go to the "[Installing the Oracle Database Software](#)" section on page 6-10.

6.3.2.2 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.

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.

These steps are described in the "[Installing from a Remote DVD Drive](#)" section on page 6-6.

3. Through the remote access software, run Oracle Universal Installer on the remote computer. You access Oracle Universal Installer from the shared DVD drive.
4. Go to the "[Installing the Oracle Database Software](#)" section on page 6-10.

6.3.3 Downloading Oracle Software

You can download the trial version of the installation files from the Oracle Technology Network (OTN) or Oracle Software Delivery Cloud website and extract them on your hard disk. Ensure that you completely review and understand the terms of the license. Most downloads include the Development License. This section contains the following topics:

- [Downloading the Installation Archive Files from Oracle Technology Network](#)
- [Downloading the Software from Oracle Software Delivery Cloud](#)
- [Extracting the Installation Files](#)

6.3.3.1 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 Oracle Technology Network:

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

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 OraDB12c, 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 Oracle Technology Network.
8. Extract the files in each directory that you just created.
9. After you have extracted the required installation files, see [Section 6.4, "Installing the Oracle Database Software."](#)

6.3.3.2 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/>

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.

Note: Print the page with the list of downloadable files. It contains a list of part numbers and their corresponding descriptions to refer during the installation process.

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&iid=549617.1>

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

6.3.3.3 Extracting the Installation Files

To extract the installation archive files, perform the following steps:

1. If necessary, change to the directory that contains the downloaded installation archive files.
2. Oracle Database software is available as two zip files. Ensure that you extract both the zip files to the same directory.

When you have extracted all of the required installation files, see "[Installing the Oracle Database Software](#)".

6.3.4 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.
3. After you have copied all of the required installation files, see the "[Installing the Oracle Database Software](#)" section on page 6-10.

6.4 Installing the Oracle Database Software

In most cases, you use the graphical user interface (GUI) provided by Oracle Universal Installer to install Oracle Database. The instructions in this section explain how to run the Oracle Universal Installer GUI to perform most database installations.

See Also:

- If you plan to use Oracle Restart or Oracle Automatic Storage Management, 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. For information about installing Oracle Grid Infrastructure, see ["Installing and Configuring Oracle Grid Infrastructure for a Standalone Server"](#)
- You may have to shut down existing Oracle processes before you start the database installation. See ["Stopping Existing Oracle Services"](#)
- [Appendix C, "Installing and Configuring Oracle Database Using Response Files"](#) to install Oracle Database using the silent or response file installation method, without the GUI. It also explains how to clone an existing Oracle home. These methods are 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.

See Also:

- ["Setting the ORACLE_HOSTNAME Environment Variable"](#) on page D-1
- ["Installing Oracle Database on Computers with Multiple IP Addresses"](#) on page D-1
- ["Installing Oracle Database on Computers with Multiple Aliases"](#) on page D-1
- ["Deconfigure DNS Registration for Public Network Adapter"](#) in *Oracle Grid Infrastructure Installation Guide for Microsoft Windows x64 (64-Bit)* for information about mandatory configuration task, if your server has multiple NIC cards

3. Navigate to the location of the installation media for Oracle Database 12c Release 1 (12.1), open a command prompt with administrator privileges, and run the `setup.exe` command.

Use the same installation media to install Oracle Database on all supported Windows operating systems.

4. Follow these guidelines to complete the installation:

- Do not install Oracle Database 12c software into an existing Oracle home.
- Follow the instructions displayed in the Oracle Universal Installer screens. If you need additional information, click **Help**.

See Also: "[Unlocking and Resetting User Passwords](#)" on page 8-8 for password guidelines

- 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 [Appendix G](#) 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.

Note: 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 `OraInstalldate_time` directory to remove the temporary files that were created during the installation process. The `OraInstalldate_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 `OraInstalldate_time` directory.

7. See [Chapter 7, "Oracle Database Postinstallation Tasks"](#) for information about tasks that you must complete after you have installed Oracle Database.

The following table lists the various screens displayed during an Enterprise Edition installation for Oracle Database 12c:

Table 6–1 Oracle Universal Installer Windows

Screen	Action
Configure Security Updates	<p>Enter your e-mail address, preferably your My Oracle Support e-mail address or user name in the Email field.</p> <p>You can select the I wish to receive security updates via My Oracle Support check box to receive security updates.</p> <p>Enter your My Oracle Support password in the My Oracle Support Password field.</p> <p>Click Next.</p> <p>See Also: "Database Security Notification Options" on page 2-11</p>
Select Installation Option	<p>Select one of the following installation options, click Next.</p> <ul style="list-style-type: none"> ■ Create and configure a database: This option creates a new database along with sample schemas. ■ Install database software only: This option installs only the database binaries. To configure database, you must run Oracle Database Configuration Assistant after the software installation. ■ Upgrade an existing database: This option installs the software binaries in a new Oracle home. At the end of the installation, you can upgrade the existing database.
System Class	<p>Select the type of system for installing the database, click Next.</p> <ul style="list-style-type: none"> ■ Desktop Class: Choose this option if you are installing on a laptop or desktop class system. This option includes a starter database and allows minimal configuration. This option is designed for those who want to quickly set up a database. ■ Server Class: Choose this option if you are installing on a server class system, such as what you would use when deploying Oracle in a production data center. This option allows for more advanced configuration options. Advanced configuration options available using this option include Oracle RAC, Oracle Automatic Storage Management, backup and recovery configuration, integration with Enterprise Manager Cloud Control, and more fine-grained memory tuning, among many others.
Grid Installation Options	<p>Select the type of database installation you want to perform, click Next.</p> <ul style="list-style-type: none"> ■ Single instance database installation: This option installs the database and the listener. ■ Oracle Real Application Clusters database installation: This option installs Oracle Real Application Clusters. ■ Oracle RAC One Node database installation: This option installs Oracle RAC One Node database.
Select Install Type	<p>Select one of the following, then click Next:</p> <ul style="list-style-type: none"> ■ Typical Install: This installation method is selected by default. It lets you quickly install Oracle Database using minimal input. It installs the software and optionally creates a general-purpose database using the information that you specify on this screen. ■ Advanced Install: This installation method enables to perform more complex installations, such as creating individual passwords for different accounts, creating specific types of starter databases (for example, for transaction processing or data warehouse systems), using different language groups, specifying e-mail notifications, and so on.
Select Product Language	<p>This option allows you to select the language in which you want to run the product.</p> <p>Select the product language from the Available Languages list, transfer it to the Selected Languages list. Click Next.</p>

Table 6–1 (Cont.) Oracle Universal Installer Windows

Screen	Action
Select Database Edition	<p>Select Enterprise Edition, Standard Edition, Standard Edition One, or Standard Edition 2. Click Next.</p> <p>See Also: "Enabling and Disabling Database Options" on page 7-13 for information about enabling and disabling components that are installed with Oracle Database.</p> <p>"Configuring Oracle Components" on page 7-2 for information about configuring components that are installed with Oracle Database.</p>
Specify Oracle Home User	<p>Starting with Oracle Database 12c, Oracle recommends that you use Windows Built-in Account or specify a standard Windows User Account (not an Administrator account) to install and configure the Oracle home. This account is used for running the Windows services for the Oracle home. Do not log in using this account to perform administrative tasks. Select one of the following, then click Next.</p> <ul style="list-style-type: none"> ■ Use Existing Windows User <p>The account can be a Windows Local User, Windows Domain User or Windows Managed Services Account (MSA). You must provide both the user name and password for a Windows Local or Domain User. For Windows MSA, which is a managed domain account, only the user name is required.</p> ■ Create New Windows User <p>Provide the user name and password for the Windows Local User that you want Oracle Universal Installer to create. Confirm the password. 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.</p> <p>Select Use Windows Built-in Account if you do not want to specify an Oracle Home User during installation. No user name or password is required and the Windows services for the Oracle home run as the LocalSystem or LocalService.</p> <p>For Database Server installation, Oracle recommends that you use a standard Windows User Account (instead of Windows Built-in Account) as the Oracle Home User for enhanced security.</p> <p>See Also: "Managing Oracle Home User" in <i>Oracle Database Platform Guide for Microsoft Windows</i></p>
Specify Installation Location	<p>The Oracle base path appears by default. You can change the path based on your requirement. Specify Oracle base, Software location, and click Next.</p> <p>The Oracle base directory is a top-level directory for Oracle software installations owned by an Oracle installation owner account. The default Oracle base path is <i>DRIVE_LETTER:\app\user</i>, where <i>user</i> is the user account running the installation. You can change the path based on your requirements.</p> <p>In the Software Location field, accept the default value or enter the Oracle home directory path in which you want to install Oracle components. The directory path should not contain spaces.</p> <p>Click Next.</p> <p>Note: This screen is available only with Advanced Installation.</p> <p>See Also: "Optimal Flexible Architecture Directory Naming Conventions" for information about directory naming conventions</p>
Select Configuration Type	<p>Select one of the following, click Next:</p> <ul style="list-style-type: none"> ■ General Purpose / Transaction Processing: This is a starter database designed for general usage or transaction-heavy applications. ■ Data Warehousing: A starter database optimized to run Data Warehousing applications. <p>See the online Help provided by either Oracle Universal Installer or Oracle Database Configuration Assistant for a description of these preconfigured database types.</p>

Table 6–1 (Cont.) Oracle Universal Installer Windows

Screen	Action
Specify Database Identifiers	<p>Specify the following information, then click Next:</p> <p>Database Naming</p> <p>Specify the Global Database Name using the following syntax:</p> <pre>database_unique_name.db_domain</pre> <p>where:</p> <ul style="list-style-type: none"> ▪ <i>database_unique_name</i> is the name of the database. It can contain a maximum of 30 characters as long as the first eight characters are unique and begin with an alphabetic character. The characters can include alphanumeric, underscore (_), dollar (\$), and pound (#), no other special characters are permitted in a database name. ▪ <i>db_domain</i> is the computer environment used for the database. It should contain no more than 128 characters (alphanumeric, underscore (_), and pound (#)), inclusive of all periods. <p>Note: Ensure that the combination of database name (first eight unique characters of database unique name), delimiter, and the database domain name does not exceed 128 characters.</p> <p>For example:</p> <pre>sales.us.example.com</pre> <p>where:</p> <ul style="list-style-type: none"> ▪ <i>database_unique_name</i> is <i>sales</i> ▪ <i>db_domain</i> is <i>us.example.com</i> <p>When you enter the Global Database Name, Oracle Universal Installer automatically populates the SID prefix with the database name. You can change this name in Advanced installation.</p> <p>Oracle Universal Installer limits the SID to 12 alphanumeric characters and the SID cannot contain underscore (_), dollar (\$), and pound (#).</p> <p>Select the Create as Container database option to create the database as a multitenant container database (CDB) that can support one pluggable database (PDB). If you want Oracle Universal Installer to create a PDB when it creates the CDB, specify the PDB name in the Pluggable Database Name field.</p> <p>The PDB name must be unique and must follow the database naming conventions. See "Identifying Databases"</p> <p>To create additional PDBs and to manage PDBs, use Oracle Database Configuration Assistant.</p> <p>See Also: "Creating and Managing a Database with DBCA" in <i>Oracle Database 2 Day DBA</i></p>

Table 6–1 (Cont.) Oracle Universal Installer Windows

Screen	Action
Specify Configuration Options	<p>Specify the following configuration details, then click Next.</p> <p>Memory:</p> <p>Select the Enable Automatic Memory Management option to allow the database to automatically distribute memory between SGA and PGA. If you do not select this option, then the SGA and PGA must be sized manually.</p> <p>See Also: "Consider Memory Allocation and Automatic Memory Management" on page 2-8</p> <p>Character Sets:</p> <p>This option enables you to store the character data in the database in one of the following methods:</p> <ul style="list-style-type: none"> ■ Use the default: This option uses the operating system language settings. ■ Use Unicode: This option enables you to store multiple language groups. ■ Choose from the following list of character sets: This option enables the Select Database Character Set drop down list. <p>See Also:</p> <ul style="list-style-type: none"> ■ "Selecting the Database Character Set" ■ <i>Oracle Database Globalization Support Guide</i> for information about choosing a character set. <p>Sample Schemas:</p> <p>The Create database with sample schemas option is not selected by default. However, you can select the option, to create the starter database with sample schema. If you create the database as a CDB with one PDB, then the sample schema is created as a PDB.</p> <p>Note: By default, Oracle database is configured to include enhanced security settings.</p>
Specify Database Storage Options	<p>Select one of the following, then click Next.</p> <ul style="list-style-type: none"> ■ File System: Specify the database file location. ■ Oracle Automatic Storage Management. <p>See Also: "Using an Oracle Automatic Storage Management Disk Group" on page 6-5</p>
Specify Management Options	<p>This screen gives you the option to manage your database using Oracle Enterprise Manager Cloud Control. Select Register with Enterprise Manager (EM) Cloud Control and specify the following for Oracle Enterprise Manager Cloud Control configuration, and click Next:</p> <ul style="list-style-type: none"> ■ OMS Host: This is the system name where the Management repository is running. ■ OMS Port: This is the Oracle Enterprise Manager port number to receive requests from the Management service. ■ EM Admin User Name: This is the user name to log in to Oracle Enterprise Manager. ■ EM Admin Password: This is the password to log in to Oracle Enterprise Manager. ■ Specify password of ASMSNMP user: This is the password for the ASMSNMP user configured in Oracle ASM, required only if you choose Oracle ASM as your database storage option. <p>Note: Oracle Enterprise Manager Database Express is always installed and configured by default irrespective of whether you register Oracle Enterprise Manager Cloud Control.</p>

Table 6–1 (Cont.) Oracle Universal Installer Windows

Screen	Action
Specify Recovery Options	<p>Select Enable Recovery to enable recovery using one of the following options:</p> <ul style="list-style-type: none"> ■ Select File System to use a file system directory for the fast recovery area, and then specify the fast recovery area path in the Recovery Area location field. ■ Select Oracle Automatic Storage Management to use an Automatic Storage Management disk group for the fast recovery area. <p>Click Next.</p> <p>See Also: "Configuring Storage for Oracle Automatic Storage Management" on page 5-6</p>
Select ASM Disk Group	<p>This screen is displayed only if you select Oracle Automatic Storage Management as your storage option.</p> <p>Disk groups are created during the Oracle Grid Infrastructure installation. Disk groups are configured with the <code>SYSASM</code> privilege using <code>asmcmd</code> or <code>SQL create diskgroup</code> commands. An ASM disk group consists of multiple disk partitions.</p> <p>The table in this screen displays existing disk groups created during the Oracle Grid Infrastructure installation. Select a disk group to use for database file storage.</p>
Specify Schema Passwords	<p>Enter and confirm passwords for the privileged database accounts: SYS, SYSTEM, and DBSNMP.</p> <p>If you chose to create the database as a CDB, then Oracle Universal Installer also asks for the PDBADMIN password.</p> <p>Click Next.</p> <p>Note: Optionally, you can use the same password for all accounts. However, Oracle recommends that you specify a different password for each account. You must remember the passwords that you specify.</p> <p>See Also: "Unlocking and Resetting User Passwords" on page 8-8 for information about password guidelines</p>
Perform Prerequisite Checks	<p>This option checks if the minimum system requirements to perform the database installation are met.</p> <p>Click Fix & Check Again, if you want the installer to fix the problem and check the system requirements once more.</p> <p>If you click Check Again, then you can run the prerequisite check again to see if the minimum requirements are met to carry on with the database installation.</p> <p>To get a list of failed requirements, select Show Failed from the list. To get a list of all the prerequisite checks run by the OUI, select Show All. To get a list of the prerequisite checks that are successful, select Show Succeeded.</p> <p>Note: Oracle recommends that you use caution in checking the Ignore All option. If you check this option, then Oracle Universal Installer may not confirm that your system can install Oracle Database successfully.</p> <p>See Also: "Oracle Database Preinstallation Tasks" for information about the system requirements</p>
Summary	<p>Review the information displayed on this screen, and click Install.</p> <p>Note: You can save all the installation steps into a response file by clicking Save Response File. Later, this file can be used for a silent installation.</p>
Install Product	<p>This screen displays the progress of a database installation. It also shows the status information while the product is being installed. Click Next.</p> <p>This screen then displays the status information for the configuration assistants that configure the software and create a database. When the message is displayed after Database Configuration Assistant process, click OK to continue.</p>
Finish	<p>This screen is shown automatically when all the configuration tools are successful.</p>

6.5 Cloning an Oracle Home

You can copy an existing Oracle home and then configure it for a new environment. This process is called cloning. If you are performing multiple Oracle Database installations, you may want to use this method to create each new Oracle home, because copying files from an existing Oracle Database installation takes less time than creating a new version of them. This method is also useful if the Oracle home that you are cloning has patches applied to it. When you clone an Oracle home, the new Oracle home has the patch updates.

Note: *Oracle Database Administrator's Guide* covers cloning Oracle databases in detail, and cloning Oracle homes.

To clone an Oracle home:

1. Ensure that the Oracle Database installation whose home you want to clone has been successful.

You can check the success of the installation by reviewing the `installActionsdate_time.log` file for the installation session, which is normally located in the `C:\Program Files\Oracle\Inventory\logs` directory.

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 the Oracle-related services on this computer.

You can stop Oracle services by using one of the following methods:

- **Oracle Administration Assistant for Windows:** From the **Start** menu, select **All Programs**, then **Oracle - HOMENAME**, then **Configuration and Migration Tools**, then **Administrative Assistant for Windows**, then **Oracle Managed Objects**, then **Computers**, and then *machine-name*. Select **Databases**, then right-click *global database name*, select **Stop Service**.

Note: Choose Startup/Shutdown Options to control whether a database instance should be stopped along with the service.

- **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, selecting the **Save full path info** option.

For example, if the source Oracle installation is in

`C:\app\username\product\12.1.0\dbhome_1`, you zip the `dbhome_1` directory, leaving out the `admin`, `flash_recovery_area`, and `oradata` directories that are under `12.1.0`. 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.
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. From the `clone\bin` directory, run `clone.pl` for the unzipped Oracle home. Use the following syntax:

```
C:\ORACLE_HOME\clone\bin>
ORACLE_HOME="target location" ORACLE_BASE="target Base location" ORACLE_
HOME_USER="Windows User Account"

-defaultHomeName
```

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\12.1.0\dbhome_1"
ORACLE_BASE="C:\app\username"
ORACLE_HOME_USER="mydomain\username" -defaultHomeName
```

Oracle Universal Installer starts, and then records the cloning actions in the `cloneActionstimestamp.log` file. This log file is normally located in `C:\Program Files\Oracle\Inventory\logs`.

9. 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**.
10. 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* for information about cloning Oracle homes and Oracle databases
- *Oracle Universal Installer and OPatch User's Guide for Windows and UNIX* for additional information about cloning an Oracle home

6.6 Configuring Oracle Configuration Manager in a Cloned Oracle Home

Configuring Oracle Configuration Manager for a cloned Oracle home depends on its configuration in the original Oracle home.

If you have already installed but not configured Oracle Configuration Manager in the original Oracle home, then run the following commands from the cloned Oracle home:

```
DRIVE_LETTER:\> cd %ORACLE_HOME%\ccr\bin
DRIVE_LETTER:\> setupCCR
```

If you have already configured Oracle Configuration Manager in the original Oracle home, then run the following commands from the cloned Oracle home:

```
DRIVE_LETTER:\> cd %ORACLE_HOME%\ccr\bin
DRIVE_LETTER:\> deriveCCR
```

If `deriveCCR` cannot find the original configuration, then the Oracle Configuration Manager command-line interface prompts for the My Oracle Support credentials (MOS). Then, `deriveCCR` configures Oracle Configuration Manager in disconnected mode.

Run the following command to reconfigure Oracle Configuration Manager after running the `deriveCCR` command:

```
DRIVE_LETTER:\> configCCR
```

Oracle Database Postinstallation Tasks

This chapter describes the following postinstallation configuration tasks:

- Installing the Latest Patch Set Release
- Validating Invalid PL/SQL Modules
- Configuring the Secure Sockets Layer
- Configuring Oracle Components
- Creating a Fast Recovery Area Disk Group
- Enabling and Disabling Database Options
- Changing the Oracle Home User Password
- Postinstallation Tasks for SQL Developer

7.1 Installing the Latest Patch Set Release

Oracle recommends installing the latest patch set release after successful installation of Oracle Database.

You must register online before using My Oracle Support. After logging in to My Oracle Support, select the **Patches and Updates** tab from the top of the screen.

To download required patches:

1. Use a web browser to view the My Oracle Support website:

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

2. Log in to My Oracle Support.

Note: If you are not a My Oracle Support registered user, click **Register here** and follow the registration instructions.

3. On the main My Oracle Support page, click **Patches and Updates** tab.
4. In the Patch Search group, select **Product or Family (Advanced)**.
5. In the Product field, select **Oracle Database**.
6. In the Release field select the release number. For example, Oracle 12.1.0.1.0.
7. Click **Search**.
8. Any available patch updates are displayed in the Patch Search page.

9. Select the patch number and click **ReadMe**. The README page is displayed and contains information about the patch set and how to apply the patches to your installation.
10. Return to the Patch Search page, click **Download**, and save the file on your system.
11. Use the unzip utility provided with Oracle Database 12c to uncompress the Oracle patch updates that you downloaded from My Oracle Support. The unzip utility is located in the `ORACLE_BASE\ORACLE_HOME\bin` directory.

7.2 Validating Invalid PL/SQL Modules

Run the `utlrp.sql` script after creating or upgrading a database. This script recompiles all PL/SQL modules that may be in an INVALID state, including packages, procedures, types, and so on. You must run the `utlrp.sql` script immediately, so that the performance cost of recompilation is incurred during the installation rather than in the future.

Note: There should be no other data definition language (DDL) statements running on the database while the script is running, and packages STANDARD and DBMS_STANDARD must be valid.

1. Start SQL*Plus:

```
DRIVE_LETTER:\> sqlplus /nolog
```
2. Connect to the database with the SYS account:

```
SQL> CONNECT SYS AS SYSDBA
Enter password: SYS_password
```
3. Start the database (if necessary):

```
SQL> STARTUP
```
4. Run the `utlrp.sql` script, which by default is located in `ORACLE_HOME\rdbms\admin\utlrp.sql`. For example:

```
SQL> @?\rdbms\admin\utlrp.sql
```

7.3 Configuring the Secure Sockets Layer

Oracle highly recommends 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* for more information about Secure Socket Layer

7.4 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.

This section contains these topics:

- Configuring Direct NFS Client
- Configuring Oracle Messaging Gateway
- Configuring Oracle Administration Assistant for Windows
- Configuring Oracle Label Security
- Configuring the OraClrAgnt Service for Oracle Database Extensions for .NET
- Configuring Oracle Database Vault
- Configuring Oracle Net Services
- Installing Oracle Text Supplied Knowledge Bases
- Installing the Oracle Text Filtering Component
- Configuring or Reinstalling Oracle XML DB
- Configuring PL/SQL External Procedures
- Configuring Shared Server Support
- Setting Credentials for the Job System to Work with Oracle Enterprise Manager
- Configuring Oracle Database to Communicate with Oracle Automatic Storage Management
- Installing Oracle Database Examples
- Creating the OraMTS Service for Microsoft Transaction Server

See Also:

- "Available Installation Scenarios" in *Oracle Application Express Installation Guide*
- "Post-installation Database Configuration" section in *Oracle Configuration Manager Installation and Administration Guide* for information about postinstallation tasks for Oracle Configuration Manager

Note: You need only perform postinstallation tasks for components that you intend to use.

7.4.1 Configuring Direct NFS Client

Direct NFS Client is an alternative to using kernel-managed NFS. Refer to the following sections to configure Direct NFS Client:

- About Direct NFS Client Storage
- About the Oranfstab File for Direct NFS Client
- Mounting NFS Storage Devices with Direct NFS Client
- Specifying Network Paths for a NFS Server
- Enabling Direct NFS Client
- Performing Basic File Operations Using the ORADNFS Utility
- Monitoring Direct NFS Client Usage
- Disabling Direct NFS Client

- [Enabling HCC on Direct NFS Client](#)

7.4.1.1 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 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.

Management of Oracle data files created with Direct NFS Client should be done according to the guidelines specified in *Oracle Database Administrator's Guide*. 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 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.

7.4.1.2 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.

7.4.1.3 Mounting NFS Storage Devices with Direct NFS Client

Direct NFS Client determines mount point settings for 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.

7.4.1.4 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 `wtmax` granularity to the NFS server. Direct NFS Client does not serve an NFS server with a `wtmax` less than 16384. Oracle recommends that you use the value 32768.

For NFS servers that restrict port range, you can use the `insecure` option to enable clients other than `root` to connect to the NFS server. Alternatively, you can disable Direct NFS Client as described in "[Disabling Direct NFS Client](#)" on page 7-7.

Note: Use NFS servers supported for Oracle Database. See the My Oracle Support website for support information:

<https://support.oracle.com>

7.4.1.5 Enabling Direct NFS Client

Complete the following procedure to enable Direct NFS Client:

1. Create an `oranfstab` file with the following attributes for each NFS server to be accessed using Direct NFS Client:
 - `server`: The NFS server name.
 - `path`: Up to 4 network paths to the NFS server, specified either by IP address, or by name, as displayed using the `ifconfig` command on the NFS server.
 - `local`: Up to 4 network interfaces on the database host, specified by IP address, or by name, as displayed using the `ipconfig` command on the database host.
 - `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 outgoing messages should 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 for which Direct NFS Client should wait for a successful mount before timing out. This parameter is optional and 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 NFS servers listed in `oranfstab`. The default value is `gid:65534`, which corresponds to `group:nogroup` on the NFS server.
 - `nfs_version`: Specifies the NFS protocol version that the Direct NFS Client uses. Only NFSv3 is supported.
 - `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`.

See Also: "Limiting Asynchronous I/O in NFS Server Environments" in *Oracle Database Performance Tuning Guide*

The following is an example of an `oranfstab` file with two NFS server entries:

```
server: MyDataServer1
local: 192.0.2.0
path: 192.0.2.1
local: 192.0.100.0
```

```

path: 192.0.100.1
nfs_version: nfsv3
export: /vol/oradata1 mount: C:\APP\ORACLE\ORADATA\ORCL

server: MyDataServer2
local: LocalPath1
path: NfsPath1
local: LocalPath2
path: NfsPath2
local: LocalPath3
path: NfsPath3
local: LocalPath4
path: NfsPath4
nfs_version: nfsv3
dontroute
export: /vol/oradata2 mount: C:\APP\ORACLE\ORADATA\ORCL2
export: /vol/oradata3 mount: C:\APP\ORACLE\ORADATA\ORCL3
export: /vol/oradata3 mount: C:\APP\ORACLE\ORADATA\ORCL4
export: /vol/oradata3 mount: C:\APP\ORACLE\ORADATA\ORCL5
management: MgmtPath1
community: private

```

As a rule, a mount point specified in `oranfstab` file represents local path where the database files reside normally, that is, without Direct NFS Client being enabled. For example, if a database that does not use Direct NFS Client would have kept its files in `C:\app\oracle\oradata\orcl` directory, then `C:\app\oracle\oradata\orcl` should be specified as a virtual mount point in the corresponding `oranfstab` file.

Note:

- Direct NFS Client ignores `uid` or `gid` value of 0.
 - The exported path from the NFS server must be accessible for read, write, and execute operations by the user with the `uid`, `gid` specified in `oranfstab`. If neither `uid` nor `gid` is listed, then the exported path must be accessible by the user with the `uid:65534`, `gid:65534`.
-
-

2. By default, Direct NFS Client is installed in a disabled state with single instance Oracle Database installations. Oracle Database uses an ODM library, `oranfsodm12.dll`, to enable Direct NFS Client. Perform the following steps to enable Direct NFS Client:
 1. Set `ORACLE_HOME` to Oracle home for which the Direct NFS Client must be enabled.
 2. Change directory to `ORACLE_HOME\bin`.
 3. Shut down the Oracle database.
 4. Run the batch file, `enable_dnfs.bat` to copy `ORACLE_HOME\bin\oranfsodm12.dll` to `ORACLE_HOME\rdbms\lib\odm\oranfsodm12.dll`.

7.4.1.6 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.

Note:

- A valid copy of the `oranfstab` configuration file must be present in `ORACLE_HOME\dfs` directory for ORADNFS to operate.
 - The user must be a member of the local `ORA_DBA` group to execute ORADNFS.
-
-

7.4.1.7 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.

7.4.1.8 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\oranfsodm12.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.

7.4.1.9 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.

7.4.2 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.

See Also: "Loading and Setting Up Oracle Messaging Gateway" in *Oracle Database Advanced Queuing User's Guide* to configure Oracle Messaging Gateway and for additional instructions about configuring the `listener.ora`, `tnsnames.ora`, and `mgw.ora` files

7.4.3 Configuring Oracle Administration Assistant for Windows

Oracle Administration Assistant for Windows requires the Microsoft Management Console and HTML Help 1.2 or later to run. Microsoft Management Console (MMC) version 3.0 is available with Windows Server 2008 and Windows Server 2008 R2. Oracle recommends the latest MMC version available.

See Also: Microsoft documentation at

<http://www.microsoft.com/>

7.4.4 Configuring Oracle Label Security

You must configure Oracle Label Security in a database to use it. See "Oracle Label Security Using Oracle Internet Directory" in *Oracle Label Security Administrator's Guide* for more information.

7.4.5 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.

In earlier versions of Oracle Database, the OraClrAgnt service was automatically created by the installer. Starting with Oracle Database 12c Release 1 (12.1), 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.

See Also: *Oracle Database Extensions for .NET Developer's Guide for Microsoft Windows* for more information about the `OraClrCtl.exe` tool and for installing and configuring the OraClrAgnt service

7.4.6 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.

See the "Registering Oracle Database Vault with an Oracle Database" section in *Oracle Database Vault Administrator's Guide* to register Oracle Database Vault.

7.4.7 Configuring 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.

Note: The default location for the `tnsnames.ora` and `listener.ora` files is the `ORACLE_BASE\ORACLE_HOME\network\admin\` directory.

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 12.1 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 connection information for additional database instances to the new file.

7.4.8 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* for information about creating and extending knowledge bases, such as extending the supplied knowledge bases to accommodate your requirements, or creating your own knowledge bases in languages other than English and French

7.4.9 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 of the `vc redistrib_x64.exe` file from

<http://www.microsoft.com/downloads>

See Also: *Oracle Text Reference* for more information about Oracle Text Filtering Technology

7.4.10 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: The "Using FTP on the Standard Port Instead of the Oracle XML DB Default Port" and "Using HTTP(S) on a Standard Port Instead of an Oracle XML DB Default Port" sections in *Oracle XML DB Developer's Guide* for configuring the Oracle XML DB ports

Also, see *Oracle XML DB Developer's Guide* for more information about the following tasks:

- Reinstalling Oracle XML DB
- Configuring or customizing the Oracle XML DB tablespace
- Configuring FTP, HTTP/WebDAV port numbers

7.4.11 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 12c database, then you must manually configure them.

7.4.12 Configuring Shared Server Support

The default setup for using 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.

7.4.13 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.

7.4.14 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 it is, check the [sqlnet.ora file](#), by default located in `ORACLE_HOME\network\admin`, and ensure that it has NTS enabled. For example:

```
sqlnet.authentication_services=(NTS)
```

See Also: *Oracle Database Platform Guide for Microsoft Windows* for more information about Windows native authentication

7.4.15 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* for detailed information about various Oracle product demonstrations

7.4.16 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* for more information about OraMTS, which allows Oracle databases to be used as resource managers in distributed transactions

7.5 Creating a Fast Recovery Area Disk Group

During installation, by default you can create one disk group. If you plan to add an Oracle Database for a standalone server, then you should create the fast recovery area for database files.

7.5.1 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. 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. Enabling rapid backups for recent data can reduce requests to system administrators to retrieve backup tapes for recovery operations.

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 should 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`.

7.5.2 Creating the Fast Recovery Area Disk Group

To create a fast recovery file disk group:

1. Navigate to the Grid home bin directory, and start ASM Configuration Assistant (ASMCA). For example:

```
DRIVE_LETTER:\> cd \app\oracle\product\12.1.0\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 eligible disks to be added to the fast recovery area, and click **OK**.

4. The Diskgroup Creation window opens to inform you when disk group creation is complete. Click **OK**.
5. Click **Exit**.

See Also:

- "Setting the Fast Recovery Area Location and Initial Size" section in *Oracle Database Backup and Recovery User's Guide*
- *Oracle Automatic Storage Management Administrator's Guide*

7.6 Enabling and Disabling Database Options

When you install Oracle Database, by default certain options are enabled and others are 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* for information about connecting to the database using `SQL*Plus`

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.

Value	Description
dm	Oracle Data Mining RDBMS Files
olap	Oracle OLAP
partitioning	Oracle Partitioning
rat	Oracle Real Application Testing
ode_net	Oracle Database Extensions for .NET

Example 7-1 Complete Example of 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 dm
```

4. Start the database service, *OracleServiceSID*, using the Services program in Control Panel.

5. Start up the database:

```
srvctl start database -d myDb
```

7.7 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 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 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 logfile]
```

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 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.

7.8 Postinstallation Tasks for SQL Developer

See the following sections in *Oracle SQL Developer Installation Guide* for recommended postinstallation tasks for SQL Developer:

- Migrating User Settings from a Previous Release
- Migrating Information from Previous Releases
- Location of User-Related Information

Getting Started with Oracle Database

This chapter describes where to go after you have completed an Oracle Database installation, such as how to check the installed contents, start various tools, and identify and locate various files. It covers these topics:

- Checking the Installed Oracle Database Contents and Directory Location
- Logging In to Oracle Enterprise Manager Database Express 12c
- Managing Oracle Automatic Storage Management
- Starting and Stopping an Oracle Database
- Accessing Oracle Database with SQL*Plus
- Accessing Oracle Database with Oracle SQL Developer
- Reviewing User Accounts and Passwords
- Identifying Databases
- Locating the Server Parameter File
- Identifying Tablespaces and Data Files
- Locating Redo Log Files
- Locating Control Files
- Understanding Oracle Database Services on Windows

8.1 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.

8.2 Logging In to Oracle Enterprise Manager Database Express 12c

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. For information about logging in to Oracle Enterprise Manager Database Express see "Starting EM Express" in *Oracle Database 2 Day DBA* and "Accessing the Database Home Page" in *Oracle Database 2 Day DBA*.

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 "Configuring the HTTP Port for EM Express" in *Oracle Database 2 Day DBA*.

8.3 Managing Oracle Automatic Storage Management

This section covers the following topics:

- [Starting and Stopping Oracle Automatic Storage Management](#)
- [Oracle Automatic Storage Management Utilities](#)

8.3.1 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* for information about starting and stopping Oracle Automatic Storage Management instances by using SQL*Plus

8.3.2 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.
- `asmtool`: 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 12c: 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* for more information about managing Oracle Automatic Storage Management

8.4 Starting and Stopping an Oracle Database

You can start and stop an Oracle database by using any of the following methods:

- [Starting and Stopping the Database with Oracle Administration Assistant for Windows](#)
- [Starting and Stopping the Database from the Microsoft Windows Services Utility](#)

8.4.1 Starting and Stopping the Database with Oracle Administration Assistant for Windows

To start or stop the database:

1. From the **Start** menu, select **All Programs**, then **Oracle - HOMENAME**, then **Configuration and Migration Tools**, and then **Administrative Assistant for Windows**.
2. In the console window, expand the Oracle Administration Assistant for Windows tree structure.
3. Under Databases, right-click the name of the database, and from the menu, select from the following options:
 - **Connect Database**
 - **Start Service**
 - **Disconnect Database**
 - **Stop Service**
 - **Startup/Shutdown Options**
 - **Process Information**

8.4.2 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.

8.5 Accessing Oracle Database with SQL*Plus

To issue SQL and PL/SQL statements to Oracle Database, you can use SQL*Plus. 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* for more information about accessing Oracle Database using SQL*Plus.

8.6 Accessing Oracle Database with Oracle SQL Developer

To issue SQL and PL/SQL statements to Oracle Database, you can use SQL Developer. 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 asked 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: "SQL*Plus Statements Supported and Not Supported in SQL Worksheet" in *Oracle SQL Developer User's Guide*

8.7 Reviewing User Accounts and Passwords

All databases created by 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. This section covers the following topics:

- [Reviewing Administrative Accounts](#)
- [Unlocking and Resetting User Passwords](#)

See Also:

- "Unlocking and Resetting User Passwords" on page 8-8 for information about using Oracle Enterprise Manager Database Express to view a complete list of the user accounts defined for your database
- *Oracle Database Administrator's Guide* for information about Oracle security procedures and security best practices

Note: Use Oracle Enterprise Manager Database Express 12c to view the complete list of database accounts.

8.7.1 Reviewing Administrative Accounts

Table 8–1 describes the administrative user names.

Table 8–1 Administrative Accounts

User Name	Description	See Also
ANONYMOUS	Allows HTTP access to Oracle XML DB.	<i>Oracle XML DB Developer's Guide</i>
APEX_040200	The account owns the Oracle Application Express schema and metadata.	<i>Oracle Application Express Application Builder User's Guide</i>
APEX_PUBLIC_USER	The minimally privileged account used for Oracle Application Express configuration with Oracle HTTP Server and mod_plsql.	<i>Oracle Application Express Application Builder User's Guide</i>
APPQOSSYS	Used for storing or managing all data and metadata required by Oracle Quality of Service Management.	None
AUDSYS	The account where the unified audit data trail resides.	<i>Oracle Database Security Guide</i>
BI	Owens the Business Intelligence schema included in the Oracle Sample Schemas. It is only available if you loaded the Sample Schemas.	<i>Oracle Database Sample Schemas</i>
CTXSYS	The Oracle Text account.	<i>Oracle Text Reference</i>
DBSNMP	Used by Management Agent of Oracle Enterprise Manager to monitor and manage the database.	<i>Oracle Enterprise Manager Cloud Control Administrator's Guide</i>
DIP	Used by Directory Integration Platform (DIP) to synchronize the changes in Oracle Internet Directory with the applications in the database.	None
DVF	The account owned by Database Vault that contains public functions to retrieve the Database Vault Factor values.	<i>Oracle Database Vault Administrator's Guide</i>
DVSYST	<p>There are two roles associated with this account. Database Vault owner role manages the Database Vault roles and configurations. The Database Vault Account Manager is used to manage database user accounts.</p> <p>Note: Part of Oracle Database Vault user interface text is stored in database tables in the DVSYST schema. By default, only the English language is loaded into these tables. You can use the <code>DVSYST.DBMS_MACADM.ADD-NLS_DATA</code> procedure to add other languages to Oracle Database Vault. See the "Adding Languages to Oracle Database Vault" section in the <i>Oracle Database Vault Administrator's Guide</i></p>	<i>Oracle Database Vault Administrator's Guide</i>
EXFSYST	Owens the Expression Filter schema.	None
FLWS_FILES	The account owns the Oracle Application Express uploaded files.	<i>Oracle Application Express Application Builder User's Guide</i>
GSMADMIN_INTERNAL	The internal account that owns the Global Data Services schema. It should not be unlocked or used for a database login.	<i>Oracle Database Global Data Services Concepts and Administration Guide</i>
GSMCATUSER	The account used by Global Service Manager to connect to the Global Data Services catalog.	<i>Oracle Database Global Data Services Concepts and Administration Guide</i>
GSMUSER	The account used by Global Service Manager to connect to the database.	<i>Oracle Database Global Data Services Concepts and Administration Guide</i>
HR	Owens the Human Resources schema included in the Oracle Sample Schemas. It is available only if you loaded the Sample Schemas.	<i>Oracle Database Sample Schemas</i>

Table 8–1 (Cont.) Administrative Accounts

User Name	Description	See Also
IX	Owns the Information Transport schema included in the Oracle Sample Schemas. This account is available only if you loaded the Sample Schemas.	<i>Oracle Database Sample Schemas</i>
LBACSYS	The Oracle Label Security administrator account.	<i>Oracle Label Security Administrator's Guide</i>
MDDATA	The schema used by Oracle Spatial and Graph for storing geocoder and router data.	<i>Oracle Spatial and Graph Developer's Guide</i>
MDSYS	The Oracle Spatial and Graph, and Oracle Multimedia Locator administrator account.	<i>Oracle Spatial and Graph Developer's Guide</i>
OE	Owns the Order Entry schema included in the Oracle Sample Schemas. This account is available only if you loaded the Sample Schemas.	<i>Oracle Database Sample Schemas</i>
ORACLE_OCM	This account contains the instrumentation for configuration collection used by the Oracle Configuration Manager.	<i>Oracle Configuration Manager Installation and Administration Guide</i>
ORDDATA	This account contains the Oracle Multimedia DICOM data model.	<i>Oracle Multimedia DICOM Developer's Guide</i>
ORDPLUGINS	The Oracle Multimedia user. Plug-ins supplied by Oracle and third party plug-ins are installed in this schema.	<i>Oracle Multimedia Reference</i>
ORDSYS	The Oracle Multimedia administrator account.	<i>Oracle Multimedia Reference</i>
OUTLN	Centrally manages metadata associated with stored outlines. Supports plan stability, which enables maintenance of the same execution plans for the same SQL statements.	<i>Oracle Database Concepts</i>
PM	Owns the Product Media schema included in the Oracle Sample Schemas. This account is created only if you loaded the Sample Schemas.	<i>Oracle Database Sample Schemas</i>
SCOTT	An account used by Oracle sample programs and examples.	<i>Oracle Database Administrator's Guide</i>
SH	Owns the Sales History schema included in the Oracle Sample Schemas. This account is available only if you loaded the Sample Schemas during an Enterprise Edition installation	<i>Oracle Database Administrator's Guide</i>
SI_INFORMTN_SCHEMA	Stores the information views for the SQL/MM Still Image Standard.	<i>Oracle Multimedia Reference</i>
SPATIAL_CSW_ADMIN_USR	The Catalog Services for the Web (CSW) account. It is used by the Oracle Spatial and Graph CSW cache manager to load all record type metadata, and record instances from the database into the main memory for the record types that are cached.	<i>Oracle Spatial and Graph Developer's Guide</i>
SPATIAL_WFS_ADMIN_USR	The Web Feature Service (WFS) account. It is used by the Oracle Spatial and Graph WFS cache manager to load all feature-type metadata, and feature instances from the database into main memory for the feature types that are cached.	<i>Oracle Spatial and Graph Developer's Guide</i>
SYS	Used for performing database administration tasks.	<i>Oracle Database Administrator's Guide</i>
SYSBACKUP	The account used to perform backup and recovery tasks.	<i>Oracle Database Installation Guide</i> (this guide)

Table 8–1 (Cont.) Administrative Accounts

User Name	Description	See Also
SYSDG	The account used to administer and monitor Oracle Data Guard.	<i>Oracle Database Installation Guide</i> (this guide)
SYSKM	The account used to perform encryption key management.	<i>Oracle Database Installation Guide</i> (this guide)
SYSTEM	Used for performing database administration tasks.	<i>Oracle Database Administrator's Guide</i>
WMSYS	The account used to store the metadata information for Oracle Workspace Manager.	<i>Oracle Database Workspace Manager Developer's Guide</i>
XDB	Used for storing Oracle XML DB data and metadata.	<i>Oracle XML DB Developer's Guide</i>

See Also:

- "Database Administrator Usernames" in *Oracle Database Administrator's Guide*
- "Administering External Users and Roles on Windows" in *Oracle Database Platform Guide for Microsoft Windows*

8.7.2 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 starter database during the installation, Oracle Database Configuration Assistant displays a screen with your database information and the Password Management button. Use the Password Management button and unlock only the user names you use.

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 12c to Unlock Accounts and Reset Passwords](#)
- [Using SQL*Plus to Unlock and Change Passwords](#)

See Also: *Oracle Database Administrator's Guide* for more information about:

- Unlocking and changing passwords after installation
- Oracle security procedures
- Security best practices

8.7.2.1 Using Enterprise Manager Database Express 12c to Unlock Accounts and Reset Passwords

To unlock and reset user account passwords using Oracle Enterprise Manager Database Express 12c see the "Administering Database User Accounts" section in *Oracle Database 2 Day DBA*.

See Also: Click **Help** in the Oracle Enterprise Manager Database Express 12c window for more information

8.7.2.2 Using SQL*Plus to Unlock and Change Passwords

Use SQL*Plus to unlock accounts and change passwords any time after the installation process.

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* to learn how to add new users and change passwords
- *Oracle Database SQL Language Reference* for the `ALTER USER` statement syntax used for unlocking user accounts
- *Oracle Database Administrator's Guide* for information about the users `SYS` and `SYSTEM`

8.8 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 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: "`DB_UNIQUE_NAME`" and "`DB_NAME`" in *Oracle Database Reference*

8.9 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 12c 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 12c window for more information

8.10 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 12c databases.

Table 8–2 list 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

Tablespace	Data File	Description
EXAMPLE	EXAMPLE01.DBF	Stores the Sample Schemas, if you included them.
SYSAUX	SYSAUX01.DBF	Serves as an auxiliary tablespace to the <code>SYSTEM</code> tablespace. Some products and options that previously used the <code>SYSTEM</code> tablespace now use the <code>SYSAUX</code> tablespace to reduce the load on the <code>SYSTEM</code> tablespace.
SYSTEM	SYSTEM01.DBF	Stores the data dictionary, including definitions of tables, views, and stored procedures needed by the Oracle Database. Information in this area is maintained automatically.
TEMP	TEMP01.DBF	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 <code>GROUP BY</code> , <code>ORDER BY</code> , or <code>DISTINCT</code> , then you must expand this tablespace.
UNDOTBS	UNDOTBS01.DBF	Stores undo information. The undo tablespace 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.

Table 8–2 (Cont.) Tablespaces and Data Files

Tablespace	Data File	Description
USERS	USERS01.DBF	Stores database objects created by database users.

See Also: *Oracle Database Concepts* and the *Oracle Database Administrator's Guide* for more information

To use Oracle Enterprise Manager Database Express 12c to view the list of data files used by the database and their associated tablespaces see the "Viewing Tablespace and Data File Information" section in *Oracle Database 2 Day DBA*.

For more information about Oracle Enterprise Manager Database Express 12c, and to view, modify, and create tablespaces, click **Help** in the Oracle Enterprise Manager Database Express 12c window.

8.11 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.

See Also: *Oracle Database Backup and Recovery User's Guide* for more information about redo log files

To view or modify the redo log files for the preconfigured database using Oracle Enterprise Manager Database Express 12c see the "Viewing Online Redo Log File Information" and "Viewing Archived Redo Log File Information" sections in *Oracle Database 2 Day DBA*.

For more information about using Oracle Enterprise Manager Database Express 12c to view, modify, and create redo log files, click **Help** in the Oracle Enterprise Manager Database Express window.

8.12 Locating Control Files

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 12c 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.

To use Oracle Enterprise Manager Database Express 12c to view information about the control files for the preconfigured database see the "Viewing Control File Information" section in *Oracle Database 2 Day DBA*.

See Also: *Oracle Database Administrator's Guide* for more information about setting the CONTROL_FILES initialization parameter value

For more information about using Oracle Enterprise Manager Database Express 12c 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.

See Also: *Oracle Database Administrator's Guide* for more information about setting the CONTROL_FILES initialization parameter value

8.13 Understanding Oracle Database Services on Windows

Two main 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, the OracleOHService and OracleASMServices+ASM services are listed as well. However, other services for networking or other individual components may not automatically start.

Removing Oracle Database Software

This chapter describes how to completely remove Oracle software and configuration files related to the specified Oracle home. It includes information about removing Oracle software using the deinstallation tool.

The deinstallation tool removes standalone Oracle Database installations, Oracle Clusterware and Oracle Automatic Storage Management (Oracle ASM) from your server, as well as Oracle Real Application Clusters (Oracle RAC) and Oracle Database client installations.

Oracle recommends that you use the deinstallation tool to remove the entire Oracle home associated with the Oracle Database, Oracle Clusterware, Oracle ASM, Oracle RAC, or Oracle Database client installation. Oracle does not support the removal of individual products or components.

See Also: *Oracle Grid Infrastructure Installation Guide* and *Oracle Real Application Clusters Installation Guide* for information about removing an Oracle RAC installation.

The "Dropping Disk Groups" section in the *Oracle Automatic Storage Management Administrator's Guide* for information about removing an Oracle Automatic Storage Management disk group.

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.

The following sections describe the tool, and provide information about additional options to use the tool:

- [About the Deinstallation Tool](#)
- [Example of Running the Deinstallation Tool](#)
- [Example of Running the Deinstallation Command](#)
- [Example of a Deinstallation Response File for an Oracle Database](#)
- [Example of a Deinstallation Response File for Oracle Grid Infrastructure](#)

Caution: You must use the deinstallation tool from the same release to remove Oracle software. Do not run the deinstallation tool from a later release to remove Oracle software from an earlier release. For example, do not run the deinstallation tool from the 12.1.0.1 installation media to remove Oracle software from an existing 11.2.0.4 Oracle home.

9.1 About the Deinstallation Tool

Starting with Oracle Database 12c Release 1 (12.1), the deinstallation tool is integrated with Oracle Universal Installer (OUI). You can perform a deinstallation by running the `setup.exe` command with the `-deinstall` and `-home` options from the base directory of the Oracle Database, Oracle Database Client, or Oracle Grid Infrastructure installation media.

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

The deinstallation tool uses the information you provide and the information gathered from the software home to create a response file. Alternatively, you can supply a response file generated previously by the `deinstall` command using the `-checkonly` option, or by editing the response file template.

Using Oracle Universal Installer with the `deinstall` option, or running the deinstallation tool from the Oracle home, stops and removes Oracle software and its components, such as database and configuration files for a specific Oracle home.

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.

Caution: When you install Oracle Database, if the central inventory contains no other registered homes besides the home that you are deconfiguring and removing, then the Deinstallation tool removes the following files and directory contents in the Oracle base directory of the Oracle Database installation owner:

- admin
- cfgtoollogs
- checkpoints
- diag
- oradata
- flash_recovery_area

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

In addition, for Oracle Grid Infrastructure installations:

- Oracle Automatic Storage Management Cluster File System (Oracle ACFS) must be dismounted and Oracle Automatic Storage Management Dynamic Volume Manager (Oracle ADVM) must be disabled.
 - If Grid Naming Service (GNS) is in use, then the entry for the subdomain needs to be deleted from DNS by your DNS administrator.
-

Oracle recommends that you run the deinstallation tool as the Oracle software installation owner. The default method for running the deinstallation tool is from the `deinstall` directory in the Oracle home as the installation owner:

```
%ORACLE_HOME%\deinstall
DRIVE_LETTER:\> deinstall\deinstall.bat
```

The command uses the following syntax, where variable content is indicated by italics:

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

To run the deinstallation tool from the database installation media, use the `setup.exe` command with the `-deinstall` option, followed by the `-home` option to specify the path of the Oracle home you want to remove using the following syntax, where variable content is indicated in italics:

```
setup.exe -deinstall -home complete path of Oracle home [-silent] [-checkonly]
[-local]
[-paramfile complete path of input parameter property file] [-params name1=value
name2=value . . .] [-o complete path of directory for saving files] [-help]
```

[-tmpdir complete path of temporary directory to use]
[-logdir complete path of log directory to use] [-help]

Provide information about your servers as prompted or accept the defaults.

Note: If User Account Control is enabled, then you must create a desktop shortcut to a DOS command window. Open the command window through the **Run as administrator**, right-click context menu, and start the deinstallation tool.

For more information about the User Account Control, see "[Managing User Accounts with User Account Control](#)".

In addition, you can run the deinstallation tool from other locations, or with a response file, or select other options to run the tool.

■ -home

Use this flag to indicate the home path of the Oracle home to check or deinstall. To deinstall Oracle software using the `deinstall` command, located in the Oracle home you plan to deinstall, provide a response file in a location outside the Oracle home, and do not use the `-home` flag.

If you run the deinstallation tool from the `ORACLE_HOME\deinstall` path, then the `-home` flag is not required because the tool identifies the location of the home where it is run. If you run the tool using `setup.exe -deinstall` from the installation media, then `-home` is mandatory.

■ -silent

Use this flag to run the deinstallation tool in noninteractive mode. This option requires one of the following:

- A working system that it can access to determine the installation and configuration information. The `-silent` flag does not work with failed installations.
- A response file that contains the configuration values for the Oracle home that is being deinstalled or deconfigured.

You can generate a response file to use or modify by running the tool with the `-checkonly` flag. The tool then discovers information from the Oracle home to deinstall and deconfigure. It generates the response file that you can then use with the `-silent` option.

You can also modify the template file `deinstall.rsp.tmpl`, located in the `ORACLE_HOME\deinstall\response` directory.

■ -checkonly

Use this flag to check the status of the Oracle software home configuration. Running the deinstallation tool with the `-checkonly` flag does not remove the Oracle configuration. The `-checkonly` flag generates a response file that you can then use with the deinstallation tool and `-silent` option.

■ -paramfile *complete path of input parameter property file*

Use this flag to run the deinstallation tool with a response file in a location other than the default. When you use this flag, provide the complete path where the response file is located.

The default location of the response file depends on the location of the deinstallation tool:

- From the installation media or stage location: `\response`
- After installation from the installed Oracle home: `ORACLE_HOME\deinstall\response`.

- `-params ["name1=value" "name2=value" "name3=value" ...]`

Use this flag with a response file to override one or more values to change it in a response file you have created.

- `-o complete path of directory for saving response file`

Use this flag to provide a path other than the default location where the response file is saved. The default location is `\response\deinstall.rsp.tmp1`.

The default location of the response file depends on the location of deinstallation tool:

- From the installation media or stage location before installation: `\response`
- After installation from the installed Oracle home: `ORACLE_HOME/deinstall/response`.

- `-tmpdir complete path of temporary directory`

Specifies a non-default location where Oracle Deinstallation Tool writes the temporary files for the deinstallation.

- `-logdir complete path of log directory`

Specifies a non-default location where Oracle Deinstallation Tool writes the log files for the deinstallation.

- `-help`

Use the help option (`-help`) to obtain additional information about the command optional flags.

Note: Oracle Real Application Clusters Installation Guide for Microsoft Windows x64 (64-Bit) for information about the `-local` option

9.2 Example of Running the Deinstallation Tool

If you perform a deinstallation by running the `setup.exe` command with the `-deinstall` option from the installation media, then help is displayed unless you enter a `-home` flag and provide a path to the home directory of the Oracle software to remove from your system.

Use the optional flag `-paramfile` to provide a path to a response file.

In the following example, the `setup.exe` command is in the path `\directory_path`, where `directory_path` is the path to the database directory on the installation media, and `C:\app\oracle\product\12.1.0\dbhome_1` is the path to the Oracle home which is removed:

```
DRIVE_LETTER:> cd \directory_path
DRIVE_LETTER:> setup.exe -deinstall -home C:\app\oracle\product\12.1.0\dbhome_1
```

The following example uses a response file in the software owner location `C:\Documents and Settings\oracle\`:

```
DRIVE_LETTER:\> cd \directory_path
DRIVE_LETTER:\> setup.exe -deinstall -paramfile C:\Documents and
Settings\oracle\my_db_paramfile.tmpl
```

9.3 Example of Running the Deinstallation Command

If you perform a deinstallation by using the `deinstall` command from the `ORACLE_HOME\deinstall` folder, then the deinstallation starts without prompting you for an `ORACLE_HOME`.

Use the optional flag `-paramfile` to provide a path to a response file.

In the following example, the `deinstall` command is in the path

`C:\app\oracle\product\12.1.0\dbhome_1\deinstall`, and it uses a response file in the software owner location `C:\Documents and Settings\oracle\`:

```
DRIVE_LETTER:\> cd \app\oracle\product\12.1.0\dbhome_1\deinstall\
DRIVE_LETTER:\> deinstall.bat -paramfile %HOMEPATH%\my_db_paramfile.tmpl
```

For the grid infrastructure home, use the deinstallation script (`deinstall.bat`) in the Oracle Grid Infrastructure for a standalone server home, which in this example is

`C:\app\oracle\product\12.1.0\grid`:

```
DRIVE_LETTER:\> cd \app\oracle\product\12.1.0\grid\deinstall\
DRIVE_LETTER:\> deinstall.bat -paramfile %HOMEPATH%\my_grid_paramfile.tmpl
```

9.4 Example of a Deinstallation Response File for an Oracle Database

You can perform a deinstallation on a standalone Oracle Database with the `-paramfile` option to use the values you specify in the response file. The following is an example of a response file, in which the Oracle Database binary owner is `oracle`, the Oracle Database home (Oracle home) is in the path

`C:\app\oracle\product\12.1.0\dbhome_1`, the Oracle base (where other Oracle software is installed) is `C:\app\oracle`, the Oracle Inventory home is `C:\Program Files\Oracle\Inventory`, and the local node (the node where you run the deinstallation session from) is `myserver`:

```
#Copyright (c) 2005, 2009 Oracle Corporation. All rights reserved.
ORACLE_HOME=C:\app\oracle\product\12.1.0\dbhome_1
ORACLE_BASE.orcl=C:\app\oracle
FLASH_RECOVERY_LOC.orcl=C:\app\oracle\flash_recovery_area\ORCL
STORAGE_TYPE.orcl=FS
DB_TYPE.orcl=SI_DB
NETCA_LOCAL_LISTENERS=LISTENER
LOGDIR=C:\app\oracle\product\12.1.0\dbhome_1\deinstall\logs\
NODE_LIST.orcl=myserver
ObaseCleanupPtrLoc=\tmp\deinstall2012-06-12_09-14-11AM\orabase_cleanup.lst
ARCHIVE_LOG_DESTINATION_LOC.orcl=
ORACLE_BASE=C:\app\oracle
DUMP_DESTINATION_LOC.orcl=C:\app\oracle\admin\orcl
LOCAL_SID.orcl=orcl
INVENTORY_LOCATION=C:\Program Files\Oracle\Inventory
RAW_MAPPING_FILE.orcl=
SID_LIST.orcl=orcl
DB_UNIQUE_NAME_LIST=orcl
DATAFILE_LOC.orcl=C:\app\oracle\oradata\orcl, C:\app\oracle\fast_recovery_
area\orcl
HOME_TYPE=SIDB
```

```

CRS_HOME=false
CREATION_MODE.orcl=y
CONFIGFILE_LOC.orcl=
ORACLE_BINARY_OK=true
DIAG_DEST.orcl=C:\app\oracle\diag\rdbms\orcl
LOCAL_NODE=myserver
local=false
SPFILE_LOC.orcl=C:\app\oracle\product\12.1.0\dbhome_1\dbs\spfileorcl.ora
inventory_loc=C:\Program Files\Oracle\Inventory
MinimumSupportedVersion=11.2.0.1.0
silent=false
DBCA_LOG.orcl=C:\app\oracle\cfgtoollogs\dbca\orcl
ORACLE_HOME=C:\app\oracle\product\12.1.0\dbhome_1
CCR_CONFIG_STATUS=CCR_DEL_HOME
EMCA_LOG.orcl=C:\app\oracle\cfgtoollogs\emca\orcl
ORACLE_HOME_VERSION_VALID=true

```

9.5 Example of a Deinstallation Response File for Oracle Grid Infrastructure

You can perform a deinstallation on an Oracle Grid Infrastructure for a standalone server home with the `-paramfile` option to use the values you specify in the response file.

The following is an example of a response file, in which the Oracle grid infrastructure binary owner is `oracle`, the Oracle grid infrastructure home is in the path `D:\app\oracle`, the Oracle base (where other Oracle software is installed) is `D:\app\12.1.0\`, the central Oracle inventory home (`oraInventory`) is `C:\Program Files\Oracle\Inventory`, the local node (the node where you are run the deinstallation session from) is `myserver`:

```

# Copyright (c) 2005, 2009 Oracle Corporation. All rights reserved.
ORACLE_HOME=C:\app\oracle\product\12.1.0\grid
LOCAL_NODE=myserver
HOME_TYPE=SIHA
ASM_REDUNDANCY=EXTERNAL
ORACLE_BASE=C:\app\oracle\
ObaseCleanupPtrLoc=C:\Users\oracle\AppData\Local\Temp\deinstall12013-01-28-
05-03-31AM\ut1\orabase_cleanup.lst
SCAN_PORT=0
silent=false
ASM_UPGRADE=false
ORA_CRS_HOME=C:\app\oracle\product\12.1.0\grid
MinimumSupportedVersion=11.2.0.1.0
GPNPCONFIGDIR=$ORACLE_HOME
LOGDIR=C:\Users\username\logs\
ORACLE_HOME_VERSION_VALID=true
GPNPGCONFIGDIR=$ORACLE_HOME
ORACLE_OWNER=username
ISROLLING=true
CRS_STORAGE_OPTION=0
ORACLE_BINARY_OK=true
MGMT_DB=false
NETCA_LISTENERS_REGISTERED_WITH_HAS=LISTENER
ASM_AU_SIZE=1
HUB_SIZE=0
ASM_ORACLE_BASE=C:\app\oracle
ORA_DBA_GROUP=

```

```
JREDIR=C:\app\oracle\product\12.1.0\grid\jdk\jre\  
USER_IGNORED_PREREQ=false  
ASM_DISK_GROUPS="+DATA"  
ORA_ASM_GROUP=  
LANGUAGE_ID=AMERICAN_AMERICA.WE8MSWIN1252  
CSS_LEASEDURATION=400  
ASM_HOME=C:\app\oracle\product\12.1.0\grid  
ASM_DIAGNOSTIC_DEST=C:\app\oracle\product\OB  
TZ=America/Denver  
WindowsRegistryCleanupList=C:\Users\oracle\AppData\Local\Temp\deinstall2013-01-28_  
05-03-31AM\utl\registry_cleanup.lst  
REUSEDG=false  
SILENT=false  
local=false  
INVENTORY_LOCATION=C:\Program Files\Oracle\Inventory  
GNS_CONF=false  
BIG_CLUSTER=false  
LISTENER_USERNAME=domainname\oracle  
ASM_DISKS=\\.\ORCLDISKDATA0  
ORACLE_HOME=C:\app\oracle\product\12.1.0\grid  
CRS_HOME=true  
ASM_IN_HOME=true  
CRFHOME="C:\app\oracle\product\12.1.0\grid"  
ASM_DROP_DISKGROUPS=true  
OLD_ACTIVE_ORACLE_HOME=  
ASM_LOCAL_SID+=ASM  
JLIBDIR=C:\app\oracle\product\12.1.0\grid\jlib  
VNDR_CLUSTER=false  
ASM_DISK_GROUP=DATA
```

Installing Java Access Bridge

This appendix describes 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](#)
- [Setting Up Java Access Bridge 2.0.2](#)

A.1 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://www.oracle.com/technetwork/java/javase/tech/index-jsp-136191.html>

During installation, Oracle Universal Installer uses Java Runtime Environment (JRE) 1.6 contained on Oracle Database installation media. The JRE enables the use of Java Access Bridge during installation. See "[Setting Up Java Access Bridge 2.0.2](#)" on page A-1 for information about installing and configuring Java Access Bridge after you install Oracle components.

A.2 Setting Up Java Access Bridge 2.0.2

This section describes 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 SE2) Downloads page to download the latest build of JDK 7:

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

2. Install JDK 7 after accepting the Oracle license agreement.

Note: You must have administrator privileges to install JDK on Windows.

3. Download and install screen reader, JAWS:
<http://www.freedomscientific.com/downloads/jaws/JAWS-downloads.asp>
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://www.oracle.com/technetwork/java/javase/downloads/jab-2-0-2-download-354311.html>
 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 -jreLoc path-to-jdk7\jre
```

 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\12.1.0\dbhome_1*), until the JDK folder is created. Once the JDK folder is created, you must copy the files listed in [Table A-1](#) from the Java Access Bridge source location to the JDK destination folder. Copying these files will enable accessibility for both Oracle Database Configuration Assistant and Oracle Net Configuration Assistant.

Table A-1 Copy Files to JDK Directory on Windows 64-Bit

Copy	To
<i>AB_HOME\JavaAccessBridge-64.dll</i>	<i>dbhome_1\jdk\jre\bin</i>
<i>AB_HOME\JAWTAccessBridge-64.dll</i>	<i>dbhome_1\jdk\jre\bin</i>
<i>AB_HOME\Accessibility.properties</i>	<i>dbhome_1\jdk\jre\lib</i>
<i>AB_HOME\Access-bridge-64.jar</i>	<i>dbhome_1\jdk\jre\lib\ext</i>
<i>AB_HOME\jaccess.jar</i>	<i>dbhome_1\jdk\jre\lib\ext</i>

Optimal Flexible Architecture

This appendix describes the Optimal Flexible Architecture standard. This standard is a set of configuration guidelines created to ensure well organized Oracle installations that are easier to maintain. It includes information about the following topics:

- [Overview of the Optimal Flexible Architecture Standard](#)
- [Changes to the Optimal Flexible Architecture for Oracle Database](#)
- [Directory Tree Differences by Release](#)
- [Optimal Flexible Architecture Directory Naming Conventions](#)
- [Optimal Flexible Architecture and Multiple Oracle Home Configurations](#)
- [Comparison Between Optimal Flexible Architecture on Windows and UNIX](#)
- [Optimal Flexible Architecture Structure File Mapping](#)

B.1 Overview of the Optimal Flexible Architecture Standard

The Optimal Flexible Architecture standard helps you to organize database software and configure databases to allow multiple databases, of different versions, owned by different users to coexist. Optimal Flexible Architecture assists in identification of ORACLE_BASE with its Automatic Diagnostic Repository () diagnostic data to properly collect incidents.

All Oracle components on the installation media are compliant with Optimal Flexible Architecture. Oracle Universal Installer places Oracle Database components in directory locations, assigning the default permissions that follow Optimal Flexible Architecture guidelines.

Oracle recommends that you use Optimal Flexible Architecture, specially if the database grows in size, or if you plan to have multiple databases.

B.1.1 Advantages of Multiple Oracle Homes and OFA

When you install Oracle database, you are installing one of the largest applications that your computer can support. Using multiple Oracle homes and Optimal Flexible Architecture provides many advantages when administering large databases. The following advantages are important:

- Structured organization of directories and files, and consistent naming for database files simplify database administration.
- Distribution of I/O across multiple disks prevents performance bottlenecks caused by multiple read or write commands issued simultaneously to a single drive.

- Distribution of applications across multiple disks safeguards against database failures.
- Login home directories are not at risk when database administrators add, move, or delete Oracle home directories.
- Multiple databases, of different versions, owned by different users can coexist concurrently.
- Software upgrades can be tested in an Oracle home in a separate directory from the Oracle home where your production database is located.

B.2 Changes to the Optimal Flexible Architecture for Oracle Database

The Optimal Flexible Architecture recommended Oracle home path is similar to the following:

```
c:\app\username\product\12.1.0\dbhome_1
```

The *ORACLE_BASE* default does not contain version information but the default *ORACLE_HOME* does.

B.3 Directory Tree Differences by Release

Optimal Flexible Architecture has necessitated changes to the Oracle Database directory tree. This section lists the differences:

- [Top-Level Oracle Directory](#)
- [Database File Names](#)
- [Database File Name Extensions](#)

B.3.1 Top-Level Oracle Directory

When you install Oracle Database Optimal Flexible Architecture-compliant database, there is a top-level Oracle base directory, *DRIVE_LETTER:\app\username*, where *DRIVE_LETTER* is the hard drive letter.

The Oracle base directory contains *\ORACLE_HOME* directories, *\oradata* directories (for database files), *\diag* (for diagnostic data), *\flash_recovery_area* (for recovery operations), and *\admin* directories (for database administration files).

B.3.2 Database File Names

Database files do not have the *SID* in the database file name. For example, the first control file is named *control01.ctl*. The *SID* in the file name is not necessary because all the database files for a particular database are placed in *\oradata* under a directory called *DB_UNIQUE_NAME* that is named for that database.

B.3.3 Database File Name Extensions

In an Optimal Flexible Architecture-compliant release, database file names have the following extensions:

- *.ctl* for control files
- *.log* for log files
- *.dbf* for data files

B.4 Optimal Flexible Architecture Directory Naming Conventions

Optimal Flexible Architecture uses directory naming conventions that make it easy to identify the precise Oracle home and database name that is associated with a set of files. This section describes the naming conventions used for top-level directories of an Optimal Flexible Architecture-compliant database directory tree:

- `ORACLE_BASE` Directory
- `ORACLE_HOME` Directory
- Automatic Diagnostic Repository (ADR) Directory
- `ADMIN` Directory
- `ORADATA` Directory
- `RECOVERY_AREA` Directory

B.4.1 `ORACLE_BASE` Directory

`ORACLE_BASE` is the root of the Oracle directory tree. If you install an Optimal Flexible Architecture-compliant database using Oracle Universal Installer default settings, then `ORACLE_BASE` is `DRIVE_LETTER:\app\username`.

If you are installing Oracle Database for Microsoft Windows on a computer with no other Oracle software installed, then you can change the `ORACLE_BASE` directory before running Oracle Universal Installer. Most users do not need or want to do this.

Do not change the value of `ORACLE_BASE` after you run Oracle Universal Installer for the first time. If there is an existing `ORACLE_BASE` and you change it, then there is a conflict of Oracle base directories. If you create another `ORACLE_BASE` when the original `ORACLE_BASE` exists, then certain tools and the database are not able to find previously created files. They look for them in the new `ORACLE_BASE` instead of the original `ORACLE_BASE`.

See Also: Your operating system documentation for instructions about editing environment variables

B.4.2 `ORACLE_HOME` Directory

The `ORACLE_HOME` directory is located under `DRIVE_LETTER:\ORACLE_BASE`, where `DRIVE_LETTER:\` is any hard drive, and contains subdirectories for Oracle software executables and network files.

If you install Oracle Database for Windows on a computer with no other Oracle software installed and you use default settings, then the first directory that you create is called `\dbhome_1`.

B.4.3 Automatic Diagnostic Repository (ADR) Directory

Oracle Database 11g onwards, Automatic Diagnostic Repository directories replace the `bdump`, `cdump`, and `udump` directories for the database. The diagnostic data goes into `ORACLE_BASE\diag\rdbms\DB_UNIQUE_NAME\instance_name`

Some of these subdirectories are:

```
\alert
\hm
\incident
\incpkg
\ir
```

```
\lck
\metadata
\stage
\sweep
\trace
```

See Also: "Structure, Contents, and Location of the Automatic Diagnostic Repository" in *Oracle Database Administrator's Guide*

B.4.4 ADMIN Directory

Database administration files are stored in subdirectories of `ORACLE_BASE\admin\DB_UNIQUE_NAME`.

B.4.5 ORADATA Directory

Database files are stored in `ORACLE_BASE\oradata\DB_UNIQUE_NAME`. Names and brief descriptions of these files are:

```
CONTROL01.CTL    --control file 1
CONTROL02.CTL    --control file 2
CONTROL03.CTL    --control file 3
EXAMPLE01.DBF    --EXAMPLE tablespace data files
SYSaux01.DBF     --SYSaux tablespace data files
SYSTEM01.DBF     --SYSTEM tablespace data file
TEMP01.DBF       --TEMP tablespace data file
USERS01.DBF      --USERS tablespace data file
*.dbf            --data files corresponding to each tablespace in your database
REDO01.LOG        --redo log file group one, member one
REDO02.LOG        --redo log file group two, member one
REDO03.LOG        --redo log file group three, member one
```

Note: This directory structure allows for disk striping on UNIX and Windows platforms. See "[Support for Symbolic Links on Windows](#)" on page B-7.

B.4.6 RECOVERY_AREA Directory

The `recovery_area` directory stores and manages files related to backup and recovery. It contains a subdirectory for each database on the system. A fast recovery area is an optional disk location that you can use to store recovery-related files such as control files and online redo log copies, archived logs, flashback logs, and Oracle Database Recovery Manager (RMAN) backups. Oracle and RMAN manage the files in the fast recovery area automatically.

See Also: *Oracle Database Backup and Recovery User's Guide* to learn how to create and use a fast recovery area

B.5 Optimal Flexible Architecture and Multiple Oracle Home Configurations

The following sections describe various Optimal Flexible Architecture and multiple Oracle homes configurations.

B.5.1 Specifying an ORACLE_HOME Directory

To install an Optimal Flexible Architecture-compliant database, you must specify an Oracle home directory in the form of:

```
DRIVE_LETTER:\app\username\product\12.1.0\dbhome_1
```

where:

- *DRIVE_LETTER*: \ is any hard drive. For example, c: \
- \app\username is the *ORACLE_BASE* before performing the installation.
- dbhome_1 is the default directory name.

The following are examples of Optimal Flexible Architecture-compliant Oracle home directories:

- c:\app\test1\product\12.1.0\dbhome_1
- d:\app\test2\product\12.1.0\dbhome_1

B.5.2 Installing a Default Optimal Flexible Architecture Database: Example 1

This example shows how to create all Oracle homes within one Oracle base directory.

1. Install any Oracle Database that supports Optimal Flexible Architecture (Oracle Database Release 8.1.6 or later) on a computer with no other Oracle software installed and ensure that you accept the default settings for the Oracle home (for example, c:\app\username\product\12.1.0\dbhome_1).
2. Install any Oracle Database in a second Oracle home accepting the default settings.

Table B–1 shows the default Optimal Flexible Architecture database settings.

Table B–1 Default Optimal Flexible Architecture Database Settings

Setting	Value
<i>ORACLE_BASE</i>	c:\app\username (same for all Oracle homes)
Oracle home 1	c:\app\username\product\12.1.0\dbhome_1
Oracle home 2	c:\app\username\product\12.1.0\dbhome_2

B.5.3 Installing a Nondefault Optimal Flexible Architecture Database: Example 2

In this example, you install each Oracle home into its own directory, but they all share the same Oracle base.

1. Install any Oracle Database that supports Optimal Flexible Architecture (Oracle Database 8.1.6 or later) on a computer with no other Oracle software installed and change the default Oracle Universal Installer settings for the first Oracle home (for example, from c:\oracle\ora81 to X:\xyz\oracle\abc).
2. Install any Oracle Database and change the default Oracle Universal Installer settings for the second Oracle home (for example, from c:\oracle\ora10 to X:\pqr).

Table B–2 shows the nondefault Optimal Flexible Architecture database settings for this example.

Table B–2 Nondefault Optimal Flexible Architecture Database Settings: Example 2

Setting	Value
<code>ORACLE_BASE</code>	<code>X:\xyz\oracle</code> (same for both Oracle homes)
Oracle home 1	<code>X:\xyz\oracle\abc</code>
Oracle home 2	<code>X:\pqr</code>

The resulting directory tree would look similar to this:

```
X:\pqr                                --Oracle home 2
  \bin
  \network
X:\xyz
  \oracle                              --ORACLE_BASE for both Oracle homes
  \abc                                  --Oracle home 1
    \bin
    \network
  \admin
    \DB_UNIQUE_NAME1
      \dpdump
      \
    \DB_UNIQUE_NAME2
    \...
  \oradata
    \DB_UNIQUE_NAME1
      CONTROL01.CTL
      CONTROL02.CTL
      CONTROL03.CTL
      EXAMPLE01.DBF
      SYSAUX01.DBF
      SYSTEM01.DBF
      TEMP01.DBF
      USERS01.DBF
      REDO01.LOG
      REDO02.LOG
      REDO03.LOG
    \DB_UNIQUE_NAME2
```

B.6 Comparison Between Optimal Flexible Architecture on Windows and UNIX

You implement Optimal Flexible Architecture on Windows and UNIX in the same way. However, differences exist regarding the following:

- [Directory Naming](#)
- [ORACLE_BASE Directory](#)
- [Support for Symbolic Links on Windows](#)

See Also: Your UNIX operating system-specific administrator's reference for information about Optimal Flexible Architecture on UNIX

B.6.1 Directory Naming

Top-level names of the Optimal Flexible Architecture directory tree differ between Windows and UNIX. However, main subdirectory names and file names are the same on both operating systems.

B.6.2 ORACLE_BASE Directory

On Windows, Oracle base is associated with an Oracle home directory. *ORACLE_BASE* is defined in the registry (for example, in `HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\KEY_HOMENAME`).

On UNIX, *ORACLE_BASE* is associated with a UNIX user's environment.

B.6.3 Support for Symbolic Links on Windows

The goal of Optimal Flexible Architecture is to place all Oracle software under one *ORACLE_BASE* directory and to spread files across different physical drives as your databases increase in size.

On UNIX, although everything seems to be in one directory on the same hard drive, files can be on different hard drives if they are symbolically linked or have that directory as a mount point.

On Windows, you can use volume mount points to mount files on different hard drives to a single directory. You may have *oradata* directories on multiple drives, with data files in each one, on Windows version which does not support volume mount points.

Oracle recommends that you use one logical drive to store your database administration files and that you place other files, as needed, on other logical drives in an *oradata\DB_UNIQUE_NAME* directory.

In the following example, there are four logical drives for a database named *prod*:

- *c:* contains an Oracle home and database administration files.
- *f:* contains redo log files. The *F:* drive could also represent two physical drives that have been striped to increase performance.
- *g:* contains one of the control files and all **tablespace** files. The *G:* drive could also use a RAID Level-5 configuration to increase reliability.
- *h:* contains the second control file.

The directory structure would look similar to this:

```
c:\app\username\product\11.2.0  --First logical drive
  \dbhome_1                    --Oracle home
  \bin                         --Subtree for Oracle binaries
  \network                     --Subtree for Oracle Net
  \...
  \admin                       --Subtree for database administration files
  \prod                        --Subtree for prod database administration files
  \adump                       --Audit files
  \dpdump                      --Default directory for data pump operations.
  \pfile                       --Initialization response file

f:\app\username\product\11.2.0  --Second logical drive (two physical drives,
striped)
  \oradata                    --Subtree for Oracle Database files
  \prod                       --Subtree for prod database files
  redo01.log                  --Redo log file group one, member one
```

```

redo02.log          --Redo log file group two, member one
redo03.log          --Redo log file group three, member one

g:\app\username\product\11.2.0  --Third logical drive (RAID level 5
configuration)
  \oradata          --Subtree for Oracle Database files
  \prod             --Subtree for prod database files
    CONTROL01.CTL  --Control file 1
    EXAMPLE01.DBF  --EXAMPLE tablespace data files
    SYSAUX01.DBF   --SYSAUX tablespace data files
    SYSTEM01.DBF   --System tablespace data file
    TEMP01.DBF     --Temporary tablespace data file
    USERS01.DBF    --Users tablespace data file

h:\app\username\product\11.2.0  --Fourth logical drive
  \oradata          --Subtree for Oracle Database files
  \prod             --Subtree for prod database files
    CONTROL02.CTL  --Control file 2

```

B.7 Optimal Flexible Architecture Structure File Mapping

Table B–3 shows a hierarchical file mapping for log files of a sample Optimal Flexible Architecture-compliant installation in the `orcl` database.

Table B–3 Hierarchical File Mapping for Log Files in an Optimal Flexible Architecture Installation

Directory	Description
C:\app\username\admin\orcl\TAR	Subtree for support log files
C:\app\username\admin\orcl\arch	Archived log files
C:\app\username\admin\orcl\create\	Contains the database creation log files
C:\app\username\oradata\orcl*.log	Redo log files
C:\app\username\admin\orcl\dpdump\	Contains the data pump file <code>dp.log</code>
C:\app\username\diag	Contains all database, listener, sqlnet and other diagnostic logs
C:\app\username\audit	Contains all audit logs
C:\app\username\cfgtoollogs	Contains logs for configuration assistants such as Oracle Database Configuration Assistant, Database Upgrade Assistant, and Oracle Net Configuration Assistant

Installing and Configuring Oracle Database Using Response Files

This appendix describes how to use response files to perform silent or response file installations, configure network connections, and configure or start an Oracle database. It covers the following topics:

- [How Response Files Work](#)
- [Preparing a Response File](#)
- [Running Oracle Universal Installer Using the Response File](#)
- [Running Net Configuration Assistant Using a Response File](#)
- [Running Oracle Database Configuration Assistant Using a Response File](#)
- [Postinstallation Configuration Using a Response File](#)

C.1 How Response Files Work

You can automate the installation and configuration of Oracle software, either fully or partially, by specifying a response file when you start Oracle Universal Installer. Oracle Universal Installer uses the values in the response file to provide answers to some or all of the Oracle Universal Installer prompts. It includes information about the following topics:

- [Reasons for Using Silent Mode or Response File Mode](#)
- [General Procedure for Using Response Files](#)

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

- **Silent mode:** Oracle Universal Installer does not display any screens. Instead it displays progress information in the command window where you started it. To use silent mode, you run `setup.exe` with the `-silent` parameter and include a response file, which contains responses to the Oracle Universal Installer prompts.
- **Response File mode:** During a response file mode installation, Oracle Universal Installer displays all the screens, screens for which you specify information in the response file and also screens for which you did not specify the required information in the response file. The advantage is that you can validate the values in the screens for which you have provided the information in the response file and continue with the installation. To use 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 response file installation by entering values for the variables listed in the response file. For instance, to specify the Oracle home, you would supply the appropriate value for the `ORACLE_HOME` variable, as in the following example:

```
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.

See Also:

- *Oracle Universal Installer and OPatch User's Guide for Windows and UNIX* for more information about response file formats
- My Oracle Support website for more information about response files:

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

C.1.1 Reasons for Using Silent Mode or Response File Mode

Table C–1 describes several reasons why you might want to run Oracle Universal Installer in silent mode or response file mode.

Table C–1 *Reasons for Using Silent Mode or Response File Mode*

Mode	Uses
Silent	<p>Use silent mode to:</p> <ul style="list-style-type: none"> ■ Complete an unattended installation ■ Complete several similar installations on multiple systems without user interaction <p>Oracle Universal Installer displays progress information in the window that you used to start it, but it does not display the Oracle Universal Installer screens.</p>
Response File	<p>Use response file mode to complete similar Oracle software installations on multiple systems, providing default answers to some, but not all, of Oracle Universal Installer prompts.</p> <p>In response file mode, all the installer screens are displayed, but defaults for the fields in these screens are provided by the response file. You have to provide information for the fields in screens where you have not provided values in the response file.</p>

C.1.2 General Procedure for Using Response Files

You follow these general steps to install Oracle Database using response files:

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.

See Also:

- "Creating DAS or SAN Disk Partitions for an Oracle Automatic Storage Management Instance" on page 5-9
- "Configuring Disks Manually for Oracle Automatic Storage Management" on page 5-10

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.

"Preparing a Response File" on page C-3 explains how to customize or create the response file.

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.

"Running Oracle Universal Installer Using the Response File" on page C-5 explains how to run Oracle Universal Installer with a response file.

C.2 Preparing a Response File

This section describes 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](#)

C.2.1 Editing a Response File Template

Oracle provides response file templates for each product and installation type, and for each configuration tool. These files are located in the `ORACLE_BASE\ORACLE_HOME\assistants` directory, and the `database\response` directory on the Oracle Database installation media.

Note: If you copied the software to a hard disk, the response files are located in the `stage_area\database\response` directory.

Table C–2 lists the available sample response files:

Table C–2 *Response Files*

Response File Name	Description
db_install.rsp	Silent installation of Oracle Database 12c
grid_install.rsp	Silent installation of Oracle Grid Infrastructure

Table C–2 (Cont.) Response Files

Response File Name	Description
dbca.rsp	Silent installation of Database Configuration Assistant
netca.rsp	Silent installation of Oracle Net Configuration Assistant

Caution: When you modify a response file template and save a file for use, the response file may contain plain text passwords. Ownership of the response file should be given to the Oracle software installation owner only. 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.

See Also: *Oracle Universal Installer and OPatch User's Guide for Windows and UNIX* for detailed information about creating response files. In an installed Oracle Database, select **Start**, then **All Programs**, then **Oracle - HOMENAME**, then **Oracle Installation Products**, then **Universal Installer Concepts Guide**. It appears in HTML format.

3. Run the response file by following the instructions in the "[Running Oracle Universal Installer Using the Response File](#)" section on page C-5.

C.2.2 Saving a Response File

You can use the Oracle Universal Installer in interactive mode to save a response file, which you can edit and then use to complete silent mode or response file mode installations.

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 [Chapter 3](#).

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 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.

C.3 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, you must 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 appears, with the "Preparing to launch..." message. In a moment, the help information appears in that window.

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 the command prompt with Administrator privileges. For example:

```
DRIVE_LETTER:\setup.exe_location setup [-silent] "variable=setting"
[-nowelcome] [-noconfig] [-nowait] -responseFile
filename
```

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:

- "Installing Oracle Products" in *Oracle Universal Installer and OPatch User's Guide for Windows and UNIX* for more information about installing using response files
- "Deinstalling Products" in *Oracle Universal Installer and OPatch User's Guide for Windows and UNIX* for more information about deinstalling using response files

C.4 Running Net Configuration Assistant Using a Response File

When you run Net Configuration Assistant with a response file, you run it in 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 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 the command prompt with 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
```

C.5 Running Oracle Database Configuration Assistant Using a Response File

You can run Oracle Database Configuration Assistant in silent or 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.

Note: If you copied the software to a hard disk, the response files are located in the `stage_area\database\response` directory.

To run Database Configuration Assistant in 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.

See Also:

- "Creating a Database with Noninteractive/Silent DBCA" in *Oracle Database Administrator's Guide*
- "Oracle ASM Configuration Assistant Command-Line Interface" section in *Oracle Automatic Storage Management Administrator's Guide* for information about running Oracle ASMCA in noninteractive mode

On Windows, you must open the command prompt with Administrator privileges.

This section contains the following topics:

- [Silent Mode of Database Configuration Assistant](#)
- [Progress Only Mode of Database Configuration Assistant](#)
- [Running Database Configuration Assistant in Response File Mode](#)

C.5.1 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.

C.5.2 Progress Only Mode of Database Configuration Assistant

Use the `-progressOnly` flag in combination with the `-responseFile` flag, to set the mode to progress only. As it configures and starts the database, Database Configuration Assistant displays a window that contains status messages and a progress bar.

In this mode, Database Configuration Assistant uses values that you specify, in the response file or as command line options, to create a database.

C.5.3 Running 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 Oracle Database Configuration Assistant using the response file you just created, run Oracle Database Configuration Assistant in silent or 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 silent mode
- `-progressOnly` runs Oracle Database Configuration Assistant in 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
```

C.6 Postinstallation Configuration Using a Response File

Use the following sections to create and run a response file configuration after installing Oracle software.

C.6.1 About the Postinstallation Configuration File

When you run a silent or 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 response file mode by using a password response file. The script uses the passwords to run the configuration tools in succession to complete 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 to use for configuration.

The command syntax is as follows:

```
internal_component_name | variable_name = value
```

For example:

```
oracle.assistants.asm|S_ASMPASSWORD=welcome
```

Oracle strongly recommends that you maintain security with a password response file:

- Permissions on the response file should be set to 600.
- The owner of the response file should be the installation owner user, with the group set to the central inventory (oraInventory) group.

C.6.2 Running Postinstallation Configuration Using a Response File

To run configuration assistants with the `configToolAllCommands` 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.

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.assistants.asm|S_ASMPASSWORD=password
oracle.assistants.asm|S_ASMMONITORPASSWORD=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_ASMSNMPPASSWORD` 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 selected to

configure Oracle Enterprise Manager, then you must provide the password for the Oracle software installation owner for the S_EMADMINPASSWORD password.

```
oracle.assistants.server|S_SYSPASSWORD=password
oracle.assistants.server|S_SYSTEMPASSWORD=password
oracle.assistants.server|S_DBSNMPPASSWORD=password
oracle.assistants.server|S_PDBADMINPASSWORD=password
oracle.assistants.server|S_EMADMINPASSWORD=password
oracle.assistants.server|S_ASMSNMPPASSWORD=password
```

If you do not want to enable Oracle Enterprise Manager or Oracle ASM, then leave those password fields blank

3. Secure the c McGrsp.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\c McGrsp.properties
```

Configuring Networks for Oracle Database

Typically, the computer on which you want to install Oracle Database is connected to the network, has local storage to contain the Oracle Database installation, has a display monitor, and has a media drive.

This section describes how to install Oracle Database on computers that do not meet the typical scenario. It covers the following topics:

- [Installing Oracle Database on Computers with Multiple IP Addresses](#)
- [Installing Oracle Database on Computers with Multiple Aliases](#)
- [Installing Oracle Database on Nonnetworked Computers](#)
- [Installing a Loopback Adapter](#)

D.1 Installing Oracle Database on Computers with Multiple IP Addresses

Clients must be able to access the computer using this host name, or using aliases for this host name. To check, ping the host name from the client computers using the short name (host name only) and the full name (host name and domain name). Both must work.

Setting the ORACLE_HOSTNAME Environment Variable

To set the ORACLE_HOSTNAME environment variable:

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**.

D.2 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.

D.3 Installing Oracle Database on Nonnetworked Computers

You can install Oracle Database on a non-networked computer. 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 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.

See Also: "Installing a Loopback Adapter" on page D-2

2. Ping the computer from itself, using only the host name and using the fully qualified name, which should be 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 should return the local IP address (the IP address of the loopback adapter).

If the `ping` command fails, contact your network administrator.

Connecting the Computer to the Network after Installation

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.

D.4 Installing a Loopback Adapter

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. Any other applications that use a different Ethernet segment are routed to the network card.

A loopback adapter is required if:

- You are installing on a non-networked computer and plan to connect the computer to a network after installation.

See Also: "Installing Oracle Database on Nonnetworked Computers" on page D-2

This section covers the following topics:

- [Checking if a Loopback Adapter is Installed on Your Computer](#)
- [Installing a Loopback Adapter on Windows Server 2008](#)
- [Installing a Loopback Adapter on Windows 7 and Windows Server 2008 R2](#)
- [Installing Microsoft KM-TEST Loopback Adapter on Windows 8, Windows 8.1, Windows Server 2012, and Windows Server 2012 R2](#)
- [Removing a Loopback Adapter](#)

D.4.1 Checking if a Loopback Adapter is Installed on Your Computer

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 should be made the Primary Network Adapter.

If there is a loopback adapter installed, you would see a section that lists the values for the loopback adapter. For example:

```
Ethernet adapter Local Area Connection 2:
Connection-specific DNS Suffix . . :
Description . . . . . : Microsoft Loopback Adapter
Physical Address. . . . . : 02-00-4C-4F-4F-50
DHCP Enabled. . . . . : No
IP Address. . . . . : 10.10.10.10
Subnet Mask . . . . . : 255.255.0.0
```

D.4.2 Installing a Loopback Adapter on Windows Server 2008

To install a loopback adapter on Windows Server 2008:

1. Open the Windows Control Panel.
2. Double-click **Add Hardware** to start the Add Hardware wizard.
3. In the Welcome window, click **Next**.
4. 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**.

5. From the list of hardware types, select the type of hardware you are installing, select **Network adapters**, and click **Next**.
6. In the Select Network Adapter window, make the following selections:
 - **Manufacturer:** Select **Microsoft**.
 - **Network Adapter:** Select **Microsoft Loopback Adapter**.
7. Click **Next**.
8. In the The wizard is ready to install your hardware window, click **Next**.
9. In the Completing the Add Hardware Wizard window, click **Finish**.
10. Click **Manage Network Connections**. This displays the Network Connections Control Panel item.
11. Right-click the connection that was just created. This is usually named "Local Area Connection 2". Choose **Properties**.
12. On the **General** tab, select **Internet Protocol (TCP/IP)**, and click **Properties**.
13. 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**.
14. Click **Close**.
15. Close **Network Connections**.
16. Restart the computer.
17. 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 you entered in step 13.
 - *hostname* is the name of the computer.
 - *domainname* is the name of the domain.For example:

```
10.10.10.10 mycomputer.mydomain.com mycomputer
```
18. 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 should see the host name, and in **Full computer name**, you should see the host name and domain name. Using the previous example, the host name would be `sales` and the domain would be `us.example.com`.
- c. Click **More**. In **Primary DNS suffix of this computer**, you should see the domain name, for example, `us.example.com`.

D.4.3 Installing a Loopback Adapter on Windows 7 and Windows Server 2008 R2

To install a loopback adapter on Windows 7 or Windows Server 2008 R2:

1. Click **Start** and enter `hdwwiz` in the Search box.
2. Click **hdwwiz** to start the Add Hardware wizard.
3. Go to step 3 of [Section D.4.2, "Installing a Loopback Adapter on Windows Server 2008"](#). The remaining steps are the same as given for Windows Server 2008.

D.4.4 Installing Microsoft KM-TEST Loopback Adapter on Windows 8, Windows 8.1, Windows Server 2012, and Windows Server 2012 R2

To install a loopback adapter on Windows 8, Windows 8.1, Windows Server 2012, or Windows Server 2012 R2:

1. Complete steps 1-5 of [Section D.4.2, "Installing a Loopback Adapter on Windows Server 2008"](#).
2. In the Select Network Adapter window, make the following selections:
 - **Manufacturer:** Select **Microsoft**.
 - **Network Adapter:** Select **Microsoft KM-TEST Loopback Adapter**.

Then continue with the same steps as given for Windows Server 2008.

D.4.5 Removing a Loopback Adapter

To remove a loopback adapter:

1. Display **System** in the Windows Control Panel.
2. In the Hardware tab, click **Device Manager**. This tab is not available with Windows Server 2008. Click **Device Manager** instead.
3. In the Device Manager window, expand **Network adapters**. You should see **Microsoft Loopback Adapter**.
4. Right-click **Microsoft Loopback Adapter** and select **Uninstall**.

In Windows 8, Windows 8.1, Windows Server 2012, or Windows Server 2012 R2, 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.

Configuring Oracle Database Globalization Support

This appendix describes the following Globalization Support topics:

- [Installing and Using Oracle Components in Different Languages](#)
- [Running Oracle Universal Installer in Different Languages](#)

See Also: *Oracle Database Globalization Support Guide* for an overview of globalization support for Oracle Database

E.1 Installing and Using Oracle Components in Different Languages

This section describes the following procedures:

- [Configuring Oracle Components to Run in Different Languages](#)
- [Installing Translation Resources](#)

E.1.1 Configuring Oracle Components to Run in Different Languages

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

This section describes the following procedures:

- [Determining the Operating System Locale](#)
- [Configuring Locale and Character Sets Using the NLS_LANG Environment Variable](#)
- [NLS_LANG Settings in Console Mode and Batch Mode](#)

E.1.1.1 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.

E.1.1.2 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.characterset
```

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 the following table.

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`

E.1.1.3 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 window, you may have to set the character set field of the `NLS_LANG` parameter to a value different than the one set in Registry.

This is required 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 [Table E-1](#).

[Table E-1](#) lists the Oracle character sets that correspond to the console mode code pages.

Table E-1 Oracle Character Sets for Console Mode (OEM) Code Pages

OEM Code Page	Oracle Character Set for Console Mode
437 (US)	US8PC437
737 (Greek)	EL8PC737
775 (Baltic)	BLT8PC775
850 (Multilingual Latin I)	WE8PC850
852 (Latin II)	EE8PC852
855 (Cyrillic)	RU8PC855
857 (Turkish)	TR8PC857
858 (Multilingual Latin I + Euro)	WE8PC858
866 (Russian)	RU8PC866
874 (Thai)	TH8TISASCII
932 (Japanese Shift-JIS)	JA16SJISTILDE
936 (Simplified Chinese GBK)	ZHS16GBK
949 (Korean)	KO16MSWIN949
950 (Traditional Chinese Big5)	ZHT16MSWIN950
1258 (Vietnam)	VN8MSWIN1258

E.1.2 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.

Note: Part of Oracle Database Vault user interface text is stored in database tables in the `DVSY` 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. For the necessary steps, see Appendix C in *Oracle Database Vault Administrator's Guide*

To install translation resources:

1. Start Oracle Universal Installer.
2. In the Configure Security Updates screen enter the relevant information and click **Next**.
3. In the Select Installation Option screen, select the installation option and click **Next**.

4. In the System Class screen, select the type of system class for installing the database, and click **Next**.
5. In the Grid Installation Options screen, select the type of database installation you want to perform, and click **Next**.
6. In the Select Product Languages screen, select the language in which you want to run the product from the **Available Languages** field.

Note: The Available Languages field lists all languages supported by Oracle globalization libraries. The set of languages for which a translation is actually available is usually smaller and depends on a particular component. The scope of translation for a given component may differ between languages. For example, some translations may include all user interface text, while others may include only error messages and no help files.

7. Use the > arrow to move the selected language to the **Selected Languages** field, and then click **Next**.

Note: Oracle Universal Installer ignores languages in the Selected Languages field for which no translation is available.

E.2 Running Oracle Universal Installer in Different Languages

The operating system locale determines the language in which Oracle Universal Installer runs. Oracle Universal Installer may run in one of the following languages:

- Brazilian Portuguese
- English
- French
- German
- Italian
- Japanese
- Korean
- Simplified Chinese
- Spanish
- Traditional Chinese

To run Oracle Universal Installer in a desired language

1. Change the locale for the operating system user and the System Locale as described in the "[Determining the Operating System Locale](#)" section.
2. Run Oracle Universal Installer by following the instructions in the "[Installing the Oracle Database Software](#)" section.

If the selected language is not one of the listed earlier, Oracle Universal Installer runs in English.

Managing Oracle Database Port Numbers

This appendix lists the default port numbers and describes how to change the assigned port after installation:

- [About Managing Ports](#)
- [Viewing Port Numbers and Access URLs](#)
- [Port Numbers and Protocols of Oracle Components](#)
- [Changing the Oracle Services for Microsoft Transaction Server Port](#)

F.1 About Managing Ports

During installation, Oracle Universal Installer assigns port numbers to 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.

If the answer to any of the preceding questions is yes, Oracle Database moves to the next highest port in the allotted port range, and continues checking until it finds a free port.

F.2 Viewing Port Numbers and Access URLs

In most cases, the port number of the Oracle Database component is listed in the tool used to configure the port. In addition, ports for some Oracle Database applications are listed in the `portlist.ini` file. This file is located in the `ORACLE_HOME\install` directory.

If you change a port number, it is not updated in the `portlist.ini` file, so you can only rely on this file immediately after installation. To find or change a port number, use the methods described in this appendix.

F.3 Port Numbers and Protocols of Oracle Components

Table F-1 lists the port numbers and protocols used by components that are configured during the 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

Component and Description	Default Port Number	Port Range	Protocol
Oracle Net Listener Allows 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.	1521	Port number changes to the next available port. Modifiable manually to any available port.	TCP
Connection Manager Listening port for Oracle client connections. It is not configured during installation, but can be configured using Net Configuration Assistant.	1630	1630	TCP
Oracle XML DB 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. See Also: "Using HTTP(S) on a Standard Port Instead of an Oracle XML DB Default Port" in <i>Oracle XML DB Developer's Guide</i>	0	Configured Manually	HTTP
Oracle XML DB 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. See Also: "Using FTP on the Standard Port Instead of the Oracle XML DB Default Port" in <i>Oracle XML DB Developer's Guide</i>	0	Configured Manually	FTP

Table F-1 (Cont.) Ports Used in Oracle Components

Component and Description	Default Port Number	Port Range	Protocol
Cluster Synchronization Service (CSS) CSS service internode connection for Group Manager. The port number is assigned automatically. You cannot view or modify it afterward.	42424	Dynamic	TCP
Oracle Cluster Registry The port number is assigned automatically during installation. You cannot view or modify it afterward.	Dynamic	Dynamic	TCP
Oracle Services for Microsoft Transaction Server The port number for Microsoft Transaction Server is configured when you enter its value in 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. "Changing the Oracle Services for Microsoft Transaction Server Port" on page F-3 explains how to change its port number.	Dynamic	49152-65535	TCP

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

F.4 Changing the Oracle Services for Microsoft Transaction Server Port

In most cases, you are not required to 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.

Troubleshooting the Oracle Database Installation

This appendix contains the following information about troubleshooting:

- Verifying Requirements
- Encountering Installation Errors
- Reviewing the Log of an Installation Session
- Silent Mode Response File Error Handling
- Troubleshooting Host Name Changes and CSS
- Troubleshooting Configuration Assistants
- Troubleshooting Inventory Issues
- Troubleshooting Screen Display Issues
- Cleaning Up After a Failed Installation
- Continuing Installations or Upgrades After Server Restarts

See Also:

- Chapter 9, "Removing Oracle Database Software"
- Chapter 6, "Troubleshooting Oracle Configuration Manager" in *Oracle Configuration Manager Installation and Administration Guide* for information about some errors that may occur while using Oracle Configuration Manager and tips to troubleshoot these errors

G.1 Verifying Requirements

Before you try any of the troubleshooting steps in this appendix, do the following:

- Check Chapter 3, "Oracle Database Preinstallation Tasks" to ensure that the system meets the requirements and that you have completed all of the preinstallation tasks.
- Read the release notes for the product on your platform before installing it. You can find the latest version of the release notes on the Oracle Technology Network website:

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

G.2 Encountering Installation Errors

If you encounter an error during installation:

- Do not exit Oracle Universal Installer.
- If you clicked **Next** after you entered incorrect information about one of the installation windows, click **Back** to return to the window and correct the information.
- If you encounter an error while Oracle Universal Installer is copying or linking files, see ["Reviewing the Log of an Installation Session"](#) on page G-2 for interactive installations or ["Silent Mode Response File Error Handling"](#) on page G-2 for more information.
- If you encounter an error while a configuration assistant is running, see the ["Troubleshooting Configuration Assistants"](#) section on page G-3.
- If you cannot resolve the problem, remove the failed installation by following the steps listed in the ["Cleaning Up After a Failed Installation"](#) section on page G-5.

G.3 Reviewing the Log of an Installation Session

During an installation, Oracle Universal Installer records all the actions that it performs in a log file. If you encounter problems during the installation, review the log file for information about possible causes of the problem. By default, the log files are located in the following directory:

```
SYSTEM_DRIVE:\Program Files\Oracle\Inventory\logs
```

Log filenames from interactive installations take the form:

```
installActionsdate_time.log  
oraInstalldate_time.err  
oraInstalldate_time.out
```

For example, if an interactive installation occurred at 9:00:56 a.m. on October 14, 2005, the log file would be named:

```
installActions2005-10-14_09-00-56AM.log
```

Note: Do not delete or manually alter the Inventory directory or its contents. Doing so can prevent Oracle Universal Installer from locating products that you install on your system.

See Also: [Silent Mode Response File Error Handling](#) on page G-2

G.4 Silent Mode Response File Error Handling

To determine whether a silent-mode installation succeeds or fails, check the `silentInstallActionsdate_time.log` file, located in `DRIVE_LETTER:\Program Files\Oracle\Inventory\logs`.

If necessary, see [Section G.3, "Reviewing the Log of an Installation Session"](#) for information about determining the location of the Inventory directory.

A silent installation fails if:

- You do not specify a response file.

- You specify an incorrect or incomplete response file.
- Oracle Universal Installer encounters an error, such as insufficient disk space.

Oracle Universal Installer or a configuration assistant validates the response file at run time. If the validation fails, the silent-mode installation or configuration process ends.

See Also: "Reviewing the Log of an Installation Session" on page G-2 for information about interactive installation log files

G.5 Troubleshooting Host Name Changes and CSS

If you change the host name for Oracle Automatic Storage Management, then the Oracle CSS service does not start. In order to solve this problem, use the following steps:

1. Log in as a user with Administrator privileges.
2. Run `roothas.bat` to deconfigure CSS.

```
C:\> cd \app\oracle\product\12.1.0\grid\crs\install
perl roothas.bat -deconfig -force
```

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.

This removes any configuration related files on the system that referenced the old host name.

3. Run `gridconfig.bat` script to reconfigure CSS using the new host name:

```
C:\> cd \app\oracle\product\12.1.0\grid\crs\config
gridconfig.bat
```

4. Go to the grid home's bin directory. Use the `srvctl add database` command with the `-c SINGLE` flag to add the database in an Oracle Restart configuration. Also use the `srvctl add` command to add the listener, the Oracle ASM instance, all Oracle ASM disk groups, and any database services to the Oracle Restart configuration.

See Also: "srvctl add" in *Oracle Database Administrator's Guide*

G.6 Troubleshooting Configuration Assistants

To troubleshoot an installation error that occurs when a configuration assistant is running:

- Review the installation log files listed in the "Reviewing the Log of an Installation Session" section on page G-2.
- Review the specific configuration assistant log file located in the `ORACLE_BASE\cfgtoollogs` directory. Try to fix the issue that caused the error.

Note: Ensure that there is no space in the path.

- If you see the "Fatal Error. Reinstall message", look for the cause of the problem by reviewing the log files. See "Irrecoverable Errors" on page G-4 for more information.

G.6.1 Configuration Assistant Failures

Oracle configuration assistant failures are noted at the bottom of the installation window. The configuration assistant interface displays additional information, if available. The configuration assistant execution status is stored in the `installActionsdate_time.log` file.

The execution status codes are listed in the following table:

Status	Result Code
Configuration assistant succeeded	0
Configuration assistant failed	1
Configuration assistant canceled	-1

G.6.2 Irrecoverable Errors

If you receive an irrecoverable error while a configuration assistant is running:

1. Remove the failed installation as described in the "Cleaning Up After a Failed Installation" section on page G-5.
2. Correct the cause of the irrecoverable error.
3. Reinstall the Oracle software.

G.7 Troubleshooting Inventory Issues

If you face any of the following situations for Oracle home, then run the `opatch lsinventory -detail` command to list the contents of the inventory and see section "Recovering from inventory corruption" in the *Oracle Universal Installer and OPatch User's Guide for Windows and UNIX* for information about fixing the issue.

- Oracle home is cloned without completing the inventory steps.
- There is bad inventory.
- Inventory is not available but it is created when the Oracle Enterprise Manager Agent is installed in a separate Oracle home.

G.8 Troubleshooting Screen Display Issues

If you connect to Oracle database with the screen resolution 640 X 480 or 800 X 600, then the Next button in the GUI is not visible as it hides behind the Taskbar. In order to counter this problem, do one of the following:

- Hide the Taskbar.
- Move the Oracle Universal Installer screen up.
- Set the screen resolution to 1024 X 768 or higher.

G.9 Cleaning Up After a Failed Installation

If an installation fails, you must remove files that Oracle Universal Installer created during the attempted installation and remove the Oracle home directory.

Follow the instructions in ["Removing Oracle Database Software"](#) to run the Deinstallation tool.

G.10 Continuing Installations or Upgrades After Server Restarts

During an Oracle Grid Infrastructure for a standalone server installation or upgrade, the server might require a restart and you may see an error similar to the following:

```
ACFS-9427 Failed to unload ADVM/ACFS drivers. A system reboot is recommended
ACFS-9428 Failed to load ADVM/ACFS drivers. A system reboot is recommended
```

The workaround is to perform the following steps:

1. Restart the computer.
2. Log in as the Oracle Installation User for the Oracle home, and run the `gridconfig.bat` script located in the path `Grid_home\crs\config`.
3. To complete the installation or upgrade, run the `configToolAllCommands` script, located in the path `ORACLE_HOME\cfgtoollogs\configToolAllCommands`.

See Also: ["Postinstallation Configuration Using a Response File"](#)

Frequently Asked Questions About Installation

Use the following guidelines to decide how to install Oracle Database components:

- Installing Oracle Database or Oracle Database Client
- Installing Oracle Database Tools
- Installing Oracle Database with Oracle Applications
- Installing Oracle Database Heterogeneous Connectivity Tools (Gateways)

H.1 Installing Oracle Database or Oracle Database Client

The following are frequently asked questions about installing Oracle database:

- I only need one instance of Oracle Database or I just want to install a test database to get familiar with the product. How do I install Oracle Database for these situations?
- How can I create an Oracle database that can handle transaction-heavy or data warehousing applications?
- What's the best way to install multiple Oracle databases?
- How do I configure client connections to an Oracle database?
- What is the best way to install Oracle Database Client if my client nodes have limited disk space?
- How do I upgrade Oracle Database?
- The computers at my site have been configured to run as a cluster. How should I install Oracle Database?
- How do I migrate my non-Oracle databases to Oracle Database?

I only need one instance of Oracle Database or I just want to install a test database to get familiar with the product. How do I install Oracle Database for these situations?

- If you want a quick installation using the default installation settings, then see the platform-specific *Oracle Database Quick Installation Guide*.
- If your site has special requirements, then see [for more information](#).

How can I create an Oracle database that can handle transaction-heavy or data warehousing applications?

If you want to create a starter database designed for transaction-heavy or data warehousing applications, then see [Oracle Database Data Warehousing Guide](#) for more details. Select the **Advanced Installation** method, and then select the database type you want on the Select Database Configuration screen.

See Also: *Oracle Database Data Warehousing Guide* after installation

Alternatively, you can use Oracle OLAP. The OLAP option is provided with Oracle Database Enterprise Edition. Oracle OLAP provides optimal support for database environments that must meet OLAP requirements.

See Also:

- *Oracle OLAP User's Guide*
- *Oracle OLAP DML Reference*
- *Oracle OLAP Java API Reference*

What's the best way to install multiple Oracle databases?

Use [Oracle Universal Installer](#) to install Oracle Database using either of the following methods:

- **Installing with response files:** This method lets you run Oracle Universal Installer at a command line using a response file that contains settings specific to each computer.
- **Cloning a database:** Install Oracle Database on one computer using interactive mode. You can also clone databases. The instructions for cloning databases are described in *Oracle Database Administrator's Guide*.

How do I configure client connections to an Oracle database?

1. Install Oracle Database on a server by using [Oracle Database Data Warehousing Guide](#) for more information.
2. Use [Oracle Database Client Installation Guide](#) to install Oracle Database Client on each client node, and select the Instant Client installation type.

If you have many client nodes, consider staging the software centrally, mapping the drive, and running Oracle Universal Installer in the silent or response file mode.

If the client nodes only require a default installation into a new Oracle home directory, consider using [Oracle Database Client Installation Guide](#) for more information.

What is the best way to install Oracle Database Client if my client nodes have limited disk space?

1. Install Oracle Database onto a server by using this guide for more details.
2. Use platform-specific *Oracle Database Client Installation Guide* to install Oracle Database Client on each client node, and select the Instant Client installation type.

If you have many client nodes, then consider running Oracle Universal Installer in silent or response file mode.

How do I upgrade Oracle Database?

See *Oracle Database Upgrade Guide*.

The computers at my site have been configured to run as a cluster. How should I install Oracle Database?

Use any of the following installation scenarios:

- If you want to run a single-instance Oracle Database in a clustered environment, then install Oracle Grid Infrastructure either before or after you install Oracle Database.
- If you want a consolidated pool of storage for all databases in a cluster, then install Oracle Grid Infrastructure, and use Oracle Automatic Storage Management (Oracle ASM) to manage this storage. Afterward, install Oracle Database (which can be either a single instance database or Real Application Clusters).
- If you plan to use Oracle Real Application Clusters, first install Oracle Grid Infrastructure, and then install Oracle Real Application Clusters.

See platform-specific *Oracle Grid Infrastructure Installation Guide* and *Oracle Real Application Clusters Installation Guide* for your platform to install Oracle Grid Infrastructure and Oracle Real Application Clusters. Oracle Clusterware is installed in an Oracle Grid Infrastructure installation. See this guide which explains how to install Oracle ASM and Oracle Database.

Oracle Clusterware is a key component required by Oracle Real Application Clusters installations. Oracle Clusterware is an integrated cluster management solution that can bind multiple servers to act as a single system. This is referred to as a cluster. It performs workload management and component restart. For example, when an instance supporting a particular service fails, Oracle Clusterware restarts the service on the next available instance that you have configured for that service. Oracle Clusterware can monitor non-Oracle programs, if they are defined within the Oracle Clusterware environment using the High Availability API.

How do I migrate my non-Oracle databases to Oracle Database?

Use Oracle SQL Developer to migrate your non-Oracle databases and applications to Oracle. Oracle SQL Developer software and documentation is available at:

<http://www.oracle.com/technetwork/developer-tools/sql-developer/overview/index.html>

H.2 Installing Oracle Database Tools

The following are frequently asked questions about installing Oracle database tools:

- How do I install Oracle WebLogic Server?
- How can I administer and monitor my Oracle Database products?
- How do I manage security for my Oracle Database products?
- How do I use Oracle Database to manage my XML data?
- Does Oracle Database provide OLAP tools so that I can analyze data such as trends and time series in my database?
- Does Oracle Database provide data mining tools that I can use to discover hidden meaning in my data and predict likely outcomes based on my data?
- How do I perform backup and recovery operations for Oracle Database?
- Is Oracle Workflow included with Oracle Database?
- Is there a migration plan for customers that have built solutions using Oracle Workflow?

How do I install Oracle WebLogic Server?

Refer to *Oracle Fusion Middleware Installation Guide for Oracle WebLogic Server*.

For more information on Oracle WebLogic Server refer to the product documentation at:

<http://www.oracle.com/technetwork/middleware/weblogic/documentation/index.html>

How can I administer and monitor my Oracle Database products?

To perform regular administrative functions such as creating, configuring, or deleting databases, or managing database templates, use one of the following methods:

To manage only the single database and listener that you are installing:

1. Use `sqlplus` to install Oracle Database.
2. From Oracle Database, use Database Configuration Assistant to manage your databases.

You can also administer and monitor the database with Oracle Enterprise Manager Cloud Control, which is installed by default with Oracle Database. Oracle Enterprise Manager Cloud Control requires an agent which is not installed by default.

Oracle Enterprise Manager Cloud Control includes the Oracle Management Agent, Oracle Management Service, and Oracle Management Repository, as well as Cloud Control, a browser-based central console through which administrators can perform all monitoring, administration, and configuration tasks for the enterprise.

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

Documentation available on the Oracle Technology Network website at:

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

To perform advanced administration tasks, such as monitoring Oracle Database and managing multiple hosts, application servers, and databases including the one that you are installing, install Oracle Enterprise Manager as follows:

1. Use `sqlplus` to install Oracle Database.
If you plan to use Oracle Real Application Clusters, then install Oracle Database by using the platform-specific *Oracle Grid Infrastructure Installation Guide* and *Oracle Real Application Clusters Installation Guide*.
2. Use *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide* to install and configure Oracle Enterprise Manager. For postconfiguration tasks, use *Oracle Enterprise Manager Cloud Control Administrator's Guide*. See the documentation available on Oracle Technology Network website at:

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

How do I manage security for my Oracle Database products?

Oracle provides a wide range of security solutions for your enterprise environment, including centralized administration and security features integrated with Oracle

Internet Directory. The set of Oracle security services called Oracle Platform Security integrates the security features built into Oracle Database, Oracle WebLogic Server, and the Oracle Identity Management infrastructure. Combined, these features enable the development and deployment of secure e-business applications.

Oracle Identity Management includes Oracle Internet Directory, a centralized repository that simplifies administration of users and applications in the Oracle environment with the following components:

- Oracle Internet Directory client tools, including LDAP command-line tools, the Oracle Internet Directory SDK, and Oracle Directory Manager.
- Oracle Internet Directory server components, including the directory server, the directory replication server, the directory integration server, and various tools for starting and stopping them.

Oracle Database includes the Oracle Internet Directory client tools, but not the Oracle Internet Directory server components. To install the Oracle Internet Directory server components, see *Oracle Fusion Middleware Installation Guide for Oracle Identity and Access Management* and the Oracle Identity Management documentation at:

<http://www.oracle.com/technetwork/middleware/id-mgmt/overview/index.html>

See Also:

- *Oracle Database Security Guide*
- *Oracle Database Enterprise User Security Administrator's Guide*
- *Oracle Label Security Administrator's Guide*
- Oracle Technology Network topics on database security:
<http://www.oracle.com/technetwork/topics/security/whatsnew/index.html>

How do I use Oracle Database to manage my XML data?

Use Oracle XML DB, which is installed as part of Oracle Database. Oracle XML DB enables you to efficiently store, generate, retrieve, query, and manage XML data on your site. Oracle XML DB provides all the advantages of a relational database, for example, allowing you to control the referential integrity of XML data with constraints and triggers. It works well with large amounts of XML data by storing it in a parsed, relational form, which improves access performance.

Oracle XML DB supports XML Type, which is a native data type for XML data, for which you can choose various storage options depending on your needs. In addition, Oracle XML DB supports XML Schema processing, structured and unstructured storage, a content repository that you can access by using common protocols (FTP, HTTP(S), and WebDAV), and SQL/XML, which is a standard for SQL with XML. For Oracle Database 11g Release 1 (11.1), Oracle XML DB introduced support for the XQuery language for querying, transforming, and constructing XML; the ability for users to define their own metadata for schema-based XML; a set of new SQL functions for DML operations on XML data; and more.

You can use Oracle XML DB with Oracle XML Developer's Kit (XDK) to build applications that run on either Oracle Database or Oracle WebLogic Server.

See Also:

- *Oracle XML DB Developer's Guide*
- *Oracle XML Developer's Kit Programmer's Guide*

Does Oracle Database provide OLAP tools so that I can analyze data such as trends and time series in my database?

Yes, Oracle OLAP is available as part of an Oracle Database Enterprise Edition installation. Oracle OLAP provides optimal support for database environments that must meet OLAP requirements.

See Also:

- *Oracle OLAP User's Guide*
- *Oracle OLAP DML Reference*
- *Oracle OLAP Java API Reference*

Does Oracle Database provide data mining tools that I can use to discover hidden meaning in my data and predict likely outcomes based on my data?

Yes, you must have an Oracle Enterprise Edition license to use Oracle Data Mining tools. Oracle Data Mining is an option of the Enterprise Edition, as described in [Table 6–1, "Oracle Universal Installer Windows"](#), in the Select Database Edition row.

With the Oracle Data Mining option, you can create and execute predictive and descriptive data mining models that use a variety of algorithms.

Use the following method in to install Oracle Data Mining:

1. When you run Oracle Universal Installer, select the **Enterprise Edition** installation type.
2. In the Select Database Configuration screen, select the **General Purpose/Transaction Processing** configuration.

See Also: The following manuals for information about Oracle Data Mining:

- *Oracle Data Mining Concepts*
- *Oracle Data Mining User's Guide*
- *Oracle Database PL/SQL Packages and Types Reference* (search for Data Mining)

How do I perform backup and recovery operations for Oracle Database?

Use Oracle Database Recovery Manager (RMAN), which is a backup and recovery tool integrated into Oracle Database. This tool satisfies the pressing demands of high-performance, manageable backup, and recovery. Recovery Manager is native to the database server, automatically tracks database structure changes, and optimizes operations accordingly. In addition, Recovery Manager is integrated with leading tape media management products, so that Oracle database backups can be integrated with your existing networked data protection infrastructure.

See Also:

- *Oracle Database Backup and Recovery User's Guide*
- *Oracle Database Backup and Recovery Reference*

Is Oracle Workflow included with Oracle Database?

Starting with Oracle Database 11g, Oracle Workflow is no longer released with the database. Oracle Workflow is available with the Oracle E-Business Suite releases.

See Also: Oracle Workflow statement of direction

<http://www.oracle.com/technetwork/middleware/ias/overview/index.html>

Is there a migration plan for customers that have built solutions using Oracle Workflow?

Starting January 2006, customers are encouraged to re-create and implement workflows using Oracle SOA Suite. Refer to the following technical migration guide for detailed recommendations about migrating Oracle Workflow processes to Oracle SOA Suite (formerly known as Oracle BPEL Process Manager):

<http://www.oracle.com/technetwork/middleware/ias/owf2bpel-132189.pdf>

See Also: Oracle Workflow statement of direction:

<http://www.oracle.com/technetwork/middleware/ias/workflow-sod-089843.html>

H.3 Installing Oracle Database with Oracle Applications

The following are frequently asked questions about installing Oracle database with Oracle applications:

- [How do I install my Oracle applications with Oracle Database?](#)
- [How can I create web applications that communicate with Oracle Database?](#)
- [Which web server can my Oracle applications use?](#)
- [How can I migrate my non-Oracle applications to Oracle?](#)

How do I install my Oracle applications with Oracle Database?

In most cases, install Oracle Database itself, then install the Oracle application. The Oracle Universal Installer for that application prompts you for the connection information. Check the application documentation requirements.

If you must implement your applications with Oracle Real Applications Clusters databases, see [, and platform-specific *Oracle Grid Infrastructure Installation Guide*](#).

How can I create web applications that communicate with Oracle Database?

Install Oracle Application Express and a web server. Use [to install Oracle Database](#). Oracle Application Express is automatically installed, when you install Oracle database.

See Also: *Oracle Application Express Installation Guide*

Which web server can my Oracle applications use?

Install Oracle HTTP Server, which ships on separate media, or use the XML DB HTTP Protocol Server and the embedded PL/SQL Gateway that installs with Oracle Database 12c.

How can I migrate my non-Oracle applications to Oracle?

Use Oracle SQL Developer to migrate your non-Oracle applications to Oracle. Oracle SQL Developer software and documentation is available at:

<http://www.oracle.com/technetwork/developer-tools/sql-developer/overview/index.html>

H.4 Installing Oracle Database Heterogeneous Connectivity Tools (Gateways)

The following section discusses the Gateway products:

[How can my Oracle applications access data in a non-Oracle database system?](#)

How can my Oracle applications access data in a non-Oracle database system?

You can use Oracle Database Gateway as the connectivity tool to enable Oracle applications to access data in non-Oracle databases. The following are the functions of Oracle Database Gateway:

- Integrates a non-Oracle database into your Oracle Database environment.
- Enables Oracle PL/SQL applications to integrate with APPC-enabled transactions, or access messages in IBM Websphere MQ.

You can install the Gateway product on a computer independent of the Oracle application, Oracle database, and non-Oracle database.

For example, suppose you have the following scenario:

- Oracle Database is installed on a Linux computer.
- The Oracle application is installed on a Microsoft Windows computer and accesses data from the Oracle database on the Linux computer.
- The Oracle application needs to join data in a DB2 database on Solaris Operating System and an Oracle Database on Linux.

You have the option of installing the Database Gateway for DRDA on the Solaris computer where DB2 is running, on Linux where Oracle is running, or on a third computer.

[Table H-1](#) lists the non-Oracle database systems that you can access from Oracle applications, and the Gateways products that are available for those systems.

Table H-1 Oracle Gateway Products

Non-Oracle Database	Oracle Gateway Products and Documentation
WebSphere MQ	Oracle Database Gateway for WebSphere MQ. <i>Oracle Database Gateway for WebSphere MQ Installation and User's Guide.</i>

Glossary

automatic undo management mode

A mode of Oracle Database in which undo data is stored in a dedicated **undo tablespace**. Unlike in **manual undo management mode**, the only undo management that you must perform is the creation of the undo tablespace. All other undo management is performed automatically.

connect descriptor

A specially formatted description of the destination for a network connection. A connect descriptor contains destination service and network route information.

The destination service is indicated by using its service name for the Oracle Database or its Oracle system identifier (**SID**) for Oracle databases. The network route provides, at a minimum, the location of the **listener** through use of a network address.

connect identifier

A name, net service name, or service name that resolves to a connect descriptor. Users initiate a connect request by passing a user name and password along with a connect identifier in a connect string for the service to which they want to connect, for example:

```
SQL> CONNECT user_name@connect_identifier  
Enter password: password
```

control files

Files that record the physical structure of a database and contain the database name, the names and locations of associate data files and online **undo tablespace**, the time stamp of the database creation, the current log sequence number, and checkpoint information.

default domain

The network domain within which most client requests take place. It can be the domain where the client resides, or a domain from which the client often requests network services. The default domain is also the client configuration parameter that determines what domain to append to unqualified network name requests. A name request is unqualified if it does not have a "." character within it.

directory naming

A **naming method** that specifies a directory server to resolve a net service name into a connect descriptor. The net service name is stored centrally in a directory server.

directory server

A Lightweight Directory Access Protocol (LDAP)-compliant directory server. A directory can provide centralized storage and retrieval of database network components, user and corporate policies preferences, user authentication, and security information, replacing client-side and server-side localized files.

external procedures

Procedure or function written in the C programming language and stored in a shared library. An Oracle server can call external procedures or functions using PL/SQL routines. For Oracle Database to connect to external procedures, the server must be configured with a net service name and the **listener** must be configured with protocol address and service information.

global database name

The full database name that uniquely distinguishes it from any other database in your network domain.

For example:

```
sales.us.example.com
```

where `sales` is the name you want to call your database and `us.example.com` is the network domain in which the database is located.

initialization response file

An ASCII text file that contains information needed to initialize a database and **instance**.

instance

Process associated with a running Oracle Database instance. When a database is started on a database server (regardless of the type of computer), Oracle Database allocates a memory area called the **System Global Area** and starts one or more Oracle Database processes. This combination of the System Global Area and Oracle Database processes is called an instance. The memory and processes of an instance manage the associated database's data efficiently and serve the users of the database.

installation type

A predefined component set that automatically selects which components to install. See "[Oracle Database Editions](#)" on page 2-10 for a list of installation types available with each top-level component.

Interprocess Communication (IPC)

A protocol that client applications use that resides on the same node as the **listener** to communicate with the database. IPC can provide a faster local connection than TCP/IP.

listener

A process that resides on the server and whose responsibility is to listen for incoming client connection requests and manage the traffic to the server.

When a client requests a network session with a database server, a listener receives the actual request. If the client information matches the listener information, then the listener grants a connection to the database server.

listener.ora file

A configuration file for the listener that identifies the:

- Listener name
- Protocol addresses on which it is accepting connection requests
- Services for which it is listening

The `listener.ora` file resides in the `ORACLE_HOME\network\admin` directory.

An Oracle Database 12c does not require identification of the database service because of service registration. However, static service configuration is required for an Oracle Database 12c if you plan to use Oracle Enterprise Manager.

local naming

A **naming method** that resolves a net service name into a connect descriptor. This name is configured and stored in the **tnsnames.ora file** on each individual client.

manual undo management mode

A mode of the database in which undo blocks are stored in user-managed rollback segments.

naming method

A resolution method used by a client application to resolve a connect identifier to a network address when attempting to connect to a database service. Oracle Net Services supports the following naming methods:

- Local naming
- Directory naming
- Host naming
- External naming

net service name

A simple name for a service that resolves to a connect descriptor. Users initiate a connect request by passing a user name and password along with a net service name in a connect string for the service to which they want to connect:

```
SQL> CONNECT user_name
Enter password: password
SQL> @net_service_name
```

Depending on your needs, net service names can be stored in a variety of places, including:

- Local configuration file, `tnsnames.ora`, on each client
- Directory server
- External naming service, such as Network Information Service (NIS) or Cell Directory Service (CDS)

OPSS\$

Acronym for operating system specific. The initialization file parameter `OS_AUTHENT_PREFIX` enables users to specify a prefix that Oracle uses to authenticate users attempting to connect to the database. Oracle concatenates the value of this parameter to the beginning of the user's operating system account name. When a connection request is attempted, Oracle compares the prefixed user name with Oracle user names in the database.

The default value of this parameter is "" (a null string), thereby eliminating the addition of any prefix to operating system account names. In earlier releases, OPS\$ was the default setting.

Oracle Automatic Storage Management disk group

A set of disk devices that **Oracle Automatic Storage Management** (Oracle ASM) manages as a unit. Each disk device can be an individual physical disk, a multiple disk device such as a RAID storage array or logical volume, or even a partition on a physical disk. You can create the Oracle ASM disk group when you create the **Oracle Automatic Storage Management instance**, or with Oracle Database Configuration Assistant.

Oracle Automatic Storage Management instance

The Oracle instance that manages an **Oracle Automatic Storage Management disk group**. It is created automatically when you install and configure **Oracle Automatic Storage Management**. See also Oracle system identifier (**SID**).

Oracle Automatic Storage Management

Enables creation of a single disk group from a collection of individual disk devices. It balances I/O to the disk group across all of the devices in the disk group. It also implements striping and mirroring to improve I/O performance and data reliability.

ORACLE_BASE

ORACLE_BASE is the root of the Oracle Database directory tree. The Oracle Base directory is the top level directory that you can use to install the various Oracle software products. You can use the same Oracle base directory for multiple installations. If you install an OFA-compliant database using Oracle Universal Installer defaults, then *ORACLE_BASE* is *X:\app\username*, where *X* is any hard drive (for example, *C:\app\username\product\12.1.0*).

ORACLE_HOME

Corresponds to the environment in which Oracle Database products run. This environment includes location of installed product files, *PATH* variable pointing to products' binary files, **registry** entries, **net service name**, and program groups.

If you install an OFA-compliant database, using Oracle Universal Installer defaults, Oracle home (known as *\ORACLE_HOME* in this guide) is located beneath *X:\ORACLE_BASE*. The default Oracle home is *db_n* where *n* is the Oracle home number. It contains subdirectories for Oracle Database software executables and network files. See also **Oracle home**.

Oracle home

The directory path to install Oracle components (for example, *C:\app\oracle\product\12.1.0\dbhome_n*). You are prompted to enter an Oracle home in the **Path** field of the Specify File Locations window. See also **ORACLE_HOME**.

Oracle schema

A set of rules that determine what can be stored in an LDAP-compliant directory server. Oracle has its own schema that is applied to many types of Oracle entries, including Oracle Net Services entries. The Oracle schema for Oracle Net Services entries includes the attributes the entries may contain.

Oracle Net foundation layer

A networking communication layer that establishes and maintains the connection between the client application and server, as well as exchanging messages between them.

protocol address

An address that identifies the network address of a network object.

When a connection is made, the client and the receiver of the request, such as the **listener**, or Oracle Connection Manager, are configured with identical protocol addresses. The client uses this address to send the connection request to a particular network object location, and the recipient "listens" for requests on this address. It is important to install the same protocols for the client and the connection recipient, and to configure the same addresses.

raw partitions

Portions of a physical disk that are accessed at the lowest possible disk (block) level.

redo log files

Files that contain a record of all changes made to data in the database buffer cache. If an instance failure occurs, then Oracle Database uses the redo log files to recover the modified data that was in memory.

registry

A Windows repository that stores configuration information for a computer.

repository

A set of tables located in any Oracle database accessible to the Oracle Management Server. Oracle Management Server uses a repository to store all system data and application data, information about the state of managed nodes distributed throughout the environment, as well as information about the separately licensable management packs.

service registration

A feature by which the LREG process (an instance background process) automatically registers information with a **listener**. Because this information is registered with the listener, the **listener.ora file** must not be configured with this static information.

Service registration provides the listener with the following information:

- Service names for each running instance of the database
- Instance names of the database
- Service handlers (dispatchers and dedicated servers) available for each instance
This allows the listener to direct a client's request appropriately.
- Dispatcher, instance, and node load information
This allows the listener to determine which dispatcher can best handle a client connection's request. If all dispatchers are blocked, the listener can spawn a dedicated server for the connection.

This information allows the listener to determine how best to service a client connection request.

SID

The Oracle system identifier that distinguishes the database from all other databases on your computer. The SID automatically defaults to the database name portion of the global database name (sales in the example sales.us.example.com) until you reach eight characters or enter a period. You can accept or change the default value.

The SID can also see an Oracle Automatic Storage Management instance SID, available when you install [Oracle Automatic Storage Management](#).

sqlnet.ora file

A configuration file for the client or server that specifies the:

- Client domain to append to unqualified service names or net service names
- Order of naming methods for the client to use when resolving a name
- Logging and tracing features to use
- Route of connections
- External naming parameters
- Oracle Advanced Security parameters

The sqlnet.ora file resides in *ORACLE_HOME*\network\admin.

Secure Sockets Layer (SSL)

An industry standard protocol designed by Netscape Communications Corporation for securing network connections. SSL provides authentication, encryption, and data integrity using public key infrastructure (PKI).

SSL

See [Secure Sockets Layer \(SSL\)](#).

System Global Area

A group of shared memory structures that contain data and control information for an Oracle Database [instance](#).

system identifier

See [SID](#).

tablespace

A logical storage unit within a database. Tablespaces are divided into logical units of storage called segments, which are further divided into extents.

tnsnames.ora file

A configuration file that contains net service names mapped to connect descriptors. This file is used for the local naming method. The tnsnames.ora file resides in *ORACLE_HOME*\network\admin.

undo tablespace

An tablespace that contains one or more undo segments. The creation of any other types of segment (for example, tables, indexes) in undo tablespaces is not allowed.

In the automatic mode, each Oracle instance is assigned one and only one undo tablespace. Each undo tablespace is composed of a set of undo files. Undo blocks are grouped in extents. At any point in time, an extent is either allocated to (and used by) a transaction table, or is free.

Blocks in undo tablespaces are grouped into the following categories:

- File control blocks, bitmap blocks, and so forth used for space management
- Undo segments containing transaction table blocks, undo blocks, and extent-map blocks used for transaction management
- Free blocks that are unallocated to file control or undo segments

unqualified name

A net service name that does not contain a network domain.

User Account Control

A Microsoft Windows feature that helps prevent unauthorized changes by asking for permission or administrator privileges to perform certain operations. Some Oracle administration tasks require Windows administrator privileges granted through User Account Control.

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