

# Oracle9*i*

Database Getting Started

Release 1 (9.0.1) for Windows

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Oracle9i Database Getting Started, Release 1 (9.0.1) for Windows

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## **Oracle9i Database Getting Started, release 1 (9.0.1) for Windows**

**Part No. A90163-01**

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# Preface

This manual is your primary source of introductory and reference information for Oracle9i for Windows for both client and server. Differences between product versions are noted where appropriate.

This manual describes *only* the features of Oracle9i Enterprise Edition, Oracle9i Standard Edition, and Oracle9i Personal Edition software that apply to the Windows 95, Windows 98, Windows NT, and Windows 2000 operating systems.

This preface contains these topics:

- [Audience](#)
- [Organization](#)
- [Related Documentation](#)
- [Conventions](#)
- [Documentation Accessibility](#)

# Audience

This manual is intended for:

- Database administrators
- Network administrators
- Security specialists
- Developers who use the Oracle9i database

To use this document, you need:

- Windows NT or Windows 2000 installed and tested on your computer system
- Knowledge of object-relational database management concepts

# Organization

This document contains:

## Chapter 1, "Introduction"

Explains how different groups of users can use this document together with *Oracle9i Database Administrator's Guide for Windows* and *Oracle9i Network, Directory, and Security Guide for Windows*.

## Chapter 2, "Oracle9i Windows/UNIX Differences"

Compares features of Oracle9i Database for Windows and UNIX. This information may be helpful to Oracle developers and database administrators moving from UNIX to Windows platforms.

## Chapter 3, "Using Oracle9i on Windows 2000"

Highlights differences between Windows 2000 and Windows NT, with emphasis on procedures for common database tasks.

## Chapter 4, "Oracle9i Architecture on Windows"

Describes how Oracle9i architecture takes advantage of some of the more advanced services in the Windows operating system.

## Chapter 5, "Database Tools Overview"

Provides a list of preferred and optional tools you can use to perform common database administration tasks.



### **Chapter 6, "Multiple Oracle Homes and Optimal Flexible Architecture"**

Describes how to use multiple Oracle homes and an Optimal Flexible Architecture (OFA) configuration for placement of database files.

### **Chapter 7, "Oracle9i Services on Windows"**

Describes Windows services in general and Oracle9i Database Windows services in particular.

### **Chapter 8, "Oracle9i Default Accounts and Passwords"**

Describes usernames and passwords included in the starter Oracle9i Database.

### **Chapter 9, "Configuration Parameters and the Registry"**

Describes the use of the registry for various Oracle components. In addition, this chapter lists the recommended values and ranges for configuration parameters.

### **Chapter 10, "Developing Applications for Windows"**

Points to sources of information on developing applications for Windows and outlines a procedure for building and debugging external procedures.

### **Appendix A, "Error Messages"**

Lists the error messages, causes, and corrective actions that are specific to the operation of Oracle9i for Windows.

### **Appendix B, "Getting Started with Your Documentation"**

Describes the contents of your Oracle documentation set.

### **Glossary**

## **Related Documentation**

This manual is part of a set for developers and database administrators using Oracle9i on Windows. The other manuals in the set are:

- *Oracle9i Database Administrator's Guide for Windows*
- *Oracle9i Network, Directory, and Security Guide for Windows*

For information on the components available in your Oracle9i installation type, see your Oracle9i Database installation guide for Windows.

For Oracle product information that is applicable to *all* operating systems, see your Oracle9i Online Documentation Library CD-ROM for Windows. Many of the examples in the documentation set use the sample schemas of the seed database, which is installed by default when you install Oracle. Refer to *Oracle9i Sample Schemas* for information on how these schemas were created and how you can use them yourself.

If you are not familiar with object-relational database management concepts, see *Oracle9i Database Concepts*.

In North America, printed documentation is available for sale in the Oracle Store at

<http://oraclestore.oracle.com/>

Customers in Europe, the Middle East, and Africa (EMEA) can purchase documentation from

<http://www.oraclebookshop.com/bookshop.html>

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

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If you already have a username and password for OTN, then you can go directly to the documentation section of the OTN Web site at

<http://technet.oracle.com/docs/index.htm>

## Conventions

This section describes the conventions used in the text and code examples of this documentation set. It describes:

- [Conventions in Text](#)
- [Conventions in Code Examples](#)
- [Conventions for Windows Operating Systems](#)

## Conventions in Text

We use various conventions in text to help you more quickly identify special terms. The following table describes those conventions and provides examples of their use.

Convention	Meaning	Example
<b>Bold</b>	Bold typeface indicates terms that are defined in the text or terms that appear in a glossary, or both.	When you specify this clause, you create an <b>index-organized table</b> .
<i>Italics</i>	Italic typeface indicates book titles or emphasis.	<i>Oracle9i Database Concepts</i> Ensure that the recovery catalog and target database do <i>not</i> reside on the same disk.
UPPERCASE monospace (fixed-width font)	Uppercase monospace typeface indicates elements supplied by the system. Such elements include parameters, privileges, datatypes, RMAN keywords, SQL keywords, SQL*Plus or utility commands, packages and methods, as well as system-supplied column names, database objects and structures, usernames, and roles.	You can specify this clause only for a NUMBER column. You can back up the database by using the BACKUP command. Query the TABLE_NAME column in the USER_TABLES data dictionary view. Use the DBMS_STATS.GENERATE_STATS procedure.
lowercase monospace (fixed-width font)	Lowercase monospace typeface indicates executables, filenames, directory names, and sample user-supplied elements. Such elements include computer and database names, net service names, and connect identifiers, as well as user-supplied database objects and structures, column names, packages and classes, usernames and roles, program units, and parameter values.  <b>Note:</b> Some programmatic elements use a mixture of UPPERCASE and lowercase. Enter these elements as shown.	Enter sqlplus to open SQL*Plus. The password is specified in the orapwd file. Back up the datafiles and control files in the /disk1/oracle/dbs directory. The department_id, department_name, and location_id columns are in the hr.departments table. Set the QUERY_REWRITE_ENABLED initialization parameter to true. Connect as oe user. The JRepUtil class implements these methods.
lowercase monospace (fixed-width font) <i>italic</i>	Lowercase monospace italic font represents placeholders or variables.	You can specify the <i>parallel_clause</i> . Run <i>Uold_release</i> . SQL where <i>old_release</i> refers to the release you installed prior to upgrading.

## Conventions in Code Examples

Code examples illustrate SQL, PL/SQL, SQL\*Plus, or other command-line statements. They are displayed in a monospace (fixed-width) font and separated from normal text as shown in this example:

```
SELECT username FROM dba_users WHERE username = 'MIGRATE';
```

The following table describes typographic conventions used in code examples and provides examples of their use.

Convention	Meaning	Example
[ ]	Brackets enclose one or more optional items. Do not enter the brackets.	DECIMAL ( <i>digits</i> [ , <i>precision</i> ])
{ }	Braces enclose two or more items, one of which is required. Do not enter the braces.	{ENABLE   DISABLE}
	A vertical bar represents a choice of two or more options within brackets or braces. Enter one of the options. Do not enter the vertical bar.	{ENABLE   DISABLE} [COMPRESS   NOCOMPRESS]
...	Horizontal ellipsis points indicate either: <ul style="list-style-type: none"><li>■ That we have omitted parts of the code that are not directly related to the example</li><li>■ That you can repeat a portion of the code</li></ul>	CREATE TABLE ... AS <i>subquery</i> ;  SELECT <i>col1</i> , <i>col2</i> , ... , <i>coln</i> FROM employees;
.	Vertical ellipsis points indicate that we have omitted several lines of code not directly related to the example.	
Other notation	You must enter symbols other than brackets, braces, vertical bars, and ellipsis points as shown.	<i>acctbal</i> NUMBER(11,2); <i>acct</i> CONSTANT NUMBER(4) := 3;
<i>Italics</i>	Italicized text indicates placeholders or variables for which you must supply particular values.	CONNECT SYSTEM/ <i>system_password</i> DB_NAME = <i>database_name</i>

Convention	Meaning	Example
UPPERCASE	Uppercase typeface indicates elements supplied by the system. We show these terms in uppercase in order to distinguish them from terms you define. Unless terms appear in brackets, enter them in the order and with the spelling shown. However, because these terms are not case sensitive, you can enter them in lowercase.	<pre>SELECT last_name, employee_id FROM employees;</pre> <pre>SELECT * FROM USER_TABLES;</pre> <pre>DROP TABLE hr.employees;</pre>
lowercase	<p>Lowercase typeface indicates programmatic elements that you supply. For example, lowercase indicates names of tables, columns, or files.</p> <p><b>Note:</b> Some programmatic elements use a mixture of UPPERCASE and lowercase. Enter these elements as shown.</p>	<pre>SELECT last_name, employee_id FROM employees;</pre> <pre>sqlplus hr/hr</pre> <pre>CREATE USER mjones IDENTIFIED BY ty3MU9;</pre>

## Conventions for Windows Operating Systems

The following table describes conventions for Windows operating systems and provides examples of their use.

Convention	Meaning	Example
Choose Start >	How to start a program. For example, to start Oracle Database Configuration Assistant, you must click the Start button on the taskbar and then choose Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Database Configuration Assistant.	Choose Start > Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Database Configuration Assistant
File and Directory Names	File and directory names are not case sensitive. The special characters <, >, :, ", /,  , and - are not allowed. The special character \ is treated as an element separator, even when it appears in quotes. If the file name begins with \\, Windows assumes it uses the Universal Naming Convention.	<pre>c:\winnt\"system32 is the same as</pre> <pre>C:\WINNT\SYSTEM32</pre>

Convention	Meaning	Example
C:\>	Represents the Windows command prompt of the current hard disk drive. The escape character in a command prompt is "^". Your prompt reflects the subdirectory in which you are working. Referred to as the command prompt in this manual.	C:\oracle\oradata>
	The backslash special character (\) is sometimes required as an escape character for the double quote (") special character at the Windows command prompt. Parentheses and the single quote (') do not require an escape character. See your Windows operating system documentation for more information on escape and special characters.	C:\>exp scott/tiger TABLES=emp QUERY=\"WHERE job='SALESMAN' and sal<1600\"  C:\>imp SYSTEM/password FROMUSER=scott TABLES=(emp, dept)
HOME_NAME	Represents the Oracle home name. The home name can be up to 16 alphanumeric characters. The only special character allowed in the home name is the underscore.	C:\> net start OracleHOME_ NAME_TNSListener

Convention	Meaning	Example
<i>ORACLE_HOME</i> and <i>ORACLE_</i> <i>BASE</i>	<p>In releases prior to Oracle8i release 8.1.3, when you installed Oracle components, all subdirectories were located under a top level <i>ORACLE_HOME</i> directory that by default was:</p> <ul style="list-style-type: none"> <li>■ C:\orant for Windows NT</li> <li>■ C:\orawin95 for Windows 95</li> <li>■ C:\orawin98 for Windows 98</li> </ul> <p>or whatever you called your Oracle home.</p> <p>This release complies with Optimal Flexible Architecture (OFA) guidelines. All subdirectories are not under a top level <i>ORACLE_HOME</i> directory. There is a top level directory called <i>ORACLE_BASE</i> that by default is C:\oracle. If you install Oracle9i release 1 (9.0.1) on a computer with no other Oracle software installed, the default setting for the first Oracle home directory is C:\oracle\ora90. The Oracle home directory is located directly under <i>ORACLE_BASE</i>.</p> <p>All directory path examples in this manual follow OFA conventions.</p> <p>See <a href="#">Chapter 6, "Multiple Oracle Homes and Optimal Flexible Architecture"</a> for additional information on OFA compliance and for information on installing Oracle products in non-OFA compliant directories.</p>	Go to the <i>ORACLE_BASE\ORACLE_HOME\rdbsms\admin</i> directory.

## Documentation Accessibility

Oracle's goal is to make our products, services, and supporting documentation accessible to the disabled community with good usability. To that end, our documentation includes features that make information available to users of assistive technology. This documentation is available in HTML format and contains markup to facilitate access by the disabled community. Standards will continue to evolve over time, and Oracle is actively engaged with other market-leading technology vendors to address technical obstacles so that our documentation can be accessible to all of our customers. For additional information, visit the Oracle Accessibility Program Web site at

<http://www.oracle.com/accessibility/>

JAWS, a Windows screen reader, may not always correctly read the code examples in this document. The conventions for writing code require that closing braces should appear on an otherwise empty line; however, JAWS may not always read a line of text that consists solely of a bracket or brace.



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# Introduction

This chapter briefly describes the Oracle9i for Windows documentation set and shows how the three books in the set relate to common database administration tasks.

This chapter contains these topics:

- [Document Plan](#)
- [Task Mapping](#)

# Document Plan

The documentation for Oracle9i for Windows is divided into three parts. This manual contains information with the widest possible relevance. Whatever your database management role, you will probably find something of interest here. The other two manuals concentrate on tasks usually associated with the different realms of management required by a large database with many users. The three manuals are titled:

- *Oracle9i Database Getting Started for Windows*
- *Oracle9i Database Administrator's Guide for Windows*
- *Oracle9i Network, Directory, and Security Guide for Windows*

# Task Mapping

We recognize that this division cannot be perfect for everyone. What one organization calls database administration, another will call a network problem; and only parts of this manual or its companions are relevant to particular tasks. So in this first chapter we provide a table that maps specific tasks to specific chapters and appendixes in the three manuals.

[Table 1-1](#) lists common database tasks, grouped into three categories:

- Database Administration
- Network and Security
- Application Development

For each task, the columns labeled Getting Started, Administrator, and Network/Security show the chapters and appendixes in each of the three manuals which contain information relevant to that task.

**Table 1–1 Where to Find Task Information**

<b>Task Category</b>	<b>Getting Started</b>	<b>Administrator</b>	<b>Network/Security</b>
<b>Database Administration</b>			
Back Up and Recover	2, 4, 5, 9	6	
Create or Delete Database	3, 5	1	
Create Objects	5		
Export, Import, or Load Data	5	1	
Find Files (Directory Structure)	2, 4, 5, 6, 9	1, 2	4
Install or Configure	2, 5, 6, 9	1, 2, 5, 7	1, 2, 4
Manage Processes	2, 3, 4, 5, 6, 7, 9, A	4	
Manage Resources	2, 3, 5, 6, A	3, 5, 7, A	
Manage Services	2, 5, 6, 7, A	1, 3, 5	
Migrate or Upgrade	5, 6		
Monitor Performance	2, 3, 4, 5, 7, 9, A	4, 5	
Startup or Shutdown	2, 5, 9, A	1, 3	
<b>Network and Security</b>			
Accounts and Groups	2, 3, 5, 9		1, 2, 3, 4
Authenticate Users	2, 4, 5, 9		1, 2, 3, 4, 5
Connectivity Information	3, 4, 5, 6, 7, 9, 10, A	3, 5	1, 2, 4, A
Create Users	2, 3, 5		1, 2, 3, 4
<b>Application Development</b>			
Application Programmatic Interfaces	4, 5, 10		
External Procedures	10		
Microsoft Transaction Server	2, 4, 10		
Oracle Real Application Clusters	2, 7, 9	A	



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## Oracle9i Windows/UNIX Differences

This chapter lists the major differences between Oracle9i on Windows and UNIX. For Oracle developers and database administrators moving from a UNIX platform to Windows, this information can be helpful in understanding the Windows features that are relevant to Oracle9i.

This chapter contains these topics:

- [Automatic Startup and Shutdown](#)
- [Background Processing and Batch Jobs](#)
- [Diagnostic and Tuning Utilities](#)
- [Direct Writes to Disk](#)
- [Dynamic Link Libraries \(DLLs\)](#)
- [Hot Backups](#)
- [Initialization Parameters: Multiple Database Writers](#)
- [Install Accounts and Groups](#)
- [Installation](#)
- [Memory Resources](#)
- [Microsoft Transaction Server](#)
- [Multiple Oracle Homes and OFA](#)
- [Processes and Threads](#)
- [Raw Partitions](#)
- [Services](#)

## Automatic Startup and Shutdown

On UNIX, several files and scripts in different directories are used to start an **instance** automatically. Other scripts are run on computer shutdown, allowing applications such as Oracle to shut down cleanly.

For automatic startup on Windows, set the **registry** parameter `ORA_SID_AUTOSTART` to `true` using an Oracle tool such as ORADIM. Enter the following with parameters at the MS-DOS command prompt:

```
C:\> oradim parameters
```

To start the **listener** automatically, set the **services** startup type to automatic.

For automatic shutdown on Windows, set the registry parameters `ORA_SHUTDOWN` and `ORA_SID_SHUTDOWN` to stop the relevant `OracleServiceSID` and shut down. Set the registry parameter `ORA_SID_SHUTDOWNNTYPE` to control the shutdown mode (the default is `i`, or immediate).

### See Also:

- *Oracle9i Database Administrator's Guide*
- "Administering a Database" in *Oracle9i Database Administrator's Guide for Windows*

## Background Processing and Batch Jobs

UNIX provides sophisticated control mechanisms for background processing and batch jobs.

For similar functionality on Windows, use the AT command or a GUI version in the Microsoft Resource Kit.

## Diagnostic and Tuning Utilities

On UNIX, utilities such as `sar` and `vmstat` are used to monitor Oracle background and shadow processes. These utilities are not integrated with Oracle.

Performance utilities available on Windows include Oracle Performance Monitor, Task Manager, Control Panel, Event Viewer, User Manager, and **Microsoft Management Console** (included only with Windows 2000).

Oracle is integrated with several of these tools. For example:

- Oracle Performance Monitor displays key Oracle database information. This tool is the same in appearance and operation as the Windows Performance Monitor, except it has been preloaded with Oracle9i database performance elements.
- Event Viewer displays system alert messages, including Oracle startup/shutdown messages and the audit trail.
- Task Manager on Windows displays currently running processes and their resource usage, similar to the UNIX `ps -ef` command or OpenVMS `SHOW SYSTEM`. But Task Manager is easier to interpret and the columns can be customized.

**See Also:**

- [Chapter 5, "Database Tools Overview"](#) in this manual
- "Monitoring a Database" in *Oracle9i Database Administrator's Guide for Windows*

## Direct Writes to Disk

On both UNIX and Windows platforms, bypassing the file system buffer cache ensures the data is written to disk.

On UNIX, Oracle uses the `O_SYNC` flag to bypass the file system buffer cache. The flag name depends on the UNIX port.

On Windows, Oracle bypasses the file system buffer cache completely.

**See Also:** *Oracle9i Database Concepts*

## Dynamic Link Libraries (DLLs)

Shared libraries on UNIX are similar to the shared DLLs on Windows. Object files and archive libraries are linked to generate the Oracle executables. Relinking is necessary after certain operations, such as installation of a patch.

On Windows, Oracle DLLs form part of the executable at run time and are therefore smaller. DLLs can be shared between multiple executables. Relinking by the user is not supported, but executable images can be modified using the ORASTACK utility.

Modifying executable images on Windows reduces the chances of running out of virtual memory when using a large SGA or when supporting thousands of

connections. However, Oracle Corporation recommends doing this only under the guidance of Oracle Support Services.

**See Also:** *Oracle9i Database Concepts*

## Hot Backups

A (manual) hot **backup** is equivalent to backing up a **tablespace** that is in offline backup mode.

The backup strategy on UNIX is as follows: put the tablespace into backup mode, copy the files to the backup location, and bring the tablespace out of backup mode.

Windows supports the same backup strategy, but you cannot copy files in use with normal Windows utilities. Use the Oracle utility OCOPY to copy open database files to another disk location. Then use a utility to copy the files to tape.

**See Also:**

- *Oracle9i Database Administrator's Guide for Windows*
- *Oracle9i Backup and Recovery Concepts*

## Initialization Parameters: Multiple Database Writers

On UNIX, you can specify more than one database writer **process** with the initialization parameter DB\_WRITERS. Multiple database writers can help, for example, when a UNIX port does not support asynchronous I/O.

DB\_WRITERS is supported but typically unnecessary on Windows, which has its own asynchronous I/O capabilities.

**See Also:** "Oracle9i Database Specifications for Windows" in *Oracle9i Database Administrator's Guide for Windows*

## Install Accounts and Groups

UNIX uses the concept of a DBA group. The root account cannot be used to install Oracle. A separate Oracle account must be created manually.

On Windows, Oracle must be installed by a Windows **username** in the Administrators group. The username is automatically added to the Windows local group ORA\_DBA, which receives the **SYSDBA privilege**. This allows the user to log



into the database using `CONNECT / AS SYSDBA` and not be prompted for a password.

Password files are located in the `ORACLE_BASE\ORACLE_HOME\database` directory and are named `pwdSID.ora`, where *SID* identifies the Oracle9i database instance.

**See Also:** "Administering a Database" in *Oracle9i Database Administrator's Guide for Windows*

## Installation

The following manual setup tasks, all required on UNIX, are *not* required on Windows:

- Set environment variables
- Create a DBA group for database administrators
- Create a group for users running Oracle Universal Installer
- Create an account dedicated to installing and upgrading Oracle components

**See Also:** Your Oracle9i Database installation guide for Windows

## Memory Resources

The resources provided by the UNIX default kernels are often inadequate for a medium or large Oracle database. The maximum size of a shared memory segment (`SHMMAX`) and maximum number of semaphores available (`SEMMNS`) may be too low for Oracle recommendations.

On Windows, fewer resources are needed for interprocess communication (IPC), because the Oracle relational database management system is **thread**-based and not process-based. These resources, including shared memory and semaphores, are not adjustable by the user.

**See Also:** *Oracle9i Database Concepts*

## Microsoft Transaction Server

UNIX does not support **Microsoft Transaction Server**.

Windows supports Microsoft Transaction Server beginning with Oracle version 8. Using Oracle Services for Microsoft Transaction Server, you can develop and deploy

applications based on [COM/COM+](#). Microsoft Transaction Server coordinates application transactions for an Oracle database.

**See Also:** *Using Microsoft Transaction Server with Oracle*

## Multiple Oracle Homes and OFA

The goal of OFA is to place all Oracle software under one [ORACLE\\_BASE](#) directory and to spread database files across different physical drives as databases increase in size. OFA is implemented on Windows NT and UNIX in the same way, and the main subdirectory and filenames are the same on both operating systems. Windows NT and Unix differ, however, in their OFA directory tree top-level names and in the way variables are set.

On UNIX, [ORACLE\\_BASE](#) is associated with a user's environment. [ORACLE\\_HOME](#) and [ORACLE\\_SID](#) must be set in system or user login scripts. Symbolic links are supported. Although everything seems to be in one directory on the same hard drive, files may be on different hard drives if they are symbolically linked or have that directory as a [mount](#) point.

On Windows, [ORACLE\\_BASE](#) is defined in the registry (for example, in HKEY\_LOCAL\_MACHINE\SOFTWARE\ORACLE\HOME0). [ORACLE\\_HOME](#) and [ORACLE\\_SID](#) are variables defined in the registry. Symbolic links like those on UNIX are not supported, although Microsoft has announced the intention to support them in a future release.

**See Also:** [Chapter 6, "Multiple Oracle Homes and Optimal Flexible Architecture"](#) in this manual

## Processes and Threads

On UNIX, Oracle uses a process to implement each of such background tasks as database writer (DBW0), log writer (LGWR), shared server process dispatchers, and shared servers. Each dedicated connection made to the database causes another operating system process to be spawned on behalf of that session.

On Windows, each background process is implemented as a thread inside a single, large process. For each Oracle database instance or [system identifier](#), there is one corresponding process for the Oracle9i database. For example, 100 Oracle processes for a database instance on UNIX are handled by 100 threads inside one process on Windows.

All Oracle background, dedicated server, and client processes are threads of the master ORACLE Windows process, and all the threads of the ORACLE process share resources. This multithreaded architecture is highly efficient, allowing fast context switches with low overhead.

To view processes or end individual threads, use the Oracle Administration Assistant for Windows NT. Choose Start > Programs > Oracle - *HOME\_NAME* > Configuration and Migration Tools > Oracle Administration Assistant for Windows. Right-click the *SID* and choose Process Information.

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**Note:** The Microsoft Management Console (MMC) is started when the Oracle Administration Assistant for Windows NT is started on Windows NT 4.0. Oracle Corporation has integrated several database administration **snap-ins** into the MMC.

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**See Also:**

- Oracle Administration Assistant for Windows NT online help
- [Chapter 4, "Oracle9i Architecture on Windows"](#) in this manual

## Raw Partitions

Datafiles for tablespaces may be stored on a file system or on **raw partitions**. A raw partition is a portion of a physical disk that is accessed at the lowest possible level.

UNIX supports raw partitions (logical drives). There is no limitation on the number of disk drives.

Windows is limited to using drive letters A-Z, but creating raw partitions lets you bypass the disk drive limitation and divide the disks into smaller sections.

Use the Windows NT Disk Administrator application to create an *extended partition* on a physical drive. An extended partition points to raw space on the disk that can be assigned multiple logical partitions for the database files.

An extended partition avoids the four-partition limit on Windows by allowing you to define large numbers of logical partitions to accommodate applications using the Oracle9i database. Logical partitions can then be given symbolic link names to free up drive letters.

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**Note:** Raw partitions are necessary for the shared datafiles in an Oracle Real Application Clusters environment, available on Windows. Oracle Real Application Clusters, in which Oracle instances run on all nodes simultaneously, provides clustering and high availability.

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**See Also:** [Chapter 3, "Using Oracle9i on Windows 2000"](#) in this manual

## Services

Windows services are similar to UNIX daemons.

Oracle registers a database instance as a service (`OracleServiceSID`). Services start background processes.

To connect to and use an Oracle instance, an Oracle service is created during the database creation process and associated with the Oracle database. Once a service is created with the Oracle database, the service can run even while no user is logged on.

By default, services run under the **SYSTEM** account. Choose Start > Settings > Control Panel > Services to access the *Services* dialog box.

**See Also:** "Administering a Database" in *Oracle9i Database Administrator's Guide for Windows*

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## Using Oracle9i on Windows 2000

This chapter highlights differences between Windows 2000 and Windows NT, with emphasis on procedures for common database tasks.

This chapter contains these topics:

- [How to Perform Common Tasks in Windows NT and Windows 2000](#)
- [Other Differences Between Windows NT and Windows 2000](#)

## How to Perform Common Tasks in Windows NT and Windows 2000

**Table 3–1** lists common database administration tasks and the tools required to accomplish those tasks in Windows NT and Windows 2000.

**Table 3–1    How to Perform Common Tasks in Windows NT and Windows 2000**

Task	Windows NT	Windows 2000
Install a domain controller	Windows setup	<b>Active Directory</b> installation wizard from Configure Your Server
Manage user accounts	User Manager Choose Start > Programs > Administrative Tools > User Manager	Active Directory Users & Computers Choose Programs > Administrative Tools > Active Directory
Manage groups	User Manager	Active Directory Users & Computers
Manage computer accounts	Server Manager Choose Start > Programs > Administrative Tools > Server Manager	Active Directory Users & Computers
Add a computer to a domain	Server Manager	Active Directory Users & Computers
Create or manage trust relationships	User Manager	Active Directory Domains & Trusts
Manage account policy	User Manager	Active Directory Users & Computers
Manage user rights	User Manager	Active Directory Users & Computers: Edit the Group Policy object for the domain or organizational unit containing the computers to which the users rights apply.
Manage audit policy	User Manager	Active Directory Users & Computers: Edit the Group Policy object assigned to the Domain Controllers organizational unit.
Set policies on users and computers in a site	System Policy Editor Choose Start > Programs > Administrative Tools > System Policy Editor	Group Policy, accessed through Active Directory Sites & Services
Set policies on users and computers in a domain	System Policy Editor	Group Policy, accessed through Active Directory Users & Computers

**Table 3–1 (Cont.) How to Perform Common Tasks in Windows NT and Windows 2000**

Task	Windows NT	Windows 2000
Set policies on users and computers in an organizational unit	Not applicable	Group Policy, accessed through Active Directory Users & Computers
Use Security Groups to filter the scope of policy	Not applicable	Edit the permissions entry for Apply Group Policy on the security tab of the Group Policy Object properties sheet
Start Oracle Performance Monitor for Windows NT	Choose Start > Programs > Configuration and Migration Tools > Oracle for Windows NT Performance Monitor	Choose Start > Programs > Configuration and Migration Tools > Oracle for Windows NT Performance Monitor
Access <a href="#">services</a> dialog box	Choose Start > Settings > Control Panel > Services	Choose Start > Settings > Control Panel > Administrative Tools > Services

## Other Differences Between Windows NT and Windows 2000

### DNS Domain Name

If a Windows 2000 computer is not identified with a DNS domain name, then you will receive the following error message:

```
Calling query w32RegQueries1.7.0.17.0 RegGetValue
Key = HKEY_LOCAL_MACHINE
SubKey = SYSTEM\CurrentControlSet\Services\Tcpip\Parameters
Value = Domain
```

```
Query Exception: GetValueKeyNotFoundException
Query Exception Class: class oracle.sysman.oii.oil.OilQueryException
...
```

Perform the following steps:

1. Choose Start > Control Panel > System > Network Identification > More > Primary DNS.
2. Enter a domain name, for example, `us.oracle.com`.

### Microsoft Management Console

**Microsoft Management Console**, available in Windows NT as a separate item from Microsoft, is included in Windows 2000.

## Enterprise User Authentication

In Windows 2000, enterprise user authentication is enabled by setting the `OSAUTH_X509_NAME` **registry** parameter to `true` on the computer on which the Oracle9i database is running in a Windows 2000 domain. If this parameter is set to `false` (the default setting) in a Windows 2000 domain, then the Oracle9i database can **authenticate** the user as an **external user** (described in *Oracle9i Network, Directory, and Security Guide for Windows*).

Setting this parameter to true in a Windows NT 4.0 domain does not enable you to use enterprise users.

## Raw Partitions

In Windows NT, use Disk Administrator to create the **raw partitions** required for Oracle Real Application Clusters.

In Windows 2000, use Computer Management to create basic disks (compatible with raw partitions on Windows NT). Choose Start > Programs > Administrative Tools > Computer Management.

## Services Autostart

**Oracle services** autostart on Windows NT 4.0. After upgrading to Windows 2000, you may find that services start but the database does not start.

The solution is to use the ORADIM utility to delete and recreate the services.

To delete an **instance** using ORADIM, enter:

```
ORADIM -DELETE -SID SIDA, SIDB, SIDC, ...  
ORADIM -DELETE -SVRC SVRCA, SVRCB, SVRC, ...
```

where:

- *SIDA*, *SIDB*, *SIDC* are the values of the SIDs to delete.
- *SVRCA*, *SVRCB*, *SVRC* are the values of the services to delete.

During upgrading, the disk is converted to NTFS 5, and a different access **authorization** is used. The new services autostart under the same account, but they no longer hold the same Windows permissions as before.



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# Oracle9i Architecture on Windows

This chapter describes how Oracle9i architecture takes advantage of some of the more advanced [services](#) in the Windows operating system.

This chapter contains these topics:

- [Oracle9i on Windows Architecture](#)
- [Oracle9i Scalability on Windows](#)
- [Oracle9i Integration with Windows](#)
- [Other Sources of Information](#)

## Oracle9i on Windows Architecture

Oracle9i on Windows is a stable, reliable, and high performing system upon which to build applications. Each release of the database provides new platform-specific features above and beyond the generic database features for high performance on Windows.

Oracle9i operates the same way on Windows as it does on other platforms. The architecture offers several advantages on Windows, such as:

- [Thread-Based Architecture](#)
- [File I/O Enhancements](#)
- [Raw File Support](#)

### Thread-Based Architecture

The internal [process](#) architecture of the Oracle9i database is [thread](#)-based. Threads are objects within a process that run program instructions. Threads allow concurrent operations within a process so that a process can run different parts of its program simultaneously on different processors. A thread-based architecture provides the following advantages:

- Faster context switching
- Simpler [System Global Area](#) allocation routine, because it does not require the use of shared memory
- Faster spawning of new connections, because threads are created more quickly than processes
- Decreased memory usage, because threads share more data structures than processes

Internally, the code to implement the thread model is compact and separate from the main body of Oracle code. Exception handlers and routines track and de-allocate resources. They add robustness, with no downtime because of resource leaks or an ill-behaved program.

The Oracle9i database is not a typical Windows process. On Windows, an Oracle [instance](#) (the threads and memory structures) is a Windows service: a background process registered with the operating system. The service is started by Windows and requires no user interaction to start. This enables the database to open automatically at startup.

When running multiple Oracle instances on Windows, each instance runs its own Windows service with multiple component threads. Each thread may be required for the database to be available, or it may be optional and specific to certain platforms. Examples of optional and required threads on Windows are listed in [Table 4-1](#).

**Table 4-1 Required and Optional Oracle Threads**

Oracle Thread	Description	Required/Optional
DBW0	database writer	Required
LGWR	log writer	Required
PMON	process monitor	Required
SMON	system monitor	Required
CKPT	checkpoint process (or thread on Windows) that runs by default on Windows	Optional
ARCH0	archive process (or thread on Windows)	Optional
RECO	distributed recovery background process	Optional

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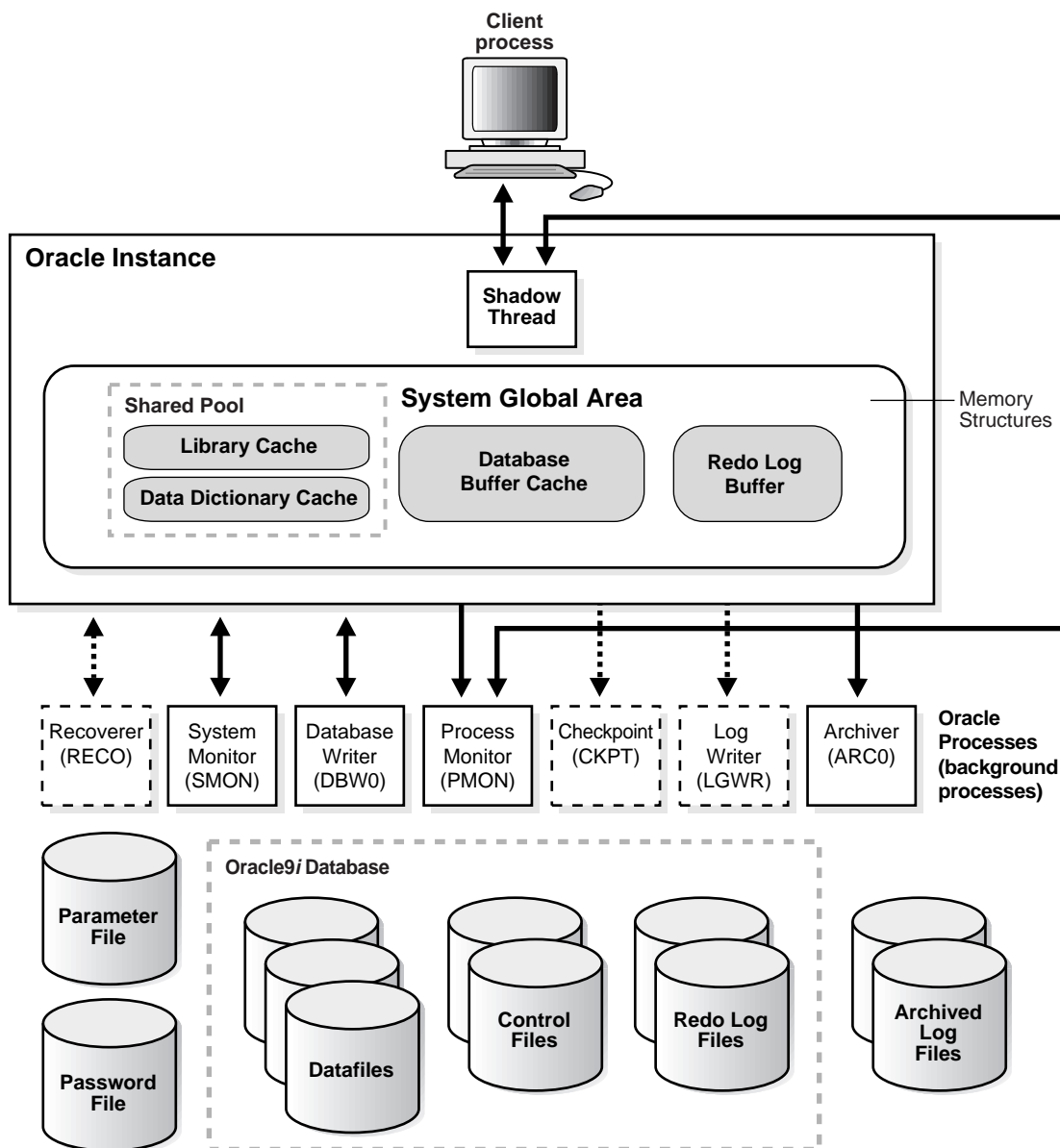
**Note:** You can view running background processes by issuing the following query:

```
SQL> select * from v$bgprocess where paddr <> '00' ;
```

---

---

**Figure 4–1 Oracle architecture on Windows. The background processes read and write from the various datafiles, depending on your configuration.**



Oracle9i for Windows is supplied as a set of executables and dynamic link libraries (DLLs). Executable images can be modified using the ORASTACK utility to change the size of the stack used by the threads of the Oracle process. (Oracle Corporation recommends you use this tool only under the guidance of Oracle Support Services.)

## File I/O Enhancements

The database supports 64-bit file I/O to allow the use of files larger than 4 gigabytes (GB) in size. In addition, physical and logical raw files are supported as data, log, and **control files** to support Oracle Real Application Clusters on Windows and for those cases where performance needs to be maximized.

All Oracle9i file I/O routines support 64-bit file offsets, meaning there are no 2 GB or 4 GB file size limitations when it comes to data, log, or control files, as there are on some other platforms. In fact, the limitations that are in place are generic Oracle limitations across all platforms. These limits include 4 million database blocks for each file, 16KB maximum block size, and 64K files per database. If these values are multiplied, then the maximum file size for a database file on Windows is 64 GB, and the maximum total database size supported (with 16KB database blocks) is 4 petabytes.

## Raw File Support

Windows supports raw files, similar to UNIX. Using raw files for database or log files can have a slight performance gain. Raw files are unformatted disk partitions that can be used as one large file. Raw files have the benefit of no file system overhead, because they are unformatted partitions. However, standard Windows commands do not support manipulating or backing up raw files. As a result, raw files are generally used only by very high-end installations and by Oracle Real Application Clusters, where they are required.

To Oracle9i, raw files are no different from other Oracle9i database files. They are treated in the same way by Oracle as any other file and can be backed up and restored through Recovery Manager or OCOPY.

## Oracle9i Scalability on Windows

New features in Oracle9i and in the Windows operating system work together to help increase scalability, throughput, and database capacity. These features include:

- [4 GB RAM Tuning \(4GT\)](#)
- [Large User Populations](#)

### 4 GB RAM Tuning (4GT)

Windows NT Server Enterprise and Datacenter Editions (version 4.0) include a feature called 4 GB RAM Tuning (4GT). This feature allows memory-intensive applications running on Oracle9i Enterprise Edition to access up to 3 GB of memory, as opposed to the standard 2 GB in previous versions of the operating system. 4GT provides a tremendous benefit: 50 percent more memory is available for database use, increasing SGA sizes or connection counts. 4GT is also supported on Windows 2000 Advanced Server and Windows 2000 Datacenter Server.

### Large User Populations

New features allow Oracle9i to support an increasingly large number of database connections on Windows NT and Windows 2000:

- Oracle [Shared Server Process](#), which limits the number of threads needed in the Oracle database process, supports over 10,000 simultaneous connections to a single database instance.
- [Oracle Net](#) multiplexing and connection pooling features allow a large configuration to connect more users to a single database instance.
- Oracle Real Application Clusters raises connection counts dramatically by allowing multiple server computers to access the same database files, increasing the number of user connections by tens of thousands, as well as increasing throughput.

## Oracle9i Integration with Windows

Oracle is increasingly integrated with Windows, easing maintenance and improving enterprise-level deployment in security, directory, and transaction services.

Integration features in Oracle9i include:

- [Oracle PKI Integration](#)
- [Active Directory](#)
- [Oracle Services for Microsoft Transaction Server](#)
- [Oracle Fail Safe](#)
- [Oracle Real Application Clusters Guard](#)

### Oracle PKI Integration

Oracle Advanced Security includes [Oracle PKI](#) (Public Key Infrastructure) integration for authentication and single signon. You can integrate Oracle-based applications with the PKI authentication and encryption framework, using the following tools:

- Oracle Wallet Manager creates an encrypted Oracle Wallet, used for digital certificates.
- Oracle Enterprise Login Assistant creates the [obfuscated](#) decrypted Oracle Wallet, used by Oracle applications for SSL-based security. The Oracle Wallet is then stored on the file system or [Oracle Internet Directory](#).

### Active Directory

Oracle customers with large user populations often require enterprise-level security and [schemas](#) management. Oracle security and administration are integrated with Windows 2000 through [Active Directory](#), Microsoft's directory service.

Oracle9i provides native authentication and single signon through Windows 2000 authentication mechanisms. Native authentication uses Kerberos security protocols on Windows 2000 and allows the operating system to perform user identification for Oracle databases. With native authentication enabled, users can access Oracle applications simply by logging into Windows. Single signon eliminates the need for multiple security credentials and simplifies administration.

Oracle native authentication also supports Oracle9i enterprise users and [roles](#). Traditionally, administrators must create a database user on every database for each Windows user. This often equates to thousands of different database users. Oracle

enterprise user mappings allow many Windows users to access a database as a single global database user. These enterprise user mappings are stored in Active Directory. For example, entire organizational units in Active Directory can be mapped to one database user.

Oracle also stores enterprise role mappings in Active Directory. With such roles, a database **privilege** can be managed at the domain level through directories. This is accomplished by assigning Windows 2000 users and groups to the Oracle enterprise roles registered in Active Directory. Enterprise users and roles reduce administrative overhead while increasing the scalability of database solutions.

### Oracle Net Naming with Active Directory

Oracle also uses Active Directory to improve the management of database connectivity information. Traditionally, users reference databases with Oracle Net-style names resolved through the **tnsnames.ora** configuration file. This file has to be administered on each client computer.

Oracle Net Naming with Active Directory stores and resolves names through Active Directory. By centralizing such information in a directory, Oracle Net Naming with Active Directory eliminates administrative overhead and relieves users from configuring their individual client computers.

Various tools in Windows 2000, such as Windows Explorer and Active Directory Users and Computers, have been enhanced. Users can now connect to databases and test database connectivity from these tools.

Oracle tools have also been enhanced. The Oracle Database Configuration Assistant automatically registers database objects with Active Directory. The Oracle Net Manager, meanwhile, registers net service objects with the directory. These enhancements further simplify administration.

## Oracle Services for Microsoft Transaction Server

**Microsoft Transaction Server** is used in the middle tier as an application server for **COM/COM+** objects and transactions in distributed environments. Oracle Services for Microsoft Transaction Server allows Oracle9i databases to be used as resource managers in Microsoft Transaction Server-coordinated transactions, providing strong integration between Oracle solutions and Microsoft Transaction Server. Oracle Services for Microsoft Transaction Server can operate with Oracle9i databases running on any operating system.

Oracle takes advantage of a native implementation and also stores **recovery** information in the Oracle database itself. Oracle Services for Microsoft Transaction



Server allows development in all industry-wide data access interfaces, including Oracle Objects for OLE (OO4O), the **Oracle Call Interface** (OCI), ActiveX Data Objects (ADO), OLE DB, and Open Database Connectivity (ODBC). The Oracle APIs, OO4O and OCI, offer the greatest efficiency.

## Oracle Fail Safe

Oracle Fail Safe ensures that Oracle databases (and also other Oracle and third-party applications) can be configured and managed for high availability on Windows clusters. An **instance** runs on only one node at a time.

A cluster is a group of independent computing systems that operates as a single virtual system, eliminating individual host systems as points of failure. Oracle Fail Safe works with Microsoft Cluster Server (included with Oracle9i Enterprise Edition) to ensure that if a failure occurs on one cluster system, then the workloads running on that system fail over quickly and automatically to a surviving system. The combination of Oracle9i with Oracle Fail Safe on a Windows cluster ensures protection from both hardware and software failures.

For well-configured solutions, Oracle Fail Safe ensures a surviving system to be operational in less than a minute, even for heavily-used databases.

**See Also:** Your Oracle Fail Safe documentation set, available on separate media in the Oracle CD-ROM package

## Oracle Real Application Clusters Guard

Oracle Real Application Clusters Guard integrates Oracle Real Application Clusters databases with Microsoft Cluster Server clusters deployed on Windows NT and Windows 2000. It enhances the high availability features of Oracle Real Application Clusters by offering:

- Optional automatic restarts of a failed instance or **listener** in a cluster
- Detection and resolution of instance hangs
- Elimination of connect-time failover TCP/IP timeout delays for new connection requests
- Use of user-written scripts after database state (online/offline) changes

---

**Note:** Oracle Fail Safe and Oracle Real Application Clusters Guard are planned to ship in a subsequent CD pack.

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## Other Sources of Information

### See Also:

- *Oracle9i Database Administrator's Guide for Windows and Oracle9i Network, Directory, and Security Guide for Windows*, on using the new Oracle9i features described in this chapter
- [Chapter 2, "Oracle9i Windows/UNIX Differences"](#)
- [Chapter 5, "Database Tools Overview"](#), for Oracle9i integration with Windows tools
- [Chapter 10, "Developing Applications for Windows"](#), for more Oracle9i integration with Windows features

---

## Database Tools Overview

Oracle9i for Windows includes various tools to perform database functions. This chapter describes the preferred tools to perform common database administration tasks and explains how the tools can be started.

Unless otherwise noted, the features described in this manual are common to Oracle9i Enterprise Edition, Oracle9i Standard Edition, and Oracle9i Personal Edition.

This chapter contains these topics:

- [Choosing a Database Tool](#)
- [Starting Database Tools](#)
- [Using SQL\\*Loader](#)
- [Using Windows Tools](#)
- [Optional Windows Diagnostic and Tuning Utilities](#)

# Choosing a Database Tool

*Database tools* is a collective term for tools, utilities, and assistants that you can use to perform database administration tasks. Some database tools perform similar tasks, though no one database tool performs all database administration tasks. The following sections indicate which database tools can be used on particular operating systems and the preferred tools to use for common database administration tasks.

**Note:**

- Oracle Server Manager is no longer shipped as of this release. All Server Manager text and examples have been replaced with SQL\*Plus equivalents.
- Additionally, connecting to the database as `CONNECT INTERNAL` is no longer supported.

`SQL> CONNECT INTERNAL/password@tnsalias`

has been replaced by:

`SQL> CONNECT SYS/password@tnsalias AS SYSDBA`

## Database Tools and Operating System Compatibility

Table 5–1 lists database tools and the operating system(s) on which each can be used.

Table 5–1 Database Tools and Operating System Compatibility

Database Tools	Windows NT/2000	Windows 95/98
Application Development		
SQL*Plus (SQLPLUS) <sup>1</sup>	Yes	Yes
Pro*C/C++	Yes	Yes
Pro*COBOL	Yes	Yes
Object Type Translator (OTT)	Yes	Yes
Oracle Services for Microsoft Transaction Server	Yes	No
Oracle Portal (formerly Oracle WebDB) <sup>2</sup>	Yes	Yes

**Table 5–1 (Cont.) Database Tools and Operating System Compatibility**

Database Tools	Windows NT/2000	Windows 95/98
<b>Database Administration</b>		
Oracle Enterprise Manager <sup>3</sup>	Yes	Yes
SQL*Plus (SQLPLUS)	Yes	Yes
Oracle Administration Assistant for Windows NT	Yes	No
Oracle Database Configuration Assistant	Yes	No
Oracle Advanced Security <sup>4</sup>	Yes	Yes
Oracle Performance Monitor for Windows NT	Yes	No
<b>Migration Utilities</b>		
Oracle Data Migration Assistant	Yes	No
Oracle Migration Workbench <sup>5</sup>	Yes	Yes
<b>Oracle Utilities from the Command Line</b>		
Migration Utility (MIG)	Yes	No
DBVERIFY (DBVERF)	Yes	Yes
Export Utility (EXP) <sup>6</sup>	Yes	Yes
Import Utility (IMP) <sup>7</sup>	Yes	Yes
OCOPY	Yes	Yes
ORADIM <sup>8</sup>	Yes	No
Password Utility (ORAPWD) <sup>9</sup>	Yes	No
Recovery Manager (RMAN)	Yes	Yes
SQL*Loader (SQLLDR)	Yes	Yes
TKPROF	Yes	Yes
OPERFCFG	Yes	Yes
<b>Network Administration</b>		
Oracle Net Manager	Yes	Yes
Oracle Net Configuration Assistant	Yes	Yes

Table 5–1 (Cont.) Database Tools and Operating System Compatibility

Database Tools	Windows NT/2000	Windows 95/98
Windows Tools		
Task Manager	Yes	Yes
Control Panel	Yes	Yes
Event Viewer	Yes	No
Registry Editor	Yes	Yes
User Manager	Yes <sup>10</sup>	No
Microsoft Management Console	Yes <sup>11</sup>	No

<sup>1</sup> The ORADEBUG utility can be used through SQL\*Plus to send debug commands to Oracle processes. See "Using the ORADEBUG Utility" in *Oracle9i Database Administrator's Guide for Windows*.

<sup>2</sup> Available on a separate CD-ROM.

<sup>3</sup> Oracle Enterprise Manager and its optional management packs have additional integrated tools to assist in managing databases. See the *Oracle Enterprise Manager Concepts Guide* for more information.

<sup>4</sup> Includes Enterprise Login Assistant and Oracle Wallet Manager. Available only with Oracle9i Enterprise Edition and Oracle9i Personal Edition, and not Oracle9i Standard Edition. See your `installActions.log` at `C:\program files\Oracle\Inventory\logs`.

<sup>5</sup> Available on a separate CD-ROM.

<sup>6</sup> The VOLSIZ parameter for the Export and Import utilities is not supported on Windows NT. If you attempt to use the utilities with the VOLSIZ parameter, then error LRM-00101 occurs. For example:

```
D:\> exp system/manager full=y volsize=100m;
LRM-00101: unknown parameter name 'volsize'
EXP-00019: failed to process parameters, type 'EXP HELP=Y' for help
EXP-00000: Export terminated unsuccessfully
```

<sup>7</sup> See footnote 6.

<sup>8</sup> ORADIM operates only on local databases.

<sup>9</sup> ORAPWD does not work on password files for remote databases.

<sup>10</sup> Windows NT only.

<sup>11</sup> Must be obtained from Microsoft Corporation for use with Windows NT 4.0; automatically included with Windows 2000.

## Preferred Database Tools

[Table 5–2](#) lists the various database tools you can use to perform common database administration tasks. Oracle Corporation recommends you use the tools listed in the "Preferred Database Tool" column of the table. After choosing a tool to perform a task, go to [Table 5–3, "Starting Database Tools from the Start Menu"](#), on page 5-8 for instructions on how to start the tool.

**Table 5–2 Preferred Database Tools**

Database Administration Task	Preferred Database Tool	Other Database Tools
Create a database	Oracle Database Configuration Assistant	SQL*Plus Worksheet
Delete database <a href="#">services</a>	Oracle Database Configuration Assistant	ORADIM
Start a database	Oracle Enterprise Manager Console	SQL*Plus SQL*Plus Worksheet
Shut down a database	Oracle Enterprise Manager Console	Control Panel SQL*Plus SQL*Plus Worksheet
Change database passwords	ORAPWD	ORADIM <sup>1</sup>
Migrate a database	Oracle Data Migration Assistant <sup>2</sup>	Migration Utility (MIG)
Upgrade a database	Oracle Data Migration Assistant	Run provided scripts in SQL*Plus <sup>3</sup>
Export data	Oracle Enterprise Manager Export Wizard	Export Utility (EXP)
Import data	Oracle Enterprise Manager Import Wizard	Import Utility (IMP)
Load data	Oracle Enterprise Manager Load Wizard	SQL*Loader (SQLLDR)
Back up database	Oracle Enterprise Manager Backup Wizard <sup>4</sup>	Recovery Manager (RMAN) OCOPY
Recover database	Oracle Enterprise Manager Recovery Wizard	Recovery Manager (RMAN) OCOPY

Table 5–2 (Cont.) Preferred Database Tools

Database Administration Task	Preferred Database Tool	Other Database Tools
Authenticate database administrators and users	Oracle Enterprise Manager Console	SQL*Plus Windows operating system Oracle Administration Assistant for Windows NT SQL*Plus Worksheet
Store encrypted and decrypted Oracle Wallet (Oracle Advanced Security and <b>Oracle PKI</b> integration)	Oracle Wallet Manager (OWM) creates the encrypted Oracle Wallet  Oracle Enterprise Login Assistant creates the <b>obfuscated</b> decrypted Wallet	None
Grant database <b>roles</b>	Oracle Enterprise Manager Console	User Manager SQL*Plus
Create database objects <sup>5</sup>	Oracle Enterprise Manager Console	SQL*Plus

<sup>1</sup> ORADIM can only set a password when none was previously set. If a password has been previously set, then ORADIM can change it only by deleting and recreating the Oracle9i services.

<sup>2</sup> Oracle Data Migration Assistant can migrate an Oracle7 release 7.3.4 database to the current release; it can also upgrade Oracle8 release 8.0.6 and Oracle8i release 8.1.5, 8.1.6, and 8.1.7 databases to the current release. It cannot be used to upgrade an earlier Oracle7 database release to a later Oracle7 database release. See your Oracle7 for Windows NT documentation for information on how to upgrade from one Oracle7 database to another.

<sup>3</sup> Required when upgrading Oracle Real Application Clusters systems.

<sup>4</sup> If you back up files while you are shutting down the database, then your backup will be invalid. You cannot use an invalid backup to restore files at a later date.

<sup>5</sup> See *Oracle9i Database Administrator's Guide* for guidelines on creating database objects.

## Starting Database Tools

This section describes how to start each of the database tools in the following categories:

- [Starting Database Tools in Multiple Oracle Homes](#)
- [Starting Database Tools from the Start Menu](#)
- [Starting Database Tools from the Command Line](#)
- [Starting the Oracle Enterprise Manager Console](#)
- [Starting Windows Tools](#)



You will be referred back to this section for database tool startup procedures as you use this manual.

## Starting Database Tools in Multiple Oracle Homes

If you have **multiple Oracle homes** on your computer from previous releases, then see [Chapter 6, "Multiple Oracle Homes and Optimal Flexible Architecture"](#) for a description of the differences between Oracle homes before and after Oracle9i release 1 (9.0.1).

### Starting Tools from Oracle8 Release 8.0.4 and Later 8.0.x Multiple Oracle Homes

If you are using multiple Oracle homes, then the command to start a tool from any home other than the first includes a *HOME\_NAME*, where *HOME\_NAME* indicates the name of that Oracle home. The *first* Oracle home created on your computer does not have *HOME\_NAME* appended to the group. For example:

**To start Oracle Administration Assistant from the first Oracle home, choose:**

Start > Programs > Oracle > Configuration and Migration Tools > Oracle Administration Assistant for Windows NT

**To start Oracle Administration Assistant from an additional Oracle home, choose:**

Start > Programs > Oracle - *HOME\_NAME* > Configuration and Migration Tools > Oracle Administration Assistant for Windows NT

### Starting Tools from Oracle8i Release 8.1.3 and Later Multiple Oracle Homes

Beginning in Oracle8i release 8.1.3, each Oracle home, including the first Oracle home you create on your computer, has a unique *HOME\_NAME*. For example:

**To start Oracle Administration Assistant from any Oracle home, choose:**

Start > Programs > Oracle - *HOME\_NAME* > Configuration and Migration Tools > Oracle Administration Assistant for Windows NT

## Starting Database Tools from the Start Menu

**Table 5–3** describes how to start assistants and other tools from the Start Menu. It also tells where to go for further information on using these products.

**Note:** When you use an assistant, you must have read and write access to the directory where database files will be moved or created. To create an Oracle9i database, you must have an administrative **privilege**. If you run Oracle Database Configuration Assistant from an account that is not part of the Administrators group, then the tool exits without completing the operation.

**Table 5–3** Starting Database Tools from the Start Menu

Tool	Start Menu Path	More Information
Administration Assistant for Windows NT	Start > Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Administration Assistant for Windows NT	"Administering External Users and Roles" in <i>Oracle9i Network, Directory, and Security Guide for Windows</i>
Data Migration Assistant	Start > Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Data Migration Assistant	<i>Oracle9i Database Migration</i>
Database Configuration Assistant	Start > Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Database Configuration Assistant	"Using Oracle Database Configuration Assistant" in <i>Oracle9i Database Administrator's Guide for Windows</i>
Enterprise Login Assistant	Start > Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Enterprise Login Assistant	<i>Oracle Advanced Security Administrator's Guide</i>
Enterprise Manager Configuration Assistant	Start > Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Enterprise Manager Configuration Assistant	<i>Oracle Enterprise Manager Configuration Guide</i>
Enterprise Manager Console	Start > Programs > Oracle - <i>HOME_NAME</i> > Enterprise Manager Console	<i>Oracle Enterprise Manager Administrator's Guide</i>
INTYPE File Assistant	Start > Programs > Oracle - <i>HOME_NAME</i> > Application Development > INTYPE File Assistant	INTYPE File Assistant online help
Locale Builder	Start > Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Locale Builder	<i>Oracle9i Database Globalization Support Guide</i>

**Table 5–3 (Cont.) Starting Database Tools from the Start Menu**

<b>Tool</b>	<b>Start Menu Path</b>	<b>More Information</b>
Microsoft ODBC Administrator	Start > Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Microsoft ODBC Administration	Microsoft ODBC Administration online help
Migration Workbench	Start > Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Migration Workbench	<i>Oracle Migration Workbench Release Notes</i>  <i>Oracle Migration Workbench for MS SQL Server and Sybase Adaptive Server Reference Guide</i>  <i>Oracle Migration Workbench for MS Access Reference Guide</i>
Net Configuration Assistant	Start > Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Net Configuration Assistant	<i>Oracle9i Net Services Administrator's Guide</i>
Net Manager	Start > Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Net Manager	<i>Oracle9i Net Services Administrator's Guide</i>
Oracle Directory Manager	Start > Programs > Oracle - <i>HOME_NAME</i> > Integrated Management Tools > Oracle Directory Manager	<i>Oracle Internet Directory Administrator's Guide</i>
Oracle for Windows NT Performance Monitor	Start > Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Oracle for Windows NT Performance Monitor	<i>Oracle9i Database Administrator's Guide for Windows</i>
Pro*C/C++	Start > Programs > Oracle - <i>HOME_NAME</i> > Application Development > Pro*C/C++	<i>Pro*C/C++ Precompiler Programmer's Guide</i>
SQL*Plus	Start > Programs > Oracle - <i>HOME_NAME</i> > Application Development > SQL*Plus	<i>SQL*Plus User's Guide and Reference</i>  "Starting and Shutting Down a Database with SQL*Plus" in <i>Oracle9i Database Administrator's Guide for Windows</i>
SQL*Plus Worksheet	Start > Programs > Oracle - <i>HOME_NAME</i> > Application Development > SQL*Plus Worksheet  Start > Programs > Oracle - <i>HOME_NAME</i> > Integrated Management Tools > SQL*Plus Worksheet	<i>Oracle Enterprise Manager Administrator's Guide</i>
Start HTTP Server powered by Apache	Start > Programs > Oracle - <i>HOME_NAME</i> > Oracle HTTP Server > Start HTTP Server powered by Apache	<i>ORACLE_BASE\ORACLE_HOME\Apache\Apache\htdocs\index.htm</i>

Table 5–3 (Cont.) Starting Database Tools from the Start Menu

Tool	Start Menu Path	More Information
Stop HTTP Server <i>powered by Apache</i>	Start > Programs > Oracle - <i>HOME_NAME</i> > Oracle HTTP Server > Stop HTTP Server <i>powered by Apache</i>	<i>ORACLE_BASE\ORACLE_HOME\Apache\Apache\htdocs\index.htm</i>
Wallet Manager	Start > Programs > Oracle - <i>HOME_NAME</i> > Integrated Management Tools > Wallet Manager	<i>Oracle Advanced Security Administrator's Guide</i>

Starting Database Tools from the Command Line

Table 5–4 describes how to start Oracle database tools from the command line, and where to go for further information on using these products.

Table 5–4 Starting Database Tools from the Command Line

Tool	Enter at Prompt	More Information
Oracle Enterprise Manager Console	C:\> oemapp console	<i>Oracle Enterprise Manager Administrator's Guide</i>
DBVERIFY	C:\> dbv  DBVERIFY starts and prompts you for a filename parameter. To obtain a list of parameters, enter:  C:\> dbv help=y	<i>Oracle9i Database Utilities</i>
Export Utility <sup>1</sup>	C:\> exp username password  EXP starts and prompts you for parameters. To obtain a list of these parameters, enter:  C:\> exp help=y	<i>Oracle9i Database Utilities</i> for instructions on use of the Export Utility  <i>Oracle9i Database Error Messages</i> for information on error messages
Import Utility <sup>2</sup>	C:\> imp username password  IMP starts and prompts you for parameters. To obtain a list of these parameters, enter:  C:\> imp help=y	<i>Oracle9i Database Utilities</i>  <i>Oracle9i Database Error Messages</i>
Migration Utility	C:\> mig  To obtain a list of parameters, enter:  C:\> mig help=y	<i>Oracle9i Database Migration</i>
OCOPY	C:\> ocopy	"Backing Up Files with the OCOPY Utility" in <i>Oracle9i Database Administrator's Guide for Windows</i>

**Table 5–4 (Cont.) Starting Database Tools from the Command Line**

Tool	Enter at Prompt	More Information
OPERFCFG	C:\> operfcfg	<a href="#">"Modifying Oracle Performance Monitor for Windows NT Parameters"</a> on page 9-20 in this manual
ORADIM	C:\> oradim <i>parameters</i> To get a complete listing of ORADIM parameters, enter: <sup>3</sup> C:\> oradim -?   -h   -help	"Using the ORADIM Utility to Administer an Oracle Instance" in <i>Oracle9i Database Administrator's Guide for Windows</i>
Password Utility (ORAPWD)	C:\> orapwd The password file is hidden. Use Windows Explorer to see it in a file list. Choose View > Options > View > Show All Files	"Creating Password Files" in <i>Oracle9i Database Administrator's Guide for Windows</i>
Recovery Manager (RMAN)	C:\> rman <i>parameters</i>	<i>Oracle9i Database Administrator's Guide for Windows</i> <i>Oracle9i Recovery Manager User's Guide</i>
SQL*Plus (SQLPLUS)	C:\> sqlplus	<i>SQL*Plus User's Guide and Reference</i> "Starting and Shutting Down a Database with SQL*Plus" in <i>Oracle9i Database Administrator's Guide for Windows</i>
SQL*Loader (SQLldr)	C:\> sqlldr SQL*Loader displays a Help screen with the available keywords and default values.	<i>Oracle9i Database Utilities</i> <i>Oracle9i Database Error Messages</i> <a href="#">"Starting Windows Tools"</a> on page 5-15 in this manual
TKPROF	C:\> tkprof	<i>Oracle9i Database Performance Guide and Reference</i>

<sup>1</sup> When running the Export Utility on Windows, the default values for the BUFFER and RECORDLENGTH parameters are 4 KB and 2 KB respectively. This default RECORDLENGTH parameter does not depend on the value of BUFSIZ defined in the system header file. If you specify a value larger than USHRT\_MAX (64 KB), you will get a warning message. The VOLSIZ parameter for the Export Utility is not supported on Windows. To export an entire database, you must use the EXP\_FULL\_DATABASE role.

<sup>2</sup> See footnote 1.

<sup>3</sup> Entering oradim without any options also displays a listing of parameters.

## Starting the Oracle Enterprise Manager Console

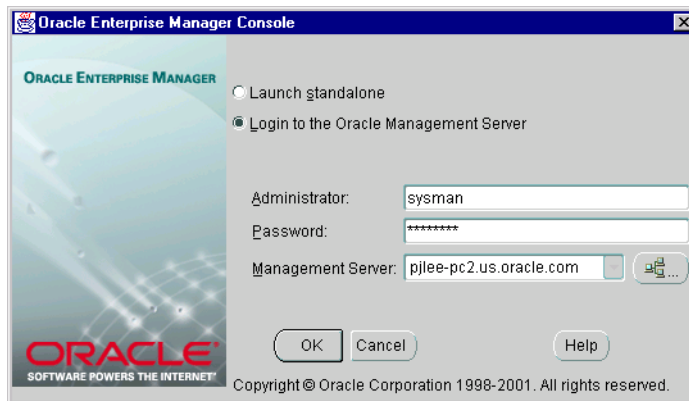
The Oracle Enterprise Manager Console can be started:

- [From the Start Menu or Command Line](#)
- [From a Web Browser](#)

### From the Start Menu or Command Line

- Choose Start > Programs > Oracle - *HOME\_NAME* > Enterprise Manager Console.
- At the command line, enter: `C:\> oemapp console`

You are prompted to choose between logging in to a Management Server or starting in standalone mode.



Choose standalone when you want to connect directly to your database(s) to perform administrative tasks. The first time Enterprise Manager is started in standalone mode, the Add Database To Tree dialog appears, allowing you to add your database(s) to Enterprise Manager's navigation tree. For more information, see "Standalone" in the *Oracle Enterprise Manager Configuration Guide*.

In Standalone mode you will not have access to functionality typically available through the Management Server and Intelligent Agent, however, because they are not required in standalone mode. These unavailable features include:

- Management of several different target types
- Sharing data among several administrators
- Advance warning of potential problems

- Automation of repetitive tasks
- Backup and data management tools
- Reports customization, scheduling, and publishing
- Running the client from a Web browser

These features are all available when you choose to log in to a Management Server, which is automatically installed and configured during standard Oracle9i Database installation types. If you performed a custom database installation, however, you may need to install and configure a Management Server. For installation instructions, see your Oracle9i Database installation guide for Windows. For configuration instructions, see "Configuring and Controlling the Management Server" in the *Oracle Enterprise Manager Configuration Guide*.

If this is your first login to a Management Server, you must enter the default Enterprise Manager administrator name `sysman` and its password `oem_temp`. The Management Server on the node you select or enter must already be configured with the repository you want to access. For more information, see "Configuring the Console When Connected to a Management Server" in the *Oracle Enterprise Manager Configuration Guide*.

### From a Web Browser

The Enterprise Manager Web site component is installed in the `ORACLE_HOME\oem_webstage` directory by default. In addition, the Enterprise Manager Web site automatically installs a preconfigured Oracle HTTP server to act as its Web server.

If you want to use a Web server other than the default preconfigured Oracle HTTP server, you must install and manually configure it. Additional supported Web servers include:

- Oracle Internet Application Server, release 1.0 and higher
  - Apache, release 1.3.9 and higher
  - Microsoft Internet Information Server (IIS), release 4.0 and higher
1. Start your Web browser and enter the following URL regardless of which Web server you have installed.

`http://webserver_hostname:port_number/`

where *webserver\_hostname* is the name of the Web server computer, and *port number* is whatever the Web server is configured for. The port number of the default preconfigured Oracle HTTP Server is 3339.

The Enterprise Manager page appears, allowing you to start the Enterprise Manager Console, view previously published Enterprise Manager reports, or link to other sites.



**ORACLE**  
Enterprise Manager

### Launch the Oracle Enterprise Manager Console

The Enterprise Manager Console allows you to centrally manage and administer your environment. To launch the Console, enter the machine name on which your Oracle Management Server runs and then click the button labeled "Launch Console".

Oracle Management Server:

### Access Oracle Enterprise Manager Reports

Enterprise Manager reports allow users to quickly view and analyze information about their managed systems. To view reports that have been published to the web, enter the machine name on which your Enterprise Manager reporting web server runs and the port on which it listens and then click the button labeled "Access Reports".

Reporting Web Server:  Port:

#### Information

- [Documentation](#)
- [Release Notes](#)
- [Quick Tours](#)

#### Useful Links

- [Oracle Home Page](#)
- [Enterprise Manager Home Page](#)
- [Support Home Page](#)
- [Download Plug-in](#)
- [Accessibility Setup](#)

2. To start the Enterprise Manager Console, enter the name of the Oracle Management Server to which you want to connect and click the button labeled "Launch Console".
3. If you are logging in to Oracle Enterprise Manager for the first time, then type in the default credentials (administrator name and password).



Administrator = sysman

Password = oem\_temp

These credentials are for the default super administrator account. The first time you start Enterprise Manager, you must log in as the super administrator. After other administrator accounts have been created using the super administrator account, you can log in as a different administrator.

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**Note:** Enterprise Manager must be configured before the reports access feature will work. See the *Oracle Enterprise Manager Configuration Guide* for information on:

- Configuration tasks
  - How to connect to an Oracle database
  - Installing the Oracle Enterprise Manager Web Site
  - Installing the Web server
- 
- 

## Starting Windows Tools

[Table 5–5](#) describes how to start each Windows tool and where to go for more information on using these products.

**Table 5–5 Starting Windows Tools**

Tool	Start Procedure	More Information
Event Viewer	Choose Start > Programs > Administrative Tools > Event Viewer	" <a href="#">Event Viewer</a> " on page 5-19 in this manual Your Microsoft operating system documentation
Microsoft Management Console (MMC) <sup>1</sup>	Choose Start > Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Administration Assistant for Windows NT	Your Microsoft operating system documentation
Oracle Performance Monitor for Windows NT	Choose Start > Programs > Oracle - <i>HOME_NAME</i> > Configuration and Migration Tools > Oracle for Windows NT Performance Monitor	"Using Oracle Performance Monitor for Windows NT" in <i>Oracle9i Database Administrator's Guide for Windows</i> Your Microsoft operating system documentation

**Table 5–5 (Cont.) Starting Windows Tools**

Tool	Start Procedure	More Information
Registry Editor	At the MS-DOS command prompt on Windows NT and 2000, enter:  C:\> regedt32  At the MS-DOS command prompt on Windows 95 and 98, enter:  C:\> regedit	"Registry Editor" on page 5-21 in this manual <a href="#">Chapter 9, "Configuration Parameters and the Registry"</a>  Your Microsoft operating system documentation
Task Manager	Right-click the Task Bar	"Task Manager" on page 5-22 in this manual  Your Microsoft operating system documentation
User Manager	Choose Start > Programs > Administrative Tools > User Manager	"User Manager" on page 5-22 in this manual  "Authenticating Database Users with Windows" in <i>Oracle9i Network, Directory, and Security Guide for Windows</i>  Your Microsoft operating system documentation

<sup>1</sup> MMC is started whenever the Oracle Administration Assistant for Windows NT is started.

## Using SQL\*Loader

This section describes Windows-specific information for using SQL\*Loader (SQLLDR).

### Windows Processing Options

This section discusses the possible values for the Operating System Dependent (OSD) file processing specifications string option, referred to in the "SQL\*Loader Control File Reference" chapter of *Oracle9i Database Utilities*.

#### Default (No Processing Option) or "str terminator\_string"

Stream record format in which each record is terminated by a record terminator. If "str terminator\_string" is not specified, then the record terminator defaults to either the Windows NT-style record terminator (the two-character sequence carriage return, \r, followed by line feed, \n) or the UNIX-style record terminator (single-character line feed, \n). The maximum record size is 48 KB.

When processing stream format data files, SQL\*Loader can usually recognize record terminators automatically, whether they are Windows NT-style or UNIX-style. So you usually do not need to specify which record terminator you are using.

For external table loads on NT, however, only the Windows NT-style record terminators are recognized automatically. If your data file contains UNIX-style record terminators, you must specify the record terminator. If you are using SQL\*Loader (with the `external_table` option), then specify the UNIX-style record terminator by specifying `"str '\n'"` on the INFILE line in the SQL\*Loader control file. For example:

```
INFILE mydata.dat "str '\n'"
```

You can also specify the record terminator in hex, by specifying `"str x'0a'"` (assuming an ASCII-based character set). For example:

```
INFILE mydata.dat "str x'0a'"
```

Note that the "0" (zero) before the "a" is required. If you are using SQL with an access parameter list to create the external table, then you must specify `'\n'` in a `RECORDS DELIMITED BY` clause. For example:

```
RECORDS DELIMITED BY '\n'
```

You can also use a hex string in this case. For example:

```
RECORDS DELIMITED BY 0x'0a'
```

Note that in this case, the "0" (zero) before the "x" and the "0" (zero) before the "a" are both required.

## "FIX *n*"

Fixed record format in which each record is exactly *n* bytes long. Record terminators are not required with fixed record format. If the record includes a record terminator, then the record terminator bytes are included in the number of bytes *n*.

## "VAR *n*"

Variable record format in which the length of each record in a character field is included at the beginning of each record in the datafile. Record terminators are not required with the variable record format. This format provides some added flexibility over the fixed record format and a performance advantage over the stream record format. You can specify a datafile that is to be interpreted as being in variable record format as follows:

```
INFILE "mydata.dat" "var n"
```

In this example, *n* specifies the number of bytes in the record length field. If *n* is not specified, SQL\*Loader assumes a length of 5 bytes. Specifying *n* larger than 40 will result in an error. Lengths are always interpreted in bytes, even if character-length semantics are in effect for the file. This is necessary because the file could contain a mix of fields, some processed with character-length semantics and others processed with byte-length semantics.

## Case Study Files

The distribution media for SQL\*Loader contains case study files for **control files**, **datafiles**, and **setup files** in `ulcase1, . . . ulcase11` in the following directory:  
`Oracle_Home\rdbms\demo.`

## Specifying the Bad File

When SQL\*Loader executes, it can create a file called a bad file or reject file in which it places records that were rejected because of formatting errors or because they caused Oracle errors. If you have specified that a bad file is to be created, it overwrites any existing file with the same name; ensure that you do not overwrite a file you wish to retain.

## Control File Conventions

When preparing SQL\*Loader control files (`.ctl`), you must follow certain syntax and notational conventions.

In full path descriptions, backslashes do not require escape characters or other special treatment. When embedding a single or double quotation mark inside a string delimited by double quotation marks, place a backslash escape character before the embedded quotation mark.

When specifying datatypes in the SQL\*Loader control file, note that the default sizes of native datatypes shown in [Table 5–6](#) are specific to Windows. These datatypes can be loaded with correct results only between systems where they have the same length in bytes. You cannot override these defaults in the control file. If the byte order is different between the systems, you can indicate the byte order of the data with the `BYTEORDER` parameter, or you can place a byte-order mark (BOM) in the file.

**Table 5–6** *Default Sizes of Native Datatypes*

Native Datatypes	Default Field Length
DOUBLE	8
FLOAT	4
INTEGER <sup>1</sup>	4
SMALLINT	2

<sup>1</sup> The default listed is correct if INTEGER is specified without a size. But INTEGER(n) is also allowed. In that case, n specifies the size of the INTEGER field in bytes.

**See Also:** *Oracle9i Database Utilities* for a complete list of options and instructions on using SQL\*Loader

## Using Windows Tools

The following Windows tools can be used to administer an Oracle database:

- [Event Viewer](#)
- [Microsoft Management Console](#)
- [Oracle Performance Monitor for Windows NT](#)
- [Registry Editor](#)
- [Task Manager](#)
- [User Manager](#)

## Event Viewer

Event Viewer lets you monitor events in your system. An event is an important occurrence in the system or application (such as your Oracle database) that requires user notification. While messages for major events can appear on-screen as you work at your computer, events not requiring your immediate attention are recorded by Windows in the Event Viewer log file. You can then view this information at your convenience.

Event Viewer can be used to monitor Oracle database events, such as:

- Initialization of the [System Global Area](#) for the active [instance](#)

- Initialization of the Program Global Area (PGA) for the background processes of the active instance
- Connection to the Oracle database using `AS SYSDBA`

In addition, the operating system audit trail is logged to Event Viewer.

**See Also:** "Monitoring a Database" in *Oracle9i Database Administrator's Guide for Windows* for specific instructions on accessing and using Event Viewer to monitor Oracle database events

## Microsoft Management Console

The Microsoft Management Console provides a central location for network administration. The Microsoft Management Console hosts applications (called **snap-ins**) that administrators can use to manage their networks. The Oracle snap-ins enable database administrators to:

- Configure Oracle database administrators, operators, users, and roles so the Windows operating system can **authenticate** them
- Configure `OracleServiceSID`
- Modify **registry** parameters for all Oracle homes on the computer
- Modify the computer hostname, **username**, and password for the database being monitored by the Oracle Performance Monitor for Windows NT
- View and terminate an Oracle **thread**

## Oracle Performance Monitor for Windows NT

Oracle Performance Monitor for Windows NT is integrated into Microsoft's Performance Monitor. This tool enables you to view the performance of processors, memory, cache, threads, and processes. Performance information provided includes device usage, queue lengths, delays, throughput measurements, and internal congestion measurements. This information is provided in the form of charts, alerts, and reports.

You can use Oracle Performance Monitor to monitor key Oracle database information, such as:

- Library cache
- Buffer cache

- Data dictionary cache
- Redo log buffer cache
- Thread activity

You can use your findings to improve database performance.

**See Also:** "Using Oracle Performance Monitor for Windows NT" in *Oracle9i Database Administrator's Guide for Windows* for specific instructions on accessing and using the Oracle Performance Monitor to monitor Oracle database performance

## Registry Editor

The Oracle9i database stores its configuration information in a structure known as the registry. You can view and modify this configuration information through the Registry Editor. The registry contains configuration information for your computer and must not be accessible for editing by inexperienced users. Only experienced administrators should view and change this information.

The Registry Editor displays configuration information in a format similar to Windows Explorer. In the left-hand window is a tree-like format consisting of keys (or folders). When one of these keys is highlighted, the parameters and values assigned to that key are displayed in the right-hand window.

When you install products from your CD-ROM, configuration parameters are automatically entered in the registry. These parameters are read each time your Windows computer is restarted and whenever an Oracle product is started. These parameters include settings for:

- Oracle home directory
- Language
- Company name
- Oracle home subdirectories for individual products
- Individual products such as SQL\*Plus
- Services

**See Also:** [Chapter 9, "Configuration Parameters and the Registry"](#) for definitions of Oracle database configuration parameters and specific instructions on using the registry to modify Oracle database configuration parameters

## Task Manager

Task Manager has three display options:

- **Applications:** Displays what applications are running. This is useful for identifying and ending unresponsive tasks. (Oracle does not appear as an application because it runs as a service.)
- **Processes:** Displays details of currently running processes and their resource usage. The columns are customizable.
- **Performance:** Graphically displays real-time CPU and memory usage, which is useful for spotting sudden changes.

## User Manager

User Manager enables you to manage Windows computer security and create user accounts on Windows NT. With User Manager, you can:

- Grant Oracle database roles
- Use operating system authentication for user accounts (For example, you can grant DBA access to an NT user.)
- Create an NT user account that enables you to make secure client connections to the Oracle9i database without a password

**See Also:** "Manually Administering External Users and Roles" in *Oracle9i Network, Directory, and Security Guide for Windows* for specific instructions on using User Manager to perform Oracle database administration



## Optional Windows Diagnostic and Tuning Utilities

The Windows NT Resource Kit includes several diagnostic and tuning utilities.

**QuickSlice:** Provides a quick overview of what is occurring on the system, using a graphical user interface.

- Distinguishes between time spent in user mode and kernel mode
- Low overhead on the system (unlike Performance Monitor)
- Shows a continuous display, rather than just a **snapshot**
- You can double-click a **process** to open a window with more details

**Process Viewer:** Summarizes resource usage by a process.

**Process Explode:** Provides a detailed display of resource usage by a process.

**Task List:** Displays resource usage and other details of a process when its processor identifier or process name is given as an argument. This tool also displays a list of executables and DLLs associated with a process.

### See Also:

- "Administering a Database" in *Oracle9i Database Administrator's Guide for Windows* for OracleServiceSID configuration tasks
- "Authenticating Database Users with Windows" in *Oracle9i Network, Directory, and Security Guide for Windows* for authentication tasks
- "Monitoring a Database" in *Oracle9i Database Administrator's Guide for Windows* for thread management tasks
- [Chapter 3, "Using Oracle9i on Windows 2000"](#)
- [Chapter 9, "Configuration Parameters and the Registry"](#) in this manual, and "Monitoring a Database" in *Oracle9i Database Administrator's Guide for Windows* for Oracle Performance Monitor for Windows NT tasks
- Your Oracle9i Database installation guide for Windows for the components available for installation



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# Multiple Oracle Homes and Optimal Flexible Architecture

This chapter describes the concepts of **multiple Oracle homes** and **Optimal Flexible Architecture** for Oracle9i for Windows.

This chapter contains these topics:

- Introduction to Multiple Oracle Homes and OFA
- Multiple Oracle Homes Overview
- Changing the Value of PATH
- Exiting Oracle Universal Installer After Entering Name and PATH
- Setting Variables in the Environment or the Registry
- Optimal Flexible Architecture Overview
- Differences Between Directory Trees by Release
- OFA Directory Naming Conventions
- OFA and Multiple Oracle Home Configurations
- Increasing Reliability and Performance
- Comparison Between OFA on Windows NT and UNIX

## Introduction to Multiple Oracle Homes and OFA

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

- Structured organization of directories and files and the consistent naming used 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 versions of application software can execute concurrently.
- Software upgrades can be tested in an Oracle home in a separate directory from the Oracle home where your production database is located.

## Multiple Oracle Homes Overview

This section includes the following topics:

- [What Is an Oracle Home?](#)
- [Benefit of Using Multiple Oracle Homes](#)
- [Multiple Oracle Home Functionality in Different Releases](#)
- [One-Listener Support of Multiple Oracle Homes](#)
- [Multiple Oracle Home Environments](#)

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**Note:** All Oracle7 products and all Oracle8 release 8.0.3 products are non-multiple Oracle home products. Your Oracle9i Database installation guide for Windows has a list of products supporting single or multiple Oracle homes.

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## What Is an Oracle Home?

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

- Location of installed product files (for example, `C:\orant` or `C:\oracle\ora90`)
- `PATH` variable pointing to the binary files of installed products
- Registry entries
- Service names
- Program groups

Oracle homes also have a name associated with them, which you specify along with their location during installation.

## Benefit of Using Multiple Oracle Homes

The main benefit of using multiple Oracle homes is that you can run multiple releases of the same products concurrently. For example, you can test an Oracle9i release 1 (9.0.1) database patch before you run your production database Oracle9i release 1 (9.0.1) against it.

## Multiple Oracle Home Functionality in Different Releases

Modifications to multiple Oracle home functionality have occurred since it was introduced in Oracle8 release 8.0.4. This section helps you determine the capabilities of your Oracle home depending on the release you are using.

### Oracle8 Releases Before 8.0.4

Releases of Oracle for Windows NT and Windows 95 prior to Oracle8 release 8.0.4 support only single Oracle homes, allowing you to install and run Oracle products in a single Oracle home. Different releases of Oracle products can be installed in the same Oracle home *provided* they have different first or second-digit release numbers. For example, you can install Oracle7 release 7.2 products and Oracle7 release 7.3 products or Oracle7 release 7.x and Oracle8 release 8.x products in the same Oracle home. However, you cannot install multiple third-digit releases of the same products. For example, you cannot install Oracle7 release 7.3.2 and Oracle7 release 7.3.3 products on the same computer; one installation will overwrite the other.

### Oracle8 Releases 8.0.4 to 8.0.6

You can install one or more releases of Oracle products in multiple Oracle homes. For example, with multiple Oracle homes, you can install Oracle8 release 8.0.x and Oracle8i release 8.1.3 products or Oracle7 release 7.x and Oracle8 release 8.0.x products in different Oracle homes on the same computer.

You can also install different releases of Oracle products in the same Oracle home provided they have different first or second-digit release numbers. For example, you can install Oracle7 release 7.2 products and Oracle8 release 8.0.x products in the same Oracle home.

### Oracle8i Release 8.1.3 to Oracle9i Release 1 (9.0.1)

These releases have the same multiple Oracle home functionality as Oracle8 releases 8.0.4 to 8.0.6, but the following restrictions apply:

- You cannot install any release from Oracle8i release 8.1.3 to Oracle9i release 1 (9.0.1) into an Oracle home that was created using the old installer. (The old installer was called Oracle Installer and was used for installations before Oracle8i release 8.1.3; the new Java-based installer is called Oracle Universal Installer.)
- You cannot install releases prior to Oracle8i release 8.1.3 into an Oracle home that was created by any release from Oracle8i release 8.1.3 to Oracle9i release 1 (9.0.1).
- Releases from Oracle8i release 8.1.3 to Oracle9i release 1 (9.0.1) must be installed in separate Oracle homes. You cannot have more than one release installed in each Oracle home.

### Oracle8i Release 8.1.5 to Oracle9i Release 1 (9.0.1)

You can use an Oracle9i release 1 (9.0.1) [listener](#) to spawn a connection to a database from Oracle9i release 1 (9.0.1), Oracle8i release 8.1.x, Oracle8 release 8.0.x, or Oracle7 release 7.3.x. Some restrictions apply, however, in using Oracle9i release 1 (9.0.1) listeners with the earlier releases of the database:

- You should enable process mode [external procedures](#) for Oracle9i release 1 (9.0.1) if you want to spawn a connection to a Oracle8 release 8.0.3 database.
- You must install the Oracle8 release 8.0.4.0.3 (or later) patch for [Oracle Net](#).
- You cannot enable shared sockets.

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**WARNING:** Multiple Oracle homes functionality works only with Oracle8 releases 8.0.4 and later. For example, if you have Oracle7 release 7.3.3 products already installed on your computer, then it does not work. You cannot install Oracle7 release 7.3.4 products in a separate Oracle home.

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## One-Listener Support of Multiple Oracle Homes

You can use one listener for spawning connections to databases for multiple Oracle homes. Simply add each **system identifier** to the `SID_LIST` section in the `ORACLE_BASE\ORACLE_HOME\network\admin\listener.ora` file.

Because the SID is unique to a system across different Oracle homes, the listener can spawn the database **thread** for a specific SID in the correct Oracle home, and the `ORACLE_HOME` parameter (used in UNIX environments only) is not needed in the `listener.ora` file.

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**Note:** There may be multiple `listener.ora` files on your computer, one for each Oracle home. To ensure that you use the correct `listener.ora` file, check the Oracle home name in the listener service. See "Managing Oracle Services" in *Oracle9i Database Administrator's Guide for Windows* for information on verifying service names.

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## Multiple Oracle Home Environments

This section describes the differences among multiple Oracle home environments since they were first introduced in Oracle8 release 8.0.4.

### Oracle Home Environments in Oracle8 Releases 8.0.4 and Later 8.0.x

If you have Oracle8 release 8.0.4 or later 8.0.x Oracle homes on your computer, then note the differences in [Table 6-1](#) between the first Oracle home you installed and more recent Oracle homes you may install.

**Table 6–1    Oracle Home Environments in Oracle8 Releases 8.0.4 and Later 8.0.x**

Element	First Oracle Home	Each Additional Oracle Home
Service Names	OracleTNSListener80	OracleHOME_NAMETNSListener80 Oracle home name included in service names.
Program Groups	Oracle for Windows NT	Oracle for Windows - HOME_NAME Oracle home name appended to the program group.
Registry Entries	Located in HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE	Subkeys for each Oracle home are added below the HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE subkey (HOME0, HOME1, HOME2, and so on). For more information on the <a href="#">registry</a> keys and subkeys, see <a href="#">Chapter 9, "Configuration Parameters and the Registry"</a> in this manual.
System Identifier (SID) name for starter database	Automatically named ORCL	Only the first <a href="#">starter database</a> on your computer is called ORCL. Additional starter databases use the naming convention ORCx or ORxx where x is a number appended to ensure the SID is unique.

**Oracle Home Environments in Oracle8i Releases 8.1.3, 8.1.4, and 8.1.5**

Oracle8i release 8.1.3, 8.1.4, and 8.1.5 Oracle homes are slightly different from Oracle homes before Oracle8i release 8.1.3. [Table 6–2](#) displays those differences.

**Table 6–2    Oracle Home Environments in Oracle 8i Releases 8.1.3, 8.1.4, and 8.1.5**

Element	First Oracle Home	Each Additional Oracle Home
Service Names	OracleHOME_NAMETNSListener	OracleHOME_NAMETNSListener
Program Groups	Oracle - HOME_NAME	Oracle - HOME_NAME
Registry Entries	Located in HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\HOME0	Subkeys for each Oracle home are added in the HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE subkey. For example, the next subkeys after HOME0 are HOME1, HOME2, HOME3, and so on. For more information on the registry keys and subkeys, see <a href="#">Chapter 9, "Configuration Parameters and the Registry"</a> in this manual.
System Identifier (SID) <sup>1</sup> name and DB_NAME	Automatically named ORCL for Oracle8i releases 8.1.3 and 8.1.4.	For Oracle8i releases 8.1.3 and 8.1.4, the second database you create on your computer has a SID of ORCL0. For Oracle8i release 8.1.5 and onwards, you must type in the global database name and SID name of your choice when prompted during installation.

<sup>1</sup> For Oracle8i releases 8.1.3 through 9.0, the SID can be a maximum of 64 alphanumeric characters in length. For all Oracle for Windows releases prior to 8.1.3, the SID is a maximum of 4 alphanumeric characters.



## Changing the Value of PATH

Unless you specify otherwise at installation time, the Oracle home in which you installed products most recently is the first directory listed in your `PATH` (primary home). As such, it has priority over the other Oracle home entries in your `PATH`.

If you start a product from the MS-DOS command prompt, then the release of the product started is the one in the Oracle home listed first in your `PATH`, unless you specifically start a different release of the product by one of the following methods:

- Specifying the full directory path name to the release of the product you want to use at the MS-DOS command prompt
- Changing to the directory that contains the executable you want to use
- Changing your `PATH` so that the first entry points to the binary files for the product release you want to use

You can change the value of `PATH` by using one of the following methods:

- [Using Oracle Home Selector](#)
- [At the System Level on Windows NT](#)

You can assign a new value at the system level. The new value exists until you change the value of `PATH` again.

- [At the MS-DOS Command Prompt](#)

You can assign a new value at the MS-DOS command prompt. The new value reverts to its previous value when you quit the session.

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**Note:** The first two methods of changing the value of `PATH` are only valid if you are a member of the Administrators group. After you have changed the value of `PATH`, you must open a new MS-DOS command prompt window to make it active. The change is not reflected in already-opened windows.

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## Using Oracle Home Selector

Oracle Home Selector is a graphical user interface tool that enables you to edit your environment path to make an appropriate Oracle home directory your primary home. This tool can be used only when you have multiple, active Oracle home directories on a single computer.

1. Choose Start > Programs > Oracle Installation Products > Home Selector.  
The *Oracle Home Selector* window appears.
2. Select the Oracle home that you want as the primary Oracle home from the drop-down list.
3. Click OK.

## At the System Level on Windows NT

1. Choose Start > Settings > Control Panel.  
The *Control Panel* window appears.
2. Double-click the System icon.  
The *System Properties* window appears.
3. Click the *Environment* tab.  
The system variables appear.
4. Edit the value of PATH in the Value field and choose Set.
5. Click OK.

## At the System Level on Windows 95 or 98

1. Open the `autoexec.bat` file.
2. Edit the value of the PATH statement.
3. Restart your computer.

In some cases on Windows 95 and Windows 98, the Oracle Home Selector fails to switch the entries in the `PATH` environment variable as desired. This occurs where the `PATH` is defined in multiple places in the file `autoexec.bat`.

For example, if the following lines exist in `autoexec.bat`:

```
PATH C:\windows
PATH D:\oracle\ora817;D:\oracle\ora816;%PATH%
```

then an attempt to switch the order of `D:\oracle\ora817` with `D:\oracle\ora816` in the `PATH` using Oracle Home Selector fails.

To work around this limitation, modify `autoexec.bat` so that the `PATH` is defined in one location in the file. Using the previous example, modify `autoexec.bat` to read:

```
PATH D:\oracle\ora817;D:\oracle\ora816;C:\windows
```

If you then attempt to use Oracle Home Selector to switch the order of Oracle homes in the `PATH`, it will succeed.

## At the MS-DOS Command Prompt

At the MS-DOS command prompt, enter:

```
C:\> set PATH=PATHNAME;%PATH%
```

where `PATHNAME` is the full path to the binary files for the products you want to use. This change is valid for the current session only. If you want to change the value of your `PATH` permanently, then use Oracle Home Selector or change the value of `PATH` at the system level. Both methods are described earlier in this section.

## Exiting Oracle Universal Installer After Entering Name and PATH

If you have to exit Oracle Universal Installer unexpectedly after you have entered the name and path for an Oracle home (for example, because there is no more disk space in the path you specified), then you cannot specify a different path until you delete the `HOMEID` key and the `IDx` key corresponding to that Oracle home from the registry. To do this:

1. Read the value of the `ORACLE_HOME_NAME` parameter for each `HOMEID` subkey in the `HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE` key until you find the value that matches the name of the Oracle home you must delete.
2. Delete the `HOMEID` subkey you just located.
3. Delete the appropriate `IDx` subkey in the `HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\ALL_HOMES` key, where `x` has the same value as the `ID` in `HOMEID`. For example, if the `HOMEID` subkey for the home name you want to delete is `HOME1`, then the appropriate `IDx` subkey is `ID1`.

**See Also:** [Chapter 9, "Configuration Parameters and the Registry"](#) in this manual for more information on the registry keys and subkeys

## Setting Variables in the Environment or the Registry

Variables set in the environment always override the value of equivalent variables set in the registry. The following section describes the consequences of setting two of the most commonly-used environment variables, `ORACLE_HOME` and `TNS_ADMIN`.

### ORACLE\_HOME

Oracle Corporation recommends that you *never* set the `ORACLE_HOME` environment variable, because it is not required for Oracle products to function properly. If you set the `ORACLE_HOME` environment variable, then Oracle Universal Installer will unset it for you. Oracle products find the value of `ORACLE_HOME` at the location specified by the `ORACLE_BASE\ORACLE_HOME\bin\oracle.key` file. If you must set `ORACLE_HOME` in the environment for another reason, then you must take care to run software only from that Oracle home when the variable is set.

When you run an Oracle application from the MS-DOS command prompt, the first executable by that name found in the directory path runs. For example, `C:\>`

`sqlplus`. Alternately, if you specify a full directory path, then the specified application runs. For example, `C:\oracle\ora82> sqlplus`.

If you modify the value of `PATH` using any of the four methods described in the previous section, then you can choose which release of an application is run from the MS-DOS command prompt. In sum, modifying the value of `PATH` indicates from which Oracle home to run executables at the MS-DOS command prompt, when no full directory path is specified.

Once an Oracle application starts, it looks for all environment variables first in the current environment and second in the registry key for the Oracle home from which the application is running.

The application knows where it is running from by calling Windows to obtain the executable's path name and then parsing the path name to get the directory from which it is running. In the `ORACLE_BASE\ORACLE_HOME\bin` directory where the executable resides, there is a file called `oracle.key`. This file specifies where in the registry to look for variables when applications from that particular Oracle home are run.

For example, if you run `C:\oracle\ora82\bin\sqlplus.exe`, then `sqlplus.exe` looks in `C:\oracle\ora82\bin\oracle.key` to find out where to look for its registry variables. If the `oracle.key` file does not exist (for version 7 and some version 8 Oracle homes), then Oracle uses `HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE` to locate the registry variables.

In a typical case, there are no Oracle variables (that is, `ORACLE_HOME`) set in the environment. Any applications run from an Oracle8 release 8.0.5 or later Oracle home look in the `oracle.key` file in that Oracle home and find their variables (including `ORACLE_HOME`) in the correct registry key. Likewise for Oracle9i release 1 (9.0.1), the Oracle home that gets priority depends on the `PATH`, but regardless of the `PATH` setting, all the software works correctly.

## Consequences of Setting `ORACLE_HOME`

If you set `ORACLE_HOME` in the environment, then software run from another Oracle home will not work reliably. The conflict occurs when you set `ORACLE_HOME` to point to one Oracle home directory, then attempt to run applications from a second Oracle home. These applications first check for any environment variable settings (such as `ORACLE_HOME`), before checking the registry through the `oracle.key` file. Because `ORACLE_HOME` is set, the applications in the second Oracle home attempt to use files in the first Oracle home, causing a conflict.

For example, suppose you have Oracle8 release 8.0.5 installed in `C:\orant` and Oracle9i release 1 (9.0.1) installed in `C:\oracle\ora90`. Suppose further that `ORACLE_HOME` is set to `C:\orant` in the environment. If you run an application from `C:\oracle\ora90\bin`, then that application first looks in the environment for all variables *before* looking at its `oracle.key` file. So an application run from your Oracle9i release 1 (9.0.1) Oracle home runs with `ORACLE_HOME=C:\orant`. Therefore, anything that the application uses `ORACLE_HOME` for will be looked for in `C:\orant`, where it may not exist. Examples include message files (`*.msb`), SQL scripts (`.sql`), and any other files opened by the application and based off `ORACLE_HOME`.

Note that the same behavior occurs on UNIX. If you run an application from Oracle home number 1 with `ORACLE_HOME=OracleHome number 2` in the environment, then the same behavior can be observed.

## TNS\_ADMIN

Oracle software looks for `TNS_ADMIN` in one location in the registry (depending upon the type of Oracle home installed). If you installed software into the default Oracle home, then any software running from that Oracle home will look in `HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE`. If you installed a new-style (8.0.4 or later) multiple Oracle home, then the Oracle software looks in `HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\HOMEID`. (The `ALL_HOMES` key is used by the installer and plays no role when translating variables.)

The environment always overrides the registry, so if `TNS_ADMIN` is set in the environment, then that takes precedence over the `TNS_ADMIN` setting in the registry. No variables should be set in the environment by the Oracle Home Selector except for the `PATH`.

## Optimal Flexible Architecture Overview

Oracle Optimal Flexible Architecture (OFA) is a set of file naming and placement guidelines for Oracle software and databases. It can also be thought of as a set of *good habits* to adopt when organizing Oracle directories and files on your computer. All Oracle products on CD-ROM are OFA-compliant; that is, Oracle Universal Installer places Oracle products in directory locations that follow the OFA guidelines. Although using OFA is not a requirement, Oracle Corporation recommends that you use it if your database will grow in size, or if you plan to have multiple databases.

The aim of OFA is to prevent an entire class of problems that can occur when you have different releases of Oracle software and multiple, growing databases on your computer. OFA is designed to provide significant benefits:

- Easier maintenance of Oracle software and databases through standard file organization
- Greater reliability through data spanning multiple physical drives
- Higher performance through decreased I/O contention for disks

For example, Oracle Universal Installer now separates Oracle software executables from database files. Previously, database files were placed in `ORACLE_HOME\database`, a subdirectory of the Oracle home directory that also contained Oracle software.

Using OFA, Oracle Universal Installer puts Oracle software in `ORACLE_BASE\ORACLE_HOME` and database files in `ORACLE_BASE\oradata`. Now when you upgrade a database to the latest release, the new Oracle software executables will be placed in a different Oracle home directory. After you judge the upgrade successful, you can easily remove the old Oracle home directory and reclaim space, because the database does not reside there.

## Benefits of an OFA-Compliant Database

An OFA-compliant database has the following benefits:

- Easier database administration and management of database growth  
The file system organization simplifies locating specific database files and adding database files as the database grows.
- Fewer performance bottlenecks  
Disk contention decreases, because Oracle administration files, binary files, and datafiles that used to be on one disk can now reside in separate directories on separate disks.
- Safeguards against disk failures  
By spreading files across more than one disk, disk failures impact as little data as possible.
- Support for concurrent execution of application software  
Multiple releases of application software can run simultaneously, enabling testing and use of a new release of an application before abandoning the

previous release. Transferring to a new release after an upgrade is simple for the database administrator and transparent for the user.

## Characteristics of an OFA-Compliant Database

An OFA-compliant database has the following characteristics:

- Independent subdirectories

Categories of files are separated into independent subdirectories so that files in one category are minimally affected by operations on files in other categories.

- Consistent naming conventions for database files

Database files are easily distinguishable from all other files. Files of one database are easily distinguishable from files of another database. Datafiles, **redo log files**, and **control files** are easily identifiable. Datafiles are clearly associated with a particular **tablespace**.

- Integrity of Oracle home directories

You can add, move, or delete Oracle home directories without having to revise applications that refer to them.

- Separation of administrative information for each database

The ability to distinguish administrative information about one database from that of another ensures a reasonable structure for the organization and storage of administrative data.

- Separation of tablespace contents

Tablespace free space fragmentation and I/O request contention are minimized, while administrative flexibility is maximized.

- Tuning I/O loads across all disks

I/O loads are tuned across all disks, including disks storing Oracle data in raw devices, if needed.



## Differences Between Directory Trees by Release

OFA has necessitated changes to the Oracle database directory tree. This section lists the differences.

### Top-Level Oracle Directory

When you install an Oracle8i release 8.1.3 or earlier release, all subdirectories are located under a top-level `ORACLE_HOME` directory that by default is `C:\orant`.

When you install an Oracle8i release 8.1.4 or later OFA-compliant database, all subdirectories are no longer under a top-level `ORACLE_HOME` directory. There is now a new top-level directory called **ORACLE\_BASE** that is of the form `X:\oracle` where `X` is any hard drive. If you install an OFA-compliant database using Oracle Universal Installer defaults, then `ORACLE_BASE` is `C:\oracle`.

`ORACLE_BASE` contains `\ORACLE_HOME` directories, `\oradata` directories (for database files), and `\admin` directories (for database administration files).

### Database Filenames

In Oracle8i release 8.1.3 and earlier releases, database files have the SID in the database filename. For example, the first control file is named `ctl1SID.ora`.

Beginning with Oracle8i release 8.1.4, database files no longer have the SID in the database filename. For example, the first control file is named `control01.ctl`. There is no need for the presence of the SID in the filename, because all the database files for a particular database are placed in `\oradata` under a directory called `DB_NAME` that is named for that database.

### Database Filename Extensions

In Oracle8i release 8.1.3 and earlier releases, all database files have the same `.ORA` extension.

In an OFA-compliant release, the convention of having `.ora` as the filename extension for database files is no longer used. Database filenames now have more meaningful extensions. These are:

- `.ctl` for control files,
- `.log` for log files
- `.dbf` for datafiles.

## OFA Directory Naming Conventions

OFA 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 the top-level directories of an OFA-compliant database directory tree:

- [ORACLE\\_BASE Directory](#)
- [ORACLE\\_HOME Directory](#)
- [ADMIN Directory](#)
- [ORADATA Directory](#)
- [DB\\_NAME Directory](#)

### *ORACLE\_BASE* Directory

*ORACLE\_BASE* is the root of the Oracle directory tree. If you install an OFA-compliant database using Oracle Universal Installer defaults, then *ORACLE\_BASE* is `X:\oracle` where `X` is any hard drive. For example, `C:\oracle`.

If you are installing Oracle9i for Windows on a computer with no other Oracle software installed, then you can change *ORACLE\_BASE* before running Oracle Universal Installer. Most users will 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 will be a conflict of Oracle base directories. If you create another *ORACLE\_BASE* when the original *ORACLE\_BASE* already exists, then certain tools and the database will not be able to find previously created files. They will look for them in the new *ORACLE\_BASE* instead of the original *ORACLE\_BASE*.

#### Changing *ORACLE\_BASE* at the System Level on Windows NT:

1. Choose Start > Settings > Control Panel.

The *Control Panel* window appears.

2. Double-click the System icon.

The *System Properties* window appears.

3. Click the *Environment* tab.

The System Variables appear.

4. Select *ORACLE\_BASE*.
5. Type a new value for *ORACLE\_BASE* in the Value text box, then click OK to exit.

### Changing *ORACLE\_BASE* at the System Level on Windows 95 or 98:

1. Open the `autoexec.bat` file, using a text editor.
2. Edit the value of the *ORACLE\_BASE* statement.
3. Restart your computer.

---

**Note:** An *ORACLE\_BASE* registry key exists for every Oracle home. Ideally, the value of the *ORACLE\_BASE* registry key will be identical for each Oracle home.

---

## *ORACLE\_HOME* Directory

The *\ORACLE\_HOME* directory is located beneath `X:\ORACLE_BASE` and contains subdirectories for Oracle software executables and network files.

If you install Oracle9i for Windows on a computer with no other Oracle software installed and you use the default settings, then the first Oracle home directory that you create is called `\ora90`.

## ADMIN Directory

Database administration files are stored in subdirectories of *ORACLE\_BASE* `\admin\DB_NAME`. The names and brief descriptions of some of these subdirectories are:

<code>\bdump</code>	--background process trace files
<code>\cdump</code>	--core dump files
<code>\create</code>	--database creation files
<code>\exp</code>	--database export files
<code>\pfile</code>	--initialization parameter files
<code>\udump</code>	--user SQL trace files

## ORADATA Directory

Database files are stored in *ORACLE\_BASE\ORADATA\DB\_NAME*. The names and brief descriptions of these files are:

control01.ctl	--control file 1
control02.ctl	--control file 2
control03.ctl	--control file 3
oemrep03.dbf	--Oracle Enterprise Manager repository tablespace datafile
system01.dbf	--SYSTEM tablespace datafile
rbs01.dbf	--RBS tablespace datafile
indx01.dbf	--INDEX tablespace datafile
temp01.dbf	--TEMP tablespace datafile
users01.dbf	--USERS tablespace datafile
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 only on UNIX platforms. See ["Support for Symbolic Links on Windows NT"](#) on page 6-25 in this manual.

---

## DB\_NAME Directory

*DB\_NAME* is the unique name for a particular database and has the same value as the *DB\_NAME* parameter in the [initialization parameter file \(init.ora\)](#). When you create a database, *DB\_NAME* can be no more than eight characters long and can contain only the following characters:

- Alphabetic characters
- Numbers
- Underscores ( \_ )
- Pound sign ( # )
- Dollar sign ( \$ )

## OFA and Multiple Oracle Home Configurations

The following sections describe various OFA and multiple Oracle homes configurations.

## Specifying an *ORACLE\_HOME* Directory

To install an OFA-compliant database, you must specify an Oracle home directory in the *Path:* field of Oracle Universal Installer. It is of the form:

```
X:\[PATHNAME]\oracle\HOME_NAME
```

where:

- X:\ is any hard drive. For example, C:\
- [PATHNAME] is an optional directory path name
- \oracle is a mandatory directory path name, unless you changed the value of the ORACLE\_BASE registry key before performing the installation
- HOME\_NAME is the name of the Oracle home

The following are examples of OFA-compliant Oracle home directories:

- C:\test\oracle\ora90
- D:\oracle\ora90

## Installing a Default OFA Database: Example

1. Install Oracle8i for Windows release 8.1.6 on a computer with no other Oracle software installed and accept the default Oracle Universal Installer settings for the first Oracle home (C:\oracle\ora81) in the *path:* field.
2. Complete the installation.
3. Run Oracle Universal Installer again and install Oracle9i release 1 (9.0.1). Accept the default Oracle Universal Installer settings for the first Oracle home (C:\oracle\ora90) in the *path:* field.

Table 6–3 shows the default OFA database settings.

**Table 6–3 Default OFA Database Settings**

Setting	Value
ORACLE_BASE	C:\oracle (the same for all Oracle homes)
Oracle home 1	C:\oracle\ora81
Oracle home 2	C:\oracle\ora90

## Installing a Nondefault OFA Database: Example 1

1. Install Oracle8i for Windows release 8.1.6 and change the default Oracle Universal Installer settings for the first Oracle home from C:\oracle\ora81 in the *path:* field to X:\xyz.
2. Complete the installation.
3. Run Oracle Universal Installer again and change the default Oracle Universal Installer settings for the second Oracle home from C:\oracle\ora90 in the *path:* field to Y:\abc.

Table 6–4 shows the nondefault OFA database settings for example 1.

**Table 6–4    Nondefault OFA Database Settings: Example 1**

Setting	Value
ORACLE_BASE	X:\xyz for the first Oracle home; Y:\abc for the second Oracle home
Oracle home 1	X:\xyz
Oracle home 2	Y:\abc

The resulting directory tree would like like this:

```
X:\xyz
  \admin
    \DB_NAME1
    \DB_NAME2
  \bin
  \network
  \oradata
    \DB_NAME1
      control01.ctl
      control02.ctl
      control03.ctl
      indx01.dbf
      rbs01.dbf
      system01.dbf
      temp01.dbf
      users01.dbf
      redo01.log
      redo02.log
      redo03.log
    \DB_NAME2
```

```

Y:abc
  \admin
    \DB_NAME1
    \DB_NAME2
  \bin
  \network
  \oradata
    \DB_NAME1
      control01.ctl
      control02.ctl
      control03.ctl
      indx01.dbf
      rbs01.dbf
      system01.dbf
      temp01.dbf
      users01.dbf
      redo01.log
      redo02.log
      redo03.log
    \DB_NAME2

```

## Installing a Nondefault OFA Database: Example 2

1. Install Oracle8i for Windows release 8.1.6 and change the default Oracle Universal Installer settings for the first Oracle home from C:\oracle\ora81 in the *path:* field to X:\xyz\oracle\abc.
2. Complete the installation.
3. Run Oracle Universal Installer again and change the default Oracle Universal Installer settings for the second Oracle home from C:\oracle\ora90 to X:\pqr.

Table 6–5 shows the nondefault OFA database settings for example 2.

**Table 6–5 Nondefault OFA Database Settings: Example 2**

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

The resulting directory tree would look similar to this:

```
X:\pqr                                     --Oracle home 2
  \bin
  \network
X:\xyz                                     --ORACLE_BASE for both Oracle homes
  \oracle                                 --Oracle home 1
    \abc
      \bin
      \network
    \admin
      \db_name1
        \ad hoc
        \bdump
        \cdump
        \create
        \exp
        \pfile
        \udump
      \DB_NAME2
      \...
    \oradata
      \DB_NAME1
        control01.ctl
        control02.ctl
        control03.ctl
        indx01.dbf
        rbs01.dbf
        system01.dbf
        temp01.dbf
        users01.dbf
        redo01.log
        redo02.log
        redo03.log
      \DB_NAME2
```



## Increasing Reliability and Performance

One of the basic goals of OFA is to increase reliability and performance by distributing I/O loads across different physical drives. Two ways to do that are:

- [Disk Mirroring](#)
- [Disk Striping](#)

### Disk Mirroring

Oracle log files and database files can be separated and treated with different levels of hardware reliability. Oracle log files are highly reliable to start with, because they are stored redundantly. Creating similar reliability for database files may require you to duplicate all of your data, using disk mirrors.

Disk mirroring usually involves two or more identical drives and either a hardware controller or Windows Disk Administrator. If one disk fails, then the other disk(s) can be used to recover data that would otherwise be lost. Using one of the disks to recover lost data may involve "breaking" the mirror. If the mirror breaks, then you must build a new mirror.

Disk mirroring is part of some levels of Redundant Array of Independent Disks (RAID) configurations, provided by the disk controller. The RAID level determines the amount of redundancy. Some RAID levels can use the "hot swapping" feature, which means that you can replace a bad disk with a good one without turning off the computer or losing functionality.

### Disk Striping

How you set up disks for use in a database depends on the number of disks and the type of hard disk controllers available. If the hard disk controllers support both striping and mirroring, then Oracle Corporation recommends you configure the controllers to support striping.

Some controllers are configured at system startup time by issuing a keyboard sequence that brings up configuration programs written by the controller manufacturer. One goal is to stripe as many drives together as possible by configuring the controllers. Each stripe shows up as one logical device.

Striping provides significant performance advantages. All the space from the striped drives appears as a single logical drive. Furthermore, the space is used by interlacing "stripes" of space from all of the disks in the stripe. This means that a large file uses some space from the first disk, then some from the second disk and so

on to the last disk and then starting back at the first disk again. Each file can be spread over all of the striped disks. The data in such a file may be accessed randomly by more than one CPU without contention.

The controllers that support striping usually provide caching as well. This means that data can be written to the controller and cached and saved for a time in storage not on the disk. Data that is read can be cached on the controller in a similar fashion. Read caching is not necessary for Oracle databases, because all database reads are cached already in the [System Global Area](#). The value of the `DB_BLOCK_BUFFERS` parameter in the initialization parameter file (`init.ora`) determines the number of buffers that can be used in the SGA. This value also configures the Oracle9i database on startup.

## Using Raw Partitions for Tablespaces

A raw partition is a portion of a physical disk that is accessed at the lowest possible level. The I/O of a raw partition improves performance by approximately 5% to 10% compared to the I/O of a partition containing a file system. Therefore, Oracle Corporation encourages you to use [raw partitions](#) for your tablespace files.

## Comparison Between OFA on Windows NT and UNIX

You implement OFA on Windows NT and UNIX in the same way. However, differences exist with regard to the following:

- [Directory Naming](#)
- [ORACLE\\_BASE Directory](#)
- [Support for Symbolic Links on Windows NT](#)

**See Also:** Your UNIX operating system-specific administrator's reference for information about OFA on UNIX

## Directory Naming

The top-level names of the OFA directory tree differ between Windows NT and UNIX. However, the main subdirectory and filenames are the same on both operating systems.

## ***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\HOME0).

On UNIX, *ORACLE\_BASE* is associated with a UNIX user's environment.

## **Support for Symbolic Links on Windows NT**

The goal of OFA is to place all Oracle software under one *ORACLE\_BASE* directory and to spread the 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.

Windows NT currently does not support symbolic links, so datafiles will not all show up under a single directory like on UNIX. Instead, you may have `oradata` directories on multiple drives, with datafiles in each one. In this way, you still get the OFA benefits, even though the datafiles are not all visible in a single directory.

Oracle Corporation 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_NAME` directory.

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

- `C:\` contains an Oracle home and the database administration files.
- `F:\` contains the 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 of the **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:\oracle	--First logical drive
\ora90	--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
\adhoc	--Ad hoc SQL scripts
\adump	--Audit files
\bdump	--Background process trace files
\cdump	--Core dump files
\create	--Database creation files
\exp	--Database export files
\pfile	--Initialization parameter file
\udump	--User SQL trace files
F:\oracle	--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:\oracle	--Third logical drive (RAID level 5 configuration)
\oradata	--Subtree for Oracle database files
\prod	--Subtree for prod database files
control01.ctl	--Control file 1
indx01.dbf	--Index tablespace datafile
rbs01.dbf	--Rollback tablespace datafile
system01.dbf	--System tablespace datafile
temp01.dbf	--Temporary tablespace datafile
users01.dbf	--Users tablespace datafile
H:\oracle	--Fourth logical drive
\oradata	--Subtree for Oracle database files
\prod	--Subtree for prod database files
control02.ctl	--Control file 2

---

# Oracle9i Services on Windows

This chapter describes Windows services in general and Oracle9i Database Windows services in particular.

This chapter contains these topics:

- [Introduction to Oracle9i Services](#)
- [Oracle9i Services Available on Windows](#)
- [Using Oracle9i Services](#)

## Introduction to Oracle9i Services

Oracle9i starts each **instance** as a service on Windows. A service is an executable **process** registered in the Windows **registry** and administered by Windows. The registry automatically tracks and records security information for each service created.

Oracle also uses services, similar to Windows services, to provide support for its operations. **Oracle services** are created during the database creation process and are associated with the Oracle database. They are used to create, connect to, and use an Oracle instance.

Services simplify the process of starting up the database. The database can be configured to come up automatically when the computer is restarted, with no user interaction. Another advantage of services is that they can start with a specified user **privilege**.

Services start background processes, similar to the daemon processes on UNIX. When the Oracle database service starts, there is no typical Oracle **thread** running in the process. Instead, the process waits for the first connection from SQL\*Plus. This causes a foreground thread to start and creates the background threads of the **System Global Area**.

When the database is shut down, all the threads that were created are terminated. But the process itself continues, waiting for the next connection request and startup command.

Finally, the Oracle Net Listener is a service. This service needs to run before users can connect to the database. This process does not affect how clients connect to or use the database.

## Oracle9i Services Available on Windows

Services are started manually or they can be set to start automatically when the computer is restarted. By default, services run under the `system` user. However, `system` is not a user that can create a logon session; rather, it is an operating system session for running system services.

The following are some of the services available on Windows. You may have additional services, depending on the components you installed.

### Oracle Object Service

Used by Oracle Object Link Manager to synchronize symbolic link naming to logical volume mapping automatically on all the nodes in a cluster.

**Oracle OLAP Agent**

The back end for Oracle OLAP Instance Manager. Performs the tasks specified in Instance Manager, such as starting and stopping an OLAP service or changing its configuration settings. Oracle OLAP Agent also returns information from the operating system, such as the success or failure of a startup attempt.

**Oracle OLAP 9.0.1.0.0**

The default OLAP service. Supports a calculation engine and multidimensional analytic workspaces for analytical applications. Performs complex statistical, mathematical, and financial calculations along with predictive analysis functions such as forecasting, modeling, consolidations, allocations, and scenario management.

**OracleCMService9i**

Used for the Cluster Manager for Oracle Real Application Clusters.

**OracleDirectoryService\_SID**

Responsible for starting and shutting down all **Oracle Internet Directory** (OID) servers (oidldapd, oidrepld, and oidmetad). Also monitors all OID servers once they are up and running. If an OID server goes down, then OracleDirectoryService\_SID restarts it.

**OracleEXTPRC**

Used for external naming methods (Novell Directory Services and Network Information Service).

**OracleGSDService**

The Global Services Daemon (GSD) receives requests from SRVCTL to execute an administrative job task, such as startup or shutdown. The task is executed locally on all nodes, and the results are sent back to SRVCTL. This service is installed with Real Application Clusters.

**OracleHOME\_NAMEAgent**

Part of the Oracle Enterprise Manager product suite. Intelligent Agent is required for the execution of jobs and performance monitoring of Oracle services or targets such as listeners, databases, Oracle HTTP Server *powered by Apache*, and Oracle Applications. Intelligent Agent also collects statistical data for Capacity Planner and

Performance Manager, which are data-collecting applications available in the Oracle Diagnostics Pack.

### **OracleHOME\_NAMEClientCache**

Used for the Client Cache Service, a networking product.

### **OracleHOME\_NAMECMAdmin**

Performs administrative functions, including answering requests sent from the Oracle Connection Manager Control utility, monitoring registered listeners, and communicating address information to Oracle Names servers.

### **OracleHOME\_NAMECMan**

Listens for incoming client connection requests. It also provides session multiplexing, access control, and protocol conversion functions.

### **OracleHOME\_NAMEHTTPServer**

Starts the Oracle HTTP Server *powered by Apache*. Used as the Web server with browser-based Oracle Enterprise Manager.

### **OracleHOME\_NAMEManagementServer**

Management Server is the middle tier of Oracle Enterprise Manager. It maintains centralized intelligence and distributed control between clients and managed nodes.

### **OracleHOME\_NAMEPagingServer**

Oracle Enterprise Manager Paging Server allows Enterprise Manager administrators to receive paging notifications concerning registered events and scheduled jobs.

### **OracleHOME\_NAMETNSListener**

Listens for and accepts incoming connection requests from client applications. Automatically starts when the Windows computer restarts. If it is not started, then the following error message appears when attempting to connect with `username/password@net_service_name`:

```
ORA-12541 TNS: no listener
```



### **OracleMSCSService**

Created and configured during the installation of Oracle Fail Safe and Oracle Real Application Clusters Guard. Required on all Windows clusters nodes where these components are installed. `OracleMSCSService` is under the control of Microsoft Cluster Server and should be set to manual startup.

Oracle Fail Safe and Oracle Real Applications Clusters Guard are planned to ship in a subsequent CD pack.

### **OracleMTSRecoveryService**

Helps Oracle databases recover in-doubt Oracle transactions that were started on behalf of **Microsoft Transaction Server** (MTS) transactions originating from Windows NT and Windows 2000 computers. There is only one such service for each Windows NT or Windows 2000 computer having Oracle Services for MTS installed.

### **OracleNAMES**

Used for the distributed naming service developed for Oracle environments.

### **OracleServiceSID**

Created for the database instance **system identifier**, where *SID* is the value you entered for the database name during Oracle9i installation. This service is mandatory. If it is not started, then the following ORA-12560 error message appears when you attempt to use any of the Oracle9i Utilities, such as SQL\*Plus:

```
ORA-12560 TNS: protocol adapter error
```

### **OracleSNMPPeerEncapsulator**

See `OracleSNMPPeerMasterAgent`. The Encapsulator is only required when you have more than one SNMP sub-agent installed and configured on the system.

### **OracleSNMPPeerMasterAgent**

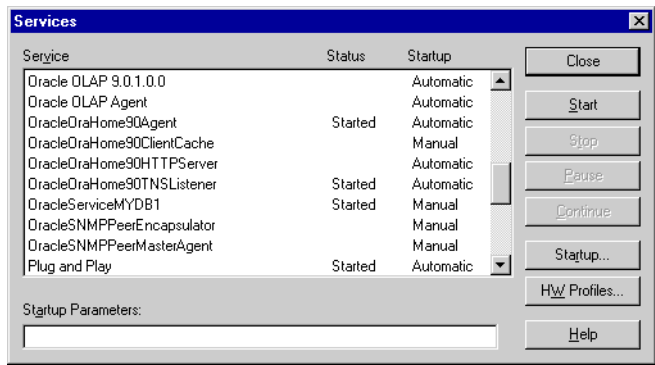
Simple Network Management Protocol (SNMP) is a standard internet protocol enabling certain nodes in a network to query other network components or applications for information concerning their status and activities. All requests sent to a given network node are handled by the same Master Agent, which redirects the requests to the appropriate managed elements on the node, in some cases using subagents.

**OraFenceService**

A kernel mode service to provide I/O fencing. Reboots a node in case the node hangs in kernel mode for a defined amount of time. The service is installed on all nodes with OracleCMService9i.

**Using Oracle9i Services**

Oracle services appear in the *Services* dialog box of the Control Panel:



All Oracle services begin with "Ora". Use the *Services* dialog box to start or stop each of the Oracle services available on the computer.

The services are found in the registry under: HKEY\_LOCAL\_MACHINE\SYSTEM\CURRENTCONTROLSET\SERVICES.

**See Also:**

- [Chapter 6, "Multiple Oracle Homes and Optimal Flexible Architecture"](#) in this manual for information on multiple, active Oracle home directories on a single computer, which affects the naming conventions for Oracle services
- "Administering a Database", in *Oracle9i Database Administrator's Guide for Windows* for details on managing Oracle services

---

# Oracle9i Default Accounts and Passwords

This chapter describes the Oracle9i Database default accounts and passwords.

This chapter contains these topics:

- [Overview](#)
- [Unlocking and Changing Passwords](#)
- [Granting Limited SYS Database Role Privileges](#)
- [Reviewing Accounts and Passwords](#)

## Overview

Oracle9i installs with a number of default accounts. The Oracle Database Configuration Assistant locks and expires all default database accounts upon successful installation with the following exceptions:

- SYS
- **SYSTEM**
- SCOTT
- DBSNMP
- OUTLN
- AURORA\$ORB\$UNAUTHENTICATED
- AURORA\$JIS\$UTILITY\$
- OSE\$HTTP\$ADMIN

You must unlock all other accounts before using them. Oracle Corporation recommends changing all user passwords *immediately* after installation.

---

---

**Important:** If installing **Oracle Internet Directory**, then change the passwords for **SYS** and **SYSTEM** only after the Oracle Internet Directory installation is complete.

---

---

At a minimum, the Oracle Database Configuration Assistant creates the **SYS**, **SYSTEM**, and **DBSNMP** accounts in *all* databases. Additional accounts are created depending on the components installed. Unlock accounts and change passwords before using them. [Table 8-2](#) describes the accounts and passwords.

**See Also:**

- *Oracle9i Database Administrator's Guide for Windows* for information on Oracle security procedures and security best practices
- *Oracle Enterprise Manager Administrator's Guide* for information on security management

## Unlocking and Changing Passwords

At the end of installation, several configuration assistants automatically start to create and configure your database and network environments. One such assistant is the Oracle Database Configuration Assistant, which automatically prompts you to change passwords and unlock accounts immediately after installation.

### To change a password during the database installation and configuration process:

1. From the Oracle Database Configuration Assistant window, choose the Password Management button.

---

---

**Note:** The Password Management button is not available when using Oracle Database Configuration Assistant as a standalone tool (that is, after the installation and configuration process is complete).

---

---

2. Select a **username** and clear the check mark.
3. Enter a new password and confirm the new password for each username.

---

---

**Note:** If you unlock a password, but do not specify a new password, then the password is expired until the next time you access that account.

---

---

Alternatively, 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 / AS SYSDBA
```

3. Change the password according to the SQL commands indicated in [Table 8-1](#):

Table 8–1 SQL Statements for Administering Accounts and Passwords

Action	SQL Statement
Unlock a password	ALTER USER <i>username</i> ACCOUNT UNLOCK ;
Lock a password	ALTER USER <i>username</i> ACCOUNT LOCK ;
Change the password of an unlocked account	ALTER USER <i>username</i> IDENTIFIED BY <i>password</i> ;
Change the password of a locked account	ALTER USER <i>username</i> ACCOUNT IDENTIFIED BY <i>password</i> ACCOUNT UNLOCK ;

## Granting Limited SYS Database Role Privileges

Any database user can be granted a limited SYS database role **privilege** to use the Oracle Enterprise Manager Diagnostic Pack. Grant users access to these necessary SYS privileges by granting the OEM\_MONITOR role. This role is created when the database is installed and is defined in the SQL script at \ORACLE\_BASE\ORACLE\_HOME\rdbms\admin\catsnmp.sql.

**See Also:** Oracle9i SQL Reference for information on the GRANT statement

## Reviewing Accounts and Passwords

Table 8–2 lists Oracle9i default accounts and passwords. It also briefly describes the purpose of each username and shows where to find additional information.

Table 8–2 Oracle9i Default Accounts and Passwords

Username	Password	Description	More Information
SYSTEM <sup>1</sup>	MANAGER	Used for performing database administration tasks. SYSTEM includes the AQ_ADMINISTRATOR_ROLE and DBA database <b>roles</b> .	Oracle9i Database Administrator's Guide
SYS <sup>2</sup>	CHANGE_ON_INSTALL <sup>3</sup>	Used for performing database administration tasks.	Oracle9i Database Administrator's Guide
AURORA\$JIS\$UTILITY\$	Randomly assigned at installation	Used internally by Enterprise Java Beans and <b>CORBA</b> Tools. Log on as SYS to change the password for this username.	Not applicable

**Table 8–2 (Cont.) Oracle9i Default Accounts and Passwords**

Username	Password	Description	More Information
AURORA\$ORB\$UNAUTHENTICATED	Randomly assigned at installation	Used internally by Enterprise Java Beans and CORBA Tools. Log on as SYS to change the password for this username.	Not applicable
CTXSYS	CTXSYS	The Oracle Text username with CONNECT, DBA, and RESOURCE database roles.	<i>Oracle Text Reference</i>
DBSNMP	DBSNMP	Includes the CONNECT and RESOURCE database roles. Run <code>catnsnmp.sql</code> if you want to drop this role and user.	<i>Oracle Intelligent Agent User's Guide</i>
LBACSYS	LBACSYS	The Oracle Label Security administrator username.	<i>Oracle Label Security Administrator's Guide</i>
MDSYS	MDSYS	The Oracle Spatial and Oracle Locator administrator username.	<i>Oracle Spatial User's Guide and Reference</i>
OLAPDBA	OLAPDBA	OLAP Services uses OLAPDBA to <b>authenticate</b> user credentials. Includes the CONNECT, OLAP_DBA, and RESOURCE database roles.  When you change the password for OLAPDBA in the database, you must make the same change to the User Password configuration setting for OLAP Services.	<i>Oracle9i OLAP Services Concepts and Administration Guide</i>  OLAP Services Instance Manager Help
OLAPSVR	INSTANCE	Proxy identification used by all OLAP Services connections. Includes CONNECT, OLAP_DBA, RESOURCE, and SELECT_CATALOG_ROLE database roles.  When you change the password for OLAPSVR in the database, you must make the same change to the OlapProxyPwd configuration setting for OLAP Services.	<i>Oracle9i OLAP Services Concepts and Administration Guide</i>  OLAP Services Instance Manager Help
OLAPSYS	MANAGER	Includes the CONNECT, OLAP_DBA, and RESOURCE database roles	<i>Oracle9i OLAP Services Concepts and Administration Guide</i>
ORDPLUGINS	ORDPLUGINS	The Oracle <i>interMedia</i> Audio and Video username with CONNECT and RESOURCE database roles. Allows non-native plug-in formats for one session.	<i>Oracle interMedia User's Guide and Reference</i>
ORDSYS	ORDSYS	The Oracle <i>interMedia</i> Audio, Video, Locator, and Image administrator username with CONNECT, JAVAUSERPRIV, and RESOURCE database roles.	<i>Oracle interMedia User's Guide and Reference</i>

Table 8–2 (Cont.) Oracle9i Default Accounts and Passwords

Username	Password	Description	More Information
OSE\$HTTP\$ADMIN	Randomly assigned at installation	Used internally by the Oracle Servlet Engine. Log on as SYS to change the password for this username.	Not applicable
OUTLN	OUTLN	Centrally manages metadata associated with stored outlines. Supports plan stability, which allows you to maintain the same execution plans for the same SQL statements. Includes CONNECT and RESOURCE database roles.	<i>Oracle9i Database Concepts</i> <i>Oracle9i Database Performance Guide and Reference</i>
SCOTT	TIGER	Includes CONNECT and RESOURCE database roles.	<i>Oracle9i Database Administrator's Guide for Windows</i>
WKSYS	WKSYS	Used for storing Ultra Search system dictionaries and <b>PL/SQL</b> packages. WKSYS includes CONNECT, CTXAPP, DBA, JAVASYSPRIV, JAVAUSERPRIV, and RESOURCE database roles.	Oracle Ultra Search Online Documentation

<sup>1</sup> If installing Oracle Internet Directory, then change the passwords for SYS and SYSTEM only after the Oracle Internet Directory installation is complete.

<sup>2</sup> If installing Oracle Internet Directory, then change the passwords for SYS and SYSTEM only after the Oracle Internet Directory installation is complete. SYS includes the following database roles: AQ\_ADMINISTRATOR\_ROLE, AQ\_USER\_ROLE, CONNECT, CTXAPP, DBA, DELETE\_CATALOG\_ROLE, EXECUTE\_CATALOG\_ROLE, EXP\_FULL\_DATABASE, HS\_ADMIN\_ROLE, IMP\_FULL\_DATABASE, JAVA\_ADMIN, JAVADEBUGPRIV, JAVA\_DEPLOY, JAVAIDPRIV, JAVAUSERPRIV, JAVASYSPRIV, OEM\_MONITOR, OLAP\_DBA, RECOVERY\_CATALOG\_OWNER, RESOURCE, SELECT\_CATALOG\_ROLE, WKADMIN, WKUSER, and WM\_ADMIN\_ROLE.

<sup>3</sup> SQL statement must include the privilege AS SYSDBA or AS **SYSOPER**.

See Also:

- "The Oracle Database Administrator" in *Oracle9i Database Administrator's Guide*
- "Administering External Users and Roles" in *Oracle9i Network, Directory, and Security Guide for Windows*



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# Configuration Parameters and the Registry

This chapter describes use of the **registry** for various Oracle9i for Windows components. It also lists the recommended values and ranges for configuration parameters.

This chapter contains these topics:

- [About Configuration Parameters](#)
- [Registry Overview](#)
- [Registry Parameters](#)
- [Oracle Real Application Clusters Registry Parameters](#)
- [Modifying a Registry Value with regedt32](#)
- [Adding a Registry Parameter with regedt32](#)
- [Adding or Modifying Registry Parameters with Oracle Administration Assistant for Windows NT](#)
- [Modifying Oracle Performance Monitor for Windows NT Parameters](#)

## About Configuration Parameters

Oracle9i for Windows uses configuration parameters to locate files and specify runtime parameters common to all Oracle products. When an Oracle program or application requires a translation for a particular configuration variable, Oracle9i for Windows uses the associated parameter. All Oracle parameters are stored in the registry.

## Registry Overview

Oracle9i for Windows stores its configuration information in a repository (the registry) that is organized in a tree format. The tree format consists of keys in the registry and parameter values for the keys. Keys and parameter values can be viewed and modified in the Registry Editor.

Keys are folders that appear in the left pane of a Registry Editor window. A key contains subkeys or parameters.

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**WARNING:** Although the Registry Editor lets you view and modify registry keys and parameter values, you normally are not required to do so. In fact, you can render your system useless if you make incorrect changes. Therefore, only advanced users should edit the registry! Back up your system before making any changes in the registry.

---

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Parameters in the Registry Editor appear as a string, consisting of three components:

- Parameter name
- Value class or type of entry
- Value itself

For example, parameter ORACLE\_SID can have the following entry in the registry:

```
ORACLE_SID:reg_sz:orcl1
```

Value classes for Oracle9i for Windows parameters are:

- String value with a REG\_SZ, REG\_EXPAND\_SZ (for an expandable string), or a REG\_MULTI\_SZ (for multiple strings) prefix to identify a parameter value entry as a data string

- Binary value with a `REG_DWORD` prefix to identify a value entry as a dword (hexadecimal data) entry

Most Oracle9i for Windows parameter values are string types. Use Oracle Universal Installer defaults when a type is not given.

## Registry Parameters

This section describes the Oracle9i for Windows registry parameters for the following keys. Other products, such as Oracle Enterprise Manager, have additional keys and parameters that are not described in this chapter.

- `HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\HOMEID`
- `HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE`
- `HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\ALL_HOMES`
- `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services`

To modify these registry values, see "[Modifying a Registry Value with regedt32](#)" on page 9-14 in this manual.

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**Note:** This chapter describes how to use `regedt32` to edit your registry. If you are using Windows 95 or Windows 98, then you must use `regedit`, which operates slightly differently than `regedt32`. See your Windows 95 or Windows 98 documentation for instructions.

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## HKEY\_LOCAL\_MACHINE\SOFTWARE\ORACLE\HOMEID

Each time you install Oracle products into a new Oracle home on your computer, HKEY\_LOCAL\_MACHINE\SOFTWARE\ORACLE\HOMEID is created and *ID* is incremented. This subkey contains parameter values for most Oracle products.

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**Note:** See [Chapter 6, "Multiple Oracle Homes and Optimal Flexible Architecture"](#) in this manual for details on the PATH variable and registry values when you are working with **multiple Oracle homes**.

---

HKEY\_LOCAL\_MACHINE\SOFTWARE\ORACLE\HOMEID includes the following parameters for an Oracle home directory. Depending on the products you install, additional parameters can also be created. See your Windows development manuals.

### MSHELP\_TOOLS

Specifies the location of the Windows help files. The default value is ORACLE\_BASE\ORACLE\_HOME\mshelp.

### NLS\_LANG

Specifies the supported language, territory, and character set. This parameter specifies the language in which messages appear, the territory and its conventions for calculating week and day numbers, and the character set displayed. Oracle Universal Installer sets this value during installation based on the language setting of the operating system. See the *Oracle9i Database Globalization Support Guide* for a list of values.

### ORA\_CWD

Specifies the current working directory. For example, if you set this parameter and then use ORADIM, a log file called oradim.log is created in this directory. This parameter must be manually set.

### ORA\_SID\_AUTOSTART

Starts the database when the OracleServiceSID service is started. The default value is true.

**ORA\_SID\_PFILE**

Specifies the full path to the **initialization parameter file (init.ora)**. The default value is `ORACLE_BASE\admin\DB_NAME\pfile\init.ora`

**ORA\_SID\_SHUTDOWN**

When set to `true`, the default value, this parameter shuts down the Oracle database identified by *SID* when `OracleServiceSID` is stopped.

**ORA\_SID\_SHUTDOWN\_TIMEOUT**

Sets the maximum time (in seconds) to wait for the shutdown to complete before the service for a particular *SID* stops. The default value is 30.

**ORA\_SID\_SHUTDOWNTYPE**

Specifies the mode in which the database is shut down when you stop `OracleServiceSID`. The valid values are `a` (abort), `i` (immediate), and `n` (normal). The default value is `i`.

**ORA\_TZFILE**

Specifies the location of the timezone file. Each file contains:

- Valid timezone names
- Offset from UTC
- Abbreviation for standard time
- Abbreviation for daylight savings time

`ORACLE_BASE\ORACLE_HOME\oracore\zoneinfo\timezone.dat` is the default. It contains the most commonly used timezones and is smaller for better database performance. The optional file, `timezlg.dat`, includes timezones not defined in the default; but its use may affect database performance. To enable use of the optional file, the database administrator must:

1. Shut down the database.
2. Set `ORA_TZFILE` to the full path name of the location of `timezlg.dat` file.
3. Restart the database.

To view the timezone names, use `SQL*Plus` to make the following query:

```
SELECT * from v$timezone_names
```

Once the larger file is used, it must stay in use unless the user is sure that no data uses one of the added timezones. Also, all databases that share information must use the same timezone file.

#### ORACLE\_AFFINITY

Specifies the Windows NT processor affinity of each **thread** within the Oracle **process**. This parameter must be manually added. Oracle Corporation recommends consulting Oracle Support Services before changing this parameter. The format is:

```
name1:cpumask1;name2:cpumask2
```

Each `name` setting must be the name of a background thread, `user` for non-background (shadow) threads, or `def` for any thread type not handled specifically.

The `name mask` sets the affinity mask of the Oracle process. Valid background thread names include `DBW0`, `LGWR`, `PMON`, `SMON`, `ARCH`, `RECO`, `CKPT`, `TRWR`, `SNP0` through `SNP9`, `P000` through `P481`, and any other name found in the `NAME` column of the `v$bgprocess` **data dictionary view**.

Each affinity setting must be a valid affinity mask (or its numeric equivalent) for the corresponding name. Process affinity masks are used only when **Oracle services** are first started. Each thread's affinity is set only when the individual thread is started (for example, at database startup time for the background threads).

#### ORACLE\_BASE

Specifies the top-level Oracle directory (for example, `C:\oracle`) that contains `ORACLE_HOME`, `\admin`, and `\oradata`. The default is `ORACLE_BASE`.

#### ORACLE\_GROUP\_NAME

Specifies the name of the group containing icons of the Oracle products installed. The parameter is added to your registry when you first install Oracle products, even if Oracle Universal Installer does not create a program group for the Oracle products you have installed (for example, if you have installed only **Oracle Net** software). The default value is `Oracle - HOME_NAME`.

#### ORACLE\_HOME

Specifies the Oracle home directory in which Oracle products are installed. This directory is immediately beneath the Oracle base directory in the Oracle directory hierarchy. The default value is the drive letter and name that you specify during installation.

**ORACLE\_HOME\_KEY**

The `HKEY_LOCAL_MACHINE` location of Oracle parameters. The default value is `software\oracle\HOMEID`.

**ORACLE\_HOME\_NAME**

Specifies the home name of the Oracle home directory in which Oracle products are installed. The default value is the name that you specify during installation.

**ORACLE\_PRIORITY**

Determines the Windows NT scheduling priorities of the threads within the Oracle database management system process. The format is:

```
name1:priority1;name2:priority2 . . .
```

The name class sets the `priority` class of the Oracle process. Threads can be assigned priority either collectively or individually. The collective name `user` designates non-background (shadow) threads; the collective name `def` designates any thread type not handled specifically. Valid individual background thread names include `DBW0`, `LGWR`, `PMON`, `SMON`, `ARCH0`, `RECO`, `CKPT`, `TRWR`, `SNP0` through `SNP9`, and any other name found in the `NAME` column of the `v$bgprocess` data dictionary view.

The default value is `class:normal; def:normal`.

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**Note:** `ORACLE_PRIORITY` is not automatically created for you in the registry. When it is not defined in the registry, the Windows NT default values are used for the priorities of the thread.

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**ORACLE\_SID**

Specifies the name of the Oracle database **instance** on the host computer. The value of this parameter is the SID for the instance. The default value is specified by the entry in the *Database Identification* window of Oracle Universal Installer.

**RDBMS\_ARCHIVE**

Specifies the location of the **backup** database files. The default value is `ORACLE_BASE\ORACLE_HOME\database\archive`.

#### OSAUTH\_PREFIX\_DOMAIN

Enables user authentication. When set to `true`, enables the server to differentiate between one **username** and another, whether they are local users, domain users, or domain users on another domain in your network. When set to `false`, the domain is ignored, and the local user becomes the default value of the operating system user returned to the server. The default value is `false`.

#### OSAUTH\_X509\_NAME

Enables client users to access the Oracle9i database as X.509-compliant enterprise users. This parameter is required only if you want to use enterprise users and **roles** in an Oracle9i database computer running in a Windows 2000 domain. The default value is `false`.

#### RDBMS\_CONTROL

Specifies the location of the backup database **control files**. The default value is `ORACLE_BASE\ORACLE_HOME\database`.

#### SQLPATH

Specifies the location of SQL scripts. The default value is `ORACLE_BASE\ORACLE_HOME\dbs`.

### HKEY\_LOCAL\_MACHINE\SOFTWARE\ORACLE

This subkey contains the following parameters:

#### INST\_LOC

Specifies the location of Oracle Universal Installer files. The default value is `System Drive:\program files\oracle\inventory`.

#### OO4O

Specifies the location of Oracle Objects for OLE message files. The default value is `ORACLE_BASE\ORACLE_HOME\oo4o\mesg`.

### HKEY\_LOCAL\_MACHINE\SOFTWARE\ORACLE\ALL\_HOMES

This subkey provides general information on each Oracle home directory on a computer.



**DEFAULT\_HOME**

Specifies the default Oracle home name (that is, the first Oracle home installed on your computer). The default value is the name that you specify during installation. You can also use an Oracle tool to change the default home name. See ["Using Oracle Home Selector"](#) on page 6-8 in this manual.

**HOME\_COUNTER**

Specifies the number of installed Oracle homes. The default value is 1.

**LAST\_HOME**

Displays the ID number of the most recently installed Oracle home. For example, if HOME0 was the most recently installed Oracle home, then the number 0 appears. The default value is 0.

**IDx**

This subkey corresponds to the **HOMEID** of the same number (for example, HOME0 for the first installation, HOME1 for the second installation, and so on). IDx contains NAME and PATH parameters. The values that appear are determined by what you enter during installation in the *File Locations* window of Oracle Universal Installer.

- NAME specifies the home name of the Oracle home for IDx. This is the value that you specify during installation when prompted for an Oracle home name.
- PATH specifies the Oracle home directory for IDx. The default value is `ORACLE_BASE\ORACLE_HOME`.

**HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services**

The HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet registry address contains four keys:

- Control
- Enum
- HardwareProfiles
- Services

The first three are used by the operating system. You can edit only the Services subkey, which contains:

- [Parameters for Oracle Performance Monitor for Windows NT](#)
- [Parameters for Oracle Services](#)

### Parameters for Oracle Performance Monitor for Windows NT

Oracle Performance Monitor for Windows NT parameters appear in HKEY\_LOCAL\_MACHINE\SYSTEM\CURRENTCONTROLSET\SERVICES\ORACLE9\PERFORMANCE.

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**Note:** Modify only the hostname, password, and username values to point to any database.

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For Oracle Performance Monitor for Windows NT to display information for Oracle performance objects, it must log into the database. Modify the following parameters if the default information is not applicable or if you want to access another database:

- Hostname displays an Oracle Net **connect string** that lets you edit the SID (two entries labeled SID in this example):

```
(DESCRIPTION=
  (ADDRESS_LIST=
    (ADDRESS=
      (PROTOCOL=BEQ)
      (PROGRAM=oracle9)
      (ARGV0=oracle9SID)
      (ARGS=
        ' (DESCRIPTION=(LOCAL=YES) (ADDRESS=(PROTOCOL=beq)) ) '
      )
    )
  )
  (CONNECT_DATA=(SID=SID))
)
```

---

---

**Note:** The 2:, 2:orcl, and 2:sid connect strings for local connections to Oracle9i for Windows are not supported. Instead, the default connect string for a local connection uses Bequeath Protocol support.

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- **Password** displays the encrypted password for the username to access the database. The default value is `MANAGER` (encrypted).
- **Username** displays the username to access the database. The default value is `SYSTEM`.

Oracle Performance Monitor for Windows NT requires the following parameters as entry points:

- **Close** specifies the close entry point for the DLL. The default value is `CloseOracle9PerformanceData`.
- **Collect** specifies the collect entry point for the DLL. The default value is `CollectOracle9PerformanceData`.
- **Library** specifies the name of the Oracle Performance Monitor DLL. The default value is `oraperf.dll`
- **Open** specifies the open entry point for the DLL. The default value is `OpenOracle9PerformanceData`.

The following parameters specify the Oracle Performance Monitor for Windows NT log file and object configuration files:

- **LOGFILE** specifies the name of the Oracle Performance Monitor log file. This log file reports any errors, such as Oracle objects not appearing or database access problems. The default value is `ORACLE_BASE\ORACLE_HOME\dfs\operf90.log`.
- **PERF\_FILE\_NAME** specifies the location of the `perf.ora` file, which contains all the performance objects displayed by Oracle Performance Monitor. The default value is `ORACLE_BASE\ORACLE_HOME\dfs\perf90.ora`

## Parameters for Oracle Services

The `HKEY_LOCAL_MACHINE\SYSTEM\CURRENTCONTROLSET\SERVICES` subkey contains additional subkeys that correspond to each Oracle service.

Each service subkey contains the following parameters:

- **DisplayName** specifies the service name of the instance whose *SID* is *SID*. The default value is the name of the service. For example, `OracleServiceORCL1`, where `ORCL1` is the *SID*.
- **ImagePath** specifies the fully qualified path name of the executable started by the service and any command-line arguments passed into the executable at runtime. The default value is the path to the executable file of the product.

- `ObjectName` specifies the logon user account and computer to which the service should log on. The default value is `LocalSystem`.

## Oracle Real Application Clusters Registry Parameters

Oracle Real Application Clusters registry values are based on Oracle Corporation's Operating System Dependent (OSD) clusterware. If you are not using the Oracle OSDs, then some of this information may not be applicable to your particular cluster environment.

The registry values are first listed and described (where necessary). Data types and default values are displayed in [Table 9-1, "Oracle Real Application Clusters Registry Parameters"](#)

`HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\OSD9I`

This subkey contains the following required and optional values:

- `CMDLL` specifies the full path of the Cluster Manager (CM) DLL.
- `IODLL` specifies the full path of the I/O DLL.
- `IPCDLL` specifies the full path of the Inter-Process Communication (IPC) DLL.
- `STARTDLL` specifies the full path of the Startup DLL.

`HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\OSD9I\CM`

This subkey contains the Cluster Manager registry values. These values are updated when the Oracle OSD clusterware is installed.

- `ClusterID`
- `ClusterName`
- `CmDiskFile`
- `CmHostName` is for public host names used by the local Cluster Manager. Useful in a multihost environment, when more than one network is available on the node.
- `DefinedNodes` specifies the names for the nodes in a private network. The Oracle OSD clusterware uses these addresses for its interconnect traffic.
- `MissCount` defines the number of check-in intervals that can be missed before a Cluster Manager and its related node are declared down by the cluster.

- **PollInterval** defines the check-in time among Cluster Managers on different nodes. Each Cluster Manager is expected to send at least one status packet to all other nodes for each poll interval.
- **PublicNames** specifies the public node names in the public network (known as DNS host names).
- **ServiceName**

## HKEY\_LOCAL\_MACHINE\SOFTWARE\ORACLE\OSD9I\IPC

This subkey contains the Inter-Process Communication (IPC) registry values. These values are updated when the Oracle OSD clusterware is installed.

- **DeviceNic** is for use with Virtual Interface Architecture (VIA) hardware. Nic refers to the Network Interface Card.
- **InstanceID** contains the VIA MAC addresses of all the nodes.

## Parameter Data Types and Default Values

**Table 9–1 Oracle Real Application Clusters Registry Parameters**

Parameter Name	Type	Default Value
CMDLL	REG_SZ	\winnt\system32\osd9i\cm.dll
IODLL	REG_SZ	\winnt\system32\osd9i\io.dll
IPCDLL	REG_SZ	\winnt\system32\osd9i\ipc.dll
STARTDLL	REG_SZ	\winnt\system32\osd9i\start.dll
ClusterID	REG_DWORD	0
ClusterName	REG_SZ	Oracle Cluster Manager 9I
CmDiskFile	REG_SZ	\\.\ \opsm
CmHostName	REG_SZ	hostname
DefinedNodes	REG_MULTI_SZ	hostname
MissCount	REG_MULTI_SZ	3
PollInterval	REG_DWORD	1000 (milliseconds)
PublicNames	REG_MULTI_SZ	hostname
DeviceNic	REG_SZ	nic0

**Table 9–1 (Cont.) Oracle Real Application Clusters Registry Parameters**

Parameter Name	Type	Default Value
InstanceID	REG_MULTI_SZ	not applicable

## Modifying a Registry Value with regedt32

**Warning:** Do not edit your registry unless absolutely necessary. If an error occurs in your registry, then Oracle9i for Windows can stop functioning and the registry itself can become unusable.

**To edit Oracle-related settings:**

1. Start the Registry Editor in one of two ways:
  - From the MS-DOS command prompt, enter:  
`C:\> regedt32`
  - Choose Start > Run, enter `regedt32` in the Open field, and click OK.

**Note:** Use `regedit` to edit the registry on Windows 95 and Windows 98. The dialog boxes for adding a registry parameter using `regedit` are slightly different from those for `regedt32`. See your Windows 95 and Windows 98 documentation for specific instructions.

The *Registry Editor* window appears.

2. Navigate to the values you want to view or modify by double-clicking the appropriate keys.

The left-hand side of the window shows the hierarchy of registry keys, and the right-hand side of the window shows various values associated with a key.
3. Double-click the parameter to edit.

The *String Editor* dialog box appears:



4. Make any necessary edits.
5. Click OK.
6. Choose Exit from the Registry Editor menu.

## Adding a Registry Parameter with regedt32

To add a parameter to the registry:

1. Start the Registry Editor in one of two ways:
  - From the MS-DOS command prompt, enter:  

```
C:\> regedt32
```
  - Choose Start > Run, enter `regedt32` in the Open field, and click OK.

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**Note:** Use `regedit` to edit the registry on Windows 95 and Windows 98. The dialog boxes for adding a registry parameter using `regedit` are slightly different than those described below for `regedt32`. See your Windows 95 and Windows 98 documentation for specific instructions.

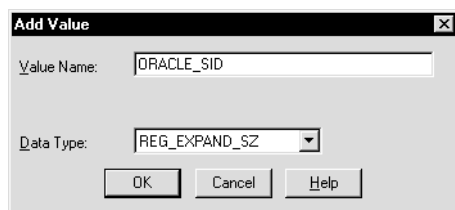
---

---

The *Registry Editor* window appears.

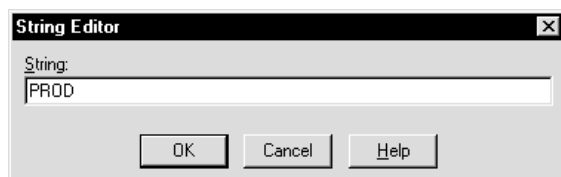
2. Navigate to the key to which you want to add the new value.
3. Choose Add Value from the Edit menu.

The *Add Value* dialog box appears:



4. In the *Value Name* text box, type the name of the value that you want to add to the currently selected key.
5. In the *Data Type* list, select the data type that you want to assign to the added value:
  - REG\_SZ, REG\_EXPAND\_SZ (for an expandable string), or REG\_MULTI\_SZ (for multiple strings) for a data string
  - Binary value with a REG\_DWORD prefix to identify a value entry as a DWORD (hexadecimal data) entry
6. Click OK.

The String Editor dialog box appears:



7. Type the value for the parameter.
8. Click OK.

The Registry Editor adds the parameter.
9. Choose Exit from the Registry Editor menu.



## Adding or Modifying Registry Parameters with Oracle Administration Assistant for Windows NT

Instead of using `regedt32` to add, edit, and delete parameters for an Oracle home, you can use the Oracle Home Configuration snap-in, one of several **snap-ins** included as part of Oracle Administration Assistant for Windows NT. You must have **Microsoft Management Console** on your computer to use this product. The Oracle home parameters are located in the `HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\HOMEID` key.

See "`HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\HOMEID`" in this manual for more information about the Oracle home parameters.

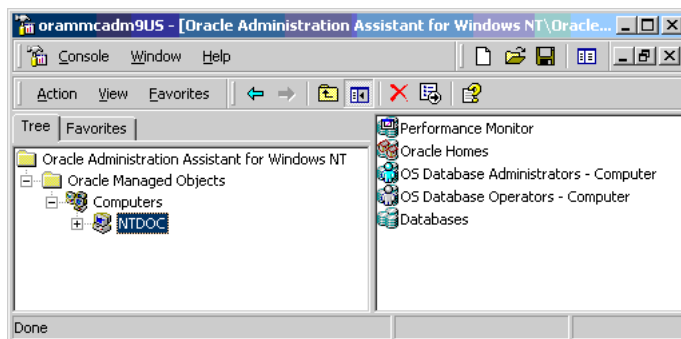
### Starting the Oracle Administration Assistant for Windows NT

To start the Oracle Administration Assistant for Windows NT:

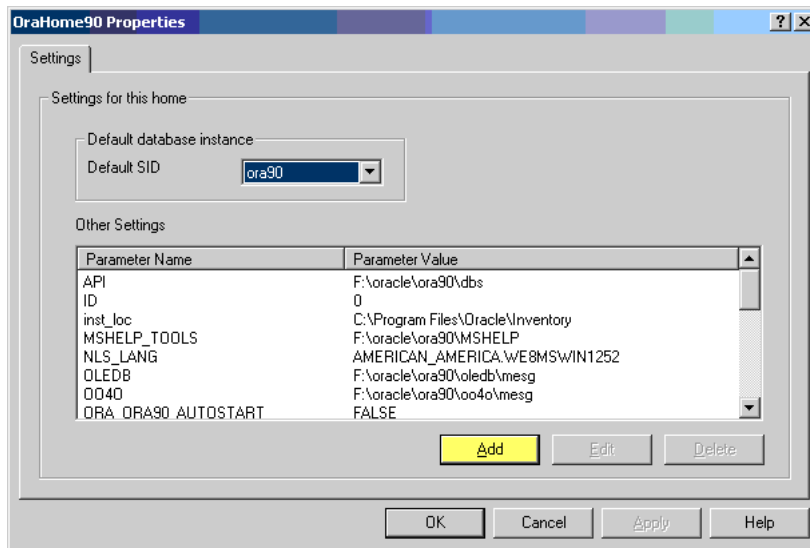
1. Choose Start > Programs > Oracle - *HOME\_NAME* > Configuration and Migration Tools > Oracle Administration Assistant for Windows NT.

Oracle Administration Assistant for Windows NT starts.

2. Expand Oracle Homes.
3. Right-click the Oracle home that you want to modify.



4. Click Properties. The *Properties* dialog box appears.

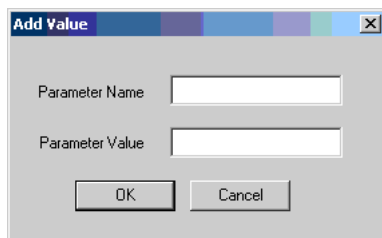


## Adding Oracle Home Parameters

To add an Oracle home parameter:

1. Click Add in the *Properties* dialog box.

The *Add Value* dialog box appears.



2. Enter the name in the Parameter Name text box.
3. Enter the value in the Parameter Value text box.
4. Click OK.
5. Click Apply.

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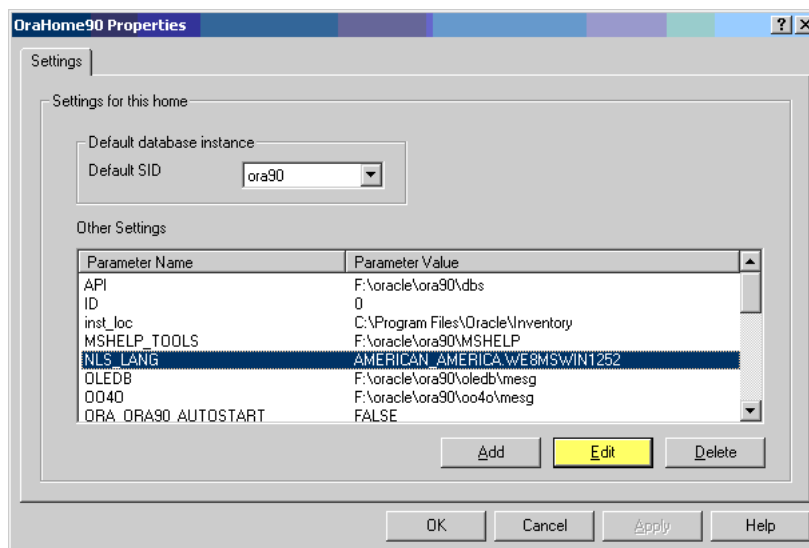
**Note:** With Oracle Administration Assistant for Windows NT, you can add parameters only with a datatype of REG\_SZ. Use `regedt32` to add parameters with a datatype of REG\_EXPAND\_SZ, REG\_MULTI\_SZ, or REG\_DWORD.

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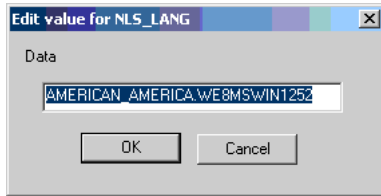
## Editing Oracle Home Parameters

To change the default SID, select the SID from the Default SID list in the *Properties* dialog box. To edit one of the other parameters:

1. Select the parameter in the Other Settings text box in the *Properties* dialog box.
2. Click Edit.



The *Edit Value* dialog box appears.



3. Modify the value.
4. Click OK.
5. Click Apply.

## Deleting Oracle Home Parameters

To delete an Oracle home parameter:

1. Select the parameter in the Other Settings text box in the *Properties* dialog box.
2. Click Delete.

## Modifying Oracle Performance Monitor for Windows NT Parameters

Instead of using `regedt32` to modify Oracle Performance Monitor's Hostname, Password, and Username parameters, you can use Oracle's OPERFCFG utility or Oracle Administration Assistant for Windows NT.

**See Also:** ["Parameters for Oracle Performance Monitor for Windows NT"](#) in this manual for more information about the Hostname, Password, and Username parameters

## Using the OPERFCFG Utility

The OPERFCFG utility is an Oracle tool that you run from the MS-DOS command prompt. Use this syntax:

```
operfcfg [-U username] [-P password] [-D database_name]
```

where:

- *username* is the username registry parameter value that Oracle Performance Monitor uses to log into the database. You must have a DBA **privilege** on this database.
- *password* is the password registry parameter value for the *username*.
- *database\_name* is the **net service name** that Oracle Performance Monitor uses to connect to the database. It affects the `Hostname` registry parameter. The net service name corresponds to the *SID* of the database that you want to monitor. The `-D` command can be specified without providing a database name value.

The `-U`, `-P`, and `-D` commands are all optional.

The following examples illustrate the use of the `OPERFCFG` utility. First, to change the username to `dba_admin`, the password to `frank`, and leave the database name at its current value, you would enter:

```
C:\> operfcfg -U dba_admin -P frank
```

To change the username to `dba_admin`, the password to `frank`, and the database name to `prod`, you would enter:

```
C:\> operfcfg -U dba_admin -P frank -D prod
```

To change the password to `frank` for the current username and database name, you would enter:

```
C:\> operfcfg -P frank
```

In the final example, you change the `Hostname` parameter to a blank value, causing the Oracle Performance Monitor to connect to the default database on the computer. The current username and password must be valid user accounts on this database. Enter:

```
C:\> operfcfg -D
```

## Using the Oracle Administration Assistant for Windows NT

The Oracle Performance Monitor snap-in is part of the Oracle Administration Assistant for Windows NT. You must have Microsoft Management Console on your computer in order to use this product.

To use the Oracle Performance Monitoring snap-in:

1. Choose Start > Programs > Oracle - *HOME\_NAME* > Configuration and Migration Tools > Oracle Administration Assistant for Windows NT.

Oracle Administration Assistant for Windows NT starts.

2. Right-click Performance Monitor.
3. Click Properties.

The *Performance Monitor Properties* dialog box appears.

4. Modify the text in the Username, Password, or Database text boxes.
5. Click Apply.

---

# Developing Applications for Windows

This chapter points to sources of information on developing applications for Windows and outlines a procedure for building and debugging external procedures.

This chapter contains these topics:

- [Finding Information on Application Development for Windows](#)
- [Developing Windows Applications](#)
- [Building External Procedures](#)
- [Debugging External Procedures](#)
- [Accessing Web Data with Intercartridge Exchange](#)

## Finding Information on Application Development for Windows

This section describes where to find information on developing applications specifically for Windows. These products are included on your Oracle Server CD-ROM.

### Java Enhancements

Oracle9i includes many Java enhancements. JVM includes the integrated Java Virtual Machine, JServer Accelerator, and Oracle Servlet Engine. Oracle also provides Oracle Java Database Connectivity (JDBC) Drivers. For more information:

- *Oracle9i Java Developer's Guide*
- *Oracle9i Servlet Engine Developer's Guide* and the entire Java documentation set

### XML Support

Oracle's XML products include the XML Developer's Kit (XDK) and Oracle XML SQL Utility. For more information:

- *Oracle9i Application Developer's Guide - XML*
- *Oracle9i XML Reference*

### Support for Internet Applications

Oracle's support for internet applications includes Oracle Portal, which enables you to publish your data to the Web, Oracle HTTP Server *powered by Apache*, and PL/SQL Embedded Gateway, which offers [PL/SQL](#) procedures stored in an Oracle9i database that can be started through browsers. For more information:

- *Oracle Portal Installation Guide and Tutorial*
- *Oracle Enterprise Manager Configuration Guide*
- *Oracle9i Servlet Engine Developer's Guide*

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**Note:** Oracle Portal is available on a separate CD-ROM and included with Oracle9i for Windows.

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## Application Wizards

Oracle Application Wizards allow developers to create database applications easily and quickly. They improve ease-of-use and reduce development time by generating much of the code for database connectivity. For information and downloads:

- <http://technet.oracle.com/software/>

## Oracle COM/COM+ Integration Feature

Oracle's **COM/COM+** integration feature enables Java stored procedure developers and COM/COM+ developers to load COM+ objects from the Oracle9i database. For more information:

- *Oracle COM Automation Feature Developer's Guide*
- Oracle Objects for OLE (OO4O) for Windows online help

## Oracle Services for Microsoft Transaction Server

Oracle9i for Windows permits enhanced deployment of COM/COM+ components in **Microsoft Transaction Server**, using an Oracle database as the resource manager. For more information:

- *Using Microsoft Transaction Server with Oracle*

## Pro\*C/C++ and Pro\*COBOL Applications

- *Pro\*C/C++ Precompiler Getting Started for Windows*
- *Pro\*COBOL Precompiler Getting Started for Windows*
- *Oracle Call Interface Getting Started for Windows*

## OLE DB

- *Oracle Provider for OLE DB Developer's Guide*

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**Note:** Oracle ODBC Driver is updated on a regular basis. Release 9.0 is included on your CD-ROM. To download the latest release, visit: <http://technet.oracle.com/software/>

Select Oracle ODBC Drivers from the "Select a Utility or Driver" drop-down list.

---

---

# Developing Windows Applications

Oracle provides a comprehensive set of APIs for Windows application developers and is well suited for both Java and COM/COM+ development. Oracle is integrated with Microsoft's development and deployment components, known as the Windows Distributed interNet Applications Architecture (DNA). Performance and data access on Windows is enhanced in the following areas:

- Wide variety of data access methods for Windows and internet applications
- Wizards and assistants to speed application development
- COM/COM+/DCOM integration through two APIs: Oracle Objects for OLE or Oracle Provider for OLE DB
- Microsoft Transaction Server integration: Oracle Services for Microsoft Transaction Server
- Platform extensions for internet application development

Developers are able to deploy their database applications more quickly by using the data access method with which they are familiar, rather than having to learn a new one. An Oracle database server can communicate with Windows clients in a variety of methods, as described in [Table 10-1](#).

**Table 10-1 Oracle Data Access Methods**

Development Environment	Data Access Method
Java/ <b>CORBA</b>	JDBC
	SQLJ
COM/COM+	Oracle Objects for OLE (OO4O)
	Oracle Provider for OLE DB
	COM/COM+ Automation Feature

By using Oracle data access interfaces, developers can take advantage of specific Oracle9i features. These interfaces also offer flexibility and adherence to open standards.

Oracle COM/COM+ interfaces include the following features:

- OO4O can be used from any programming environment that supports Microsoft COM/COM+ technology, such as Visual Basic, Visual C++, VBA in Excel, Active Server Pages, PowerBuilder, Delphi, Internet Information Server

(IIS), and Microsoft Transaction Server. OO4O is developed specifically for use with Oracle database servers.

- Oracle Provider for OLE DB gives ActiveX Data Objects (ADO) developers high performance and efficient access to Oracle databases. A native OLE DB provider, it offers data access optimizations and access to Oracle-specific database features.
- COM/COM+ Automation Feature APIs make it easy for PL/SQL developers to incorporate COM/COM+ objects into their routines. A new extension of this feature, Oracle COM/COM+ Integration, enables Java stored procedures and COM/COM+ developers to load COM/COM+ objects through OLE Automation or custom COM/COM+ interfaces from the Oracle9i database.

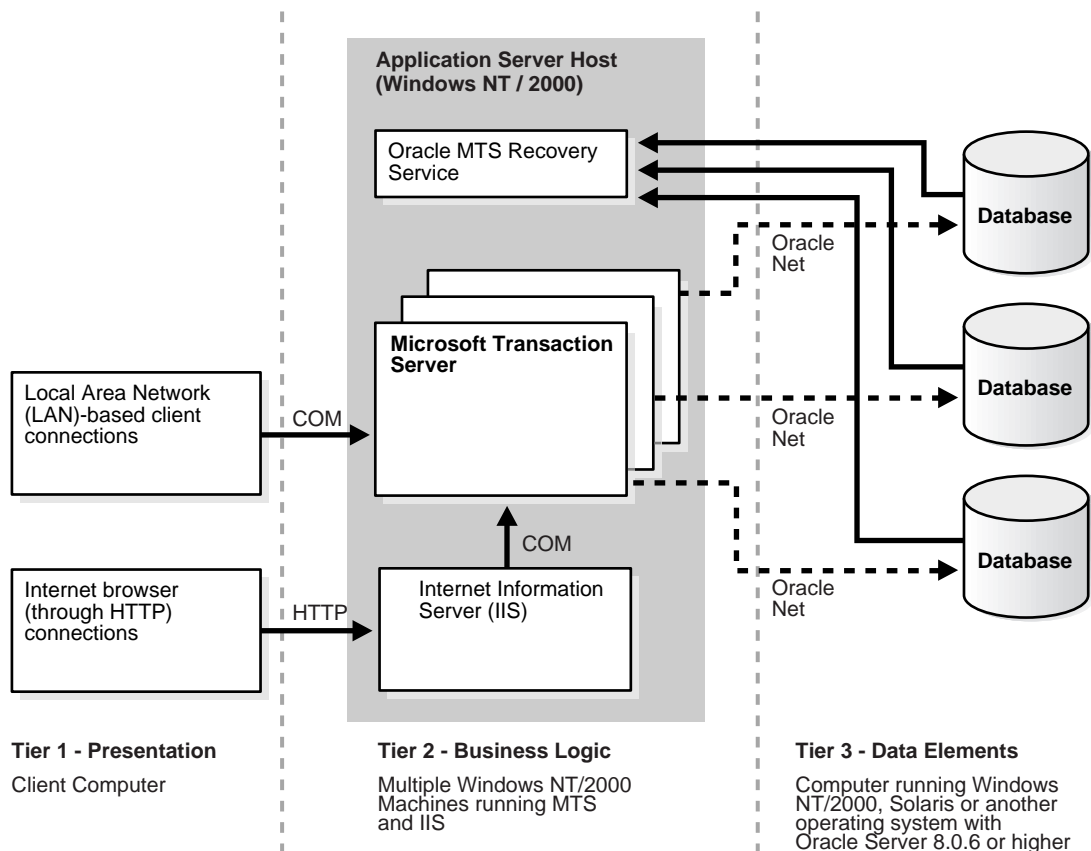
## Developing Internet Applications

Oracle provides Windows extensions for internet development, enabling access from any client, such as:

- Any browser
- Windows or Macintosh client
- FTP client
- Database client
- COM/COM+ client
- CORBA client
- E-mail client

The Oracle data access interfaces and development tools, along with Microsoft Transaction Server integration, can be used to build internet applications, as illustrated in [Figure 10-1, "Microsoft Transaction Server and Oracle Database Integration"](#).

**Figure 10–1 Microsoft Transaction Server and Oracle Database Integration**



## Building External Procedures

This section describes how to create and use **external procedures** on Windows. The following files are located in `ORACLE_BASE\ORACLE_HOME\rdbms\extproc`:

- `extern.c` Code example shown in "Task 2: Writing an External Procedure"
- `make.bat` Batch file that builds the **dynamic link library**
- `extern.sql` Automates the instructions described in "Task 4: Registering an External Procedure" and "Task 5: Executing an External Procedure"

## External Procedures Overview

External procedures are functions written in a third-generation language (C, for example) and callable from within PL/SQL or SQL as if they were a PL/SQL routine or function. External procedures let you take advantage of the strengths and capabilities of a third-generation programming language in a PL/SQL environment.

---

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**Note:** Oracle also provides a special purpose interface, the call specification, that lets you call external procedures from other languages, as long as they are callable by C.

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The main advantages of external procedures are:

- Performance, because some tasks are performed more efficiently in a third-generation language than in PL/SQL, which is better suited for SQL transaction processing
- Code re-usability, because dynamic link libraries (DLLs) can be called directly from PL/SQL programs on the server or in client tools such as Oracle Forms

You can use external procedures to perform specific processes:

- Solving scientific and engineering problems
- Analyzing data
- Controlling real-time devices and processes

To create and use an external procedure, perform the following sequential steps:

- [Task 1: Installing and Configuring](#)
- [Task 2: Writing an External Procedure](#)
- [Task 3: Building a DLL](#)
- [Task 4: Registering an External Procedure](#)
- [Task 5: Executing an External Procedure](#)

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**Note:** You must have a C compiler and linker installed on your system to build DLLs.

---

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**Attention:** You can combine the instructions described in the fourth and fifth tasks into one SQL script that automates the task of registering and executing your external procedure. For an example of a SQL script that combines these steps, see

`ORACLE_BASE\ORACLE_HOME\rdbms\extproc\extern.sql`

---

---

## Task 1: Installing and Configuring

This section describes the installation and configuration of the Oracle9i database and **Oracle Net**.

### Installing the Oracle9i Database

Follow the steps in your Oracle9i Database installation guide for Windows to install these products on your Windows server:

- Oracle9i Enterprise Edition, Oracle9i Standard Edition, or Oracle9i Personal Edition. Each type contains PL/SQL, from which external procedures are called, and the PL/SQL external procedure program (EXTPROC), which runs external procedures.

- Oracle Net Client
- Oracle Net Server
- **Oracle Protocol Support**

### Configuring Oracle Net

If you install Oracle Net Server from your CD-ROM, then your server network files are automatically configured to use external procedures.

When PL/SQL calls an external procedure, the Oracle Net Listener starts a session-specific process called EXTPROC. Through Oracle Net, PL/SQL passes the following information to EXTPROC:

- DLL name
- External procedure name
- Parameters (if necessary)

EXTPROC then loads the DLL and starts the external procedure.

If you copy your server network files into your Oracle9i network files directory, then you must manually configure the following files for the external procedure behavior described previously to occur:

- `ORACLE_BASE\ORACLE_HOME\network\admin\listener.ora`
- `ORACLE_BASE\ORACLE_HOME\network\admin\tnsnames.ora`

See the *Oracle9i Net Services Administrator's Guide* for instructions.

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---

**Note:** The `sqlnet.ora` file requires no changes. By default, the values for the parameters `NAMES.DEFAULT_DOMAIN` and `NAME.DEFAULT_ZONE` are set to `world`. These values match with the `.world` extension on the end of `EXTPROC_CONNECTION_DATA` in the `tnsnames.ora` file.

---

---

## Task 2: Writing an External Procedure

Using a third-generation programming language, you can write functions to be built into DLLs and started by EXTPROC. The following is a simple Microsoft Visual C++ example of an external procedure:

---

---

**Note:** Because external procedures are built into DLLs, they must be explicitly exported. In this example, the `DLL_EXPORT` storage class modifier exports the function `FIND_MAX` from a dynamic link library.

---

---

```
#include <windows.h>
#define NullValue -1
/*
    This function tests if x is at least as big as y.
*/
long __declspec(dllexport) find_max(long x,
short x_indicator,
long y,
short y_indicator,
short *ret_indicator)
{
    /* It can be tricky to debug DLL's that are being called by a process
       that is spawned only when needed, as in this case.
       Therefore try using the DebugBreak(); command.
       This will start your debugger. Uncomment the line with DebugBreak();
       in it and you can step right into your code.
    */
    /* DebugBreak(); */

    /* First check to see if you have any nulls. */
    /* Just return a null if either x or y is null. */

    if ( x_indicator==NullValue || y_indicator==NullValue) {
        *ret_indicator = NullValue;
        return(0);
    } else {
        *ret_indicator = 0;          /* Signify that return value is not null. */
        if (x >= y) return x;
        else return y;
    }
}
```

### Task 3: Building a DLL

After writing your external procedure(s) in a third-generation programming language, use the appropriate compiler and linker to build a DLL, making sure to



export the external procedures as noted previously. See your compiler and linker documentation for instructions on building a DLL and exporting its functions.

After building the DLL, you can move it to any directory on your system. For the example in Task 2, you can build the external procedure `find_max` into a DLL called `extern.dll` by going to `ORACLE_BASE\ORACLE_HOME\rdbms\extproc` and typing `make`.

## Task 4: Registering an External Procedure

Once you have built a DLL containing your external procedure(s), you must register your external procedure(s) with the Oracle9i database:

To create a PL/SQL library to map to the DLL:

1. Start SQL\*Plus:

```
C:\> sqlplus
```

2. Connect to the database with the appropriate **username** and password.
3. Create the PL/SQL library using the `CREATE LIBRARY` command:

```
SQL> CREATE LIBRARY externProcedures AS 'C:\oracle\ora81\rdbms\
extproc\extern.dll';
```

where `externProcedures` is an alias library (essentially a schema object in the database), and `C:\oracle\ora81\rdbms\extproc\extern.dll` is the path to the Windows operating system `dll` `extern.dll`. This example uses `C:\oracle` as your Oracle base and `\ora90` as your Oracle home.

---

---

**Note:** The DBA must grant the `EXECUTE` **privilege** on the PL/SQL library to users who want to call the library's external procedure from PL/SQL or SQL.

---

---

4. Create a PL/SQL program unit specification.

Do this by writing a PL/SQL subprogram that uses the `EXTERNAL` clause instead of declarations and a `BEGIN . . . END` block. The `EXTERNAL` clause is the interface between PL/SQL and the external procedure. The `EXTERNAL` clause identifies the following information about the external procedure:

- Name
- DLL alias

- Programming language in which it was written
- Calling standard (defaults to C if omitted)

In the following example, `externProcedures` is a DLL alias. You need the `EXECUTE` privilege for this library. The external procedure to call is `find_max`. If enclosed in double quotation marks, it becomes case-sensitive. The `LANGUAGE` term specifies the language in which the external procedure was written.

```
CREATE OR REPLACE FUNCTION PLS_MAX(  
  x BINARY_INTEGER,  
  y BINARY_INTEGER)  
RETURN BINARY_INTEGER AS  
  EXTERNAL LIBRARY externProcedures  
  NAME "find_max"  
  LANGUAGE C  
  PARAMETERS (  
    x long,                -- stores value of x  
    x_INDICATOR short,     -- used to determine if x is a NULL value  
    y long,                -- stores value of y  
    y_INDICATOR short      -- used to determine if y is a NULL value  
  RETURN INDICATOR short ); -- need to pass pointer to return value's  
                             -- indicator variable to determine if NULL  
-- This means that my function will be defined as:  
-- long max(long x, short x_indicator,  
-- long y, short y_indicator, short * ret_indicator)
```

## Task 5: Executing an External Procedure

To run an external procedure, you must call the PL/SQL program unit (that is, the alias for the external function) that registered the external procedure. These calls can appear in any of the following:

- Anonymous blocks
- Standalone and packaged subprograms
- Methods of an object type
- Database triggers
- SQL statements (calls to packaged functions only)

In ["Task 4: Registering an External Procedure"](#), the PL/SQL function `PLS_MAX` registered the external procedure `find_max`. Follow these steps to run `find_max`:

1. Call the PL/SQL function `PLS_MAX` from a PL/SQL routine named `UseIt`:

```
SET SERVER OUTPUT ON
CREATE OR REPLACE PROCEDURE UseIt AS
    a integer;
    b integer;
    c integer;
BEGIN
    a := 1;
    b := 2;
    c := PLS_MAX(a,b);
    dbms_output.put_line('The maximum of '||a||' and '||b||' is '||c);
END;
```

2. Run the routine:

```
SQL> EXECUTE UseIt;
```

## Debugging External Procedures

Usually, when an external procedure fails, its C prototype is faulty. That is, the prototype does not match the one generated internally by PL/SQL. This can happen if you specify an incompatible C datatype. For example, to pass an `OUT` parameter of type `REAL`, you must specify `float *`. Specifying `float`, `double *`, or any other C datatype will result in a mismatch.

In such cases, you might get a `lost RPC connection to external procedure agent error`, which means that agent `extproc` terminated abnormally because the external procedure caused a core dump. To avoid errors when declaring C prototype parameters, refer to the *Oracle9i Data Cartridge Developer's Guide*.

## Using Package `DEBUG_EXTPROC`

To help you debug external procedures, PL/SQL provides the utility package `DEBUG_EXTPROC`. To install the package, run the script `dbgextp.sql`, which you can find in the PL/SQL demo directory.

To use the package, follow the instructions in `dbgextp.sql`. Your Oracle account must have `EXECUTE` privileges on the package and `CREATE LIBRARY` privileges.

To debug external procedures:

1. From the Windows Task Manager, in the Processes dialog, select `ExtProc.exe`.
2. Right click, and select `Debug`.

3. Select OK in the message box.

If you have built your DLL in a debug fashion with Microsoft Visual C++, then Visual C++ is activated.

4. In the Visual C++ window, select Edit > Breakpoints.

Use the breakpoint identified in `dbgextp.sql` in the PL/SQL demo directory.

**See Also:**

- `ORACLE_BASE\ORACLE_HOME\rdbms\extproc\readme.doc` (explains how to run the sample and provides debugging advice)
- *PL/SQL User's Guide and Reference*
- *Oracle9i Java Developer's Guide*
- "Calling External Procedures" in *Oracle9i Application Developer's Guide - Fundamentals*
- *Oracle9i Data Cartridge Developer's Guide*

## Accessing Web Data with Intercartridge Exchange

This section discusses the following topics:

- [Configuring Intercartridge Exchange](#)
- [Using Intercartridge Exchange](#)
- [UTL\\_HTTP Exception Conditions](#)
- [Exception Conditions and Error Messages](#)

## Configuring Intercartridge Exchange

You must add a parameter to the [registry](#) before using Intercartridge Exchange.

1. Start the Registry Editor from the MS-DOS command prompt:

```
C:\> regedt32
```

The *Registry Editor* window appears.

---

**Note:** For another way to configure your registry, see "[Modifying a Registry Value with regedt32](#)" on page 9-14 in this manual

---

2. Add HTTP\_PROXY to the registry subkey of the Oracle home directory that you are using. The location of this parameter is determined by how many Oracle home directories are on your computer. If you have only one home directory, add HTTP\_PROXY to

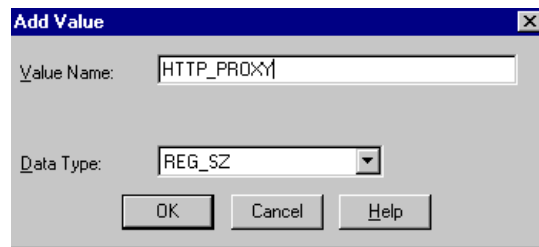
HKEY\_LOCAL\_MACHINE\SOFTWARE\ORACLE\HOME0.

If you have more than one home directory, add it to

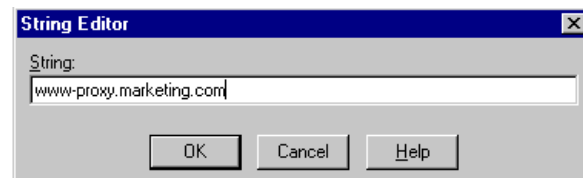
HKEY\_LOCAL\_MACHINE\SOFTWARE\ORACLE\HOMEID

where *ID* is incremented for each additional Oracle home directory on your computer.

3. Choose Add Value from the Edit menu.  
The *Add Value* dialog box appears.
4. Type HTTP\_PROXY in the Value Name text box and REG\_SZ in the Data Type text box.



5. Click OK.
6. Type `www-proxy.your-site` in the String text box,



In this example, the Web site is `marketing.com`. You will enter the domain name of your actual Web site.

## Using Intercartridge Exchange

Intercartridge Exchange enables you to use a stored package called UTL\_HTTP to make Hypertext Transfer Protocol (HTTP) calls from PL/SQL, SQL, and SQL\*Plus statements.

UTL\_HTTP can do both of the following:

- Access data on the Internet
- Call Oracle Web Application Server cartridges

UTL\_HTTP contains two similar entry points, known as packaged functions, that turn PL/SQL and SQL statements into HTTP callouts:

- UTL\_HTTP.REQUEST
- UTL\_HTTP.REQUEST\_PIECES

Both packaged functions perform the following tasks:

- Take a string universal resource locator (URL) of a site
- Contact that site
- Return the data (typically HTML) obtained from that site

The declarations to use with both packaged functions are described in the following subsections.

### Packaged Function UTL\_HTTP.REQUEST

UTL\_HTTP.REQUEST uses a URL as its argument and returns up to the first 2000 bytes of data retrieved from that URL. Specify UTL\_HTTP.REQUEST as follows:

```
FUNCTION REQUEST (URL IN VARCHAR2) RETURN VARCHAR2;
```

To use UTL\_HTTP.REQUEST from SQL\*Plus, enter:

```
SQL> SELECT UTL_HTTP.REQUEST( 'HTTP://WWW.ORACLE.COM/' ) FROM DUAL;
```

which returns:

```
UTL_HTTP.REQUEST( 'HTTP://WWW.ORACLE.COM/' )
-----
<html>
<head><title>Oracle Corporation Home Page</title>
<!--changed Jan. 16, 19
1 row selected.
```

## Packaged Function UTL\_HTTP.REQUEST\_PIECES

UTL\_HTTP.REQUEST\_PIECES uses a URL as its argument and returns a PL/SQL table of 2000 bytes of data retrieved from the given URL. The final element can be shorter than 2000 characters. The UTL\_HTTP.REQUEST\_PIECES return type is a PL/SQL table of type UTL\_HTTP.HTML\_PIECES.

UTL\_HTTP.REQUEST\_PIECES, which uses type UTL\_HTTP.HTML\_PIECES, is specified as:

```
type html_pieces is table of varchar2(2000) index by binary_integer;
function request_pieces (url in varchar2,
    max_pieces natural default 32767)
return html_pieces;
```

A call to REQUEST\_PIECES can look like this example. Note the use of the PL/SQL table method COUNT to discover the number of pieces returned; it can be zero or more:

```
declare pieces utl_http.html_pieces;
begin
    pieces := utl_http.request_pieces('http://www.oracle.com/');
    for i in 1 .. pieces.count loop
        .... -- process each piece
    end loop;
end;
```

The second argument to UTL\_HTTP.REQUEST\_PIECES (MAX\_PIECES) is optional. MAX\_PIECES is the maximum number of pieces (each 2000 characters in length, except for the last, which can be shorter) that UTL\_HTTP.REQUEST\_PIECES returns. If provided, that argument is usually a positive integer.

For example, the following block retrieves up to 100 pieces of data (each 2000 bytes, except perhaps the last) from the URL. The block prints the number of pieces retrieved and the total length, in bytes, of the data retrieved.

```
set serveroutput on
/
declare
    x utl_http.html_pieces;
begin
    x := utl_http.request_pieces('http://www.oracle.com/', 100);
    dbms_output.put_line(x.count || ' pieces were retrieved. ');
    dbms_output.put_line('with total length ');
    if x.count < 1
    then dbms_output.put_line('0');
    else dbms_output.put_line
```

```
((2000 * (x.count - 1)) + length(x(x.count)));
    end if;
end;
/
```

which displays:

```
Statement processed.
4 pieces were retrieved.
with total length
7687
```

The elements of the PL/SQL table returned by UTL\_HTTP.REQUEST\_PIECES are successive pieces of data obtained from the HTTP request to that URL.

## UTL\_HTTP Exception Conditions

This subsection describes the exceptions (errors) that can be raised by packaged functions UTL\_HTTP.REQUEST and UTL\_HTTP.REQUEST\_PIECES.

### UTL\_HTTP.REQUEST

PRAGMA RESTRICT\_REFERENCES enables the display of exceptions:

```
create or replace package utl_http is
function request (url in varchar2) return varchar2;
pragma restrict_references (request, wnds, rnds, wnps, rnps);
```

### UTL\_HTTP.REQUEST\_PIECES

PRAGMA RESTRICT\_REFERENCES enables the display of exceptions:

```
create or replace package utl_http is
type html_pieces is table of varchar2(2000) index by binary_integer;
function request_pieces (url in varchar2,
    max_pieces natural default 32767)
return html_pieces;
pragma restrict_references (request_pieces, wnds, rnds, wnps, rnps);
```

## Exception Conditions and Error Messages

If initialization of the HTTP callout subsystem fails for environmental reasons (such as lack of available memory), then exception UTL\_HTTP.INIT\_FAILED is raised:

```
init_failed exception;
```



If the HTTP call fails due to failure of the HTTP daemon or because the argument to REQUEST or REQUEST\_PIECES cannot be interpreted as a URL (because it is NULL or has non-HTTP syntax), then exception UTL\_HTTP.REQUEST\_FAILED is raised:

```
request_failed exception;
```

Unless explicitly caught by an exception handler, these first two exceptions are reported by a generic message that shows them as "user-defined" exceptions, even though they are defined in this system package:

```
ORA-06510: PL/SQL: unhandled user-defined exception
```

If any other exception is raised during the processing of the HTTP request (for example, an out-of-memory error), then function UTL\_HTTP.REQUEST or UTL\_HTTP.REQUEST\_PIECES reraises that exception.

If no response is received from a request to the given URL, because the function made no contact with a site corresponding to that URL, then a formatted HTML error message may be returned:

```
<HTML>
<HEAD>
<TITLE>Error Message</TITLE>
</HEAD>
<BODY>
<H1>Fatal Error 500</H1>
Can't Access Document: http://home.nothing.comm.
<P>
<B>Reason:</B> Can't locate remote host: home.nothing.comm.
<P>
<P><HR>
<ADDRESS><A HREF="http://www.w3.org">
CERN-HTTPD3.0A</A></ADDRESS>
</BODY>
</HTML>
```

If UTL\_HTTP.REQUEST or UTL\_HTTP.REQUEST\_PIECES raises an exception or returns an HTML-formatted error message, yet you believe that the URL argument is correct, try contacting that same URL with a browser to verify network availability from your computer.



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## Error Messages

This appendix lists the error messages, causes, and corrective actions that are specific to the operation of Oracle9i for Windows. This appendix also includes database connection issues.

This appendix contains these topics:

- [Logging Error Messages](#)
- [ORA-09275: CONNECT INTERNAL No Longer Supported](#)
- [OSD-04000 to OSD-04599: Windows NT-Specific Oracle Messages](#)
- [DIM-00000 to DIM-00039: ORADIM Command Syntax Errors](#)
- [Database Connection Issues](#)

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**Note:** The `ora.hlp` file, which was shipped in previous releases, is no longer available. See this Appendix, *Oracle9i Database Error Messages*, and *Oracle Enterprise Manager Messages Manual* for information on error messages.

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## Logging Error Messages

Keep a log of error messages you receive by redirecting the messages to a file. You can record the contents of normal utility messages by using the `LOGFILE` parameter discussed in *Oracle9i Database Utilities*. You can separately record the error message portion by using standard Windows NT file redirection. For example, use the following syntax to redirect the output from the Export Utility:

```
C:\> exp USERNAME/PASSWORD parfile=FILENAME >file1.log 2>file2.err
```

With this command line, `file1.log` receives the standard output from the Export utility, while `file2.err` receives the standard error messages.

## ORA-09275: CONNECT INTERNAL No Longer Supported

### ORA-09275

*Connect internal is no longer supported*

**Cause:** `CONNECT INTERNAL` is no longer supported.

**Action:** Connect to the database as `CONNECT / AS SYSDBA` or an existing user with the appropriate password.

## OSD-04000 to OSD-04599: Windows NT-Specific Oracle Messages

The error messages in this section are Oracle operating system-dependent (OSD) messages displayed in response to an error condition in Windows NT. Each message in this section triggers an Oracle9i database error message.

The error messages appear first in summary tables consisting of error numbers and the corresponding error message. Following the tables is a more detailed discussion of errors, including causes and corrective actions.

- [File I/O Errors: OSD-04000 to OSD-04099](#)
- [Memory Errors: OSD-04100 to OSD-04199](#)
- [Process Errors: OSD-04200 to OSD-04299](#)
- [Loader Errors: OSD-04300 to OSD-04399](#)
- [Semaphore Errors: OSD-04400 to OSD-04499](#)
- [Miscellaneous Errors: OSD-04500 to OSD-04599](#)

<b>File I/O Errors:</b>	<b>OSD-04000 to OSD-04099</b>
4000	Logical block size mismatch
4001	Invalid logical block size
4002	Unable to open file
4003	Unable to read file header block
4004	Invalid file header
4005	SetFilePointer() failure, unable to read from file
4006	ReadFile() failure, unable to read from file
4007	Truncated read
4008	WriteFile() failure, unable to write to file
4009	Truncated write
4010	<create> option specified, file already exists
4011	GetFileInformationByHandle() failure, unable to obtain file info
4012	File size mismatch
4013	Unable to read line from file
4014	Unable to close file
4015	An asynchronous I/O request returned an error
4016	Error queuing an asynchronous I/O request
4017	Unable to open the specified RAW device
4018	Unable to access the specified directory or device
4019	Unable to set file pointer
4020	Unable to set eof file marker
4021	Unable to read file
4022	Unable to write file
4023	SleepEx() failure, unable to Sleep
4024	Unable to delete file
4025	Invalid question asked
4026	Invalid parameter passed

<b>Memory Errors:</b>	<b>OSD-04100 to OSD-04199</b>
4100	malloc() failure, unable to allocate memory
4101	Invalid SGA: SGA not initialized
4102	Unable to open/create file for shared memory object
4103	Unable to attach to SGA: SGA does not exist
4104	Unable to map shared memory (SGA) into the address space
4105	Shared memory (SGA) mapped to wrong address
4106	Unable to allocate memory with VirtualAlloc
4107	Unable to deallocate memory with VirtualFree
4108	Unable to protect memory with VirtualProtect

<b>Process Errors:</b>	<b>OSD-04200 to OSD-04299</b>
4200	Unable to begin another thread
4201	No pid structure supplied to spdcr()
4202	DosSetPriority() failure, unable to set process priority
4203	DosKillProcess() failure, unable to kill process
4204	Invalid pid
4205	CreateProcess() failure, unable to spawn process
4207	Invalid priority specified in CONFIG parameter ORACLE_PRIORITY
4208	OpenProcess() failure, unable to open process handle
4209	Incorrect or unknown background image name given to spdcr()
4210	Timeout waiting for thread semaphore
4211	Thread information not found
4212	Maximum number of ORACLE threads reached
4213	ORACLE thread unable to DuplicateHandle()
4214	ORACLE thread unable to CreateEvent()
4215	Bad function code supplied to ssthreadop
4216	Unable to find file handle for that thread
4217	Unable to retrieve system username for current user
4218	Cannot post thread

<b>Process Errors:            OSD-04200 to OSD-04299</b>	
4219	Bad thread list semaphore
4221	Target thread is currently busy
4222	Unable to get the threads context
4223	Unable to set the threads context
4224	Unable to suspend the target thread
4225	Unable to resume the target thread
<b>Loader Errors:            OSD-04300 to OSD-04399</b>	
4300	Unable to read complete record from datafile
4301	Record size too large
4302	Invalid record type, load options, or both
<b>Semaphore Errors:        OSD-04400 to OSD-04499</b>	
4400	Unable to acquire internal semaphore for process
4401	WaitForSingleObject() failure, unable to obtain semaphore
<b>Miscellaneous Errors:    OSD-04500 to OSD-04599</b>	
4500	Illegal option specified
4501	Internal buffer overflow
4502	Translations nested too deep
4503	Text contains no translatable elements
4505	stdin not responding
4506	Unable to spawn process via system()
4510	Operating system roles are not supported
4511	Unable to get date and time from the operating system
4512	Unable to translate the 'USERNAME' config.ora variable on server
4513	'remote_os_authent' init.ora variable not set to true
4514	The Windows Group name is too long for internal buffer
4515	This command is not implemented at this time

## File I/O Errors: OSD-04000 to OSD-04099

### OSD-04000

*Logical block size mismatch*

**Cause:** The database block size specified in the **initialization parameter file (init.ora)** does not match the block size of the actual database files.

**Action:** Use matching logical block sizes.

### OSD-04001

*Invalid logical block size*

**Cause:** The logical block size is not a multiple of 512 bytes, or it is too large.

**Action:** Change the value of `DB_BLOCK_SIZE` in the initialization parameter file.

### OSD-04002

*Unable to open file*

**Cause:** The specified path or filename is invalid, or the destination device is full. This error can also be caused by insufficient Windows NT file handles.

**Action:** Make sure the path and file exist, and the device has free space. If this fails, then increase the number of Windows NT file handles.

### OSD-04003

*Unable to read file header block*

**Cause:** The media has been damaged.

**Action:** Recover the file, if necessary, and verify that Windows NT is functioning correctly.

### OSD-04004

*Invalid file header*

**Cause:** The file is damaged.

**Action:** Recover the file.



**OSD-04005**

*SetFilePointer() failure, unable to read from file*

**Cause:** There was an unexpected return from the Windows NT system service SetFilePointer().

**Action:** Check the operating system error code and consult the Windows NT documentation.

**OSD-04006**

*ReadFile() failure, unable to read from file*

**Cause:** There was an unexpected return from the Windows NT system service ReadFile().

**Action:** Check the operating system error code and consult the Windows NT documentation.

**OSD-04007**

*Truncated read*

**Cause:** The system encountered an unexpected end-of-file, which is due to damaged media.

**Action:** Verify that the file is not damaged.

**OSD-04008**

*WriteFile() failure, unable to write to file*

**Cause:** There was an unexpected return from the Windows NT system service WriteFile().

**Action:** Check the operating system error code and consult the Windows NT documentation.

**OSD-04009**

*Truncated write*

**Cause:** The destination device is full, or the media is damaged.

**Action:** Verify that the device has free space and that the file is not damaged.

**OSD-04010**

*<create> option specified, file already exists*

**Cause:** The file you attempted to create already exists.

**Action:** Delete the existing file or use the REUSE option in the SQL statement.

**OSD-04011**

*GetFileInformationByHandle() failure, unable to obtain file info*

**Cause:** There was an unexpected return from the Windows NT system service GetFileInformationByHandle().

**Action:** Check the operating system error code and consult the Windows NT documentation.

**OSD-04012**

*File size mismatch*

**Cause:** The file to be re-used is either too large or too small.

**Action:** Specify the correct file size or delete the existing file.

**OSD-04013**

*Unable to read line from file*

**Cause:** This error is caused by an operating system error or by damaged media.

**Action:** Check the operating system error code (if available) and consult the Windows NT documentation. If no operating system error code is presented, then verify that the media is not damaged.

**OSD-04014**

*Unable to close file*

**Cause:** The media has been damaged.

**Action:** Recover the file, if necessary, and verify that Windows NT is functioning correctly.

**OSD-04015**

*Asynchronous I/O request returned an error*

**Cause:** There was an unexpected return from the Windows NT system service.

**Action:** Check the operating system error code and consult the Windows NT documentation.

**OSD-04016**

*Error queuing an asynchronous I/O request*

**Cause:** There was an unexpected return from the Windows NT system service.

**Action:** Check the operating system error code and consult the Windows NT documentation.

**OSD-04017**

*Unable to open the specified RAW device*

**Cause:** An invalid path or filename was specified, or the device is full.

**Action:** Make sure the file exists and the device is not full; verify that the operating system is functioning correctly.

**OSD-04018**

*Unable to access the specified directory or device*

**Cause:** An invalid path name was specified.

**Action:** Make sure the directory or device exists and is accessible.

**OSD-04019**

*Unable to set file pointer*

**Cause:** This error is caused by an operating system error or by damaged media.

**Action:** Check the operating system error code (if available) and consult the Windows NT documentation. If no operating system error code is presented, then verify that the media is not damaged.

**OSD-04020**

*Unable to set eof file marker*

**Cause:** This error is caused by an operating system error or by damaged media.

**Action:** Check the operating system error code (if available) and consult the Windows NT documentation. If no operating system error code is presented, then verify that the media is not damaged.

**OSD-04021**

*Unable to read file*

**Cause:** This error is caused by an operating system error or by damaged media.

**Action:** Check the operating system error code (if available) and consult the Windows NT documentation. If no operating system error code is presented, then verify that the media is not damaged.

**OSD-04022**

*Unable to write file*

**Cause:** This error is caused by an operating system error or by damaged media.

**Action:** Check the operating system error code (if available) and consult the Windows NT documentation. If no operating system error code is presented, then verify that the media is not damaged.

### **OSD-04023**

*SleepEx() failure, unable to Sleep*

**Cause:** There was an unexpected return from the Windows NT system service.

**Action:** Check the operating system error code and consult the Windows NT documentation.

### **OSD-04024**

*Unable to delete file*

**Cause:** This error is caused by an operating system error or by damaged media.

**Action:** Check the operating system error code (if available) and consult the Windows NT documentation. If no operating system error code is presented, then verify that the media is not damaged.

### **OSD-04025**

*Invalid question asked*

**Cause:** This is an internal error, not normally expected to occur.

**Action:** Contact Oracle Support Services.

### **OSD-04026**

*Invalid parameter passed*

**Cause:** This is an internal error, not normally expected to occur.

**Action:** Contact Oracle Support Services.

## **Memory Errors: OSD-04100 to OSD-04199**

### **OSD-04100**

*Malloc() failure, unable to allocate memory*

**Cause:** The program is out of memory.

**Action:** Shut down all unnecessary processes or install more memory in the computer.

### **OSD-04101**

*Invalid SGA: SGA not initialized*

**Cause:** The System Global Area (SGA) has been allocated but not initialized.

**Action:** Wait until the STARTUP has completed before attempting to connect.

**OSD-04102**

*Unable to open/create file for shared memory object*

**Cause:** There was an unexpected return from the Windows NT system service CreateFile().

**Action:** Check the operating system error code and consult the Windows NT documentation.

**OSD-04103**

*Unable to attach to SGA: SGA does not exist*

**Cause:** The SGA does not exist.

**Action:** Start up an Oracle [instance](#).

**OSD-04104**

*Unable to map shared memory (SGA) into the address space*

**Cause:** There was an unexpected return from the Windows NT system service MapViewOfFileEx().

**Action:** Check the operating system error code and consult the Windows NT documentation.

**OSD-04105**

*Shared memory (SGA) mapped to wrong address*

**Cause:** There was an unexpected return from the Windows NT system service MapViewOfFileEx().

**Action:** Check the operating system error code and consult the Windows NT documentation.

**OSD-04106**

*Unable to allocate memory with VirtualAlloc*

**Cause:** The program is out of memory.

**Action:** Shut down all unnecessary processes or install more memory in the computer.

**OSD-04107**

*Unable to deallocate memory with VirtualFree*

**Cause:** There was an unexpected return from the Windows NT system service VirtualFree().

**Action:** Check the operating system error code and consult the Windows NT documentation.

**OSD-04108**

*Unable to protect memory with VirtualProtect*

**Cause:** There was an unexpected return from the Windows NT system service VirtualProtect().

**Action:** Check the operating system error code and consult the Windows NT documentation.

**Process Errors: OSD-04200 to OSD-04299**

**OSD-04200**

*Unable to begin another thread*

**Cause:** The program has run out of system resources.

**Action:** Shut down all unnecessary processes; install more memory in the computer.

**OSD-04201**

*No pid structure supplied to spdcr()*

**Cause:** This is an internal error, not normally expected to occur.

**Action:** Contact Oracle Support Services.

**OSD-04202**

*DosSetPriority() failure, unable to set process priority*

**Cause:** There was an unexpected return from the Windows NT system service DosSetPriority().

**Action:** Check the operating system error code and consult the Windows NT documentation.

**OSD-04203**

*DosKillProcess() failure, unable to kill process*

**Cause:** There was an unexpected return from the Windows NT system service DosKillProcess().

**Action:** Check the operating system error code and consult the Windows NT documentation.

**OSD-04204**

*Invalid pid*

**Cause:** Process ID not recognized by system; process previously terminated.

**Action:** Verify that process ID is correct and that process is active.

**OSD-04205**

*CreateProcess() failure, unable to spawn process*

**Cause:** There was an unexpected return from the Windows NT system service CreateProcess().

**Action:** Check the operating system error code and consult the Windows NT documentation.

**OSD-04207**

*Invalid priority specified in CONFIG parameter ORACLE\_PRIORITY*

**Cause:** The priority specified is invalid or out of range.

**Action:** Specify a valid setting for ORACLE\_PRIORITY.

**OSD-04208**

*OpenProcess() failure, unable to open process handle*

**Cause:** There was an unexpected return from the Windows NT system service OpenProcess().

**Action:** Check the operating system error code and consult the Windows NT documentation.

**OSD-04209**

*Incorrect or unknown background image name given to spdcr()*

**Cause:** There was an unexpected background name given to spdcr().

**Action:** Contact Oracle Support Services.

**OSD-04210**

*Timeout waiting for thread semaphore*

**Cause:** An Oracle database thread died holding the semaphore.

**Action:** Restart Oracle database instance.

**OSD-04211**

*Thread information not found*

**Cause:** An Oracle database thread died without deleting its information.

**Action:** Restart Oracle database instance.

**OSD-04212**

*Maximum number of Oracle threads reached*

**Cause:** The maximum number of Oracle database threads for the instance is reached.

**Action:** Wait until some connections exit before trying again.

**OSD-04213**

*Oracle thread unable to DuplicateHandle()*

**Cause:** This is an internal error, not normally expected to occur.

**Action:** Contact Oracle Support Services.

**OSD-04214**

*Oracle thread unable to CreateEvent()*

**Cause:** This is an internal error, not normally expected to occur.

**Action:** Contact Oracle Support Services.

**OSD-04215**

*Bad function code supplied to ssthreadop*

**Cause:** This is an internal error, not normally expected to occur.

**Action:** Contact Oracle Support Services.

**OSD-04216**

*Unable to find file handle for that thread*

**Cause:** This is an internal error, not normally expected to occur.

**Action:** Contact Oracle Support Services.

**OSD-04217**

*Unable to retrieve system username for current user*

**Cause:** This is an internal error, not normally expected to occur.

**Action:** Contact Oracle Support Services.

**OSD-04218**

*Cannot post thread*

**Cause:** This is an internal error, not normally expected to occur.

**Action:** Contact Oracle Support Services.



**OSD-04219***Bad thread list semaphore***Cause:** This is an internal error, not normally expected to occur.**Action:** Contact Oracle Support Services.**OSD-04221***Target thread is currently busy***Cause:** The target thread is processing an oradebug command.**Action:** Wait and resend command.**OSD-04222***Unable to get the threads context***Cause:** Check operating system error code.**Action:** Remedy operating system error.**OSD-04223***Unable to set the threads context***Cause:** Check operating system error code.**Action:** Remedy operating system error.**OSD-04224***Unable to suspend the target thread***Cause:** Check operating system error code.**Action:** Remedy operating system error.**OSD-04225***Unable to resume the target thread***Cause:** Check operating system error code.**Action:** Remedy operating system error.

## Loader Errors: OSD-04300 to OSD-04399

### OSD-04300

*Unable to read complete record from datafile*

**Cause:** The datafile ended in the middle of a record. This error occurs when loading files with a fixed record length.

**Action:** Verify that the datafile is of the correct length and contains complete records.

### OSD-04301

*Record size too large*

**Cause:** The specified record size is too large to load.

**Action:** Reduce record size and reload the data.

### OSD-04302

*Invalid record type, load options, or both*

**Cause:** The control file's Windows NT file processing options string contains an invalid option or keyword.

**Action:** Set the Windows NT file processing options string to an acceptable value.

## Semaphore Errors: OSD-04400 to OSD-04499

### OSD-04400

*Unable to acquire internal semaphore for process*

**Cause:** Oracle database has exceeded the maximum number of connections.

**Action:** Delete any unused connections and try again.

### OSD-04401

*WaitForSingleObject() failure, unable to obtain semaphore*

**Cause:** There was an unexpected return from the Windows NT system service WaitForSingleObject().

**Action:** Check the operating system error code and consult the Windows NT documentation.

## Miscellaneous Errors: OSD-04500 to OSD-04599

### OSD-04500

*Illegal option specified*

**Cause:** This is an internal error, not normally expected to occur.

**Action:** Contact Oracle Support Services.

### OSD-04501

*Internal buffer overflow*

**Cause:** This is an internal error, not normally expected to occur.

**Action:** Contact Oracle Support Services.

### OSD-04502

*Translations nested too deep*

**Cause:** The program encountered too many intermediate translations while attempting to translate a configuration variable.

**Action:** Simplify the values of configuration parameters to include fewer intermediate translations.

### OSD-04503

*Text contains no translatable elements*

**Cause:** The program cannot recognize variables in the text to be translated.

**Action:** Check and, if necessary, correct the text to be translated.

### OSD-04505

*stdin not responding*

**Cause:** The system is unable to receive input from the standard input stream.

**Action:** Verify that the process has access to an input device.

### OSD-04506

*Unable to spawn process via system()*

**Cause:** The system is out of memory or the executable is invalid.

**Action:** Shut down unnecessary processes; install more memory in the computer. Verify the name of the executable.

#### **OSD-04510**

*Operating system roles are not supported*

**Cause:** An attempt was made to use an operating system role.

**Action:** Only use roles that were created 'IDENTIFIED BY PASSWORD' as opposed to 'IDENTIFIED EXTERNALLY'.

#### **OSD-04511**

*Unable to get date and time from the operating system*

**Cause:** There was an unexpected return from GetLocalTime() call.

**Action:** Verify that the system time is correct on the computer.

#### **OSD-04512**

*Unable to translate the 'USERNAME' config.ora variable on server*

**Cause:** The 'USERNAME' configuration parameter variable on the host is not properly set.

**Action:** Verify the 'USERNAME' variable is set.

#### **OSD-04513**

*'remote\_os\_authent' init.ora variable not set to TRUE*

**Cause:** For remote operating system logon to function, the 'REMOTE\_OS\_AUTHENT' parameter must be set to TRUE.

**Action:** Shut down and start up the instance with 'REMOTE\_OS\_AUTHENT = TRUE' in the initialization parameter file.

#### **OSD-04514**

*The Windows NT Group name is too long for internal buffer*

**Cause:** The Windows NT Group name is too long.

**Action:** Use a shorter Windows NT group name.

## DIM-00000 to DIM-00039: ORADIM Command Syntax Errors

ORADIM is a command-line utility for starting and stopping database instances that is only available on Oracle for Windows. It is not available on any other platform.

Oradim Errors	DIM-0000 to DIM-0039
00000	ORADIM completed with no errors
00001	ORADIM: <command> [options]. Please refer to the manual.
00002	Valid commands are: -DELETE, -EDIT, -NEW, -STARTUP, and -SHUTDOWN
00003	An argument is missing for the parameter
00004	Either a SID or service name is mandatory. Please enter a valid SID or service name
00005	You have entered a SID with more than 64 characters
00006	You have entered an empty SID
00007	Missing or invalid -STARTMODE parameter. Valid -STARTMODE parameter is AUTO or MANUAL
00008	A valid service name is OracleService appended with a SID
00009	SID name is mandatory. Please enter a valid SID name
00010	SYSTEM\CurrentControlSet\Services\OracleService key does not exist
00011	The service does not exist
00012	You did not enter a pfile for autostart capability
00013	The service start mode could not be set in the <a href="#">registry</a>
00014	Cannot open the Windows NT Service Control Manager
00015	Cannot start already-running ORACLE - shut it down first
00016	Missing or invalid -SHUTTYPE parameter. A valid -SHUTTYPE parameter is SRVC or INST
00017	Instance shutdown mode must be one of the following: a for abort, i for immediate or n for normal
00018	Failed to stop Oracle Service
00019	Create Service Error
00020	A service for this SID is already created. Please enter a different SID name. No action has been taken
00021	RegOpenkeyEx failed
00022	Please enter one of the following commands
00023	Create an instance by specifying the following parameters:

Oradim Errors	DIM-0000 to DIM-0039
00024	-NEW -SID sid   -SRVC service [-INTPWD password] [-MAXUSERS number] [-STARTMODE a   m] [-PFILE file] [-TIMEOUT secs]
00025	Edit an instance by specifying the following parameters:
00026	-EDIT -SID sid [-NEWSID sid] [-INTPWD passwd] [-STARTMODE a   m] [-PFILE file] [-SHUTMODE a   i   n] [-SHUTTYPE svc   inst]
00027	Delete instances by specifying the following:
00028	-DELETE -SID sid   -SRVC service name
00029	Startup services and instance by specifying the following parameters:
00030	-STARTUP -SID sid [-USRPWD password] [-STARTTYPE svc   inst   svc,inst] [-PFILE filename]
00031	Shutdown services and instance by specifying the following parameters:
00032	-SHUTDOWN -SID sid [-USRPWD password] [-SHUTTYPE svc   inst   svc,inst] [-SHUTMODE a   i   n]
00033	Query for help by specifying the following parameters: -?   -h   -help
00034	You have entered an invalid option for the -NEW command
00035	You have entered an invalid option for the -EDIT command
00036	You have entered an invalid option for the -DELETE command
00037	You have entered an invalid option for the -STARTUP command
00038	You have entered an invalid option for the -SHUTDOWN command
00039	Internal logic error in ORADIM

**DIM-00000**

*ORADIM completed with no errors*

**Cause:** ORADIM has completed without any errors.

**Action:** None.

**DIM-00001**

*ORADIM: <command> [options]. Please refer to the manual.*

**Cause:** Command-line arguments could not be recognized.

**Action:** Usage: ORADIM <command> [options]

Use the following commands:

**To create an instance:**

```
-NEW -SID sid | -SRVC service name [-INTPWD password][-MAXUSERS number]  
[-STARTMODE auto [-PFILE filename]] manual]
```

**To edit an instance:**

```
-EDIT -SID sid [-NEWSID sid][-INTPWD password][-STARTMODE auto  
[-PFILE filename]] manual]
```

**To delete an instance:**

```
-DELETE -SID sid | -SRVC service name
```

**To startup a service and instance:**

```
-STARTUP -SID sid [-USRPWD password][-STARTTYPE srv | inst | srv,inst]  
[-PFILE filename]
```

**To shutdown a service and instance:**

```
-SHUTDOWN -SID sid [-USRPWD password][-SHUTTYPE srv | inst | srv,inst]  
[-SHUTMODE a | i | n]
```

**To query for help**

```
 -? | -h | -help
```

**DIM-00002**

*Valid commands are: -DELETE, -EDIT, -NEW, -STARTUP, and -SHUTDOWN*

**Cause:** You have not entered one of the referenced commands.

**Action:** Use the valid commands.

**DIM-00003**

*An argument is missing for the parameter*

**Cause:** You have entered an invalid argument.

**Action:** Use a valid argument and start the program again.

**DIM-00004**

*Either a SID or service name is mandatory. Please enter a valid SID or service name*

**Cause:** You have not entered the *SID* following *-SID*.

**Action:** Enter a valid *SID* of 64 characters and try again.

**DIM-00005**

*You have entered SID with more than 64 characters*

**Cause:** You have entered a *SID* with more than 64 characters.

**Action:** Change it to 64 or fewer characters and make sure that there is no other service with this name.

**DIM-00006**

*You have entered an empty SID*

**Cause:** Enter a *SID* with 64 characters and make sure that there is no service with this *SID* on your system.

**Action:** Fill in the *SID* and rerun the program.

**DIM-00007**

*Missing or invalid -STARTMODE parameter. Valid -STARTMODE parameter is AUTO or MANUAL*

**Cause:** You have not entered the valid start mode (AUTO or MANUAL).

**Action:** Enter the valid start mode and try again.

**DIM-00008**

*A valid service name is OracleService appended with a SID*

**Cause:** You have entered a service name other than OracleService(*SID*).

**Action:** Correct the name of service and try again.

**DIM-00009**

*SID name is mandatory. Please enter a valid SID name*

**Cause:** You did not enter a *SID*.

**Action:** Enter the *SID* and try again.

**DIM-00010**

*SYSTEM\CurrentControlSet\Services\OracleService key does not exist*

**Cause:** The referenced key is not in the registry.

**Action:** Try reinstalling. If the problem persists, then contact Oracle Support Services.



**DIM-00011**

*The service does not exist*

**Cause:** You have tried to edit a service which does not exist, or there is an error trying to access the registry.

**Action:** Verify service/*SID* name used and try again. Restart if necessary or contact Oracle Support Services.

**DIM-00012**

*You did not enter a pfile for autostart capability*

**Cause:** You did not provide the parameter file for starting the database.

**Action:** Enter the parameter file used to start the database and retry.

**DIM-00013**

*The service start mode could not be set in the registry*

**Cause:** The start mode entry in the registry for the service could not be set.

**Action:** Try again later, restart, or call Oracle Support Services.

**DIM-00014**

*Cannot open the Windows NT Service Control Manager*

**Cause:** The Service Control Manager could not be opened.

**Action:** Restart or call Oracle Support Services.

**DIM-00015**

*Cannot start already-running ORACLE - shut it down first*

**Cause:** The instance is already started; shut it down first.

**Action:** Stop the database before restarting.

**DIM-00016**

*Missing or invalid -SHUTTYPE parameter. A valid -SHUTTYPE parameter is SRVC or INST*

**Cause:** You did not enter a valid shuttype parameter (Service or Instance).

**Action:** Enter parameter to shut the instance or the service and try again.

**DIM-00017**

*Instance shutdown mode must be one of the following: a for abort, i for immediate or n for normal*

**Cause:** You did not enter the correct mode for shutting down the database.

**Action:** Enter the correct mode and try again.

**DIM-00018**

*Failed to stop Oracle Service*

**Cause:** Failed to stop the Oracle Service.

**Action:** Retry. If the error persists, then look at the system error or call Oracle Support Services.

**DIM-00019**

*Create Service Error*

**Cause:** Service could not be created.

**Action:** Look at the detail error.

**DIM-00020**

*A service for this SID is already created. Please enter a different SID name. No action has been taken*

**Cause:** Service with this name already exists.

**Action:** Retry with a different SID.

**DIM-00021**

*RegOpenkeyEx failed*

**Cause:** This is a system error due to the service not existing or Windows error.

**Action:** Retry, restart, or call Oracle Support Services.

**DIM-00022**

*Please enter one of the following commands:*

**DIM-00023**

*Create an instance by specifying the following parameters:*

**DIM-00024**

*-NEW -SID sid | -SRVC service [-INTPWD password] [-MAXUSERS number]  
[-STARTMODE a|m] [-PFILE file] [-TIMEOUT secs]*

**DIM-00025**

*Edit an instance by specifying the following parameters:*

**DIM-00026**

*-EDIT -SID sid [-NEWSID sid] [-INTPWD passwd] [-STARTMODE a | m] [-PFILE file] [-SHUTMODE a | i | n] [-SHUTTYPE svc | inst]*

**DIM00027**

*Delete instances by specifying the following:*

**DIM-00028**

*-DELETE -SID sid | -SRVC service name*

**DIM-00029**

*Startup services and instance by specifying the following parameters:*

**DIM-00030**

*-STARTUP -SID sid [-USRPWD password] [-STARTTYPE svc | inst | svc,inst] [-PFILE filename]*

**DIM-00031**

*Shutdown services and instance by specifying the following parameters:*

**DIM-00032**

*-SHUTDOWN -SID sid [-USRPWD password] [-SHUTTYPE svc | inst | svc,inst] [-SHUTMODE a | i | n]*

**DIM-00033**

*Query for help by specifying the following parameters: -? | -h | -help*

**DIM-00034**

*You have entered an invalid option for the -NEW command*

**DIM-00035**

*You have entered an invalid option for the -EDIT command*

**DIM-00036**

*You have entered an invalid option for the -DELETE command*

**DIM-00037**

*You have entered an invalid option for the -STARTUP command*

**DIM-00038**

*You have entered an invalid option for the -SHUTDOWN command*

**DIM-00039**

*Internal logic error in ORADIM*

## Database Connection Issues

The following are common Oracle9i database connection error codes, their causes, and suggested remedies.

### TNS-12203

*TNS: unable to connect to destination*

**Cause:** OracleServiceSID service, OracleHome\_NameTNSListener service, or both are not running.

**Action:** Ensure that both services are started.

### ORA-12560

*TNS: lost contact*

**Cause:** OracleServiceSID service, OracleHome\_NameTNSListener service, or both are not running. You receive this error if you attempt to use any of the Oracle9i Utilities, such as SQL\*Plus. This error is analogous to the following Oracle7 error: ORA-09352: Windows 32-bit Two-Task driver unable to spawn new ORACLE task.

**Action:** Ensure that both services are started.

### ORA-28575

*unable to open RPC connection to external procedure agent*

**Cause:** tnsnames.ora and listener.ora files have not been correctly configured to use **external procedures**.

**Action:** Reconfigure the services.

### ORA-06512

*at "APPLICATIONS.OSEXEC", line 0*

**Cause:** tnsnames.ora and listener.ora files have not been correctly configured to use external procedures.

**Action:** Reconfigure the services.

**ORA-06512**

*at "APPLICATIONS.TEST", line 4*

**Cause:** `tnsnames.ora` and `listener.ora` files have not been correctly configured to use external procedures.

**Action:** Reconfigure the services.

**ORA-06512**

*at line 2*

**Cause:** `tnsnames.ora` and `listener.ora` files have not been correctly configured to use external procedures.

**Action:** Reconfigure the services.

**ORA-01031 and LCC-00161**

*Both codes appear at startup*

**Cause:** Parameter file (`init.ora`) or Windows services are damaged. These errors usually appear when the parameter file cannot be read by Oracle at database startup.

**Action:** Delete and recreate the SID and services. Make sure you are logged on as the user Administrator, or a user within the Windows Administrator's Group with full administrative rights. At the MS-DOS command prompt, enter:

`oradim -delete -sid sid` where: *sid* is the name of your database (for example, `orcl`). Recreate the *sid* and services by entering: `oradim -new -sid sid -intpwd password -startmode auto -pfile full path to init.ora`

**See Also:** *Oracle9i Net Services Administrator's Guide.*



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## Getting Started with Your Documentation

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Your Oracle documentation set is provided in both HTML and PDF formats on two CDs, both included in your CD Pack and labeled as follows:

- Oracle9i Online Documentation Library CD-ROM for Windows
- Oracle9i Online Documentation Library CD-ROM for Windows - Installation CD

Use the first CD-ROM to browse the library from the CD or copy files directly to a local system. Use the second CD-ROM to install the documentation library with the Oracle Universal Installer. The contents of the library are the same on both discs.

The library includes a Web-based search tool that enables you to search for information about a particular product, parameter, file name, procedure, error message, or other area of interest. The search tool also makes it possible to construct a "virtual book" drawn from the complete documentation library, but consisting only of topics and procedures relevant to your needs. The library also includes a comprehensive Master Index, as well as lists of SQL and PL/SQL keywords, initialization parameters, catalog views, and data dictionary views.

Instructions for installing the library and viewing its contents are in three README files at the root level of the documentation CD-ROMs:

- README.htm
- README.pdf
- README.txt

The contents of the three files are identical; only the format differs.

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The following manuals are not included on the Oracle9i Online Documentation Library CD-ROM for Windows:

- Oracle9i Database installation guide for Windows and Oracle9i Database release notes for Windows

To access these documents before installation, open `start_here.htm` in the `\doc` directory on the component CD-ROM. To access these documents after installation, choose Start > Programs > Oracle - HOME\_NAME > Release Documentation or open `start_here.htm` in the `ORACLE_BASE\ORACLE_HOME\doc` directory on your hard drive.

- Oracle Migration Workbench documentation

The latest version can be viewed at: <http://technet.oracle.com/>.

- Oracle Fail Safe and Oracle Real Application Clusters Guard documentation

These documents are on the Oracle Fail Safe and Oracle Real Application Clusters Guard product CD-ROM, shipping in a subsequent CD pack.



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# Glossary

## **Active Directory**

Oracle security and administration are integrated with Windows 2000 through Active Directory, Microsoft's directory service. Oracle uses Active Directory for enterprise-level security and schema management.

## **authenticate**

To verify the identity of a user, device, or other entity in a computer system, often as a prerequisite for allowing access to resources in a system.

## **authorization**

Permission given to a user, application, or **process** to access an Oracle database or operating system.

## **backup**

A representative copy of data. This copy includes important parts of your database such as **control files**, **redo log files**, and datafiles.

A backup is a safeguard against unexpected data loss; if you lose your original data, then you can use the backup to make the data available again. A backup is also a safeguard against an application error; if an application makes incorrect changes, then you can restore the backup.

## **Common Object Request Broker Architecture**

A standard that enables distributed objects to communicate with each other, independent of programming language, operating system, and location.

## **COM/COM+**

Microsoft's Component Object Model is an object-oriented programming architecture and a set of operating system services. These services notify running application components of significant events and ensure that they are authorized to run. COM/COM+ is intended to make it relatively easy to create business applications that work well with **Microsoft Transaction Server** in Windows NT and Windows 2000.

## **connect string**

See **net service name**.

## **control files**

Files that record the physical structure of a database and contain the database name, the names and locations of associated databases and online **redo log files**, the time stamp of the database creation, the current log sequence number, and checkpoint information.

## **CORBA**

See **Common Object Request Broker Architecture**.

## **data dictionary**

A set of read-only tables that provide information about a database.

## **DLL**

See **dynamic link library**.

## **dynamic link library**

An executable file that a Windows application can load when needed.

## **external procedures**

Functions written in a third-generation language (C, for example) and callable from within **PL/SQL** or SQL as if they were PL/SQL functions or procedures.

## **external user**

The Windows operating system can **authenticate** a user, who can then access the Oracle database without being prompted for a password. External users are typically regular database users (non-database administrators) to whom you assign standard database roles (such as CONNECT and RESOURCE), but do not want to assign the **SYSDBA** (database administrator) or **SYSOPER** (database operator) **privilege**.

## **Globalization Support**

The Oracle architecture that ensures that database utilities, error messages, sort order, date, time, monetary, numeric, and calendar conventions automatically adapt to the native language and locale.

## **HOMEID**

Represents a unique **registry** subkey for each Oracle home directory in which you install products. A new HOMEID is created and the *ID* counter incremented each time you install products to a different Oracle home directory on one computer. Each HOMEID contains its own configuration parameter settings for installed Oracle products.

## **HOME\_NAME**

Represents the name of an Oracle home. In Oracle9i release 1 (9.0.1), all Oracle homes have a unique *HOME\_NAME*.

## **initialization parameter file (init.ora)**

An ASCII text file that contains information needed to initialize a database and **instance**.

## **instance**

Every running Oracle database is associated with an Oracle instance. When a database is started on a database server (regardless of the type of computer), Oracle allocates a memory area called the **System Global Area** and starts one or more Oracle processes. This combination of the System Global Area and Oracle 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.

## **listener**

The Oracle server **process** that listens for and accepts incoming connection requests from client applications. The listener process starts up Oracle database processes to handle subsequent communications with the client; then it goes back to listening for new connection requests.

## **listener.ora**

A configuration file that describes one or more Transparent Network Substrate (TNS) listeners on a server.

### **Microsoft Management Console**

An application that serves as a host for administrative tools called **snap-ins**. By itself, Microsoft Management Console does not provide any functionality.

### **Microsoft Transaction Server**

A transaction processing system based on **COM/COM+** that runs on an Internet or network server.

### **migrate**

To transform an installed version of an Oracle database from a major release to another major release. An Oracle8i for Windows database, for example, can be migrated to Oracle9i for Windows. Compare with **upgrade**.

### **mount**

To associate a database with an **instance** that has been started.

### **MTS**

See **Microsoft Transaction Server**

### **multiple Oracle homes**

The capability of having more than one Oracle home on a computer.

### **net service name**

The name used by clients to identify an Oracle Net server and the specific **system identifier** or database for the **Oracle Net** connection. A net service name is mapped to a port number and protocol. Also known as a connect string, database alias, host string, or service name.

This also identifies the specific SID or database to which the connection is attaching, not just the Oracle Net server.

### **network listener**

A listener on a server that listens for connection requests for one or more databases on one or more protocols. See **listener**.

### **network service**

In an Oracle application network, a service performs tasks for its service consumers. For example, a Names Server provides name resolution services for clients.

**obfuscated**

Protected by a process often used by companies for intellectual property written in the form of Java programs. The obfuscation process mixes up Java symbols found in the code. It leaves the original program structure intact, allowing the program to run correctly, while changing the names of the classes, methods, and variables in order to hide the intended behavior. Although it is possible to decompile and read non-obfuscated Java code, obfuscated Java code is sufficiently difficult to decompile to satisfy U.S. government export controls.

**Object Request Broker**

A software component that serves as the middleware between distributed objects. The distributed objects must comply with the [Common Object Request Broker Architecture](#) standard.

**OCI**

See [Oracle Call Interface](#).

**OFA**

See [Optimal Flexible Architecture](#).

**OID**

See [Oracle Internet Directory](#).

**Optimal Flexible Architecture**

A set of file naming and placement guidelines for Oracle software and databases.

**Oracle Call Interface**

An application programming interface that enables you to manipulate data and [schemas](#) in an Oracle database. You compile and link an Oracle Call Interface application in the same way that you compile and link a non-database application. There is no need for a separate preprocessing or precompilation step.

**Oracle Internet Directory**

An Oracle database-based LDAP V3 directory server, used for centralizing database user, [Oracle Net](#) network connector, and database [listener](#) parameters.

**Oracle Net**

The Oracle network interface that enables Oracle tools running on network workstations and servers to access, modify, share, and store data on other servers.

## **Oracle Net Naming**

Oracle Net Naming with **Active Directory** stores and resolves names through Active Directory.

## **Oracle PKI**

Oracle Advanced Security includes Oracle PKI (Public Key Infrastructure) integration for authentication and single signon. Oracle-based applications are integrated with the PKI authentication and encryption framework, using Oracle Wallet Manager and Oracle Enterprise Login Assistant.

## **Oracle Protocol Support**

A product that maps the functions of a given network protocol into Oracle Transparent Network Substrate (TNS) architecture. This process translates TNS function calls into requests to the underlying network protocol. This allows TNS to act as an interface among all protocols. **Oracle Net** requires Oracle Protocol Support.

## **Oracle services**

Windows **services** that are associated with particular Oracle components.

## ***ORACLE\_BASE***

*ORACLE\_BASE* is the root of the Oracle directory tree. If you install an OFA-compliant database using Oracle Universal Installer defaults, then *ORACLE\_BASE* is X:\oracle where X is any hard drive (for example, C:\oracle).

## ***ORACLE\_HOME***

Corresponds to the environment in which Oracle products run. This environment includes the location of installed product files, the PATH variable pointing to the binary files of installed products, **registry** entries, **net service names**, and program groups.

If you install an OFA-compliant database, using Oracle Universal Installer defaults, then Oracle home (known as *\ORACLE\_HOME* in this manual) is located beneath X:\ORACLE\_BASE. It contains subdirectories for Oracle software executables and network files.

## **ORB**

See **Object Request Broker**

## **PL/SQL**

Oracle Corporation's procedural language extension to SQL.

PL/SQL enables you to mix SQL statements with procedural constructs. You can define and run PL/SQL program units such as procedures, functions, and packages.

## **precompiler**

A programming tool that enables you to embed SQL statements in a high-level source program.

## **privilege**

A right to run a particular type of SQL statement or to access another user's object.

## **process**

A mechanism in an operating system that can run an executable. (Some operating systems use the terms job or task.) A process normally has its own private memory area in which it runs. On Windows a process is created when an application runs (such as Oracle or Microsoft Word). In addition to an executable program, all processes consist of at least one **thread**. The Oracle master process contains hundreds of threads.

## **raw partitions**

Portions of a physical disk that are accessed at the lowest possible disk (block) level.

## **recovery**

To *restore* a physical backup is to reconstruct it and make it available to the Oracle server. To *recover* a restored backup is to update it using redo records (that is, records of changes made to the database after the backup was taken). Recovering a backup involves two distinct operations: rolling back all changes made in uncommitted transactions to their original state, and rolling forward to a more current time by applying redo data.

## **redo log buffer**

A circular buffer in the **System Global Area** that contains information about changes made to the database.

## **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 the redo log files are used to recover the modified data that was in memory.

**registry**

A Windows repository that stores configuration information for a computer.

**remote database**

A database on a computer other than the local database.

**replication**

The process of copying and maintaining database objects in multiple databases that make up a distributed database system.

**roles**

Named groups of related privileges. You can grant roles to users or other roles.

**schemas**

Named collections of objects, such as tables, views, clusters, procedures, and packages, associated with particular users.

**services**

Executable processes installed in the Windows [registry](#) and administered by Windows. Once services are created and started, they can run even when no user is logged on to the computer.

**service name**

See [net service name](#).

**SGA**

See [System Global Area](#).

**Shared Server Process**

A server configuration which allows many user processes to share very few server processes. The user processes connect to a dispatcher background process, which routes client requests to the next available shared server process.

**SID**

See [system identifier](#).

**snap-ins**

Administrative tools that run within [Microsoft Management Console](#).



**snapshot**

- (1) Information stored in rollback segments to provide transaction **recovery** and read consistency. Rollback segment information can be used to recreate a snapshot of a row before an update.
- (2) A point-in-time copy of a master table located on a remote site. Read-only snapshots can be queried, but not updated. Updateable snapshots can be queried and updated. They are periodically refreshed to reflect changes made to the master table, and at the snapshot site.

**starter database**

A preconfigured, ready-to-use database that requires minimal user input to create.

**SYSDBA**

A special database administration role that contains all system privileges with the ADMIN OPTION, and the **SYSOPER** system privilege. SYSDBA also permits CREATE DATABASE actions and time-based recovery.

**SYSOPER**

A special database administration role that permits a database administrator to perform STARTUP, SHUTDOWN, ALTER DATABASE OPEN/MOUNT, ALTER DATABASE BACKUP, ARCHIVE LOG, and RECOVER, and includes the RESTRICTED SESSION privilege.

**System Global Area**

A group of shared memory structures that contain data and control information for an Oracle **instance**.

**system identifier**

A unique name for an Oracle **instance**. To switch between Oracle databases, users must specify the desired system identifier. The system identifier is included in the CONNECT DATA parts of the connect descriptors in a tnsnames.ora file, and in the definition of the **network listener** in a tnsnames.ora file.

**SYSTEM**

One of two standard database administrator usernames automatically created with each database. (The other username is SYS.). The SYSTEM username is the preferred username for database administrators to use for database maintenance.

**tablespace**

A database is divided into one or more logical storage units called tablespaces. Tablespaces are divided into logical units of storage called segments, which are further divided into extents.

**thread**

An individual path of execution within a [process](#). Threads are objects within a process that run program instructions. Threads allow concurrent operations within a process so that a process can run different parts of its program simultaneously on different processors. A thread is the most fundamental component that can be scheduled on Windows.

**tnsnames.ora**

A file that contains connect descriptors mapped to net service names. The file can be maintained centrally or locally, for use by all or individual clients.

**trace file**

Each server and background [process](#) can write to an associated trace file. When a process detects an internal error, it dumps information about the error to its trace file. Some of the information written to a trace file is intended for the database administrator, while other information is intended for Oracle Support Services. Trace file information is also used to tune applications and instances.

**upgrade**

To transform an installed version of an Oracle database major release into another major release of the same version. Compare with [migrate](#).

**username**

A name that can connect to and access objects in a database.

**view**

A selective presentation of the structure and data of one or more tables. Views can also be based on other views.

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