Oracle® Enterprise Manager

Getting Started with the Oracle Standard Management Pack

Release 2.1

February 2000

Part No. A76910-01

ORACLE®

Getting Started with the Oracle Standard Management Pack, Release 2.1

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Preface

This section describes the purpose and organization of this guide: *Getting Started with the Oracle Standard Management Pack*. Specifically, it covers the following topics:

Purpose of This Guide

This guide provides an overview of the Oracle Standard Management Pack applications and their features. As the guide describes how to use the Oracle Standard Management Pack applications, it also introduces you to key concepts and terminology in the following products: Oracle Performance Manager, Oracle Index Tuning Wizard, Oracle Baseline Viewer, Oracle Change Manager, Oracle DB Capture, Oracle DB Diff, and Oracle TopSessions.

Audience

This guide is written for the Oracle Standard Management Pack users who want to monitor and diagnose problems, tune high impact indexes, and track and compare changes in their Oracle environment.

How This Guide Is Organized

This guide is organized as follows:

Chapter 1, "Overview"

Provides a general description of the Oracle Standard Management Pack.

Chapter 2, "Post-Installation Configuration"

Describes how to configure Performance Manager and TopSessions.

Chapter 3, "Introduction to Oracle Performance Manager"

Provides an overview of the Oracle Performance Manager application and its features.

Chapter 4, "Introduction to Oracle Index Tuning Wizard"

Provides an overview of the Oracle Index Tuning wizard.

Chapter 5, "Overview of the Change Management Applications"

Provides an overview of the Baseline Viewer, DB Capture, DB Diff, and Change Manager applications and their features.

Chapter 6, "Using Change Manager"

Provides an overview of the Change Manager application.

Chapter 7, "Using Oracle TopSessions"

Provides an overview of the Oracle TopSessions application and its features.

Appendix A, "Troubleshooting Appendix"

Provides solutions to problems you may encounter while working with the Standard Management Pack.

Conventions Used in This Guide

The following table lists the conventions used in the guide.

Convention	Explanation
#	The default superuser prompt.
%	The default user prompt.
[Ctrl/C]	Press the Ctrl key while you simultaneously press another key (in this case, C).

Convention	Explanation
italics	Italicized words indicate variables, such as a file or directory name.
$ORACLE_HOME	Represents the directory where you installed Oracle Enterprise Manager components and the Oracle Standard Management Pack applications. The directory name may be different on your system.
otrace*xx*	The *xx* represents the version of the database for which you are collecting data; for example, otrace73 for the Oracle Server release 7.3.

This guide also assumes that you are familiar with the operation of Microsoft Windows NT. Refer to the Windows documentation for your system, if necessary. In general, this guide shows the directory names as they are used in UNIX; on an NT system, delineate directory names with a backslash (\).

To reduce wordiness and redundancy, menu and submenu choices are joined by arrows. For example, Collection=>Create refers to the Create Collection choice in the Collection menu.

Oracle Enterprise Manager Pack Information

The Oracle Enterprise Manager product family includes the following packs: Oracle Change Management Pack, Oracle Diagnostics Pack, Oracle Standard Management Pack, Oracle Tuning Pack, Oracle Management Pack for SAP R/3, and Oracle Management Pack for Oracle Applications. Each pack is fully integrated into the Oracle Enterprise Manager Console framework.

Oracle Change Management Pack

- Includes Baseline Viewer, Change Manager, DB Alter, DB Capture, DB Diff, DB Propagate, DB Quick Change, DB Search, and Plan Editor.
- Tracks metadata changes in databases.
- Eliminates errors and loss of data when upgrading databases to support new applications.
- Analyzes the impact and complex dependencies associated with application change and automatically performs database upgrades.
- Allows you to find the database objects that match a set of search criteria that you specify.

- Initiates change safely with easy-to-use wizards that teach the systematic steps necessary to upgrade.

Oracle Diagnostics Pack

- Includes Oracle Performance Manager, Oracle Capacity Planner, Oracle Trace, Oracle TopSessions, and Oracle Event Tests that are provided with the Oracle Diagnostics Pack.
- Monitors, diagnoses, and maintains the health of databases, operating systems, and applications. Both historical and real-time analysis are used to automatically avoid problems before they occur.
- Provides powerful capacity planning features that enable users to easily plan and track future system resource requirements.

Oracle Standard Management Pack

- Includes Baseline Viewer, Change Manager, DB Capture, DB Diff, Oracle Index Tuning Wizard, Oracle Performance Manager, and Oracle TopSessions.
- Monitors and diagnoses problems, tunes high impact indexes, and tracks and compares changes in your Oracle environment.

Oracle Tuning Pack

- Includes Oracle Auto-Analyze, Oracle SQL Analyze, Oracle Expert, Oracle Index Tuning Wizard, Oracle Tablespace Map, and Oracle Reorg Wizard.
- Optimizes system performance by identifying and tuning major database and application bottlenecks such as inefficient SQL, poor data structures, and improper use of system resources.
- Proactively discovers tuning opportunities and automatically generates the analysis and required changes to tune the system. Inherent in the product are powerful teaching tools which train DBAs how to tune as they work.
- Instills "Consultant Quality" tuning expertise into developers and DBAs and increases their productivity.

Oracle Management Pack for SAP R/3

- Includes Oracle Performance Manager, Oracle Capacity Planner, and Oracle Event Tests that are specific to monitoring your SAP R/3 environment.
- Monitors, diagnoses, and maintains the health of a SAP R/3 system. Both historical and real-time analysis are used to automatically avoid problems before they occur.

- Provides powerful capacity planning features that enable users to easily plan and track future system resource requirements.

Oracle Management Pack for Oracle Applications

- Includes Oracle Performance Manager, Oracle Capacity Planner, Concurrent Processing Tuning Assistant, and Oracle Applications Event Tests.
- Enables you to monitor all aspects of your system, including databases and concurrent managers.
- Enables the monitoring, diagnosing, and capacity planning of the Oracle Applications environment.

Oracle Enterprise Manager Documentation

The *Getting Started with the Oracle Standard Management Pack* manual is one of several Oracle Enterprise Manager documents.

Oracle Enterprise Manager base documentation

- The *Oracle Enterprise Manager Readme* provides important notes regarding the online documentation, updates to the software, and other late-breaking information.
- The *Oracle Enterprise Manager Administrator's Guide* explains how to use Oracle Enterprise Manager, Oracle's systems management console, common services, and integrated platform tool.
- The *Oracle Enterprise Manager Concepts Guide* provides an overview of the Oracle Enterprise Manager.
- The *Oracle Enterprise Manager Configuration Guide* explains how to configure Oracle Enterprise Manager.
- The *Oracle Enterprise Manager Messages Manual* describes the Oracle Enterprise Manager error messages and methods for diagnosing the messages.
- *Oracle Intelligent Agent User's Guide* provides configuration information and answers to crucial troubleshooting questions pertaining to the Oracle Intelligent Agent.

Oracle Change Management Pack documentation

- The *Oracle Change Management Pack Readme* provides important notes regarding the Oracle Change Management Pack online documentation, updates to the software, and other late-breaking information.

- The *Oracle Enterprise Manager Getting Started with Oracle Change Management Pack* manual provides an overview of the concepts and features of the Oracle Change Management Pack applications.

Oracle Diagnostics Pack documentation

- The *Oracle Diagnostics Pack Readme* provides important notes regarding the Oracle Diagnostics Pack online documentation, updates to the software, and other late-breaking information.
- The *Getting Started with the Oracle Diagnostics Pack* provides an overview of the concepts and features of the Oracle Performance Manager, Oracle Capacity Planner, and Oracle TopSessions applications. It also describes the Oracle Event Tests that are provided with the Oracle Diagnostics Pack, which allow you to manage database, listener, and service types.
- The *Oracle Enterprise Manager Oracle Trace User's Guide* explains how to use the Oracle Trace application to capture and use historical data to monitor Oracle databases.

Oracle Standard Management Pack documentation

- The *Oracle Standard Management Pack Readme* provides important notes regarding the Oracle Standard Management Pack online documentation, updates to the software, and other late-breaking information.
- The *Getting Started with the Oracle Standard Management Pack* provides an overview of the concepts and features of Baseline Viewer, Change Manager, DB Capture, DB Diff, Oracle Index Tuning Wizard, Oracle Performance Manager, and Oracle TopSessions.

Oracle Tuning Pack documentation

- The *Oracle Tuning Pack Readme* provides important notes regarding the Oracle Tuning Pack online documentation, updates to the software, and other late-breaking information.
- *Oracle Enterprise Manager Database Tuning with the Oracle Tuning Pack* provides an overview of the concepts and features of each of the applications included in the Oracle Tuning Pack. The applications include Oracle SQL Analyze, Oracle Expert, Oracle Index Tuning Wizard, Oracle Reorg Wizard, and the Oracle Tablespace Map. A description of how these applications can work together to tune an Oracle database is also provided.

Oracle Management Pack for SAP/R3 Documentation

- *Oracle Management Pack for SAP/R3 Readme* provides important notes regarding Oracle Management Pack for SAP R/3 online documentation, updates to the software, and other late-breaking information.
- *Oracle Enterprise Manager Getting Started with Oracle Management Pack for SAP/R3* provides an overview of the concepts and features of Oracle Performance Manager and Oracle Capacity Planner. It also describes Oracle Event Tests that are provided with the Oracle Management Pack for SAP/R3.

Oracle Management Pack for Oracle Applications Documentation

- *Oracle Management Pack for Oracle Applications Readme* provides important notes regarding Oracle Management Pack for Oracle Applications online documentation, updates to the software, and other late-breaking information.
- *Getting Started with the Oracle Management Pack for Oracle Applications* provides an overview of the concepts and features of Oracle Performance Manager, Oracle Capacity Planner, and Concurrent Processing Tuning Assistant. It also describes Oracle Applications Event Tests and Jobs that are specific to monitoring your Oracle Applications environment.
- *Oracle Intelligent Agent User's Guide* provides configuration information and answers to crucial troubleshooting questions pertaining to the Oracle Intelligent Agent.

1

Overview

The Oracle Standard Management Pack is an optional set of applications that provide advanced tools that allow you to monitor and diagnose problems, tune high impact indexes, and track and compare changes in your Oracle8*i* environment.

The Oracle Standard Management Pack includes the following applications:

- Oracle Performance Manager

  Applies real-time, graphical Oracle and host monitoring through an extensive array of customized performance charts.

- Oracle Index Tuning Wizard

  Proactively optimizes the indexes in your database environment.

- Oracle Baseline Viewer

  Lets you display baselines created using DB Capture.

- Oracle Change Manager

  Gives you direct or indirect access to change management operations.

- Oracle DB Capture

  Captures definitions of schema objects.

- Oracle DB Diff

  Allows you to easily compare schemas or databases.

- Oracle TopSessions

  Provides focused, performance diagnostics for Oracle sessions.

The following sections provide an overview of these applications.

Oracle Performance Manager

Oracle Performance Manager provides a system for capturing, filtering, and presenting performance data for both the database and the host operating system. Oracle Performance Manager offers:

- Graphical, real-time monitoring

  With Oracle Performance Manager, database and host operating system performance statistics are captured in real-time mode and can be viewed in various tables and charts and in two- and three-dimensional presentations.

- Predefined charts

  Oracle Performance Manager provides a large collection of predefined charts and tables organized into performance monitoring groups, including database contention, I/O, load, memory use, instance metrics, parallel server performance, and host operating system resource usage.

- User-defined charts

  Oracle Performance Manager can be used to graphically display any data accessible through SQL or through the data collection framework. The application allows you to create customized charts from user-defined scripts which then can be added to the Oracle Performance Manager navigator tree for easy access.

- Customizable chart attributes and displays

  With Oracle Performance Manager, chart properties and attributes can be customized to change the type of the presentation. The type of chart can be changed to bar, hierarchical, strip, pie, or table.

- Chart drill down

  Allows charts to be linked to other charts to gather detailed information.

- Record and playback of charts

  A user can capture a chart's activity for analysis at a later date. Oracle Performance Manager allows charts to be recorded and played back at your convenience.

Oracle Index Tuning Wizard

The Oracle Index Tuning wizard quickly finds indexing problems that can slow down the performance of your Oracle8 database. You can use the Index Tuning

wizard to evaluate and optimize indexes for situations when, for example, SQL statement response time is slow.

The Index Tuning wizard considers your application type, for example, data warehousing, table, and SQL statements for tuning.

The Index Tuning wizard then implements the generated recommendations or saves the recommendations for later implementation. Each index recommendation generated contains detailed information on exactly what operation needs to be performed on the schema.

Oracle Baseline Viewer

The Baseline Viewer application lets you display baselines created using DB Capture. Baseline Viewer also allows you to view a particular version of a baseline and to generate SQL statements for a baseline (if the statements were not generated already by DB Capture when the baseline was created).

Oracle Change Manager

The Change Manager application is the change management central interface. In most cases, Change Manager gives you direct or indirect access to change management operations.

Oracle DB Capture

The DB Capture application guides you through the process of capturing the definitions of a database (or a subset of a database) in a form useful to DB Diff and other applications. DB Capture lets you specify the set of database object definitions to capture, then captures those definitions in their current state.

DB Capture can capture object definitions in both of the following forms:

- A baseline. The baseline stores definitions in a form that DB Diff can use. (A baseline is an object that contains a set of database definitions captured at a certain time.)
- SQL DDL (optional). These SQL DDL statements can be used to create the definitions in a new database or as input to CASE tools that accept SQL DDL input.

Oracle DB Diff

The DB Diff application guides you through the steps of selecting two sets of object definitions and then comparing them. The object definitions can be selected from current databases or they can be selected from baselines created earlier with DB Capture. If differences are found when the two sets of object definitions are compared, DB Diff allows you to view the differences between the corresponding object definitions.

Oracle TopSessions

Oracle TopSessions provides a focused view of database activity by database session. Oracle TopSessions extracts and analyzes sample dynamic Oracle performance data by session, automatically determining the top Oracle users based on a specific selection criteria, such as memory, CPU usage, or file I/O activity.

Note: All the applications that make up the Oracle Standard Management Pack are members of other Oracle Enterprise Manager Packs. For this reason, you may find mention of other applications in the help, documentation, and user interfaces that make up the Oracle Standard Management Pack.

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Post-Installation Configuration

After you have installed the Standard Management Pack, configure the components listed in the following table:

Components	Where to Find the Information
Performance Manager	"Setting Up Performance Manager" on page 2-1
TopSessions	"Setting Up TopSessions" on page 2-4

Setting Up Performance Manager

The following setup tasks are required before you use Oracle Performance Manager:

- ❏ Configure the Oracle Data Gatherer to collect data
- ❏ Enable disk statistics collection on Windows NT
- ❏ Convert any user-defined charts you created with earlier versions of Performance Manager

The following sections describe each of these setup tasks in more detail.

Configuring Oracle Data Gatherer to Collect Data

Performance Manager requires the use of the data gathering service (also known as the Oracle Data Gatherer). For monitoring operating system data, the Oracle Data Gatherer must be installed on the same node as the operating system you are monitoring. For monitoring other service types, such as databases, the Oracle Data Gatherer can run on the same node as the service you are monitoring, or it can run on a different node, depending upon your configuration.

Refer to the *Oracle Intelligent Agent User's Guide* for information on how to configure and start the Oracle Data Gatherer.

Enabling Disk Statistics Collection for Performance Manager on Windows NT

To collect disk statistics on Windows NT, enable them by typing:

```
diskperf -Y
```

Disk statistics are enabled the next time the system is restarted. For more information about the DISKPERF tool, refer to the Microsoft Windows NT documentation.

Note: Enabling disk statistics is not required. You can still monitor other operating system statistics with Performance Manager even if disk statistics are not enabled.

Converting User-Defined Charts From Previous Releases of Performance Manager

If you created user-defined charts using Performance Manager release 1.5.0 or earlier and want to use them with the current Performance Manager release, you must first convert them to release 1.6.0.

Performance Manager Release 1.6.0 user-defined charts are converted to the current release when you migrate your existing performance data to the Enterprise Manager Release 2.1 repository.

For more information, refer to the following sections.

Note: Release 1.5.5 of Performance Manager did not include the functionality of user-defined charts.

Converting Performance Manager Release 1.5.0 User-Defined Charts

To convert user-defined charts created using Performance Manager Release 1.5.0 or earlier:

1. Run vmmmig.exe. This executable creates a text file named vtmusr.txt in the $ORACLE_HOME\SYSMAN\ADMIN directory. This text file contains data about the user-defined charts created using Performance Manager release 1.5.0 or earlier. When you run vmmmig.exe, specify the user name, password, and

service for the Enterprise Manager repository that contains the user-defined charts that you want to convert, for example:

```
vmmmig joseph/password@my_rep
```

Note that `my_rep` in the previous command line is the service name for the Enterprise Manager repository.

2. Run vmm2vtm.exe. This executable uses the data in the vtmusr.txt file to create user-defined charts in the repository that can be used with Performance Manager release 1.6.0. When you run vmm2vtm.exe, supply a user name, password, and service for the Enterprise Manager V2.x repository and the name of the service under which you want the user-defined charts stored for Performance Manager release 1.6.0, for example:

   ```
   vmm2vtm.exe joseph/password@my_rep my_db
   ```

   Note that my_rep in the previous command line is the service name of the Enterprise Manager V2.x repository and my_db is the name of the target service under which you want the user-defined charts stored. In other words, after the previous command is run, all the user-defined charts are converted and stored under the my_db service in the Performance Manager release 1.6.0 tree view.

   If any error messages are generated when you run vmm2vtm.exe, edit the vtmusr.txt file based on the error messages. For example, the error messages may state that there is a problem with a chart or that a chart does not exist. Since the vtmusr.txt file contains a list of the charts, edit the file to remove any problematic charts.

   Then, run vmm2vtm.exe again.

Converting Performance Manager Release 1.6.0 User-Defined Charts

If you created user-defined charts with Performance Manager Release 1.6.0, you can convert those charts for use with the current release of Performance Manager. User-defined charts created with Performance Manager 1.6.0 are converted when you create a new Enterprise Manager repository and migrate your existing performance data to the new repository.

For more information about creating a new Oracle Enterprise Manager repository and migrating your existing data, see the *Oracle Enterprise Manager Configuration Guide*.

Setting Up TopSessions

To install the features of TopSessions:

- ❏ Create additional tables and views on each database you want to connect to from TopSessions
- ❏ Grant certain SELECT privileges

The smptsi*xx*.sql scripts have been provided to help automate this process. The *xx* in the file name identifies the version of the database against which the script should be run. The script for each database version is located in the $ORACLE_HOME\SYSMAN\ADMIN directory.

Version of the Database	Script to Run
Oracle 7.3.4	smptsi73.sql script
Oracle 8.0	smptsi80.sql script
Oracle 8.1	smptsi81.sql script

When smptsi*xx*.sql is run, it also automatically runs the following two scripts:

- catblo*xx*.sql
- utlxpl*xx*.sql

These two scripts create in the managed database some additional tables, views, and public synonyms that are required by the Oracle Advanced Events.

To set up TopSessions for a database:

1. Access SQL*Plus Worksheet from the Start menu by following the path: Start=>Programs=>ORACLE_HOME=>DBA Management Pack=>SQLPlus Worksheet.

   Note: ORACLE_HOME represents the Oracle home in which the Diagnostics Pack is installed.

2. Use the Oracle Enterprise Manager Login dialog box to connect to the managed database as SYS.

   For additional information, refer to the online help or the *Oracle Enterprise Manager Administrator's Guide*.

3. Grant SELECT ANY TABLE privileges to each administrator account. This step may be omitted if the account has already been granted the same privileges as SYSTEM.

   Note that when preparing to run the smptsi*xx*.sql script on managed databases, you should log into each database as SYS, as mentioned previously.

   You can use Security Manager to grant privileges to an account. Refer to the Oracle Enterprise Manager Online Help for detailed information about how to use Security Manager.

4. Run the smptsi*xx*.sql script for the managed database.

   If the smptsi*xx*.sql script is not run on a managed database, you may see a "Table or View does not exist" message when you try to use TopSessions.

5. If the ALL_CATALOG view does not exist on the managed database, run the catalog.sql script on the database from the SYS account. The catalog.sql script is located in the $ORACLE_HOME\RDBMSxx\ADMIN directory.

6. If the AUDIT_ACTIONS view does not exist on the managed database, run the cataudit.sql script on the database from the SYS account. The cataudit.sql script is located in the $ORACLE_HOME\RDBMSxx\ADMIN directory.

7. Exit SQL*Plus Worksheet.

3

Introduction to Oracle Performance Manager

Oracle Performance Manager is an Oracle Enterprise Manager application that allows you to monitor different types of real-time performance data.

Oracle Performance Manager uses the Agent data gathering service (also called the Oracle Data Gatherer) to collect performance data. To monitor some types of data, you must install the Oracle Data Gatherer on the system (or systems) where you want to monitor data. See the *Oracle Intelligent Agent User's Guide* for information on managing the Agent data gathering service on a system.

If you are using Oracle Performance Manager to monitor database performance, the Agent data gathering service can be installed on another system. See "Accessing Performance Data Through an Intermediate Host" on page 3-2 for more information on accessing data through an Agent data gathering service on another system.

The types of performance data that Oracle Performance Manager can monitor on a system depends on the products that are installed. Table 3–1 shows the types of data (or services) that Oracle Performance Manager can monitor when various Oracle products are installed.

Table 3–1 Data that Performance Manager Can Monitor when Various Oracle Products Are Installed

Oracle Product	Oracle Concurrent Manager Data	Oracle Server Data	Operating System Data	SAP R/3 System Data	Microsoft SQL Server Data
Diagnostics Pack		Yes	Yes		Yes

Table 3–1 Data that Performance Manager Can Monitor when Various Oracle Products Are Installed (Cont.)

Oracle Product	Oracle Concurrent Manager Data	Oracle Server Data	Operating System Data	SAP R/3 System Data	Microsoft SQL Server Data
Management Pack for Oracle Applications	Yes		Yes		
Management Pack for SAP R/3			Yes	Yes	
Standard Management Pack (Oracle Standard Edition only)		Yes	Yes		Yes

If additional products from Oracle or other vendors are installed, Oracle Performance Manager may be able to monitor additional types of data not shown in Table 3–1.

Accessing Performance Data Through an Intermediate Host

Oracle Performance Manager relies on the Oracle Data Gatherer to monitor a service (such as a node, a database, or a concurrent manager). Usually, the collection of the data is done on the system where the service is located. However, for some types of services Oracle Performance Manager can also monitor data on a system by using the Oracle Data Gatherer on another system (an intermediate host).

This intermediate host could be the client system where the Oracle Performance Manager is running, or any other system on the network on which the Data Gatherer is available.

There are three ways to set the location of the Oracle Data Gather. The method you use depends on how you connect to the service. Consider the following three scenarios:

- You connect to a database that has been discovered using the Enterprise Manager console and you are running Oracle Performance Manager while connected to the Oracle Management Server.

Performance Manager attempts to connect to the Data Gatherer on the host where the service is located. If this connection fails or cannot be attempted because no preferred credentials have been set for the database, you will be prompted with a dialog box containing logon credentials for the database. This dialog box also contains a field to specify the location of the Oracle Data Gatherer that will be used to collect performance data.

- You click the **Add New Service** button in the toolbar panel and manually add the service to the navigator.

  Performance Manager displays a Logon dialog box. This dialog box also contains a field to specify the location of the Data Gatherer that will be used to collect performance data.

- You select a service in the Performance Manager navigator tree and choose **Set Data Gatherer Location** from the **File** menu.

  Performance Manager displays the Database Logon dialog box for the selected service. This dialog box also contains a field to specify the location of the Data Gatherer that will be used to collect performance data.

> **Note:** The database name (or service) shown in the Database Logon dialog box must be a service name which can be resolved on the system where the Agent data gathering service is located. A **tnsnames** entry or name server entry must be available for that service on the system specified in the **Data Gatherer Location** field.

Usage Scenarios for Oracle Performance Manager

Using Oracle Performance Manager, you can:

- Monitor one or more services concurrently.
- View the monitored data in various chart formats, including strip (line), pie, bar, table, and hierarchical.
- Set the refresh rate for a chart's data.
- View multiple charts concurrently for each monitored service.
- View multiple charts in a single window.
- Drill down from one chart to another related chart.
- Choose the collected data and data sources to display in a chart.

- Print a chart.
- Generate an HTML report for a chart.
- Display context-sensitive help for a chart, if help is available for the chart.
- Play a recording of a chart, with fast-forward and pause features.
- Create and modify user-defined charts.

Starting Oracle Performance Manager

You can start Oracle Performance Manager from the Oracle Enterprise Manager console or from the **Start** menu.

Starting Oracle Performance Manager from the Console

You can start Oracle Performance Manager from the Oracle Enterprise Manager console in any of the following ways:

- On the Oracle Enterprise Manager console, point to the **Standard Management Pack** drawer, then click **Performance Manager**.
- On the **Tools** menu of the Oracle Enterprise Manager console, point to **Standard Management Pack**, then click **Performance Manager**.

> **Note:** When you start Oracle Performance Manager from the Oracle Enterprise Manager console, Oracle Performance Manager connects to the Oracle Management Server using the same credentials used to start the Oracle Enterprise Manager console.

Starting Oracle Performance Manager from the Start Menu

On the **Start** menu, follow the path: **Start**=>**Programs**=>**ORACLE_HOME**=>**Standard Management Pack**=>**Performance Manager**.

> **Note:** ORACLE_HOME represents the home directory in which the Standard Management Pack is installed.

When you start Performance Manager from the **Start** menu, you are given a choice of logging in to the Oracle Management Server or running Performance Manager in standalone mode.

Running Performance Manager in Repository Mode

To run Oracle Performance Manager in repository mode:

1. Click **Login to the Oracle Management Server**.
2. Enter the appropriate connection information for your Oracle Management Server.

To select an alternate Management Server, click the **Management Server** button next to the **Management Server** drop-down list. In the resulting dialog box, you can add another node that is running Oracle Management Server software. The Oracle Management Server and its associated repository must already exist.

For information on the fields in the Management Servers dialog box, click **Help**.

3. Click **OK**.

If the repository information for the Standard Management Pack has not been created, Oracle Performance Manager automatically updates the repository at connection time.

Note: If the repository was created using Enterprise Manager Release 2.0.4 or earlier, you must upgrade the repository or create a new repository. For more information, see the *Oracle Enterprise Manager Configuration Guide*.

Running Performance Manager in Standalone Mode

To run Oracle Performance Manager in standalone mode (not connected to the Oracle Enterprise Manager repository), click **Standalone, no repository connection**, then click **OK**.

Note: When you run Oracle Performance Manager without connecting to a valid repository, you cannot save any user-defined charts, and any recordings you make during the session will not be saved when you exit Oracle Performance Manager.

In addition, you will need to manually add services you want to monitor, and you will have to add them again each time you start Performance Manager.

Using the Oracle Performance Manager Main Window

The primary component of the Oracle Performance Manager user interface is the main window (see Figure 3–1), which contains two panels. The navigator or tree panel appears on the left side of the main window and the property sheet panel appears on the right side. When you select an item in the navigator panel, the property sheet panel displays the properties of the selected item.

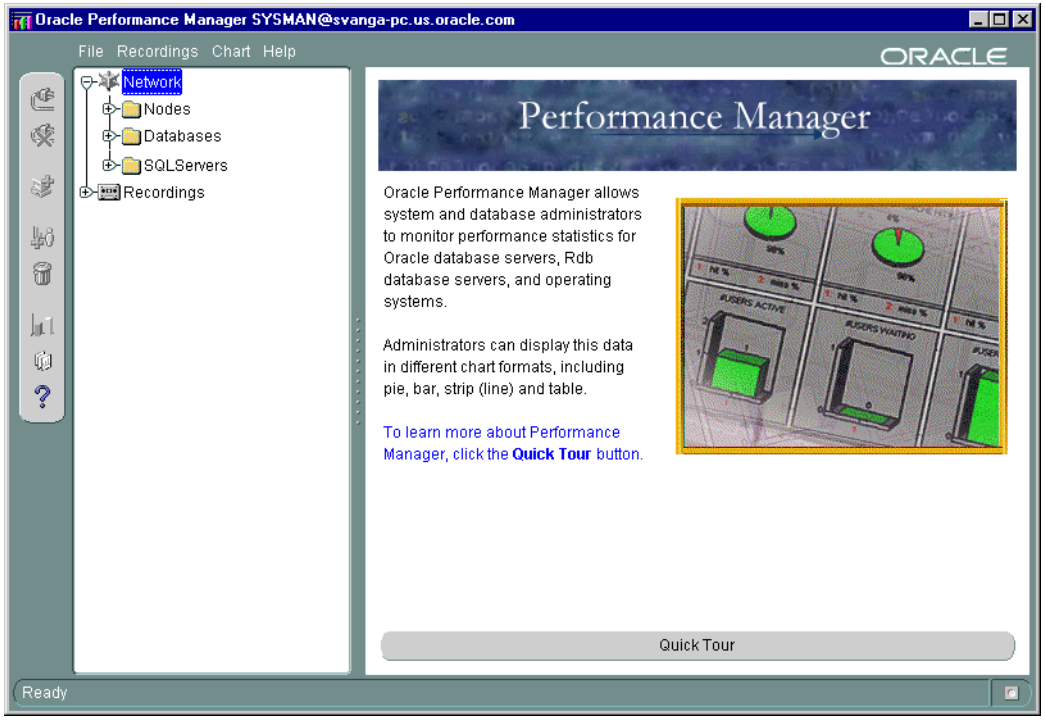
When you first start Oracle Performance Manager, the navigator panel displays the service type folders and the property sheet panel displays the Performance Manager welcome screen.

A vertical toolbar appears on the left side of the window and a menu bar appears across the top of the window. For more information about the buttons in the toolbar and the commands available from the Performance Manager menus, choose **Window** from the Performance Manager **Help** menu.

In the navigator panel, the **Network** folder contains a folder for each service type. For example, when you have the Standard Management Pack installed, the service types are Nodes, Databases, and SQL Servers.

In addition to the **Network** folders, the **Recordings** folder contains any recordings of chart data that exist. For more information about the **Recordings** folder, see "Recording Chart Data" on page 3-17.

Figure 3–1 Oracle Performance Manager Main Window



Connecting to a Discovered Service in Repository Mode

If you are working in repository mode, expand a service type folder to view the corresponding services previously discovered through the Oracle Enterprise Manager console.

To connect to a discovered service, select the service in the navigator tree and click **Connect to Service** in the Performance Manager toolbar, or click the plus sign (+) next to the service in the navigator. You may be prompted with a Logon dialog box if credentials are required to connect to the service. For information on the fields in the Logon dialog box, click **Help**.

Manually Connecting to a Service

If you are working in standalone mode, the service type folders are empty and you must manually add each service you want to monitor to the navigator tree.

If you are working in repository mode, you can manually add additional services that have not been discovered using the Enterprise Manager console.

> **Note:** When you add a service manually to the navigator tree using the **Add New Service** button, you are adding that service for the current session of Performance Manager only. You can begin collecting data for the service, but if you exit and restart Performance Manager, you will have to add the service again.

To add and connect to a service manually:

1. Select the folder for the service type you are adding.

2. Click **Add New Service** in the Performance Manager toolbar panel.

   Performance Manager displays a Logon dialog box.

3. Fill in the fields in the Logon dialog box and click **OK**.

   For information on the fields in the Logon dialog box, click **Help**.

After you connect to a service, Performance Manager displays the classes of performance information you can monitor for the selected service. Expand a class to see the individual performance data charts available for the selected class.

Viewing Performance Manager Charts

You can display a chart using one of the following methods:

- Select the chart in the navigator, and click the **Show Chart** button on the toolbar.
- Select the chart in the navigator, and choose **Show Chart** from the **Chart** menu.

- Select the chart in the navigator, which displays the chart's property sheet. To start the chart with the selected property sheet options, click **Show Chart** on the property sheet.
- Select a chart class, then select the chart in the **Predefined Displays** list and click **Show Chart**.
- Select the chart in the navigator and click the right mouse button. From the context menu, click **Show Chart**.

Performance Manager displays each chart or chart group in its own window, which is separate from the main window. This window is called the Chart Display

window. For more information, see "Using the Chart Display Window" on page 3-11.

Monitoring Multiple Services Concurrently

You can view charts from multiple services concurrently by connecting to the services from the navigator tree and displaying the chart.

Viewing Chart Groups

Some types of data include a chart group, which is two or more charts that are displayed within a single Chart Display window. You display a chart group the same way as you view any other chart (see "Viewing Performance Manager Charts" on page 3-8).

You can display a special chart group that contains the Overview Charts for a selected service:

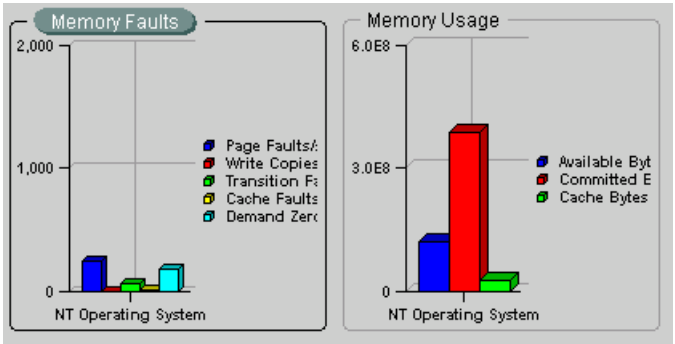
1. Select a service in the Performance Manager navigator.

2. Click the **Show Overview Charts** button in the toolbar panel.

   Performance Manager displays a chart group containing some key statistics most likely of interest to database administrators monitoring the selected service.

Charts in a chart group are displayed within a single window. You perform actions, such as setting options and displaying drill-down charts, on one chart at a time within a chart group. The currently selected chart within a chart group window is identified by a highlighted title. For example, the **Memory Faults** chart is the currently selected chart in Figure 3–2.

Figure 3–2 Identifying the Selected Chart In a Chart Group



Besides viewing the Overview Charts for a selected service, you can also view a chart group provided with a data class. For example, you can select the **Memory** data class for a Windows NT node and display the **Memory at a Glance** chart group. Not all data classes provide chart groups, however.

Selecting Collected Data and Data Sources

For some charts, the chart's property sheet allows you to select the collected data to display and the data sources for which the collected data should be displayed.

The collected data are the statistics that can be monitored and displayed in the chart. The data sources are the items from which Oracle Performance Manager is able to collect the data. For example, the data source of disk statistics may be disk1 or disk2, and the data source of file statistics may be file1 or file2.

By clicking in the column next to the name of the collected data or the name of the data source in the chart property sheet, you can specify whether or not to monitor that collected data or data source and display it in the chart.

When a green check mark appears in the column, Oracle Performance Manager will display that collected data or data source in the chart. If you click in the column again, the check mark goes away, which indicates that Oracle Performance Manager will not display that collected data or data source. You can toggle back and forth between monitoring and not monitoring all the collected data or data sources by clicking in the column head. If the check mark is gray, it means Oracle Performance Manager will display the collected data or data source, and you are unable to change the selection of this data.

If the chart definition contains default data source or collected data attributes, then those items are preselected in the chart's property sheet.

Using the Chart Display Window

When you display a chart, Oracle Performance Manager opens the Chart Display window. The window contains its own toolbar and menu bar. For information about the Chart Display window, choose **Window** from the Chart Display window **Help** menu.

Selecting a Chart Format

To change the format of the chart, click one of the chart format buttons in the Chart Display window toolbar.

For example, suppose a chart initially displays as a bar chart. To see the data as a pie chart, click the **Pie Chart** button in the toolbar. You can also display a chart in one of the additional formats:

- Bar
- Strip (or line chart)
- Table
- Hierarchical

For more information about the buttons on the Chart Display window toolbar, see the Oracle Performance Manager online help.

Note: Depending upon the type of chart you are displaying, one or more of the chart formats may not be available.

Setting the Chart Refresh Rate

By default, most charts are set to refresh every five seconds. That means that Performance Manager collects the data every five seconds and then immediately refreshes (or redisplays) the chart using the new data.

To change the refresh rate for the current chart:

1. Click the **Set Refresh** rate button in the Chart Display window toolbar.

   Performance Manager displays the Set Refresh Rate dialog box.

2. Use the fields on the dialog box to set a new refresh rate for the current chart.
3. Click **OK** to close the dialog box and display the chart using the new refresh rate.

Pausing and Restarting a Chart

By default, Performance Manager continues to collect performance data and update the current chart using the current refresh rate.

To pause a chart so it stops redisplaying based on the refresh rate, click the **Pause Chart** button in the Chart Display toolbar.

To restart the chart, click the **Resume Chart** button in the Chart Display toolbar.

Selecting Chart Options

After you display a chart in the Chart Display window, you can still modify the collected data and data sources for the chart. For more information about selecting the collected data and data sources before you display a chart, see "Selecting Collected Data and Data Sources" on page 3-10.

To set the chart options:

1. Click the **Set Options** button in the Chart Display toolbar.

   Performance Manager displays the Set Options dialog box.

2. Use the dialog box to add or remove data items from the chart.

   For more information on selecting data sources and selecting collected data, click **Help**.

Oracle Performance Manager also allows you to select filters to limit the data collected for a chart. However, not all charts provide filters.

For charts that allow you to filter the chart data, you can select a limit to the number of data sources that are displayed. For example, if the data sources are the processes on an operating system, you can modify the chart to display only 10 processes, rather than all the processes.

For example, to select a limit to the number of data sources that are displayed for the **Pagefaults Per Session** chart, do the following:

> **Note:** The **Pagefaults Per Session** chart in the **Process** class is available only when you are monitoring a Windows NT node. For a UNIX node, select the **Process Info** chart in the **Process Data** class as an example of a chart you can filter.

1. Highlight the **Pagefaults Per Session** chart in the navigator tree of the Performance Manager main window.

   You can locate the chart by traversing the tree as follows: **Network**=>**Nodes**=><Name of Node>=>**Process**=>**Pagefaults Per Process**.

2. Click the **Options** tab in the Property Sheet panel.

3. Enter **10** in the **Maximum Number of Data Sources to Display** field.

   The 10 data sources will be sorted by Page Faults per second, as shown in the **Sort the data by** drop-down list.

> **Note:** The number of options available on the Options tab will vary, depending upon the class of data you are modifying. Some data classes offer more or fewer options than the Pagefaults Per Process class discussed here.

4. Click **Show Chart**.

   Performance Manager displays the chart, but includes a maximum of 10 data sources.

You can later change this setting after the chart is displayed:

1. In the Chart Display window for the Pagefaults Per Process chart, click the **Set Options** button in the toolbar.

2. In the **Options** tab, set the **Maximum Number of Data Sources to Display** back to 7.

3. Click **OK**.

These options can be useful for finding the top resource users. In the case where processes are the data sources and the data collected is memory usage and CPU usage, you can ask the Agent data gathering service to limit the number of data

sources to 10, and to sort by memory usage. Your chart would then show the 10 processes using the most memory. If you were to sort by CPU usage, you would get the 10 processes using the most CPU instead.

Some charts can also give different views of the data. If that feature is available, you will also be able to select a view of the data. An example of a data view may be the current rate per second or current rate per transaction for each piece of data collected in the chart.

Chart-Specific Commands

Some types of charts have their own unique commands. For example, you can select the **Kill Session** command when you are viewing the Lock Manager charts for Oracle database services.

To see if a chart-specific command is available for a chart:

- Click the right mouse button on an item name in the chart legend or a data item in the chart and click **Tools** on the context menu.
- Click the **Tools** menu on the Chart Display window menu bar.

Drilling Down from One Chart to Another

Some charts have drill-down charts associated with them. To see if any drill-down charts are available for the current chart, do one of the following:

- Click the right mouse button on an item name in the chart legend or a data item in the chart and click **Drilldown** on the context menu.
- Click the **Drilldown** menu on the Chart Display window menu bar.

In either case, Performance Manager displays any drill-down charts associated with that chart item as menu options on the **Drilldown** menu. If a list of drill-down chart names is not displayed, it means no drill-down charts are associated with that item.

Note: If you have trouble selecting a particular data item when you try to drill down for related data, pause the chart or reduce the refresh rate. For more information, see "Pausing and Restarting a Chart" on page 3-12.

Displaying Alternate Chart Orientations

You can display bar charts with either a horizontal or vertical orientation.

To change the orientation of the bar chart, click the button associated with the orientation that you want.

Sorting Data in a Table Chart

When a chart is displaying data in table format, the sort order of the column data can be changed by clicking the column headers in the table. The first click on a column header sorts the data in ascending order, and a second click sorts the data in descending order.

Changing the sort order in the chart table does not affect the data's sort order on the server. To change the sort order of the data on the server, use the **Options** page. For more information, see "Selecting Chart Options" on page 3-12.

Saving Your Changes to a Chart

If you are working in repository mode and you make modifications to a chart (for example, if you change the format, orientation, or sorting order of a chart), you can save your changes in one of two ways:

- Click **Save** on the Chart Display **File** menu.

  Performance Manager saves your changes using the same name as the original chart. When you display the chart again, your changes will appear in the Chart Display window.

  To later remove your changes and display the predefined chart using its original settings, click **Remove Chart** on the **Chart** menu.

  Note: You can remove the changes you saved to a predefined chart, but you cannot delete the original predefined chart.

- Click **Save As** on the Chart Display **File** menu.

  Performance Manager displays the Save Custom Chart dialog box. Use this dialog box to enter a name for the custom chart and to indicate whether you want to create a similar chart for other services of the same type. For information about the fields on the Save Custom Chart dialog box, click **Help**.

  Click **OK** in the Save Custom Chart dialog box to save the custom chart using the name you provided. Performance Manager saves the chart in the Custom Charts folder for the selected service.

To delete a custom chart from the Custom Charts folder, select the chart and click **Remove Chart** on the **Chart** menu.

> **Note:** You can delete custom charts, but you cannot delete predefined charts.

Obtaining Help for a Class, Chart, or Data Item

To get help on a class or chart:

1. Select the class or chart.
2. From the **Help** menu, choose **Selected Item**.

   If help is available for the selected chart, Performance Manager displays a message box or a help topic window describing the chart data.

To get help on a data item:

1. Select a chart.
2. In the Property Sheet panel, hover over a data item or select a data item and choose **Selected Item** from the **Help** menu.

   If help is available for the selected item, Performance Manager displays a pop-up balloon or a message box describing the data item.

> **Note:** Help is not available for all objects.

Printing a Chart

To print a chart, click the **Print Screen** button on the Display Chart window toolbar.

The size of the chart on the screen determines the size of the chart in the chart printout. For example, when you print a chart that is 5 inches high and 7 inches wide on your screen, the chart will be 5 inches high and 7 inches wide in the printout.

Generating a Report for a Chart

To generate an HTML report for a chart:

1. Click the **Report Chart** button while the chart is displayed.

Performance Manager displays a dialog box that tells you the name of the HTML file used to display the report and where the file will be saved.

2. Make a note of the file name and location.
3. Click **Yes** to preview the chart in your Web browser, or click **No** if you do not want to preview the report.

You can view the report later using a Web browser, or—if you have experience with Web publishing tools and techniques—you can share the report with your co-workers by publishing the HTML file and its associated graphic files on a Web server.

Recording Chart Data

Oracle Performance Manager allows you to record the data being monitored in a chart. After a recording is complete, you can play it back. During playback, you can pause and fast forward the recording, if you wish.

Chart recordings are saved under the **Recordings** folder and on the Recordings tab of the right pane of the Performance Manager main window when a recorded chart is selected. The Recordings tab is added to a chart's property sheet after you record the chart.

You can manage chart recordings in the **Recordings** folder without connecting to the service from which a chart was recorded. If you are already connected to a service, you can see a chart's recordings by selecting the **Recordings** tab in that chart's Detail property sheet.

Starting a Recording

You start a recording by performing one of the following steps:

- With a chart highlighted in the navigator tree of the Performance Manager main window, click **Record Chart** on the chart's property sheet.

- With a chart displayed in the Chart Display window, click **Start Recording** in the Chart Display window toolbar.
- With a chart displayed in the Chart Display window, click **File**=>**Recording**=>**Start Recording**.

Oracle Performance Manager displays the Recording Parameters dialog box. For more information on the fields in the Recording Parameters dialog box, click **Help**.

Stopping a Recording

To stop recording a chart, do one of the following:

- To stop recording the current chart, click the **Stop Recording** button in the Chart Display window toolbar.
- To stop all recordings at one time, choose **Stop All Recordings** from the Performance Manager main window **Recordings** menu.
- To stop a recording from the **Recordings** folder, expand the **Recordings** folder in the Performance Manager main window and navigate to the chart. Select the chart and click **Stop Recording** on the chart's property sheet.
- With a chart displayed in the Chart Display window, click **File**=>**Recording**=>**Stop Recording**.

Playing a Recording

Note: Before you can play a recording, you must stop the recording. For more information, see "Stopping a Recording" on page 3-18.

To play a recording, do the following in the Performance Manager main window:

1. Navigate to the **Recordings** folder.
2. Select the chart you want to play in the navigator tree.
3. In the corresponding property sheet, select the recording from the list of recordings for the selected chart, and click **Play Recording** (or on the **Recordings** menu click **Play Recording**).

4. In the Chart Display window toolbar, click **Start Playback**.

   The **Stop Playback**, **Pause Playback**, and **Fast Forward** buttons become available in the playback window (Figure 3–3). When the playback is complete, the **Reset Playback** button becomes available.

Figure 3–3 Chart Playback Buttons in the Chart Display Window

Removing a Recording

To remove a recording:

1. Navigate to the **Recordings** folder or the Recordings tab on the chart's Detail page.
2. Select the recording you want to remove.
3. From the **Recordings** menu, click **Remove Recording**.

Creating a User-Defined Chart

In addition to predefined charts, you can define your own charts for database services based on user-defined scripts. By defining your own charts, you can take a snapshot of data at any given interval. After successful evaluation of the script, you can define the operations to be performed on the data.

> **Note:** The Performance Manager online help includes an example of creating a user-defined chart. Search for **Example** in the online help index.

To define a new chart:

1. Expand the **Databases** folder in the navigator tree.
2. Expand the database for which you want to define a user-defined chart.
3. Select the **User-Defined Charts** folder.

4. Click **Add User-Defined Chart** in the toolbar.

   The resulting New Chart property sheet includes the SQL Script Command page and the Data Items page.
5. On the SQL Script Command page, enter a SQL script that will be used to gather statistics for the chart you are defining.
6. Click **Evaluate**.

   Performance Manager evaluates the SQL script. If the script is valid, Performance Manager displays the Data Items page.
7. Use the Data Items page to customize how the resulting data from the script entered on the SQL Script Command page will be displayed in chart form.

You can remove columns and change the names of the columns. You can also define new columns with data calculated from existing columns. For more information, see "Modifying the Data Items for a User-Defined Chart" on page 3-20.

Modifying an Existing User-Defined Chart

To modify an existing chart you perform the same steps as outlined in "Creating a User-Defined Chart" on page 3-19. The only exception is that the chart label is already defined.

Note: To add or modify data items to user-defined charts, you must use the Agent data gathering service release 8.1.6. or later.

To modify an existing chart:

1. Expand the **Databases** folder in the navigator tree.
2. Expand the database for which you want to modify a user-defined chart.
3. Select the **User-Defined Charts** folder.
4. Click the name of the chart you want to modify.

   On the SQL Script Command page, you can modify the script used to gather statistics for the chart. On the Data Items page, you can remove, add, or modify the data items associated with the chart. For more information, see "Modifying the Data Items for a User-Defined Chart" on page 3-20.

Modifying the Data Items for a User-Defined Chart

When you select a user-defined chart and then display the Data Items page, you can modify the data items for the chart as follows:

- Select a data item and click **Set Data Source**.

A key icon appears next to the data item you designate as the data source. The data source is the object about which Performance Manager is able to collect the data. You must designate one of the data items as the source for the user-defined chart. To designate a data item as the data source, highlight the data item you want as the data source and click this button. By default, the first data item is set as the data source.

- Select a data item and click **Remove**.

  Performance Manager removes the data item from the Data Items page.

- Select a data item and click **Modify** or click **Add** to add a new data item to the user-defined chart.

> **Note:** To add or modify data items to user-defined charts, you must use the Agent data gathering service release 8.1.6 or later.

Performance Manager displays the Add/Modify Chart Columns dialog box. For more information about this dialog, click **Help**. The Oracle Performance Manager Help provides details on the functions and operations available. The Help also provides an example of creating a user-defined chart.

Copying a User-Defined Chart

You can copy user-defined charts from one service to another or within the same serve by using the Create Like option. To copy a user-defined chart:

1. In the navigator tree, select the user-defined chart you want to copy.
2. From the **Charts** menu, click **User-Defined Charts**=>**Create Like**.

   Performance Manager displays the Create Like User-Defined Chart dialog box.
3. Type a label for the new chart in the **Chart Label** field.

   Note that chart labels must be unique within a service.
4. In the **Service** drop-down list, select the target service for the new chart.
5. Click **OK**.

In the Create Like User-Defined Chart dialog box, you can choose the SQL Script Command or Data Items page to view the attributes of the chart you are copying. However, you cannot change the values of the attributes. Once the chart has been copied, you can select the new chart in the navigator tree and make any desired adjustments.

Converting Old Performance Manager User-Defined Charts

If you created user-defined charts using Oracle Performance release 1.5.0 or earlier (the Windows versions of Oracle Performance Manager), you can convert these

user-defined charts so that they can be used with Oracle Performance Manager release 2.1. See "Converting User-Defined Charts From Previous Releases of Performance Manager" on page 2-2 for information on how to perform the conversion.

4

Introduction to Oracle Index Tuning Wizard

The Oracle Index Tuning wizard is a software application that identifies tables with inefficient indexes and makes recommendations which will improve access to those tables.

The Index Tuning wizard:

- Identifies tables in need of index changes
- Presents its findings in reports
- Implements the recommendations for you

The Index Tuning wizard is intended for use with the Oracle cost-based optimizer. The recommendations made by the Index Tuning wizard will optimize index usage for the Oracle cost-based optimizer. Therefore, you should not use the Index Tuning wizard for those schemas where rule-based optimization is used.

This chapter describes when to use the Index Tuning wizard, how to access the Index Tuning wizard, and the Index Tuning wizard interface.

When to Use the Index Tuning Wizard

You can use the Index Tuning wizard to proactively maintain optimal indexes for your database. You should run the Index Tuning wizard regularly to evaluate whether index changes should be made to improve SQL query performance. The Index Tuning wizard may recommend adding new indexes, changing existing indexes, or changing the type of an index.

You should also use the Index Tuning wizard when one of the following situations occurs:

- A user has reported unacceptable response times for a query

- New applications have been added to the database environment
- Existing application SQL has been modified
- The database server has been upgraded to a new version
- Table sizes within the database have increased substantially

Any of these factors may impact the indexing decisions for the database.

Accessing the Index Tuning Wizard

You can access the Index Tuning wizard in the following ways:

- From the Standard Management Pack tool drawer
- Through the Oracle Expert application

  If you have the Oracle Expert application installed, you can launch the Index Tuning wizard from the Oracle Expert Tools menu.

> **Note:** In either case, you must first select a database in the navigator tree before launching the Index Tuning wizard.

The Index Tuning wizard makes two database connections:

1. The Index Tuning wizard connects to its repository to store and analyze data required for index tuning.
2. The Index Tuning wizard uses the database credentials defined in Oracle Enterprise Manager console to connect to the target database for index tuning.

Index Tuning Wizard Interface

When you first access the Index Tuning wizard, you are greeted with a Welcome screen that provides some of the advantages of using the Index Tuning wizard.

You will be lead through the following screens:

- Application Type
- Schema Selection
- Index Recommendations
- Analysis Report and Script

- Finish

Each of these screens is described in the following sections.

Application Type

On this screen, you choose the type of application that is primarily being used for the target database being tuned: Online Transaction Processing (OLTP), data warehousing, or multipurpose.

Schema Selection

On this screen, you have the opportunity to select the schemas you wish to evaluate. The **Any Schema** option tells the Index Tuning Wizard to select any schema which has a table referenced by one of the worst performing SQL statements. Select this option if you want an overview of the database's overall performance problems.

The purpose of the **Selected Schemas** option is to hide recommendations for schemas that you are not responsible for tuning or you do not wish to tune at the current time. Select this option if you only want recommendations for schemas you control. The schemas you select may or may not be the worst performers so you may or may not get tuning recommendations for all of the selected schemas.

When you first use the Index Tuning wizard, it is best to let the wizard select any schema so you will see an overall view of the problem areas. You can then focus on specific areas of the database for which you have control.

Index Recommendations

From this screen you can:

- Have the Index Tuning wizard generate the index recommendations, that is, collect and analyze the data to provide the index recommendations.
- Choose the index recommendations to be implemented.

The Index Tuning wizard provides a work-in-progress dialog box.

You can stop the generation at any time. The Index Tuning wizard deletes all the created files in preparation for the next generation.

Once the recommendations are generated, use this screen to choose the index recommendations you want to implement. The Details button provides additional

information about each recommendation. To activate the Details button, select a recommendation.

Analysis Report and Script

The Analysis Report and Script page displays the Analysis Report and Script tabs to view all of the recommendations for a tuning session, as well as the rationale for those recommendations.

> **Note:** The Analysis report for a tuning session is available only after the Index Tuning Wizard has analyzed the collected data.

During an analysis, the Index Tuning Wizard sifts through the collected data, uses its rules to generate tuning recommendations, then stores the information for the Analysis report in the repository. The Analysis report information stays in the repository until another analysis is performed for the tuning session.

The Script tab displays the SQL script needed to implement the recommendations that you selected on the Index Recommendations page. You can view the SQL *before* choosing to implement the recommended changes.

You can print and save the report and script from this page.

Finish

This screen allows you to implement and save the index tuning recommendations. The possibilities are:

- Implement the selected recommendations immediately
- Save the recommendations as an implementation script (Provides you with another opportunity to save the analysis report and script if you have not already done so.)
- Save the recommendations to an Oracle Expert Tuning Session (Standard Management Pack users must have the Oracle Tuning Pack installed for this option to work.)

When you click Finish, the recommendations will be saved and/or implemented according to the choices made.

5

Overview of the Change Management Applications

The change management applications provided by the Oracle Standard Management Pack are a group of integrated applications used to track changes to database object definitions. The change management applications are components of Oracle Enterprise Manager.

The change management applications provided by the Oracle Standard Management Pack are:

- Baseline Viewer
- DB Capture
- DB Diff
- Change Manager

This chapter provides an overview of important change management concepts and features.

The following section describes new features for this release of the change management applications.

New Features for the Change Management Applications

The following list describes the major new features for this version of the change management applications:

- Change Manager application

Change Manager, a new application, is now the central control panel for the change management applications. In most cases, interaction with the change management applications is directly or indirectly through Change Manager.

- Improved multiple user support

  The change management applications provide improved multiple user support. Each user has read and write access to the object definitions that he or she owns, and has read-only access to object definitions owned by other users. The Change Manager navigator tree displays baselines and comparisons, organized by owner.

- Baselines and comparisons can be created from the Oracle Enterprise Manager console and from DBA Studio

  See "Capturing a Baseline from the Oracle Enterprise Manager Console or DBA Studio" on page 5-7 and "Performing a Comparison from the Oracle Enterprise Manager Console or DBA Studio" on page 5-9 for more information.

- History features for change management tasks

  You can now view history entries that show the status of the following change management tasks:

  – Capturing baselines

  – Performing comparisons

  By viewing the history entries for tasks, you can determine when each change management task was performed and which user performed it. See "Viewing History Entries for Tasks" on page 6-5 for more information on history entries for tasks.

- Launch DBA Studio from Change Manager

  You can launch DBA Studio directly from Change Manager to modify database objects. On the Change Manager **Tools** menu, click **DBA Studio** to start DBA Studio.

- Create and view multiple versions of a baseline

  After you create a named baseline specification that describes the object definitions to include in the baseline, use the specification as often as you like to generate baseline versions that match the baseline specification criteria.

  Any differences between versions of a baseline accurately reflect differences in the database contents, not changes to the baseline specification (a baseline specification is a read-only object). Storing these baseline versions is an easy

way to record changes in your database at different times in a development cycle.

You can view a particular version of a baseline. See "Working With a Particular Version of a Baseline or Comparison" on page 6-6 for more information on viewing baseline versions.

- Create and view multiple versions of a comparison

  After you create a comparison specification that describes the sets of object definitions to compare, use the specification as often as you like to generate comparison versions that determine the differences between the sets of object definitions.

  Any differences between comparison versions accurately reflect differences in the database contents, not changes to the comparison specification (a comparison specification is a read-only object). Storing these comparison versions is an easy way to record the differences between two sets of definitions at different times in a development cycle.

  You can view a particular version of a comparison. See "Working With a Particular Version of a Baseline or Comparison" on page 6-6 for more information on viewing comparison versions.

- View text differences for database object definitions

  The DB Diff application now lets you view the text differences in the SQL for objects such as check constraints, procedures, functions, packages, trigger bodies, and views.

  After performing a comparison, select an object pair in the DB Diff tree view and in the detail view to the right of the tree view, select the text attribute of the object, then choose **Show Text Difference** on the **Tools** menu. This option only applies to text attributes such as the body of a procedure.

- Exclude the SYS and SYSTEM schemas from an operation

  When you capture a baseline using the Advanced mode of DB Capture, the user interface now allows you to specify that you want to exclude the SYS and SYSTEM schemas from the operation.

  See the online help for more information.

- Baseline Viewer application

  Use Baseline Viewer, a new application, to view baselines.

Database Objects Supported by the Change Management Applications

The types of database object definitions that the change management applications supports are:

- Cluster
- Database link
- Function
- Index
- Package
- Package body
- Procedure
- Profile
- Refresh group
- Role
- Rollback segment
- Sequence
- Snapshot
- Snapshot log
- Synonym
- Table
- Tablespace
- Trigger and instead-of trigger
- User
- View

In this release, the change management applications do not support the following features of the database objects in the previous list:

- Object-oriented features:
  - Tables and snapshot logs that refer to user-defined data types.
  - Object tables

  - Nested tables
  - Object views
- Snapshots that are not read-only

For a more complete list that describes the level of support the change management applications offer for specific database objects and attributes, see the section on currently unsupported database features and attributes in the *Oracle Standard Management Pack Readme*.

Understanding Change Management Objects

The following types of objects are created only by change management applications and are used to track changes to other object definitions:

- Baselines

  A baseline is a group of database object definitions captured by the DB Capture application at a particular point in time. Each baseline has the name of its baseline specification and a version number. A baseline is stored in a format that can be used by multiple change management applications.

  A baseline specification is used to generate baselines. A baseline specification includes a baseline name, source database, scope specification, and owner. The baseline name can be changed after the baseline specification is created, but the source database, scope specification, and owner cannot. The scope specification for a baseline is a set of criteria that an object must meet to be included in the baseline generated from the baseline specification. The scope specification describes the types of database object definitions to be included in the baseline, the schemas in which to look for those object definitions, and the names of those object definitions. See "Overview of DB Capture" on page 5-7 for more information about baselines.

- Comparisons

  A comparison identifies the differences found by the DB Diff application in two sets of database object definitions. Each comparison has the name of its comparison specification and a version number.

  A comparison specification is used to generate comparisons. A comparison specification is defined by its name, source database, scope specification, and owner. The name can be changed after the comparison specification is created, but the source database, scope specification, and owner cannot. The scope specification for a comparison is a set of criteria that the set of objects to be

compared must meet to be included in a comparison generated from the comparison specification. The scope specification describes the types of database object definitions to be included in the comparison, the schemas in which to look for those object definitions, and the names of those object definitions. See "Overview of DB Diff" on page 5-8 for more information about comparisons.

Change Management Applications

With change management applications, you can track changes by:

- Capturing the current definitions of a set of database objects in a baseline.
- Creating new versions of a baseline at regular intervals to track changes in that set of database objects over time.
- Comparing a set of object definitions in one schema, database, or baseline to another set of definitions (in a schema, database, or baseline) by performing a comparison. A comparison finds the differences between the two sets of definitions.
- Creating new versions of a comparison at regular intervals to determine the differences between the two sets of definitions over time.

The applications and their functions are:

- DB Capture

  Captures one or more definitions from one database.

- Baseline Viewer

  Lets you display baselines created earlier using DB Capture.

- DB Diff

  Compares two sets of definitions.

The change management applications also include the Change Manager application, which is a general-purpose interface that provides direct or indirect access to all change management features. See "Starting Change Manager" on page 6-1 for more information on starting Change Manager.

The following sections provide additional overview information on the change management applications.

Overview of DB Capture

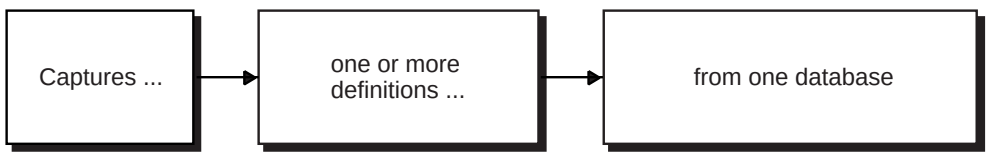
The DB Capture application guides you through the process of capturing a database (or a subset of a database) in a form that is readable by other change management applications. DB Capture lets you specify the set of database object definitions to capture, then captures those definitions in their current state at the time of the capture operation.

DB Capture can capture object definitions in both of the following forms:

- A baseline. The baseline stores definitions in a form that other change management applications can use. A baseline is created during every capture operation.
- A SQL DDL script. The script contains the SQL statements that correspond to the captured definitions. You can use the script to save a textual version of the definitions or as input to CASE tools that accept SQL DDL input. You can also use individual SQL statements from the script to create definitions in a new database. You have the option of whether or not to create a SQL DDL script.

Figure 5–1 shows the functional capabilities of DB Capture.

Figure 5–1 Functional Capabilities of DB Capture



To view a baseline created with DB Capture, use the Baseline Viewer application.

Capturing a Baseline from the Oracle Enterprise Manager Console or DBA Studio

When you have Oracle Standard Management Pack installed, you can perform a capture operation from the Oracle Enterprise Manager console or DBA Studio by following these steps:

1. Select a database, type, or schema folder in the Oracle Enterprise Manager navigator or the DBA Studio navigator.
2. Click the right mouse button.

3. On the context menu, point to **Standard Management**, then click **Capture Database Objects**.

DB Capture is started to capture a baseline for the selected database, then after the capture operation is completed, the Baseline Viewer is started to allow you to view the baseline.

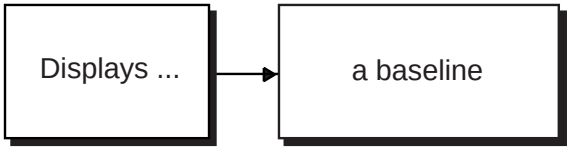
The online help contains more information about the specifics of using DB Capture.

Overview of Baseline Viewer

The Baseline Viewer application lets you display baselines created earlier using DB Capture.

Figure 5–2 shows the functional capabilities of Baseline Viewer.

Figure 5–2 Functional Capabilities of Baseline Viewer



You can also use Baseline Viewer to generate a SQL DDL script for the baseline if you did not generate one when the baseline was captured.

The online help contains more information about the specifics of using Baseline Viewer.

Overview of DB Diff

The DB Diff application guides you through the steps of selecting two sets of object definitions and then comparing them. The object definitions can be selected from current database definitions or they can be selected from baselines created earlier with DB Capture. If differences are found when the two sets of object definitions are compared, DB Diff allows you to view the differences between the corresponding object definitions.

The result of comparing two sets of object definitions using DB Diff is called a comparison. You can name a comparison, save it, and view it later.

Figure 5–3 on page 5-9 shows the functional capabilities of DB Diff.

Figure 5–3 Functional Capabilities of DB Diff

You can also generate a report in HTML format about a DB Diff comparison. The report includes:

- A description of what you compared.
- The comparison options you selected.
- A summary of the comparison results.
- The comparison tree and comparison details (optional).

Performing a Comparison from the Oracle Enterprise Manager Console or DBA Studio

When you have the Oracle Standard Management Pack installed, you can perform a comparison operation from the Oracle Enterprise Manager console or DBA Studio by following these steps:

1. Select a database, type, or schema folder in the Oracle Enterprise Manager navigator or the DBA Studio navigator.
2. Click the right mouse button.
3. On the context menu, point to **Standard Management**, then click **Compare Database Objects**.

DB Diff is started to perform a comparison, then the DB Diff viewer is started to allow you to view the comparison.

The online help contains more information about the specifics of using DB Diff.

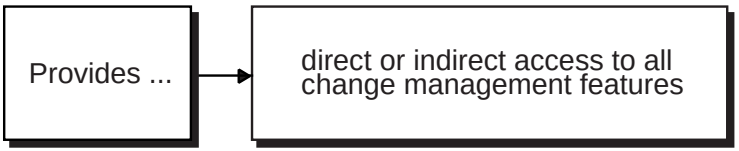
Overview of Change Manager

The Change Manager application is the change management central interface. In most cases, Change Manager gives you direct or indirect access to change management operations.

Using Change Manager, you can view change management objects (baselines and comparisons), as well as check on the status of current tasks. You can also view history information that tells you which change management operations were performed by what users at what time.

Figure 5–4 shows the functional capabilities of Change Manager.

Figure 5–4 Functional Capabilities of Change Manager



See Chapter 6, "Using Change Manager" on page 6-1 for more information on using Change Manager.

Sample Uses for the Change Management Applications

Some of the common usage scenarios for the change management applications are:

- Using DB Capture to capture a baseline of the current state of database object definitions, then using DB Diff later to compare the baseline to the current state of those database definitions.
- Using DB Capture to create a baseline specification that describes the object definitions that you want to include in the baseline, then using the specification multiple times to create new versions of the baseline. The definitions included in the baseline versions may differ over time, as changes are made at the source database being used. These baseline versions can be stored by Oracle Standard Management Pack, making them an easy way to record important points in a development cycle.
- Using DB Diff to create a comparison specification that describes the sets of object definitions that you want to compare, then using the specification multiple times to create new versions of the comparison. The differences found during each comparison may change over time, as changes are made to the sets of definitions being compared. These comparison versions can be stored by DB Diff, making them an easy way to record changes to sets of definitions at different points in a development cycle.

- Using the history features in Change Manager to track the status of change management tasks performed by your users.

Using Help

Online help is provided for all of the Oracle Change Management Pack applications. Note that the Oracle Standard Management Pack includes only the Change Manager, Baseline Viewer, DB Capture, and DB Diff applications, and provides read-only access to database object definitions. Also, you cannot create change plans with Oracle Standard Management Pack. You can display either the Contents page of the Oracle Change Management Pack help system, or you can display a help topic for your current context in an application.

Displaying the Contents Page for Help

Depending on the application that you are using, you can display the Contents page for the Oracle Change Management Pack online help by using one of the following methods:

- Press F1. If the Contents page for the help system does not display, click the Navigator button on the Help Topic Window toolbar.
- Click the ? on the application toolbar. This applies to Change Manager, Baseline Viewer, and DB Diff only.
- On the Help menu, choose Contents. This applies to Change Manager, Baseline Viewer, and DB Diff only.

Use the help system's Contents page, Index page, or Help Search page to locate help topics of interest. To access the Help Search page, on the Help Navigator window's Tools menu, choose Search.

Displaying a Help Topic for Your Current Context in an Application

You can display context-sensitive help in several ways, depending on your context in an application.

- If a Help button exists, click it.
- If a Help button does not exist, click the object that you are interested in, then press F1.

- Some wizard pages for the change management applications also display property pages. To access help for the wizard page, click the Help button at the bottom left corner of the page. To access help for a property page, click a field in the property page, then click the Help button beneath the property page. If a Help button does not exist beneath the property page, click a field in the property page, then press F1.

Finding a Particular Type of Help Topic

In addition to providing context-sensitive help, the Oracle Change Management Pack help system contains conceptual topics, task topics, and a glossary. To locate each type of topic:

- Help topics whose titles begin with words such as "About," "Introduction,"or "Overview" are conceptual topics. These topics usually provide overview information about change management applications or conceptual information that you should be aware of before performing a particular task. They do not provide step-by-step instructions for accomplishing a task. The Conceptual Topics book on the help system's Contents page includes all of the conceptual topics in the Oracle Change Management Pack help system.
- Help topics whose title begin with the word "To" are task topics. These topics provide step-by-step instructions for accomplishing a task. They do not provide conceptual information that you should be aware of before performing the task. The Task Topics book on the help system's Contents page includes all of the task topics in the Oracle Change Management Pack help system.
- The Oracle Change Management Pack glossary is available by accessing the Glossary book on the help system's Contents page.

6

Using Change Manager

The Change Manager application is the change management central interface. Change Manager gives you direct or indirect access to all of the change management operations (in cases where Change Manager cannot directly perform an operation, such as capturing or comparing object definitions, Change Manager starts the application that performs that operation).

Change Manager provides access to all the change management objects owned by all users, and allows appropriate operations on these objects depending on ownership.

Objects are ordered by owner in the Change Manager navigator tree. Each user has read and write access to the object definitions that he or she owns, and has read-only access to object definitions owned by other users.

Starting Change Manager

You can start the Change Manager application in any of the following ways:

- From the Oracle Enterprise Manager console, use any of these methods:
  - Select a database in the navigator panel, click the right mouse button, point to the **Related Tools** menu option, then click **Change Manager**.
  - On the **Tools** menu, point to **Standard Management Pack**, then click **Change Manager**.
  - Click the Standard Management Pack drawer, then click the Change Manager icon.
- On the Windows **Start** menu, point to **Programs**, then to the Oracle Home where Oracle Enterprise Manager is installed, then to **Standard Management Pack**, then click **Change Manager**.

See "Starting Change Management Applications from Change Manager" on page 6-2 for more information on starting the other change management applications from Change Manager and "Starting DBA Studio from Change Manager" on page 6-3 for more information on starting DBA Studio from Change Manager.

Using the Change Manager Main Window

The Change Manager main window has a navigator tree on the left and a detail view on the right.

The navigator tree displays the following change management objects, organized by owner:

- baselines
- comparisons

If the Change Manager navigator tree contains no objects, this means that no baselines or comparisons have been created in the Oracle Enterprise Manager repository that Change Manager is connected to. When you create these objects, they appear in the Change Manager tree.

When you select a change management object or object folder and click the right mouse button, a context menu is displayed that lists the operations that can be performed in the current context. If you select an object that you do not own, some of the operations on the context menu are unavailable (for example, you cannot remove or modify an object that you do not own, because you have read-only access to objects owned by other users). On the context menu, choose any available operation that you are interested in performing.

When the Change Manager Users folder (the root of the Change Manager tree) is selected, the detail view provides information about change management applications and the operations that they can perform. Click on an application's icon in the detail view to learn more about the operations that the application can perform.

When other folders or objects are selected in the Change Manager tree, the detail view provides related information about the selected folder or object.

Starting Change Management Applications from Change Manager

You start the other change management applications from Change Manager, as follows:

- Baseline Viewer

  Expand the Change Manager folder, user folder, and Baselines folder in the Change Manager tree, select a baseline, then on the **Object** menu, click **View Baseline**.

- DB Capture

  On the Change Manager **Object** menu, click **Create Baseline**.

- DB Diff

  On the Change Manager **Object** menu, click **Compare Database Objects**.

Starting DBA Studio from Change Manager

In some cases, you may want to start DBA Studio to quickly create or modify object definitions. To start DBA Studio from Change Manager, on the **Tools** menu, click **DBA Studio**.

Working with Baselines

Table 6–1 describes how to use Change Manager to perform different types of baseline operations.

Table 6–1 Performing Baseline Operations

Operation	Steps for Performing the Operation
Create a new baseline	On the Change Manager **Object** menu, click **Create Baseline** and follow the steps in the DB Capture application.
View a baseline	Select the baseline in the tree. On the Change Manager **Object** menu, click **View Baseline**.
Delete a baseline	Select the baseline in the tree. On the Change Manager **Object** menu, click **Remove**. This deletes all the versions of the baseline.
Export a baseline to a file	On the Change Manager **Tools** menu, click **Export Plans/Baselines/Comparisons**, then specify the baseline to export and the name of the export file.
Import a baseline from a file	On the Change Manager **Tools** menu, click **Import Plans/Baselines/Comparisons**, then specify the name of the export file and the baseline to import.

Table 6–1 Performing Baseline Operations (Cont.)

Operation	Steps for Performing the Operation
Create a new version of a baseline	Select the baseline in the tree. On the Change Manager **Object** menu, click **Recapture**.
View a previous version of a baseline	Select the baseline in the tree. On the Change Manager **Object** menu, click **Show Versions**. In the Versions dialog box, click the version you want to view, then click **View**.
Delete a previous version of a baseline	Select the baseline in the tree. On the Change Manager **Object** menu, click **Show Versions**. In the Versions dialog box, click the version you want to delete, then click **Remove**.
View history entries for baseline tasks	On the **View** menu, click **Show History**. In the History dialog box, view history entries for completed baseline tasks on the History page.

For more information on working with baselines, see:

- "Viewing History Entries for Tasks" on page 6-5 for more information on viewing history entries for baseline tasks.
- "Working With a Particular Version of a Baseline or Comparison" on page 6-6 for more information on working with particular versions of baselines.
- "Exporting and Importing Baselines and Comparisons" on page 6-7 for more information on exporting and importing baselines.

Working with Comparisons

Table 6–2 describes how to use Change Manager to perform different types of comparison operations.

Table 6–2 Performing Comparison Operations

Operation	Steps for Performing the Operation
Create a new comparison	On the Change Manager **Tools** menu, click **Compare Database Objects** and follow the steps in the DB Capture application.
View a comparison	Select the comparison in the tree. On the Change Manager **Object** menu, click **View Comparison**.
Delete a comparison	Select the comparison in the tree. On the Change Manager **Object** menu, click **Remove**. This deletes all the versions of the comparison.

Table 6–2 Performing Comparison Operations (Cont.)

Operation	Steps for Performing the Operation
Export a comparison to a file	On the Change Manager **Tools** menu, click **Export Plans/Baselines/Comparisons**, then specify the comparison to export and the name of the export file.
Import a comparison from a file	On the Change Manager **Tools** menu, click **Import Plans/Baselines/Comparisons**, then specify the name of the export file and the comparison to import.
Create a new version of a comparison	Select the comparison in the tree. On the Change Manager **Object** menu, click **Repeat Comparison**.
View a previous version of a comparison	Select the comparison in the tree. On the Change Manager **Object** menu, click **Show Versions**. In the Versions dialog box, click the version you want to view, then click **View**.
Delete a previous version of a comparison	Select the comparison in the tree. On the Change Manager **Object** menu, click **Show Versions**. In the Versions dialog box, click the version you want to delete, then click **Remove**.
View history entries for comparison tasks	On the **View** menu, click **Show History**. In the History dialog box, view history entries for completed comparison tasks on the History page.

For more information on working with comparisons, see:

- "Viewing History Entries for Tasks" on page 6-5 for more information on viewing history entries for comparison tasks.
- "Working With a Particular Version of a Baseline or Comparison" on page 6-6 for more information on working with particular versions of comparisons.
- "Exporting and Importing Baselines and Comparisons" on page 6-7 for more information on exporting and importing comparisons.

Viewing History Entries for Tasks

You can view history entries that show the status of the following change management tasks:

- Capturing baselines
- Performing comparisons

By viewing the history entries for completed tasks, you can determine when each change management task was performed and its completion status.

To view the history entries for tasks in the current change management repository, on the Change Manager **View** menu, choose the **Show History** option, which displays the History dialog box. The History dialog box allows you to view completed tasks.

Viewing Completed Tasks

Click the History tab of the History dialog box to view completed tasks.

The history entries on the History page of the History dialog box enable you to track the change management tasks that have been completed. Each row on the History page is a history entry for one completed task. The status for a particular history entry tells you whether the task completed successfully or not.

On the History page, you can perform the operations shown in Table 6–3:

Table 6–3 Operations That Can be Performed on Completed Tasks

Operation	Steps to Perform the Operation
Remove a task	Select a task and click **Remove**.
Update the History page display	Click the **Refresh** button. Any new completed tasks are displayed.
View a task	Select a task and click **GoTo**. The appropriate change management application window is opened in the correct context for viewing the task.
Save history entries to a file	Click the **Save List** button. The Save List dialog box lets you save some or all of the task history entries in a file. You have the option of viewing and printing the information to be included in the file before saving the file.
Sort history entries	Click a column heading on the History page. The first time you click a heading, the history entries are sorted in ascending order, using the values in that column. If you click again on the same heading, the history entries are sorted in descending order, using the values in that column.

Working With a Particular Version of a Baseline or Comparison

After you create a baseline specification, you can use the specification to generate multiple baselines over time. Similarly, after you create a comparison specification, you can use it to generate multiple comparisons over time.

By default, when you select a baseline or comparison in Change Manager, any operations you perform are carried out on the latest version of that object. In some

cases, however, you may want to view or remove an earlier version of the object. To do so, after you select the object in Change Manager, on the **Object** menu, click **Show Versions**. This displays the Versions dialog box. In the Versions dialog box, select the version of the object that you are interested in, then click **View** to view the selected version of the object in the appropriate change management window or click **Remove** to remove the selected version of the object from the Oracle Enterprise Manager repository.

Note: When you remove a version of a baseline or comparison, the version numbers for the remaining versions of that object remain the same.

Exporting and Importing Baselines and Comparisons

You can export and import baselines and comparisons using Change Manager. After you export one or more of these objects to a file, you can then import the objects into another repository, which copies the objects from one repository to another.

To export baselines or comparisons:

1. In Change Manager, on the **Tools** menu, click **Export Plans/Baselines/Comparisons**.
2. In the Export Plans / Baselines / Comparisons dialog box, specify the object or objects to export, then click **Export**.
3. In the Export Plans / Baselines / Comparisons to which file? dialog box, select a file into which the selected objects will be exported, then click **Save**.

To import baselines or comparisons:

1. In Change Manager, on the **Tools** menu, click **Import Plans/Baselines/Comparisons**.
2. In the Import Plans / Baselines / Comparisons from which file? dialog box, identify the file that contains the object or objects that you want to import, then click **Open**.
3. In the Import Plans / Baselines / Comparisons dialog box, select the object or objects that you want to import, then click **Import**. If the import utility discovers that any of the objects being imported has the same name as an existing object in the current repository, you will be prompted to either rename the object being imported or to cancel the import operation for that object.

7

Using Oracle TopSessions

This chapter covers how you use Oracle TopSessions, including the following topics:

Before You Start Oracle TopSessions

Before using Oracle TopSessions, it is best to ensure that the following views exist on the database instance:

- V$SESSION
- V$STATNAME
- V$SESSTAT
- ALL_TAB_COLUMNS
- V$OPEN_CURSOR
- V$SQLTEXT
- V$LOCK

- SYS.DBA_OBJECTS
- V$ROLLNAME
- PLAN_TABLE
- ALL_CATALOG
- AUDIT_ACTIONS

The first four tables of the list are essential; Oracle TopSessions cannot run without them. The rest of the tables are required to use certain features of Oracle TopSessions; however, you can still run Oracle TopSessions without them.

The smptsi*xx*.sql scripts have been provided by Oracle Enterprise Manager to create the required tables and views on each database you want to connect to from Oracle TopSessions. The *xx* in the file name identifies the version of the database against which the script should be run. For example, if you have an Oracle 7.3 database, you would run the smptsi73.sql script against it, and if you have an Oracle 8.0 database, you would run the smptsi80.sql script against it. The script for each database version is located in the $ORACLE_HOME\SYSMAN\ADMIN directory. Run these scripts from the SYS account. For more information about running these scripts, see the section on setting up Oracle TopSessions in "Setting Up TopSessions" on page 2-4.

If the ALL_CATALOG view or the AUDIT_ACTIONS view does not exist on a database, run catalog.sql against the database from the SYS account. This script is located in the $ORACLE_HOME\RDBMS*xx*\ADMIN directory.

Starting Oracle TopSessions

You start Oracle TopSessions as you would any typical Oracle Enterprise Manager application.

> **Attention:** See "Before You Start Oracle TopSessions" on page 7-1 if an error message appears when you attempt to start Oracle TopSessions.

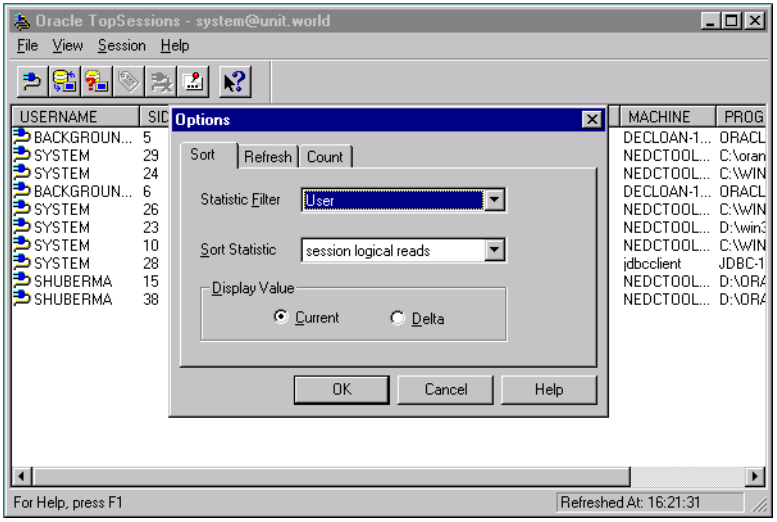
By default, the top *n* sessions in the main display are sorted by the session logical reads statistic. If you want to change the sort statistic and / or the statistic filter, choose Options on the Session menu. This displays the Options property sheet, on which you can customize the session information displayed in the main display. See

"Customizing the Session Information You Display" on page 7-17 for more information about using the Options property sheet.

> **Note:** The options that were selected when you last exited Oracle TopSessions are automatically loaded the next time you start Oracle TopSessions. These options are saved in ORACLE_HOME\SYSMAN\TEMP\TOPSESS.OPT.

Figure 7–1 shows the Oracle TopSessions main window and the Options property sheet.

Figure 7–1 Oracle TopSessions Main Window



If you are monitoring multiple databases, it is possible to start multiple Oracle TopSessions connections to multiple database instances. The system resources of the management console are the only constraining factors.

Oracle TopSessions Main Window

As Figure 7–1 shows, the Oracle TopSessions main window includes the following components:

- Title bar
- Menu bar
- Toolbar
- Main display
- Status bar

The following sections describe each of these components.

Title Bar

The title bar of the Oracle TopSessions main window displays the name of the application and the database instance to which an Oracle TopSessions connection has been established. If no connection to a database instance currently exists, the message "No database connection" is displayed in the title bar.

Toolbar

The toolbar of the Oracle TopSessions main window contains icons representing certain Oracle TopSessions menu items, including the following: Change Database Connection, Refresh, Toggle Manual / Auto Refresh, Session Details, Kill Session, Options, and Help. If no Oracle TopSessions connection to a database instance currently exists, all tools except the Change Database Connection and Help tools are disabled. If a database connection does exist, the Change Database Connection, Refresh, Toggle Manual / Auto Refresh, Options, and Help tools are enabled.

The Refresh Mode tool performs the same function as the Manual and Automatic buttons on the Refresh page of the Options property sheet. When the Refresh Mode tool is not pressed (default), manual refresh mode is enabled. When the Refresh Mode tool is pressed, automatic refresh mode is enabled.

Enabling automatic refresh mode with the Refresh Mode tool enables whatever refresh interval is set on the Refresh page of the Options property sheet. To adjust

this interval, go to the Refresh page itself. See "Customizing the Session Information You Display" on page 7-17 for more information.

> **Attention:** The length of time a data refresh requires varies, depending on the number of sessions connected to the database instance. A database instance with 700 to 800 sessions logged on would require about 10 seconds to refresh. Thus, an instance with perhaps 1,000 sessions logged on, when automatically refreshed at the default 10 second interval, would be in perpetual refresh mode. Thus, if you plan to use the automatic refresh mode, it is very likely that you will want to adjust the refresh interval to reflect your particular environment.

Status Bar

The status bar of the Oracle TopSessions main window can include the following information:

Left section

When a menu item has been selected, an explanation of the menu item appears in this section of the status bar.

Right section

Displays the time of the last data refresh of the Oracle TopSessions main display.

Oracle TopSessions Menu Bar

The menu bar of the Oracle TopSessions main window includes the following pull-down menus:

- File
- View
- Sessions
- Help

File Menu

The File menu items allow you to create new database connections and exit Oracle TopSessions.

The File menu includes the following commands:

Change Database Connection

Displays the Login Information dialog box, enabling you to connect to a database instance of your choice.

Exit

Exits Oracle TopSessions. See "Exiting Oracle TopSessions" on page 7-20 for more information.

View Menu

The View menu items allow you to refresh the main window display and to show / hide the toolbar or status bar.

The View menu includes the following commands:

Refresh

If manual refresh mode (default) is enabled, you can choose this command to refresh (immediately) the session information displayed in the Oracle TopSessions main window.

Toolbar

Allows you to show / hide the toolbar.

Status Bar

Allows you to show / hide the status bar.

Sessions Menu

The Sessions menu items allow you to specify what session statistics will be displayed in the Oracle TopSessions main display, and how that information will be refreshed. See "Customizing the Session Information You Display" on page 7-17 for more information about these menu items.

The Sessions menu includes the following commands:

Details

Displays the Session Details window for the session selected from the Oracle TopSessions main display. This menu item is disabled when no session in the Oracle TopSessions main display has been selected.

Kill

Kills the user session selected on the Oracle TopSessions main display.

When a session has been killed, a red "X" marks the username of that session. This symbol is like the red "X" on the Kill tool icon.

Options

Displays the Options property sheet, from which you can specify the sorting criterion, the refresh mechanism, and the number of entries for statistics displayed in the Oracle TopSessions main window.

The length of time the data refresh requires varies, depending on the number of sessions connected to the database instance. An instance with 700 to 800 sessions logged on would require about 10 seconds to refresh.

If no Oracle TopSessions connection to a database instance currently exists, all of these Session menu items are disabled.

Help Menu

The Help menu items allow you to obtain help on Oracle TopSessions menu items or property sheets.

Contents

Displays an overview of the Oracle TopSessions help system.

Search for Help On

Displays an alphabetical list of Help topics.

Using Help

Displays information about using the Help system.

About Oracle TopSessions

Displays the version number of this application.

Obtaining an Overview of Session Activity

Once populated with data, the Oracle TopSessions main display includes a multi-column list of summary information for each session connected to the database instance, or for each of the top *n* sessions, as measured by the selected sort statistic. This information is obtained from the V$SESSION view, as follows:

SID

Oracle session ID for this session.

USERNAME

Oracle user name using this session.

OSUSER
Operating system user name.

Sort Statistic
This fourth column varies, depending on the sort statistic you have selected.

COMMAND
Last Oracle command executed by this session.

STATUS
Status of this session: IDLE, ACTIVE, KILLED, or BLOCKED.

MACHINE
Identifier of the machine using this session.

PROGRAM
Name of the client program executing this session.

See "Customizing the Session Information You Display" on page 7-17 for information about defining the top *n* sessions.

For information on the V$ views from which these statistics are derived, see the *Oracle Server Reference*. For information on how to make use of these statistics, see *Oracle Server Tuning* and *Oracle Server Administrator's Guide*.

Using the Right Mouse Button on the Main Display

In the Oracle TopSessions main display, you can click on a username with the right mouse button, and then select one of the following menu items:

Details
Displays the Session Details window for that session. See "Viewing Details About a Given Session" on page 7-9 for more information.

Kill
Kills the selected session. This menu item works like the Kill menu item of the Session menu.

Sorting the Order of Entries in the Main Display

By default, the value of the sort statistic determines the order of session entries in the Oracle TopSessions main display. (The sort statistic is the fourth column of the

multi-column list.) However, you can use any field in the list to sort the order of displayed session entries, by clicking on any column header in the list.

Viewing Details About a Given Session

To obtain more information about a given session, you can drill down by double clicking on an SID in the Oracle TopSessions main display. A Session Details window for that session appears. This section covers the following topics:

- Session Details pages
- Session Details data refresh time
- Viewing session details for multiple sessions simultaneously

Session Details Pages

The Session Details window includes the following pages:

- General
- Statistics
- Cursors
- Locks

To select one of these pages, click on the appropriate tab title near the top of the Session Details window.

Session Details General Page

The General page of the Session Details window provides detailed information about a session. This information is obtained from the V$SESSION view.

For information on the V$ views from which these statistics are derived, see the *Oracle Server Reference*. For information on how to make use of these statistics, see *Oracle Server Tuning* and *Oracle Server Administrator's Guide*.

While the contents of the General page can vary, depending on the Oracle7 or Oracle8 server release, for an Oracle 7.3 server, the General page contains the following:

SADDR
Session address of this session.

SID
Oracle session ID of this session.

SERIAL#
Serial number of this session. Together with the SID, this number provides a unique key for this session.

AUDSID
Auditing session ID.

PADDR
Address of the Oracle process using this session.

USER#
ID of the user using this session.

USERNAME
User name of the user using this session.

COMMAND
Last Oracle command executed.

TADDR
Address of the transaction state object.

LOCKWAIT
Address of lock waiting for; null if none.

STATUS
Status of this session: ACTIVE, IDLE, KILLED, or BLOCKED.

SERVER
Server type: DEDICATED, SHARED, PSEUDO, or NONE.

SCHEMA#
Schema user identifier.

SCHEMANAME
Schema user name.

OSUSER
Operating system user name.

PROCESS
Process ID.

MACHINE
Identifier of the machine using this session.

TERMINAL
Operating system terminal name.

PROGRAM
Name of the client program using this session.

TYPE
Session type.

SQL_ADDRESS
Together with the SQL hash value, identifies the SQL statement that is currently being executed.

SQL HASH VALUE
Together with the SQL address, identifies the SQL statement that is currently being executed.

PREV_SQL_ADDR
Together with the previous SQL hash value, identifies the SQL statement that executed previous to the SQL statement currently executing.

PREV_HASH_VALUE
Together with the previous SQL address, identifies the SQL statement that executed previous to the SQL statement currently executing.

MODULE
Name of the currently executing module as set by calling the procedure named DBMS_APPLICATION_INFO.SET_MODULE.

MODULE_HASH
The hash value of the above module name.

ACTION
Name of the currently executing action as set by calling the procedure named DBMS_APPLICATION_INFO.SET_ACTION.

ACTION_HASH
The hash value of the above action name.

CLIENT_INFO
Information set by the DBMS_APPLICATION_INFO.SET_CLIENT_INFO procedure.

FIXED_TABLE_SEQUENCE
Number that increases every time the session completes a call to the database and there has been an intervening select from a dynamic performance table.

ROW_WAIT_OBJ#
Object ID for the table containing the row ID specified in ROW_WAIT_ROW#.

ROW_WAIT_FILE#
Identifier for the datafile containing the row ID specified in ROW_WAIT_ROW#. This column is valid only if the session is currently waiting for another transaction to commit and the value of ROW_WAIT_OBJ# is non-zero.

ROW_WAIT_BLOCK#
Identifier for the block containing the row ID specified in ROW_WAIT_ROW#. This column is valid only if the session is currently waiting for another transaction to commit and the value of ROW_WAIT_OBJ# is non-zero.

ROW_WAIT_ROW#
Current row ID being locked. This column is valid only if the session is currently waiting for another transaction to commit and the value of ROW_WAIT_OBJ# is non-zero.

LOGON_TIME
Logon timestamp for the session.

LAST_CALL_ET
Last call made during the session.

Session Details Statistics Page

The Statistics page of the Session Details window provides a large number of performance statistics for the selected session. The particular statistics this page displays can vary, depending on the Oracle server instance. These statistics are obtained from the V$SESSTAT view.

The selected category in the Category drop-down menu determines the statistics that will be displayed for the current session. To define a custom set of statistics to display, click the Custom... button on the Statistics page. Then use the Choose Statistics for Display dialog box to select the set of statistics. After you have chosen a set of statistics, they are saved as the Custom category of statistics and the Custom category is added to the Category drop-down menu. Then, to select the Custom category of statistics for display, select Custom from the Category drop-down menu. See "Choose Statistics for Display Dialog Box" on page 7-13 for more information on choosing a custom set of statistics.

For information about the statistics that can be displayed for a session and the V$ views from which they are derived, see the *Oracle Server Reference*. For information on how to make use of these statistics, see *Oracle Server Tuning*.

Choose Statistics for Display Dialog Box

The Choose Statistics for Display dialog box allows you to select a custom set of statistics to display for a session.

The left tree view contains the list of statistics that are currently selected for display in the Custom category on the Statistics page of the Session Details window. The right tree view contains the available statistics that can be selected for display in the Custom category. In the tree views, a + or - sign icon is used for the names of the categories of statistics. Click the + or - sign for a category of statistics to view or hide the individual statistics in the category.

To move a category of statistics or an individual statistic from one tree view to the other, double-click on the category or statistic. Click OK when the left tree view contains the set of statistics you want to display in the Custom category. After you have chosen a set of statistics, they are saved as the Custom category of statistics and the Custom category is added to the Category drop-down menu on the Statistics page of the Session Details window. Then, to select the Custom category of statistics for display, select Custom from the Category drop-down menu on the Statistics page of the Session Details window.

You can modify the set of statistics in the Custom category by clicking the Custom... button on the Statistics page of the Session Details window, then selecting a different set of statistics using the Choose Statistics for Display dialog box.

The set of statistics in the Custom category are saved in $ORACLE_HOME\SYSMAN\TEMP\TOPSESSC.INI.

Session Details Cursors Page

The Cursors page of the Session Details window provides information about each shared cursor in the shared SQL area for the selected session.

> **Attention:** In order to view explain plans for SQL statements accessing V$ views, you must log in as SYS. In addition, you must have privileges to access the objects in the SQL statement for which you want to view an explain plan.

The Cursors page contains the following:

Show Cursors

Click on an item in this list box to display SQL statement(s) for the selected user session. Options include:

Current Cursor: Displays the SQL statement currently executing. This is the default.

All Cursors: Displays all SQL statements that have executed or will execute on the database server for the selected user session.

Show Explain Plan

Click on this button to display the explain plan for the SQL statement in the Cursors page display box which you have selected. See "Displaying an Explain Plan for a User Session" on page 7-15 for more information.

Display box

Displays one or more SQL statements for the selected user session. If All Cursors has been selected, the first SQL statement in the list is the statement currently executing on the server for the session.

> **Attention:** If no SQL statement appears in this display box, but you expect one to exist for the session, a problem may exist with an important database table. See "Before You Start Oracle TopSessions" on page 7-1 for more information.

> **Attention:** Only SQL statements containing the commands SELECT, INSERT, UPDATE and DELETE will produce explain plans for you to view in this display box; any other SQL statement will not produce an explain plan for you to view.

Displaying an Explain Plan for a User Session

To display an explain plan for a user session, from the Cursors page of the Session Details window, select a SQL statement and click on the Show Explain Plan button. The Explain Plan For Session *xx:y* window appears.

The title bar of this window includes the SID *(xx)* of the session and the number of windows opened on that session *(y)*. This window includes the following elements.

SQL Statement
Displays the SQL statement for which you want to view the explain plan.

Explain Plan
The folders allow you to collapse or expand the level of detail of the explain plan. This feature is particularly useful when analyzing long and / or complicated explain plans.

> **Note:** The Expected Rows column only appears when an Oracle 7.3 database is being monitored.

Session Details Locks Page

The Locks page of the Session Details display provides information about locks held or requested by a given session. This information is obtained from the V$LOCK and V$ROLLNAME views.

For information about the V$ views from which these statistics are derived, see the *Oracle Server Reference*. For information on how best to interpret and use these statistics, see *Oracle Server Tuning*.

The Locks page includes the following list box:

Lock Types
Clicking on an item in this list box allows you to select the type of lock by which the sessions will be displayed. Options include All Locks or Blocking / Waiting Locks.

The Locks page contains the following fields:

User Name
Oracle user name using the session.

Session ID
Oracle session ID for the session.

Lock Type
Type of lock, as follows: MR (Media Recovery); RT (Redo Thread); UN (User Name); TX (Transaction); TM (DML); UL (PL/SQL User Lock); DX (Distributed Xaction); CF (Control File); IS (Instance State); FS (File Set); IR (Instance Recovery); ST (Disk Space Transaction); TS (Temp Segment); IV (Library Cache Invalidation); LS (Log Start or Switch); RW (Row Wait); SQ (Sequence Number); TE (Extend Table); and TT (Temp Table).

Mode Held
Mode in which the lock is currently held by the session, as follows: None; Null; Row-S (SS); Row-X (SX); Share; S/Row-X (SSX); and Exclusive.

Mode Requested
Mode in which the lock is being requested by the process, as follows: None; Null; Row-S (SS); Row-X (SX); Share; S/Row-X (SSX); and Exclusive.

Object Name
Name of the object, rollback segment, table or view, being locked. If the lock type is TM, the object is a table or view. If the lock type is TX, the object is a rollback segment.

Object Owner
Owner of the object that has been locked by the session. The session user, listed in the Username field of the Session Details window General page, may be different than the owner of the object being locked.

Object Type
Object type.

Object ID
Unique identifier of the object.

Resource ID 1
For certain types of locks, this value is the object ID or rollback segment number.

Resource ID 2
Undocumented.

> **Attention:** If no information is displayed on the Locks page, it is likely that no locks currently exist for the session. However, if you suspect that locks exist, but no information is displayed on the Locks page, a problem may exist with an important database table. See "Before You Start Oracle TopSessions" on page 7-1 for more information.

Session Details Display Refresh Time

Like the status bar of the Oracle TopSessions main display, the status bar of the Session Details display also shows the refresh time for the information it displays. This time reflects the refresh time of the Oracle TopSessions main display at the time the Session Details display is created. Even when the Oracle TopSessions main display is subsequently refreshed, the information in a Session Details window that remains open during the main display refresh will not itself be refreshed.

Likewise, even though the refresh time in the status bar of the main window is updated to reflect the most recent refresh, the refresh time in the status bar of an open Session Details window is not updated simultaneously. Thus, the refresh time in the Session Details window status bar continues to reflect the time the static information in the Session Details window was captured.

Should you want to refresh the information for a given session in the Session Details window, close the window and then double-click on the SID for that session in the Oracle TopSessions main window. The resulting Session Details window will reflect the latest refresh time of the Oracle TopSessions main display.

Viewing Session Details for Multiple Sessions

You can display, minimize (iconify), and maximize Session Details displays for multiple sessions as you track down problems and work to resolve them.

Customizing the Session Information You Display

To customize how session information is displayed in the Oracle TopSessions main window, choose Options from the Session menu. The Options property sheet that appears includes the following pages:

- Sort

- Refresh
- Count

To select one of these pages, click on the appropriate tab title near the top of the Options property sheet.

> **Note:** The options that were selected when you last exited Oracle TopSessions are automatically loaded the next time you start Oracle TopSessions. These options are saved in ORACLE_HOME\SYSMAN\TEMP\TOPSESS.OPT.

Options Sort Page

Use the Sort page of the Options property sheet to specify how session information displayed in the Oracle TopSessions main window will be sorted, and what time interval the data will reflect. The Sort page contains the following:

Statistic Filter

Click on an item in this list box to specify the group of statistics from which to choose then select a particular sort statistic in the Sort Statistic list box.

These groups of statistics are labeled as follows: Predefined, User (default), Redo, Enqueue, Cache, Operating System, Parallel Server, SQL, Debug, Other, and All.

Selecting one of these items makes available a different group of statistics in the Sort Statistics box. With the exception of the Predefined group, the mapping between a statistic and its statistic filter group is derived from the CLASS column of the dynamic performance table V$STATNAME.

The Predefined statistics are defined or calculated from statistics displayed on the Statistics page of the Session Details display, as follows: CPU Usage (CPU used by this session); File I/O (physical reads + physical writes); Memory (session uga memory); Open Cursors (opened cursors current); User Transactions (user commits + user rollbacks).

Sort Statistic

Click on this list box to select the statistic by which the sessions displayed in the Oracle TopSessions main window will be sorted. The contents of this list box vary, depending on the Statistic Filter that has been selected.

Display Value

Current: Click on this button to specify that statistics displayed in the Oracle TopSessions main window be based on the most recent data refresh.

Delta: Click on this button to specify that displayed statistics reflect the difference (delta value) between the most recent data refresh and the data refresh previous to that.

Options Refresh Page

Use the Refresh page of the Options property sheet to specify how you want session information displayed in the Oracle TopSessions main window to be refreshed. The length of time the data refresh requires will vary, depending on the number of sessions connected to the database instance. An instance with 700 to 800 sessions logged on would require about 25 seconds to refresh.

The Refresh page contains the following:

Manual

Click on this button (default) to enable manual refreshing of the session information displayed in the Oracle TopSessions main window. You can then use the Refresh command from the View menu or the Refresh tool to refresh this information when you so choose.

Automatic

Click on this button to enable automatic refresh of session information displayed in the Oracle TopSessions main window; the Refresh Interval group of list boxes is then enabled for use.

Refresh Interval

Click on the appropriate combination of the Seconds, Minutes and Hours list boxes to specify the refresh interval for session information displayed in the Oracle TopSessions main window. The default refresh interval is 10 seconds.

Attention: The refresh interval is the time interval measured from the beginning of a refresh to the beginning of the refresh following it. Thus, a database instance with perhaps 1,000 sessions logged on, and being automatically refreshed at the default 10 second interval, would be in perpetual refresh mode. Thus, if you plan to use the Automatic refresh mode, it is very likely that you will want to adjust the refresh interval to reflect your particular environment.

Options Count Page

Use the Count page of the Options property sheet to specify the number of sessions to be displayed in the Oracle TopSessions main window. The Count page contains the following:

Display All Sessions
Click this button to display all sessions connected to the database instance. As this option is very resource-intensive in almost all cases, Oracle Corporation recommends that you use the default option Display Top N Sessions.

Display Top N Sessions
Click on this button (default) to display the top *n* sessions that meet the sort statistic criterion specified in the Sort page of the Options property sheet. The default number of sessions is 10. Click on the scroll box to the right of this button to specify the value of *n*.

Exiting Oracle TopSessions

To exit Oracle TopSessions, choose Exit from the File menu. A dialog box is displayed, confirming that you want to close your Oracle TopSessions session.

A

Troubleshooting Appendix

This appendix describes different ways of troubleshooting problems that may occur when you are using change management applications.

You may decide to contact an Oracle Worldwide Customer Support representative regarding a problem with the change management applications. If so, you may be asked to use one of the approaches described in this appendix to obtain information that will help the representative determine the source of the problem.

Using Environment Variables When Running Change Manager from the Command Line

You can set environment variables in the MS-DOS command line before you run the Change Manager application from the command line. The following environment variables may provide information that is useful for troubleshooting and debugging change management application problems:

- set ORACLE_OEM_JAVAMX=-mx<number>m

  The default is -mx128m. This environment variable specifies the maximum amount of virtual memory to be used by the Java Virtual Machine (in megabytes). This memory is not used unless needed. If the amount is exceeded, execution will be terminated. This environment variable can be used to increase the amount of memory for large script generations and other purposes.

- set ORACLE_OEM_CLIENTTRACE=<any text>

  This environment variable causes an MS-DOS window to be displayed. Sometimes, useful troubleshooting information will be displayed in this window. Note that you must type some text after the equal sign for this environment variable to work properly. The environment variable works properly as long as you enter some text.

Note: The OCM_TRACE property described in Table A–1 must be set to true for the troubleshooting information to be displayed in the MS-DOS window.

- set ORACLE_OEM_JAVARUNTIME=<directory where bin\java.exe is located>

  You can specify this environment variable if you have a Java development environment. This environment variable can be useful when the system is hanging and you want to get a thread dump.

You can run the Change Manager application from the MS-DOS command line. To do so:

1. From the Windows Start menu, point to Programs, then click Command Prompt to display an MS-DOS window.
2. Set the working directory to the bin subdirectory of the Oracle installation directory (ORACLE_HOME) for Oracle Enterprise Manager, for example: \OEM_21\bin.
3. Start the Oracle Management Server if it is not already started, or make sure your system has access to an Oracle Management Server running on a different system.
4. Run the Change Manager application by typing the following in the MS-DOS window:

   ```
   oemapp ocm
   ```

5. After Change Manager starts, you can start any of the other change management applications from Change Manager in the usual manner.

Enabling Tracing and Debugging for Change Management Applications

You can turn on tracing and debugging facilities for the change management applications to help troubleshoot problems.

The ocm.properties file in the ORACLE_HOME\sysman\ocm\bin directory for Oracle Enterprise Manager contains a number of properties that you can set to provide more information about change management applications. Table A–1 displays the properties and a description of each property.

Note: The other properties in the ocm.properties file whose names begin with OCM_TRACE are meaningful only when the OCM_ TRACE property is set to true.

Table A–1 Using the ocm.properties File to Enable Tracing and Debugging

Property	Description
OCM_TRACE	If true, enables output of informational and problem trace messages.
OCM_TRACE_FILE	If true, enables output of trace information to a file. The setting of the OCM_TRACE_VERSIONING property determines the name of the trace file.
OCM_TRACE_VERSIONING	The OCM_TRACE_FILE property must be true for the OCM_TRACE_VERSIONING property to be meaningful. If the OCM_TRACE_VERSIONING property is true, a new version of the trace file is created for each run of the application. The file has a name of the format Oracle Change Manager_nnnnnn.log. If a change management application is running in more than one session on your machine, examine the timestamp of each trace file to determine the trace file that is associated with each session. The trace file with the earliest timestamp is the trace file for the session that started first, and so on. If the OCM_TRACE_VERSIONING property is false, the trace file has the name Oracle Change Manager.log, and the file is overwritten for each run of the application.
OCM_TRACE_DEBUG	If the OCM_TRACE_DEBUG property is true, general debugging information (such as property values) is output to the trace file at application startup time.
OCM_TRACE_DEBUG_VERBOSE	If the OCM_TRACE_DEBUG_VERBOSE property is true, more detailed debugging information, including class names and line numbers, is output to the trace file at application startup time.
VDB_DEBUG	If the VDB_DEBUG property is true, database calls are output to the trace file.

Table A–1 Using the ocm.properties File to Enable Tracing and Debugging (Cont.)

Property	Description
VDB_VERBOSE_DEBUG	If the VDB_VERBOSE_DEBUG property is true, more detailed information about database calls, including SQL statement issued and return values, is output to the trace file.

By default, the trace files for change management applications are written to the ORACLE_HOME\sysman\log directory for Oracle Enterprise Manager.

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