

Oracle® Enterprise Manager

Getting Started with the Oracle Diagnostics Pack

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Oracle Enterprise Manager Getting Started with the Oracle Diagnostics Pack, Release 9.0.1

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Send Us Your Comments

Oracle Enterprise Manager Getting Started with the Oracle Diagnostics Pack, Release 9.0.1

Part No. A88748-02

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Preface

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

- Purpose of This Guide
- Audience
- How This Guide Is Organized
- How to Use This Guide
- Oracle Enterprise Manager Pack Information
- Related Publications
- How to Find Oracle Documentation Online
- Documentation Accessibility
- Oracle Support

Purpose of This Guide

This guide provides an overview of the Oracle Performance Manager, Oracle Capacity Planner, Oracle E-business Management tools, Oracle Trace Data Viewer, and Oracle TopSessions charts and their features. As the guide describes how to use these applications provided with the Oracle Diagnostics Pack, it also introduces you to key concepts and terminology.

Audience

This guide is written for those who wish to use Oracle Performance Manager, Oracle Capacity Planner, Oracle TopSessions charts, Oracle E-business Tools, Oracle and Trace Data Viewer included in the Oracle Diagnostics Pack.

This guide assumes that you are familiar with the Oracle Enterprise Manager console and base applications. If you are not, please read the *Oracle Enterprise Manager Concepts Guide* and the *Oracle Enterprise Manager Administrator's Guide*.

How This Guide Is Organized

This guide is organized as follows:

Chapter 1, "Overview"

Provides an overview of the Oracle Diagnostics Pack and its features.

Chapter 2, "Post-Installation Configuration"

Provides lists of steps to consider after the installation of the Oracle Diagnostics Pack has taken place.

Chapter 3, "Introduction to Oracle Performance Manager"

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

Chapter 4, "Introduction to Oracle Capacity Planner"

Provides an overview of the Oracle Capacity Planner application and its features.

Chapter 5, "Oracle e-Business Management Tools"

Provides an overview of the Oracle e-Business Management Tools, a set of applications that enable centralized management of the complete e-Business infrastructure.

Chapter 6, "Using Oracle TopSessions"

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

Chapter 7, "Using Oracle Trace Data Viewer"

Provides an overview of the Data Viewer application and its features.

Appendix A, "Using Advanced Event Tests Effectively"

Provides several case studies demonstrating how the Oracle Event Tests provided with the Oracle Diagnostics Pack can help database administrators simplify daily administration tasks.

How to Use This Guide

This guide should be read in its entirety to provide you with an overview of Oracle Performance Manager, Oracle Capacity Planner, Oracle TopSessions charts, and the Trace Data Viewer included in the Oracle Diagnostics Pack, so that you are familiar with the tasks that the applications can perform. The online help provides more information about the applications in the Oracle Diagnostics Pack.

Oracle Enterprise Manager Pack Information

The Oracle Enterprise Manager product family includes six packs: Oracle Change Management Pack, Oracle Diagnostics Pack, Oracle Tuning Pack, Oracle Standard Management 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, Create Baseline, Compare Database Objects, DB Propagate, DB Quick Change, Find Database Objects, 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 with easy-to-use wizards that teach systematic steps necessary to upgrade databases.

Oracle Diagnostics Pack

- Includes Oracle Performance Manager, Oracle Capacity Planner, Oracle Trace Data Viewer, Oracle E-business Tools, and Oracle TopSessions charts.

-
- Monitors, diagnoses, and maintains the stability of databases, operating systems, and applications. Both historical and real-time analyses 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 Tuning Pack

- Includes Oracle SQL Analyze, Oracle Expert, Oracle Index Tuning Wizard, Reorg Wizard, and the Tablespace Map.
- 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.
- Discovers tuning opportunities and automatically generates the analysis and required changes to tune the system. Inherent in the product are powerful teaching tools that help DBAs learn to tune the system as they work.
- Helps increase developers and DBAs productivity.

Oracle Standard Management Pack

- Includes Baseline Viewer, Change Manager, Create Baseline, Compare Database Objects, Oracle Index Tuning Wizard, Oracle Performance Manager, and Oracle TopSessions charts.
- Monitors and diagnoses problems, tunes high impact indexes, and tracks and compares changes in your Oracle environment.

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.

Related Publications

For further details about the information provided in this manual, see the following manuals in the Oracle Server documentation set:

- *Oracle9i Database New Features*
- *Oracle9i Database Concepts*
- *Oracle9i Database Administrator's Guide*
- *Oracle9i Database Performance Guide and Reference*
- *Oracle9i Database Performance Methods*

Oracle Enterprise Manager Documentation

Getting Started with the Oracle Diagnostics Pack is one of several Oracle Enterprise Manager documents.

Oracle Enterprise Manager Base Documentation

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

-
- The *Oracle Enterprise Manager Event Test Reference Manual* describes Oracle Event Tests which allow you to implement automatic problem detection and correction on concurrent managers, databases, listeners, nodes, and SAP R/3 systems.

Oracle Management Pack Installation Documentation

- The *Oracle 9i Installation Guide Release 9.0.1 for UNIX Systems* provides important information for installing the Oracle Enterprise Manager console and the management packs. This manual also contains information such as hardware and software requirements, installable components, and deinstallation procedures. The *Oracle 9i Installation Guide Release 9.0.1 for UNIX Systems* is located on the Oracle9i Online Generic Documentation CD-ROM, Release 1 (9.0.1) or you can get a free download from the Oracle Documentation Center at docs.oracle.com.

Oracle Change Management Pack Documentation

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

Oracle Diagnostics Pack Documentation

- The *Getting Started with the Oracle Diagnostics Pack* provides an overview of the concepts and features of Oracle Performance Manager, Oracle Capacity Planner, Oracle Data Viewer, and the Oracle TopSessions charts.
- You can access online information about the Database Cartridge classes, charts, and data items by viewing an HTML version of this information. The start page for this help system can be found on your system in *Oracle_Home/doc/em/dbcart_webhelp/dba.htm*. You can access the start page by choosing *Start->Programs->Oracle-oem22->Diagnostics Pack->Database Charts - Help*.

Oracle Tuning Pack Documentation

- *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, Reorg Wizard, Tablespace Map, Outline Management, and the Outline Editor. A description of how these applications can work together to tune an Oracle database is also provided.

Oracle Standard Management Pack Documentation

- The *Getting Started with the Oracle Standard Management Pack* manual provides an overview of the concepts and features of Baseline Viewer, Change Manager,

Create Baseline, Compare Database Objects, Oracle Data Viewer, Oracle Index Tuning Wizard, Oracle Performance Manager, and Oracle TopSessions charts.

Oracle Management Pack for SAP/R3 Documentation

- *Oracle Management Pack for SAP R/3 Readme* provides important notes regarding Oracle Management Pack for SAP R/3 online documentation, updates to the software, and other late-breaking information.
- *Getting Started with Oracle Management Pack for SAP R/3* 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.
- The *Oracle Management Pack for SAP R/3 Installation Guide* provides important information for installing the Oracle Management Pack for SAP R/3. This manual also contains information such as hardware and software requirements, installable components, and deinstallation procedures.

Oracle Management Pack for Oracle Applications Documentation

- *Getting Started with 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.

How to Find Oracle Documentation Online

To download free release notes or installation documentation, please visit the Oracle Documentation Center at:

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Contact your Oracle sales representative for more information.

Overview

The Oracle Diagnostics Pack extends Oracle Enterprise Manager to enable the monitoring, diagnosing, and capacity planning of the multitiered Oracle server environment. The Diagnostics Pack takes advantage of the following Enterprise Manager system management features:

- Discovery and graphical representation of targets, such as databases or nodes, to be monitored
- Starting tools from the console in the context of a specific target
- Automated collection of performance and resource usage data
- Central monitoring and administration of remote systems using intelligent agents

The Diagnostics Pack provides the following components:

- Oracle Advanced Event Tests
A set of predefined event tests built on the Oracle Event Management System offering "lights out" performance monitoring and problem solving for distributed systems.
- Oracle Performance Manager
A real-time performance monitor, providing graphical views of an array of performance metrics for the targets you are monitoring. Performance Manager provides the ability to drill down to detailed data of performance diagnostics data to identify problems such as lock contention and excessive file I/O.
- Oracle Capacity Planner
A tool for collecting, storing, and analyzing historical performance data for the targets you are monitoring. Capacity Planner allows you to use historical

information to diagnose problems today and to anticipate resource needs to avoid problems in the future.

- Oracle Trace Data Viewer

A comprehensive tracing mechanism for the Oracle Server. Oracle Trace captures SQL, transaction, and application-based workload and performance data.

- Oracle TopSessions charts

A diagnostics tool that pinpoints problematic database sessions and displays detailed performance and resource consumption data.

This chapter provides a brief overview of each of these components and gives a brief example of how to best use these components to solve database performance problems.

What's New in Version 9i

As part of Oracle Diagnostics Pack release 9i, Oracle offers the following list of new features:

- A single performance monitoring solution that combines automated agent-based monitoring with real-time graphical charts and historical trend analysis, providing logical step-by-step methodology for discovering and investigating performance problems. This is accomplished by integrating the Advanced Events with the Performance Manager charts and Capacity Planner's historical data.
 - Events and real-time performance charts share common performance thresholds that are enabled from either Performance Manager or the Enterprise Manager console.
 - Event notifications can be investigated by launching real-time charts, historical data and diagnostic advice directly from the event viewer.
 - Real-time diagnostic charts incorporate event notification through chart threshold state indicators.
- Significantly expanded coverage of Agent-based database monitoring. Through the integration of the Agent event system with the data collection mechanism used by Performance Manager and Capacity Planner, the Advanced Events support lights out monitoring of many of the Oracle database metrics currently only available through real time charts or historical data analysis.

- An enhanced real-time diagnostics interface that builds on the new performance data organization and drilldowns introduced in the previous version of the Diagnostics Pack.
 - New organization of the Database Health overview diagnostics charts for easier performance assessment.
 - Integration of host operating system diagnostics data in the Database Health overview, providing a single monitoring point for databases and operating systems.
 - Chart threshold state indicators that provide immediate visual notification of performance status.
 - Drilldowns to diagnostics advice.
- Automated generation and Web publication of Performance Manager charts and Capacity Planner analysis reports. This allows administrators to set up status and performance reports that are periodically updated for access from a web server by other database administrators and system managers. This supports all targets covered by Performance Manager and Capacity Planner.
- New top activity diagnostics charts for finding and troubleshooting high impact sessions and SQL.
 - New filtering capabilities providing complete flexibility in searching for high impact activity, such as high cost SQL by object or type.
 - New top details provide graphical performance data to help diagnose a problem session or SQL statement
- Browser-based implementation of some Performance Manager functionality.
- Direct Connect Performance Manager that allows database monitoring with the Agent or OMS.

Oracle Advanced Event Tests

In addition to the basic UpDown event tests provided for all targets administered in the Enterprise Manager console, the Diagnostics Pack provides a library of advanced event tests to automatically detect excessive resource use, performance degradation, and other problem situations.

See the *Oracle Enterprise Manager Event Test Reference Manual* for a complete list of these advanced event tests.

The key to a smooth running system is to resolve problems before they turn into crises. These advanced event tests allow you to focus on the causes of a problem before the symptoms become serious. In addition, with the paging and E-mail support provided by Enterprise Manager, you can be notified of any problems with the system wherever you happen to be.

Oracle Performance Manager

Performance Manager displays performance data in real-time graphical views that can be automatically refreshed at user-defined intervals. Multiple charts and tables can be displayed simultaneously, affording you a multifaceted view of system performance. For example, an Oracle server administrator can monitor resources consumed by the database, the underlying operating system, and other processes running on the node. Some of the predefined overview charts are:

- Free space available on selected disks
- Memory usage on selected nodes
- Cache utilization
- Throughput

Users can further drill down on these charts to see greater detail, and in some cases, drill down to problematic sessions and terminate them. Many other subsystem specific charts are available, giving you a rich set of data to analyze your system from multiple viewpoints.

See Chapter 3, "Introduction to Oracle Performance Manager" for more information about Oracle Performance Manager.

Oracle Capacity Planner

The same data collection mechanism used by Performance Manager to sample real-time data is also used to collect historical performance and resource consumption data. The Diagnostics Pack uses Capacity Planner to analyze performance data to help you diagnose problems using historical information and project your future capacity needs.

In Performance Manager, historical data can be gathered for the targets you monitor. The collection can be customized, allowing you to select any subset of statistics to collect and the interval at which these statistics should be sampled. The data collection mechanism provides roll up capabilities, where data is automatically aggregated at the end of each hour, day, week, or month. This data collection

mechanism also allows you to set up data expiration policies so you can fully control the amount of storage needed for the historical data.

Once the data is gathered, you can use Capacity Planner to chart the historical data for the purposes of identifying trends and predicting future hardware requirements for the system. You can also extrapolate to a particular point in time or work back from a particular target value and find when a specific level of usage is expected to occur. These charts can be customized, allowing you to get the data you need and to view data from multiple sources (for example, CPU and disk) on a single, unified chart.

See Chapter 4, "Introduction to Oracle Capacity Planner" for more information about Capacity Planner.

Oracle Trace Data Viewer

Trace is a general-purpose tracing mechanism that collects data for any software product enabled with Trace Application Programming Interface (API) calls, such as the Oracle server. You can use Trace to collect a wide variety of data, such as performance statistics, diagnostic data, system resource usage, and business transaction details.

The major components of Trace are the Trace Manager and Trace Data Viewer. Trace Manager is an application used to create, schedule and administer Trace collections for products containing Trace API calls. Trace Manager automatically discovers Trace preconfigured products that are installed on all nodes that are known to the Oracle Management Server. By default Trace discovers any Oracle Server release 7.3.3 and higher. For more information about Oracle Trace, see the *Oracle9i Database Performance Guide and Reference*

Data Viewer allows you to view formatted data collected by Trace. Data Viewer handles the complex task of extracting data and aggregating key server performance metrics on a large Trace collection. Once you select a Trace collection, you can have Data Viewer compute SQL or Wait statistics or both.

See Chapter 7, "Using Oracle Trace Data Viewer" for more information about using Data Viewer.

Oracle TopSessions Charts

TopSessions is a chart that monitors how connected sessions use database instance resources in real time. You can obtain an overview of session activity, by displaying the top "n" sessions sorted by a statistic of your choosing. For any given session, you

can then drill down for more detail. You can further customize the information you display by specifying manual or automatic data refresh, the rate of automatic refresh, and the number of sessions to display.

In addition to these useful monitoring capabilities, TopSessions provides a methodology for identifying and correcting certain database performance problems. For example, when sudden file I/O load is detected, you can first identify the sessions contributing most to the problem, and then isolate the executing SQL statements in user applications for those sessions. You can then analyze the SQL explain plans for those SQL statements to determine how best to resolve the problem.

For more information about using the Top Sessions chart, see Chapter 6, "Using Oracle TopSessions".

Typical Scenario for Using the Diagnostics Pack

Monitoring, problem diagnosis, and correction can be broken down into three stages:

- Detecting a problem
- Diagnosing the cause of the problem
- Correcting the problem and preventing the problem from occurring again

The following sections provide an example of how you can use the Diagnostics Pack to solve performance problems.

System Monitoring and Problem Detection

Problems can come to your attention in a number of ways:

- You are alerted by your users that there is a problem, for example, the system is very slow
- You notice something yourself
- You get an alarm, page, or E-mail that the system is not working correctly or that a potential problem may exist

Ideally an administrator would like to be alerted to a problem before his or her users are aware of the problem. The Advanced Event Tests included in the Diagnostics Pack allow you to proactively identify potential problems before they become serious and adversely affect users.

Diagnosing the Cause of the Problem

You can diagnose the cause of the problem by:

- Examining the current state of the system
- Investigating resource usage
- Identifying problem sessions
- Identifying high impact SQL
- Analyzing past (historical) information

Examining the Current State of the System

Using Performance Manager, you can take a quick look at the system resources by accessing the Overview chart. This chart provides the following information:

- Processor, user, and privileged times across all processors
- Bytes available on each disk
- Current processor queue length
- Available and committed memory
- Counts of various objects on the system
- System I/O operations

Investigating Resource Usage

Using Performance Manager you can identify the processes using the most resources. The Process Info Chart found under the Nodes branch of the navigator tree, lists the Percent Memory Used. The Memory Statistics Chart found under the Databases branch of the navigator tree, lists memory statistics, for example, Shared Pool Size, Buffer Cache Size, and SGA Size.

Identifying Problem Sessions

Using Oracle TopSessions you can identify the top *n* sessions using the most CPU, memory, and I/O. You can also drill down into sessions statistics, for example, V\$: sesstat, open_cursor, locks, and sqlarea.

You can also sort data based on a selected statistics filter. For example, you can sort the top 10 sessions for the Redo activity by redo blocks written, redo size, and redo entry volume.

Finally, you can view open cursors, explain plans, and sessions holding locks that other sessions are waiting for.

Identifying High Impact SQL

Using SQL Analyze, an application available in the Oracle Tuning Pack, you can select and sort the top n cached SQL statements based on the SQL volume metrics and SQL efficiency metrics. The SQL volume metrics include: number of executions, disk reads, and sorts. The SQL efficiency metrics include: buffer gets per executions, buffer gets per rows processed, and parse calls per executions.

Also using SQL Analyze, you can drag and drop SQL statements to the SQL Analyze workbench for tuning.

Analyzing Past Information

If a collection was set using Capacity Planner, you can determine what led up to the problem. For example, you can collect data to determine space usage and answer the following questions:

- What led up to the space problem? Was the space consumed gradually or all at once?
- Does the space problem still exist?
- Is the space problem getting any better?

By using the trend analysis feature of Capacity Planner, you can determine when the disk will be full.

Correcting the Problem

Once you have diagnosed the problem, there are various actions you can take to resolve the problem. Some examples include:

- Starting fixit jobs in the Enterprise Manager console
Define an event to automatically run a fixit job when the event is triggered.
- Identifying and correcting resource-intensive sessions
Either kill or block a session if the session is consuming too many resources.
- Identifying problematic SQL statements
Use Performance Manager to drill down to a SQL chart and launch SQL Analyze to tune the problematic SQL statement.

- Analyzing space usage
Add a datafile in a tablespace storage folder. You can also change the MAXEXTENTS of a table.
- Improving memory usage
Analyze the buffer size DB_BLOCK_BUFFER parameter. You can also change the initialization parameters using the Instance Manager application.
- Tuning the database by using the Oracle Tuning Pack
- Reorganizing tablespaces using the Oracle Tuning Pack

Microsoft SQL Server Support

The Oracle Diagnostics Pack can monitor the performance of hosts, Oracle servers, Microsoft SQL Server, and other targets. In Performance Manager you can view real-time charts displaying performance and resource use of the Microsoft SQL Servers. In Capacity Planner you can collect and view historical data about your Microsoft SQL Servers. The Advanced Events contain an Up/Down test for Microsoft SQL Server. These capabilities are included as part of the Oracle Diagnostics Pack; no additional licenses are required.

This SQL Server monitoring support is provided as a plug-in to the Intelligent Agent on NT. Once you have installed this plug-in to the Intelligent Agent, you can discover SQL Servers as part of the normal Enterprise Manager discovery process. You will then be able to select SQL Servers from the navigator and view their performance. The metrics shown are contained in the NT performance registry as exposed by SQL Server.

To monitor SQL Server:

- Install the Diag Pack SQL Server component on the target (it must be selected at install time)
- Be sure you have 8.0.6 or higher NT Agent/DG running on the SQL*Server node
- Drop and rediscover, or refresh the node
- SQL Server targets will show up in the Console navigator and in Capacity Planner and Performance Manager

Post-Installation Configuration

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

Components	Where to Find the Information
Advanced Events	"Setting Up Advanced Events" on page 2-1
Capacity Planner	"Setting Up Capacity Planner and Performance Manager" on page 2-2
Performance Manager	"Setting Up Capacity Planner and Performance Manager" on page 2-2

Setting Up Advanced Events

Before you use Oracle Advanced Events, do the following:

- Create additional tables, views, and public synonyms required for Advanced Events.
Refer to "Obtaining Trace Data for Use in Trace Data Viewer" on page 2-6 for information on what scripts to run.
- If you plan to use the Chained/Migrated Row advanced event, the CHAINED_ROWS table must exist in the database. To create the CHAINED_ROWS table:
 1. Log into the database as SYS.
 2. Run the utlchain.sql script. This script is located in the \$ORACLE_HOME/RDBMS/ADMIN directory.

Setting Up Capacity Planner and Performance Manager

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

- Configure Pre-9i Databases to Use Performance Reporting In Capacity Planner
- Configure the Oracle Intelligent Agent to collect data
- Optionally, enable disk statistics collection on Windows NT

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

- Convert any user-defined charts you created with earlier versions of Performance Manager
- If you plan to use Performance Manager in a Parallel Server environment, you may need to set up your server using Oracle-supplied SQL scripts.

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

Configuring Pre-9i Databases to Use Performance Reporting in Capacity Planner

Before you can use the Performance Reporting capability in Capacity Planner on pre-Oracle 9i databases, you must first run a SQL script that defines the OEM_MONITOR role which contains all the privileges required to use the Diagnostics Pack products. Granting the OEM_MONITOR role is the best way to ensure that a user has the correct privileges to use Capacity Planner. The OEM_MONITOR role has been granted more privileges in the 9i version that helps to provide better functionality and performance. The script also creates views and public synonyms used in Performance Reporting and Oracle Recommended collection settings.

For 9i databases, the SQL script, **catsnmp.sql**, is run by default as part of the 9i database creation process. For all versions of the database prior to 9i, you must manually run a SQL script to define the OEM_MONITOR role and create the necessary views.

For versions 8.1.5, 8.1.6, and 8.1.7 of the database, you must run the script **catsnmp_8i.sql**. For versions 8.0.5 and 8.0.6 of the database, you must run the script **catsnmp_80.sql**. For version 7.3.4 of the database, you must run script **catsnmp_734.sql**. The selected script must be executed by a user with SYS privileges.

The sql files are located in the Oracle home of the Oracle Enterprise Manager installation, \$ORACLE_HOME/SYSMAN/ADMIN. You must run the appropriate

version of the SQL script manually on all pre-9i databases in order to use Performance Reporting in Capacity Planner.

The OEM_MONITOR role must be granted to any user wishing to use the Oracle Diagnostics Pack. Performance Manager does not require any of these new views in order to run, but if you attach to a database that does not have the views, or your process does not have the required privileges, or the OEM_MONITOR role does not exist, then an informational message displays.

Configuring Oracle Intelligent Agent to Collect Data

Performance Manager and Capacity Planner require the use of the Intelligent Agent data gathering service. For monitoring operating system data, the Oracle Intelligent Agent must be installed on the same node as the operating system you are monitoring. For monitoring other target types, such as databases, the Oracle Intelligent Agent can run on the same node as the target 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 Intelligent Agent.

Enabling Disk Statistics Collection 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 or Capacity Planner 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 target for the Enterprise Manager V2.x repository and the name of the target 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 target 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*.

Using Performance Manager in a Parallel Server Environment

To use Performance Manager in a Parallel Server environment, two database instances must be started, otherwise Performance Manager does not treat the server as a Parallel Server.

There are two scenarios for using Performance Manager in an Oracle Parallel Server environment, and different configuration steps are required for each scenario.

The two scenarios and their configuration steps are:

1. If you are using Performance Manager to monitor an Oracle7 Parallel Server environment, do the following:
 - a. Ensure all instances are running.
 - b. Run the `ops_gdl.sql` script. This generates an appropriate `ops_dbl.sql` file. The `ops_dbl.sql` file shipped with the product is only an example. The actual contents of `ops_dbl.sql` depend on your database name, instance names, and the number of instances which exist.
 - c. Run the `ops_mon.sql` script, which runs `ops_ctab.sql`, `ops_dbl.sql`, `ops_pack.sql` to create Performance Manager tables and views to fetch and display Oracle7 Parallel Server data in charts.

Oracle7 does not have global VS (GV\$) tables; these files install a set of PL/SQL procedures, database links, and OS tables that are used by Performance Manager in the absence of GV\$ tables.
2. If you are using Performance Manager to monitor an Oracle8 Parallel Server environment, you do not need to run any of the Parallel Server scripts. For

example, if you use any release of Oracle that has GV\$ tables (namely Oracle release 8.0 and later), you do not need to run these scripts.

Obtaining Trace Data for Use in Trace Data Viewer

To obtain data to view, see the chapter, "Using Oracle Trace" in the *Oracle9i Database Performance Guide and Reference* for information about collecting Oracle Trace Data via the command line interface.

Introduction to Oracle Performance Manager

Oracle Performance Manager is an Oracle Enterprise Manager application that allows you to monitor the performance of the database and its related applications and operating systems in real time. It allows system and database administrators to monitor performance statistics for Oracle database servers, web servers, Oracle concurrent managers, operating systems, and other managed targets. Performance Manager also allows you to record statistics and play them back at a later time.

You can display these statistics in a number of formats including horizontal and vertical tables, strip charts, horizontal and vertical bar charts, and pie charts. You can also drill down for more detail on some predefined charts.

Since Performance Manager is integrated with Oracle Capacity Planner, you can also drill down to an historical view of the displayed data. The drilldown to historical data allows you to quickly compare the current real time value with the historical average to provide you with a better understanding of the meaning of the current value. For more information about Capacity Planner, see Chapter 4, "Introduction to Oracle Capacity Planner".

For most targets, Performance Manager integrates Event system thresholds with charts so that events and charts share common performance thresholds you can set from either monitoring point. This provides consistent monitoring of thresholds across Enterprise Manager and allows access to graphical and historical diagnostics information from the Event system. You can investigate event notifications by launching charts, historical data and diagnostic advice directly from the Event Viewer. Performance Manager charts incorporate event notification through chart threshold state indicators. Performance Manager threshold and event features are available for node and database data.

You can use activity diagnostic charts such as TopSessions for finding and troubleshooting high impact sessions. These charts provide graphical performance data to help you diagnose a problem session or SQL statement.

Note: In releases prior to 9i, the Agent data gathering service (also known as the Oracle Data Gatherer) was used to collect data for presentation in real-time performance monitoring utilities and historical data. The Intelligent Agent and the data gathering service were separate services that were started and stopped independently of each other.

With 9i, the data collection capabilities are integrated into the 9i Intelligent Agent. Therefore, there is no separate service that needs to be started. Furthermore, when you stop the 9i Intelligent Agent, the data gathering capabilities are disabled and not available.

Oracle Performance Manager uses the Intelligent Agent (Agent) to collect performance data. To monitor some types of data, you must install the Agent 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 on a system.

If you are using Oracle Performance Manager to monitor database performance, the Agent can be installed on another system. See "Accessing Performance Data Through an Intermediate Host" on page 3-3 for more information on accessing data through an Agent 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 targets) 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	No	Yes	Yes	No	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	No	Yes	No	No
Management Pack for SAP R/3	No	No	Yes	Yes	No
Standard Management Pack (Oracle Standard Edition only)	No	Yes	Yes	No	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 Agent to monitor a target (such as a node, a database, or a concurrent manager). Usually, the collection of the data is done on the system where the target is located. However, for some types of targets Oracle Performance Manager can also monitor data on a system by using the Agent 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 Agent is available.

There are three ways to set the location of the Agent. The method you use depends on how you connect to the target. Consider the following three scenarios:

- You connect to a target 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 Agent on the host where the target is located. If this connection fails or cannot be attempted because no preferred credentials have been set for the target, you can use the Connection Details dialog box to specify logon credentials for the target. This dialog box also contains a field to specify the location of the Agent that will be used to collect performance data.

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

Performance Manager displays a Logon dialog box. You can use the Connection Details dialog box to specify the location of the Agent that will be used to collect performance data.

- You select a target in the Performance Manager navigator tree and choose **Set Connection Details** from the **File** menu.

Performance Manager displays the Logon dialog box for the selected target. Use the Connection Details dialog box to specify the location of the Agent that will be used to collect performance data.

Usage Scenarios for Oracle Performance Manager

Using Oracle Performance Manager, you can:

- Monitor one or more targets 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 target.
- View multiple charts in a single window.
- Drill down from one chart to another related chart. Drill down to diagnostic advice.
- Drill down from real-time chart data to historical chart data.
- Choose the collected data and data sources to display in a chart.
- View threshold state indicators that provide immediate visual notification of performance status for specific targets.
- Print a chart.

- Generate and publish 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, from the UNIX command line, or from the Windows **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 **Diagnostics Pack** drawer, then click **Performance Manager**.
- On the **Tools** menu of the Oracle Enterprise Manager console, point to **Diagnostics Pack**, then click **Performance Manager**.
- Click the right mouse button on the **target** for which you want to start Performance Manager and then choose **Performance Manager** from the **Related Tools** menu item on the context menu.

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 UNIX Command Line

To start Performance Manager from the UNIX command line, set default to the `ORACLE_HOME/bin` directory, then type the following command:

```
./oemapp pm
```

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

When you start Performance Manager from the UNIX command line, you are given a choice of logging in to the Oracle Management Server and running Performance Manager in Enterprise mode or Standalone mode.

See "Running Performance Manager in Enterprise Mode" on page 3-6 and "Running Performance Manager in Standalone Mode" on page 3-7 for more information about running Performance Manager in Enterprise mode and Standalone mode.

Starting Oracle Performance Manager from the Start Menu in Windows NT

On the **Start** menu of Windows NT, follow the path: **Start=>Programs=>ORACLE_HOME=>Diagnostics Pack=>Performance Manager**.

Note: ORACLE_HOME represents the home directory in which the Diagnostics 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 and running Performance Manager in Enterprise mode or Standalone mode.

Running Performance Manager in Enterprise Mode

To run Oracle Performance Manager in Enterprise 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**.

Note: If the repository was created using Enterprise Manager Release 2.1 or earlier, you must upgrade the repository or create a new repository. For more information, see the *Oracle Enterprise Manager Configuration Guide*.

When Performance Manager is running in Enterprise mode and the navigator is first displayed with a target type folder expanded, the targets of that type that were discovered in the Enterprise Manager console are displayed. When you expand a target, Performance Manager attempts to connect to the target. When the target is a database and preferred credentials for the database have been saved in the Oracle Enterprise repository, Performance Manager attempts to connect to the database using those credentials. Otherwise, the Oracle Database Logon dialog box prompts you for the logon information.

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**.

When Performance Manager is running in Standalone mode Performance Manager displays any targets that were added to the console in Standalone mode. You can add nodes or databases to the collection view for the current standalone mode session only. Click on the Add Service toolbar button after selecting the folder for the desired target type.

Note: Your recordings and user-defined charts will not be saved in Standalone mode. If you exit Performance Manager, you will not be able to play back any recordings or access these user-defined charts in future sessions. You will also not be able to save any chart settings or custom charts.

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.

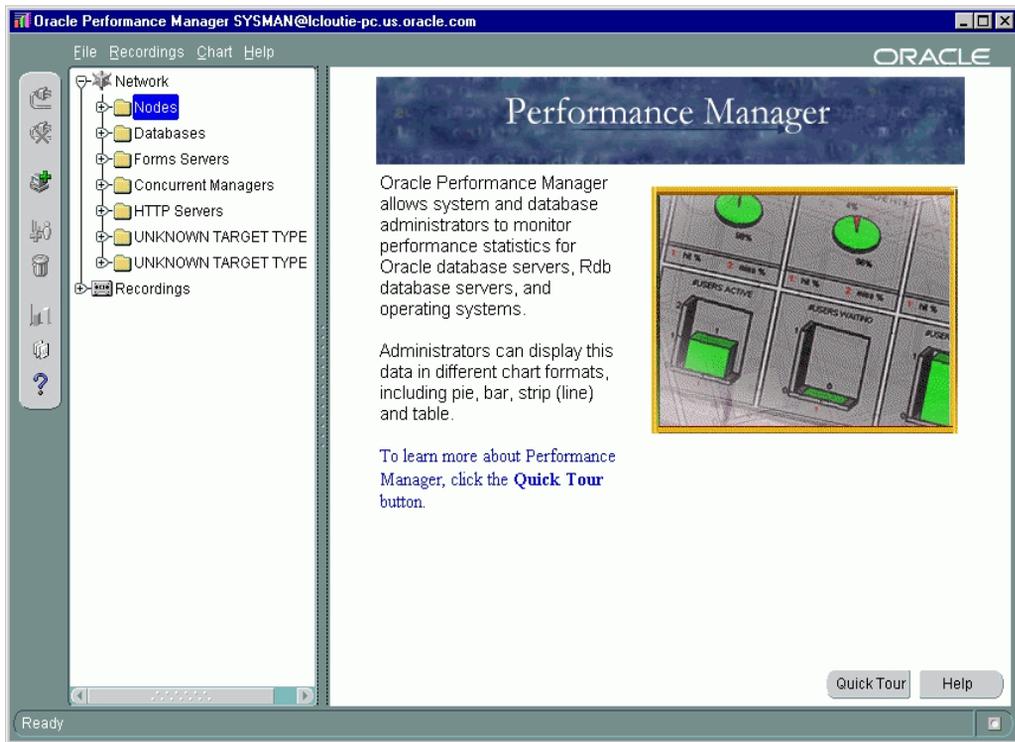
When you first start Oracle Performance Manager, the navigator panel displays the target type folders and the property sheet panel displays the Performance Manager welcome screen.

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 target type. For example, when you have the Diagnostics Pack installed, the target types are Nodes, Databases, Forms Servers, Concurrent Managers, SAP R/3 Systems, HTTP Servers, and SQL Servers. Not all target types may be available on all systems.

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 3-23.

Figure 3–1 Oracle Performance Manager Main Window



Connecting to a Discovered Target in Enterprise Mode

Expand a target type folder to view the corresponding targets previously discovered through the Oracle Enterprise Manager console.

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

Manually Connecting to a Target

You can manually add additional targets that have not been discovered using the Enterprise Manager console.

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

To add and connect to a target manually:

1. Select the folder for the target type you are adding.
2. Click **Add 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 target, Performance Manager displays the classes of performance information you can monitor for the selected target. 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 3-13.

Monitoring Multiple Targets Concurrently

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

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 3-10).

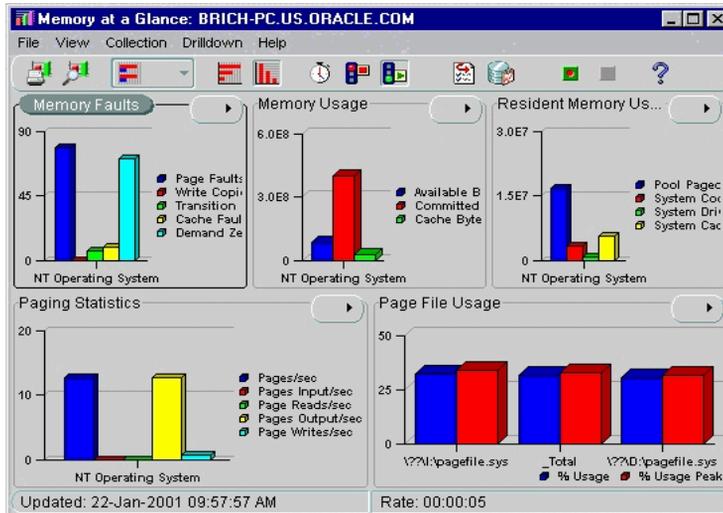
You can display a special chart group that contains the Overview Charts for a selected target:

1. Select a target 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 target.

Charts in a chart group are displayed within a single window. You perform actions, such as setting options and displaying drilldown 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 or a black box. 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 target, 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 on the **Chart Format button** in the Chart Display window toolbar and select the format in which you want to display the chart from the list that displays.

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

- Bar (vertical or horizontal orientation)
- Strip (or line chart)
- Table (vertical or horizontal orientation)
- Hierarchical

You can also choose a chart format from the View menu in the Chart display window or right mouse click on a chart and select a chart type from the context menu. 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 fifteen seconds but vary based on the chart. That means that Performance Manager collects the data every fifteen seconds and then immediately refreshes (or redisplay) the chart using the new data.

To change the refresh rate for the current chart:

1. Click the **Refresh Rate** button in the Chart Display window toolbar.
Performance Manager displays the 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.

You can also choose Refresh Rate from the **Collection menu** to change the 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 3-12.

To set the chart options:

1. Click the **Options** button in the Chart Display toolbar.
Performance Manager displays the Options dialog box.
2. Use the Options dialog box to add or remove data items from the chart.

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

You can also access the Options dialog box by choosing Options from the Collection menu.

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 chart you are modifying. Some charts offer more or fewer options than the Pagefaults Per Process chart 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 **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 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 targets, or **Turn SQL Trace On** if you are viewing a Top Sessions chart.

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 **Drilldown** on the context menu.
- Click the **Drilldown** 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.
- Click on the **Chart Status button**.

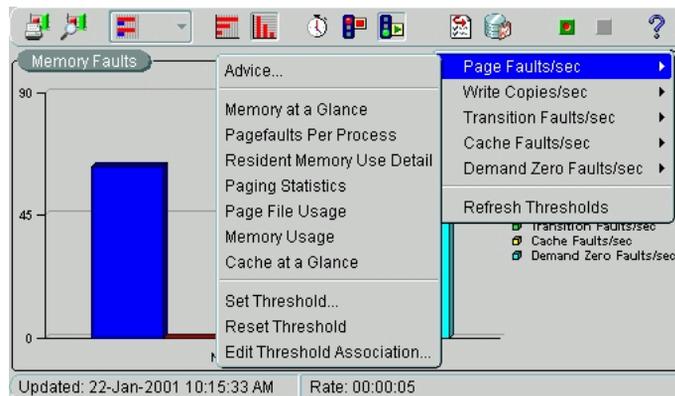
In all cases, Performance Manager displays any drill-down charts associated with that chart item as menu options on the **Drilldown** menu. If a list of drill-down chart names is not displayed, no drill-down charts are associated with that item.

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 3-14.

Using the Chart Status Button

You can use the Chart Status button located in the upper right corner of a chart to perform one of several tasks. When you click on the button, menu items appear based on the context of the chart as seen in Figure 3-3.

Figure 3-3 Chart Status Button



- View the threshold status of chart metric(s)

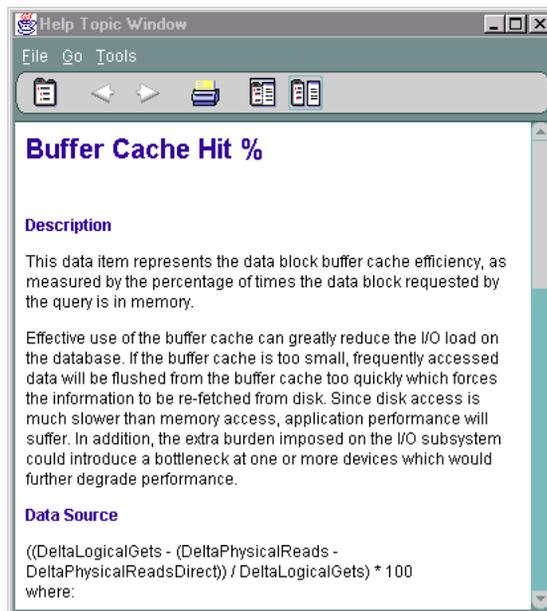
The Chart Status button displays the current status of thresholds for metrics in the chart. If an indicator flag is present, at least one of the metrics on the chart has thresholds defined. The most severe threshold displays on the button. A green flag indicates that no metrics have crossed a threshold, a yellow flag indicates that at least one metric has crossed a warning threshold, and a red flag indicates that at least one metric has crossed a critical threshold. When you press the Chart Status button, you can view the status of individual metrics within the chart. If several metrics have crossed warning or critical thresholds,

the menu items are sorted according to the severity, with the indicators for the most severe items on top and the less severe on the bottom.

- Display advice on a data item

When you choose Advice from the Chart Status button, Performance Manager displays an information window that provides information about the currently selected data item along with guidelines for solving existing problems, or suggestions about other charts to view for further diagnosis, as seen in Figure 3-4.

Figure 3-4 Viewing Advice from the Chart Status Button



Note: In addition to accessing help topics for individual metrics and events through the Advice function, you can view the full documentation set for all types of metrics and events independently through your web browser. For more information see "Viewing Metric and Event Documentation Through a Browser" on page 3-40.

- Drill down to a chart
After you select a data item, you can choose to drill down to one of the charts displayed in the list or invoke tools like SQL Analyze.
- Set or reset thresholds for a chart or an event
You can set chart-only thresholds for a data item or you can reset the chart-only threshold to its default value. You can choose to set or edit the threshold for the value in the chart only, or you can edit or register an event threshold for the data item. For more information, see "Registering Events in Performance Manager" on page 3-33.
- Edit a threshold association
You can edit a threshold association for a metric by selecting Edit Threshold Association from the Chart Status button and choosing an event from the dialog box that appears. For more information, see "Editing Threshold Associations" on page 3-37.
- Refresh thresholds
To view Event System changes made while a Performance Manager chart is visible, choose Refresh Thresholds from the Chart Status button menu on the Performance Manager chart. For more information, see "Refreshing Thresholds" on page 3-37.

Drilling Down to an Historical Chart

From a Performance Manager real-time chart, you can drill down to see an historical view of the same data collected over a longer period of time, for example, days, months, and years. This view of historical data, provided by the Oracle Capacity Planner software, allows you to analyze long-term trends in the data.

Historical data collection must be enabled to view the historical data for a chart. If you drill down to a historical chart for which historical data collection has not been enabled, Performance Manager allows you to start historical data collection. You

can also start historical data collection by starting Oracle Capacity Planner. From the Capacity Planner window, you can also control other aspects of your historical data collection, such as how often data is collected and loaded into the historical database.

Note: User-Defined charts do not support drill-down to historical data.

To drill down to historical data:

1. Display a chart in the Chart Display window.
2. Click the right mouse button on a data item in the chart.
3. From the context menu, click **Drilldown**.
4. From the **Drilldown** submenu, click **Historical Data**.

What happens next depends on whether or not you have begun collecting historical data. Consider three possible scenarios:

- If Performance Manager finds historical data related to the chart, Performance Manager displays the Analysis Chart window.

Note that if you previously set up your historical database using an alternate database location, Performance Manager displays a database logon box before it displays the Analysis Chart window.

The Analysis Chart window shows you the historical information about the collected data. From here, you can modify the format of the chart or perform a trend analysis on the historical data. For more information, select an option from the **Help** menu in the Analysis Chart window or see the chapter about Capacity Planner in this manual.

- If Performance Manager cannot find historical data related to the chart, the following message appears:

The historical chart cannot be displayed because there is no history available for the data sources or data items.

Would you like to begin collecting the history of these data sources and data items now so that you can view the chart in the future?

Click **Yes** to begin collecting historical data automatically or click **Help** to learn how to collect historical data using the Oracle Capacity Planner software.

When you click **Yes**, Performance Manager displays another message explaining that historical data is now being gathered, but is not yet available. Click **Continue** to return to the Display Chart window.

- If no historical data has ever been saved to the historical database, Performance Manager displays a message box that includes the following errors:

Error connecting to the historical database.
The specified schema is not a Capacity Planner database.

Click **Continue**. Performance Manager displays the message described in the previous bullet item.

Click **Yes** to begin collecting historical data or click **Help** for more information about how historical data is collected. When you click **Yes**, Performance Manager displays another message explaining that historical data is now being gathered, but is not yet available.

Click **Continue** to return to the Display Chart window.

Displaying Alternate Chart Orientations

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

To change the orientation of the bar chart or table, 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 3-14.

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 targets 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 target.

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 in the main window navigator.
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, select a data item and choose **Selected Item** from the **Help** menu.

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 target from which a chart was recorded. If you are already connected to a target, 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 3-24.

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 3–5). When the playback is complete, the **Reset Playback** button becomes available.

Figure 3–5 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 targets 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 **Create 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 3-27.

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 3-25. 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 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 3-27.

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 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 target 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 target.

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 2-3 for information on how to perform the conversion.

Chart Display Window Menu Shortcut Keys

Table 3-2 lists the Chart Display Window menu and submenu items along with their corresponding shortcut keys.

Table 3-2 Chart Display Window Shortcut Keys

Task	Shortcut Key
Print Screen . . .	Control+P
Report Chart. . .	Control+R
Start Recording	Control+K
Stop Recording	Control+J
Start Playback	Control+Q
Stop Playback	Control+Y
Pause Playback	Control+W

Table 3–2 Chart Display Window Shortcut Keys

Task	Shortcut Key
Fast Forward	Control+F
Reset Playback	Control+B
Save	Control+S
Save As	Control+A
Close	Alt+F4
Pause/Resume Chart	Control+Q
Refresh Rate . . .	Control+E
Options	Control+O
Historical Data	Control+D
Using Help	Control+Shift+U
Help on Item	Control+Shift+H
Contents	Control+H
Search . . .	Control+Shift+S
Window	F1

Working With Events and Thresholds in Performance Manager

You can create and edit threshold values from both the Oracle Enterprise Manager console and Performance Manager.

Note: The Performance Manager threshold and event features described in this section are available only for node and database data.

From Performance Manager, you can create and edit a Chart-only threshold, create and register an event, reset a Chart-only threshold, or edit a registered event. From the Enterprise Manager console, you can create, edit or deregister an Enterprise Manager event but you cannot edit or view Chart-only thresholds.

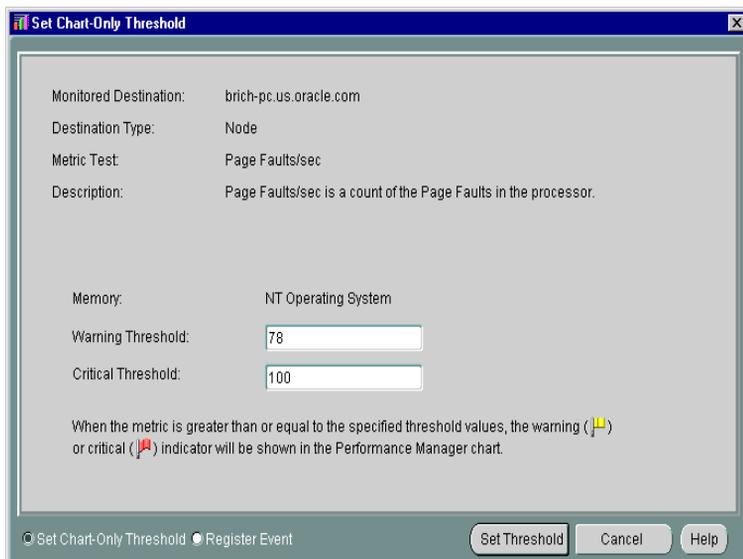
You can set thresholds on data items by using event tests or by setting a threshold for a data item in a chart (Chart-only threshold) using the Set Chart-only Threshold dialog box seen in Figure 3–6. When you monitor a chart that contains a data item

that supports a threshold established for an event, you can edit the parameters for that event by choosing **Set Threshold** from the **Chart Status** button.

When you create events from Performance Manager, the event is initialized with the context defined by the Performance Manager chart. You can only modify the event tests in an event if the event was registered using the Oracle 9i Agent.

If a data item supports the concept of an event, the chart displays a visible indicator (a flag) based on thresholds stored in the repository for that data item. If the data item does not support the concept of an event, you cannot establish a chart-only threshold for the data item. Every metric-based event test can have a warning and a critical threshold value. The flag indicators on a chart specify whether a threshold value has crossed a warning or critical threshold. The flag that appears on the Chart Status button in a chart displays the most serious state of any contained metric thresholds, and the metrics that appear when you click on the **Chart Status** button are sorted with the most serious indicators displayed first in the list.

Figure 3–6 Set Chart-only Threshold dialog box



Threshold values may be derived from one of three sources:

- A default value for some metrics that is added to the repository at the time of product installation.

- Chart-only thresholds, which are warning and critical threshold values for a specific metric, target, target type and instance.
- An event test derived threshold, which can be shared among administrators depending on the access rights of the user and the event containing the event test. When you set a threshold on a data item associated with an existing event, the thresholds displayed in that chart correspond to the thresholds set for the event test.

The threshold types listed above apply to metrics in a specific order of precedence:

- If you have Event System access and access to an event containing a metric, the threshold values for the metric are defined by the Event Test and override any Chart-only or default threshold values.
- If you have established a Chart-only threshold for a metric, the threshold values you establish are valid and supersede any default values that may exist.
- If neither of the previous two scenarios exist and a default threshold is defined in the repository for the metric, the default value defines the warning and critical thresholds for this metric, regardless of target or data source.

Threshold values are stored in the Oracle Management Server repository and are updated whenever the user sets or edits a Chart-only threshold or when Event registration changes occur. Chart-only thresholds are removed from the repository when you invoke Reset Threshold or when the Administrator is removed from the system. If you create a Chart-only threshold that is later overridden by the registration of an event, the Chart-only threshold remains in the repository. If the association between the metric and the event is later broken, the Chart-only threshold is restored.

To set or edit thresholds in Performance Manager:

1. Click the **Chart Status** button in the upper right corner of the chart below the menu bar.
2. Select the data item for which you want to set a threshold and then choose **Set Thresholds** from the context menu.

If there is more than one data source displayed in a chart when you select Set Thresholds, Performance Manager displays the Select Data Source dialog box where you must choose a single data source for which to set a threshold. When you create or edit a chart-only threshold or create a new event, you must choose a single data source before setting thresholds.

3. To set or modify a Chart-Only threshold, select **Set Chart-Only Threshold** at the bottom of the window. To register an event, select **Register Event**.

Note: If you do not have permission to access the Enterprise Manager Event System, the option of registering an event from the dialog box is not present.

4. To set or modify a Chart-Only threshold, add or modify the values in the **Warning Threshold** and **Critical Threshold** fields. If default warning or critical threshold values are defined for the metric, the input fields will contain these values.

To register or modify an event, select **Register Event** and then complete the fields in the General, Test, Parameters, Schedule, Access and Fixit Jobs pages of the event property sheet. If you are using a pre-9i Agent and you modify an event that has been registered, those changes are not used by the registered event.

Triggered Events and Thresholds

Events and thresholds often poll at different intervals. For example, events may be polled at intervals of minutes or even hours, while thresholds may be sampled in seconds. The result is that you could see a metric cross a threshold in a chart but not be notified of an event simultaneously. If the problem were caused by a spike, the threshold may be crossed in the chart with a sampling occurrence measured in seconds, but not trigger an event because the metric is sampled in minutes or hours, meaning the event is never triggered at all.

Additionally, events can include the concept of occurrences. Occurrences prevent notification for erratic or one-time instances of a threshold being crossed. If an event has a number of occurrences associated with a test, you may see the threshold crossed in a chart but never see the corresponding event triggered.

Events Registered for Multiple Targets

If you attempt to modify a threshold that has an associated event test registered for multiple targets, a warning displays indicating that the change you make will affect the event test for multiple targets and that if you want to use different thresholds for each target, you must create separate events. If you continue with the change, the existing event is deregistered for all targets and re-registered for all targets with the new threshold.

Metrics with Multiple Events and Different Thresholds

When you display a chart for a data item for which there are multiple event tests, a message is displayed indicating that there are multiple tests for the same metric. To show a threshold for the chart, you must select which event test to associate with the metric. If you then modify the associated event test or the metric in the chart, the thresholds are synchronized. Other tests of the metric are not affected by changes to the threshold in a chart.

If another user de-registers the associated event test and then you display a chart with that metric, a warning displays indicating that the previously associated event test no longer exists. If only a single event test remains for the metric, the message indicates that the remaining event is now associated with the metric. If more than one event remains, the message indicates that you must select a new event to associate with the metric.

If you add a new event test for a metric where a single chart-only threshold already exists, the thresholds associated with the previous test will not be used during monitoring.

Event Permissions

If you display a chart for which you have read-only permission for the corresponding event, you cannot modify the thresholds for that chart. You receive a read-only view of the event indicating that if you wish to change the thresholds associated with the data item, you must be granted appropriate access to the event system.

Note: Super-users who set up permissions on an event should consider the effect on non-privileged administrators who will be unable to modify the thresholds.

Registering Events in Performance Manager

You can register events from within Performance Manager through the Chart Status button on a chart containing the data item for which you want to register an event.

Registering events through Performance Manager is procedurally identical to registering events through the Enterprise Manager console.

To create or edit events in Performance Manager:

1. Click on the **Chart Status button** in the upper right corner of the chart.

2. Select the data item and then choose **Set Threshold** from the context menu.
If there is more than one data source displayed in a chart when you select **Set Threshold**, Performance Manager displays the **Select Data Source** dialog box where you must choose a single data source for which to set a threshold. When you create or edit a Chart-only threshold or create a new event, you must choose a single data source before setting thresholds.
3. Select **Register Event** at the bottom of the dialog box.
4. Complete or modify the fields in the **General**, **Test**, **Parameters**, and **Permissions** pages of the property sheet to create a new event. If you are using a pre-9i Agent and you modify an event that has been registered, those changes are not used by the registered event.

When you use a pre-9i Agent, the property sheet for creating a new event is similar to the property sheet for modifying an event. Some fields are editable while others are not. If you are using a 9i Agent, you can modify many more fields.

You can use several predefined event tests that have been installed with Oracle Enterprise Manager. See the *Oracle Enterprise Manager Event Test Reference Manual* for more information on these event tests.

About Oracle 9i and Pre-9i Agents

If you attempt to register a 9i event with a pre-9i Agent, you will receive an error message indicating that you cannot register the event. You can use only a 9i Agent to register 9i events.

If there exists both a 9i and pre-9i version of the same event, then the Oracle Management Server will determine which to use depending on the Agent version. For example, if there is a 9i Agent, the Agent will request registration using the 9i version of the event. If the Agent is pre-9i, then it will use the pre-9i version.

If you have migrated from a pre-9i Agent, then an existing event will not automatically use the 9i counterpart. To use the 9i test and access thresholds in the repository, you must deregister the pre-9i event and register the 9i event using the 9i Agent.

Viewing Thresholds

If a Performance Manager chart is displaying metrics that have multiple data sources, you can display the **View Thresholds** dialog box to view all threshold indicators. The **View Thresholds** dialog box is accessible from the **Chart Status** button.

The View Thresholds dialog box displays the current threshold status of each data item and its corresponding data source. You can view the status for each metric/data source pair using flags to indicate whether the value of the data item has passed its warning or critical threshold. If a data item has no threshold set, the column containing that data item is left blank.

When you display the View Thresholds dialog box, the current data item and threshold values are captured in a dataset and the status of each threshold is displayed in the table. A timestamp of the dataset appears in the bottom left corner of the View Thresholds dialog box.

If you change a threshold value for a data item while the View Thresholds dialog box remains open, the new threshold value is compared against the dataset created at the time you displayed the dialog box, not against the current value of the data item in real time. To refresh the statuses in the View Threshold dialog box, close and redisplay it.

You can add or change threshold values by clicking the **Chart Status** button on the View Thresholds dialog box and choosing **Set Threshold** from the context menu.

To view thresholds:

1. Click the **Chart Status** button for the chart containing the data item for which you want information and select **View thresholds** from the context menu.

The View Thresholds dialog box appears, displaying the status of any thresholds set for each of the data items and data sources in the chart. The status for a threshold is indicated by the flag that appears in the column for the data item and data source.

- A **green flag** indicates the value for the data item has not crossed a threshold.
- A **yellow flag** indicates the value for the data item is at or has passed the warning threshold.
- A **red flag** indicates the value for the data item is at or has passed the critical threshold.

If no threshold is set for a data item, the status for that metric is left blank.

The threshold statuses that appear in the View Thresholds dialog box are derived from dataset values gathered at the time you display the View Thresholds dialog box. The date and time of the dataset appears at the bottom of the dialog box. The View Thresholds dialog box is not updated when the Performance Manager chart is refreshed.

From the View Thresholds dialog box, you can set thresholds or reset and edit associations for a specific cell if thresholds are set.

You can set or edit a threshold for a metric from the View Thresholds dialog box by clicking the **Chart Status** button and selecting **Set Thresholds** from the context menu. For more information about setting thresholds, see "Working With Events and Thresholds in Performance Manager" on page 3-29.

Note: If you add or change the value of a threshold for a data item, the status flag for the data item on the currently displayed View Thresholds dialog box is updated based on the values stored in the dataset at the time the View Thresholds dialog box was displayed. To update all the status flags in the current chart, close the View Thresholds dialog box and redisplay it.

Resetting Thresholds

You can reset Chart-only thresholds through the **Chart Status** button on a chart. If you reset a Chart-only threshold for a data item, the current threshold is deleted and is reset to its default value. If the data item has no default value, the threshold is simply deleted and no value is assigned as a threshold.

If you select Reset Threshold for a data item with an assigned event, a message box displays stating that you must deregister or edit the event from within the Enterprise Manager console.

To reset a threshold:

1. From the chart, click on the **Chart Status** button and select the metric and data source for which you want to reset a threshold.
2. From the context menu, choose **Reset Threshold**. When you select Reset Threshold, the current data item is reset to its default value. If the data item has no default threshold value, the threshold is eliminated.

A confirmation dialog box appears, verifying that you are about to reset the threshold for the current metric. Click the **OK** button to confirm.

If no threshold exists for the metric, an error dialog box displays informing you that the threshold cannot be reset because no threshold exists for the metric.

If you attempt to reset a threshold associated with a registered event, an error message dialog box displays. You cannot deregister an event from within Performance Manager because the event associated with a metric may have several

other targets and tests. You can instead edit the event from within Performance Manager by choosing Set Threshold (for 9i targets) to remove or modify the event.

Refreshing Thresholds

A chart may not reflect an event that is registered while the related chart is open because the information for the metric in the chart related to the event has not been read from the repository. A chart does not automatically reflect the effect of event system changes. When you select Refresh Thresholds from the Chart Status button, Performance Manager updates the chart with the new data from the threshold repository and updates the chart threshold indicators.

When Event Registration or Permission changes effect the threshold repository, Performance Manager users are notified of these changes in a dialog box when the threshold data for the metric is next read from the repository. The following actions are conveyed to the Performance Manager user when a chart is opened, thresholds are refreshed for a chart, or thresholds are edited:

- An event test associated with a metric has been deregistered.
- A Chart-only threshold is overridden by the registration of an event test by another user.
- An event test associated with a metric has failed registration.
- Access to an event containing an event test associated with a metric has been removed.
- An event test associated with an event has been removed from the event or the instance has been modified.
- An event test associated with a metric has failed event modification.

To refresh thresholds, choose **Refresh Thresholds** from the **Chart Status** button on the Performance Manager chart.

Editing Threshold Associations

There may be circumstances when a user has permission to view several events that contain the same event test. When viewing a chart, you must decide which event will be associated with the metric in the chart. You can invoke Edit Threshold Association to change this association.

The **Edit Threshold Association** menu item has no application for data items with less than two events assigned to it. If you select **Edit Threshold Association** in such a case, a message box appears informing you that the threshold association cannot

be changed because a threshold association for the metric does not exist or there is only one registered event test.

You cannot change the association for Chart-only thresholds because each user has his own pool of Chart-only thresholds and duplicates are not supported.

To edit threshold associations:

1. Click the **Chart Status** button in the current chart and select the metric for which you want to edit the threshold association, and then choose **Edit Threshold Association** from the context menu.
2. When applicable, select the data source from the **Select Data Source** dialog box and click **OK**.
3. Select the event threshold you want to assign to the data item in the list that appears in the **Associate Metric with Event Test** dialog box.
4. Click the **OK** button at the bottom of the **Associate Metric with Event Test** dialog box.

Note: If you attempt to set a threshold association when the metric is not associated with an event test or you only have permission to view one registered event test for the specified target and data source, an error dialog box appears informing you that the association cannot be changed.

To edit threshold associations:

1. Click the **Chart Status** button in the current chart and select the metric for which you want to edit the threshold association and then choose **Edit Threshold Association** from the context menu.
2. When applicable, select the data source from the **Select Data Source** dialog box and click **OK**.
3. Select the event threshold you want to assign to the data item in the list that appears in the **Associate Metric with Event Test** dialog box.
4. Click on the **OK** button at the bottom of the **Associate Metric with Event Test** dialog box.

Running Performance Manager in a Browser

You can run Oracle Performance Manager in a browser and use a significant subset of the features of the full product, including basic monitoring features and event integration. Browser support includes basic monitoring features and event integration if you are using a version 9i Agent (or later).

The following features are available when running Performance Manager in a browser:

- Show database chart
- Show node chart
- Drilldowns
- Help
- Quick Tour
- Print Screen from charts
- Report Chart from charts
- Pause/Resume charts
- Set Refresh Rate
- Set Options
- Setting Chart-only thresholds
- Event Registration

The following features are not available while running Performance Manager in a browser:

- Recordings
- Historical collection drilldowns
- Custom Charts
- Saved chart attributes
- User-defined charts
- Direct Connect
- Standalone mode
- SQL Analyze

- Threshold status

Viewing Metric and Event Documentation Through a Browser

You can view specific information about metrics, events, charts and classes in Performance Manager through the Advice function on the Chart Status button and through other contextual functions within the Oracle Enterprise Manager application. However, you can view the full set of documentation for all the following types of metrics and events independently through your web browser without having to access the Oracle Enterprise Manager application. The documentation available through your browser provides a comprehensive Table of Contents, an index keyword search, and a full text search function.

- Oracle Database
- Windows NT
- IBM AIX
- Sun Solaris
- HP-UX
- Compaq Tru64
- SAP R/3 System
- Oracle Applications system

For each of these types of metrics and events, the following information is provided.

For Metrics:

- Classes
- Charts
- Data Items
 - Description
 - Source
 - User Action
- Event Tests
 - Description

- Source
- Parameters
- Output
- Frequency
- User Action

To access each documentation set, open the appropriate file below in a web browser:

- Oracle Database -- ORACLE_HOME/doc/EM/Webhelp/dba/dba.htm
- Windows NT -- ORACLE_HOME/doc/EM/Webhelp/nt_os/NT_OS.htm
- IBM AIX -- ORACLE_HOME/doc/EM/Webhelp/aix/AIX.htm
- Sun Solaris -- ORACLE_HOME/doc/EM/Webhelp/sol/SOL.htm
- HP-UX -- ORACLE_HOME/doc/EM/Webhelp/hpux/HPUX.htm
- Compaq Tru64 -- ORACLE_HOME/doc/EM/Webhelp/dec/DEC.htm
- SAP R/3 -- ORACLE_HOME/doc/EM/Webhelp/sap/sap.htm
- Oracle Applications System -- ORACLE_HOME/doc/EM/Webhelp/oafnd/OAFND.htm

Introduction to Oracle Capacity Planner

Oracle Capacity Planner is an Oracle Enterprise Manager application that allows you to collect different types of performance statistics and record that data in an historical database. You can then use Oracle Capacity Planner to analyze the historical data to plan future capacity.

Note: In releases prior to 9i, the Agent data gathering service (also known as the Oracle Data Gatherer) was used to collect data for presentation in real-time performance monitoring utilities and historical data. The Intelligent Agent and the data gathering service were separate services that were started and stopped independently of each other.

With 9i, the data collection capabilities are integrated into the 9i Intelligent Agent. Therefore, there is no separate service that needs to be started. Furthermore, when you stop the 9i Intelligent Agent, the data gathering capabilities are disabled and not available.

Oracle Capacity Planner uses the Intelligent Agent (Agent) to collect its historical data. To collect most types of data, you must install the Agent on the system (or systems) where you want to collect data. See the *Oracle Intelligent Agent User's Guide* for information on managing the Agent.

If you are using Oracle Capacity Planner to collect database data, the Agent can be installed on another system. See "Accessing Historical Data Through an Intermediate Host" on page 4-3 for more information on accessing data through an Agent on another system.

The types of performance data that Oracle Capacity Planner can collect on a system depend on the products that are installed. Table 4–1 shows the types of data that Oracle Capacity Planner can collect when various Oracle products are installed.

Table 4–1 Data That Capacity Planner Can Collect When Various Oracle Products are Installed

Oracle Product	Oracle Concurrent Manager Data	Oracle Database Data	Node (Operating System) Data	SAP R/3 System Data	Microsoft SQL Server Data
Diagnostics Pack	No	Yes	Yes	No	Yes
Management Pack for Oracle Applications	Yes	No	Yes	No	No
Management Pack for SAP R/3	No	No	Yes	Yes	No

If additional products from Oracle or other vendors are installed, Oracle Capacity Planner may be able to collect additional types of data not shown in Table 4–1.

How Capacity Planner Collects and Stores Performance Data

The following list identifies how Capacity Planner uses the Agent to collect performance data:

- The Agent collects the data at an interval you specify from within Capacity Planner.
The Agent stores the data in an efficient binary form.
- At a specified loader interval, the data is read from this binary file and stored in a readable form in the Oracle Capacity Planner historical database.
The Agent also aggregates the data by time, creating summary statistics for the data that is collected at different time intervals (hour, day, week, and so on).
- Over time, the Agent purges the data in the historical database, keeping only as much data as you specify.

Purging the historical data allows you to have access to a current view of recent performance data for your environment and to manage the amount of stored data to avoid wasting disk space.

Accessing Historical Data Through an Intermediate Host

Oracle Performance Manager relies on the Agent to monitor a target (such as a node, a database, or a concurrent manager). Usually, the collection of the data is done on the system where the target is located. However, for some types of targets Oracle Performance Manager can also monitor data on a system by using the Agent 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 Agent is available.

There are three ways to set the location of the Agent. The method you use depends on how you connect to the target. Consider the following scenarios:

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

Capacity Planner attempts to connect to the Agent on the host where the target 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. You can use the Connection Details dialog box to specify the location of the Agent that will be used to collect performance data.

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

Capacity Planner displays a Logon dialog box. This dialog box also contains a field to specify the location of the Agent that will be used to collect performance data.

- You select a target in the Capacity Planner navigator tree and choose **Set Connection Details** from the **File** menu.

Capacity Planner displays the Database Logon dialog box for the selected target. This dialog box also contains a field to specify the location of the Agent that will be used to collect performance data.

Usage Scenarios for Oracle Capacity Planner

Oracle Capacity Planner can perform tasks such as the following:

- Track the increase in the amount of used space on a disk over time and estimate when 95 percent of the space on the disk will be consumed
- Track the increase in the total I/O rate for a host over time, then estimate what the total I/O rate for the host will be at some future point in time
- Determine thresholds to set in Performance Manager by evaluating historical data gathered in Capacity Planner
- Provide a predefined set of data that measures performance (Oracle Recommended Collection)
- Publish historical data to a website where administrators and system administrators can view data that is periodically updated

Starting Oracle Capacity Planner

You can start Oracle Capacity Planner in any of the following ways:

- On the Oracle Enterprise Manager console, click the **Diagnostics Pack** drawer, then click the **Capacity Planner** icon.
- On the Oracle Enterprise Manager console, select a Database target, click the right mouse button, point at **Related Tools** in the context menu, then click **Capacity Planner**.
- On the **Tools** menu of the Oracle Enterprise Manager console, point to **Diagnostics Pack**, then click **Oracle Capacity Planner**.
- From the UNIX command line, change directory to the ORACLE_HOME/bin directory (where ORACLE_HOME represents the home directory in which the Diagnostics Pack is installed), then type the following command:

```
./oemapp cp
```
- From the **Start** menu, point to **Programs**, then to the Oracle Home where Oracle Enterprise Manager is installed, then to **Diagnostics Pack**, then click **Capacity Planner**, which displays the Capacity Planner Login dialog box.

Enter the appropriate connect information for your Oracle Enterprise Manager repository, then click **OK**.

Using Help

When you are using Oracle Capacity Planner, you can display context-sensitive help topics. You can also display conceptual topics and task topics.

To obtain context-sensitive help for an Oracle Capacity Planner panel, window, dialog box, or property page, select an item in the panel, window, dialog box, or property page, then on the **Help** menu, choose **Window**.

To obtain context-sensitive help for a class, chart, or data item on a property page, select the class, chart, or data item on the property page, then take one of the following actions:

- Press F1.
- Click the **Help** icon on the toolbar.
- On the **Help** menu, choose **Selected Item**.

If a help topic is not available for a class, chart, or data item, a No Help Available message is displayed when you request help.

To view the Contents page for the Oracle Capacity Planner help, on the **Help** menu, choose **Contents**. On the Contents page, you can:

- View a list of the conceptual help topics by double-clicking the **Conceptual Topics** book on the help system's Contents page.
Conceptual topics provide conceptual or overview information of which you should be aware before performing a particular Oracle Capacity Planner task. Conceptual topics do not contain step-by-step information for performing a task.
- View a list of the task help topics by double-clicking the **Task Topics** book on the help system's Contents page.
Task topics provide step-by-step instructions for accomplishing an Oracle Capacity Planner task. They do not provide conceptual information that you should be aware of before performing the task.

You can access a glossary of Oracle Capacity Planner terms by double-clicking the **Oracle Capacity Planner Glossary** book on the Contents page.

Using Oracle Capacity Planner

You may find it helpful to think of using Oracle Capacity Planner as a two-step process:

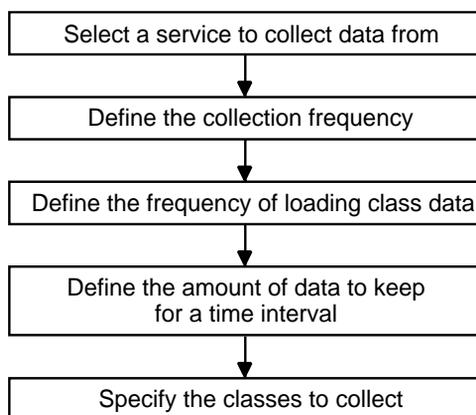
1. **Setting up the collection of historical data**
See "Setting Up a Collection" on page 4-6 for a detailed description of how to collect historical data.
2. **Analyzing the collected data**
See "Analyzing Collected Data" on page 4-35 for a detailed description of how to analyze collected data.

Setting Up a Collection

To set up a historical data collection with Oracle Capacity Planner, you:

1. Select (and connect to) the targets for which you want to collect historical data.
2. Define the frequency of collection samples.
3. Define the location of the historical database and the frequency at which collected data should be loaded in the historical database.
4. Define the amount of data to be kept in the Oracle Capacity Planner database at each time interval.
5. Select the classes of data to collect, based on what is available in the Oracle Capacity Planner navigator.

Figure 4-1 shows the steps to follow when setting up a collection. For more information on each step, see the following sections.

Figure 4–1 Steps for Setting Up a Collection

NU-3695A-AI

Selecting Targets

You can select one or more targets from which you want to collect historical performance statistics. For example, when you have the Oracle Diagnostics Pack installed, the target types are usually Nodes and Databases.

The procedure for selecting a target depends upon whether or not the server resides on a node that is known to the Enterprise Manager main console. A node is known to the console when it has been *discovered* with the Enterprise Manager console **Discover Nodes** command.

Selecting Targets on Discovered Nodes

To select a target on a node that has been discovered by the Enterprise Manager console:

1. Click the **Collection** tab of the Oracle Capacity Planner navigator panel, which displays the Oracle Capacity Planner collection view.
2. Double-click one of the target type folders.

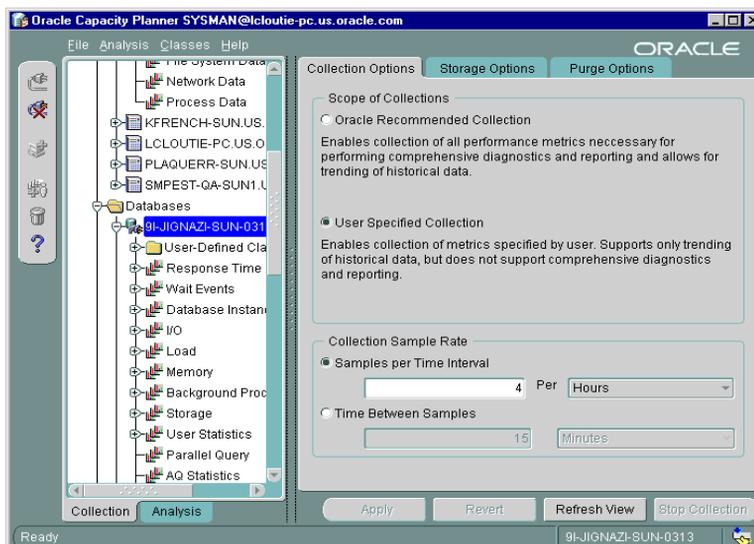
The Oracle Capacity Planner navigator tree displays the targets of the selected type that are known to the Oracle Enterprise Manager main console.

3. Select the target from which you want to collect performance data and click the **Connect** button in the Capacity Planner toolbar, or click the plus sign (+) next to the target in the navigator.

When you connect to a target in the Oracle Capacity Planner navigator panel, you may be prompted for credentials if they are required to connect to that target. If a logon dialog box appears, click **Help** for information on the individual fields on the dialog box.

After you connect to a target, the available collection classes for that target appear in the navigator and Oracle Capacity Planner displays the Target property sheet for the selected target. For example, Figure 4–2 shows the classes that appear when you connect to a Windows NT node target.

Figure 4–2 Selecting a Target in the Oracle Capacity Planner Window



Selecting Targets on Undiscovered Nodes

If you double-click a target type and the target you are looking for does not appear in the target type folder, you can do one of the following:

- Use the Enterprise Manager console to discover the node where the target resides.

This is the preferred method for adding a target to the Capacity Planner navigator panel. When you discover a node with the Enterprise Manager console, Capacity Planner saves key information about the target, such as the preferred credentials, location of the Agent, and historical database information.

- Add the target manually to the Capacity Planner navigator panel.

When you add a target manually, the target is added for the current session of Capacity Planner only. You can start gathering data for the target, but the next time you start Capacity Planner, the target will not appear in the navigator panel. To modify collection settings or analyze data collected for the target, you will have to add the target again the next time you start Capacity Planner.

To add a target manually:

1. Select the target type for the target you want to add.

2. Click the **Add Service** button in the Capacity Planner toolbar.

Capacity Planner displays a message to remind you that targets you add manually will be available for the current session of Capacity Planner only.

3. Click **Yes**.

Capacity Planner displays a logon dialog box for the target. Click **Help** if you need information about any of the specific fields on the dialog box.

4. After you fill in the logon credentials, click **OK** to connect to the target.

After you connect to a target, the available collection classes for that target appear in the navigator and Oracle Capacity Planner displays the Target property sheet for the selected target (Figure 4–2).

About the Target Property Sheet

When you connect to a target, Oracle Capacity Planner displays the Target property sheet, which contains the following property pages:

- Collection Options page
- Storage Options page
- Purge Options page

The collection, load, and purge settings you select on these pages apply to all the classes in the selected target. You cannot change these settings for a selected class; you can change them only for a selected target.

Defining the Frequency of Collection Samples

When you first connect to a target, Capacity Planner displays the Collection Options property page. The values you select on this page determine how often the Agent will collect information about the selected target and save it to disk. On the

Collection Options property page, you can set the frequency of collection samples using either of these two methods:

- By selecting the number of data samples to collect for a specified time interval

For example, to collect information 3 times every hour, select **Samples per Time Interval**, enter 3 in the text field, and choose **Hours** from the drop-down list.



The screenshot shows a configuration panel with a radio button selected for "Samples per Time Interval". To the right of the radio button is a text input field containing the number "3", followed by the word "Per" and a dropdown menu currently showing "Hours".

- By specifying the length of time between collection samples

For example, to collect information every 20 minutes, select **Time Between Samples**, enter 20 in the text field, and choose **Minutes** from the drop-down list.



The screenshot shows a configuration panel with a radio button selected for "Time Between Samples". To the right of the radio button is a text input field containing the number "20", followed by a dropdown menu currently showing "Minutes".

Note: To configure the settings for collecting data, the Agent that will collect data for a target must be running. Normally, the Agent is located on the host where the target is located.

To collect data for a database, the Agent can be located on a host other than the host where the database is located. See "Accessing Historical Data Through an Intermediate Host" on page 4-3 for more information.

Defining the Location of the Historical Database

After you set the frequency of collection samples, use the **Storage Options** tab to specify the location of the Oracle Capacity Planner historical database. This setting defines where Capacity Planner will save information collected for the selected target. When data is saved in the historical database, you can later analyze the data or use it to generate trend analyses.

By default, collected data is saved in your Oracle Enterprise Manager repository. However, you can specify an alternate database for the historical data if you do not want to store historical data for the selected target in the repository.

To save the data collected for a target in a location other than the Oracle Enterprise Manager repository:

1. From the Storage Options tab, select **Store historical data in alternate location**.
2. Enter the credentials for the database that will store the collection data for the target.

Enter the appropriate user name, password, and target for the Oracle Capacity Planner historical database. This connection information is used by the Agent when it loads the collected data at the specified loader interval. Therefore, the target specified for the Oracle Capacity Planner historical database must be known and accessible from the host where the Agent is running.

For example, if you specify MY_DB.WORLD as the historical database and your Agent is running on host MYNODE, then database MY_DB.WORLD must be reachable via Net8 or SQL*Net from host MYNODE (MY_DB.WORLD must exist in the TNSNAMES.ORA file for host MYNODE, for example).

Defining the Frequency of Loading Collection Data

After you define how often data will be collected and where the data will be stored, you can define how often the data will be loaded into the historical database.

You can determine how frequently the Oracle Capacity Planner loader program loads collection data for the target using either of these two methods:

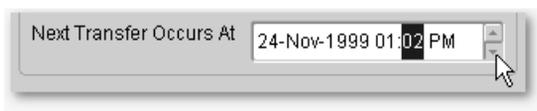
- Using the **Per Time Interval** field to specify the number of loader passes for a specified time interval
- Using the **Time Between** field to specify the length of time between loader passes

Note: Although data can be collected at short time intervals (such as 5, 10, or 15 minutes), collected data is not available to you for analysis until it has been loaded into the Oracle Capacity Planner historical database. Therefore, the load interval you specify controls when the most recently collected data will be visible to you.

The collection frequency you set determines the lowest time interval for which Oracle Capacity Planner can analyze data. For example, if you want to be able to analyze data from hourly intervals, you need to set a collection frequency of at least once an hour.

After you define the frequency of loading collection data, you can set a time for the next loader pass by using the **Next Transfer Occurs at** field:

1. Click the value that you want to change in the date and time box.
2. Click the up or down arrow to select a higher or lower value.



If the current time is later than the time displayed for the **Next Transfer Occurs at** setting, click **Refresh View** to update the display to show the actual time of the next loader pass.

Note that the values that you select on the Storage Options property page apply to all classes of data collected on the selected target.

Understanding When the Loader Runs

The loader runs at the regular time interval specified on the Storage Options property page. The time specified in the **Next Transfer Occurs at** field controls when the loader runs. For example, if you want the loader to run once a day at 2:00 a.m., then set the transfer interval to once per day, and set the next transfer time to the next day at 2:00 a.m. The loader will run for the first time at 2:00 a.m. the next day, and then will run once a day, each day at 2:00 a.m.

You can use the **Next Transfer Occurs at** field to force the loader to run immediately—or as soon as possible. Simply set the next transfer time to a time earlier than the current time.

Understanding How Data Aggregation Works

As it loads data into the database, Oracle Capacity Planner automatically aggregates the data. During aggregation, Oracle Capacity Planner examines the collection samples for a given time interval, calculates an average value for that interval, then uses that average value for calculations at the next larger time interval.

On each loader pass, Oracle Capacity Planner examines the time stamps of all collected data to determine whether or not the threshold for a set interval (hour, day, week, month, or year) has been crossed since the previous loader pass. If so, Oracle Capacity Planner performs an aggregation of collected data from the next smaller interval to the interval threshold just passed. Table 4-2 shows the larger time interval to which data at each time interval is aggregated.

Table 4-2 *Aggregation of Data from Smaller to Larger Time Intervals*

Data at This Interval	Aggregates to This Interval
Minutes	Hours
Hours	Days
Days	Weeks
Weeks	Months
Months	Years

An example may help clarify how Oracle Capacity Planner aggregates collection data. Suppose Oracle Capacity Planner is collecting a data sample every 10 minutes to capture the percentage of used space on a particular disk, and the loader runs once an hour. When the Oracle Capacity Planner loader runs and transfers data into the Oracle Capacity Planner database every hour, it examines the values for the percentage of used disk space in the samples collected during the previous hour, then it computes an average percentage for the samples. That average percentage is then used as the average value for the hour.

At the first loader pass after midnight, Oracle Capacity Planner uses the hourly averages since midnight the previous day to compute the day's percentage of used disk space.

At the first loader pass after midnight on Saturday, Oracle Capacity Planner examines the daily averages of used disk space since midnight the previous Saturday and computes an average percentage for the week.

At the first loader pass after midnight on the last calendar day of the month, Oracle Capacity Planner examines the weekly averages since midnight on the last calendar day of the previous month and computes an average percentage for the month.

Finally, at the first loader pass after midnight on December 31, Oracle Capacity Planner examines the last 12 monthly averages to compute a yearly average.

Defining the Amount of Data to Keep

The final step in setting up a target for historical data collection is defining the amount of data to keep.

When you select a target, you can click the **Purge Options** tab to display the Purge Options property page. On this page, you specify the amount of data you want to store in the Oracle Capacity Planner historical database for each type of data (for example, hour data, day data, and week data). You can accept the default Purge Options property page values or choose different values.

The values set on the Purge Options property page apply to all classes of data collected on the selected target.

The values you specify in the data retention table (the **Enter the amount of data you want to keep** table on the Purge Options page) determine how far back in time you can go to analyze data for the different types of data.

Suppose, for example, you always want to be able to view hour data for the previous six weeks. In this case, for the Hours **Data Type** row in the data retention table, you would enter 6 in the **Timespan** column and Weeks in the **To Keep** column. This tells Oracle Capacity Planner that you want to keep hour data for a 6-week period. Oracle Capacity Planner calculates 6 weeks from the current time, and the **Purge Data Older Than** column shows the time span for which hour data is available. Table 4–3 shows the Hours row in the data retention table with this data entered.

Table 4–3 *Specifying How Much Data to Keep for a Data Type*

Data Type	Timespan	To Keep	Purge Data Older Than
Hours	6	Weeks	(current date minus 6 weeks)

For each row in the data retention table, you can choose the time span to keep data samples for that type of data by entering the desired value in the **Timespan to Keep** column.

Applying and Reverting the Collection Settings for a Target

When you finish setting all the options on the Target property sheet, do the following to apply your collection settings:

1. Click **Apply**.

If you changed the location of the historical database on the Storage Options page, Capacity Planner displays a message box reminding you that any information stored in the previous location will not be available for analysis.

If you don't want to be reminded about this implication the next time you change the database location, select **Don't show this message again**.

2. Click **OK**.

Capacity Planner displays a message stating that the options were set successfully.

3. Click **Continue** to close the message box and return to the Capacity Planner main window.

When you apply your collection settings, Capacity Planner sends the settings to the Agent for the selected target. Note that you cannot select data to be collected until these settings have been applied.

At any time during the process of modifying the settings on the Target property sheet, you may revert the settings to their last saved (applied) state by clicking **Revert**. However, after you apply the settings, they cannot be reverted to their previous settings using the **Revert** button; they must be modified manually.

Selecting the Classes of Data to Collect

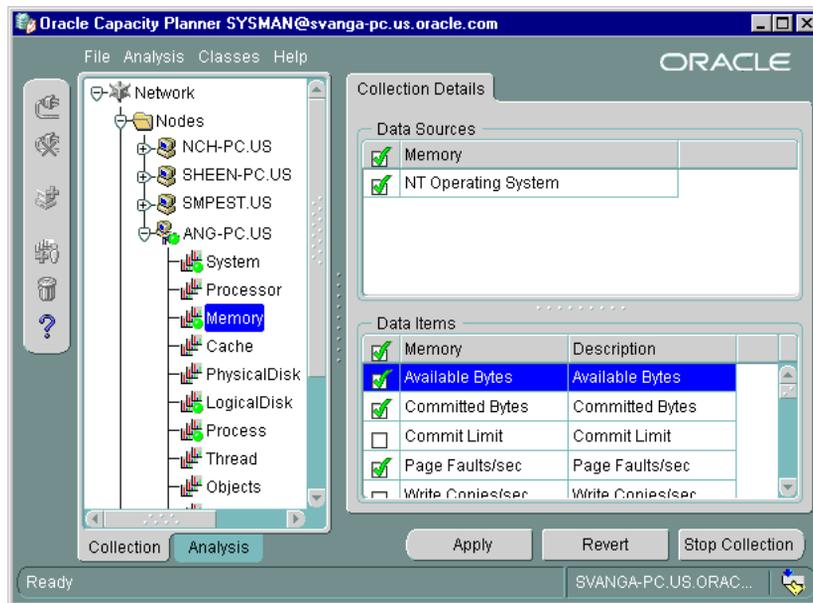
After you set the collection and loading options for a target, you can then select the classes of performance data that you want to collect for that target:

1. In collection view, select and connect to the target.

For more information, see "Selecting Targets" on page 4-7.

2. Click the plus sign (+) next to the target to show the classes of data you can collect.
3. Select one of the classes for the target.

Figure 4-3 shows a typical collection class for a node target on Windows NT and the data sources and data items available for the class.

Figure 4–3 Selecting Data Sources and Data Items for a Collection Class

The following list explains classes, data items, and data sources in more detail:

- Classes

A class is a container for a particular category of data. For example, a node (or operating system) target might include the following classes:

- System
- Processor
- Memory

When you select a target in the navigator, Capacity Planner displays the names of the classes below the target in the tree view.

You can collect data from none, some, or all displayed classes for a target. A class may also be a container for other classes, to provide logical groupings of the performance data at higher levels. For example, an I/O class may be a container for other more specific I/O classes.

- Data items

In a class, each of the related statistics is referred to as a data item. For example, a LogicalDisk class might include the following data items:

- Percent Free Space
- Free Megabytes
- Current Disk Queue Length
- Disk Writes per Second

A class can contain one or more data items. When you select a class in the navigator, the names of the data items and data sources associated with the data items are displayed on the Collection Details property page. Select the data items that you are interested in collecting.

A green check mark appears next to the name of each data item that is selected for collection. You can toggle the state of all data items between collected and not collected by clicking the **Data Items** column header that contains the check mark.

- Data sources

A data source is a description of where Oracle Capacity Planner can collect the data items for a class. A class can contain one or more data sources. When you select a class in the navigator, the names of the data items and data sources associated with the class are displayed on the Collection Details property page.

The type of data in the class determines the data sources for the class. For example, in a LogicalDisk class, the data sources might be the individual disks for the operating system (for example, disk1, disk2, and so on). In a CPU Utilization class, the sources are the individual CPUs for the host (for example, cpu1, cpu2, and so on). You can collect data items from one or more data sources.

When you select a data source, a green check mark appears next to the name of the data source on the Collection Details property page. You can toggle the state of all data sources between collected and not collected by clicking the **Data Sources** column header that contains the check mark.

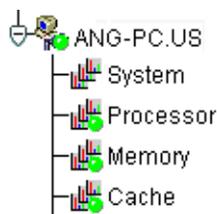
Starting Data Collection

After you select the data items that you want to collect from the available data sources on the Collection Details property page, click **Apply** to confirm your selections, or click **Revert** to cancel the selections.

When you click **Apply** for a class of data, Capacity Planner marks the icon for the selected class and the selected target with a green dot in the Collection view of the navigator panel. A green dot on a collection class icon indicates that one or more data sources are selected for the class. A green dot on a target icon indicates that Capacity Planner is collecting data for one or more classes in the target.

For example, in Figure 4–4, Capacity Planner is actively collecting data for the Processor, Memory, and Cache classes for node ANG-PC. Capacity Planner is not collecting data for the System collection class.

Figure 4–4 Green Dots on a Target or Class Indicate Capacity Planner is Collecting Data



Stopping Data Collection

To stop collecting data for one or more data items or data sources for a collection class, follow these steps:

1. Select the collection class in the navigator.
2. On the Collection Details page, click on the green check marks for those data items or data sources from which you no longer want data collected, which causes the check marks to disappear.
3. Click **Apply**.

To stop collecting data for all data items and data sources for a collection class, follow these steps:

1. Select the collection class in the navigator.
2. On the Collection Details page, click **Stop Collection**.

Capacity Planner displays a message box stating that collections for the class have stopped.

3. Click **OK** to close the message box and return to the Capacity Planner main window.

When no data sources are selected for collection for a class of data, the icon for that class in the navigator does not display a green dot.

To stop collecting data for all classes in a target:

1. In collection view, select and connect to the target.

For more information, see "Selecting Targets" on page 4-7.

2. Click **Stop Collection** on the Target property sheet.

Capacity Planner displays a confirmation box.

3. Click **Yes** to stop collecting data for all classes in the target; click **No** to cancel the operation.

Generating a Collection Report

A collection report provides a summary of the collection settings for one or more targets. Capacity Planner displays the collection settings in your Web browser. In the browser, you can easily review the settings currently applied to the target or targets you selected.

To display a collection report for one or more targets:

1. In collection view, on the **File** menu, choose **Collection Report**.

Capacity Planner displays the first screen of the Collection Report Wizard.

2. Use the Collection Report Wizard to specify the target or targets whose collection settings you want to include in the report and to generate and view the report.

At any time while using the wizard, click **Help** for more information.

When you click **Finish** on the last screen of the Collection Report Wizard, Capacity Planner saves the report to an HTML file and displays the report in your Web browser.

Copying Collection Settings

After you set up collection settings for one service, you can quickly copy those settings to another similar target.

To copy the collections settings from one target to another:

1. In collection view, select a target whose collection settings you want to copy.
2. On the **File** menu, choose **Copy Collection Settings** or right mouse click on the Collection Settings from the context menu.

Capacity Planner displays the first screen of the Copy Collections Wizard.

3. Use the Copy Collection Settings Wizard to specify the destination targets to which you would like to copy the collection settings for the selected target.

From the wizard, you can also view the progress of the copy operation. At any time while you are using the Copy Collection Settings Wizard, click **Help** for more information.

Note: Any destination target you select must be running an Agent of the same type and version as the target from which you are copying your settings.

Creating a User-Defined Class

You can create a user-defined class for any database target. As with other classes, you can collect data from a user-defined class and then analyze that collected data.

To create a user-defined class:

1. In collection view, select and connect to a database target.
For more information, see "Selecting Targets" on page 4-7.
2. Select the **User-Defined Classes** folder for the database.
3. In the Capacity Planner toolbar, click the **Add User-Defined Class** button.
4. On the SQL Script Command page, specify a name for the user-defined class and a SQL statement that returns the columns of data that you want to include in your user-defined class.
5. Click **Evaluate**.

Oracle Capacity Planner performs a validation check on the SQL statement. When the validation check succeeds, the Collection Details page becomes available.

6. On the Collection Details page, designate a data source for the user-defined class by selecting the data item that contains the column that you want to designate as the data source, then click **Set Data Source**.

A key icon appears in the Data Item column next to the data item that is designated as the data source. For more information, see "Designating a Data Item as the Data Source for a User-Defined Class" on page 4-21.

7. Make any changes that you want to make to the data items by clicking either **Remove**, **Modify**, or **Add**.

For more information, see "Removing, Modifying, and Adding Data Items in a User-Defined Class" on page 4-22.

8. After you finish defining the user-defined class, click **Start Collection** to start collecting data for the class.

Note: The Oracle Capacity Planner online help includes an example of creating a user-defined class. Search for **Example** in the Capacity Planner online help index.

Designating a Data Item as the Data Source for a User-Defined Class

On the Collection Details page for a user-defined class, you must designate one of the data items as the data source for the class. Each row in the Class Data Items table displays information about a data column that will be returned when the statement on the SQL Script Command page runs. The **Data Item** column displays the name that Oracle Capacity Planner will use for the data item in the user-defined class. The **Derived From** column displays the source or derivation of the Data Item name.

When the Oracle Capacity Planner loader runs and determines that the collected data for the user-defined class needs to be aggregated, the values of the data items are aggregated by the values in the data source, then stored with the data source in the historical database.

For example, the sample user-defined class described in the Capacity Planner online help creates a user-defined class that gathers rollback segment data. In that example, the logical choice for the data source is the rollback segment number. The other data items in the example provide data about each rollback segment. At regular intervals, Capacity Planner aggregates the data items associated with each of the rollback segments (or each rollback segment number) to come up with averages over time.

Removing, Modifying, and Adding Data Items in a User-Defined Class

The Class Data Items table on the Collection Details page displays the data items in the user-defined class. Use the Class Data Items table to remove, modify, and add data items in a user-defined class.

Note: To modify or add data items in a user-defined class, you must be running the Agent provided with Oracle Server 8.1.6 or later.

- To remove a data item:

Select the data item that you want to remove from the class, then click **Remove**. This removes the data item from the Class Data Items table and the user-defined class.

- To modify a data item:

Select the data item that you want to modify, then click **Modify**, which displays the Add/Modify Collection Details page.

On the Add/Modify Collection Details page, you can change the label of the data item. You can also specify how the data item is derived. After you finish modifying a data item on the Add/Modify Collection Details page, the information for the data item is updated in the Class Data Items table.

- To add a data item:

Click **Add**, which displays the Add/Modify Collection Details page. On the Add/Modify Collection Details page, you can specify a label for the data item. You can also specify how the data item is derived. After you finish defining the data item on the Add/Modify Collection Details page, a row for the data item is added to the Class Data Items table.

The Add/Modify Collection Details page allows you to define new data items derived from the definitions of existing data items. You can specify functions to be used on retrieved data items from the script. These functions can be performed on numeric data only.

The online help for Oracle Capacity Planner provides details on the functions and operations available.

Modifying User-Defined Classes

Note: You can modify a user-defined class before you start collecting data for the class, but you cannot modify the class after you start collecting data for the class.

If you want to make changes to a user-defined class after starting data collection for the class, create a new user-defined class like the class you want to modify, then modify the new user-defined class. For more information, see "Creating a User-Defined Class Like an Existing User-Defined Class" on page 4-24.

After you make the desired changes to the new user-defined class, you can collect data for the new class and stop data collection for the user-defined class that was created earlier.

To modify a user-defined class before you start collecting data for the class, follow these steps:

1. In collection view, select and connect to a database target.
For more information, see "Selecting Targets" on page 4-7.
2. Select and expand the **User-Defined Classes** folder for the database.
3. Select the user-defined class that you want to modify.
Capacity Planner displays the SQL Command Script page and the Collection Details page for the class.
4. If you want to modify the name of the class, modify the name in the **Class Label** field on the SQL Script Command page.
5. If you want to change the SQL statement that defines the user-defined class, modify the statement on the SQL Script Command page.
After you change a SQL statement, click **Evaluate** so that Oracle Capacity Planner can perform a validation check on the statement. When the validation check succeeds, click the Collection Details tab.
6. On the Collection Details page, you can remove, modify, or add rows in the Class Data Items table.

Note: To modify or add data items in a user-defined class, you must be running the Agent provided with Oracle Server 8.1.6 or later.

For example, you can click **Remove** to remove a data item, and **Modify** or **Add** to modify or add a data item, respectively.

When you modify or add a data item, you can also specify that functions or operations be performed on data items that have numeric data types. For more information, see the Capacity Planner online help.

Creating a User-Defined Class Like an Existing User-Defined Class

To create a user-defined class like an existing user-defined class, follow these steps:

1. In collection view, select and connect to a database target.
For more information, see "Selecting Targets" on page 4-7.
2. Select and expand the **User-Defined Classes** folder for the database.
3. Select the user-defined class that is similar to the user-defined class that you want to create.
4. On the **Classes** menu, choose **Create Like User-Defined Class**.

Capacity Planner displays the Create Like User-Defined Class dialog box.

5. Enter a name for the new user-defined class in the **Class Label** field.
6. Select a database target from the **Service** drop-down list.

Note that you cannot make any other changes to the user-defined class until after you create the new class.

7. Click **OK**.

Capacity Planner creates the new user-defined class in the User-Defined Classes folder of the target you selected.

You can now modify the new user-defined class using the procedure in "Modifying User-Defined Classes" on page 4-23.

Starting Data Collection for a User-Defined Class

After you create a new user-defined class, you can start collecting data for the class:

1. In collection view, select and connect to a database target.
For more information, see "Selecting Targets" on page 4-7.
2. Select and expand the **User-Defined Classes** folder for the database.
3. Select the user-defined class for which you want to data.
4. Click **Start Collection**.

A green dot appears next to user-defined classes when you start collecting data for the class.

Deleting a User-Defined Class

To delete a user-defined class, follow these steps:

1. In collection view, select and connect to a database target.
For more information, see "Selecting Targets" on page 4-7.
2. Select and expand the **User-Defined Classes** folder for the database.
3. Select the user-defined class that you want to delete.
4. In the detail panel, click **Stop Collection**.
5. On the **Classes** menu, choose **Remove User-Defined Class**.

Troubleshooting Collection and Load Problems

During the collection and load processes, errors may be encountered by the Agent. You can determine if data is not being collected or loaded by using either of these methods:

- Browsing the analysis data in the Oracle Capacity Planner navigator. See "Browsing the Collected Data" on page 4-37 for more information.
- Accessing the historical database using SQL. See "Understanding the Oracle Capacity Planner Historical Database" on page 4-51 for more information.

If data is not being collected or loaded, you should check the status of the Agent on the host from which data is being collected. If the Agent is running, check the log file (`$ORACLE_HOME/network/log/dbsnmp.log`) for errors related to the

collection or loading of data. See the *Oracle Intelligent Agent User's Guide* for additional details on the configuration of the Agent.

Collecting Data for Diagnostic Reporting

Capacity Planner allows you to collect and report on historical data for a database in the context of diagnostic reporting. Collection for diagnostics reporting involves collecting a fixed set of metrics over time. This predefined set of data, the **Oracle Recommended Collection**, collects all performance metrics required to perform comprehensive diagnostics and reporting and allows for trending of historical data. Data is loaded to the OEM repository or an alternate location on the frequency you specify.

Note: Use of the Oracle Recommended Collection is only provided when data collection is performed via an Oracle 9i Agent.

To perform diagnostics using historical data, a complete set of data must be available for analysis. Capacity Planner gives you the option to enable collection of this dataset as a unit. You can initiate collection of diagnostics data for a specific database from within the Capacity Planner collection setup tab using one of two options:

- Oracle Recommended Collection

To support diagnostics reporting, it is important that the complete set of data be available for analysis. Choosing Oracle Recommended Collection enables you to collect all performance data necessary for performing diagnostics, reporting, and trending based on a non-editable template of collection metrics defined by Oracle. When you choose Oracle Recommended Collection, you do not have the option of selecting specific metrics or classes of metrics or adding metrics to the predefined list, and all of your current collections are dismissed.

- User Specified Collection

Choosing User Specified Collection allows you to select specific sets of metrics but limits the use of that data to trending of historical data since it results in an incomplete data set.

If you select Oracle Recommended Collection and begin collecting data, then instead choose User Specified Collection, you can add or modify other metrics for collection without disabling the collection of other metrics.

To collect performance reporting data, follow these steps:

1. Click on the target for which you want to collect performance data in the navigator panel of Capacity Planner.
2. Select the Collection Options tab on the property page for the target.
3. Click on the Oracle Recommended Collection to enable collection of performance metrics required for generating diagnostics and reports.

Scope of the Oracle Recommended Collection

When you select Oracle Recommended Collection as your collection option, Capacity Planner designates a predefined list of metrics for collection. If you have previously specified other metrics for collection, those metrics are disabled and only those metrics that are part of the Oracle specified template are selected.

Table 4–4 lists the charts and metrics that are enabled for collection when you choose Oracle Recommended Collection.

Table 4–4 Oracle Recommended Collection Metrics

Chart	Metric
Instance Response Time	% Wait Time
	% CPU Time
	Response Time per Trans
	Transaction Count
	Commit Count
	Rollback Count
	Response Time Per Execute
	Execute Count
Instance Wait Events	Wait Time
	Count
	Number Timeouts
Sessions Waiting on Events	Count

Table 4–4 Oracle Recommended Collection Metrics

Chart	Metric	
Instance Efficiency Statistics	Cursor Cache Hits	
	Buffer Cache Hit %	
	User Call %	
	Soft Parse %	
	% Parse CPU Time	
	% Recursive CPU Time	
	% Other CPU Time	
	Library Cache Hit %	
	Memory Sort %	
	Rows/Sort	
	Maximum Sort Allocation	
	Redo No Wait %	
	Latch %	
	Hard Parse/Execute %	
	Total Table Scans/Sec	
	% Shared Pool Free	
	Executes without Parses %	
	Commit %	
	Initialization Parameters	DB_BLOCK_BUFFERS
		BUFFER_POOL_KEEP
DB_BLOCK_LRU_LATCHES		
BUFFER_POOL_RECYCLE		
LOG_BUFFER		
CURSOR_SPACE_FOR_TIME		
SESSION_CACHED_CURSORS		
OPEN_CURSORS		
TIMED_STATISTICS		
SORT_AREA_SIZE		
SORT_AREA_RETAINED_SIZE		

Table 4–4 Oracle Recommended Collection Metrics

Chart	Metric
File Statistics	Physical Reads/Sec
	Physical Writes/Sec
	Physical Block Reads/Sec
	Physical Block Writes/Sec
	Read Time
	Write Time
	Average time/Read
	Average time/Write
	Physical Blocks/Reads
	Physical Blocks/Writes
	Instance I/O Statistics Data
Physical Writes/Sec	
Logical Reads/Sec	
Blocks per Table Scan	
Avg Free Buffers Scanned	
Full Table Scan Rows ratio	
Table Scans(Long)/Sec	
Table Scans(Short)/Sec	
Rows Fetched by RowID %	
Table Scan Rows/Sec	
Network Bytes/Sec	
Summed Dirty Queue Length	
Phys Reads Direct/Trans	
Avg Dirty Queue Length	
Dirty Buffers per Free Req	
Block Changes/Sec	
Cons. Changes/Sec	
Physical Reads/Trans	
Physical Writes/Trans	
Physical Writes/Trans	

Table 4–4 Oracle Recommended Collection Metrics

Chart	Metric
Instance I/O Statistics Data (cont.)	Logical Reads/Trans
	Table Scans(Long)/Trans
	Table Scans(Short)/Trans
	Table Scan Rows/Trans
	Block Changes/Trans
	Cons. Changes/Trans
	Network Bytes/Trans
	Phys Reads Direct/Sec
	Phy Reads Direct/Trans
	Redo Size/Sec
	Redo Size/Trans
	Phys Writes Direct/Txn
	Redo Writes/Trans
	Fast Full Index Scans/Sec
	Fast Full Index Scans/Sec
	Fast Full Index Scans/Trans
	Instance Statistics Per Sec.
Free Buff Requested/Sec	
Dirty Buff Inspected/Sec	
Parses/Sec	
Hard Parses/Sec	
Executes/Sec	
Cursor Cache Count/Sec	
Cursor Cache Hits/Sec	
Cons. Gets/Sec	
Buffer is pinned/Sec	
Buffer is not pinned/Sec	
User Calls/Sec	
Recursive Calls/Sec	
Logons/Sec	

Table 4–4 Oracle Recommended Collection Metrics

Chart	Metric	
Instance Statistics Per Sec. (cont.)	Disk Sorts/Sec	
	Memory Sorts/Sec	
	Sort Rows/Sec	
	Enqueue Waits/Sec	
	Block Gets/Sec	
	Block Changes/Sec	
	Cons. Changes/Sec	
	Rollbacks/Sec	
	Commits/Sec	
	Long Table Scans/Sec	
	Short Table Scans/Sec	
	Physical Reads/Sec	
	Physical Writes/Sec	
	Session Logical Reads/Sec	
	Transactions/Sec	
	Instance Statistics Per Transaction	Free Buff Inspected/Trans
		Free Buff Requested/Trans
Dirty Buff Inspected/Trans		
Parses/Trans		
Harde Parses/Trans		
Executes Trans		
Cursor Cache Count/Trans		
Cursor Cache Hit/Trans		
Cons. Gets/Trans		
Buffer is pinned/Trans		
User Calls/Trans		
Recursive Calls/Trans		
Logons/Trans		
Disk Sorts/Trans		
Memory Sorts/Trans		

Table 4–4 Oracle Recommended Collection Metrics

Chart	Metric
Instance Statistics Per Transaction (cont.)	Sort Rows/Trans
	Enqueue Waits/Trans
	Block Gets/Trans
	Block Changes/Trans
	Cons. Changes/Trans
	Rollbacks/Trans
	Commits/Trans
	Long Table Scans/Trans
	Short Table Scans/Trans
	Redo Size/Trans
	Physical Reads/Trans
	Physical Writes/Trans
	SessionLogical Reads/Trans
	Total Table Scans/Trans
	Shared Pool
Rsvd list Request Misses	
Rsvd list Request Failures	
Shared Pool Size	
Shared Pool Rsvd Size	
Session UGA Size	
Session UGA Max Memory	
Rsvd List Alloc Hit %	
Java Pool Size	
DB Block Buffers Size	
Log Buffer Size	
Fixed SGA Size	
% Shared Pool Free	

Table 4–4 Oracle Recommended Collection Metrics

Chart	Metric
Data Dictionary Detail	Entries in Cache
	Misses/Sec
	Valid Entries
	Gets/Sec
	Scans/Sec
	ScanMisses/Sec
	ScanCompletes/Sec
	Modifications/Sec
	Flushes/Sec
	DLM_Requests/Sec
	DLM_Conflicts/Sec
	DLM_Releases/Sec
	DBWR Statistics
DBWR Free Buffers Found	
DBWR LRU Scans	
DBWR Summed Scan Depth	
DBWR Buffers Scanned	
DBWR Checkpoints	
Redo Statistics	Average Redo Write Size
	Redo Entries/Sec
	Redo Log Space Req/Sec
	Redo Synch Writes/Sec
	Redo Blocks Written/Sec
	Redo Writes/Sec
	Redo Size/Sec
	Redo Allocation Retries
Rollback Statistics	Rollback Nowait %

Table 4–4 Oracle Recommended Collection Metrics

Chart	Metric
Rollback Segment	Header Gets/Sec
	Header Waits/Sec
	Rollback Nowait %
	Active Transactions
	Shrinks/Sec
	Wraps/Sec
	Extends/Sec
	Status
	Waits Logical Reads ratio
	Size
	Writes
	OptSize
	HWMSize
	AveShrink
	AveActive
Extents	
Session Activity Counts	Count
Performance Reporting	N/A

Collecting for Performance Reporting

You can enable the collection of all performance reporting data in Capacity Planner through the Performance Reporting Data page. When you select a database as a target and you use an Oracle 9i Agent, you can select Performance Reporting in the Navigator for that database to display the Performance Reporting Data page. You can then choose from one of three options:

- Enable Collection of All Performance Reporting Data

When you select Enable Collection of All Performance Reporting Data, the collection of all critical performance metrics is initiated which allows for the generation of comprehensive reports about the performance of the database.

- Enable Collection of All Performance Reporting Data Excluding SQL

When you select **Enable Collection of All Performance Reporting Data Excluding SQL**, all of the same metrics collected in the first option are collected with the exception of SQL information. This provides for a significantly shorter but still comprehensive report by eliminating the expansive and data intensive information found in the SQL cache.

- **Disable Collection of All Performance Reporting Data**

When you select **Disable Collection of All Performance Reporting Data**, you disable the collection of all critical performance metrics. You will no longer be able to produce comprehensive performance reports with this option selected, however, you can continue to collect other historical data to create charts and perform trending.

If you selected the Oracle Recommended Collection as the option for collections for the database, Performance Reporting is automatically turned on as part of the template of metrics activated by the Oracle Recommended Collection.

Analyzing Collected Data

After collected data is loaded into the Oracle Capacity Planner historical database, you can perform a variety of analyses on it. To access the analysis features of Oracle Capacity Planner, click the **Analysis** tab (Figure 4-5) at the bottom of the Oracle Capacity Planner navigator tree view. This displays the Oracle Capacity Planner analysis view.

Figure 4-5 *Clicking the Analysis Tab*



Connecting to an Oracle Capacity Planner Historical Database

When you expand the Historical Database folder at the root of the navigator tree in analysis view, you are prompted for the logon credentials for an Oracle Capacity Planner historical database.



After you connect to a historical database, the folder expands to show the targets for which data is available in that historical database.



If you store data in multiple historical databases, you must disconnect from one historical database before you can connect to a different historical database.

To disconnect from the current historical database,

1. Click the Historical Database folder at the root of the navigator tree.
2. Click the **Disconnect** button in the Capacity Planner toolbar panel.

To connect to a different historical database, expand the Historical Database folder again and enter the credentials for the new historical database in the resulting logon dialog box.

Organization of Data in the Navigator

When you expand a target in the navigator under the Historical Database folder, two forms of data are displayed below the target:

- **Classes of data**

The classes displayed for the target are the collection classes for which data is available in the Oracle Capacity Planner historical database. You can select and view data from these classes by selecting a class in the navigator, specifying the selection criteria, and then clicking **Show New Chart**. These operations are the first step in creating an analysis.

- **Analyses**

Below each target in the navigator is an Analyses folder, which contains predefined and user-defined analyses. Predefined analyses are provided for some targets. You can create user-defined analyses by selecting a class of data, displaying an analysis of the data, and then saving the analysis. You can also create a user-defined analysis by using an existing analysis as a template, making modifications to the analysis, and then saving the analysis under a new name.

Browsing the Collected Data

To browse the collected data for a particular target:

1. In analysis view, expand the Historical Database folder.
You are prompted for the credentials for the historical database that contains the collected data that you want to analyze.
2. Enter your logon credentials and connect to the historical database.
3. On the navigator panel, expand the folder for the target whose collected data you want to analyze.

The navigator displays the:

- Names of the classes for which collected data exists in the historical database for the target
- An **Analyses** folder, which contains predefined and user-defined analyses you created for the target
- For database targets, a **User-Defined Classes** folder for any data collected from user-defined classes you created in collection view.

Viewing an Analysis for a Class of Data

To view an analysis chart for a selected class of data:

1. On the navigator panel, click the name of a class whose collected data you want to analyze.
Capacity Planner displays the property page for the class (Figure 4-6).
2. To specify the selection criteria for the class of data you want to analyze, see "Specifying Selection Criteria for a Class of Data" on page 4-38 for instructions.
3. Click **Show New Chart**.

Capacity Planner displays the Analysis window, which contains two or more pages. The Chart page displays the chart. The remaining pages are Details pages. A separate Details page exists for each class from which one or more data items are included in the analysis.

For information about the Analysis window, choose **Window** from the Analysis window **Help** menu. For information about modifying the analysis or changing the way the data is displayed, see "Working with Analyses" on page 4-42.

Saving a Class Analysis as a User-Defined Analysis

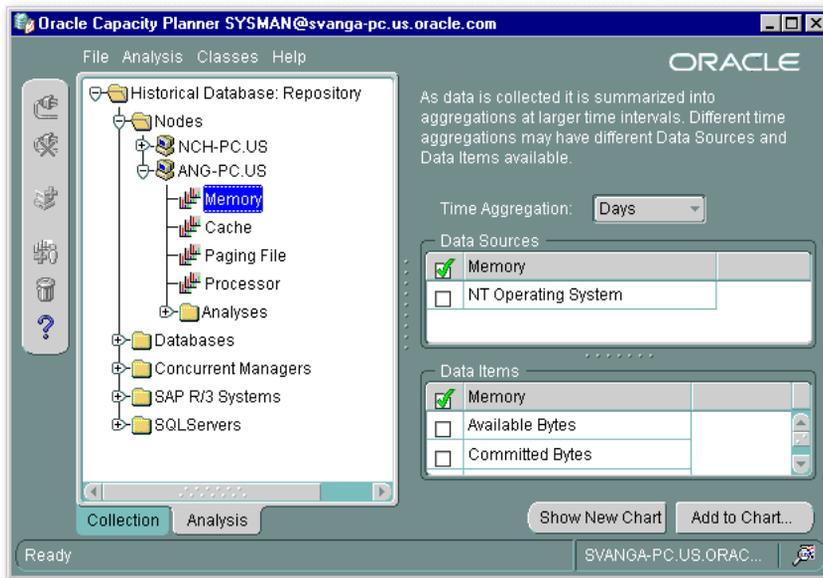
After you view an analysis for a class of data, you can save it as a user-defined analysis to view later.

To save the analysis:

1. While viewing the analysis chart, click **Save Chart** on the analysis window toolbar.
2. Click **Yes** in the message box.

Performance Manager places the new user-defined analysis in the **Analyses** folder of the navigator panel.

Figure 4–6 Oracle Capacity Planner Analysis View



Specifying Selection Criteria for a Class of Data

When you select a class in the navigator panel in analysis view, Capacity Planner displays a property sheet that contains options available for selecting data from the Oracle Capacity Planner historical database for that class.

Before you display a chart of the collected data you must:

1. Select the time aggregation level from the **Time Aggregation** drop-down list.
For example, select **Hours** if you want to analyze hourly data, **Days** if you want to analyze daily data, and so on.
2. In the **Data Sources** section, select one or more data sources whose data items you want to analyze.
3. In the **Data Items** section, select one or more data items you want to analyze.
A check mark appears next to each data item that is selected for analysis.

After you specify the selection criteria, there are two ways to display the data in an analysis chart:

- To add the selected data to a new analysis chart, click **Show New Chart**, which displays the new chart.
- To add the selected data to an analysis chart that is already displayed in the Analysis window, click **Add to Chart**, then in the Add Data to Analysis dialog box, select the name of the previously-displayed analysis chart. Note that only charts that are currently opened are displayed in the Add Data to Analysis dialog box.

Viewing and Modifying User-Defined and Predefined Analyses

You can view and modify both user-defined and predefined analyses. However, once modifications are made to a predefined analysis, the only way to save those changes is to save the analysis to a new name. This creates a new user-defined analysis and preserves the original predefined analysis.

Note: Not all targets provide predefined analyses.

To view an existing analysis, which makes it available for modification, follow these steps:

1. Expand the Analysis folder for the target, which displays the existing predefined and user-defined analyses for the target.

A bar chart icon identifies a predefined analysis. Not all targets provide predefined analyses.

A bar chart and person icon identifies a user-defined analysis. You create a user-defined analysis by displaying an analysis for a class of data or displaying a predefined analysis, and then saving the analysis.

Note: You can limit the list of displayed analyses to only user-defined analyses by removing the check mark from the **View Predefined Analyses** option on the **Analysis** menu. When you choose the **View Predefined Analyses** option on the **Analysis** menu again, the check mark preceding the menu option is replaced, and predefined analyses are displayed again.

2. Select a predefined analysis or user-defined analysis in the navigator panel.

The Analysis Summary property page for the selected analysis is displayed in the detail panel. This property page displays the names of the targets and classes whose data is used in the analysis.

3. To view the data sources and data items in the analysis, click the plus sign (+) next to the target icons in the **Service/Source** column.
4. To view the chart for the analysis, click **Show**.

Note that if you are opening a predefined analysis, Capacity Planner displays the Select Data Sources for Analysis dialog box. Predefined analyses are provided for some targets. Predefined analyses require you to specify the available data sources for your installation. Select the data sources you want to include in the predefined analysis and click **OK**.

After you have opened an analysis, you can modify the contents and how they are presented. See "Working with Analyses" on page 4-42 for more information.

You can also create a copy of an analysis, rename an analysis, or delete an analysis, as explained in the next three sections.

Creating a Copy of an Analysis

You can create an analysis that is an exact copy of an existing analysis, but the copy has a different name. To do this:

1. In analysis view, locate and expand the target that contains the analysis you want to copy.
2. Expand the **Analyses** folder.
3. Select the analysis you want to copy.
4. On the **Analysis** menu, choose **Create Like**.

5. In the Create Analysis Like dialog box, enter a unique name for the new analysis that you are creating and click **OK**.

Capacity Planner creates the new copy of the analysis in the **Analyses** folder for the target.

Renaming a User-Defined Analysis

Note: You cannot rename a predefined analysis. This restriction ensures that the original predefined analysis charts are not overwritten.

However, after you make changes to a predefined analysis, you can save the modified version of the predefined analysis as a user-defined chart with a new name. For more information, see "Saving the Results of a Predefined Analysis" on page 4-50.

To rename a user-defined chart:

1. In analysis view, locate and expand the target that contains the analysis you want to rename.
2. Expand the **Analyses** folder.
3. Select the user-defined analysis you want to rename.
A bar-chart-and-person icon identifies user-defined analyses.
4. On the **Analysis** menu, choose **Rename**.
5. In the Rename Analysis dialog box, enter a unique name for the analysis you are renaming and click **OK**.

Deleting a User-Defined Analysis

Note: You cannot delete a predefined analysis.

To delete a user-defined analysis:

1. In analysis view, locate and expand the target that contains the analysis you want to delete.

2. Expand the **Analyses** folder.
A bar-chart-and-person icon identifies the user-defined analyses in the folder.
3. Select the user-defined analysis that you want to delete.
4. On the **Analysis** menu, choose **Delete**.
5. In the message dialog box that prompts you to confirm the deletion, click **OK**.

Working with Analyses

After you have opened an analysis chart, either by selecting and showing an existing analysis or by browsing collected data to create a new analysis, the data included in that analysis is shown in the Oracle Capacity Planner Analysis window.

The Analysis window contains two or more pages. The first page is called the Chart page and it displays the analysis chart. The remaining page or pages are Details pages. A separate Details page exists for each class from which one or more data items are included in the analysis. Each Details page shows the:

- Data sources for the data items plotted in the chart
- Time aggregation level of the plotted data items
- Value of each plotted data item each time the data item was collected during the time range for the analysis

The time range for the collected data appears along the bottom of each chart, with the beginning of the time range at the left and the end of the time range at the right.

Two types of lines can appear on a chart. Each solid line plots the values of a selected data item during the specified time range. Each dashed line plots the result of a trend analysis to time or trend analysis to value. See "What Is a Trend Analysis?" on page 4-47 for more information about performing a trend analysis.

The rest of this section describes other features of the Analysis window.

Viewing the Value of a Data Point

To view the value for a data point (that is, one plotted point of a data item) on a line in an analysis chart, position the cursor over the data point. If there is a point beneath the cursor, Capacity Planner displays the date, time, and value for that data point displays in a box above the point (see Figure 4-7).

Figure 4-7 Viewing the Value of a Data Point

Selecting a Line

When you view an analysis chart, you can perform certain operations after selecting a line in the chart. Most of the available operations are started by clicking a toolbar button on the analysis window after a chart line is selected.

To select a line, click a data point on the line. When a line is selected, the description of the line is displayed in the status bar at the bottom of the window, and the appropriate toolbar buttons are enabled.

Operations available from the toolbar are also available on a context menu. To display the context menu, click the right mouse button on a data point in a line in the analysis chart.

To be sure which line is currently selected (before clicking a toolbar button), read the description of the line in the status bar.

Adding a Class of Data to an Analysis

After you open an analysis, you may want to add data from other classes to the analysis. You can use this feature to compare two different classes of data.

To add a class of data to an analysis that is currently displayed in the Analysis window:

1. Confirm that Capacity Planner is in analysis view.
2. Select from the navigator the class of data that you want to add.
3. Specify the selection criteria (as described in "Specifying Selection Criteria for a Class of Data" on page 4-38) for the class.
4. Click **Add to Chart**.
5. In the Add Data to Analysis dialog box, select the name of the chart to which you want to add the data.

You can add data items from multiple classes to an analysis, and you can select different aggregation levels and date ranges for each class.

However, data items within a single class must share the same aggregation level and date range. If you try to add additional data items from the same class to an existing chart, you will receive a prompt, warning that the chart already contains data from this class. If you click **OK**, Capacity Planner will overwrite the chart with the currently selected data, aggregation levels, and date range.

Modifying Selection Criteria from the Analysis Window

From the analysis window, you can modify the selection criteria associated with any of the classes of data included in the analysis. Modify the selection criteria using one of these methods:

- Select a line in the analysis chart and click the **Select Items** toolbar button.
- Click the right mouse button on a data point in the line and choose **Select Items** from the context menu.
- Click the **Data** tab in the analysis window (as opposed to the **Chart** tab) and click the **Select Items** toolbar button.

These actions display the Select Items dialog box, which contains the property sheet for the class of data associated with the selected line. This property sheet contains the selection criteria for that class of data, which you can modify and apply to the current analysis. See "Specifying Selection Criteria for a Class of Data" on page 4-38 for more information.

After you modify selection criteria, you can click either **Apply** or **OK** on the Analysis Options dialog box. If you click **Apply**, the changes made to the selection criteria are applied to the analysis and the updated analysis is shown. The Select Items dialog box remains displayed, and you can make other modifications to the same selection criteria, if you want. If you click **OK**, Capacity Planner applies the modifications to the analysis and closes the Select Items dialog box.

Removing a Line from a Chart

You can remove a line from an analysis chart by either of these methods:

- Select the line by clicking the right mouse button, then choose **Remove Line** from the context menu.
- Select the line, then click the **Remove Line** button on the analysis window toolbar.

These actions remove the data for the selected data item from the chart, but not from the historical database.

Excluding a Data Point from a Chart

You can exclude a data point (that is, one plotted point of a data item) from a chart. To exclude a data point, click the right mouse button on the data point and choose **Exclude Point** from the context menu.

Excluding a data point is useful if you know that the value of a particular data point is skewed. For example, if you know that a particular CPU-intensive program was not run at the usual time, you can remove the value for the % Processor Time data item for that time from the chart. The selected data point is removed from the chart, but the data for the data point is not removed from the historical database.

After you exclude one or more data points from a line, a red X appears in the status bar when you select the line.

To later redisplay excluded data points for a selected line, click **View Exclusions** on the Analysis window toolbar, or click the right mouse button on the line and select **View Exclusions** from the context menu.

These actions display the Data Point Exclusions dialog box, which displays the current list of excluded points for the selected line. You can toggle the check mark for each data point in the list. A check mark indicates that the data point is excluded from the analysis. To display an excluded data point in the analysis again, clear the check mark.

When you click **OK**, Capacity Planner closes the Data Point Exclusions dialog box and updates the chart to include the points removed from the list of exclusions.

Note: Data point exclusions are not saved with an analysis.

Showing or Hiding the Chart Legend

You can control whether or not the legend is displayed in an analysis chart by toggling the **Show/Hide Legend** button on the analysis window toolbar. When the legend is not shown, you can identify a line by clicking it, which displays the description of the line in the analysis window status bar.

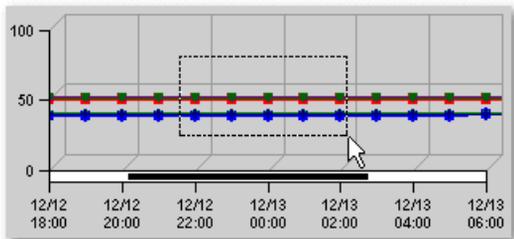
Zooming and Scrolling to View More or Less Chart Data

Depending on the date range and the number of data items and data sources you are analyzing, you may want to zoom in, zoom out, or scroll the contents of the chart window.

To view more detail or less detail, click the **Zoom In** and **Zoom Out** buttons on the Analysis Chart window toolbar. You can also zoom in by pressing the Page Down key on your keyboard or the numeric 3 on your keypad, and you can zoom out by pressing the Page Up key or the numeric 9 on your keypad.

You can also zoom in on a very specific part of the chart by dragging a rectangle around the area you want to magnify (Figure 4–8). Release the mouse button to zoom in on the selected area. You can zoom back out by using the Zoom Out button Home or End key on your keyboard.

Figure 4–8 Zooming in on a Selected Area of the Chart



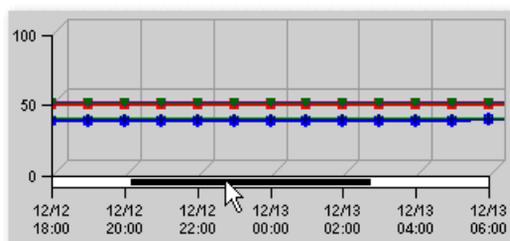
Often, the chart data will extend beyond the width of the Analysis Chart window. You can view the data that extends beyond the edges of the window by resizing the Analysis Chart window or by scrolling to the right or left.

To scroll the Analysis chart window:

1. Press and drag the pointer on the black scroll bar below the chart (Figure 4–9).
2. When the portion of the chart you want to view is displayed in the Analysis Chart window, release the mouse button.

Optionally, you can use the arrow keys on your keyboard to scroll left and right. Press the left arrow to scroll left and the right arrow to scroll right. If you experience a conflict with the Tab function using the left and right arrow keys, you can use the up and down arrow keys on your keyboard to scroll. Press the up arrow to scroll left (or the numeric 8 on your keypad), or the down arrow key to scroll right (or the numeric 2 on your keypad).

Figure 4–9 Scroll Bar in the Analysis Chart Window



Auto-Scaling Data

If an analysis contains data from different classes where the scale of the data is significantly different, you may want to apply scaling to the data. Scaling normalizes the data so that all lines have a maximum value of no greater than 100. Very large data items are scaled down, and very small data items are scaled up.

To apply scaling, click **Toggle Auto Scaling** on the analysis window toolbar. When scaling is applied to a chart, data lines with very different scales may be visually correlated. When scaling is enabled, Capacity Planner displays the label **Scaled Data** along the Y-axis of the chart. If you select a line from the chart by clicking it, the scaling factor for that line is included in the status bar.

What Is a Trend Analysis?

A trend analysis infers or estimates future values by projecting and extending known values. Oracle Capacity Planner can perform the following types of trend analyses:

- Trend analysis to a point in time

In a trend analysis to a point in time, you provide a goal time for a data item. Oracle Capacity Planner uses the specified values in the historical database to project the value of the data item at the goal time.

A trend analysis to a point in time is used to answer questions such as, "How full will this disk be at the end of the year?"

- Trend analysis to a value

In a trend analysis to a value, you provide a goal value for a data item. Oracle Capacity Planner uses the specified values in the historical database to project the time at which the data item will reach the goal value.

A trend analysis to a value is used to answer questions such as, "When will our CPU utilization reach 95 percent?"

As the default, the Capacity Planner Trend Analysis wizard uses the critical threshold for the metric (if one is defined) when you perform a trend to a value.

Specifying and Performing a Trend Analysis

To specify and perform a trend analysis, follow these steps:

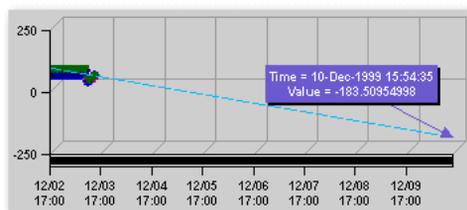
1. In the Analysis window, either:
 - Select a line by clicking a data point in the line, then click the **Trend Analysis Wizard** button on the toolbar.
 - Click the right mouse button on a data point in a line, then select **Trend Analysis Wizard** from the context menu.Both of these methods display the Trend Analysis Wizard.
2. Capacity Planner displays the **Trend Analysis Wizard Welcome panel** that identifies the selected data on which you can conduct the trend analysis. You can click on the option box that prevents the Welcome screen from displaying in subsequent uses of the wizard. Click on **Next** to move to the next wizard panel.
3. In the **Date Range panel**, select a date range to use as a basis for the trend analysis:
 - Click **Use only the visible date range (as currently zoomed in the chart)** to use the range of dates currently visible in the analysis chart window (not including any data that extends beyond the edge of the chart window).

This option is enabled only if you zoomed in to see more detail in the chart. For more information, see "Zooming and Scrolling to View More or Less Chart Data" on page 4-46.
 - Click **Use the date range selected for the chart** to use the date range currently used for all the data in the chart (even data that extends beyond the edge of the chart window).
 - Click **Select a new chart range** to select a different date range . You can designate either a recent period of time by choosing **Use a recent period of time** and then selecting the time increment and number of units of time to use, or you can specify a new start and end time by choosing **Use a new start and end time**.
 - Click on **Next** to move to the next wizard panel.

4. In the **Trend Analysis Type** panel of the wizard, specify which type of trend analysis you want to perform.
 - To perform a trend analysis to a value, click the **Estimate when the data item will reach the following value:** and enter the numeric value for which you wish to determine the date and time.
 - To perform a trend analysis to a future date and time, click **Estimate what the value of the data item will be at the following date:** and enter the time and date for which you wish to determine a value.
 - Click on **Next** to move to the next wizard panel.
5. The **Summary** panel displays the results of the trend analysis. Click on **Finish** to add the trend line to the chart.
6. Choose **Customize Annotation** from the View menu to display the Annotate Trend dialog box and make changes to the annotation. Optionally, you can right mouse button click on the annotation created by the Trend Analysis wizard and then choose **Customize Annotation** from the context menu.

Use the Annotate Trend dialog box to specify whether Capacity Planner will annotate the trend analysis (see Figure 4–10) and the appearance of the trend analysis line in the chart window. If you need information about the fields in the Annotate Trend dialog box, click **Help**.

Figure 4–10 Annotation for a Trend Analysis



7. Click **OK** to close the Annotate Trend dialog box.

Note: To move the annotation box in an analysis chart, click the box, hold the mouse button down, then move the mouse to a different position on the chart. Release the mouse button when you have reached the position in the chart where you want the annotation box displayed.

Saving Changes to a User-Defined or Predefined Analysis

You can save the changes you make to an analysis. Oracle Capacity Planner can determine if you are saving a user-defined analysis or a predefined analysis. The steps for saving your changes differ, depending on the type of analysis.

Saving the Results of a User-Defined Analysis

To save changes to a user-defined analysis:

1. While viewing the analysis, click **Save Chart** on the analysis window toolbar.
2. Click **Yes** in the message box.

Your changes are saved to in the Analysis folder for the selected target using the current name of the analysis or data class. To save the analysis under a different name, choose **Save As** from the Analysis window **File** menu.

Saving the Results of a Predefined Analysis

If you modify a predefined analysis, you must provide a new name for the analysis when you save the results of the analysis. When you do this, you create a new user-defined analysis. Saving the analysis with a new name ensures that the original predefined analysis is not overwritten.

To save the results of a predefined analysis:

1. While viewing the analysis, click **Save Chart** on the analysis window toolbar.
2. Click **Yes** in the dialog box that is displayed.
3. In the Save Analysis As dialog box, type a unique name for the user-defined analysis that will be created.
4. Click **OK** in the Save Analysis As dialog box.

Capacity Planner places the new user-defined chart in the Analyses folder of the navigator panel.

Printing an Analysis Chart

To print an analysis chart, click the **Print Chart** button in the Analysis Chart toolbar while the chart is displayed.

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 an Analysis Chart

To generate an HTML report for an analysis chart:

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

Understanding the Oracle Capacity Planner Historical Database

The logical structure of the Oracle Capacity Planner historical database schema was designed to facilitate querying of capacity planning data by tools other than Oracle Capacity Planner, such as Microsoft Excel. This section contains a brief description of the design of the Oracle Capacity Planner historical database schema. It is not intended to be a comprehensive description of all tables and columns in the schema.

Caution: Performing any modification to the Oracle Capacity Planner historical database schema (tables, columns, or indexes) or to the data itself is not recommended and is not supported. Such modifications may render your Oracle Capacity Planner historical database schema unusable as a target to load or retrieve capacity planning data.

Understanding the Service Reference Table (vp_service_ref)

The service reference table contains a list of all targets for which data has been stored in the Oracle Capacity Planner historical database. The **HOST** column contains the name of the host where the Agent that loaded data for the specified target (the **NAME** column) is located. The **SVC_ID** column is a column used for lookup into the class reference table, described in the following paragraph.

Understanding the Class Reference Table (vp_class_ref)

The class reference table contains a list of all collection classes for which data has been stored in the Oracle Capacity Planner historical database, for all targets. To see the list of classes for a particular target, a query should look for the SVC_ID column equal to a SVC_ID value from the service reference table, described in the previous paragraph. Such a query would produce a list of all classes for which data exists in the database for a particular target.

Understanding the Data Tables

Each class of data in the class reference table has six data tables that contain the data for that collection class. Each table contains data for a particular time aggregate, for example, hours, days, weeks, months, and years. The base table contains the raw data as it is collected at the collection frequency. Therefore, the base table does not contain any statistical aggregations. The aggregate tables contain aggregate statistics for each data item collected for that class.

Data Table Names

Data tables are named according to the first four columns of the class reference table (in reverse order) plus the aggregate. Example 4-1 shows an entry for a collection class in the class reference table.

Example 4-1 Collection Class Entry in the Class Reference Table

CLS_ID	MOD_ID	SVC_ID	IS_UDS	CONTAINER_CLASS_LABEL
8	2	2	0	I/O

The collection class in Example 4-1 would have the data tables shown in Example 4-2.

Example 4-2 Data Tables for a Collection Class

- VP_0_2_2_8_BASE
- VP_0_2_2_8_HOUR
- VP_0_2_2_8_DAY
- VP_0_2_2_8_WEEK
- VP_0_2_2_8_MONTH
- VP_0_2_2_8_YEAR

Data Table Contents

The first two columns of each data table are always the Timestamp column and the Data Source Name column. The Data Source Name column is essentially the class name, for example, Logical Disk. In aggregate tables (tables other than BASE), the third column is an accuracy calculation, which is not supported in this version of Oracle Capacity Planner.

All subsequent columns contain the values for the data items collected for that class, as they are actually named. In aggregate tables, these columns are prefixed with a two-character abbreviation for the aggregation statistic that the column contains. Table 4-5 shows these abbreviations and their meanings.

Table 4-5 Prefixes Used for Column Names in Aggregate Tables

Prefix	Meaning
AV	Average
SM	Sum
MN	Minimum
MX	Maximum
SD	Standard deviation
VR	Variance
CT	Count

These statistics are calculated for the set of data in that aggregate from the next lowest level. For example, a row in the DAY aggregate table contains statistics calculated for all entries in the HOUR table for that day.

Oracle e-Business Management Tools

The Oracle e-Business Management Tools (hereafter referred to as e-Business Tools) are a set of applications that enable centralized management of the complete e-Business infrastructure including the client, middle-tier HTTP servers, and database. The e-Business Tools provide a seamless monitoring, reporting, and diagnostics of the e-Business middle-tier HTTP servers.

The following HTTP server platforms are supported in Enterprise Manager release 9.0.1:

- Apache HTTP Server version 1.3.9 and higher
- Oracle *iAS* version 1.0

Release 9.0.1 of the e-Business Tools focuses on operational management which includes the reporting on, and the monitoring of the HTTP servers. All the components are controlled from and fully integrated into the Enterprise Manager console.

Monitoring Features of the HTTP Servers

The monitoring features of the HTTP servers include:

- Discovery
- Real-time Monitoring

Discovering the HTTP Server

HTTP server targets are recognized on all nodes in the system. The supported HTTP server targets are the Apache HTTP server and the Oracle *iAS* HTTP Listener.

Real-Time Monitoring of the HTTP Server

The middle-tier HTTP server I/O and HTTP server processes are monitored in real time. The e-Business Tools advanced event tests are provided for lights-out event monitoring and problem detection of the HTTP server. There are two types of event tests associated with the HTTP server:

- UpDown event test
- Threshold event tests

The HTTP Server UpDown event test checks whether the Apache HTTP server being monitored is running.

The threshold event tests are triggered by user-specified metrics. You can register events for the following metrics:

Table 5-1 HTTP Server Threshold Event Tests

Event Test	Description
Bytes per Second	This event test monitors the number of bytes transferred by the HTTP server per second. The rate is calculated depending on the frequency of the event. For example, if the event test was registered with a frequency of 100 seconds, the event test will calculate the rate by dividing the number of bytes served in that period by 100.
Requests per Second	This event test monitors the number of requests made to the HTTP server per second. The rate is calculated depending on the frequency of the event. For example, if the event test was registered with a frequency of 100 seconds, the event test will calculate the rate by dividing the number of requests in that period by 100.
Total Servers	This event test monitors the number of servers that the HTTP server has spawned to handle the incoming requests. The HTTP server increases the number of servers when there is a greater number of requests to handle and reduces the number of servers when there are fewer requests. This action maximizes the resource utilization on the system. Note: On Windows NT, servers represent the number of threads while on UNIX systems a server correlates to a process.

Reporting of HTTP Server Activity

The Apache Server Access Log Traffic report provides an overview of the daily, weekly, and monthly statistics of activity on the HTTP server. Data for this report is extracted from the Apache server log files and is viewed in HTML format.

The Apache server log files can be configured by the administrator to determine their refresh rate. The amount of data displayed in the report is dependent upon the amount of data in the log files.

Log Analysis Report Job Task

The Log Analysis Report job task analyzes the access log file for the HTTP server target and generates a report. The output is an HTML file that contains various statistics. See "Contents of Apache Server Access Log Traffic Report" for details of the report.

Contents of Apache Server Access Log Traffic Report

The Apache Server Access Log Traffic report is divided into the following sub-reports:

- **Monthly Activity Report**

This report gives top level details that allow the administrator to view information about the monthly server activity.

Table 5–2 Monthly Activity Report

Column Heading	Description
Month	Month for which the statistics are calculated
Year	Year for which the statistics are calculated
Requests	Total number of requests received by the server for the indicated month
Kbytes	Total number of kilobytes served for the indicated month
Pages	Total number of pages served for the indicated month

- **Activity by Day of Week Report**

The data for this report is cumulative and displayed by day of week (for example, Sunday, Monday, and so on) and represents the total amount of traffic

on that server for each week day. Administrators can use this report to determine which day of the week receives the most traffic.

Table 5–3 Activity by Day of Week Report

Column Heading	Description
Day	Day of the week for which the statistics are calculated
Requests	Total number of requests received by the server for the day of week
Kbytes	Total number of kilobytes served for the day of week
Pages	Total number of pages served for the day of week

- Activity by Hour of Day Report

This report displays the cumulative data that shows the amount of traffic on the server by hour of the day. Administrators can use this report to see which times of the day are their peak periods.

Table 5–4 Activity by Hour of Day Report

Column Heading	Description
Hour	Starts at midnight (00:00)
Requests	Total number of requests received by the server for the hour
Kbytes	Total number of kilobytes served for the indicated hour
Pages	Total number of pages served for the indicated hour

- Daily Activity Report

This report shows the total amount of traffic on the server for a particular day. Information includes:

Table 5–5 Daily Activity Report

Column Heading	Description
Date	Date for the displayed statistics (by day of week, date, and year)
Requests	Total number of requests received by the server for the indicated day
Kbytes	Total number of kilobytes served for the indicated day

Table 5–5 Daily Activity Report (Cont.)

Column Heading	Description
Pages	Total number of pages served for the indicated day

Charts and Chart Groups

This section describes the HTTP Server charts and chart groups available in Oracle Performance Manager. Some of these charts provide the ability to perform administrative tasks, for example, server utilization.

The HTTP Server charts are divided into classes. The classes are:

- Performance Overview
- I/O
- Server Utilization

The following sections describe these classes and their associated charts and chart groups.

Performance Overview Class

The Performance Overview class provides chart groups that describe high-level activity. The chart groups and their associated charts are:

Table 5–6 Performance Overview Class Chart Groups and Charts

Chart Groups and Charts	Description
HTTP Server at a Glance Chart Group	This chart group allows a server administrator to see how well the HTTP server is performing.
<ul style="list-style-type: none"> ■ Requests per Second 	This chart shows the rate at which the HTTP server is serving requests.
<ul style="list-style-type: none"> ■ Bytes per Second 	This chart shows the rate at which the HTTP server is serving data.
<ul style="list-style-type: none"> ■ Bytes per Request 	This chart shows the average number of bytes served for a request.
<ul style="list-style-type: none"> ■ Server Utilization 	This chart shows the relationship between busy and total available servers
I/O Chart Group	This chart group shows an overview of important I/O activities.

Table 5–6 Performance Overview Class Chart Groups and Charts (Cont.)

Chart Groups and Charts	Description
<ul style="list-style-type: none"> ■ Requests per Second 	This chart shows the rate at which the HTTP server is serving requests.
<ul style="list-style-type: none"> ■ Bytes per Second 	This chart shows the rate at which the HTTP server is serving data.
Server Utilization Chart Group	This chart group shows an overview of important server utilization activities
<ul style="list-style-type: none"> ■ Server Utilization 	This chart shows the relationship between busy and total available servers

I/O Class

The I/O class provides charts that describe I/O activity.

Table 5–7 I/O Class Utilization Class Charts

Chart	Description
Total Kilobytes Served	This chart shows the total amount of data the HTTP server has served since it was started.
Total Requests Served	This chart shows the total number of requests the HTTP server has served since it was started.
Bytes per Second	This chart shows the rate at which the HTTP server is serving data.
Requests per Second	This chart shows the rate at which the HTTP server is serving requests.
Bytes per Request	This chart shows the average number of bytes served for a request.

Server Utilization Class

The Server Utilization class provides charts that describe server activity.

Table 5–8 Server Utilization Class Charts

Chart	Description
Busy Servers	This chart shows how many servers are busy serving requests.
Idle Servers	This chart shows how many servers are not busy serving requests.

Table 5–8 Server Utilization Class Charts (Cont.)

Chart	Description
Total Servers	This chart shows how many servers are running.

Using Oracle TopSessions

This chapter discusses the following Oracle TopSessions topics:

- Overview of Oracle TopSessions
- Before You Use the Oracle TopSessions Chart
- Displaying the TopSessions Chart
- Overview of Session Activity
- Viewing Details About a Given Session
- Customizing the Session Information You Display

Overview of Oracle TopSessions

You can use Performance Manager to assist you in identifying performance bottlenecks within your system and database environment. The TopSessions chart displays database sessions that are contributing most heavily to database activity. You can display various details for these sessions, including the SQL statements, and resource usage.

You can obtain an overview of session activity by displaying the top sessions sorted by a statistic of your choosing. For any given session you can then drill down for more detail, or if you choose, you can terminate the session using the Kill Session option.

The TopSessions chart provides a methodology for identifying and correcting certain database performance problems. For example, when sudden file I/O load is detected, you can first identify the sessions contributing most to the problem and then isolate the executing SQL statements in user applications for those sessions. You can then analyze the SQL explain plans for those SQL statements to determine how best to resolve the problem.

Once populated with data, the TopSessions chart 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.

You can also access the TopSessions chart from the Enterprise Manager console by selecting TopSessions from the Diagnostics Pack tool drawer. You can access information about individual sessions via drill downs from this chart.

The TopSessions chart displays the sessions sorted by the statistic specified on the Options tab of the TopSessions property sheet. By using the Set Options button in the toolbar the chart can be customized to show only the items of interest and the sort criteria can be changed. You can specify the number of sessions to display on the Options tab as well. See "Customizing the Session Information You Display" on page 6-15 for more information about customizing the TopSessions display.

You can re-sort the sessions by clicking on the statistic column you want to use as the sort criterion. Clicking on the column header toggles the sort order in descending or ascending order. This changes only the display sort order and has no effect on the top "n" sorting/reduction done by selecting the sort item in the Options page.

The File, View, Collection, Tools and Help menus are the same as those in the chart window for Performance Manager. The Drilldown menu is customized to reflect some of the tasks specific to TopSessions.

Before You Use the Oracle TopSessions Chart

Before you can use the TopSessions chart on pre-Oracle 9i databases, you must first run a SQL script that defines the OEM_MONITOR role which contains all the privileges required to use the Diagnostics Pack products. Granting the OEM_MONITOR role is the best way to ensure that a user has the correct privileges to use the TopSessions functions. The OEM_MONITOR role has been granted more privileges in the 9i version that help to provide better functionality and performance.

For 9i databases, the SQL script, **catsnmp.sql**, is run by default as part of the 9i database creation process. For all versions of the database prior to 9i, you must manually run a SQL script to define the OEM_MONITOR role and create the necessary views.

For versions 8.1.5, 8.1.6, and 8.1.7 of the database, you must run the script **catsnmp_8i.sql**. For versions 8.0.5 and 8.0.6 of the database, you must run the script **catsnmp_80.sql**. For version 7.3.4 of the database, you must run script

catsnmp_734.sql. The selected script must be executed by a user with SYS privileges.

The sql files are located in the Oracle home of the Oracle Enterprise Manager installation, \$ORACLE_HOME/SYSMAN/ADMIN. You must run the appropriate version of the SQL script manually on all pre-9i databases.

The OEM_MONITOR role must be granted to any user wishing to use the Oracle Diagnostics Pack. Performance Manager does not require any of these new views in order to run, but if you attach to a database that does not have the views, or your process does not have the required privileges, or the OEM_MONITOR role does not exist, then an informational message displays.

Displaying the TopSessions Chart

You can display the TopSessions chart from the Oracle Enterprise Manager console, from the **Start** menu, or from within Performance Manager.

Displaying the TopSessions Chart from the Console

You can display the TopSessions chart from the Oracle Enterprise Manager console in any of the following ways:

- On the Oracle Enterprise Manager console, point to the **Diagnostics Pack** drawer, then click **TopSessions**.
- On the **Tools** menu of the Oracle Enterprise Manager console, point to **Diagnostics Pack**, then click **TopSessions**.
- Click the right mouse button on the **target node** for which you want to display the TopSessions chart and then choose **TopSessions** from the **Related Tools** menu item on the context menu.

Starting TopSessions from the Start Menu

On the **Start** menu, follow the path: **Start=>Programs=>ORACLE - \$Oracle _Home=>Diagnostics Pack=>TopSessions**.

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

When you launch TopSessions from the Start menu, a database logon dialog box appears. By default, you are connected to the database via Direct Connect, allowing the application to run in Standalone mode. You can change the connection details from the logon dialog to connect to an OMS if you choose.

Displaying TopSessions in Performance Manager

You can display the TopSessions chart from within Performance Manager by following these steps:

1. Point to the database for which you want to display TopSessions in the Performance Manager navigator and then choose **TopSessions** from the list of available charts.

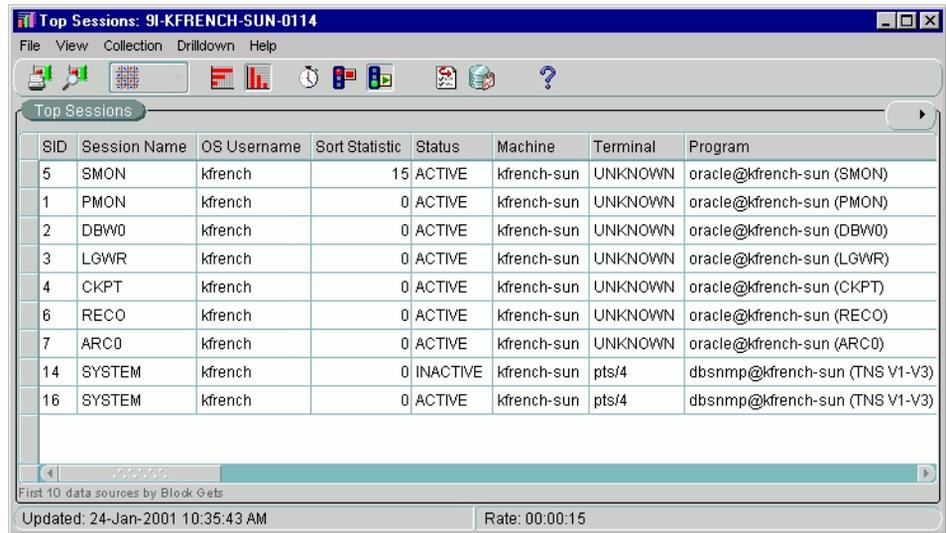
The Data Tab appears in the right-side pane.

2. Choose the data sources from the list that appears in the top panel of the Data Tab.
3. Select the collection types you want to display from the list at the bottom panel of the Data Tab.
4. To filter the sessions you want to display, click on the Session Filtering Tab. Filtering allows you to reduce the number of sessions returned by specifying criteria that a session must meet in order to be considered part of the sample set. For more information about the Session Filtering function, see "Session Filtering Options Page" on page 6-17.
5. To limit the number of data sources and to set the sort order for the chart, click on the Options Tab.
6. To display the TopSessions chart, click on the Show Chart button at the bottom of the panel.
7. To record the chart activity, click on the Record Chart button at the bottom of the panel to bring up the Recording Parameters dialog box.

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 6-15 for more information about using the Options property sheet.

Figure 6-1 shows the Oracle TopSessions chart.

Figure 6–1 Oracle TopSessions Chart



As Figure 6–1 shows, the Oracle TopSessions chart includes the following components:

- Menu bar
- Toolbar

The following sections describe each of these components.

Oracle TopSessions Menu Bar

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

- File
- View
- Collection
- Drilldown
- Help

File Menu

The File menu on the Charts display window has the following options:

- **Print Screen**
Prints the displayed TopSessions chart.
- **Report Chart**
Generates a report for the TopSessions chart. When you click the Report Chart button, Performance Manager creates a TopSessions chart report in HTML format and saves it for you. You can also preview the report by displaying it in your Web browser.
- **Close**
Closes the displayed TopSessions chart.

View Menu

The View menu on the Charts display window has the following options:

- **Table**
Changes the current display to a table chart. Table charts present text information, or a large number of instances, in a format that is easy to review.
- **Horizontal Orientation**
Changes the chart orientation to horizontal.
- **Vertical Orientation**
Changes the chart orientation to vertical.

Collection Menu

The Collection menu on the Charts display window has the following options:

- **Pause Chart/Resume Chart**
Allows you to stop or resume collections for the chart displayed in the chart window.
- **Refresh Rate**
This option lets you set the amount of elapsed time between data samples. The maximum interval is one day and the minimum is one second.
Choose one or all of the following:

- Hours - maximum is 23 hours
- Minutes - maximum is 59 minutes
- Seconds - maximum is 59 seconds
- 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.

Drilldown Menu

The Drilldown menu shows the same items available from the Performance Manager chart window as well as available drilldowns for the selected sessions. The drilldowns available depend on the tools available on your system. If you choose Session Details from the Drilldown menu when no session is selected in the TopSessions chart, Performance Manager displays the Select Data Source dialog box where you can select from a list of data sources. After you choose the data sources, the Session Details window appears.

The Drilldown menu in the TopSessions chart also includes items specific to TopSessions. You can end a user session that you select on the TopSessions chart by choosing Kill Session from the Drilldown menu. When you kill a session, the session is removed from the chart. If a Session Detail window is open when you kill its session, the Session Detail window stops refreshing and reports an error.

Note: If the Tuning Pack is installed, Current SQL and Explain Plan appear on the Drilldown menu.

The Drilldown menu on the TopSessions chart has the following options:

- Historical Data
Displays the Oracle Capacity Planner Database Logon dialog box. Supply the user name, password, and target information as needed. Once you have logged into Capacity Planner, you can display historical data for this chart or start collecting historical data.
- Session Details
Displays the Session Details window for the session selected from the Oracle TopSessions chart. This menu item is disabled when no session in the Oracle TopSessions main display has been selected.

- Current SQL
- Open Cursors for this Session
- Timed Statistics
- List of Drill-Down Charts

List of chart statistics for which you can view additional information (charts).

- Kill Session

You can kill a session from the Top Sessions chart. This tool requires the Intelligent Agent release 8.0.6 or higher.

- Turn SQL Trace On
- Turn SQL Trace Off
- Tune SQL Statement

Highlight an item in a Top Sessions chart and choose the Tune SQL statement menu option. If the Tuning Pack is installed, this action activates the SQL Analyze application.

Help Menu

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

Toolbar

The toolbar of the Oracle TopSessions chart contains icons representing certain Oracle TopSessions menu items, including the following:

Print Screen

Prints the displayed chart.

Report Chart

Generates a report for the displayed chart. When you click the Report Chart button, a chart report in HTML format is automatically created and saved for you. Performance Manager allows you to preview the report by displaying it on your screen.

Chart Type

Changes the current display to the chart type you select from the drop-down list. You can select a bar chart, pie chart, strip chart, or table chart. Bar charts show discrete measurements at the current time. Pie charts show the relationship or proportions of parts to a whole. Strip charts show trends or changes in data over a period of time. When you first display a Strip chart, you will notice the addition over time of tics at the bottom of the chart. Each point represents a polling event. Table charts present text information, or a large number of instances, in a format that is easy to review.

Horizontal Orientation

Changes the chart orientation to horizontal.

Vertical Orientation

Changes the chart orientation to vertical.

Refresh Rate

Allows you to set the time between collections. The time can be set in hours, minutes, and seconds.

Pause Chart

Allows you to stop the collection for a chart displayed in the chart window.

Resume Chart

Allows you restart the collection of a chart displayed in the chart window.

Options

Allows you to choose the data sources, data, sort criteria, and number of rows to display for the collection.

Historical Data

Displays the Oracle Capacity Planner Database Logon dialog box. Supply the user name, password, and service information as needed. Once you have logged into Capacity Planner, you can display historical data for this chart or start collecting historical data.

Start Recording

Starts recording the current TopSessions Chart.

Stop Recording

Stops recording the current TopSessions Chart.

Help on Chart

Displays help about the TopSessions chart.

Overview of Session Activity

Once populated with data, the Oracle TopSessions chart 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 listed in Table 6-1.

Table 6-1 *TopSessions Sort Statistics*

Sort Statistic	Description
Recursive CPU	Amount of CPU used for parsing row cache statements such as lookups in the data dictionary, executing triggers, and PL/SQL.
Parse CPU	Amount of CPU time spent parsing SQL statements. The Parse CPU filter represents the percentage of CPU time spent parsing SQL statements. Parse time CPU can be a strong indication that an application has not been well tuned. High parse time CPU usually indicates that the application may be spending too much time opening and closing cursors or is not using bind variables.
Total CPU Time	Total elapsed time (in seconds) spent parsing, executing, and fetching during a session.
Execute Time	Total elapsed time (in seconds) for all calls (user and recursive) associated with a distinct session.
Rollback Count	Total number of times users manually issue the ROLLBACK statement or an error occurs during a user's transactions during the sample period.

Table 6–1 TopSessions Sort Statistics

Sort Statistic	Description
Commit Count	Total number of user commits performed during the sample period. When a user commits a transaction, the redo generated that reflects the changes made to database blocks must be written to disk. Commits often represent the closest thing to a user transaction rate.
SPID	Server Process Identifier is a unique value given to each database server process. You must specify an exact id number for the filter to work.
Logical Reads (%)	Percentage of total buffer gets that were attributed to this session during the sample period. Default is 10%.
Physical Reads (%)	Percentage of database blocks read from disk. Also known as "disk reads." Default is 10%.
Logon Time	Time of logon by this session (filter includes sessions that started before a user-defined date and time). To set the date and time, double click on a piece of the timestamp and use the up/down arrows to increase or decrease the value. The default timestamp is the current date and time.
UGA Memory	Total amount of memory used by the User Global Areas for a session.
Parse Elapsed Time	Total elapsed time (in seconds) for all parses associated with a distinct session.
Action	The name of the action being performed by the application module that first executed this statement. This name can be optionally set by using <code>DMBS_APPLICATION_INFO.SET_ACTION</code> .
Module	The name of the application module that first executed this statement. This name can be optionally set by using <code>DMBS_APPLICATION_INFO.SET_MODULE</code> .
Program	The name of the client program. (Useful when the program name is known and is distinct from other programs.)
Terminal	The operating system terminal name (useful for character mode applications).
Machine	The operating system machine name.

Table 6–1 TopSessions Sort Statistics

Sort Statistic	Description
OS Username	The name of the operating system client user. (Useful in a two tier architecture when the database client process does not live on a middle tier machine but initiated by the user on his desktop, or initiated on a UNIX machine. For desktop initiated processes, the Windows registry key USERNAME must be set to the username.)
Session Name	Either the Oracle username of the current session or if the session is owned by an Oracle background process, the name of the background process.
Total Parses	Total number of parse calls (hard and soft). A parse occurs when a SQL statement is mapped to a cursor during a session.
Hard Parses	Hard parses happen when the server parses a query and cannot find an exact match for the query in the library cache. Hard parses can be avoided by sharing SQL statements efficiently. The use of bind variables instead of literals in queries is one method to increase sharing.
Sort Rows	Total number of rows sorted.
Memory Sorts	Number of sorts with no disk writes. Sorts in memory are sorts that could be performed completely within the sort buffer in memory without using the temporary tablespace segments.
Disk Sorts	Sorts on disk are sorts too large to be performed entirely in the sort area, requiring I/O to temporary segments on disk.
Constant Changes	The number of times a database block has applied rollback entries to perform a consistent read on the block.
Block Changes	The number of times changes were made to blocks in the SGA as part of an update or delete. These are changes that are generating redo log entries and hence will be permanent changes to the database if the transaction is committed.
Phys Reads	This data item represents the number of data blocks read from disk during this sample period. When a user performs a SQL query, Oracle will try to retrieve the data from the database buffer cache (memory) first, then go to disk if it is not in memory already. Reading data blocks from disk is much more expensive than reading the data blocks from memory. The goal with Oracle should always be to maximize memory utilization.
Constant Gets	Total number of requests for information on constants in the data dictionary cache.

Table 6–1 TopSessions Sort Statistics

Sort Statistic	Description
Block Gets	Total number of requests for information on blocks in the data dictionary cache in CURRENT mode. When Oracle processes a user request for data it checks to see if the database blocks containing the requested data are in the memory (the database buffer cache) first. If so, Oracle checks to see if the data in those blocks is "up to date". If they are, Oracle will fulfill the request using the data blocks in memory. If they aren't in memory, Oracle will retrieve them from disk. This is less efficient, but necessary. If Oracle was able to retrieve the blocks from memory without having to apply rollback data for consistency, each block retrieved will log a db block get.

Using the Right Mouse Button on the Main Display

In the Oracle TopSessions chart, you can click on a username with the right mouse button and then select one of the menu items that appears in the context menu. The list contains the Print Screen, Report Chart, and Help on Chart menu items, and then lists the View, Collection, and Drilldown menus from which you can then select related items from the flyout menus.

Sorting the Order of Entries in the Chart

By default, the value of the sort statistic determines the order of session entries in the Oracle TopSessions chart. 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.

Using the Chart Status Button

Use the Chart Status button in the upper right corner of the TopSessions chart to access many of the same options available from the Drilldown menu. You can display Advice about the current chart, view the Session Details page, kill the current session, and turn SQL Trace on or off. The contents of the menu that displays when you press the Chart Status button is subject to the context of the chart.

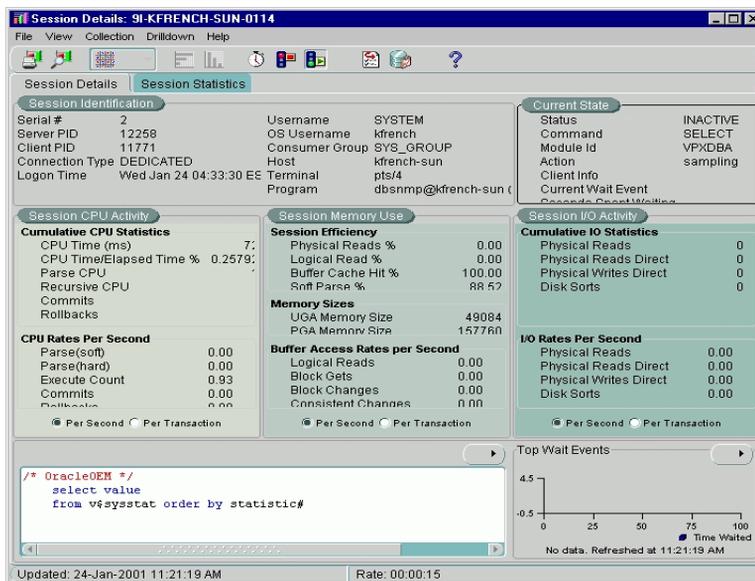
Viewing Details About a Given Session

To obtain more information about a given session, you can drill down by right mouse clicking on a session in the Oracle TopSessions chart. Click on the Drilldown

menu item and choose Session Details. Optionally, you can select a session and then choose Session Details from the Drilldown menu on the menu bar.

A Session Details window for that session appears as seen in Figure .

Figure 6–2 TopSessions Details window



Session Details Page

The Session Details page presents a tabular view of a sessions details and includes the following sections:

- Session Identification Information
- Current State
- Session CPU Activity
- Session Memory Use
- Session I/O Activity
- Current SQL
- Top Wait Events

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.

Figure 6–3 Session Statistics Page

Name	Value	Class
write clones created in foreground	0	8
write clones created in background	0	8
work area memory allocated (KB)	0	64
work area executions - optimal size	0	64
work area executions - one pass size	0	64
work area executions - multipasses size	0	64
user rollbacks	0	1
user commits	0	1
user calls	2157	1
Unnecessary process cleanup for SCN batching	0	32
transaction tables consistent reads - undo records applied	0	128
transaction tables consistent read rollbacks	0	128
transaction rollbacks	0	128
transaction lock foreground wait time	0	128
transaction lock foreground requests	0	128
transaction lock background get time	0	128
transaction lock background gets	0	128
total number of slots	0	8
total file opens	0	8
table scans (short tables)	4	64
table scans (rowid ranges)	0	64
table scans (long tables)	0	64

Updated: 24-Jan-2001 11:24:18 AM Rate: 00:00:15

For information about the statistics that can be displayed for a session, see the *Oracle Server Reference*. For information on how to make use of these statistics, see *Oracle Server Tuning*.

Customizing the Session Information You Display

To customize how session information is displayed in the Oracle TopSessions chart, choose Options from the Collection menu or click on the Options button on the toolbar. The Options property sheet that appears includes the following pages:

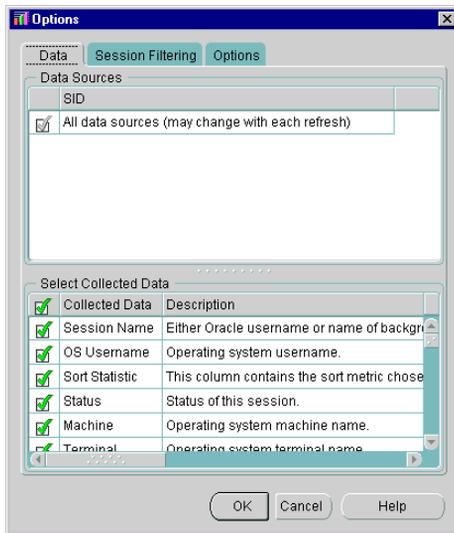
- Data
- Session Filtering
- Options

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

Data Options Page

When TopSessions is selected from the Oracle Performance Manager navigator tree, the Data Tab appears in the right-hand pane. The Data Tab presents information about the selected TopSessions collection such as the Data Sources and the collection types of the selected data. You can personalize the Data Tab view by selecting or deselecting the collected data items.

Figure 6–4 TopSessions Data Options Page



Data Sources

The "All data sources" option is selected by default.

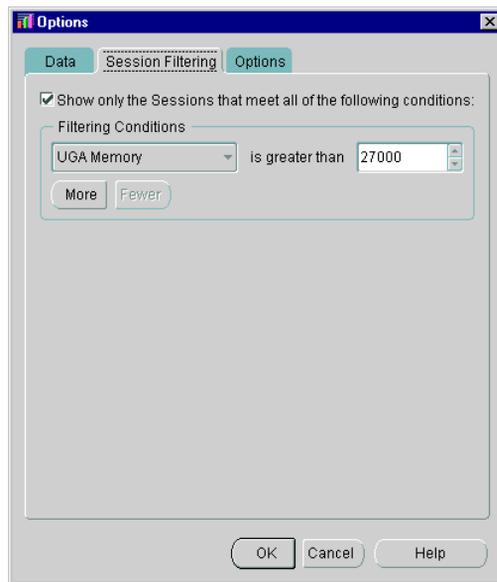
Select Collected Data

You can specify which data items should appear in the chart by selecting or deselecting the items in this list. By default, a check mark appears in the "Collected Data" row, all data items will automatically appear in the chart.

Session Filtering Options Page

By default, a TopSessions collection will show any session that is currently active or any session that has executed a SQL statement since the last sample. These sessions are selected based on a default set of pre-defined filters. If you prefer, you can also customize the TopSessions collection by defining your own set of TopSessions filters. The TopSessions Filtering tab allows you to specify your own set of filters.

Figure 6–5 TopSessions Session Filtering Page



To enable the filtering options, check the box labeled: **Show only the statements that meet all of the following conditions**. Select a filtering condition and value, then click the **More** button to add additional filters. You can eliminate filters by pressing the **Fewer** button.

Creating a Customized TopSessions Collection

Before you create your own set of TopSessions filters, it is important to note the following filtering restrictions:

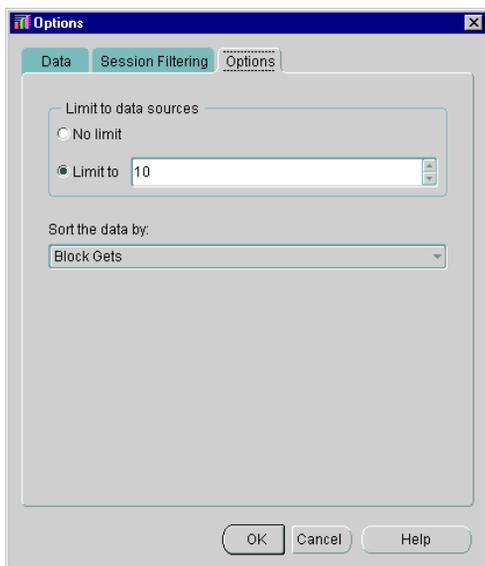
- You can only include one value per filter.
- Adding additional filters may negate previously defined filters.

For a complete list of filtering conditions and their descriptions, see Table 6-1, "TopSessions Sort Statistics" on page 6-10.

Options Page

The Options tab provides two display options. These options should be set prior to showing the TopSessions chart. You can also change the options after starting the chart to reduce the number of sessions to a smaller sample set based upon some abnormality you see in the default chart.

Figure 6-6 TopSessions Options Page



- **Limit to data sources:**
 - No limit--The TopSessions chart will display all of the statements that meet the filtering criteria(n).
 - Limit to--By default the TopSessions chart will only display the top 25 statements that meet the filtering criteria(n). You can, however, view more or fewer statements by adjusting this number.
- **Sort the data by:**

This option allows you to specify a sorting parameter. When the chart is displayed, the data items will be organized by the sorting parameter you have specified. The chart is sorted by disk reads by default.

Using Oracle Trace Data Viewer

Oracle Trace Data Viewer (hereafter referred to as Data Viewer) is an Oracle Enterprise Manager application that allows you to view formatted data collected by the Oracle Trace command line interface. For more information about using the command line interface to collect data, see the *Oracle9i Database Performance Guide and Reference*.

This chapter includes the following:

- Overview
- Usage Scenarios for Data Viewer
- Starting Data Viewer
- Using Data Viewer
- Using the Data View Wizard
- Data Viewer Problems
- Isolating an Oracle Trace Problem

Overview

An Oracle Trace server collection typically contains a large volume of valuable information that can be used for troubleshooting and investigating SQL or wait activity and resource utilization. Data Viewer handles the complex task of extracting data and aggregating key server performance metrics on a large Oracle Trace collection. Once you select an Oracle Trace collection, you can have Data Viewer compute SQL or Wait statistics or both.

Once you select an Oracle Trace collection, Data Viewer runs through all of the Oracle Trace formatter tables, extracting, processing, and aggregating key

performance metrics. This processed data is presented in a comprehensive set of Oracle Trace predefined data views.

A **data view** is the definition of a query into the formatted data collected by Oracle Trace. A data view consists of items or statistics to be returned and, optionally, a sort order and limit of rows to be returned.

With the data views provided by Data Viewer, you can:

- Examine important statistical data, for example, elapsed times
- Drill down as needed to get additional details about the data

If you want to define your own data views, you can use the Oracle Trace Data View Wizard.

Usage Scenarios for Data Viewer

Using Data Viewer you can:

- Look at Oracle Server SQL statistics

Data Viewer provides predefined data views that can accelerate the process of identifying poorly performing SQL statements. Oracle Server SQL data views are grouped by categories. Some specific data views include:

- Elapsed Time statistics

Average Elapsed Time (sorts SQL by greatest average elapsed time per execution of queries within the collection)

- Sort statistics

Sorts in memory and sorts on disk and number of rows sorted

- I/O statistics

Disk Reads/Logical Reads Ratio (sorts SQL by worst disk to logical I/O data buffer cache hit rate)

- View Logical and Physical Transaction level statistics
- View Wait statistics

Starting Data Viewer

You can access Data Viewer in the following ways:

- From the Oracle Enterprise Manager program group

- From the Start menu

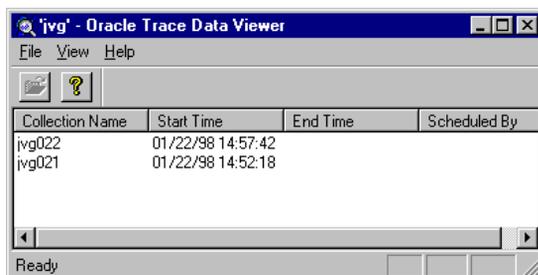
Note: Oracle Trace data must be formatted before you can use Data Viewer.

The following sections explain how to use these methods.

Starting Data Viewer from Oracle Enterprise Manager

To start Data Viewer from Oracle Enterprise Manager, either click on Trace Data Viewer from the Diagnostics Pack drawer or select Tools=>Diagnostics Pack=>Trace Data Viewer. The Oracle Trace Data Viewer Login box appears. Provide login information to connect to a schema containing formatted collections. Data Viewer displays all collections formatted to the schema (see Figure 7-1).

Figure 7-1 Data Viewer Collection Screen



Decide which formatted collection you want to investigate and double-click on the collection name. The Work in Progress dialog box appears.

Starting Data Viewer from the Start Menu

To start Data Viewer from the Start menu, select Start=>Programs=>ORACLE_HOME=>Diagnostics Pack=>Trace Data Viewer.

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

The Oracle Trace Data Viewer Login box appears. Provide login information to connect to a schema containing formatted collections. Data Viewer displays all collections formatted to the schema (see Figure 7-1).

Decide which formatted collection you want to investigate and double-click on the collection name. The Work in Progress dialog box appears.

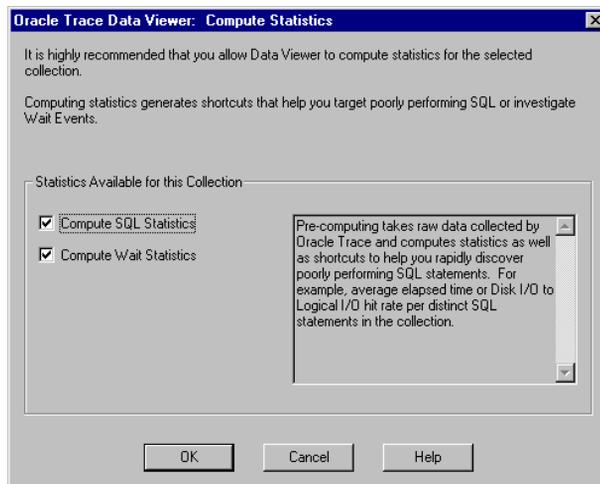
Using Data Viewer

The first time a collection is accessed by Data Viewer, the Compute Statistics dialog box appears. At this time, Data Viewer can compute SQL and Wait statistics.

Computing Statistics – Preparing Data for Fast Access and Analysis

The first time you run Data Viewer on a formatted collection containing Oracle Server data, Data Viewer asks whether you want to calculate SQL statistics, Wait statistics, or both (see Figure 7-2).

Figure 7-2 Compute Statistics



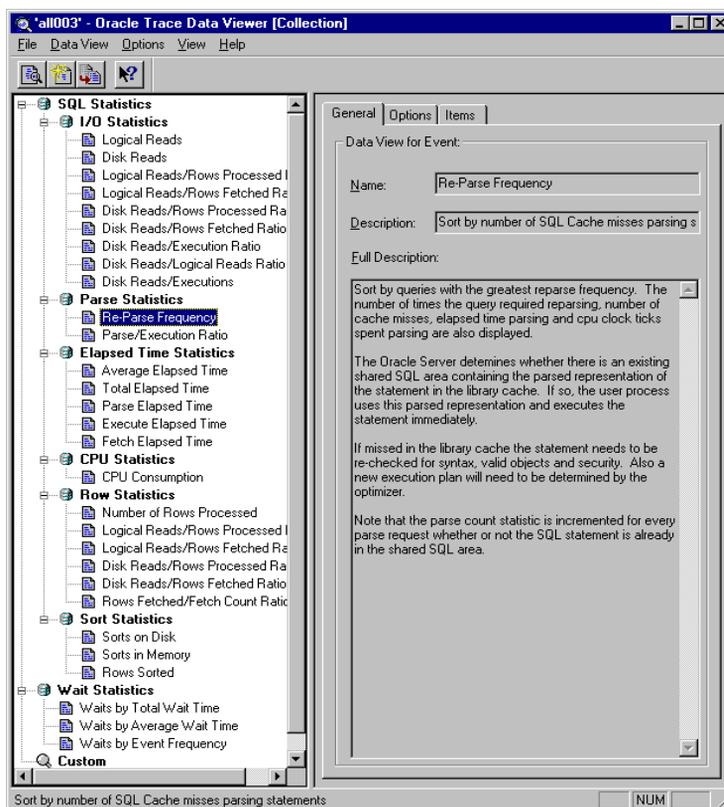
This step prepares the data for fast access and simplified problem analysis. Oracle Corporation **strongly** recommends that you allow this processing to occur.

Note: For large collections, the Computing Statistics step is time consuming. Oracle Corporation recommends that you perform this step at off-peak times.

Displaying Data Views

Data Viewer displays the predefined data views for a collection, as shown in Figure 7-3.

Figure 7-3 List of Predefined Data Views



Depending on the events collected, the predefined data view list will vary. For example, the Oracle Server collection will contain predefined data views appropriate for data collected in an Oracle Server collection.

Note: Predefined data views reflect statistics computed for all occurrences of a distinct query within the collection (see Table 7-1.)

If the Oracle Trace ALL class was used for the collection, Wait events will also display in the navigator tree. Unless you need to examine wait events, Oracle Corporation suggests that you collect data for the DEFAULT or EXPERT class to minimize the amount of data collected.

Table 7-1 Predefined Data Views Provided By Oracle Trace

View Name	Sort By	Data Displayed	Description
Logical Reads	Total number of logical reads performed for each distinct query.	Total number of blocks read during parses, executions and fetches. Logical reads for parses, executions and fetches of the query.	Logical data block reads include data block reads from both memory and disk. Input/output is one of the most expensive operations in a database system. I/O intensive statements can monopolize memory and disk usage causing other database applications to compete for these resources.
Disk Reads	Queries that incur the greatest number of disk reads.	Disk reads for parses, executions, and fetches.	Disk reads also known as physical I/O are database blocks read from disk. The disk read statistic is incremented once per block read regardless of whether the read request was for a multiblock read or a single block read. Most physical reads load data, index, and rollback blocks from the disk into the buffer cache. A physical read count can indicate a high miss rate within the data buffer cache.
Logical Reads/Rows Fetched Ratio	Number of logical reads divided by the number of rows fetched for all executions of the current query.	Total logical I/O. Total number of rows fetched.	The more blocks accessed relative to the number of rows actually returned the more expensive each row is to return. Can be a rough indication of relative expense of a query.
Disk Reads/Rows Fetched Ratio	Number of disk reads divided by the number of rows fetched for all executions of the current query.	Total disk I/O. Total number of rows fetched.	The greater the number of blocks read from disk for each row returned the more expensive each row is to return. Can be a rough indication of relative expense of a query.

Table 7–1 Predefined Data Views Provided By Oracle Trace (Cont.)

View Name	Sort By	Data Displayed	Description
Disk Reads/Execution Ratio	Total number of disk reads per distinct query divided by the number of executions of that query.	Total disk I/O. Logical I/O for the query as well as the number of executions of the query.	Indicates which statements incur the greatest number of disk reads per execution.
Disk Reads/Logical Reads Ratio	Greatest miss rate ratio of disk to logical reads.	Individual logical reads. Disk reads for the query as well as the miss rate.	The miss rate indicates the percentage of times the Oracle Server needed to retrieve a database block on disk as opposed to locating it in the data buffer cache in memory. The miss rate for the data block buffer cache is derived by dividing the physical reads by the number of accesses made to the block buffer to retrieve data in consistent mode plus the number of blocks accessed through single block gets. Memory access is much faster than disk access; the greater the hit ratio, the better the performance.
Re-Parse Frequency	Queries with the greatest reparse frequency.	Number of cache misses. Total number of parses. Total elapsed time parsing. Total CPU clock ticks spent parsing.	The Oracle Server determines whether there is an existing shared SQL area containing the parsed representation of the statement in the library cache. If so, the user process uses this parsed representation and executes the statement immediately. If missed in the library cache, the statement needs to be re-checked for syntax, valid objects, and security. Also a new execution plan will need to be determined by the optimizer. Note that the parse count statistic is incremented for every parse request whether or not the SQL statement is already in the shared SQL area.
Parse/Execution Ratio	Number of parses divided by the number executions per statement.	Individual number of parses. Number of executions.	The count of parses to executions should be as close to one as possible. If there are a high number of parses per execution then the statement has been needlessly reparsed. This could indicate the lack of use of bind variables in SQL statements or poor cursor reuse. Reparsing a query means that the SQL statement has to be re-checked for syntax, valid objects and security. Also a new execution plan will need to be determined by the optimizer.
Average Elapsed Time	Greatest average time spent parsing, executing and fetching on behalf of the query.	Individual averages for parse, execution and fetch.	The average elapsed time for all parses, executions and fetches-per-execution are computed, then summed for each distinct SQL statement in the collection.

Table 7–1 Predefined Data Views Provided By Oracle Trace (Cont.)

View Name	Sort By	Data Displayed	Description
Total Elapsed Time	Greatest total elapsed time spent parsing, executing and fetching on behalf of the query.	Individual elapsed times for parses, executions and fetches.	The total elapsed time for all parses, executions and fetches are computed, then summed for each distinct SQL statement in the collection.
Parse Elapsed Time	Total elapsed time for all parses associated with a distinct SQL statement.	SQL cache misses. Elapsed times for execution and fetching. Total elapsed time.	During parsing the Oracle Server determines whether there is an existing shared SQL area containing the parsed representation of the statement in the library cache. If so, the user process uses this parsed representation and executes the statement immediately. If missed in the library cache, the statement needs to be rechecked for syntax, valid objects and security. Also a new execution plan will need to be determined by the optimizer.
Execute Elapsed Time	Greatest total elapsed time for all executions associated with a distinct SQL statement.	Total elapsed time. Individual elapsed times for parsing and fetching.	The total elapsed time of all execute events for all occurrences of the query within an Oracle Trace collection.
Fetch Elapsed Time	Greatest total elapsed time for all fetches associated with a distinct SQL statement.	Number of rows fetched. Number of fetches. Number of executions. Total elapsed time. Individual elapsed times for parsing and executing.	The total elapsed time spent fetching data on behalf of all occurrences of the current query within the Oracle Trace collection.
CPU Statistics	Total CPU clock ticks spent parsing, executing and fetching on behalf of the SQL statement.	CPU clock ticks for parses, executions and fetches. Number of SQL cache misses and sorts in memory.	When SQL statements and other types of calls are made to an Oracle Server, a certain amount of CPU time is necessary to process the call. Average calls require a small amount of CPU time. However, a SQL statement involving a large amount of data, a runaway query, in memory sorts or excessive reparsing can potentially consume a large amount of CPU time. Note that CPU time displayed is in terms of the number of CPU clock ticks on the operating system housing the database.
Number of Rows Returned	Greatest total number of rows returned during fetch for the SQL statement.	Number of rows returned during the fetch operation as well as the execution rows.	Targets queries that manipulate the greatest number of rows during fetching. May mean that high gains can be made by tuning row intensive queries.

Table 7-1 Predefined Data Views Provided By Oracle Trace (Cont.)

View Name	Sort By	Data Displayed	Description
Rows Fetched/Fetch Count Ratio	Number of rows fetched divided by the number of fetches.	Individual number of rows fetched. Number of fetches.	This ratio shows how many rows were fetched at a time. It may indicate the level to which array fetch capabilities have been utilized. A ratio close to one may indicate an opportunity to optimize code by using array fetches.
Sorts on Disk	Queries that did the greatest number of sorts on disk.	Sort statistics for SQL statements. Number of in memory sorts. Total number of rows sorted.	Sorts on disk are sorts that could not be performed in memory, therefore they are more expensive since memory access is much faster than disk access.
Sorts in Memory	Queries that did the greatest number of sorts in memory.	Sort statistics for SQL statements. Number of disk sorts. Total number of rows sorted.	Sorts in memory are sorts that could be performed completely within the sort buffer in memory without using the temporary tablespace segments.
Rows Sorted	Queries that sorted the greatest number of rows.	Number of in memory sorts. Number of sorts on disk.	Returns sort statistics for SQL statements ordered by queries that sorted the greatest number of rows.
Waits by Total Wait Time	Highest total wait time per distinct type of wait.	Average wait time, total wait time and number of waits per wait type.	Waits are sorted by wait description or type that had the greatest cumulative wait time for all occurrences of the wait type within the collection.
Waits by Average Wait Time	Highest average wait time per wait type.	Average wait time, total wait time and number of waits per wait type.	Waits are sorted by wait type that had the greatest average wait time for all occurrences of the wait type within the collection.
Waits by Event Frequency	Frequency of waits per wait type.	Number of waits per wait type, average wait time, and total wait time.	Waits are sorted by wait events or wait descriptions that appear most frequently within the collection.

Accessing the Definition of a Data View

To access the definition for each data view, click on the data view name listed in the Data View Name column, for example, Disk Reads/Logical Reads Ratio. The description of the statistical data returned from the data view is on the General property page located on the right pane of the screen as shown in Figure 7-4. More details are shown in the Items and Options pages.

- **General**

Displays the name, short description, and full description of the data view. For the Oracle Server predefined data views, the name reflects the name of the event. The full description is usually used to indicate what type of information

is displayed in a data view and when it would be appropriate to use the data view.

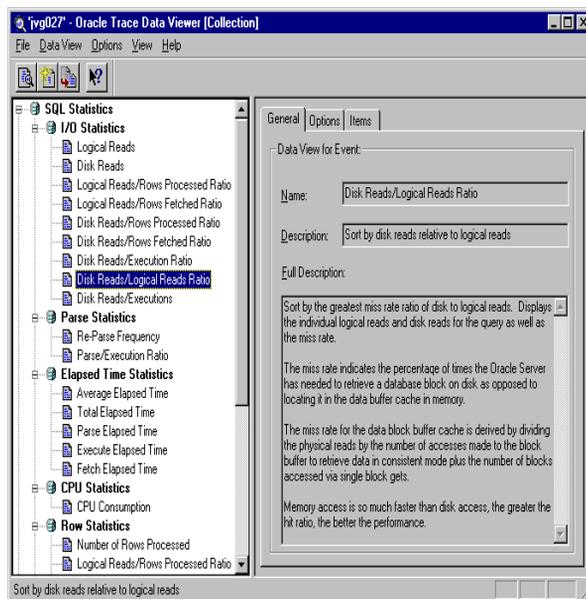
- Options

Shows which statistics will be used to determine sort order, if any. Also displays the number of rows that will be selected by the data view. Limiting the number of rows to be retrieved and displayed can accelerate the display of the data.

- Items

Lists the statistics that will be displayed by the currently selected data view, as well as all possible statistics for the data view.

Figure 7-4 Predefined Data View - Disk Reads/Logical Reads Ratio



Viewing Data in a Data View

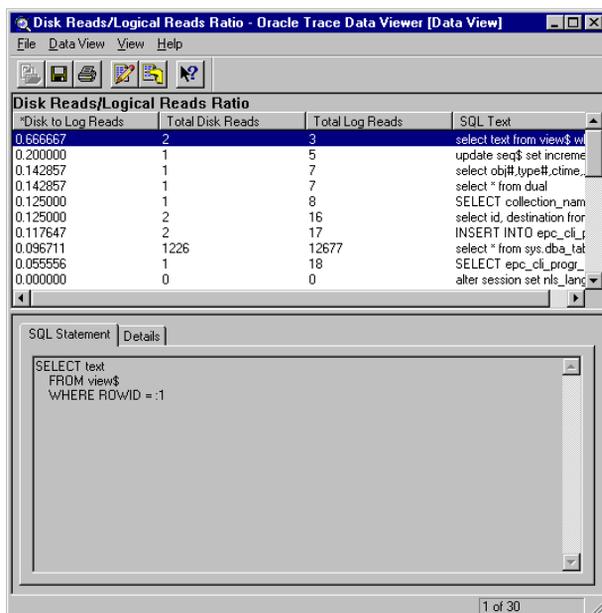
To examine the data defined in each data view, do one of the following:

- Double-click on the View Name, for example, Disk Reads/Logical Reads Ratio.
- With the data view selected, click the Open Data View button.

- Choose Data View=>Open from the Collection window.

Data Viewer then displays the data (see Figure 7-5) identified by criteria defined in the selected data view. In this example, the data view shows summary information for each SQL statement executed, sorted by the Disk to Logical Reads Ratio (for example, column name marked with asterisk (*)).

Figure 7-5 Details of "Disk Reads/Logical Reads Ratio" Data View



Disk to Log Reads	Total Disk Reads	Total Log Reads	SQL Text
0.666667	2	3	select text from view\$ w
0.200000	1	5	update seq\$ set increm
0.142857	1	7	select obj#,type#,ctime_
0.142857	1	7	select * from dual
0.125000	1	8	SELECT collection_nam
0.125000	2	16	select id, destination fro
0.117647	2	17	INSERT INTO epc_cl_f
0.096711	1226	12677	select * from sys.dba_tat
0.055556	1	18	SELECT epc_cl_progr_
0.000000	0	0	alter session set nls_lang

The screenshot also shows a 'Details' pane at the bottom with the following SQL statement text:

```

SELECT text
FROM view$
WHERE ROWID =:1

```

The major portions of the screen are:

Data value columns

The columns are displayed in the sort order determined by the value in the column marked with asterisk (*).

SQL Statement

The SQL statement property page displays the SQL statement text for the query associated with the currently selected row of returned statistics. Note that statement text changes as you highlight various rows.

Use the right mouse button to display the popup menu that can be used to select and copy text.

Details

The Details property page lists all statistics associated with the highlighted row in the data view. The statistics shown are for *all* executions of the current query within the Oracle Trace collection.

Use the right mouse button to display the popup menu that can be used to select and copy text.

Note: Detail statistics for SQL data views are similar to statistics presented by the TKPROF utility.

Status Bar

Shows the number of rows returned and the number of the currently selected row. The status is displayed in the lower right corner of the window.

Creating Custom Data Views

You can also create a new data view or create a data view like an existing data view. Create a data view when a predefined data view does not contain the information you want to examine. "Using the Data View Wizard" on page 7-18 describes the process of creating a data view.

Modifying or Extending Data Views

You can modify a data view to either add or remove statistics from the view.

For example, to add the "Execute rows" statistics to the data view, do the following:

1. Select a data view, for example, "Disk Reads/Logical Reads Ratio," then in the Data View window, choose Data View=>Modify.
2. In the Edit Data View dialog box, select the Items tab, and move the "Execute rows" statistics from the Items list to the Display These Items list.
3. Click OK.

The new information will be added to the view immediately. You can then save this data view to use at another time by choosing File=>Save As. The original view still exists. The modified view appears at the bottom of the navigator tree under the Custom folder.

Note that from the Data View window you can:

- Click on the current sort column to reverse the sort order. Click on a new column to change the sort criteria. The sort column is indicated by an asterisk (*) appended to the front of the header title.
Changing the sort order causes the database to be queried again for the top rows using the new sort criteria.
- Revise the options, for example, the maximum number for rows retrieved. Click the Options tab to make these changes. (This tab becomes available after you select Data View=>Modify.)
- Modify the name, description, and full description of the data view by clicking the General tab. (This tab becomes available after you select Data View=>Modify.)

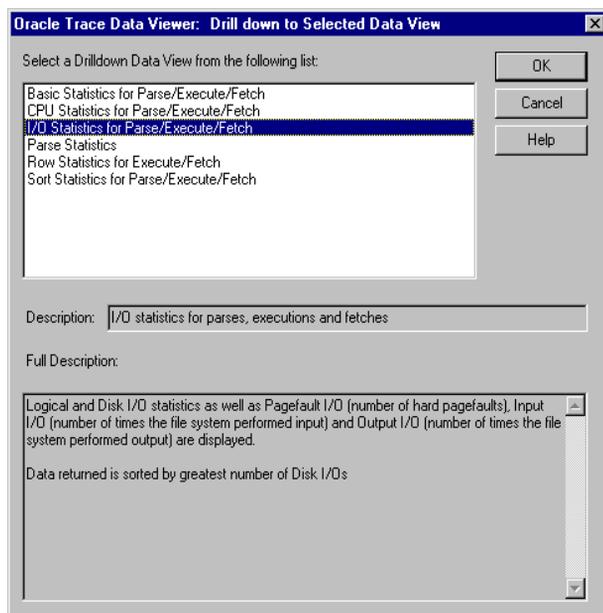
Drill-Down of Data Views

For certain events, you can drill down to related events to refine your view of the data. The drill-down option is available if the event that is currently being shown consists of other related events. For example, when examining the SQL Statistics data views, you can drill down to the Parse, Execute, and Fetch statistics for the currently selected query.

Note: When viewing SQL Statistics, you are viewing statistics for ALL executions of each distinct query within the collection. Drill down to view statistics for each parse, execution, and fetch for the selected SQL statement.

Select a row that you wish to analyze further (see Figure 7-5) and choose Data View=>Drill down. This allows you to join this row to other events and items of interest.

Figure 7-6 shows the resulting drill-down window.

Figure 7–6 Intermediate Drill-Down to Selected Data View

The major portions of the window are:

- **List of predefined data views**
Predefined data views are supplied for drilling down to the individual parses, executions, and fetches associated with a selected SQL statement.
- **Description**
Displays a short description of the currently selected drill-down data view.
- **Full Description**
Displays a more in-depth description of the data returned by the currently selected drill-down data view, as well as a list of the statistics returned by this data view and the statistic that is used to sort it.

Select and double-click a drill-down data view to see individual parse, execute, and fetch statistics for each execution of the SQL statement within the collection. You will see the parse, execution, and fetch statistics within their own scrolling regions, as shown in Figure 7–7.

Figure 7-7 Resulting Drill-Down Data View

I/O Statistics for Parse/Execute/Fetch - Oracle Trace Data Viewer [Drill-down...]

File Data View View Help

Parse I/O statistics

*Disk I/O	Log I/O	Pagefault I/O	Input I/O	Output I/O	Elapsed
2,000,000	3,000,000	0	0	0	0.066502

Execution I/O statistics

*Disk I/O	Log I/O	Pagefault I/O	Input I/O	Output I/O	Elapsed
0.000000	0.000000	0	0	0	0.002065

Fetch I/O statistics

*Disk I/O	Log I/O	Pagefault I/O	Input I/O	Output I/O	Elapsed
492,000,000	3,980,000,000	0	0	0	0.459638
75,000,000	1,037,000,000	0	0	0	0.167035
73,000,000	933,000,000	0	0	0	0.126889

SQL Statement | Details

```
SELECT *
FROM sys.dba_tables
```

1 of 1

Major portions of the screen are:

- Top part of window
 - Lists the detailed information returned by the data view. Each event will have columns containing statistics of items returned by the data view.
- SQL Statement
 - The SQL statement property page displays the SQL statement text for the query associated with the currently selected row of returned statistics.
- Details
 - The Details property page shows the statistics for *all* executions of the current query within the Oracle Trace collection.

Selecting a Drill-Down Data View

Predefined data views are supplied for drilling down to the individual parses, executions, and fetches associated with a selected SQL statement. Table 7–2 lists the drill-down data views available in Data Viewer.

Table 7–2 Drill-Down Data Views

Drill-Down Name	Sort By	Data Displayed	Description
Basic Statistics for Parse/Execute/Fetch	Greatest elapsed time.	For each distinct event: CPU time. Elapsed time. Disk I/O. Logical I/O. Number of rows processed.	Parse, Execution, and Fetch statistics like statistics output from TKPROF.
CPU Statistics for Parse/Execute/Fetch	Greatest elapsed CPU time.	CPU total. Pagefaults.	CPU and pagefault statistics for Parses, Executions, and Fetches of the current query. CPU total is the number of clock ticks in both user and system mode. The clock tick granularity is specific to the operating system on which the database resides.
I/O Statistics for Parse/Execute/Fetch	Greatest number of disk I/Os.	Logical and Disk I/O statistics. Pagefault I/O (number of hard pagefaults). Input I/O (number of times the file system performed input). Output I/O (number of times the file system performed output).	I/O statistics for parses, executions, and fetches.
Parse Statistics	Greatest elapsed time.	Current user identifier. Schema identifiers.	Parse information, such as whether or not the current statement was missed in library cache, Oracle optimizer mode, current user identifier, and schema identifier.
Row Statistics for Execute/Fetch	Greatest number of rows returned.	Number of rows returned. Number of rows sorted. Number of rows returned during a full table scan.	Execution and fetch row statistics.

Table 7–2 Drill-Down Data Views (Cont.)

Drill-Down Name	Sort By	Data Displayed	Description
Sort Statistics for Parse/Execute/Fetch	Greatest elapsed time.	Sorts on disk. Sorts in memory. Number of rows sorted. Number of rows returned from a full table scan.	Parse, execution, and fetch sort statistics.
Wait Parameters	Wait_Time.	Description. Wait_Time. P1. P2. P3.	Investigating Waits may help to identify where contention resides and what is causing the contention. P1, P2, and P3 parameters are values that provide more information about a specific wait event. The parameters are foreign keys to views that are wait event dependent. For example, for latch waits, P2 is the latch number which is a foreign key to v\$latch. The meaning of each parameter is specific to each wait type.

Modifying Drill-Down Data Views

Drill-down data views can be modified and saved much like top level data views. You can modify a drill-down data view to either add or remove statistics from the view.

Because slightly different statistics are associated with the parse, execution, or fetch events, you must modify each event separately. For example, to add the "Rows" (row count) statistic to the execution and fetch output in the drill-down data view, do the following:

1. Select any row in "Execution I/O Statistics" and choose Data View=>Modify.
2. In the Edit Data View dialog box, select the Items tab, and move the Rows statistics from the Items list to the Display These Items list.
3. Click OK.
4. Select any row in the "Fetch I/O Statistics" and add the "Rows" statistics to that event.

The new information is added to the view immediately. You can then save this data view to use at another time.

Saving As Data Views and Files

From the Data View window, you can save the current data view settings by selecting File=>Save As=>Data View. This is useful if you want to reuse this data view frequently. You must provide a name, description, and full description to save the view. Modified views are listed in the Custom folder in the navigator tree.

Also, you can save the selected rows of a data view to a file by selecting File=>Save As=>File. You can save the data in either of the following formats:

- SQL text (text only) for rows that have SQL text. You can use this file for import into SQL Analyze.
- CSV (comma-separated value format). You can use this format for import into other programs that accept CSV format.

Printing Data Views

From the File menu, there are three printing options available: Print, Print Setup, and Set Printer Font.

The Print option prints the currently active portion of a data view. If the currently active region is a data area, you can print either the entire region (including rows that are not visible on the screen) or selected rows. If the currently active region is the "SQL Statement/Details" area, both the SQL Statement and the Details will be printed.

The Print Setup option displays the standard Print Setup dialog box.

The Set Printer Font option displays the standard Font dialog box with the font selection for the currently selected printer.

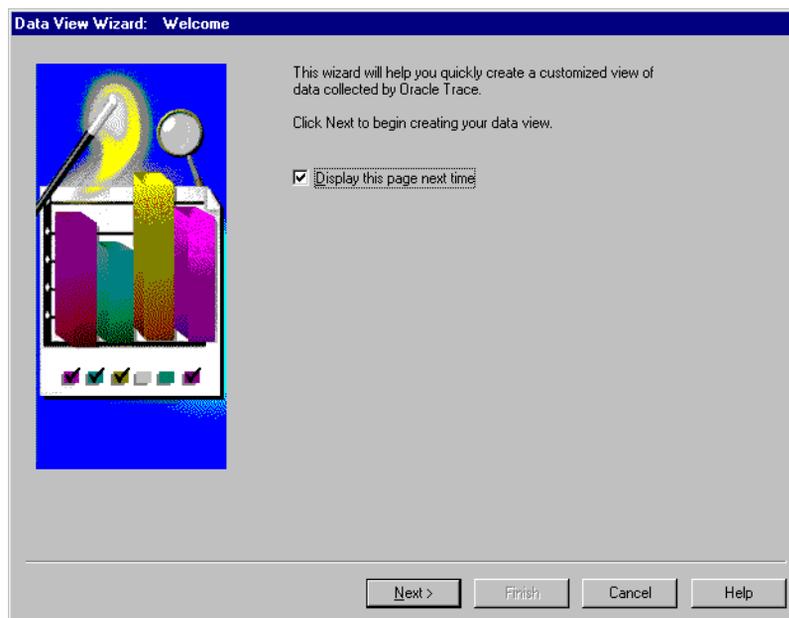
Using the Data View Wizard

You can create your own customized data view by using the Oracle Trace Data View wizard (hereafter referred to as the Data View wizard).

To invoke the wizard, choose Data View=>Create or Data View=>Create Like. The wizard's Welcome page appears (see Figure 7-8).

Use the Data View wizard to examine data that you cannot find in a predefined view. However, this data will not be optimized and may take longer to process.

Figure 7–8 Data View Wizard Welcome Page

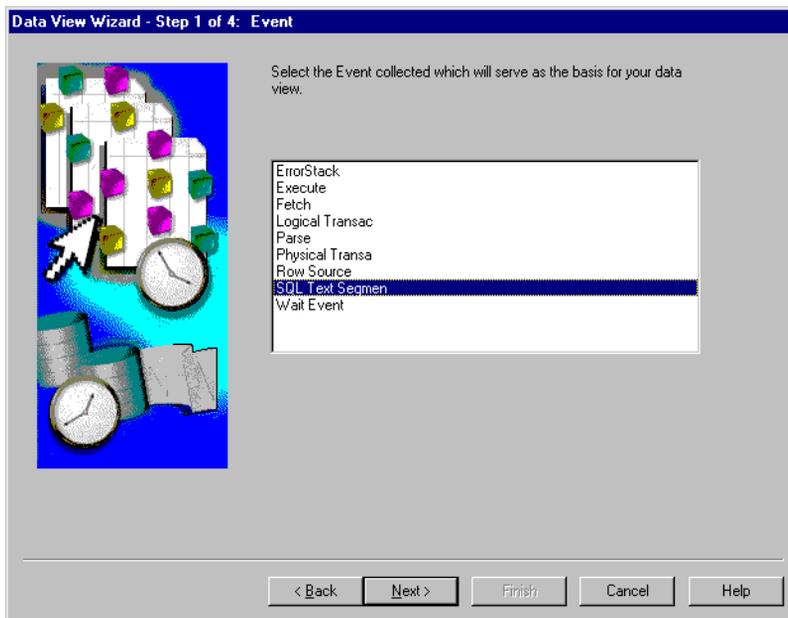


You can choose to bypass this Welcome page the next time you use the Data View wizard.

Click Next to start the definition of the data view.

Choosing an Event

The Event page is the first page used in the definition of the data view that you are creating. The Event page is as shown in Figure 7–9.

Figure 7–9 Selecting the Event

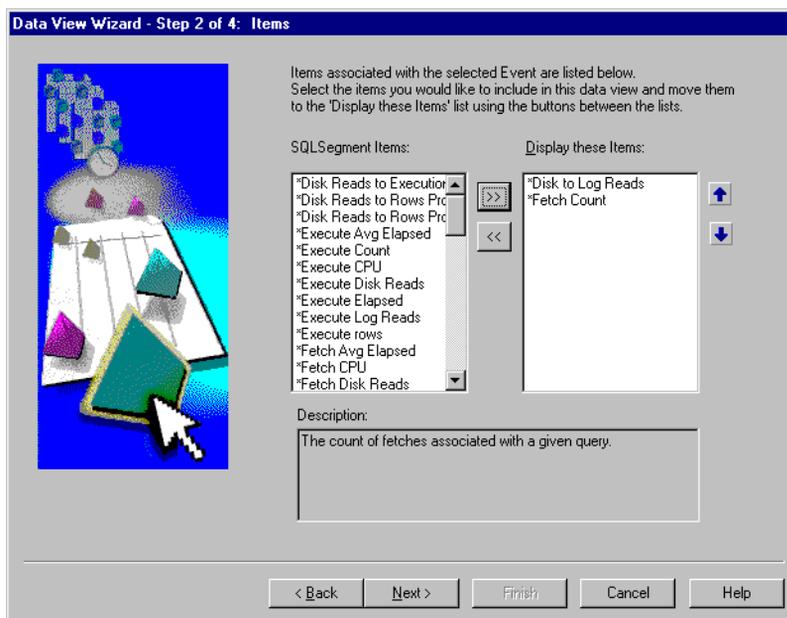
From the Event page, choose the event on which to base the data view. The list of event names comes from the Oracle Trace formatted data tables. Event names are limited to and truncated at 16 characters.

If you are looking at an Oracle Server collection and you let Data Viewer compute statistics, the SQL Text Segment event allows you to examine statistics from Parse, Execute, and Fetch events.

After you select the event, continue to the Items page by clicking Next.

Choosing Items Associated with the Selected Event

On the Items page, select the items that you want to display in the data view (see Figure 7–10).

Figure 7–10 *Selecting and Ordering Items Associated with the Event*

Items available are based on the event chosen.

- Choose items to display by selecting them in the Items list and use >> to move the items to the Display These Items list. Use << to remove an item from the Display These Items list. Items prefixed with an asterisk (*) are statistics computed by Data Viewer.
- Order these items by highlighting an item in the Display These Items list and using the up and down arrows to move the item in the list. The first item in the list is the first item displayed in the data view. Each item will be in a column in the data view.

When the item is selected, the Description field displays the description.

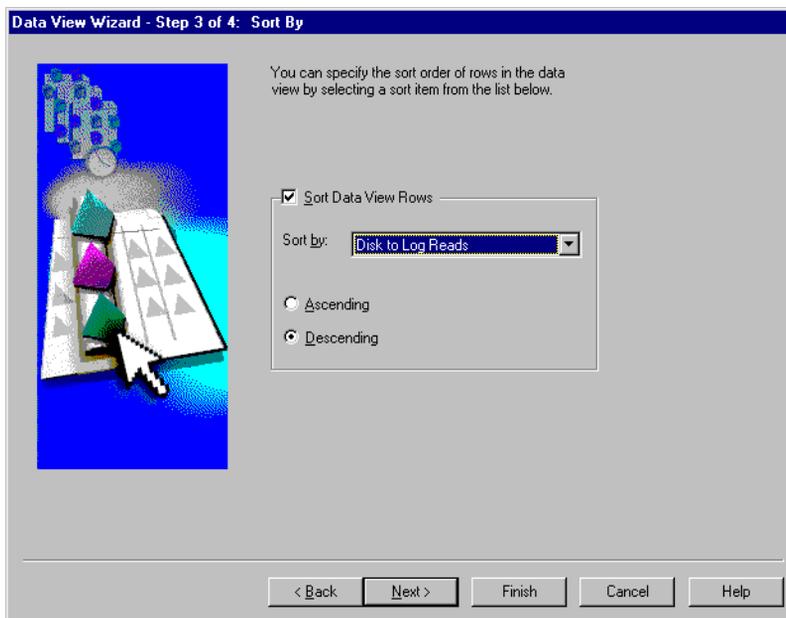
You must choose at least one item to generate a data view.

The next step in defining the data view is to define the sort criteria. Click Next to access the Sort By page.

Choosing the Sort Criteria

The Sort By page (see Figure 7–11) allows you to choose the item or statistic on which the sorting will take place. Sort criteria is optional.

Figure 7–11 Selecting Sort Criteria



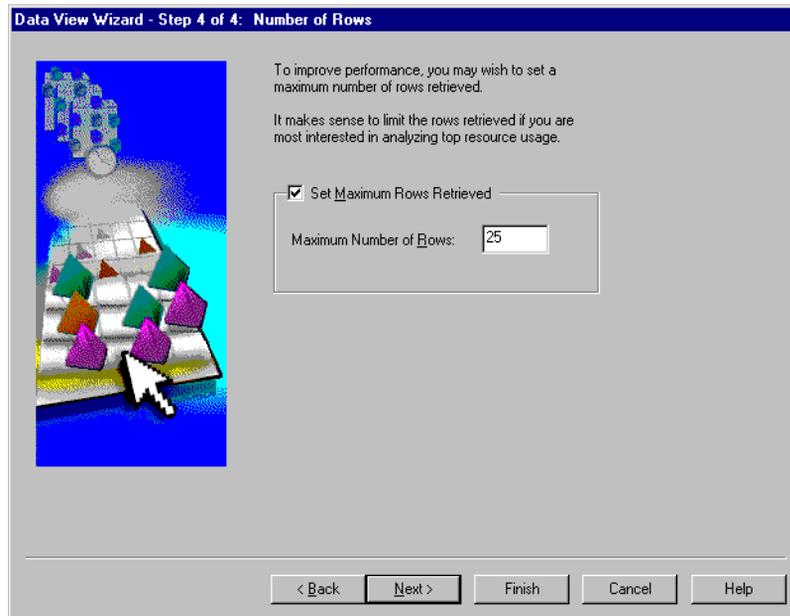
The data can be displayed in either ascending or descending order. Descending order is the default.

The next step in defining the data view is to optionally limit the number of rows to display in the data view. Click Next to access the Number of Rows page.

Defining the Number of Rows to Display

The last step in defining the data view is to decide how many rows are to be displayed in the data view (see Figure 7–12). You can either limit the number of rows to display or decide to display all the rows.

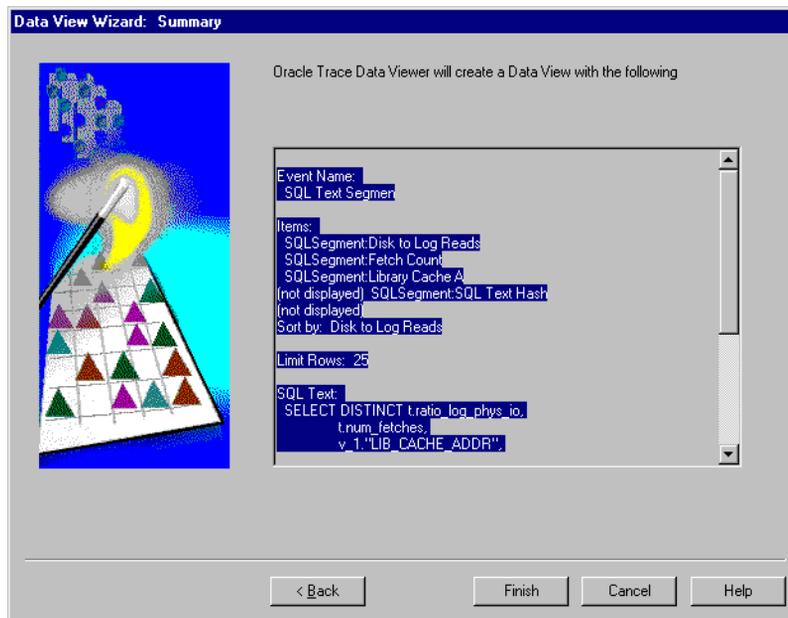
Limiting the number of rows returned can improve performance. If you are interested in viewing the highest value of some statistic, limit the number of rows. You can change the number for rows from the data view later on.

Figure 7–12 Limiting Number of Rows

This is the last step in defining the data view. Click Next to view the Summary page.

Reviewing the Summary Page

The Summary page gives you the opportunity to review the choices that you made while defining the data view (see Figure 7–13).

Figure 7–13 Summary Page

You can either accept all of the choices by clicking Finish or go back to change one or more definitions by clicking Back.

Data Viewer Problems

The following section deals with problems specific to Data Viewer.

Could Not View Oracle Trace Formatted Data

To view Oracle Trace formatted data using the Data Viewer, a user account needs the following system privileges:

```
CREATE SESSION
CREATE SEQUENCE
CREATE TABLE
CREATE PROCEDURE
CREATE ANY INDEX
EXECUTE ANY PROCEDURE
DELETE ANY TABLE
```

```
DROP ANY INDEX
DROP ANY SEQUENCE
UNLIMITED TABLESPACE
```

Need to Restore Formatted Data

Data Viewer adds statistical information to your formatted data. To restore your formatted data to the exact state it was in prior to running Data Viewer, run the `ORACLE_HOME\Sysman\Admin\TdvDrop.sql` script. Reasons for restoring data include:

- You encountered an insufficient privilege error prior to or during computing statistics.
- You received a database error creating a tablespace extent.

```
ORA-01658: unable to create INITIAL extent for segment in tablespace
MY_TABLESPACE
```
- You encountered an unexpected error that appears to be non-recoverable.

Additional Formatted Data Is Missing from Data Viewer

The first time Data Viewer views a collection, you can compute SQL statistics for all queries currently in the collection. Data Viewer does not detect new data added to a collection by a partial format while Data Viewer is viewing that collection. If you choose to partially format your collected data, you can force Data Viewer to recompute statistics using both existing and newly collected data by choosing `Options=>Recompute Statistics`.

Poor Performance

If multiple collections exist in one set of user tables, computing statistics and subsequent selects may take longer than necessary. Placing a large collection in a new database user account will improve performance.

Table or View Does Not Exist (or No Data in Collection)

When a record is not written to the `EPC_FACILITY_REGISTRATION` table, the user may see an error like the following:

```
XP-21016: A database error has occurred:
SELECT DISTINCT FACILITY_NUMBER, FACILITY_VERSION, VENDOR
FROM EPC_FACILITY_REGISTRATION WHERE COLLECTION_ID - :1
```

ORA-00942: table or view does not exist

Removing the 'Filtering by User' option on collections targeting Oracle Server release 8.0.4 databases will correct this problem for future collections.

Manually adding an EPC_FACILITY_REGISTRATION record for the collection allows Trace Data Viewer to see that collection's formatted data. For example, insert EPC_FACILITY_REGISTRATION record with the following values:

```
Collection_ID:    123          [Look in formatted data's EPC_COLLECTION table
                             for the collection_id column value that matches
                             your collection_name]
Vendor:           192216243   [Hard code this value]
Facility_number:  5           [Hard code this value]
Facility_version: '8.0'      [or '7.3' for a collection against a 7.3 database
                             or '8.1' for a collection against an 8.1 database]
```

Isolating an Oracle Trace Problem

Oracle Server releases 7.3.4 and 8.0.4 and later automatically create the formatter tables. Prior to Oracle Server releases 7.3.4 and 8.0.4, you must run the otrcfmtc.sql script from Oracle Server Manager or Oracle SQL*Plus Worksheet as the user who will be formatting the data. To ensure version compatibility, use the otrcfmtc.sql script located in the ORACLE_HOME of the destination server.

The otrcfmtc.sql script is located in the \$ORACLE_HOME/otracenn/admin directory (where *nn* represents the version of Oracle Trace).

Formatting error might be due to one of the following causes:

1. The user did not run the script to create the formatter tables (valid for releases of Oracle Server prior to 7.3.4 and 8.0.4).
2. The formatter tables were not created by the same user ID that was used when the collection was created (valid for releases of Oracle Server prior to 7.3.4 and 8.0.4).

Look for EPC_COLLECTION.

To check for formatter tables using SQL Worksheet:

```
connect <username>/<password>@<service name>
describe epc_collection
```

To create formatter tables, execute the `otrcfmtc.sql` script from the `ORACLE_HOME` of the Oracle Server that you connected to. You only need to run this script on Oracle Server releases prior to 7.3.4 and 8.0.4.

```
@ORACLE_HOME/otrace/admin/otrcfmtc.sql
```

Isolating a Problem in Oracle Trace Collection Services

Here are a few suggestions to help you isolate problems in the Oracle Trace Collection Services.

Oracle Trace Command-Line Interface

To test the CLI:

1. CLI needs to run from a privileged account, for example, the Oracle operating system user account.
2. The Oracle Home and SID environmental variables must be set properly.

To check settings on UNIX:

```
printenv ORACLE_HOME
printenv ORACLE_SID
```

To set settings on UNIX:

```
setenv ORACLE_HOME <path>
setenv ORACLE_SID <sid>
```

There should be one CLI per `ORACLE_HOME`. For example, if you have two Oracle Server release 7.3.3 instances sharing the same `ORACLE_HOME`, there should be only one CLI.

3. Verify that the CLI release matches the database server release.

The Oracle Trace Collection Services files may be overwritten on NT by other product installations. If this occurs, your Oracle Trace Collection Services files will no longer match the version required by your Oracle Server database and you may receive a memory mapping error.

On the server node, type the following command on the operating system command line:

```
$_ORACLE_HOME/bin/otrccol version
```

4. Verify if the collection name has not already been used before you start the collection. Look in the .cdf and .dat directories \$ORACLE_HOME\otracenn\admin on NT (\$ORACLE_HOME/otrace/admin on UNIX).
5. If you want to generate database activity for this collection, connect to the database.

- For Oracle Server release 7.3.x, connect to the service before you create your collection.
- For Oracle Server release 8.0, you can connect to the database anytime and the processes will be registered.

A .dat file and a .cdf file will be created in one of the following directories: \$ORACLE_HOME/otrace/admin/cdf or the directory specified by the ORACLE_TRACE_COLLECTION_PATH parameter in your init<sid>.ora file.

- a. Verify that the collection was started.

```
otrcocol check <collection_name>
```

The collection should show as active.

Oracle7 Stored Procedures

If the attempt to collect Oracle Trace data for an Oracle7 database results in the message "Error starting/stopping Oracle7 database collection," this may be due to missing database stored procedures that Oracle Trace uses to start and stop Oracle7 collections.

- Check for stored procedures (for Oracle Server releases 7.3.x)

To check for stored procedures using the Oracle Enterprise Manager console, use the Navigator and the following path:

```
Networks=>Databases=><your database>=>Schema Objects=>Packages=>SYS
```

Look for stored procedures starting with DBMS_ORACLE_TRACE_XXX.

To check for stored procedures using Oracle Server Manager or Oracle SQL*Plus Worksheet:

```
select object_name from dba_objects where object_name like '%TRACE%'
and object_type = 'PACKAGE';
OBJECT_NAME
DBMS_ORACLE_TRACE_AGENT
DBMS_ORACLE_TRACE_USER
```

2 rows selected.

Prior to Oracle Server release 8.0.3, Oracle Trace required that stored procedures be installed on the database. These SQL scripts may be automatically run during database installation depending on the platform-specific installation procedures. If they are not executed during database installation, you must run these scripts manually. You can add these stored procedures to the database by running the `otrcsvr.sql` script from `$ORACLE_HOME\otracenn\admin` on NT (`$ORACLE_HOME/otrace/admin` on UNIX) from a privileged database account (SYS or INTERNAL). To run the script, set the default to the path where the script is located. This script runs other scripts that do not have the path specified. These other scripts fail if you are not in the directory where these scripts will run.

EPC_ERROR.LOG File

The `EPC_ERROR.LOG` file provides information about the collection processing, specifically the Oracle Trace Collection Services errors.

The `EPC_ERROR.LOG` file is created in the current default directory.

For general information about causes and actions for most Oracle Trace messages, see the *Oracle Enterprise Manager Messages Manual*

Information Needed When Reporting a Problem

If you have tried all the previously described suggestions and Oracle Trace is still not working, please call your local Oracle World Wide Support Center. When reporting a problem, have the following information available:

- Version of Oracle Trace
- Operating system and version you are using for the server and the version of the Oracle Server
- Operating system you are using for the client and the version of the client
- Verify whether you have multiple `ORACLE_HOME` installations. If so, what Oracle components and versions are in each `ORACLE_HOME` installation?
- Steps to follow to reproduce the problem
- Log files (`EPC_ERROR.LOG`)
- Steps you have followed to attempt to solve the problem

Using Advanced Event Tests Effectively

Oracle Advanced Event Tests are integrated into the Oracle Enterprise Manager Console's Event Management System. They are installed as part of the Diagnostics pack and provide DBAs and database users with additional resources to monitor event conditions in their network environment.

This appendix demonstrates how the Oracle Event Management System and Advanced Event Tests can help DBAs simplify their day to day administrative tasks, enabling them to perform tasks that can provide even greater benefit to the company.

In our examples, the DBA uses events in three different scenarios to proactively monitor potential problems. Proactive management allows the DBA to take action to resolve the issue before the problem occurs, minimize unscheduled downtime, and prevent slow response time.

Each of the scenarios provides a description of the problem, a step-by-step preventative action plan, and a resolution summary. The following management tasks are addressed in the scenarios:

- Operational Management
 - The DBA wants to automate his routine monitoring tasks so he can spend his time addressing performance tuning and participating in system design.
- Space Management
 - The DBA wants to ensure a night time batch load does not fail due to insufficient tablespace free space.
- Performance Tuning
 - The DBA wants to ensure there is no performance degradation once a new SQL intensive application is brought online.

Note: For step-by-step instructions on using the Oracle Enterprise Manager Console and Event Management System, please see the *Oracle Enterprise Manager Administrator's Guide*. This guide also provides information on setting up job system and event requirements.

Operational Management

Problem

The DBA realizes that most of his time is spent performing routine, time-consuming tasks which focus on the operational aspect of keeping various databases up and running. To reduce the labor of system management across numerous managed databases, he uses the Oracle Event Management System. The Event System will allow him to proactively monitor the systems for which he is responsible.

He decides to divide his tasks into three different groups (depending on the frequency at which these tasks should be performed):

- Items that should be monitored on a continuous basis
- Items that should be monitored on a daily basis
- Items that should be monitored on a weekly basis

Action

1. Create an event which will monitor the items that should be monitored continuously by following these steps:
 - a. Enter the name of the new event, Continuous, in the General tab of the Create Event page. Choose Database as the Target Type. Add one or more targets where the monitoring should take place for the event.
 - b. Select the following event tests from the Available Tests column in the Tests tab of the Create Event page:

Fault:

Alert-- new errors in Alert file

Database UpDown-- database is down

Probe -- database connection cannot be made

User Blocks -- database user is blocking others

Performance - Instance Activity:

Buffer Cache Hit %-- buffer cache hit ratio is low

Free Buffer Waits -- free buffer waits is increasing

In Memory Sort % -- in memory sort ratio is low

Redo Log Allocation Hit % -- redo log allocation hit ratio is low

Rollback Contention -- rollback segment contention is high

Space:

Archive Full -- archive device is full

Archive Full (%) -- archive device is full shown as a percentage

- c. In the Parameters tab of the Create Event page, accept the Critical and Warning threshold settings.
2. Create an event which will monitor the items that should be monitored on a daily basis by following these steps:
 - a. Enter the name of the new event, Daily, in the General tab of the Create Event page. Choose Database as the Target Type. Add one or more targets where the monitoring should take place for the event.
 - b. Select the following event tests from the Available Tests column in the Tests tab of the Create Event page:

Space:

Chunk Small-- contiguous space is insufficient

Dump Full -- dump destination device is full

Dump Full (%)-- dump destination device is full shown as a percentage

Fast Segment Growth-- segment growth rate is high

Maximum Extents -- segment's maxextent limit approached

Tablespace Full -- tablespace is full

- c. In the Parameters tab of the Create Event page, accept all default settings.
- d. In the Schedule tab of the Create Event page, select the On Interval option and set the interval to be 24 hours.

3. Create an event which will monitor the items that should be monitored on a weekly basis by following these steps:
 - a. Enter the name of the new event, Weekly, in the General tab of the Create Event page. Choose Database as the Target Type. Add one or more targets where the monitoring should take place for the event.
 - b. Select the following event tests from the Available Tests column in the Tests tab of the Create Event page.

Resource:

Datafile Limit -- maximum datafile approached

Space:

Alert File Large -- alert file is large

Index Rebuild-- index which may benefit from a rebuild

- c. In the Parameters tab of the Create Event page, accept all default settings.
- d. In the Schedule tab of the Create Event page, select the On Day of Week option and set the date and time.

Resolution

The appropriate resolution depends on the specific event condition. Each event description provides a possible user action to correct your condition.

In addition, the DBA can use other Oracle Enterprise Manager tools to further pinpoint database inefficiencies and tune performance. Please refer to the Oracle Enterprise Manager documentation library for more information on the individual tools.

Table 7-3 Summary of Event Tests Used in Operational Management

Fault	Performance - Instance Activity	Space	Resource
Alert	Buffer Cache Hit %	Alert File Large	Datafile Limit
Database UpDown	Free Buffer Waits	Archive Full	
Probe	In Memory Sort %	Archive Full (%)	
User Blocks	Redo Log Allocation Hit %	Chunk Small	
	Rollback Contention	Dump Full	
		Dump Full (%)	
		Fast Segment Growth	
		Index Rebuild	
		Maximum Extents	
		Tablespace Full	

Space Management

Problem

The DBA has been warned that a new table will be created in the APP_DATA tablespace and during the night a batch load will take place. The DBA decides to monitor the free space in this tablespace. Should free space become a problem, he wants to be notified of the condition, but also wants a datafile automatically added to avoid having the batch load fail.

Action

1. Create an event that will monitor the total used space in the APP_DATA tablespace. The event will generate a warning or critical alert if the tablespace becomes too full. In addition, create a fixit job (AppDataAddFile) and associate it with the event. Then, if the tablespace becomes too full, the job will run and automatically correct the problem. The steps to create the event are:
 - a. Enter the name of the new event, AppDataFull, in the General tab of the Create Event page. Choose Database as the Target Type. Add one or more targets where the monitoring should take place for the event.
 - b. Select the following event test from the Available Tests column in the Tests tab of the Create Event page:

Space:

Tablespace Full -- tablespace is full

2. In the Parameters tab of the Create Event page, accept the default Warning and Critical threshold settings. Also, specify the following filter for the Tablespace Name Filter: ='APP_DATA'
3. Create a fixit job (a job used to correct problems detected by an event) by accessing the Fixit Jobs tab on the Create Event page. Check the 'If ANY test triggers, run a fixit job' option then click the Create button. This activates the Oracle Enterprise Manager Console Job System. Follow these steps to create the fixit job:
 - a. Enter the name of the new job, AppDataAddFile, in the General tab of the Create Job page. Choose Database as the Target Type. Select the database target where the event will be monitored.
 - b. Select Run SQL*Plus Script from the Available Tasks list in the Tasks tab of the Create Job page.
 - c. Enter the following Script Text in the Parameters tab of the Create Job page:

```
ALTER TABLESPACE APP_DATA  
ADD DATAFILE  
'c:\orant\database\app02.ora' SIZE 5M;
```
4. Submit the fixit job. (You must resubmit the job for each datafile or the job will fail.)

Resolution

In this example using the Oracle Event Management System, the DBA was able to proactively monitor for the potential problem and automatically prevent any impact to end users. No further action would be required.

Performance Tuning

Problem

The DBA knows a new SQL intensive application is being brought on-line. He worries that his shared pool might be sized too small to handle the new application. If the shared pool is too small, users will consume additional resources in order to complete a database operation. For library cache access, the overhead is primarily

the additional CPU resources required to reparse the SQL statement. For dictionary cache access, the overhead is primarily the additional I/O since the dictionary cache references that have been displaced from the cache will need to be refetched from disk.

To prevent any performance degradation that would be noticed by users, he decides to proactively monitor the performance of the shared pool.

Action

Create an event through the Oracle Enterprise Manager Event Management System that will monitor the performance of the shared pool. Since the shared pool contains the library cache and the data dictionary cache, the efficiency of both of these caches should be monitored to determine whether or not the shared pool requires tuning. If either of these caches are performing poorly, the DBA wants to be notified. The steps to create the event set are:

1. Enter the name of the new event, SharedPool, in the General tab of the Create Event page. Choose Database as the Target Type. Add one or more targets where the monitoring should take place for the event.
2. Select the following event tests from the Available Tests column in the Tests tab of the Create Event page:

Performance - Instance Activity:

Library Cache Hit % -- monitors library cache efficiency as measured by the miss ratio. It records the percentage of times the fully parsed or compiled representation of PL/SQL blocks and SQL statements are not already in memory.

Data Dictionary Hit % -- monitors dictionary cache efficiency as measured by the miss ratio. It records the percentage of times the dictionary data was not already in memory.

3. Accept the default number of occurrences and threshold settings in the Parameters tab of the Create Event page for each of the selected events.

Resolution

If the library cache miss ratio or the data dictionary miss ratio is high then the DBA has several options:

- Use Oracle Expert to tune the shared pool by creating a focused tuning session for the database. The tuning scope of the tuning session should focus on SGA

instance tuning. If the Library Cache Event test was triggered, the DBA may also want to include the SQL reuse tuning focus. Once Oracle Expert has automatically collected and analyzed the appropriate data, a set of recommendations for achieving the best performance is provided.

- Consider increasing the SHARED_POOL_SIZE to:
 - Decrease the frequency in which SQL requests are being flushed from the shared pool in order to make room for new request
 - Decrease the frequency in which dictionary data is being flushed from the shared pool in order to make room for new data
- To take advantage of the additional memory available for shared SQL areas, the number of cursors permitted for a session may need to be increased. This limit can be increased by increasing the value of the initialization parameter OPEN_CURSORS.
- If the library cache was found to be inefficient, examine SQL statements which can be modified to optimize shared SQL pool memory utilization and avoid unnecessary statement reparsing. This type of problem is commonly caused when similar SQL statements are written which differ in space, case or some combination of the two. Consider using bind variables rather than explicitly specified constants in your statements whenever possible.

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