Oracle® Enterprise Manager

Concepts Guide

Release 1.6.0

June 1998

Part No. A63730-01

The *Oracle Enterprise Manager Concepts Guide* provides an overview of the Oracle Enterprise Manager system and is intended for those who wish to learn the general concepts of Oracle Enterprise Manager.

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Oracle Enterprise Manager Concepts Guide

Part No. A63730-01

Release 1.6.0

Printed in the U.S.A

Contributing Authors: Eric Belden, Jackie Gosselin, Daniella Hansell, Jacinda Johnson, Valerie Kane, Keri Kruse, Dennis Lee, Priscilla Lee, Robert McCormick, Patricia McGonigle, Hanne Rasmussen, Bert Rich, Jennifer Smith, and David Stowell.

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Preface

This preface describes the purpose and organization of the *Oracle Enterprise Manager Concepts Guide*. The preface contains the following information:

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Purpose of this Guide

This guide gives a general overview of Oracle® Enterprise Manager.

The Oracle Enterprise Manager provides an integrated solution for managing your heterogeneous environment, with an open, client/server architecture. The client/server architecture, which is both scalable and lightweight, consists of a centralized console, common services, and Intelligent Agents running on the managed nodes. Various applications reside on top of the common services, performing comprehensive system management tasks.

Audience

This guide is intended for those who wish to learn the general concepts of Oracle Enterprise Manager.

You should already be familiar with the Oracle Universal Data Server and the administrative tasks you wish to perform. For general information about the Oracle Server and how it works, see the Oracle Server Concepts Guide. For information about database administration procedures, refer to the Oracle Server documentation set. The Oracle Server documentation set contains specific and thorough descriptions of the database administration tasks you can perform with Oracle Enterprise Manager tools. In addition, the Oracle Server documentation set provides recommendations on how to administer your database optimally.

You should also be familiar with the operation of your specific Microsoft Windows system. Refer to the documentation for your Windows system, if necessary.

How this Guide Is Organized

This guide is divided into the following chapters:

Chapters	Description
Chapter 1, “Overview Of Oracle Enterprise Manager”	This chapter describes the overall organization and features of Oracle Enterprise Manager, its Console, and common services.
Chapter 2, “The Console”	This chapter describes the layout and use of the Oracle Enterprise Manager Console.
Chapter 3, “Job and Event Systems”	This chapter describes the Job Scheduling and Event Management systems that execute jobs and monitor events on sites throughout the network.
Chapter 4, “DBA Applications”	This chapter describes the standard suite of database administration applications that are integrated into the Console.
Chapter 5, “System Management Packs and Other Value-Added Applications”	This chapter describes the optional Oracle Diagnostics Pack, Oracle Tuning Pack, Oracle Change Management Pack, and other integrated applications.

Documentation

The *Oracle Enterprise Manager Concepts Guide* is one of several Oracle Enterprise Manager documents. The guides are available on the Oracle Enterprise Manager CD in HTML format for viewing with a web browser. In addition to the Oracle Enterprise Manager documentation, extensive online help is provided for Oracle Enterprise Manager components.

Oracle Enterprise Manager base documentation

- The *Oracle Enterprise Manager Readme* provides important notes regarding the online documentation, updates to the software, and other late-breaking information.
- The *Oracle Enterprise Manager Installation CD-ROM Insert* provides information about installing Oracle Enterprise Manager.
- The *Oracle Enterprise Manager Administrator's Guide* explains how to use Oracle Enterprise Manager, the Oracle Enterprise Manager Console, common services, and integrated platform tools.
- The *Oracle Enterprise Manager Concepts Guide* provides an overview of the Oracle Enterprise Manager.
- The *Oracle Enterprise Manager Configuration Guide* explains how to configure Oracle Enterprise Manager.
- The *Oracle Enterprise Manager Application Developer's Guide* gives an overview of developing applications that integrate into Oracle Enterprise Manager.
- The *Oracle Enterprise Manager Messages Manual* describes the Oracle Enterprise Manager error messages and methods for diagnosing the messages.

Oracle Enterprise Manager Change Management Pack documentation

- The *Oracle Enterprise Manager Change Management Pack Readme* provides important notes regarding the Oracle Change Management Pack online documentation, updates to the software, and other late-breaking information.
- The *Oracle Enterprise Manager Getting Started with Oracle Change Management Pack* manual provides an overview of the concepts and features of the Oracle Change Management Pack applications.

Oracle Enterprise Manager Diagnostics Pack documentation

- The *Oracle Enterprise Manager Diagnostics Pack Readme* provides important notes regarding the Oracle Diagnostics Pack online documentation, updates to the software, and other late-breaking information.
- The *Oracle Enterprise Manager Getting Started with Oracle Performance Manager and Oracle Capacity Planner* manual provides an overview of the concepts and features of the Oracle Performance Manager and Oracle Capacity Planner applications.
- The *Oracle Enterprise Manager Oracle Trace User's Guide* explains how to use the Oracle Trace application to capture and use historical data to monitor Oracle databases.
- The *Oracle Enterprise Manager Oracle Trace Developer's Guide* explains how to instrument your application with Oracle Trace routines.
- The *Oracle Enterprise Manager Getting Started with Oracle TopSessions and Oracle Lock Manager* manual provides an overview of the concepts and features of the Oracle TopSessions and Oracle Lock Manager applications.

Oracle Enterprise Manager Tuning Pack documentation

- The *Oracle Enterprise Manager Tuning Pack Readme* provides important notes regarding the Oracle Tuning Pack online documentation, updates to the software, and other late-breaking information.
- The *Oracle Enterprise Manager Oracle Expert User's Guide* explains how to use Oracle Expert to optimize the performance of your database environment during initial configuration, as well as during ongoing database operation.
- The *Oracle Enterprise Manager Getting Started with Oracle SQL Analyze* manual provides an overview of the concepts and features of the Oracle SQL Analyze application.
- The *Oracle Enterprise Manager Getting Started with Oracle Tablespace Manager* manual provides an overview of the concepts and features of the Oracle Tablespace Manager application.

Related Publications

The *Oracle Enterprise Manager Concepts Guide* refers to important information in the related publications. The books referred to in this guide are listed below:

- For general information about the Oracle Server and how it works, see the *Oracle Server Concepts Guide*.
- For information about administering the Oracle Server, see the *Oracle Server Administrator's Guide*.
- For information about administering Oracle Parallel Servers, see the *Oracle Parallel Server Support for the Oracle Enterprise Manager Console Guide.*
- For information about developing database applications within the Oracle Server, see the *Oracle Server Application Developer's Guide*.
- For the procedures for migrating a previous version of Oracle to Oracle, see the *Oracle Server Migration* manual.
- For information on Oracle's SQL commands and functions, see the *Oracle Server SQL Reference* guide.
- For information about Oracle's procedural language extension to SQL, PL/SQL, see the *PL/SQL User's Guide and Reference.*
- For information about Oracle messages and codes, refer to the *Oracle Server Messages* manual.
- For information about the utilities bundled with the Oracle Server, including Export, Import, and SQL*Loader, refer to the *Oracle Server Utilities* manual.
- For information about distributing and replicating data, refer to *Oracle Distributed Systems Volume I: Distributed Data* and *Volume II: Replicated Data.*
- For information specific to the Oracle Server working on your host operating system, see your operating system-specific Oracle documentation (specific book titles vary by operating system) and system release bulletins, if available.
- For information about the Oracle networking system, see your network-specific documentation.

Oracle Corporation also publishes several files that are available on your distribution media. These files are usually named README, RELNOTE, BUGHST, and RESTRICT and have extensions such as .WRI, .DOC, and .TXT. Read these files to learn about changes to the software or documentation that have not been described in the guides.

Note: The exact names and locations of the files mentioned above may vary, depending on your operating system.

1

Overview Of Oracle Enterprise Manager

Oracle Enterprise Manager is a system management tool which provides an integrated solution for managing your heterogeneous environment. It combines a graphical console, agents, common services, and tools to provide an integrated, comprehensive systems management platform for managing Oracle products.

From the Oracle Enterprise Manager's Console, you can do the following tasks:

- Administer, diagnose, and tune multiple databases
- Distribute software to multiple servers and clients
- Schedule jobs on multiple nodes at varying time intervals
- Monitor objects and events throughout the network
- Customize your display using multiple graphic maps and groups of network objects, such as nodes and databases
- Administer Oracle Parallel Servers (For information about administering Oracle Parallel Servers, see the *Oracle Parallel Server Support for the Oracle Enterprise Manager Console Guide*.)
- Integrate participating Oracle or third-party tools

This chapter presents an overview of the Oracle Enterprise Manager's benefits and major components.

Topic	See Page
Benefits of the Oracle Enterprise Manager	1-2
The Basic Components	1-5

Benefits of the Oracle Enterprise Manager

This section discusses the major benefits of the Oracle Enterprise Manager. The topics are listed below:

Topic	See Page
Centralized Console for Single Point of Management	1-2
Scalability for Growing, Distributed Environments	1-2
Automated “Lights Out” Administration	1-3
Autonomous Intelligent Agent	1-4
Easy-to-Use Security	1-4

Centralized Console for Single Point of Management

You can manage your distributed systems and databases from the Oracle Enterprise Manager Console. The Console gives you a central point of control for the Oracle environment through an intuitive graphical user interface (GUI) that provides drag-and-drop system management. The interface enables an administrator to be effective with minimal training.

The Oracle Enterprise Manager enables you to manage a heterogeneous environment as easily as a homogeneous one. You can schedule and run jobs on multiple nodes simultaneously or monitor groups of services together.

Scalability for Growing, Distributed Environments

Designed to provide the flexibility and customization required by administrators of rapidly growing distributed environments, the Oracle Enterprise Manager easily scales upward to maintain performance and automate routine tasks. Even in a large system you can customize the Console GUI to display any part of the system.

Automated “Lights Out” Administration

In a large, distributed database environment, the proportion of nodes per administrator increases rapidly, requiring tools that can automate tasks and detect problems on multiple nodes and databases. Oracle Enterprise Manager offers “lights out” (automated) task management and proactive event management.

With the Job Scheduling system, you can automate routine tasks in the network such as backing up databases or running reports on a regular basis. Jobs can be scheduled to run on remote sites, providing the kind of “lights out” management that is vital in a large, distributed environment.

Using the Event Management system, you can remotely monitor for critical database and system events. The events of interest are pre-registered by the administrator; and when one of these events occurs, it is detected and represented graphically on the Console. You can also choose to be notified through electronic mail or page.

Oracle Enterprise Manager can also automate problem correction. When registering an event, you can specify that a task be performed in response to the event. For example, you can register an event for the monitoring of space usage in a tablespace, and also register a *fixit* job which would automatically allocate a new datafile to the tablespace whenever the event occurs. Proactive management of an event ensures that a problem is corrected before it noticeably impacts end-users.

Note: See Chapter 3, “Job and Event Systems” for more information on jobs and event sets. For detailed information, refer to Chapter 4, “Job Scheduling,” and Chapter 5, “Event Management,” of the *Oracle Enterprise Manager Administrator’s Guide*.

Autonomous Intelligent Agent

With Oracle Enterprise Manager, you can localize database administration (DBA) task execution so that tasks are completed even when a crucial part of the network is down. Localized tasks are dependable since all job processing is performed by Intelligent Agents which reside on managed nodes in the network.

For example, if you schedule a job on a node, the job is executed locally at the specified time. Since it is executed locally, the job runs even if a network outage occurs between the node and the Console. The messages are saved until they can be delivered, even if a network connection is down.

Note: For information on the Intelligent Agents, refer to Chapter 6, "Agents and Communication Daemon," of the *Oracle Enterprise Manager Administrator's Guide*.

Easy-to-Use Security

Oracle Enterprise Manager provides easy-to-use administrator-level security. Each administrator's privileges are stored in a credentials file and are used by the Oracle Enterprise Manager to manage your connections. When you connect to a database from the Console, your credentials are transparently passed on by Oracle Enterprise Manager; therefore, you do not have to log in repeatedly.

The security management is flexible enough so that you can change it to suit the security roles and policies of the system. Your preferred credentials for nodes and services can be stored throughout the network. Because a separate list is stored for each administrator, you can share credentials or have unique ones.

The Basic Components

Oracle Enterprise Manager's client/server architecture consists of a centralized Console, common services, and Intelligent Agents running on the managed nodes. Various applications reside on top of the common services, performing comprehensive system management tasks.

This section describes the following components of Oracle Enterprise Manager:

Topic	See Page
Console	1-5
Common Services	1-7
Integrated and Value-Added Applications	1-10
Command Line Interface	1-10
Online Help	1-10

Console

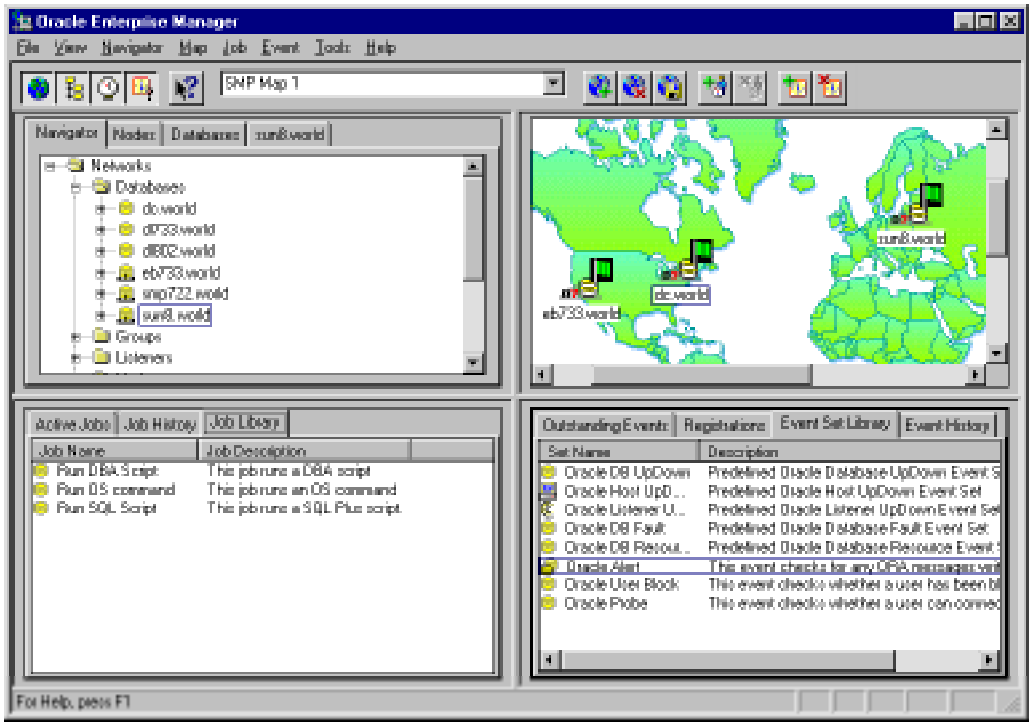
The Oracle Enterprise Manager Console is a graphical user interface that provides menus, toolbars, launch palettes, and the framework to allow access to Oracle tools, plus utilities available through other vendors. The format of the Console screen and the number of applications are determined by user preferences and the products purchased. See Figure 1-1, "Oracle Enterprise Manager Console," for an illustration of a Console screen.

The Console's interface consists of the Navigator, Map, Job, and Event windows. The Navigator discovers and displays a tree list of all the objects in a network, providing a direct view of databases, user-defined groups, listeners, nodes, plus the objects that they contain. The Navigator shows all the objects in the network with their relationships to other objects.

The Map system allows you to monitor network objects at a glance. With the Map system, you can create, save, modify, and recall views of the network. To set up the various groups for monitoring, you simply drag and drop objects from the Navigator into the Map view.

The Console menu bar provides access to the Navigator, Map, Job, Event, and DBA applications. You can also use toolbars and tool palettes to access the applications.

Figure 1–1 Oracle Enterprise Manager Console



Note: See Chapter 2, "The Console" for descriptions of the basic components and how they are organized. For information on the Console menus, see the *Oracle Enterprise Manager Administrator's Guide*, Chapter 1.

Common Services

Oracle Enterprise Manager has a set of common services that help you manage nodes throughout your network. This section describes the Oracle Enterprise Manager common services:

Topic	See Page
Job Scheduling System	1-7
Event Management System	1-7
Repository	1-8
Intelligent Agents and Communication Daemon	1-8
Service Discovery	1-9
Security	1-9

Job Scheduling System

The Job Scheduling system allows you to manage job scheduling and execution among the databases, groups, listeners, and nodes that you are administering.

With the Job Scheduling system, you can schedule and run jobs on remote sites throughout the network. Jobs can be scheduled at various times, such as daily or weekly, and at single or multiple destinations.

For example, you can schedule a report to be run every Sunday night on a predetermined set of databases; and you only have to schedule the job once. Oracle Enterprise Manager ensures that the job is run on schedule on all specified databases, and it keeps a history of the job and record of the job's status.

Event Management System

The Event Management system allows you to track and display the status of events occurring on the databases, groups, listeners, and nodes in your network system.

When a registered event occurs and is detected, it is represented graphically on the Console. In addition, you can choose to be notified through electronic mail or page. The Oracle Enterprise Manager Console provides support for paging and email when a registered event is encountered. The Console currently supports alphanumeric paging systems that use the TAP (Telocator Alphanumeric Paging) protocol for automatic paging and both SMTP and MAPI for email notification.

You can also automate the correction of system problems by creating fixit jobs that you specify to be run in response to particular events.

Note: See Chapter 3, "Job and Event Systems" for information on how these systems execute jobs and monitor events. For information on the Job and Event menus, see the *Oracle Enterprise Manager Administrator's Guide*, Chapters 4 and 5.

Repository

Each Oracle Enterprise Manager administrator is associated with a specific repository (a set of tables in an Oracle database) where any information related to the tasks performed by the administrator is stored.

A repository provides a central location for storing information about the state of the environment managed by Oracle Enterprise Manager from the perspective of each Console user. It contains information on configurations, jobs and events, historical collections, tuning recommendations, the preferred credentials for each user, and other information associated with each Oracle Enterprise Manager Console log-in.

The repository tables can be installed in any database accessible to the Console, and you can log on to the database where your repository resides from any network machine. Also, the repositories for the administrators do not have to be in the same database.

Intelligent Agents and Communication Daemon

Oracle Enterprise Manager uses Intelligent Agents and a communication daemon to manage remote tasks such as scheduling and running remote jobs and monitoring events on remote sites.

Intelligent Agents are processes that run on remote nodes in the network and execute jobs and monitor user-defined events sent by the Console via the communication daemon. Intelligent Agents are also used to discover services on the nodes where they reside.

Each Console has a communication daemon that communicates with the Intelligent Agents. For instance, when a registered event occurs on a managed service, the Intelligent Agent notifies the daemon, which then updates the Console to reflect the new information.

High availability of the agents is ensured because the agents function regardless of the status of the Console or network connections. Intelligent Agents also run independently of the services they manage, so they can be used to shut down and start up those services.

Note: For information on the Intelligent Agents, refer to Chapter 6, "Agents and Communication Daemon," in the *Oracle Enterprise Manager Administrator's Guide.*

Service Discovery

The communication daemon and Intelligent Agents work together to discover services on the network nodes. When these services are discovered, they are displayed in the tree view in the Navigator window of the Console. The manner in which the services are located depends on the version of the Intelligent Agent that is on the node where the service is being discovered.

Note: For information on the communication daemon, refer to the *Oracle Enterprise Manager Administrator's Guide.* For information on using Oracle Network Manager, see the *Oracle Network Manager Administrator's Guide*. For information on Oracle Enterprise Manager configuration files, see the *Oracle Enterprise Manager Configuration Guide*.

Security

Access to Oracle Services on the network is controlled by a set of user-defined, preferred credentials for the available nodes and services. Oracle Enterprise Manager encrypts the user authentication information in the repository and provides it as part of the connection request from the Console or Console-launched applications.

Integrated and Value-Added Applications

Oracle Enterprise Manager includes a set of standard, integrated database administration applications. These applications are specialized management tools that can be launched directly from the Console or from the Oracle Administrator Toolbar.

Note: For an overview of the database tools, refer to Chapter 4 of this guide, "DBA Applications" or to Chapter 7, "Overview of the Database Tools," in the *Oracle Enterprise Manager Administrator's Guide.*

Oracle Enterprise Manager's functionality can be extended further by adding one or more of the specialized applications found in three optional system management packs: the Oracle Diagnostics Pack, the Oracle Tuning Pack, and the Oracle Change Management Pack. Combined with Oracle Enterprise Manager, these three packs offer a single integrated solution for monitoring system bottlenecks, optimizing and tuning system performance, managing system changes, and planning for increases in resource utilization of your entire information system environment.

Third parties can also write applications that integrate into the Console and use the available common services. These applications can be launched directly from the Console.

Command Line Interface

A command line interface is sometimes necessary or desirable. Oracle Server Manager provides a conversational line mode. In line mode, you can explicitly execute DBA commands on a command line.

Note: For more information about using Server Manager in line mode, refer to Appendix A of the *Oracle Enterprise Manager Administrator's Guide*.

Online Help

Oracle Enterprise Manager uses the Microsoft Windows online help system to provide you with information on windows and dialog boxes in the Console and database tools. The Help system is context sensitive, but you can also search through the online help contents or index to find a particular topic.

Note: For information on the Help menu, refer to the *Oracle Enterprise Manager Administrator's Guide,* Chapter 1.

2

The Console

This chapter describes the basic components of the Oracle Enterprise Manager Console and how they are organized.

The following topics will be covered:

Topic	See Page
Console Graphical User Interface	2-2
Console Windows	2-3

Console Graphical User Interface

The Oracle Enterprise Manager Console has a graphical user interface that provides menus, toolbars, launch palettes, and the framework to allow access to Oracle tools, plus utilities available through other vendors. The menus, toolbars, and palettes are context-sensitive.

Item	Function
Menus	The Console menus primarily manipulate the Navigator, Map, Job, and Event systems and the database administration (DBA) applications.
Toolbars	The toolbars provide graphic icons that represent most of the menu items. When you move the mouse cursor over an icon, the description of the icon's function displays in the status bar at the bottom of the Console.
Palettes	The Tools palette is used to launch applications and utilities and contains graphic representations of the Tools menu items. When you move the mouse cursor over an icon, the description of the icon's function displays in the status bar at the bottom of the Console.

Console Windows

The Console contains four windows that provide a general view of the system being managed and an interface to the Oracle Enterprise Manager common services. These windows are the Navigator window, the Map window, the Job Scheduling window, and the Event Management window.

This section contains the following topics:

Topic	See Page
Navigator Window	2-3
Map Window	2-4
Job Scheduling Window	2-5
Event Management Window	2-6

Navigator Window

The Navigator window provides the following functionality:

- Discovery of objects in the network system
- A view of the objects in a network environment and the relationships among them
- A way of accessing the objects and administering tasks on them
- The source for dragging and dropping objects to create maps
- A place from which to launch DBA tools and other integrated applications

The Navigator discovers objects in a network and displays them in a tree list which provides a direct view of the objects in a hierarchical view. The objects include databases, user-defined groups, listeners, and nodes and the objects that they contain.

Note: For detailed information on the Navigator window, refer to Chapter 2, "Navigator," of the *Oracle Enterprise Manager Administrator's Guide.*

Map Window

The Map window provides a customized, graphical representation of key objects created by an administrator to manage and monitor a group of related objects in the system.

With the Map system, you can create, save, modify, and recall views of the network. Objects can be grouped together based on any criteria, simplifying all operations performed on the group members. To create the various groups that you want to monitor, you simply drag objects from the Navigator and drop them in Map view.

The map is especially useful for environments with very many databases and is also used to visually represent problems detected by the Event Management system.

Note: For detailed information on the Map window, refer to the *Oracle Enterprise Manager Administrator's Guide.*

Job Scheduling Window

The Job Scheduling window is the user interface to the Job Scheduling system, which enables you to automate repetitive tasks and provides the kind of "lights out" management which is vital in a large, distributed environment.

The Job Scheduling system allows you to manage tasks among the databases, groups, listeners, and nodes that you are administering. Using the menus, property sheets, and dialog boxes of the Job Scheduling window, you can execute, schedule, or cancel a job, view its status, and review historical information about jobs.

Jobs can be administered immediately, scheduled once, or scheduled for various times, such as daily or weekly, and at single or multiple destinations. Using the Job Scheduling system, you can also create and manage job scripts.

The Job window contains the following tabbed pages of information:

Job Window Pages	Function
Active Jobs	The Active Jobs page contains a summary of the active jobs on the network that are currently scheduled or running. These are jobs that you have submitted to the job system and are not yet completed.
Job History	The Job History page contains a list of previous job activities, such as multiple executions of a job. These are jobs that have been submitted to an agent and have executed successfully or unsuccessfully. This page also lists deleted jobs.
Job Library	The Job Library page contains a list of the jobs that you have created and saved. These jobs can be submitted to the job system at a later date. This is useful if you want to submit the same job at different times.

Note: See Chapter 3 of this guide, "Job and Event Systems," for more information on the Job Scheduling system. For detailed information on the Job window, see the *Oracle Enterprise Manager Administrator's Guide.*

Event Management Window

In the Event Management window, you can create and register event sets, modify or cancel registrations, view the status of services being monitored, get information about events that have occurred, and further manage event information.

With the Event Management window you can choose to have the events of interest represented graphically on the Console when they are detected. The system can also notify you through e-mail or page. The Oracle Enterprise Manager console provides support for paging and e-mail when a pre-registered event is encountered. The console currently supports alphanumeric paging systems that use the TAP (Telocator Alphanumeric Paging) protocol for automatic paging and both SMTP and MAPI for e-mail notification.

When registering an event set, you can also create a job that you specify to be run to automatically fix the problem.

The Event window contains the following tabbed pages of information:

Event Window Pages	Function
Outstanding Events	The Outstanding Events page displays event sets that have been applied and have occurred.
Registrations	The Registrations page displays the event sets that have been applied and registered to monitor events on any network objects.
Event Set Library	The Event Set Library page displays event sets that you have created as well as pre-defined event sets that have been installed in Oracle Enterprise Manager.
Event History	The Event History page displays a history of events that have occurred and have been acknowledged by an administrator or cleared by an agent.

Note: See Chapter 3, "Job and Event Systems" for more information on the Event Management System. For detailed information on the Event menu and window, refer to Chapter 5, "Event Management," in the *Oracle Enterprise Manager Administrator's Guide.*

3

Job and Event Systems

The Oracle Enterprise Manager provides a Job Scheduling system and an Event Management system.

The Job Scheduling system provides stored and forwarding capability which enables the automation of standard and repetitive tasks. With the Job Scheduling system, you can create and manage jobs, schedule execution of jobs, and view information about the jobs. Jobs can be scheduled on a single node or multiple nodes in the network, and can be executed immediately or scheduled in advance. If a site or its agent is down, the job request is queued, and once the site can be contacted, the queued job is submitted to the agent.

The Event Management system allows you to monitor the network environment for specific events or conditions, such as loss of service or lack of storage. In the Event Management window, you choose pre-defined events or create custom events which the Intelligent Agents then detect on specified sites in the network, if and when such events occur.

When an event is detected, the agent sends an alert to the Console. You can also define the parameters for which you want to be notified, including having specific system administrators notified when an event occurs. Additionally, when registering an event set, you can create a fixit job which would automatically correct the problem.

This chapter contains the following topics:

Topic	See Page
Job Scheduling System	3-2
Event Management System	3-6

Job Scheduling System

The Job Scheduling system allows you to execute, schedule, and manage tasks on remote sites. With the Job Scheduling system, you can perform asynchronous tasks on multiple sites without having to maintain connections to all those sites. In addition, jobs can run simultaneously on different nodes in the system.

The Job Scheduling system, communication daemon, and Intelligent Agents work in unison to schedule and execute jobs.

The following steps describe the process for scheduling and executing a job:

1. From the Console Job window or menu bar, you set up and submit a job.
2. The Console's communication daemon sends the job information to the appropriate Intelligent Agent(s) residing on the targeted site(s) in the network.
3. If a site or its agent is down, the communication daemon queues the job. Once the site can be contacted, the daemon submits the queued job to the agent.
4. The agent executes the job on schedule.
5. The agent returns any related job messages back to the daemon for display in the Console.

This section discusses the following benefits of the Job Scheduling system.

Topic	See Page
Pre-defined Job Tasks	3-3
Stored and Forwarding Job Scheduling	3-3
Lights-Out Management	3-3
Cross-Platform Job Scripts	3-4
Communication with the Intelligent Agent	3-4
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Pre-defined Job Tasks

In addition to creating your own custom jobs in the Job Scheduling system, you can choose from a variety of pre-defined jobs which are installed on Oracle Enterprise Manager. Such jobs include starting up or shutting down databases or listeners and running SQL scripts or operating system programs.

Stored and Forwarding Job Scheduling

The Job Scheduling system is simple to use because the task of scheduling and managing jobs is centralized in the Console. You only need to submit a job once, regardless of the number of destinations on which the job will run or the number of times it will run.

When you submit a job, the Console's communication daemon sends the information about the job to the appropriate Intelligent Agents on the destinations you selected. The agents are responsible for executing the job on schedule and returning job status messages back to the daemon.

When a job is submitted to one or more destinations, it is possible that any one of those sites may be down. If a site or its agent is down, the communication daemon queues the job request that could not be delivered to the site. Once the site can be contacted, the daemon submits the queued job to the agent.

To schedule a job, you do not have to connect to the node on which the job will be run. You only need to submit the job to the Console and specify the destinations on which it should run. The destinations can include nodes, databases, listeners, names servers, and user-defined groups that have been created with the Map system.

Lights-Out Management

The Job Scheduling system allows you to automate repetitive and periodic tasks and the correction of problems. If a job has to be executed repetitively or periodically, the agent(s) execute(s) the job automatically without the need for DBA intervention. Messages about a job's status are reported back to the Console.

For automating the correction of problems, the Job Scheduling system works with the Event Management system. When you register an event to be monitored by Oracle Enterprise Manager, you have the option of specifying a fixit job, which will be executed to correct the problem if the event occurs.

Cross-Platform Job Scripts

Jobs are implemented as Tool Command Language (Tcl) scripts. Tcl is a scripting language that is used to write both job and event scripts. Oracle has also extended Tcl (OraTcl) to include database-specific commands.

With OraTcl, you can do the following tasks:

- Invoke operating system facilities such as programs or shell scripts
- Execute SQL and PL/SQL scripts
- Start up and shut down Oracle databases

Communication with the Intelligent Agent

Although you submit jobs from the Console, the job scripts themselves reside on the Intelligent Agents. Because the manner in which a job is implemented may depend on the platform, each agent keeps its own set of job scripts.

Composite Jobs

Some DBA jobs involve more than one task. For example, before making schema changes to a database, you may want to back up the database. To accommodate these types of jobs, the Job Scheduling system allows you to combine two or more jobs into one *composite job*. Each of the jobs contained in the composite job is called a *task*.

Composite jobs can contain test conditions based on the success of a task. For example, if a composite job consists of two tasks, starting up a database and then running a SQL script, you can specify that the script be run only if the database was successfully started.

Scalability

The Job Scheduling system allows you to run jobs efficiently on multiple remote nodes. When a job reaches a remote node, all the information needed to run the job is transferred to the Intelligent Agent servicing the node. When the job is executed, it is run by the agent on that node, minimizing network traffic between the remote node and the Console and daemon. The only communication between the agents and the Console and daemon are the initial transmission of job information and any subsequent messages about job status.

Because jobs are run independently by agents, you can submit any number of jobs on multiple nodes without affecting the Console. For example, you can submit several jobs and then immediately start another task without waiting for the agents to schedule the jobs.

Because there is an agent residing on each managed node, jobs can be run on multiple nodes simultaneously. For example, you can submit a job to run a report on multiple databases worldwide. The job is scheduled and run independently by each agent servicing each site. Therefore, the jobs can be executed by their respective agents at the same time.

Security and Jobs

Jobs are normally run with your preferred credentials. Therefore, you are only able to run jobs to perform functions that you can perform logged into the machine directly.

Because jobs are categorized by service types, such as databases or nodes, the Job Scheduling system knows which credentials to pass to the agent. For instance, if the job runs on a node, the Job Scheduling system passes either your preferred credentials for the node, or if none are specified, the username and password you used when you logged into the Console.

You can also choose to have a job run with the agent's credentials. This flexibility allows a site to easily incorporate the Job Scheduling system's authentication methods with existing security policies.

Event Management System

The Event Management system automates problem detection and correction by having Intelligent Agents monitor for specified events throughout the network and execute fixit jobs to correct the problems.

The following tasks can be done with the Event Management system:

- Creating and registering event sets
- Interpreting and correcting event occurrences
- Setting up administrators, e-mail and paging services, and the system modem

The following steps describe the process of registering an event set:

1. From the Console, you register a pre-defined event set or a set that you created.
2. The communication daemon sends the event information to the appropriate Intelligent Agent(s).
3. The agent does the monitoring and alerts you if the event occurs.
4. Optionally, you can specify a fixit job to be executed if the event occurs.
5. The event is logged in the repository and its status can be viewed in the Console.

When an event occurs, you can be notified in various ways, such as electronic mail or paging. The Oracle Enterprise Manager Console provides support for paging and e-mail when a pre-registered event is encountered. The Console supports alphanumeric paging systems that use the TAP (Telocator Alphanumeric Paging) protocol for automatic paging and both SMTP and MAPI for email notification.

This section discusses the following features of the Event Management system:

Topic	See Page
Proactive Events Management	3-7
Unsolicited Error Detection	3-7
Scalability	3-7
Pre-defined Event Sets	3-8
Event Scripts	3-8
Optimized Intelligent Agents	3-8

Proactive Events Management

When an event set is registered, you have the option to specify a fixit job, which is a job run by the agent if it detects the event. Events and fixit jobs used together automate problem detection and correction. This proactive management of an event ensures that a problem is corrected before it noticeably impact end-users.

Unsolicited Error Detection

The Event Management system does not require that the Intelligent Agents be the only mechanisms for error detection. Other tools and applications can be integrated with the Event Management system and can detect events independently of the Intelligent Agents. These tools and applications can communicate directly with the Intelligent Agents.

For example, a third-party application can detect an event on a node and report that event to the node's agent, which then sends the message back to the Console as usual.

Scalability

The Event Management system allows one person to monitor a large system. If you are responsible for 100 databases, you cannot connect to each database every day to check on its performance. However, the Event Management system can effectively have the agents monitor all the databases 24 hours a day and can alert you if a problem is detected.

Monitoring a large number of sites with the Event Management system puts minimal performance impact on the Console. Because the Intelligent Agents perform the monitoring independent of the Console, many sites can be monitored at once without slowing down other tasks.

In the Event Management system, event settings are stored based on the administrator registering the event. Therefore, if you are an administrator of a large system, you can customize your event systems to your preferences and tasks, so that you receive only those messages related to the events that you have submitted.

The Event Management system also allows you to focus on select systems and events. Focus control is vital in a large system. If you do not wish to monitor all sites or a large number of sites, you can pinpoint only the sites you wish to monitor.

Pre-defined Event Sets

Oracle Enterprise Manager provides a variety of standard, pre-defined event sets. Additional pre-defined events can be obtained with the optional Oracle Diagnostics Pack which includes an application called Oracle Advanced Events.

The standard, pre-defined event sets included with Oracle Enterprise Manager are fault management events:

- Database up / down
- Listener up / down
- Node up / down

Pre-defined Advanced Events that are included with the Oracle Diagnostics Pack include the following:

- Space and resource management events, such as a disk becoming too full or a tablespace running out of extents
- Performance management events, such as a CPU that is loading abnormally or a database system statistic that is too high

For more information on events, refer to the chapter on Events Management in the *Oracle Enterprise Manager Administrator's Guide*, or refer to the Oracle Enterprise Manager Console's online help for events.

Event Scripts

As with jobs, events are OraTcl scripts that are stored on the agent. Event scripts can save state information between executions of an event script. This allows the agent to remember if it has detected a certain event already and eliminates redundant event messages to the Console. Saving state information also allows event scripts to maintain a history of a database and adjust to behavior that is typical.

Note: Unlike job scripts, event scripts are run with the permission of the agents.

Optimized Intelligent Agents

The Intelligent Agent has been optimized to efficiently monitor large numbers of systems in a node. Event tests are generally executed by the agent process directly and can be run quickly.

4

DBA Applications

A standard package of database applications is shipped with the Oracle Enterprise Manager. These applications are the primary administrative components of the Oracle Enterprise Manager and can be used to perform most of your DBA administration tasks.

The design of the applications allows you to do the following tasks:

- Execute the commands quickly and conveniently by pointing and clicking with the mouse rather than manually entering the SQL commands to perform tasks
- Concurrently perform multiple tasks in multiple Oracle Enterprise Manager windows
- Administer multiple databases simultaneously in multiple windows
- Centralize database administration tasks for both local and remote databases running on any Oracle platform in any location worldwide
- Perform DBA administrative tasks using Oracle Enterprise Manager's line mode interface (available on all platforms) when a graphical user interface is unavailable or undesirable

This chapter contains the following topics on DBA applications:

Topic	See Page
Common Features	4-2
The Database Tools	4-4

For detailed information on the DBA applications refer to the *Oracle Enterprise Manager Administrator's Guide.*

Common Features

This section discusses the following common elements shared by the DBA applications:

Topic	See Page
Tree Lists of Managed Objects	4-2
Multi-Column Lists	4-2
Property Sheets	4-2
Record and Play-Back	4-3
Advanced Mode	4-3

Tree Lists of Managed Objects

In the standard suite of database applications included in Oracle Enterprise Manager, all the tools provide a navigator tree list for organizing groups and instances associated with the application. The tree list is similar to the Navigator tree list in the Console.

Each application's navigator tree displays on the left side of the application window after the application has successfully connected to a database. A database's groups and instances are usually contained in the database folder which is the root of the navigator and displays the name of the database that the application is connected to. For example, in the Oracle Security Manager application, the tree list has containers for users, roles, and profiles.

Multi-Column Lists

When you select a container, a multi-column list of rows displays on the right side of the application window. Each row in the list provides a quick summary of information about an object in the selected container.

Property Sheets

When you select a container's object in the tree list, the object's property sheet appears on the right side of the application. A property sheet is a dialog box with one or more tabbed pages and is used to specify options for an object when you are creating or altering a composite instance such as a user or a tablespace.

Record and Play-Back

The standard DBA applications provide a “record and play-back” mechanism that makes it easy to record a task and perform it at multiple locations. For example, if you want to assign several privileges to a set of users who exist on ten databases, you could use Oracle Security Manager and the logging mechanism to record the granting of the privileges, and then use the Job system to perform the assignment at the ten databases.

Advanced Mode

The Advanced Mode option in the View menu displays or hides additional property sheets that allow you to access an application’s advanced database administration features.

The Database Tools

This section explains each of the standard DBA tools included in Oracle Enterprise Manager.

DBA Tool	Task	See Page
Oracle Instance Manager	Manages instances and sessions	4-5
Oracle Schema Manager	Manages schema objects	4-6
Oracle Security Manager	Controls security	4-6
Oracle Storage Manager	Manages storage	4-7
Oracle SQL Worksheet	Enters and executes DBA commands, SQL statements, and PL/SQL commands	4-7
Oracle Backup Manager	Manages database backups and recovery environments	4-8
Oracle Data Manager	Exports, imports, and loads data in and out of an Oracle database	4-9
Oracle Software Manager	Distributes, installs, and de-installs software packages on servers and clients throughout the network	4-9
Oracle Net8 Assistant	Helps you configure and manage your Oracle network environment with Net8	4-10

Additional applications can be purchased to allow you to diagnose your database system and manage a replication environment.

Oracle Instance Manager

With Oracle Instance Manager, you can start up and shut down a database, view and edit the values of initialization parameters, resolve in-doubt transactions, and manage users' sessions.

When the Instance Manager has successfully connected to a database, the Initialization Parameters, Stored Configurations, Sessions, and In-Doubt Transactions folders display in a navigator tree on the left side of the Instance Manager window. These folders are contained in the root folder which displays the name of the database the application is currently connected to.

The display on the right side of the window is determined by the containers and objects selected on the left side of the screen. The right side may contain a multi-column scrolling list or a property sheet.

A new Oracle8 option, SHUTDOWN TRANSACTION <time-out>, gives the user only the length of the specified time-out period to finish transactions. During this time, no users can start new transactions on the instance. Instead, users must failover to a backup instance to start a transaction. If time-out is not specified, users are not disconnected until the last transaction completes.

Another new Oracle8 option, DISCONNECT POST_TRANSACTIONAL, is useful if the database administrator wants to disconnect a session but not until its current transaction has been finished. This option is possible when choosing Disconnect from the Sessions menu in Instance Manager.

In Instance Manager, you can also change the archivelog mode for a database. By selecting Archive Log in the Database menu, you enable or disable archivelog mode. The database is shut down and restarted whenever the archivelog mode is changed.

Oracle Schema Manager

With Oracle Schema Manager, you can create, alter, or drop schema objects such as clusters, database links, execution plans, PL/SQL, sequences, snapshots, snapshot logs, synonyms, tables, and views.

When Schema Manager successfully connects to a database, the schema navigator displays on the left side of the application window. The navigator consists of a series of schema object containers which are contained in the main Schema Objects folder. The name of the connected database is displayed next to the Schema Objects folder.

The display on the right side of the window is determined by the containers and objects selected on the left side of the screen. The right side may contain a multi-column scrolling list or property sheet. The scrolling lists contain information about each schema object, such as status, owner, creation date and last date modified.

Oracle Security Manager

Oracle Security Manager allows you to control the security of Oracle databases and manage users, roles, and profiles. Using the dialog boxes provided, authorized administrators can create, alter and drop users, roles and profiles and add multiple privileges and roles for database users.

In a dynamic environment, security parameters such as users' profiles and roles are in constant change. Oracle Security Manager simplifies making these necessary changes by providing security lists which an administrator can access to see the profiles and roles that have been assigned to a set of users. Property sheets can then be used to quickly specify the security parameters for each database.

Oracle Storage Manager

With Oracle Storage Manager you can perform DBA tasks associated with managing database storage. The navigator tree in the Storage Manager consists of Tablespaces, Datafiles, and Rollback Segments containers. By selecting these containers and their contents you can perform storage management tasks which include managing tablespaces and rollback segments and adding and renaming datafiles. You can also launch other database tools and utilities from the application.

Oracle SQL Worksheet

With Oracle SQL Worksheet you can enter SQL statements, PL/SQL code, and Oracle Enterprise Manager DBA commands dynamically, and run scripts which are stored as files.

SQL Worksheet maintains a history of the commands you have entered; so you can use SQL Worksheet to edit and re-execute an earlier command without having to re-type it. You can also drag a SQL file from the File Manager and drop it into a worksheet to load it.

You can have multiple SQL Worksheets open at a time, each of which is separate from the others; so you can commit or roll back work in each worksheet independently.

Oracle Backup Manager

Oracle Backup Manager is used to manage your database backup and recovery environment. The subsystem availability of Backup Manager depends on the version of the database you are attempting to back up. When logging into Oracle7 databases, you can select Operating System Backup or the Enterprise Backup Utility. For Oracle8 databases, you can select Operating System Backup or Oracle8 Recovery Manager.

The Three available subsystems are listed below:

Subsystem	Function
Oracle8 Recovery Manager	The Oracle8 Recovery Manager provides an intuitive graphical interface for Recovery Manager. This subsystem is an extremely powerful and flexible command line backup and recovery utility designed expressly for the Oracle8 database.
Operating System Backup	Operating System Backup provides automated tablespace backup and recovery script generation for submission to the Oracle Enterprise Manager job system for Oracle7 databases. Operating System Backup also provides limited backup and recover capability for Oracle8 databases.
Enterprise Backup Utility	The Enterprise Backup Utility provides backup and recovery functionality for Oracle7 databases only. See your Enterprise Backup Utility documentation for further information. **Note:** Enterprise Backup Utility is not compatible with Oracle running on Windows NT systems.

Oracle Data Manager

Oracle Data Manager automates the transfer of data to and from an Oracle database and provides Data Manager Wizards to guide you through the steps. Data Manager also provides job tasks that can be submitted with the Job Scheduling system.

The Data Manager Wizards can be accessed in the Data menu and include Export, Import, and Load wizard options for performing the following tasks:

- Export

  This option transfers data from an Oracle database to an Oracle binary operating system file. The import operation can then transfer the data from this file to an Oracle database.

- Import

  This option transfers data to an Oracle database that has been exported from an Oracle database.

- Load

  This option loads data from operating system files, such as text files, to an Oracle database.

Oracle Software Manager

The Oracle Software Manager application allows all software in a network to be managed from a central location. This product addresses the problems faced by application software administrators by offering the following features:

- An integrated toolset for managing software in a distributed fashion
- Next-generation architecture that offers network scalability through an advanced client-agent-server paradigm
- An easy-to-use graphical user interface that allows administrators to easily run software configuration jobs and track assets across the entire network

The Oracle Enterprise Manager / Oracle Software Manager network is made up of one or more Oracle Enterprise Manager / Oracle Software Manager installations, each of which administers a host server containing an Intelligent Agent.

Oracle Net8 Assistant

Oracle Net8 Assistant is a tool for configuring and managing your Oracle network environment with Net8. Net8 is Oracle's interface to standard communications protocols that allows for the proper transmission of data between computers. Using Net8 assistant, you can configure and manage profiles, service names, listeners, and Oracle names servers.

5

System Management Packs and Other Value-Added Applications

Oracle Enterprise Manager's functionality can be extended further by adding one or more of the specialized applications found in three optional system management packs: the Oracle Diagnostics Pack, the Oracle Tuning Pack, and the Oracle Change Management Pack. Combined with Oracle Enterprise Manager, these three packs offer a single integrated solution for monitoring system bottlenecks, optimizing and tuning system performance, managing system changes, and planning for increases in resource utilization of your entire information system environment.

Oracle Corporation also offers other administration utilities that can be integrated into the Oracle Enterprise Manager Console:

- Oracle Replication Manager
- Oracle Rdb for NT
- Oracle Fail Safe Manager
- Oracle Biometrics

This chapter contains the following sections:

Topic	See Page
Oracle Diagnostics Pack	5-2
Oracle Tuning Pack	5-7
Oracle Change Management Pack	5-9

Oracle Diagnostics Pack

The Oracle Diagnostics Pack provides easy-to-use tools for monitoring the health of your system. This set of tools helps in automatically detecting problems, diagnosing problems, and planning for the future.

The Oracle Diagnostics Pack Documentation Set includes the following guides:

- *Oracle Enterprise Manager Getting Started with Oracle Performance Manager and Oracle Capacity Planner*
- *Oracle Enterprise Manager Oracle Trace User's Guide*
- *Oracle Enterprise Manager Oracle Trace Developer's Guide*
- *Oracle Enterprise Manager Getting Started with Oracle TopSessions and Oracle Lock Manager*

This section describes each of the Oracle Diagnostics Pack tools:

Topic	See Page
Oracle Performance Manager	5-3
Oracle Capacity Planner	5-3
Oracle Trace Manager	5-4
Oracle Trace Data Viewer	5-4
Oracle Top Sessions	5-4
Oracle Lock Manager	5-4
Oracle Advanced Events	5-5

Oracle Performance Manager

Oracle Performance Manager is a tool for filtering, monitoring, and analyzing performance data. With Performance Manager, performance statistics for both the Oracle server and host operating system are captured in real-time mode and can be viewed in various tables and charts and in two- and three-dimensional presentations. Data is sampled via Oracle Enterprise Manager's data collection mechanism and displayed in real-time graphical views that can be automatically refreshed at user-defined intervals. The data collection mechanism is part of the Oracle Enterprise Manager framework.

With Performance Manager, you can define your own custom charts or choose from the large collection of pre-defined charts and tables which are provided by Performance Manager. These pre-defined charts are organized into performance monitoring groups including file IO, CPU use, database contention, I/O, load, memory use, instance metrics, and parallel server performance. Each group allows easy access to key metrics for that performance category. For example, the memory group includes pre-defined charts for database buffers, library and dictionary cache performance, memory sort performance, parse ratios, and a tabular presentation of all cached SQL statements.

Oracle TopSessions and Oracle Lock Manager can also be viewed as Performance Manager charts. Additionally, Performance Manager provides other "Top" charts, such as Top SQL and Top Datafiles. These Top charts allow you to focus on performance bottlenecks in your system.

Oracle Capacity Planner

With Oracle Capacity Planner, you can proactively plan for your future computing needs. Capacity Planner helps you answer questions like "When will I need a new disk?" or "What will my hardware requirements be for the next fiscal year?"

Capacity Planner provides a comprehensive set of database and operating system statistics that can be collected and customized. When specifying a collection for a particular database or host, you can select the entire set of available statistics or a subset, as well as specify a sampling frequency for the data to be collected. By allowing you to define the scope of the data collected and the sampling frequency, Capacity Planner gives you the flexibility to decide how much detail you need in your collected data. You can then customize the data collections to best suit the specific capacity planning needs of your site.

Once data has been collected and stored in the historical database, Capacity Planner can perform analyses on the data. Capacity Planner includes a set of pre-defined analyses which define the type of data and the analysis to be done.

However, you can also specify your own custom analyses and save it to be used again.

Oracle Trace Manager

Oracle Trace provides Oracle Trace Manager, an application to create, schedule, and administer Oracle Trace collections for products instrumented with the Oracle Trace API.

Trace Manager is a client-based Windows application that runs on the Oracle Enterprise Manager Console. Trace Manager automatically discovers Trace instrumented products that are installed on all nodes that are known to the Console.

Most Oracle Trace users manage collections for products that are already instrumented with the Oracle Trace API. Therefore, most users only need to be familiar with the data that can be collected for the products and how to use the Trace Manager application to create and administer data collections.

Oracle Trace Data Viewer

Oracle Trace Data Viewer is an application that helps you get information about system activity, such as which statements ran the longest or the most often. The Trace Data Viewer takes raw, formatted, Oracle Server data collected by Oracle Trace and displays this data for your analyses.

Trace Data Viewer provides a pre-defined set of data views, which are snapshots of data. With these data views you can examine important statistical data and drill down as needed to get additional details about the data. You can also define your own data views using the Oracle Trace Data View Wizard.

Oracle TopSessions

Oracle TopSessions provides the ability to pinpoint database sessions causing the greatest impact on performance. The top “N” sessions can be identified in real time based on performance impact factors such as resource usage, open cursors, user transactions, and block changes.

Once a problem session is identified, TopSessions can be used to drill down into the session to examine detailed statistics on session activity such as cache processing, redo activity, locks, SQL processing, and Parallel Server operations. Selected SQL statements and explain plans can be displayed for analysis. TopSessions also allows the database administrator to take action by easily terminating problem sessions.

Oracle Lock Manager

The Oracle Lock Manager application helps to identify troublesome locking situations. Lock Manager provides a graphical display of database locks, including details such as the locking user, lock type, object locked, and mode held and requested. Sessions blocking and waiting are displayed in a graphical tree view for easy analysis. If necessary, locked sessions can be easily terminated by Lock Manager's "kill session" feature.

Oracle Advanced Events

The Oracle Diagnostics Pack provides a collection of additional pre-defined event sets called Oracle Advanced Events. Advanced Events are an addition to the standard pre-defined event sets included with the Oracle Enterprise Manager. Just like the standard events, Advanced Events run on the Event Management system and can be launched from the Console. Advanced Events also use the Intelligent Agents, which reside on managed nodes, to autonomously monitor and detect specified events and then react according to DBA specifications, such as notifying an administrator or fixing the problem.

Event-driven Monitoring

Advanced Events includes four types of pre-defined database events:

- Fault management events such as corrupted blocks or replication errors
- Performance issues such as I/O rates, cache performance, and response time
- Space management issues such as the maximum number of extents allowable for a specific segment, the outer limits of contiguous free space, and other database storage metrics
- Resource usage issues such as the maximum number of users, processes, and locks, and datafile size limits

Advanced Events also includes pre-defined node events such as excessive CPU utilization, load or paging problems, and disk capacity problems.

Flexible Alerting and Notification

Like the standard, pre-defined events, Advanced Events allow you to decide when, how, and how often to be notified of a problem through the Event Management system. Advanced Events can be customized with user-defined event thresholds and monitoring intervals for detecting pre-defined events. Administrators can be contacted by page, email, or by receiving a visual alert at the Console. Third party systems can also be notified, such as the HP Openview product.

Automated Problem Correction

In addition to alerting the administrator, Advanced Events also can be configured with a fixit job to automatically correct a problem, just as with the standard pre-defined events. Fixit jobs are created by the administrator using the Oracle Enterprise Manager Job system. For example, a fixit job could be created to increase the size of a datafile, and then be available as a corrective action in response to an occurrence of the Datafile Limit event.

Oracle Tuning Pack

The Oracle Tuning Pack is a set of tools that addresses the tuning needs of a network's databases and applications to ensure that they run at peak efficiency. The Oracle Tuning Pack Documentation Set includes the following books:

- *Oracle Enterprise Manager Oracle Expert User's Guide*
- *Oracle Enterprise Manager Getting Started with Oracle Tablespace Manager*
- *Oracle Enterprise Manager Getting Started with Oracle SQL Analyze*

This section describes each of the Oracle Tuning Pack tools:

Topic	See Page
Oracle Expert	5-7
Oracle SQL Analyze	5-7
Oracle Tablespace Manager	5-9

Oracle Expert

When used on a periodic, proactive basis, Oracle Expert discovers tuning opportunities in your network and automatically generates an analysis with the recommended tuning changes that would increase the performance of your database(s).

Oracle Expert contains hundreds of rules for tuning an Oracle database. Data collected by Oracle Expert is fed into the rules engine along with other information supplied by the user. Oracle Expert evaluates this data, looking for tuning opportunities, and produces a set of recommendations for tuning improvements.

Oracle Expert provides the user with flexible, focused tuning in three categories: instance tuning, application tuning, and structure tuning. Oracle Expert generates a full explanation of the recommendations and supporting evidence. The various tuning recommendations are listed according to performance-gain impact, and you can automatically generate scripts and reports which support the analysis.

Oracle SQL Analyze

Inefficient SQL statements are a major contributor to database performance problems. Oracle SQL Analyze is a tool for creating, evaluating and benchmarking optional SQL statement formats and optimizer modes, which dramatically simplify the complexities of SQL tuning.

SQL Analyze starts by executing SQL under various optimizer modes and presenting explain plans and execution statistics for easy comparison. SQL Analyze also automatically checks SQL statements for basic SQL design violations. It achieves this by running your SQL statements through a “rules-of-thumb” repository that will evaluate and then, if necessary, generate alternative SQL that corrects the problem and positively impacts your database's performance.

Additional tuning tools provided in SQL Analyze allow you to walk through an analysis of a SQL statement's potential join orders and methods. Using a cost-based optimizer, SQL Analyze allows you to control the join strategy through the use of SQL hints.

However, using hints to control the join method and order for specific queries can be complex and risky. To assist you with this process, SQL Analyze provides an automated methodology that can be used to evaluate alternative join strategies where appropriate. If an alternative join order can be used, it will rewrite the statement with the necessary hints or reordering of objects.

Finally, SQL Analyze helps you fine tune your SQL statements by performing multiple “what-if” scenarios, executing the statements one or more times to measure performance. The relative performance of SQL statements can be measured against three parameters: elapsed time to perform the query, CPU time, and a number of logical and physical reads.

Oracle Tablespace Manager

The Oracle Tuning Pack also includes Oracle Tablespace Manager, an application for monitoring and managing tablespace usage. This application provides graphical, at-a-glance views of tablespace details, such as the number of extents allocated in a tablespace, the number of blocks in each extent, and the amount of free space. The navigator on the left displays a hierarchical tree list of tablespaces, segments, and datafiles. When you select a tablespace container or its contents, a dialog box with a graphical chart displays on the right.

Using the dialog boxes in Tablespace Manager, you can reorganize tables, indexes, and clusters for more efficient space usage. During the reorganization process, you have the option of modifying the storage attributes of segments, such as the number and size of extents and data-block percent free / used parameters. If the database objects become fragmented, Tablespace Manager can defragment them to optimize performance.

Oracle Change Management Pack

One of the most challenging tasks for an administrator of an Oracle database is managing changes to database schemas and objects, particularly to those used in mission-critical applications. Changes to schema objects, like tables, need to be implemented without error or loss of data and with minimal downtime.

The Oracle Change Management Pack is a set of tools that provides a complete solution for managing complex schema changes in the Oracle environment. Using Oracle Change Manager's intuitive graphical interface, you can specify the types of changes that need to be made; the Oracle Change Management Pack then performs the necessary analysis of dependencies and generates a script for implementing the changes. It also provides an impact report, so you can evaluate the effects of the changes before actually making them. Additionally, the application allows you to back out of changes and recover to the state before the changes were made.

By using Oracle Change Manager to manage change, administrators can respond quickly to new requirements, eliminate errors or loss of data when making changes, minimize downtime, and maximize productivity.

For more information please refer to the *Oracle Enterprise Manager Getting Started with Oracle Change Manager* manual.

This section describes each of the Oracle Change Management Pack tools:

Topic	See Page
Oracle Plan Manager	5-9
Oracle DB Alter	5-10
Oracle DB Capture	5-10
Oracle DB Diff	5-11
Oracle DB Propagate	5-11
Oracle DB Quick Change	5-12

Oracle Plan Manager

The core interface of the Oracle Change Management Pack is Oracle Plan Manager, which combines change specifications and deployment into one general-purpose tool. Experienced users can accomplish everything that Oracle Change Management Pack can do from the Plan Manager interface. The other tools in Oracle Change Manager are dedicated to giving step-by-step guidance for certain tasks.

Oracle DB Alter

Oracle DB Alter guides you through the process of making changes to one or more object definitions in one or more databases. You indicate changes to objects by directly manipulating their representation in property pages that are similar to those used by Oracle Enterprise Manager's Schema Manager tool. DB Alter can also create a group of changes to object definitions that can be executed as a unit.

When you use DB alter, you are aware that change requests are being bundled into a plan; you can save the plan, select a destination database, generate a script for the destination database, and apply the script against the destination database immediately or at a later time.

Oracle DB Capture

Oracle DB Capture allows you to capture a database or subset of a database in a form that is useful to other applications in the Oracle Change Management Pack, as well as non-Oracle Change Management Pack tools. DB Capture captures a database's object definitions, taking a snapshot of a *baseline* or of a *SQL DDL script*.

A baseline is an object with a unique name that contains a set of database definitions captured at a certain time. A baseline records the time and date it was created and the scope specification, which is a filter used to limit objects included in a baseline by object type and/or schema. A baseline stores definitions in a form that other Oracle Change Management Pack applications can use.

A SQL DDL script is a script that contains commands needed to re-create the definitions in an empty database. You can use the script to create the definitions in a new database, or as input to CASE tools that accept SQL DDL input.

Oracle DB Diff

Oracle DB Diff helps you compare databases, schemas, and individual database objects. When used for comparison only, DB Diff guides you through the process of designating two things to compare and then compares them. You can use DB Diff to compare

- one database to another database
- part of one database to the corresponding part of another database
- one schema to another within the same or another database
- one database to a baseline that has similar metatata
- one schema to another within a baseline
- part or all of one baseline to part or all of another baseline.

DB Diff allows you to drill into areas of difference and see the differences in definition between corresponding objects. After you have found and analyzed differences, you can use DB Diff to synchronize the objects you have compared, making one set like the other (with the exception of baselines, which are read-only and cannot be modified). The Synchronization Wizard creates a *change plan* (a container for one or more change requests which describe the definition changes you want to make to one or more database objects) from which a script can be generated to apply the changes at the selected database.

Oracle DB Propagate

Oracle DB Propagate guides you through various database life cycle activities such as

- reproducing database objects for developers to modify
- reproducing a set of database objects from a development database to a test database
- reproducing needed metadata items when deploying a new application to one or more production databases
- reproducing modified metadata items when upgrading an application at one or more production databases.

You reproduce these items by using DB Propagate to first select object definitions from a source database, then assembling them to be propagated and applied to one or more destination databases or to a destination schema within a database. The

resulting definitions, which are stored in a plan, are applied to a destination database by your generating a script and executing it against the database.

Oracle DB Quick Change

Oracle DB Quick Change simplifies the process of making one or more changes to an object definition in a single database. With DB Quick Change, saving your change requests in a change plan is optional.

Value-Added Applications

Oracle Corporation also offers other administration utilities that can be integrated into the Oracle Enterprise Manager Console.

Oracle Replication Manager

Oracle Replication Manager enables you to perform many system management tasks for a replicated environment.

Oracle Rdb for NT

Oracle Rdb for NT provides graphical tools to administer an Oracle Rdb database.

Oracle Fail Safe Manager

Oracle Fail Safe Manager is the graphical, high-availability option for Oracle solutions on Windows NT clusters.

Oracle Biometrics

Oracle Biometrics Manager administers the biometric credentials (fingerprints) of Oracle database users that use the Oracle Advanced Networking Option.

Note: Other systems management applications are also available for Oracle Enterprise Manager from Oracle Corporation and third-party software developers.

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