

Oracle® Enterprise Manager

Administrator's Guide

Release 9.0.2

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ORACLE®

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Send Us Your Comments

Oracle Enterprise Manager Administrator's Guide, Release 9.0.2

Part No. A95407-01

Oracle Corporation welcomes your comments and suggestions on the quality and usefulness of this document. Your input is an important part of the information used for revision.

- Did you find any errors?
- Is the information clearly presented?
- Do you need more information? If so, where?
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Preface

This chapter describes the purpose and organization of this guide. The following information is discussed:

- Purpose of this Guide
- Audience
- How this Guide Is Organized
- How to Use This Guide
- Conventions Used in This Guide
- Documentation Set
- Related Publications
- Documentation Accessibility

Purpose of this Guide

This guide describes Oracle® Enterprise Manager, Release 9.0.2: Oracle's system management Console, common services, and integrated platform graphical tools. Oracle Enterprise Manager also provides an integrated set of standard database administration applications to help automate and simplify the common daily tasks of administrators. These supplemental applications focus on specific areas of database administration, helping administrators with their daily and routine tasks of managing databases and other services and keeping them operational.

From the client interface, the Oracle Enterprise Manager Console, you can do the following:

- Centrally administer, diagnose, and tune multiple databases
- Manage non-database Oracle products and services
- Effectively monitor and respond to the health of your Oracle family of products and third-party services 24 hours a day
- Schedule jobs on multiple nodes at varying time intervals
- Monitor networked services for events
- Customize your display by organizing databases and other targets into logical administrative groups
- Generate custom and predefined reports for monitored targets in your enterprise and optionally publish the reports to a webserver.

While using Enterprise Manager products, you should refer to the online help for specific information on the displayed dialog box, menu, or window. You can display the online help by pressing F1 or selecting a Help button if present.

For an overview of the Oracle Enterprise Manager system, see the *Oracle Enterprise Manager Concepts Guide*.

Audience

This guide is written for those who wish to use Oracle Enterprise Manager to perform system administration tasks.

This guide assumes you are familiar with the administrative tasks you wish to perform. If you are not, 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 Enterprise Manager applications. In addition, the Oracle server documentation set provides recommendations on how to administer your database optimally. If you have not yet read the introductory chapters of the Oracle server administrator's guide, we recommend that you do so. These chapters describe the specific responsibilities of a database administrator.

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

How this Guide Is Organized

This guide is divided into chapters as described below.

Part I: *Oracle Enterprise Manager Console*

Chapter 1, "Console"

This chapter describes the Enterprise Manager Console, its basic configuration and functions, as well as system administrative functions such as paging, email, and managing administrators.

Chapter 2, "The Standalone Console"

This chapter introduces the option of launching the Console standalone, thus allowing a single administrator to perform simple database schema, instance, storage, security, and other database tasks by connecting directly to the target database(s) without using the Management Server or Intelligent Agents on target machines.

Chapter 3, "Navigator"

This chapter explains the Navigator component of the Enterprise Manager Console, associated menus, and managing objects within the Navigator such as discovering services, managing web servers, and generating reports.

Chapter 4, "Working with Groups"

This chapter explains the Group component of the Enterprise Manager Console and how using Groups can simplify administering your enterprise.

Chapter 5, "Jobs"

This chapter explains how to use the Job Scheduling component of Enterprise Manager to automate administrative tasks.

Chapter 6, "Events"

This chapter explains how to use the Event Management component of Enterprise Manager to monitor managed nodes and services.

Chapter 7, "Enterprise Manager Event Handler"

This chapter explains how to use the Event Handler to monitor for specific event conditions and have Enterprise Manager respond to them automatically.

Chapter 8, "Enterprise Manager Reporting"

This chapter explains how to use Enterprise Manager's integrated reporting functionality and how to publish generated reports to an HTTP server.

Chapter 9, "Enterprise Security Management"

This chapter explains how to use Enterprise Security Manager to administer enterprise user security for the Advanced Security Option.

Part II: *Database Administration Tools*

Chapter 10, "Database Administration"

This chapter introduces the database management functionality, which is an integrated set of standard database administration applications to help automate and simplify the common daily tasks of administrators. It also describes the user interface elements used in the database administration applications.

Chapter 11, "Managing Backup and Recovery"

This chapter explains how to use the Oracle Enterprise Manager Backup Management wizards to administer your database backup and recovery environment.

How to Use This Guide

The *Oracle Enterprise Manager Administrator's Guide* has been designed to be used closely with the Oracle Server documentation set. While this guide describes how to use Enterprise Manager to perform database administration tasks, the Oracle Server

documentation set describes the reasons for and the implications of performing these tasks. Consequently, you should refer to the Oracle Server documentation set while using Enterprise Manager to perform your administrative tasks.

For an overview of the Enterprise Manager system, see the *Oracle Enterprise Manager Concepts Guide*. After reading this manual, you may choose to proceed directly to those chapters that are relevant to the tasks you plan to perform using Enterprise Manager.

Before using the database administration applications, you should read Chapter 10, "Database Administration". This chapter provides an overview of the organization and user interface elements of the applications.

While using the Enterprise Manager products, you should refer to the online help for specific information on the displayed dialog box, menu, or window. You can display the online help by pressing F1 or selecting a Help button if present.

Conventions Used in This Guide

The following sections explain the conventions used in this guide.

Examples

This guide contains code examples. Note that the text of examples appears in a different font than the text of the guide. This is an example of a SELECT statement:

```
SELECT * FROM emp
```

Examples in this guide follow these case conventions:

- Keywords, such as CREATE and NUMBER, appear in uppercase. Keywords have special meanings. When you specify them, they can be in uppercase or lowercase, but they must be used exactly as they appear in the code example.
- Names of database objects and their parts, such as emp and empno, appear in lowercase. However, in the text of this guide, names of database objects and their parts appear in uppercase.
- Parameters act as place holders in examples. They appear in lowercase. Parameters are usually names of schema objects, Oracle datatypes, or expressions. When you see a parameter in a syntax diagram, you should substitute an object or expression of the appropriate type. Note that parameter names appear in italics in the text of this guide.

Command Syntax

- *Italics* is used for variables, such as *oem_tool*
- | denotes alternative choices
- {*param1* | *param2* | ... } signifies that one of the parameters in {} must be used
- [] identifies optional parameters

Special Text

Special text is provided to alert you to particular information within the body of this guide and within other manuals.

Note: This indicates important information related to Enterprise Manager.

Additional Information: Where necessary, this refers you to your operating system-specific Oracle documentation for additional information.

Attention: This highlights information that is important when performing the described task.

Suggestion: This signifies suggestions and practical hints that can be helpful when using Enterprise Manager.

Warning: This indicates information that you should be aware of before you perform the action described in the current section.

Documentation Set

The Oracle Enterprise Manager Release 9i documentation includes the following:

- The *Oracle Enterprise Manager Readme Release 9i* provides important notes on updates to the software and other late-breaking news, as well as any differences between the product's behavior and how it is documented.
- The *Oracle Enterprise Manager Configuration Guide Release 9i* provides information about configuring the Oracle Enterprise Manager system.
- The *Oracle Enterprise Manager Concepts Guide Release 9i* provides an overview of the Enterprise Manager system.
- The *Oracle Enterprise Manager Administrator's Guide Release 9i* describes the components and features of the Oracle Enterprise Manager system.
- The *Oracle Intelligent Agent User's Guide* describes how to administer the Oracle Intelligent Agent.
- The *Oracle Enterprise Manager Messages Manual Release 9i* contains probable causes and recommended actions for Oracle Enterprise Manager errors.
- The *Oracle Enterprise Manager Event Test Reference Manual* contains detailed descriptions of all available event tests.

In addition to the Oracle Enterprise Manager documentation set, extensive on-line help is provided for components in Oracle Enterprise Manager.

To download free release notes or installation documentation, please visit the Oracle Documentation Center at <http://docs.oracle.com/>

Printed documentation is available for sale in the Oracle Store at <http://oraclestore.oracle.com/>

Related Publications

The *Oracle Enterprise Manager Administrator's Guide* refers to important information in related publications. Depending on the version of the Oracle database, you would refer to the appropriate release. The related books referred to in this guide are listed below:

- For general information about the Oracle9i and how it works, see *Oracle9i New Features* and *Oracle9i Concepts*.
- For information about administering Oracle9i, see the *Oracle9i Administrator's Guide*.
- For information on Oracle's SQL commands and functions, see the *Oracle9i SQL Reference*.
- For information about Oracle messages and codes, refer to *Oracle9i Error Messages*.
- For information about the Oracle networking system, see your network-specific documentation.
- For information about the Oracle9i for other platforms, see your platform-specific documentation.
- For information on Oracle 9i Real Application Clusters, refer to the *Oracle9i Real Application Clusters Installation and Configuration*, which provides essential information for preparing Oracle9i for use with Oracle 9i Real Application Clusters and Oracle Enterprise Manager. The "Introducing Oracle 9i Real Application Clusters" chapter provides a conceptual and component overview of Oracle 9i Real Application Clusters. This information will help you prepare and plan your Oracle 9i Real Application Clusters installation and configuration in an Oracle9i environment.

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Part I

Oracle Enterprise Manager Console

- Chapter 1, "Console"
- Chapter 3, "Navigator"
- Chapter 4, "Working with Groups"
- Chapter 5, "Jobs"
- Chapter 6, "Events"
- Chapter 7, "Enterprise Manager Event Handler"
- Chapter 8, "Enterprise Manager Reporting"
- Chapter 9, "Enterprise Security Management"

This chapter introduces the Oracle Enterprise Manager Console and provides an overview of its components. The following topics are discussed in this chapter.

- What's New in this Release?
- Enterprise Manager Console
- Managing Enterprise Manager Administrators
- Configuring Enhanced Notifications (Paging/Email)
- Managing HTTP Servers
- Paging/Email Blackout

What's New in this Release?

Enterprise Manager Release 9.0.2 introduces many technical and usability enhancements that increase ease-of-use and utility.

Enterprise Manager Framework

Improved Console Design

Provides more tightly integrated administrative functionality, better navigation, and improved display of management information through a two-pane, master/detail view of the Administrator's global environment. The “master” left pane displays the Navigator tree while the “detail” right pane shows property sheets or other related information for objects that are selected within the Navigator.

Ability to Create and Publish Enterprise Reports to a Website

Provides a consistent user interface and the underlying “framework” for customizing, scheduling, and publishing reports to the Web. This new functionality - central to all Enterprise Manager applications - allows Administrators to create user-defined reports to satisfy unique business needs; publish reports to a central web site for general viewing, and to specify whether published reports should be generated on demand for constant access to up-to-date information or on a specific schedule to run time-consuming and/or CPU-intensive reports during non-peak hours.

Business impact reporting

Provides a rich set of pre-defined reports out-of-the-box for enabling users to quickly view and analyze information about their managed systems. Pre-defined reports, such as Availability by Service and Outstanding Alerts, identify the current status of the environment. Other pre-defined reports, such as Events in Library and Database Instance Configuration, detail the setup and configuration of the environment. These reports are accessible from a single location in the Console or from the central reporting website.

With a Diagnostics Pack license, administrators also have access to Application Health Assessment reports, which show performance in real time, performance history, and project trends into the future. These additional reports are generated from Diagnostics Pack applications, which post reports directly to the Enterprise Manager reporting website.

Scalability improvements

- *Restricted access to target discovery.* Provides better security of managed systems by allowing only Super Administrators to discover, refresh, and

remove targets from the Enterprise Manager Console. This new functionality prevents regular administrators from adding or deleting managed targets for which they are not responsible.

- *Customizable Console Navigator*: Allows Super Administrators to control and customize the list of managed targets displayed in the Console of regular administrators using Enterprise Manager. This feature improves the security of managed environments by allowing Administrators who are actually responsible for specific targets to view and manage only those targets for which they are responsible.
- *Management Regions*: Support for fully centralized management of distributed, global deployments: customers managing systems that are geographically dispersed can now use Enterprise Manager to manage those systems from a central repository with the same level of performance that they would get from local management.

Reconnect to a Management Server from within the Console

Allows Administrators to easily reconnect to a Management Server from Console should the Management Server to which the Console was originally connected become unavailable. Administrators are now prompted to specify a new Management Server directly from the error message dialog that indicates the original Management Server is no longer available.

Dynamic Events & Jobs Modification

For events, administrators can dynamically change parameters of a registered event such as adding and/or removing targets, changing some attributes, then applying the changes to all the targets of that event. Certain restrictions apply for targets running pre-9i versions of the Intelligent Agent.

For jobs, administrators can dynamically add and/or remove targets for submitted jobs.

Event Schedules

Provides more flexibility in scheduling the evaluation of an event: At specified intervals, on specified day of the week, or on a specified day of the month. It also allows administrators to specify when the first event evaluation starts, a feature which is useful for scheduling resource intensive jobs during off-peak periods.

User-Defined Events

Allows administrators to specify custom operating system scripts as new event tests that will be included as part of the Enterprise Manager Event system. This expands the breadth and flexibility of the Events system by allowing users to write and

incorporate custom scripts that are particular to their environment. Also, administrators can now integrate their existing monitoring scripts into the Events system, and thus take advantage of the services provided by the Enterprise Manager: paging/email notifications for events that go in alarm, collaborative administration of targets, etc.

Enhancements to Database Monitoring

Enhances the Enterprise Manager Event system by adding new database event tests based on metrics that are currently instrumented by the data gathering services of the Intelligent Agent. These metrics can be monitored by both the real-time Performance Manager charts, as well as in a lights out environment via the Events system.

Event Handler Enhancements

The event handler is a production feature in 9i and is now fully integrated with the Oracle Management Server as an internal service. This allows the event handler to be automatically started/shutdown along with the Management Server. Thus the current manual steps necessary to start/stop the event handler will no longer be necessary.

Blackout periods

A command line utility that allows users to suspend activity of a subsystem (jobs/events/collections/all) for a specified target (host/database/listener, etc.). This utility will provide options to start and stop blackout periods and show a list of existing blackout periods. Blackout periods can be set indefinitely until stopped, or a user can specify a duration (days:hours:minutes) for a blackout period. The same utility will be used to start, stop and show status of the Intelligent Agent. See the *Oracle Intelligent Agent User's Guide* for more information.

Database Management

In addition to framework enhancements, numerous improvements have been made to Enterprise Manager's database management functionality:

Complete integration into the Oracle Enterprise Manager Console

All database management (formerly DBA Studio) is now fully integrated into a common management framework, the Oracle Enterprise Manager Console, providing a one stop solution for all database administration tasks such as instance, schema, users, storage, backup/recovery, replication management and much more.

Replication Enhancements

The new version of replication management introduces support for single master quiesce for snapshots along with improved “Templates” Wizard to help in setting up snapshot sites more easily. In addition, replication management adds the capability to generate and save comprehensive HTML reports on the replication environment status.

OLAP Management

Business decision makers need fast access to data, powerful computational, analytical capabilities and flexible viewing capabilities of analysis-based decision-oriented systems. These systems are called OLAP systems. Oracle 9i release seamlessly integrates OLAP capabilities with the database server, using source and aggregated data from the relational source (ROLAP). Oracle now becomes a single platform for the OLTP, Warehousing and OLAP needs. Oracle Enterprise Manager provides the graphical user interface that guides the user to define and manage metadata objects, generate pre-computed data elements of the OLAP model using the Oracle Summary Management and produce comprehensive HTML reports on these.

Real Application Clusters Improved Support

The Real Applications Clusters feature is supported in Oracle Enterprise Manager similar to the management of single instance databases. In addition, cluster instances configuration and specific metrics, such as sessions, can be managed independently, per instance.

Diagnostics and Performance Charts

With the new version capabilities provided by performance management tools and capacity planning tools are fully integrated into Enterprise Manager. If the Oracle Diagnostics Pack is installed a “Performance” node appears under each managed database which contains a list of important charts: Overview, Top Sessions, Top SQL and Lock Manager. The user can select these charts, view the details and has the option to launch the diagnostics tools from the property page displayed.

DB Search Capabilities

A commonly used and very helpful facility previously available only with the Diagnostics Pack, is now available from Enterprise Manager Console: database search. It allows a user to search for any object in a database given a flexible set of criteria.

Additional HTML Reports

Enterprise Manager 9i includes additional pre-defined HTML reports to help in day to day database administration. Among them are schema specific reports, users (security) and object space usage reports.

Support for 9i New Features

- *Persistent parameter file*: Persistent parameters are a subset of all database initialization parameters that are persistently stored in the library cache and control the behavior of the PL/SQL compiler. DBAs would typically want to control these parameters and set them to specify system wide defaults and control PL/SQL applications. Enterprise Manager instance management lists these new parameters and allows the user to modify, apply changes and re-initialize the database.
- *Undo Tablespace*: Oracle 9i introduces a new approach to undo space management, Automatic Undo Management, which eliminates the need to rollback segments. With this new design users allocate their undo space in a single undo tablespace, instead of distributing them into a set of statically allocated rollback segments. Enterprise Manager 9i allows to create and set a new undo tablespace for a database. In addition, under instance management a new “Undo” tab displays the name of the active undo tablespace and the current time the database can recover after an instance crash (retention time). Administrators can modify the retention time and a graphical display of space requirements per minute of retention time can help deciding on an optimal value for it.
- *Buffer Cache Advice*: Oracle9i includes an advisory mechanism that can be used to determine an optimal size for the buffer cache. Enterprise Manager Buffer Cache Size Advice graphical display helps determine if the buffer cache should be grown or shrunk for your present workload. The chart makes it much easier to view, interpret the data and set a new optimal size for you cache.
- *Mean Time to Recovery*: Recovery from instance failure in Oracle 9i is automatic, requiring no DBA intervention. Maximum recovery time may be dictated by your business (for example, no longer than 1 minute). Administrators can control the time required for recovery after and instance crash by simply specifying the time interval and the database translates that automatically into necessary parameters.
- *Temporary Tablespace*: Storage of temporary data should require less overhead than storage of permanent data, so a default temporary tablespace, locally managed, is created at database creation time. All new users and existing ones not assigned to a temporary tablespace are assigned to this default one. Using

Enterprise Manager administrators will be able to view the current temporary tablespace, create a new one and switch to a new default temporary tablespace if needed.

- *Unicode Support:* Unicode can represent characters in any language. In a table column of type “unicode” text of any language can be stored. Enterprise Manager 9i allows definition of this new column type when creating a table. Specifically, the user will be able to select a column of “character” type and specify the length in “bytes” or “characters”. By default the column length will be as specified by the NLS_LENGTH_SEMANTICS initialization parameter.
- *Multiple Block Sizes:* Support for multiple block sizes within the database is key in facilitating transportability of tablespaces from one database type to another (for example, OLTP database to an Enterprise Data Warehouse). Oracle 9i allows creation of a “standard” block size and up to 5 additional “non-standard” block sizes such that tablespaces can simply be plugged-in from one database to another. Based on block sizes defined as an initialization parameter Enterprise Manager allows creation of new tablespaces with these new block sizes, selecting from a drop down list the block size needed.
- *Online Table Reorganization:* Oracle 9i supports the online reorganization of tables that satisfy some given conditions (for example, tables must contain a primary key). For the tables satisfying these conditions, the Enterprise Manager Reorg Wizard can perform the reorganization online if so specified.
- *Summary Advisor Workload:* Prior to version 9i, Summary Advisor used row cardinalities on base tables as a basis for recommending materialized views. In the new version the Summary Advisor has been enhanced to use workload data collected from SQL cache, Oracle Trace or an external source.
- *Materialized Views Enhancements:* To help a user know exactly what to expect from a materialized view, the new version will have a facility for explaining what aspects of Summary Management a particular materialized view supports.

Support for 8.x database features

- *Advanced Queuing:* The new version of Enterprise Manager enhances Advanced Queuing support by introducing a new topology map that displays top level information on schedules for all queues on the database selected, including dblinks status. In addition, for each queue and link users can view schedule details, edit properties and view errors details if any. Each queue also displays all available messages and they can easily be sorted using the same filtering mechanism as Table Data Editor.

- *Backup and Recovery Enhancements:* To improve the flexibility of Backup and Recovery facility the Enterprise Manager job system is now supporting an RMAN-specific job type. Users will be able to simply input any RMAN command and submit it as an Enterprise Manager job.
- *Tablespace Management:* Dictionary managed tablespaces can now be easily converted to being locally managed directly from storage management.

Enterprise Manager Console

The Console is the primary interface used for all Oracle Enterprise Manager operations. It provides menus, toolbars, and the framework to access Oracle tools and utilities in addition to those available through other vendors. The graphical configuration of the Console and the tools available are determined by the optional products installed and user preferences. See Figure 1-1, "Console Window" for an illustration of a Console screen.

Components

The Console uses a master/detail configuration to provide an integrated, consistent, and efficient way of managing your enterprise environment. When an object in the Navigator (master) is selected, the appropriate interface is displayed on the right-hand side of the Console (the detail pane). Information displayed on the right-hand side of the Console can be a multi-column list, property sheet, or overview page.

Navigator

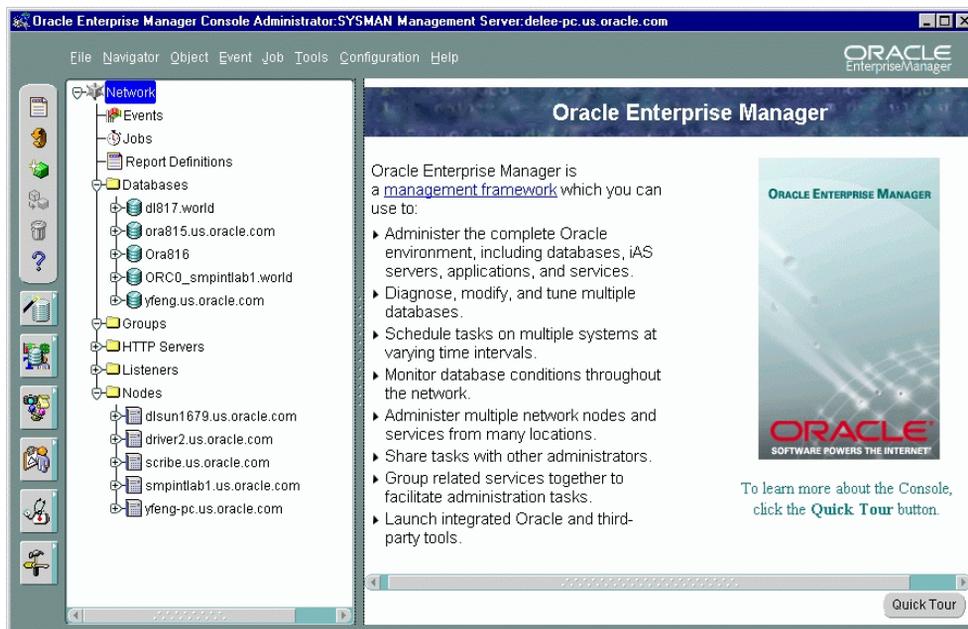
The Navigator displays a hierarchical list of all the targets in a network, providing a direct view of targets such as databases, groups, listeners, and nodes, plus the objects that they contain. The Navigator shows all the network targets with their relationships to other objects. Objects within the Navigator can be managed via context-sensitive menus. For example, you can also perform many administration tasks from the Navigator, such as creating, editing, or dropping tablespaces. See Chapter 3, "Navigator" for information.

Detail Pane

The Detail pane displays information or functionality relevant to whatever object is selected in the Navigator. Some elements that can be displayed are multi-column lists summarizing attributes or contents of an object, property sheets providing

object information and any functionality relating to the object, or comprehensive overview pages with links to related Quick Tours or functional overviews.

Figure 1–1 Console Window



Console Menus

The Console menu bar provides access to the following menus:

Figure 1–2 Console Main Menu



The File, Object, Tools, Configuration, and Help menus are described in this section.

- See "Navigator Menu" on page 3-4 for information about the Navigator menu.
- See "Job Menu" on page 5-11 for information about the Job menu.

- See "Event Menu" on page 6-36 for information about the Event menu.

When using the Console menus, note the following:

- Some menus include other menus. For example, when you select the Database Applications from the Tools menu, a sub-menu containing several options displays.
- Menu options vary depending on the objects selected in the Navigator or the active window in the Console such as the Groups View page. The Tools menu items vary depending on the components that have been installed.

Context-Sensitive Menus

You can click the right mouse button on objects in the Navigator or some windows of the Console to display a context-sensitive. This menu usually contains a subset of the options that are available through a menu in the main menu bar, or functions that are specific to a selected object in the Navigator. For example, if you click the right mouse button on a group in the Navigator, a menu appears with the menu options from the Object menu. Dialogs and property sheets displaying objects in general use the context-sensitive menus for most, if not all operations that can be performed on an individual object.

File Menu

The File menu items allow you to exit the system.

Object Menu

The Object menu provides object-specific functionality for an object selected in the Console Navigator. Though menu options change depending on the object, five base menu options always appear.

Create

Displays the Create Object dialog allowing you to create Navigator objects such as jobs, events, database objects, and report definitions.

Create like

Displays the object's Create/Edit property sheet allowing you to create a new object based on the original object's parameter settings.

View/Edit Details

Displays the object's Edit property sheet allowing you to modify the selected object's parameters.

Delete

Deletes the selected object from the Navigator.

View Published Reports

Displays the Enterprise Manager reporting home page.

Configuration Menu

The Configuration menu provides options to set up administrator and system configurations.

Preferences...

Displays the Edit Administrator Preferences property sheet, which allows the current administrator to change preferences, including access levels and login credentials. See "Changing Administrator Preferences" on page 1-19 for more information.

Add Services to tnsnames.ora

Updates the local network configuration file (tnsnames.ora) with discovered services information.

Font Settings

Changes the font settings for the Console as well as any applications launched from the Console.

Font settings in pop-up menus will not change even if you have specified to change the font settings.

Report Data Purge Options

Displays the Report Data Purge Options dialog. This dialog allows you to set the purge policy for the report data log. The report data log contains information that is collected over time and used in service level reports and enterprise reports. The report data log is stored in one or more tables within the Enterprise Manager repository. All event occurrences and service level response time tasks are logged to the report data log.

SQL Logging

Allows you to log SQL in a permanent log file. SQL Logging allows you to specify the SQL logging file information and options. When you are connected to the Management Server, you can query the log (View SQL Log).

View SQL Log

Available only when you are connected to a Management Server, this menu item displays the SQL Log Viewer, which allows you to view and purge contents of the log.

Configure Paging/Email

Allows you to set up enhanced notification (paging/email) systems for administrators. This menu option is only available to super administrators.

Manage Administrators

Displays the Administrator Manager Accounts property sheet for adding, modifying, and removing administrators. This option is only available to Super Administrators. See "Managing Enterprise Manager Administrators" on page 1-14 for more information.

Grant Access to Targets

Displays the Access to Targets dialog, which allows super administrators to customize Navigator views for all regular administrators. See "Granting Access to Targets" on page 1-17 for more information.

Set Paging/Email Blackout

Displays the Paging/Email Blackout dialog. Paging/Email Blackout allows an administrator with super administrator privileges to suspend paging and email notifications for specified targets and/or services that have been previously discovered in the Navigator. See "Paging/Email Blackout" on page 1-40 for more information.

View Reporting Website Configuration

Displays the current Reporting webserver configuration. An error message is displayed if no webserver has been configured.

Define Management Regions

Displays the Management Regions property sheet. The Management Regions feature allows super administrators to partition the targets of a particular repository and assign them to a subset of the available Management Servers.

Tools Menu

The Tools menu allows you to execute database applications and other utilities that have been installed on your system. The menu options in the Tools menu depend on your installed Oracle Enterprise Manager configuration. The standard complement of options includes:

- Database Wizards
- Application Management
- Change Management Pack
- Database Applications
- Diagnostics Pack
- Tuning Pack

Other optional applications may also be available from this menu.

Help Menu

From the Help menu, you can access the Enterprise Manager online help system. You can also access Enterprise Manager's Quick Tours. Enterprise Manager comes with a variety of Quick Tours, each providing a comprehensive overview for Enterprise Manager and specific integrated applications. Enterprise Manager version information is also available.

Toolbars/Tool Drawers

The Console toolbar, located along the upper-left side of the Console, allows you to access basic manipulation functions for objects in the Navigator and the Console in general. Some functions of the toolbar will be unavailable depending on the object selected in the Navigator. Object functionality are (top to bottom):

- View Enterprise Manager reports published on a web server
- Refresh Navigator views
- Create a new object
- Create a new object based on an existing object
- Remove an object
- Display the master contents page of the help system

Figure 1–3 Console Toolbar and Tool Drawers



The Console tool drawers, located below the toolbar, provides quick and easy access to a wide variety of integrated applications. Placing the cursor over any drawer, or content of that drawer displays the application name.

Managing Enterprise Manager Administrators

Enterprise Manager is a multi-administrator system: every person who is administering systems using Enterprise Manager has their own administrator account which they use to log into the Console.

Types of Enterprise Manager Administrators

The installation of Enterprise Manager creates two super administrator: *reports_user* and *sysman*. The *reports_user* super administrator owns all predefined reports of the reporting system. See "Enterprise Manager Reporting" on page 8-1 for more information. The super administrator *sysman* creates administrators using the Manage Administrators option in the Console Configuration menu. In addition to an administrator name and password, each account can be tagged as a "Super Administrator" account or an account to which the administrator has access to only jobs and/or events. Differences between the two types of accounts are as follows:

- **Super Administrators** automatically have full privileges for all objects in the system. To provide greater security, only Super Administrators can discover, refresh, or remove targets from the Console Navigator.

Most Super Administrators also have a separate account for daily operations but use their Super Administrator account for special operations only available to Super Administrators, such as starting and stopping the Management Server, creating new Enterprise Manager Administrators, configuring paging servers, or checking other administrator's schedules. Using the `sysman` account for daily administration work is not recommended. The Super Administrator account is similar to root on UNIX or Administrator on Windows NT and is a user which cannot be deleted or renamed. It is a user that can perform any task and therefore should be used only for setting up the environment. After the necessary DBA accounts are created, the Super Administrator account 'SYSMAN' should not be used anymore.

- **Regular Administrators** can have access to a subset of Console operations and will only see or be able to modify those jobs, events, or groups to which they have been granted access by the Super Administrator or other regular administrators. See "Granting Access to Targets" on page 1-17.

Typically, all administrators share a single Enterprise Manager repository, which allows administrators to share information. Although you can set up multiple repositories, administrators using different repositories will not have access to each other's information; there is no sharing of data between repositories. Administrative data stored in the repository is filtered based on administrator permissions.

Preferred Credentials must be set up for each administrator account. When an administrator connects through the Navigator, the preferred credentials used are those defined explicitly for that administrator.

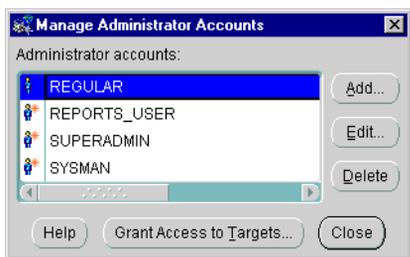
Managing Administrator Accounts

Enterprise Manager administrators are created, edited, and deleted with the Manage Administrators option of the Console Configuration menu. The Manage Administrators option displays the Manage Administrator Accounts dialog (Figure 1-4, "Manage Administrator Accounts"). The Manage Administrators option is only available to Super Administrators. Super Administrators have full privileges for all objects and can create, edit, and delete other administrators. The Super Administrator sets up the administrator name and initial password and determines whether an administrator is a Super Administrator or regular administrator. The Super Administrator also determines whether the administrator has access to the job and event systems.

In this dialog, you can:

- Click the Add button in the Manage Administrator Accounts dialog to display the Create Administrator Account dialog. The Administrator Account dialog allows you to add a new administrator. See "Creating or Editing an Administrator Account" on page 1-16 for more information.
- Click the Delete button to delete an administrator. If the administrator is the owner of any objects, you need to reassign object ownership otherwise the objects are deleted with the administrator. See "Reassigning Object Ownership" on page 1-19 for more information.
- Click Grant Access to Targets to control what targets appear in the Navigator for regular administrators. See "Granting Access to Targets" on page 1-17 for more information.

Figure 1–4 *Manage Administrator Accounts*



Creating or Editing an Administrator Account

To add a new administrator, click Add in the Manage Administrator Accounts dialog to display the Create Administrators dialog.

In the Create Administrators dialog, enter a unique administrator name and password for the Enterprise Manager administrator. Note that the administrator name (account login used by Enterprise Manager) is not the same as a database username (account login used by the database).

Figure 1-5 Create Administrator Account

The screenshot shows a dialog box titled "Create Administrator Account". It has three text input fields labeled "Username:", "Password:", and "Confirm Password:". Below these fields are three checkboxes: "Super Administrator account" (unchecked), "Access to job system" (checked), and "Access to event system" (checked). At the bottom of the dialog are three buttons: "OK", "Cancel", and "Help".

Check the access available to the administrator:

Super Administrator

Allows the administrator to add other administrators, as well as access to all created objects, e.g., jobs, events, and groups.

Access to Job System

Allows the administrator access to the Job system, but does not automatically give access privileges for specific jobs.

Access to Event System

Allows the administrator access to the Event system.

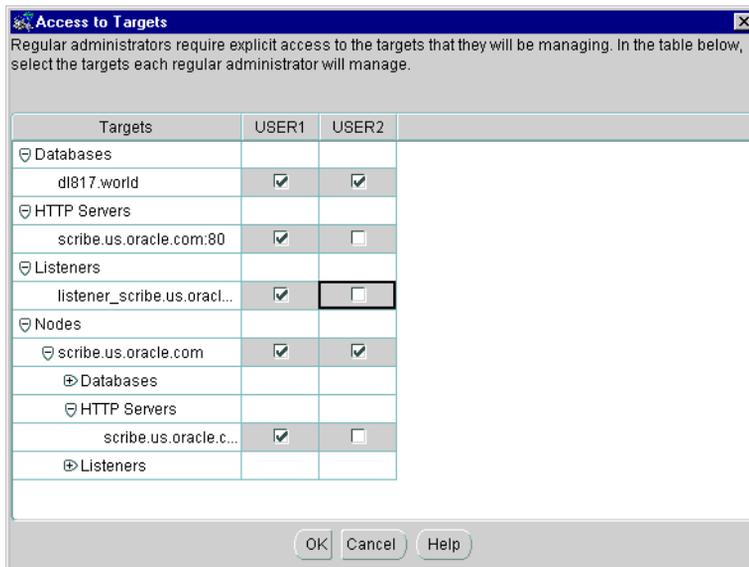
After an administrator has been created, the administrator can log in to the Enterprise Manager Console and set up administrator preferences.

If you click the Edit button, the Edit Administrator Preferences window displays. You can then edit the preferences for the selected administrator.

Granting Access to Targets

Enterprise Manager Super Administrators can control what regular administrators see in the Console Navigator through the Access to Targets dialog. This dialog can be displayed by either choosing Grant Access to Targets from the Console's Configuration menu, or clicking Grant Access to Targets from the Manage Administrator Accounts dialog. See "Managing Administrator Accounts" on page 1-15.

Figure 1–6 Access to Targets Dialog



The ability to control what targets and services appear to different users helps simplify maintaining your enterprise. For example, if you are managing 100 targets in your enterprise, and Administrator A’s responsibilities require that he manage a only 10 targets, the Super Administrator can specify that only the 10 managed targets appear in the Navigator when Administrator A logs into the Enterprise Manager Console. Again, only Super Administrators can customize Navigator views.

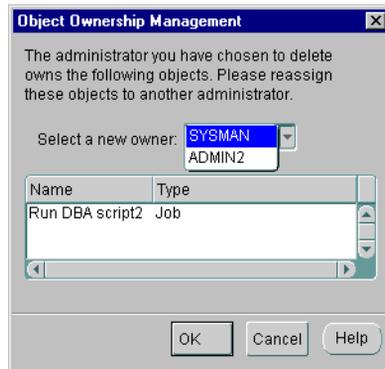
To customize the Navigator for regular administrators:

1. From the Console’s Configuration menu, choose Manage Administrators. The Manage Administrators Accounts dialog appears.
2. Click Grant Access to Targets. The Access to Targets dialog appears. The Targets column can be expanded to display lower level objects in the Navigator.
3. Under each administrator, click all checkboxes that correspond to the objects you want to appear in the Console Navigator when that user logs in.
4. Click OK when finished to close the dialog.
5. Click Close to close the Manage Administrator Accounts dialog.

Reassigning Object Ownership

If you attempt to delete an administrator who owns any object, the Object Ownership Management dialog appears. See Figure 1–7, "Object Ownership Management". The dialog allows you to reassign the objects to another Enterprise Manager administrator. If you do not reassign the objects, the objects are deleted along with the administrator.

Figure 1–7 Object Ownership Management



Changing Administrator Preferences

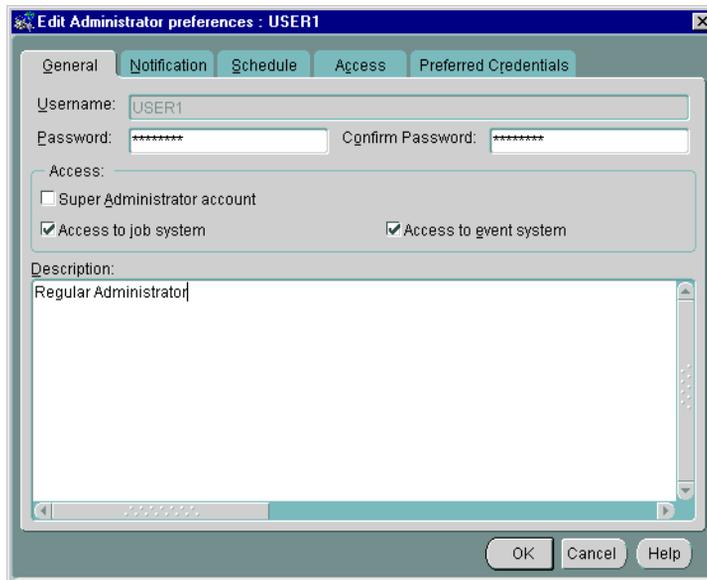
The Edit Administrator Preferences property sheet is displayed with the Preferences option of the Configuration menu and allows you to modify the administrator preferences of the user who is currently logged into the Console. The pages in the property sheet are:

- General
- Notification
- Schedule
- Access
- Preferred Credentials

General

The General Preferences page allows a Super Administrator to change an administrator's password and access privileges.

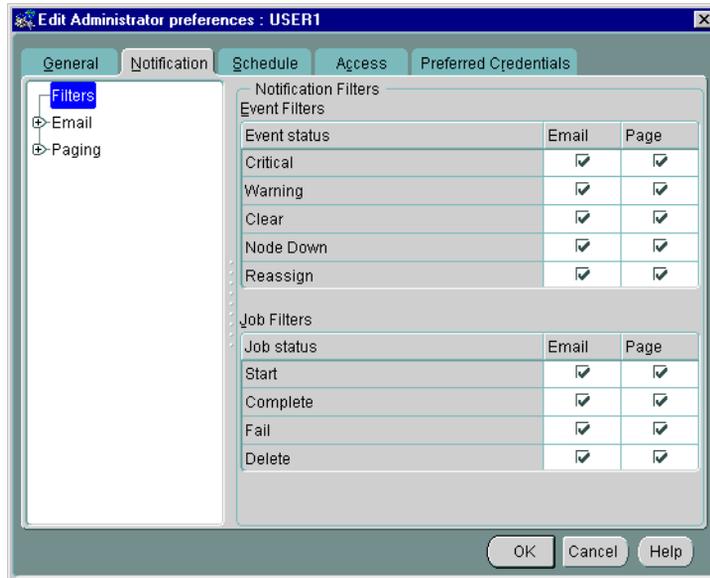
Figure 1–8 Administrator General Preferences



Notification

The Notification page allows you to set up paging and email notification methods for the administrator. This page consists of a hierarchical tree list and a right-side modal area that changes according to the object selected in the navigator. The tree list consists of three top-level objects:

- Filters (Selected by default)
- Email
- Paging

Figure 1–9 Administrator Notification Preferences

Filters

Notification filters allow each administrator to specify when to send an email notification as opposed to a page notification as a result of a job or event status change.

- **Event Notification Filter:** The Event Notification Filter allows you to filter email/pages sent to an administrator according to the event's level of severity. Filtering is set at the user level by checking or unchecking the Email/Page options on this property sheet page. You can select any combination of the following levels of event severity. For example, you can set filtering so that an administrator is notified via email if there is a warning and notified via the paging system if there is an alert. Selecting all levels of severity provides no filtering.
 - *Critical*
 - *Warning*
 - *Clear*
 - *Node Down*
 - *Reassign*

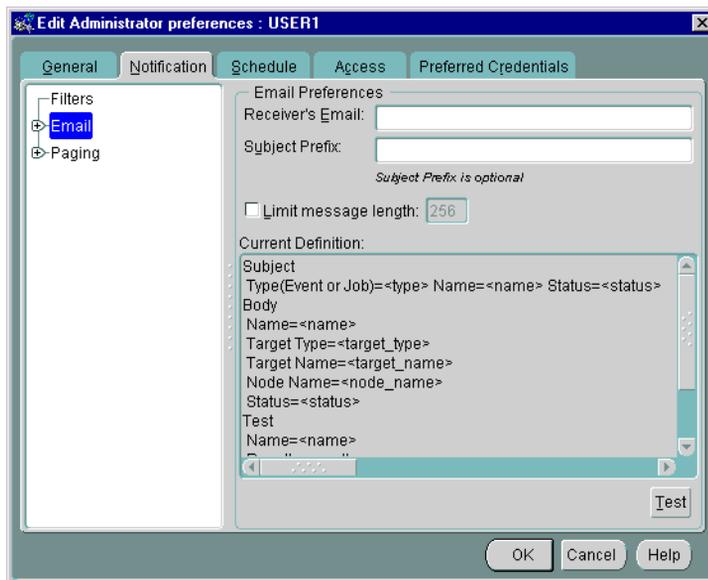
Job Notification Filter The Job Notification Filter allows you to filter email/pages sent to an administrator according to job status. As with the Event Notification Filter, filtering is set at the user level by checking or unchecking the desired option. Selecting all job statuses provides no filtering.

- *Start*
- *Complete*
- *Fail*
- *Delete (Job removed)*

Email

This page allows you to specify notification parameters for email.

Figure 1–10 Administrator Notification Preferences: Email



- **Receiver's Email:** Enter the email address of the administrator to whom the mail is being sent. You can add multiple email addresses by using commas, spaces, or tabs as delimiters between each address.

- **Subject Prefix:** Enter an optional prefix that is appended to the E-mail subject. That allows administrators to quickly identify messages from Enterprise Manager in their mail.
- **Limit message length:** Allows you to specify the maximum message body length of an E-mail notification. By default, this length is unlimited.
- **Current Definition:** Displays the current settings for format and content of E-mail notifications. To set or change the default parameters, expand the Email object in the tree list. You can select format and content options for the Subject line and Message Body. You can further expand the Message Body object to specify options at the Per Event Test level.
- **Test:** Click the Test button to check the validity of E-mail configuration. A message displays to inform you of the status of the test email.

Email Subject This page allows you to select the content and format of the email subject line. By default, Type, Name, and Status are selected. You use the left/right arrows to move items back and forth between the Available and Selected lists.

Once an item has been selected, you can control the order in which the item appears by selecting it in the list and using the up/down arrows (located to the immediate right of the Selected list) to reposition the item within the list.

Note: The following information also applies to inserting content into the Email/Paging message body.

- **Available:** Lists available content.
- **Selected:** Lists currently selected content and the order in which the content should be displayed.
- **Use Abbreviated Format:** For Type (Job or Event), Status, and Target Type, you can select the Use Abbreviated Format option. When selected abbreviations are used in the Subject line. The following abbreviations are used by the system

Table 1–1 Target Type Abbreviations

| Abbreviation | Target |
|--------------|----------|
| DB | Database |

Table 1–1 Target Type Abbreviations

| Abbreviation | Target |
|---------------------|---------------|
| LSR | Listener |
| N | Node |

Table 1–2 Status Type Abbreviations

| Abbreviation | Status |
|---------------------|------------------|
| ST | Started |
| C | Completed |
| F | Failed |
| D | Deleted |
| W | Warning |
| CR | Critical |
| CL | Cleared |
| NU | Node Unreachable |
| AC | Assignee Changed |

Timestamp Format

This option is available if Timestamp is chosen from the Selected list. You use the pull-down menu to select one of the pre-defined formats.

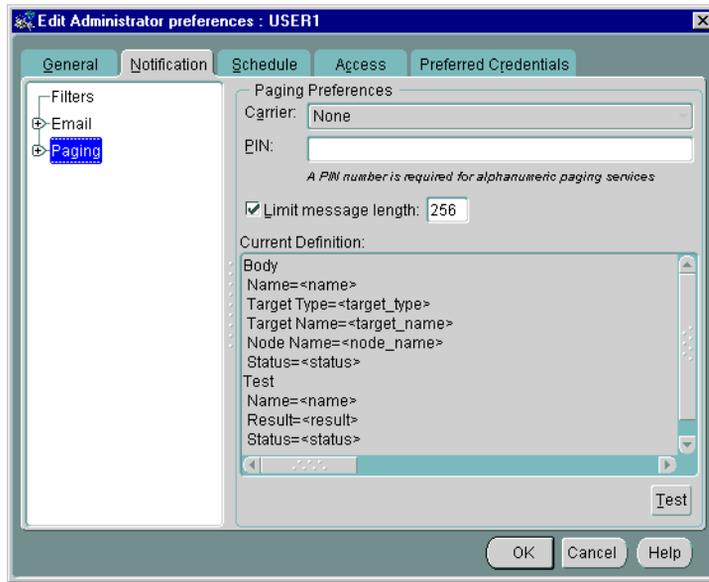
Do not include titles

When selected, classification titles such as Status, Service Name, and Timestamp are omitted from the message.

Paging

This page allows you to specify notification parameters for paging.

Figure 1–11 Administrator Notification Preferences: Paging



- **Carrier:** After a paging server is specified by a super administrator and the name of the paging carrier service and the corresponding paging carriers have been configured, select the name of the paging carrier service from the pull-down list.
- **PIN:** Enter the PIN for your paging carrier. This entry is only required for alphanumeric pagers. Enterprise Manager does not provide PIN support for numeric pagers.
- **Limit message length:** Allows you to specify the maximum message length of paging notifications. By default, this length is set to 256 characters.
- **Current Definition:** Displays the current settings for format and content of paging notifications. To set or change these parameters, expand the Paging object in the tree list. You can select format and content options for the Message Body. You can further expand the Message Body object to specify options at the Per Event Test level.
- **Test:** Click the Test button to check the validity of the paging configuration. For alphanumeric pagers, enter the PIN number. For numeric pagers 700, is sent.

Click on the Send button to send a test page to the specified pager. A message informs you of the status of the test page.

If the test fails, check the log file. If tracing is enabled for paging, you can also view the paging trace log file in the ORACLE_HOME\sysman\log directory on the machine running the paging server.

Paging Status Codes for Numeric Pages

Numeric pages need to be interpreted as follows:

For job notifications, you will receive a 3 digit number which indicates the job status.

For event notifications you will receive the a 3 or 4 digit number indicating the event status.

The event status and job status codes are listed as follows:

100 = Job Started

200 = Job Completed

300 = Job Failed

400 = Job Deleted

500 = Event Cleared

600 = Event Warning

700 = Event Critical

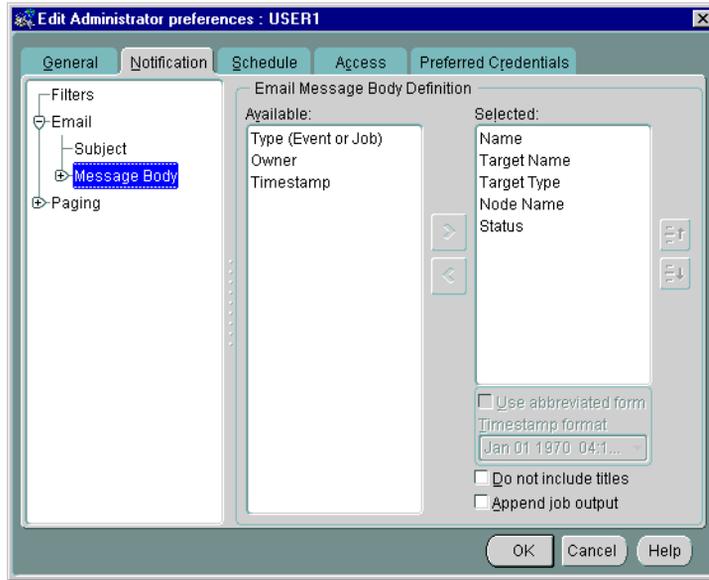
800 = Event Node Down

900 = Event Unknown

1000 = Event Assignee Changed

Email/Paging Message Body Definition

This page allows you to select the content and format for the body of the email or page message. By default, Name, and Status are selected. You use the left/right arrows to move items back and forth between the Available and Selected lists.

Figure 1–12 Administrator Notification Preferences: Email/Paging Body

Expanding the Message Body object in the navigator and selecting per Test allows you to use a subset of the following option settings on a per test basis. See "Email Subject" on page 1-23 for more information on manipulating message content.

- **Available:** Lists available content.
- **Selected:** Lists currently selected content.
- **Use Abbreviated Format:** For Type (Job or Event), Status, and Service Type, you can select the Use Abbreviated Format option. When selected abbreviations are used in the Subject line. See Table 1–1, "Target Type Abbreviations" and Table 1–2, "Status Type Abbreviations".

Timestamp Format

This option is available if Timestamp is chosen from the Selected list. You use the pull-down menu to select one of the pre-defined formats.

Do not include titles

When selected, classification titles such as Status, Service Name, and Timestamp are omitted from the message.

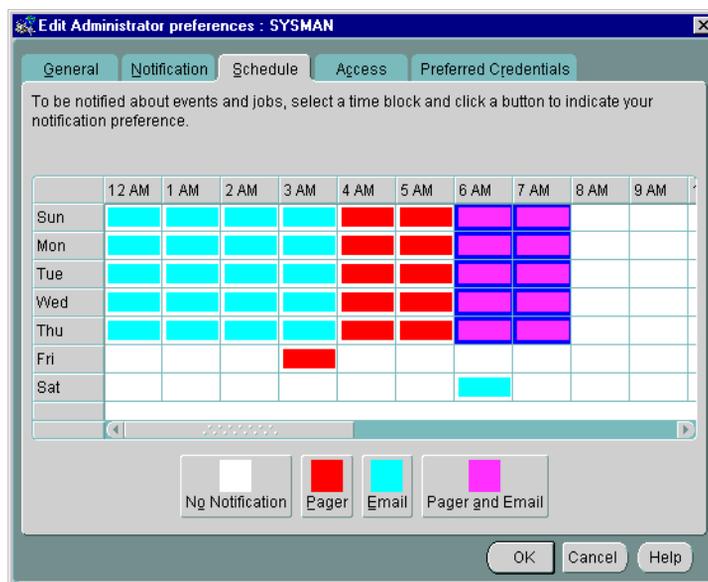
Append job output

When selected job output is appended to the end of the notification. For instances where job output is large, you may want to specify a limit to the message length. If the job output pushes the notification length past the specified limit, then the job output will be truncated, not the message itself.

Schedule

Use this property sheet page to indicate when you want to be paged and/or e-mailed. Determine the day, hour, and the method of notification. You will receive notifications only on the objects you have permission to access.

Figure 1–13 Administrator Notification Schedule



An administrator can be notified by email, paging, or both email and paging. Paging is recommended for urgent jobs, events, or critical systems.

To determine notifications:

1. Select in the appropriate day/hour to set the notification method for that time period.

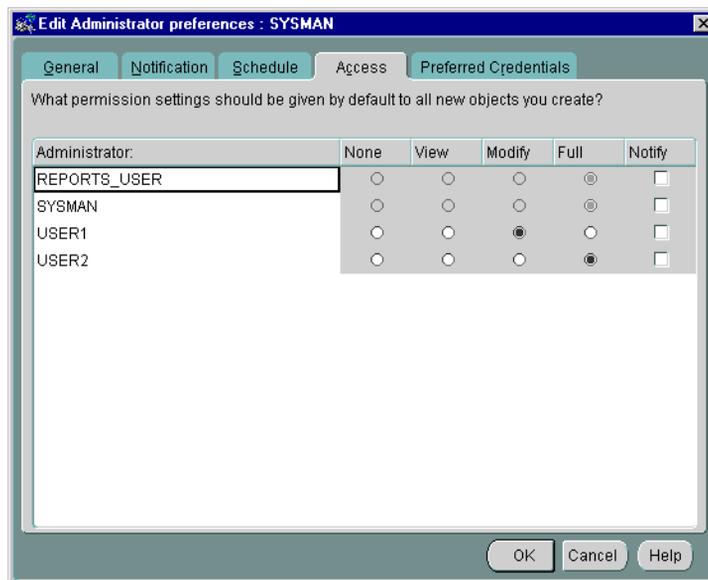
2. Click No Notification, Pager, Email, or Pager and Email at the bottom of the dialog to set the notification type for
3. Repeat steps 1 and 2 for each notification method.

If you want to set the same notification an entire day or an hour of the day, click on the heading for that row or column. For example, if you want to set up paging notification for Saturday, click on the Sat heading after you have selected Pager at the bottom of the screen. You can also drag the cursor to “paint” across multiple cells.

Access

Use this property sheet page to determine the default permissions you want to assign to other administrators for the objects you create. This allows other Enterprise Manager administrators to share objects, such as events and jobs, that you have created. If you work on a team, this page lets you assign access privileges to all the members of the team at one time. When an object is created by an administrator, that administrator is the owner and automatically has full permissions. The owner's permissions cannot be modified.

Figure 1–14 Administrator Default Permissions



Access-control permissions apply to event, group, and job objects. When these objects are created, the default permissions are assigned to other Enterprise Manager administrators according to the selections in this page. These initial permissions can be overridden with the Permissions page of the object's property sheet.

For more information, see the following sections:

- "Group Access Page" on page 4-7
- "Job Access Page" on page 5-21
- "Event Access Page" on page 6-47

Note: Changing your default access level does not retroactively change access levels on existing objects.

The levels of access that you can assign to an Enterprise Manager administrator are shown in Table 1–3, "Administrator Access Levels".

Table 1–3 Administrator Access Levels

| Permission Level | Description |
|------------------|--|
| None | This access does not allow the administrator to view this object anywhere. |
| View | This access allows the administrator to view the object, inspect object properties, view job/event status and outputs, and receive notifications if the object is an event. |
| Modify | This access allows the administrator to edit the object's properties except those reserved for Full permission. |
| Full | This access allows the administrator to delete the object, modify permissions for other administrators, and change the ownership of the object. |
| Notify | This access allows the administrator to receive event notifications on the objects. Notify permission cannot be assigned if the administrator's permission level is set to None. |

Preferred Credentials

The Administrator Preferred Credentials property sheet page displays a list of targets in the network, along with the target type and the administrator name for accessing the target. The property sheet page is accessed with the Administrator Preferences option of the Configuration menu. Each row in the list of the property sheet includes:

- Target Name
- Target Type (such as database, listener, or node)
- Credentials (Check mark indicating you have already specified connection information. The check mark is either grey (credential set in a previous session) or green (credential set in the current session).

You can click on a column heading to sort on that column. See Figure 1–15, "Administrator Preferred Credentials" for an illustration of the property sheet.

Note: Individual instances of an Oracle 9i Real Application Cluster are listed. Oracle recommends that all instances of a Oracle 9i Real Application Cluster use the same preferred credentials as the Oracle 9i Real Application Cluster.

Also, the Intelligent Agent authenticates the user name and password for all jobs and many events that it runs. These credentials are used when you access a network service in the Navigator or Group, and when running jobs and registering events. If you do not set the preferred credentials correctly, jobs and events may fail. See "Job Credentials" on page 5-4 and "Registering Events" on page 6-6 for more information.

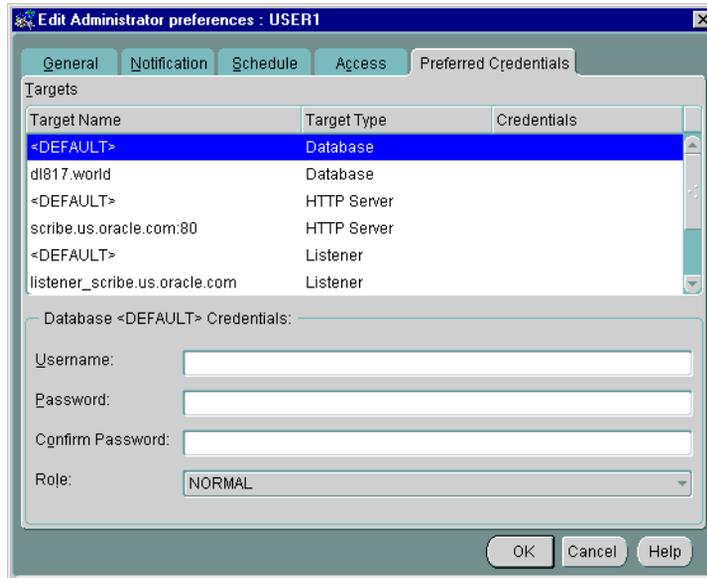
Important: Changes to the Preferred Credentials will not be automatically propagated to previously registered jobs and events. In order to update these jobs and events with the new preferred credentials, you must de-register and subsequently re-register the jobs and events.

Oracle recommends that if some services of a particular type require the same credentials, use the <DEFAULT> credentials selection for that service type to have those credentials used by all services of that type.

For example, if Administrator_1 has a username and password of foo/bar on all the databases that he manages, the administrator needs to enter foo/bar as his credentials in the <DEFAULT> database entry. All database administration tasks will use these <DEFAULT> credentials.

Furthermore, if the administrator has just one database which requires different credentials from foo/bar, he can enter different credentials for that database by selecting that specific database.

For NT users, you must set the preferred credentials for the node (where the NT Intelligent Agent resides) to be the same as the user that is set up to "Logon as a batch job."

Figure 1–15 Administrator Preferred Credentials

Setting Administrator Credentials

Select any row to update the credential fields for the object identified in the row.

Username

Enter the username. This field is required if a password needs to be entered.

Password

Enter the password associated with the username.

Confirm Password

Confirm the password.

Role (Database only)

Select the role from the pull-down list. You need to login with the SYSDBA or SYSOPER role to start up or shut down a database.

Changes to the credentials are recorded when you move to another line. When you are finished, save all your updates by clicking the OK button at the bottom of the property sheet.

Saving Logon Information as a Preferred Credential

Another convenient way to specify Preferred Credentials for discovered services is to select the Save as Preferred Credential option when manually connecting to a service from the Console or integrated application. For example, you attempt to access a newly discovered database from the Console Navigator. Enterprise Manager displays the Connect Information dialog so that you can log in to the database. You type in the requisite information and check the Save as Preferred Credential option. Click OK to log on to the database and save the logon information as a Preferred Credential for this service.

Saving the Contents of a List

Save list allows you to extract information from a multi-column list (such as the Job or Event History panes) and save it in a variety of formats (text, HTML, or Comma-Separated-Values). For example, you can select one or more entries in the Event History pane. By selecting the Save List from the Object menu, you can save the list information (Event, Target, Target Type, Severity, Date/Time, Assigned To, Owner) to an HTML file. The dialog consists of the following elements:

File Name

The name and directory to which you want to save the file information.

Browse

Displays the File Save to dialog. Choose the desired location and file name.

Format

Select HTML (table), Text row, or comma-separated-values (used by spreadsheets or other applications).

View

Active only when HTML is selected as the file format, allows you to view the generated HTML table through the default browser for your system.

Rows

- All (total number) rows – Export all rows in the multi-column list.
- Selected (number of rows selected) rows – Export only selected rows in the multi-column list.

Configuring Enhanced Notifications (Paging/Email)

Enhanced notifications allows Enterprise Manager administrators to be notified either via email or pager. Email configuration allows you to specify the mail service information for your system. Paging configuration allows you to define paging servers, specify pager numbers, and specific paging parameters. For explicit information on setup and configuration, see the *Oracle Enterprise Manager Configuration Guide*.

Management Regions

A management region is a subset of the managed nodes and a subset of management servers. The same Enterprise Manager repository can contain multiple management regions, but a particular node is a member of one and only one management region. You can only assign the Management Server to be in one and only one management region.

The management regions feature allows you to partition the nodes of a particular repository and assign them to a subset of the available Management Servers.

Once this partitioning is performed, the failover and load-balancing operations guarantee that cross-regional traffic is eliminated. The Management Servers that belong in the same partition distribute the management load amongst themselves.

For example, if you have a large, global deployment of Enterprise Manager, or have Enterprise Manager deployed across a mixture of LANs and WANs, using management regions can greatly improve performance over slow networks by allowing you to assign a subset of Management Servers and a subset of discovered nodes to a management region, thus eliminating cross-regional/cross-network communication. Additionally, the ability to segregate a large network makes the use of management regions ideal for mapping firewall boundaries.

If no Management Server is available to service a particular management region, even though Management Servers exist and are serving other regions, you can log on using a Management Server from a different region. The Oracle Enterprise Manager Console will not experience any disruption from an unmonitored management region. You can connect to a Management Server in any Management Region and you will be able to see all nodes in all Management Regions.

Defining a New Management Region

There are two ways to define a Management Region:

- Using the Console
- Using Enterprise Manager Configuration Assistant

By default, Enterprise Manager Configuration Assistant creates the initial “default” Management Region. Under this configuration, all Management Servers that use the existing Repository, as well as all discovered nodes within the Repository, are placed within this DEFAULT Management Region. This single, default management region is sufficient for most situations. However, in order to take advantage of the management region functionality, you must create additional management regions and specify a subset of discovered nodes with a subset of Management Servers within each management region.

To create a new Management Region using the Enterprise Manager Console:

1. Logon as a super administrator to any of the Management Servers working in DEFAULT region.
2. Select Define Management Regions from the Console Configuration menu to access the Management Regions property sheet.
3. Select the Regions tab from the Management Regions property sheet. The Regions page appears.
4. Click the Add Regions button on the Regions page. The Add Management Regions dialog appears.
5. Create a new region by typing the its name into the Management Region Name field and clicking the OK button.

Alternatively, you can use Enterprise Manager Configuration Assistant to create new Management Regions by editing an Oracle Management Server configuration and pointing it to a new repository.

Adding a Management Server to a Region

In this example, we are assuming that there are two already existing Management Servers (OMS1 and OMS2) using the same Repository. In this example, both OMS1 and OMS2 are running.

1. Logon as a super administrator to any of the Management Servers working in DEFAULT region.
2. Select Configure Management Regions from the Console Configuration menu to access the Management Regions property sheet.
3. Select the Regions tab from the Management Regions property sheet. The Regions page appears.

4. Click the Add Regions button on the Regions page. The Add Management Regions dialog appears.
5. Create a new region by typing its name (R1 for this example) into the Management Region Name field and clicking the OK button.
6. Select the Assign Management Servers tab on the Management Regions property sheet. The Assign Management Servers page appears. Assign OMS1 to R1.
7. Select the Assign Nodes tab from the Management Regions property sheet. The Assign Nodes page appears. Assign the required nodes to R1. Important: To assign nodes to R1, the Management Server for R1 must be running. Click OK.

Adding Discovered Nodes to a Management Region

1. Logon as a super administrator.
2. Select Define Management Regions from the Console Configuration menu to access the Management Regions property sheet.
3. Select the Regions tab from the Management Regions property sheet. The Regions page appears.
4. Click the Add Region button on the Regions page. The Add Management Regions dialog appears.
5. Create a new region. For example, R3, by typing the name into the Management Region Name field and clicking the OK button.
6. Install Management Server or Management Servers.

Install the Management Server in a new ORACLE_HOME.

If you are installing from the database CD, choose the install type: Oracle9i Management and Integration>Oracle Management Server.

If you are installing from the separately licensable packs CD, choose the install type: Oracle Enterprise Manager Packs and Management Infrastructure>Custom>Oracle Management Server.

Refer to the installation guide provided with the database release or the installation guide provided with the separately licensable packs.

7. Configure this Management Server (or Management Servers) to be in the new region, R3, using the Enterprise Management Configuration Assistant.

8. Bring up this Management Server (or Management Servers). At this point there will be two regions available: DEFAULT and R3.
9. Log on as a super administrator using one of the new Management Servers in R3.

Discover all the nodes you need to add. They will automatically be placed in the R3 region.

Removing a Management Region

A Management Region must be empty before attempting to remove it. First, ensure that there are no nodes in the region. Second, ensure there are no Management Servers in the region.

1. Logon as a super administrator.
2. Select Define Management Regions from the Console Configuration menu to access the Management Regions property sheet.
3. Select the Regions tab from the Management Regions property sheet. The Regions page appears.
4. Select the region you wish to remove.
5. Click the Delete Region button. You are asked if you wish to continue.
6. Click Yes.

Managing HTTP Servers

HTTP server management allows you to discover, start up, shut down, and monitor the server's operational status via the Event system. Additional functionality (extra job tasks and event tests) are available when the e-Business Management Tools (part of the Diagnostics Pack) are installed.

Discovering HTTP Servers

You discover a web server as you would any other managed target from the Enterprise Manager Console. See "Discovering Targets" on page 3-6. The discovery process does not require the web server to be running. Once discovered, you set the server access authorization through the Enterprise Manager Preferred Credentials (Node). See "Preferred Credentials" on page 1-31.

Important: When running on UNIX, if the web server is listening on a port number less than 1024, the administrator must have root privileges in order to submit startup or shutdown jobs to the server.

Starting Up or Shutting Down a HTTP Server

Once an HTTP server appears as a managed object within the Console Navigator, you can select Startup from the context-sensitive menu. HTTP server management utilizes the Enterprise Manager Job system to perform the actual startup operation. For this reason, you can also start the HTTP server by selecting Create Job from the Console Job menu, selecting Web Server as the Target Type, and selecting the Startup job task. After the startup job task is submitted, a dialog displays indicating the task has been submitted to the Job system. Status messages pertaining to this task appear in the Console's Job Pane.

To stop an HTTP server, select the desired HTTP server from the Console Navigator and select Shutdown from the context-sensitive menu. As with web server startup, you can also shut down the server from the Edit Web Server General page, or use the Enterprise Manager Job system directly.

Alternatively, you can select Edit to display the Edit Web Server General Page. The current web server state is selected (Shut Down or Started). To start the web server, select Started and click OK.

Determining the Status of HTTP Servers

Select a discovered HTTP server from the Console Navigator. HTTP server status and configuration information displays in the detail view. Information displayed pertaining to the selected web server includes:

- **Server Name:** Server's Internet host name. Example: xyz-machine.your_company.com. If this machine does not have a registered DNS name, an IP address will appear.
- **Port:** The network port to which the web server listens.
- **Version:** Apache server version number.
- **Server Root Directory:** The top-level directory where all web server-related files (configuration, error, and log files) are stored.
- **Configuration File Location:** Location of the web server configuration file.

- **Status URL:** The location of the Apache-generated HTML page that provides the current server statistics in an easily readable form.

Paging/Email Blackout

Paging/Email Blackout allows an administrator with super administrator privileges to suspend paging and email notifications for specified targets and/or services that have been previously discovered in the Navigator. Paging/email blackouts deactivate enhanced notification (email/paging), thus preventing Enterprise Manager administrators from being flooded with emails and pages if a managed target/service is brought down. For example, if a target is brought down on a regular basis for scheduled maintenance, a super administrator can schedule a paging/email blackout for that target to prevent enhanced notification during the maintenance period.

In addition to paging/email blackouts, the Enterprise Manager administrative framework also allows you to specify target-level blackouts to suspend all management and data collection activity for specific targets in your enterprise. See "Target-level Blackouts" on page 1-43.

Specifying Total Paging/Email Blackout

Total paging/email blackout specifies that a blackout be started immediately with an indefinite duration. The super administrator must manually turn off Total Paging/Email before any new blackout schedules can take effect or existing blackout schedules resume. To specify a total paging/email blackout:

1. Choose Set Paging/Email Blackout from the Console's Configuration menu.
2. Check Total Paging/Email Blackout
3. Click OK.

Note: You can also access Total Paging/Email Blackout menu item from a target's context-sensitive menu in the Enterprise Manager Navigator.

Defining a Paging/Email Blackout

To define a paging/email blackout for a specific node:

1. Select a target from the Navigator and then choose Set Paging/Email Blackout from the Console's Configuration menu. Optionally, you can select an object in the Navigator and access Set Paging/Email Blackout through the context-sensitive menu.
2. Click Create. The requisite naming and scheduling UI are displayed. Important: Be sure that Total Paging/Email Blackout is not checked for either the specific service or its parent target.
3. Specify a Blackout Name. All Blackout names for this node/service must be unique. Note: the Target name reflects the node/service selected in the Navigator and is not editable from this dialog.
4. Select an Occurrence

Select the frequency that you want the paging/email blackout to occur. The choices are Once, On Interval, On Day(s) of Week, and On Date(s) of Month.

- Once—schedules the blackout only one time beginning and ending on the dates and times you choose.
 - On Interval—allows you to schedule a specific time interval between paging/email blackout periods. The interval can be a combination of hours and minutes, or number of days. Select the value you want to change and click on the scroll buttons. You can also type in a new value. Select an Effective Period in which your blackout schedule will be valid.
 - On Day(s) of Week—allows you to schedule the blackout on one or multiple days (Sunday, Monday, etc.) of the week. Click on the days of the week to select the days you want the blackout period scheduled and set a start time or duration. Select an Effective Period in which your blackout schedule will be valid.
 - On Day(s) of Month—allows you to schedule the blackout on one or multiple days (1 - 31) of the month. Click on the dates of the month to select the dates you want the blackout period scheduled and set a start time or duration. Select an Effective Period in which your blackout schedule will be valid.
5. Click OK.

Important: When selecting *On Day(s) of Month* or *On Day(s) of Week*, be aware that each day terminates at 12:00 A.M. This is important when scheduling paging/email blackout periods that span the day change (12:00 A.M.).

For example, if you wish to schedule a blackout that begins on Tuesday at 10:00 P.M. and lasts for six hours, you must define two blackout periods:

- Tuesday from 10:00 P.M. to 11:59 P.M.
 - Wednesday from 12:00 A.M. to 4:00 A.M.
-
-

Making a Copy of an Existing Blackout Schedule

To schedule a paging/email blackout schedule for a node that is identical to that of another managed node:

1. Choose Paging/Email Blackout from the Console's Configuration menu. Optionally, you can select an object in the Navigator and access Paging/Email Blackout through the context-sensitive menu.
2. Select a Blackout Schedule entry from the Blackout Name list.
3. Click Create Like. A new entry is created in the list prefixed by "Copy of."
4. Modify the blackout period parameters (such as Blackout Name) as desired and click OK.

Turning Blackout Schedules On and Off

Once you have defined one or more paging/email blackout periods for a node/service, they persist in the Blackout Name list associated with the node/service until deleted. You can turn paging/email blackout on or off by checking the box located to the left of the individual blackout name. You can edit the Occurrence parameters to reflect the present date and time. Paging/email blackouts are set ON by default.

Deleting Paging/Email Blackout Periods

1. Choose Paging/Email Blackout from the Console's Configuration menu. Optionally, you can select an object in the Navigator and access Paging/Email Blackout through the context-sensitive menu.
2. Select the desired Blackout Name.
3. Click Delete.

Viewing Blackout Periods

Once you have defined blackout periods on multiple nodes, you can view them by selecting the desired target in the Console Navigator and choosing Paging/Email Blackout from the Navigator menu. If you select a high-level folder from the Navigator, such as Databases, Groups, or Nodes, rather than an individual target, all blackout periods defined in the container type are displayed.

Target-level Blackouts

Target-level Blackouts allow Enterprise Manager users to suspend any or all management and/or data collection activity on one or more managed targets. This capability permits maintenance or emergency operations to be performed. Target-level Blackouts must be set on the target running a 9i version of the Intelligent Agent and cannot be set from the Console. See the Intelligent Agent User's Guide for more information.

Specifically, blackouts can suspend:

- **Events:** All events registered on a target will not be evaluated or triggered for the duration of the blackout.
- **Jobs:** All jobs submitted to a target will not be scheduled or run for the duration of the blackout.
- **Data Collections:** All current historical data collection activities for a target are stopped. However, loading of data collected for a target **prior** to the blackout will continue as long as the database is up. New collections can be submitted but will not proceed unless the blackout ends.

The Standalone Console

Beginning with Release 9.0 when you launch the Enterprise Manager Console or various other Enterprise Manager applications, you are prompted to choose between launching the product standalone (i.e. not connecting to the middle tier Management Server) or logging into a Management Server.

Launching the Console standalone allows a single administrator to perform simple database schema, instance, storage, security, and other database tasks by connecting directly to the target database(s).

Launching standalone does not require a middle tier Management Server or Intelligent Agents on target machines.

This chapter discusses the topics listed below:

- Choosing to Launch the Console Standalone
- Starting the Standalone Console
- Adding Databases to the Tree in the Standalone Console
- Connecting to a Database in the Standalone Console
- Connecting to the Database As a Different User
- Viewing If You Are Connected As SYSDBA
- Removing a Database from the Tree
- Changing from Using the Console to the Standalone Console
- Editing Local Preferred Credentials in the Standalone Console
- Changing from Using the Standalone Console to the Console

Choosing to Launch the Console Standalone

When you launch the Enterprise Manager Console, you are prompted to choose between launching the product standalone or logging into a Management Server.

Choose to launch the Console standalone when you want to connect directly to your managed target(s) to perform administration tasks. With Enterprise Manager Release 9.0 the standalone Console only supports connecting directly to database targets, no other target types are currently supported.

Launching standalone does not require a Management Server or Intelligent Agents on managed targets. Consequently, when you launch the Console standalone, you do not have access to functionality typically available through the Management Server and Intelligent Agent, such as:

- Management of several different target types (e.g. database, web server, application server, applications, etc.)
- Sharing of administrative data among multiple administrators.
- Proactive notification of potential problems.
- Automation of repetitive administrative tasks.
- Backup and data management tools
- Customization, scheduling, and publishing of reports
- Running the client from within a web browser.

Starting the Standalone Console

On Windows-based platforms, you start the Console from the Windows Start Menu.

You can also start the standalone Console from the command line using the command:

```
C:\> oemapp console
```

On UNIX platforms, you start the Console from the command line using the command:

```
$ oemapp console
```

Figure 2–1 Enterprise Manager Login



When the dialog appears, choose "Launch standalone" and press OK.

Note: The login choice is remembered for the next time you log in whether the last login was Launch standalone or Login to the Oracle Management Server. If you had selected Login to the Oracle Management Server, the Management Server is remembered.

To bypass the Console login, you can enter the following command at any supported operating system command line:

```
oemapp console oem.loginmode=standalone
```

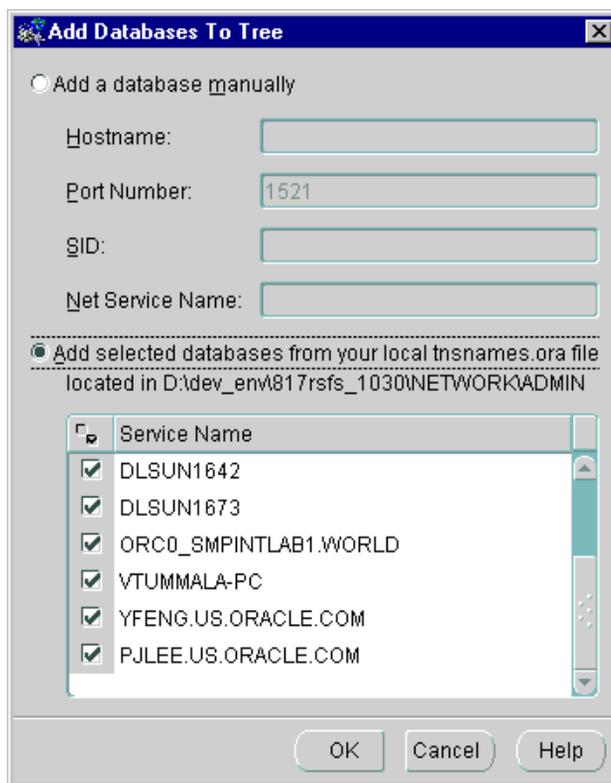
By entering the command, you will immediately see the standalone Console.

If you are starting the standalone Console for the first time, the left panel of standalone Console is empty because you have not yet added the databases you want to manage. The Add Database To Tree dialog appears automatically so that you can add them to the navigator tree.

Adding Databases to the Tree in the Standalone Console

The Add Database To Tree dialog appears automatically when you start the standalone Console for the first time; it is also available from the Navigator menu.

Figure 2–2 Add Database to Tree



The Add Database To Tree dialog allows you to manually enter the Net service names or add them from the local tnsnames.ora file.

Add a database manually

You can add databases to the standalone Console navigator tree by manually filling in the following fields:

- **SID:** the database system identifier, usually the instance name, such as ORCL

- **Hostname:** the machine or node name where the database is located
- **Port Number:** the database listener port address, usually 1521 or 1526
- **Net Service Name:** A name which uniquely identifies a database when connecting to a machine. It is usually the global database name.

For example: ORCL.world.

Note: Adding a database manually automatically updates the local tnsnames.ora file located in your <Oracle_Enterprise_Manager_Home>/network/admin directory.

Add selected databases from your local tnsnames.ora file

You can populate the standalone Console navigator tree by reading the database service names from the local tnsnames.ora file located in your Oracle Enterprise Manager home. The Add Database To Tree dialog displays a list of databases identified in your tnsnames.ora file from which you can select or deselect. Click the column header to the left of Service Name to either select or deselect all the databases. If you have deselected all the databases, you can choose specific databases by selecting their checkboxes.

Note: Currently only TCP/IP service names can be added manually for the standalone Console. If other network protocols are required, add them by entering them in the tnsnames.ora file using the Oracle Net Configuration Assistant. All protocols are supported when you import selected services from your tnsnames.ora file.

Connecting to a Database in the Standalone Console

There are three ways to connect to a database for the standalone Console:

- Click the plus symbol next to the database icon in the Console navigator tree. The preferred credentials are used if the connection information has not been set previously.
- Double-click the database icon in the standalone Console navigator tree. The preferred credentials are used if the connection information has not been set previously.
- Select the database and then select the Connect item from the Navigator menu.

If no preferred credentials are set in the Oracle Enterprise Manager Console, the Database Connection Information dialog box appears. If preferred credentials are already set, you will connect to the database using this login information.

In the Database Connect Information dialog, enter the following information to connect to the database.

Username

The Oracle username for the database to which you are connecting.

For example: system

Password

The password for the username to which you are connecting.

For example: manager

Connect As

You can select from a pull-down list whether you want to connect to the database with NORMAL, SYSOPER, or SYSDBA privileges. Select NORMAL to connect to the database as an ordinary user. Select SYSOPER to connect to the database with special operator privileges, such as capabilities to shut down and start up the database. Select SYSDBA to connect to the database as a user with full database privileges such as the capability to grant any privileges to any user.

To use SYSOPER and SYSDBA privileges, a password file or OS group authentication must be created and set up for your database.

Note: In 9i, the SYS account may only be used with SYSDBA or SYSOPER (not NORMAL). You also do not set up a password file as with previous database versions.

Save As Local Preferred Credentials

Saving preferred credentials is an option which enables you to store login information in a local file such as username, password, and role (NORMAL, SYSOPER, or SYSDBA). Passwords are always stored in encrypted format.

This login information is used when a connection is established for the database instead of having to type a username and password each time.

You can set preferred credentials by selecting the Save As Local Preferred Credentials checkbox or you can save credentials later by using the Edit Local Preferred Credentials dialog available from the Configuration menu.

Connecting to the Database As a Different User

In the standalone Console, you do not have to disconnect as a user before reconnecting as a different user.

If you are already connected to a database and you want to reconnect as a different user

- Right-click the database icon and select Connect from the context-sensitive menu.
- Select the Connect item from the Navigator menu.

When the Database Connect Information dialog appears, enter a different username and press OK.

You will automatically be disconnected and reconnected.

Viewing If You Are Connected As SYSDBA

When a connection is made to a database, a connection icon is displayed on top of the database icon in the standalone Console tree.

Next to the database name, you will see the username and role, if applicable, that you are connect as. For example, if you have connected as user SYS with the SYSDBA role, you should see "sys as SYSDBA."

Removing a Database from the Tree

To remove a database from the standalone Console navigator tree, follow the steps below:

1. Highlight the database you want to remove.

2. From the Navigator menu, choose Remove Database from Tree item.
3. A message appears, saying, "Remove the <name> database from tree. Are you sure?" Click the Yes button.

Note: Removing the database removes the entry from the standalone Console Navigator tree. It does not remove the entry from the tnsnames.ora file or physically remove the database. If desired, you have the option of adding the database to the navigator tree again.

Changing from Using the Console to the Standalone Console

When the Console is connected to an Oracle Management Server, the Console navigator tree is populated with the discovered databases.

The following steps describe how to copy these databases so they can be used in standalone mode.

The databases displayed in the navigator tree can be added to the tnsnames.ora file and their associated preferred credentials saved to a local file:

1. Use the Add Services to tnsnames.ora from the Configuration menu to copy the services to the local tnsnames.ora file.

Note: The passwords are encrypted in the local file to prevent the file from being used on other machines.

To make these databases available in standalone mode, you can perform the following steps:

2. Start the standalone Console.
3. From the Navigator menu, select the Add Database To Tree item.
4. In the Add Databases to Tree dialog, select the Net service names to add from the local tnsnames.ora file.
5. To save the local preferred credentials of a service, select the Edit Local Preferred Credentials item from the Configuration menu.

Editing Local Preferred Credentials in the Standalone Console

Note: The passwords are encrypted in the local file, `pref-<os_username>.crd`, so that they cannot be copied to another machine and used by a different user.

The standalone Console stores a list of databases that are displayed in the standalone Console navigator tree. If preferred credentials are specified for any of these databases, the username, encrypted password, and role are added to the local file. The local record, `pref-<os_username>.crd`, is located in the `<Oracle_Enterprise_Manager_Home>/sysman/config/pref` directory.

The login information is used when a connection is established to the database instead of having to type a username and password each time.

To save or edit the local preferred credentials of a service, you can perform the following steps:

1. From the Configuration menu, select the Edit Local Preferred Credentials item. The Edit Local Preferred Credentials dialog displays a list of services.

Figure 2–3 Edit Local Preferred Credentials



2. In the Edit Local Preferred Credentials dialog, select the service name of the database and enter or update the preferences for connecting to that database.
 - Username: Enter the username. This field is required if a password has been entered.
 - Password: Enter the password. You can leave this blank if you want to be prompted for a password when you connect to the database.
 - Confirm Password: Confirm the password. The contents of this field must be the same as the contents of the Password field.
 - Role: Select the role from the pull-down list. You must login with the SYSDBA or SYSOPER role to start up or shut down a database.
3. Click the OK button at the bottom of the Edit Local Preferred Credentials dialog to save your updates.

Note: You can save or overwrite the preferred credentials by selecting the "Save As Local Preferred Credentials" checkbox in the Database Connection dialog.

Changing from Using the Standalone Console to the Console

After you have started the standalone Console, and you want to connect to a management server (switching therefore from standalone into distributed mode), you must close and restart the Console.

If you have been using standalone Console, the list of databases displayed in the navigator tree is retrieved from a local file.

At some stage in the future, you may decide to administer jobs, events, and groups; run the database applications through a web browser; or perform backup and data management tasks. These tasks require you to run the Console connected to an Oracle Management Server.

If you now decide to run the Console connected to an Oracle Management Server, the databases displayed in the navigator tree may be different than those in standalone mode, because the list of databases is retrieved from the repository and not from a local file.

To add the databases that were available from the standalone Console, you will need to discover the services from the Oracle Enterprise Manager Console if the databases are not already available from the Console connected to the Oracle Management Server.

Navigator

The Navigator graphically displays network objects and allows you to administer the objects. The Navigator tree displays a direct view of the network's nodes and services, the objects they contain, and the relationships among objects. The topics discussed in this chapter include:

- Navigator Pane
- Navigator Menu
- Discovering Targets
- Manipulating Objects in the Navigator
- Removing a Node from the Navigator
- Node Removal Failure

Navigator Pane

The Navigator pane provides:

- Identification of the objects or services on nodes in the managed environment.
- Views of the objects in a network environment and the relationships among the objects. By expanding an object, you can display any objects it contains.
- Methods of accessing and launching administration tools on the objects.
- A source of objects with which to populate groups.
- A source of objects upon which to launch DBA tools and other integrated applications.
- A source of objects for copying with the drag and drop method.

Because the Enterprise Manager Console uses a master/detail-type user interface, objects selected in the "master" Navigator tree control what is displayed in the "detail" pane to the right. This simple, yet effective interaction paradigm is consistent for all Enterprise Manager applications.

Populating the Navigator Tree

The Navigator tree is populated with objects by selecting Discover Nodes from the Navigator menu. The types of services in the network may include, but are not limited to:

- Databases
- Groups
- Listeners
- Nodes
- HTTP Servers

The actual number and types of objects that appear in the Navigator differ according to the types of targets being monitored and any options you have installed in your enterprise environment.

Expanding Objects in the Navigator

Each object type in the Navigator tree is identified by an icon and name. If there is a '+' or '-' to the left of an object's icon and name, the object is a container that can be expanded to display other objects. A container that is represented by a folder icon is

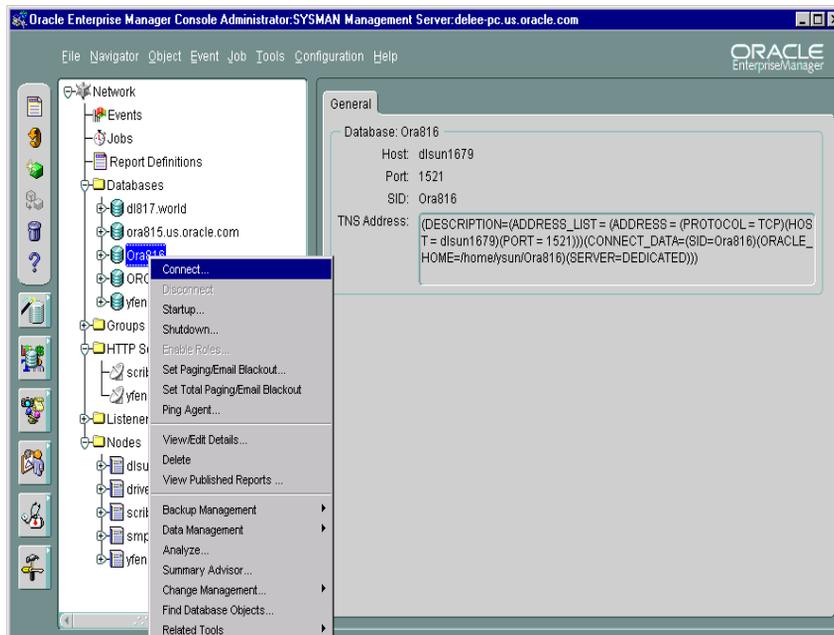
a logical grouping, or collection, of one specific type of object, such as databases. Other containers are objects that hold multiple types of objects. See Figure 3-1, "Navigator Pane and Context-sensitive Menu" for an illustration of a Navigator pane.

The top-most object in the Navigator tree is the network container. The network folder can contain:

- Events
- Jobs
- Report Definitions
- Databases folder
- Groups folder
- HTTP Servers
- Listeners folder
- Nodes folder

In addition to the folders listed above, there may also be folders for additional targets that have been discovered in your enterprise.

You can expand tree containers to view the objects and relationships in the environment. For example, you can expand a node to view the databases and listeners on the node. If you expand a database, you can access common administration areas such as schema, instance, and security. When a connection is made to a database, an icon displays on the database in the tree. See "Database Administration" on page 10-1 for more information on integrated database administration tools that are accessible from specific Navigator objects.

Figure 3–1 Navigator Pane and Context-sensitive Menu

Launching Tools

To launch a database tool in the context of a database or database object, select the object in the Navigator tree that you want to access. You can then execute a tool from the Tools menu or with the Related Tools option of the right-mouse menu.

You are connected to the database according to the preferred credentials that have been set up for the database. If connection to the database fails for any reason, the Database Connect Information dialog box displays. At that point, you can enter the requisite information and optionally save that information as a preferred credential. See "Preferred Credentials" on page 1-31 for information.

Navigator Menu

The Navigator menu allows you to manage objects in the Navigator pane. The menu options are enabled according to the object selected in the Navigator tree. Usually the Create, Create Like, Edit, and Remove menu options are available when an object is selected. See Figure 3–1, "Navigator Pane and Context-sensitive Menu" for an illustration of the Navigator menu.

Clicking on an object in the Navigator with the right mouse button, displays a *context-sensitive menu* of all the options you can use to manipulate the object, as well as related tools.

For information on operations for an object type, see the chapter in this guide that discusses the specific application that manipulates the object type. See Chapter 10, "Database Administration" for an overview of the database application tools.

Refresh

Refreshes the current Navigator view.

Find

Locates discovered databases within the Navigator Tree. It is available when you select a Database or Node icon on the tree.

Discover Nodes

Discovers services on a node in the network. You can also display the status of network services. See "Discovering Targets" on page 3-6 for more information.

Refresh All Nodes

Refreshes services for all discovered nodes.

Ping Agent

Attempts to contact the Intelligent Agent on a specified node. If it fails, either the node is down or the Intelligent Agent isn't running. If either of these is true, no Job or Event notification will come through.

Connect

Displays the Connect Information dialog allowing you to specify logon information for a selected target (such as a database) in the Navigator.

Disconnect

Log out of the selected target.

View By Schema

When viewing a database schema in the Navigator, all objects are grouped by schema.

View By Object

When viewing a database schema in the Navigator, all objects are grouped by object type.

Enable Roles

Displays the Enable Roles dialog allowing you to enable roles for an administrator.

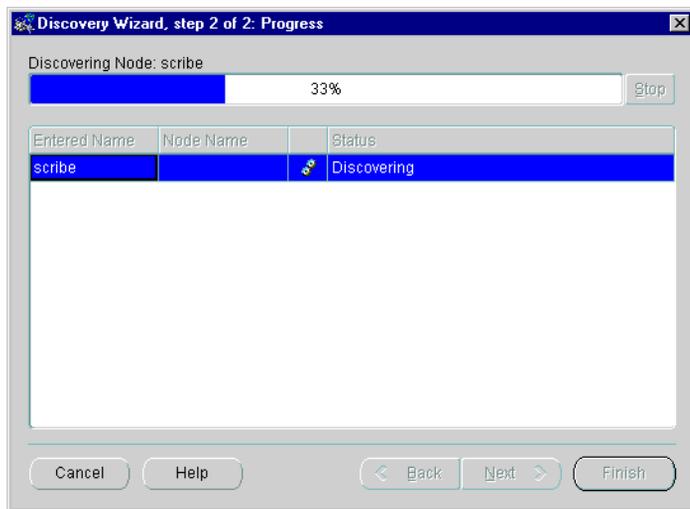
Application SQL History

Displays SQL statements produced by Enterprise Manager’s database administration functions. This option allows you to view the last 100 SQL statements (maximum) executed by the application you are using (i.e., Instance Management, Schema Management, and others) against the selected database.

Discovering Targets

The Navigator provides service discovery functions for identifying network targets populating the Navigator tree through the Discovery Wizard. The Discovery Wizard is activated each time you select Discover Nodes from the Console’s Navigator menu.

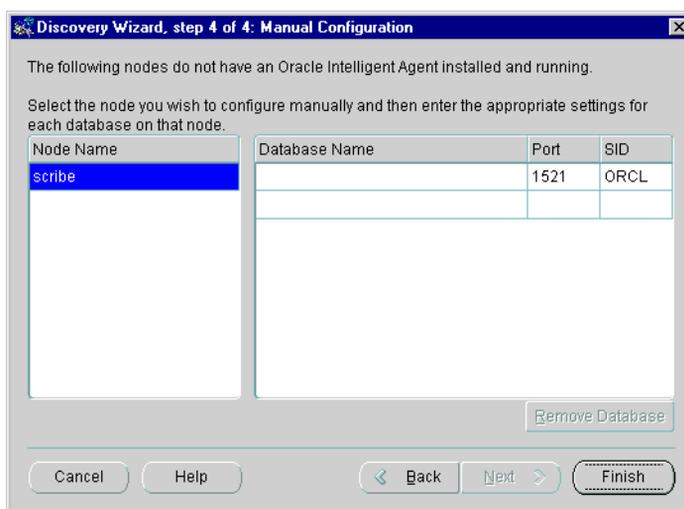
Figure 3–2 Discovery Wizard



The Discovery Wizard searches the network for the targets you specify. If that target has an Oracle Intelligent Agent running, it will be added to the Enterprise Manager Console Navigator for management along with any services running on that target. You will be able use these services as targets in jobs, events, and groups.

If there is no Oracle Intelligent Agent running, the Discovery Wizard gives you the option of performing a manual configuration. This allows you to define an Oracle database on that target so that it appears in the Console Navigator. While manual configuration permits database access from the Navigator, its use is not recommended since Enterprise Manager services, such as jobs and events, will not be available. For more information on the Intelligent Agent and the discovery process, see the *Oracle Intelligent Agent User's Guide*.

Figure 3–3 *Discovery Wizard: Manual Configuration*



When refreshing an existing target, the Discovery Wizard verifies and updates the list of services on a target that had been previously discovered. If the target was previously Manually Configured, the Discovery Wizard will check if that target now has an Oracle Intelligent Agent and if so, provide that information with the option to discover using that Intelligent Agent, or to update the previous configuration.

Note: Services on the machine where the Management Server is running are automatically discovered when you start the Console and connect to the Management Server.

Adding a Service

To discover new services, choose **Discover Nodes** from the Console Navigator menu to call up the Discovery Wizard. Any services running on that target will, if successfully discovered, appear in the Navigator. The Discovery Wizard guides you through the service discovery process. For more information on service discovery and refresh, refer to Oracle Enterprise Manager online help.

Refreshing a Target

Refreshing a target verifies and updates the list of services on a target that has been previously discovered. You can refresh the discovery of a target by selecting a target from the Navigator, clicking the right mouse button, and choosing **Refresh Node** from the context-sensitive menu.

To refresh an existing service, choose **Refresh Nodes** from the Console Navigator menu to call up the Refresh Wizard. The Refresh Wizard performs a "rediscovery" of any target selected in the Console Navigator. This menu option is greyed out until a specific target is selected from the Navigator Nodes folder.

Removing a Target

Select a target from the Console Navigator. Using the right-mouse button, choose **Delete** from the context-sensitive menu.

Pinging the Intelligent Agent

Pinging the Intelligent Agent on a monitored node allows you to check whether the Management Server can communicate with the Intelligent Agent on a monitored node. Proper Intelligent Agent operation is required for successful service discovery. If discovery is successful, the discovered node and services appear in the Navigator tree. If discovery has failed, an error message displays.

The following are common problems if the service discovery has failed:

- The node must have an Oracle Intelligent Agent started and running.
- TCP/IP network protocol must be used.
- If a database has not been discovered, make sure an entry for the database is in the `tnsnames.ora` file on the node where the Intelligent Agent is running. On a UNIX platform, check the `oratab` file.
- If a database has not been discovered, you may need to stop and restart the Intelligent Agent if the database was not configured or installed when the Intelligent Agent was last started. When the Intelligent Agent starts, database

entries are written to the `services.ora` file in the `ORACLE_HOME/network/agent` directory (Unix example).

Determining Node Properties

Since Enterprise Manager allows you to manage a heterogeneous environment, there will be situations where you may need to determine operational properties of that node (network name, operating system and version, and Intelligent Agent version). For example, you may want to find out which version of the Intelligent Agent is running on each node within your enterprise to determine which nodes require Intelligent Agent updates. To determine node properties, select the desired node from the Nodes folder in the Navigator. Pertinent node information is displayed in the detail pane of the Console.

Manipulating Objects in the Navigator

The Navigator interface provides easy manipulation of the services and objects in your managed network from the Enterprise Manager Console. From the Navigator, you can apply some or all functions available from the Console and any integrated applications to selected objects.

Administering Objects

To administer an object, select the object in the Navigator tree and choose the administration task from the Navigator menu, or use the menu options available when you click the right mouse button on the object. The menu options available vary according to the object selected. See "Navigator Menu" on page 3-4 for more information. When you create or edit an object, the property sheet for that object displays. For information on the property sheets, see the chapter on the DBA tool that administers the object.

Copying Navigator Objects

You can drag and drop some objects in the navigator to make copies of the object in different locations. For example, you can drag and drop a database user or role from one database to another to add that user or role to another user. However, if you drag and drop a group that resides within another group to a different group, it will move the group instead of copying it.

Removing a Node from the Navigator

Before removing a discovered node from the Enterprise Manager Navigator, you must remove all jobs and events submitted against that node. If the Intelligent Agent is down when you attempt to remove the node, and jobs and events have not been cleared previously, Enterprise Manager will allow you to remove the node. However, when the Intelligent Agent is restarted and the node re-discovered, the Intelligent Agent will be out of sync with the Oracle Management Server. The following example illustrates how this situation can occur.

1. You register an event with the Intelligent Agent on a managed node.
2. The Intelligent Agent goes down.
3. You remove the node from the Navigator without removing the event.
4. The Intelligent Agent is started and the node is rediscovered.
5. The Console Event window is clear.
6. You attempt to register the same event with the managed node.
7. Enterprise Manager displays a message stating the event is already registered even though it is not.

The Intelligent Agent remembers the current status of jobs and events through a series of generated files. Oracle Intelligent Agents 8.0.6 and higher and Intelligent Agents 8.1.6 and higher automatically synchronize with the Oracle Management Server by removing old Intelligent Agent overhead files. For older versions of the Intelligent Agent, you must remove these files manually.

To manually remove the Intelligent Agent overhead files:

1. Stop the Intelligent Agent (if it is currently running).
2. Go to the Intelligent Agent directory (`$ORACLE_HOME/network/agent`).
3. Delete files with the following extensions: `.q`, `.jou`, `.inp`
4. Restart the Intelligent Agent.

Node Removal Failure

Typically, node removal from the Navigator fails because of problems encountered by the Management Server. The following are the most probable causes.

- The Management Server encountered an error condition while accessing the repository. Check the Management Server log for detailed error messages.

(ORACLE_HOME/sysman/log/oms.log). If problem resolution is not obvious from the error messages, contact Oracle Support.

- The Management Server could not open a database session to the repository. Ensure that the repository is up and running. You may have to shut down other Enterprise Manager applications that may be connected to the repository. Check the Management Server log for more detailed error messages.
- Different DNS servers may resolve node names in different ways. For example, if a Management Server is running on a machine whose DNS server resolves a particular node as "A", the Management Server discovers the node as "A". Next, the Management Server is run on another machine whose DNS server resolves the same node as "B". If you switch back to running the Management Server on the first machine (originally resolved the node as "A"), attempting to remove the node from the Console Navigator will now fail since the repository entries will be out of sync.

The solution is to run the Management Server on the machine from which you last discovered the node. In the example above, you would need to run the Management Server on the second machine (resolved the node as "B") and then remove the node from the Navigator. Always ensure that the DNS setup is consistent for all nodes where the Management Server is run.

Working with Groups

The Group system lets you organize the objects you manage into logical categories for more efficient management and administration. You can organize groups based on any criteria you determine, such as function, department, geographical location, or number of administrators. You can then place the groups on a map or graphical view of the network making it easy to locate, diagnose, and act on encountered conditions. The system also lets you assign jobs to groups and monitor their status. The Groups system is especially useful for managing environments with many databases and services.

The topics discussed in this chapter include:

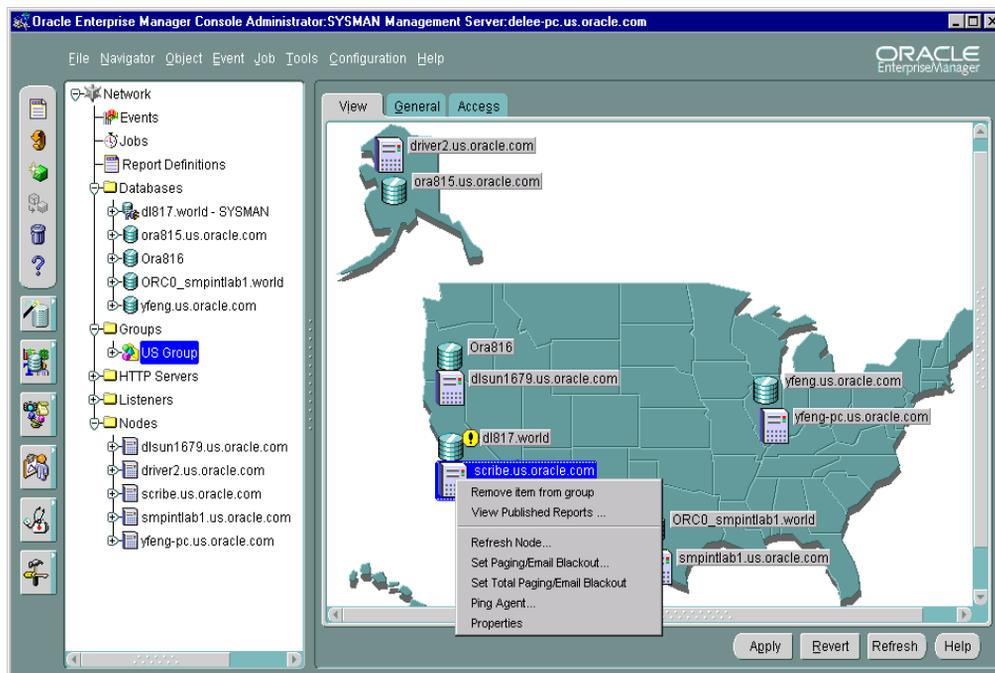
- Group View Pane
- Managing Groups
- Viewing Reports for Targets within a Group

Group View Pane

The Group view pane provides a graphical custom view of your managed environment and is displayed when any group is selected in the Console Navigator. As with any object in the Navigator, the appropriate group view is displayed in the detail area of the Console. See Figure 4–1, "Navigator and Group Panes" for an illustration of a Group view.

Note that groups are also displayed in the Navigator. To display the members of a group in this pane, expand the group by clicking the "+" symbol next to the group name. By default, the Group folder is empty.

Figure 4–1 Navigator and Group Panes



Managing Groups

A group is a collection of targets, such as databases, listeners, nodes or HTTP servers, that share a common location or function. You can create, modify, and remove groups to further organize your network view. Different types of objects, like databases and listeners, can be grouped together.

Groups appear in two places: the Navigator and the Group View pane, once a group is created.

A group is represented in the Navigator by an icon and a name. You can double-click on the group's icon to expand the group, and view and update the group's members and sub-groups.

The Group View pane gives you a graphical view of the objects in the group and their individual status. You can also add background maps to the Group pane to better visualize locations of particular objects.

Grouping nodes or services can simplify tasks that are applied to all members of the group. For example, in order to execute a SQL script on all the databases in the CHI_MAIL group, you can use the Job Scheduling services to schedule a job on the group. The job that executes the SQL script is scheduled on all the databases in the group. The job will not be applied to any other objects in the group.

Note: Jobs and events applied to a target before it joins a group will not be applied to the group retroactively. You must re-apply any jobs or events you want to apply to the entire group.

Important: If you submit a job or event against a group that contains a mixture of manually configured and discovered targets, the job or event will only be submitted against the discovered targets. If all the targets in a group are manually configured, then the job/event submitted against that group will fail.

Automatic Group Refresh

The Group View page can be refreshed automatically or manually.

Manual Refresh

The Group View page can be refreshed manually by clicking the Refresh button located at the bottom of the Group View page. When you refresh manually, only the currently selected group is refreshed.

Automatic Refresh

When refreshed automatically, all group views currently open for viewing by the administrator are refreshed.

Automatic refresh, along with the refresh frequency, can be set from the Group View page or from the General page of the Edit Administrator Preferences property sheet. Administrators can set a refresh interval greater than or equal to the minimum refresh interval set for all administrators by the Super Administrator. The minimum refresh interval can be changed from the General page of the Edit Administrator Preferences property sheet. Changing the minimum refresh interval can only be performed by Super Administrators. By default, the minimum refresh interval is five minutes.

In general, it is best to refresh group views manually. However, for situations where a Group View page needs to be displayed for extended monitoring periods, automatic refresh can be used.

Important: Setting an automatic refresh frequency too high (low interval value) may impact network and system performance.

Creating a Group

To create a group:

1. Right-click on the Groups folder to display the context-sensitive menu and choose Create. The Create Group property sheet appears.
2. On the General page of the Create Group property sheet, fill in the requisite identification information.
3. From the Available Targets list, select the specific target(s) you want to appear in the group. By holding down the Shift (in sequence) or Alt (random) key, you can select multiple objects.
4. Click Add to move the items to the Selected Targets list.
5. Click on the Access tab to set administrator access privileges.

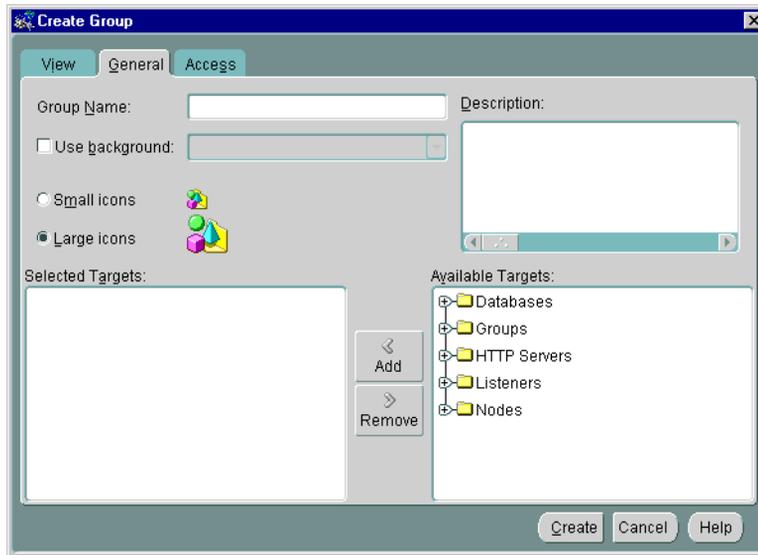
6. Click on the View tab to see a graphical representation of the group. You can re-arrange the icons on this page according to your requirements.
7. Click Create to save the group.

Once the group has been defined, it appears in the Navigator. Selecting the group in the Navigator displays the View, General, and Access pages for that specific group in the detail view. You can modify the group as needed.

To add an object to a group, click on the General tab. Select the desired object(s) from the Available Targets list, and then click Add. Alternatively, you can drag and drop objects within the Navigator to any group.

To add an existing group to another existing group, you can drag and drop one group to another within the Navigator. To add an existing group to a new group, select the desired group from the Available Targets list on the General page and click Add.

Note: When you create a group, it appears at the root level of the Groups folder. This also applies when you create subgroups; even though the subgroup appears at the appropriate level in the group hierarchy, it also appears at the root of the Groups folder.

Figure 4–2 Create Group General Page

Group General Page

This page allows you to define the group and its content. The General page consists of the following:

Group Name

Enter a unique name for the new group in the Group Name field of the dialog box.

Use background

Check this option if you want to display an image in the background of the group's View pane. When checked, you can select one of the standard images from the drop-down list. These standard files are provided in the `oracle_home\classes\oracle\sysman\resources\images` directory located on both the machine running the client Console and the machine running the Management Server. The Java-based Console reads the images from the local images directory. The browser-based Console reads the images from the machine running the Management Server.

The sample images included are:

- `asia.gif`
- `europe.gif`

- japan.gif
- usa.gif
- world.gif

You do not need to specify an explicit path for graphics located in this directory. Specify only the file name, such as `usa.gif`. You can use `.GIF` or `.JPG` graphic files. When a new image is added to a group, the file name is stored in the repository.

Note: If you want to use your own custom images, and make them available to all Consoles across your enterprise, you will need to install the images on all Management Server machines as well as all machines running the Java-based Console. Any new images added to the image directory will not appear in the drop-down list. Administrators wishing to use the new graphic must specify the exact name of the file.

Icons

Determine whether you want to display large or small icons in the group.

Selected Targets

List of targets that have been added to the group.

Available Targets

Tree list displaying all targets and existing groups that can be added to the current group.

Add

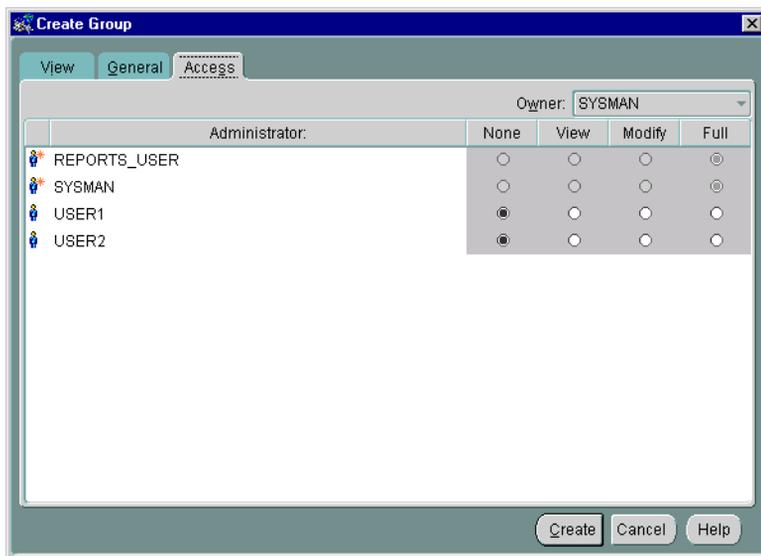
Moves objects selected in the Available Targets list to the Selected Targets list.

Remove

Moves objects from the Selected Targets list back to the Available Targets list.

Group Access Page

Determine the permissions that you want to assign to the group with the Access page. This allows other users to view or modify the group. Any permissions assigned on this page over-write any user default permissions. See "Access" on page 1-29 for an explanation of the permissions that can be assigned.

Figure 4–3 Group Access Page

Manipulating Group Views

Groups are populated by adding targets from the specific group's Available Targets list on the General page. Groups can also be populated by dragging and dropping databases, groups, nodes, listeners or any other discovered targets in the Navigator into the appropriate group in the Navigator Groups folder. You can create, update, and save any number of groups. In addition, you can add a graphic as a background to the group for visual identification or to graphically show the location of nodes. For example, you can use a group drawing of a city or state for the background of your group. Once a group is created, it can be manipulated like any other object in the Navigator.

Monitoring Status

Probably the most important aspect of the Enterprise Manager Group system is that it provides an efficient way to monitor the alerts reported by the event system. If the object or group has events registered against it, a flag showing the state of the event condition is displayed. If an object in a group has more than one event registered against it, the flag will represent the most severe alert condition.

- If the flag is green, there are no problems on the monitored objects.

- If the flag is yellow, there is a condition detected that should be checked.
- If the flag is red, there is a severe problem detected by an event and the object requires immediate attention.
- If the flag is gray, the status of the object is unknown. For example, the UpDown event is registered to a database but the node is unavailable. The gray flag will only display if an up/down test is explicitly registered for the object.
- If there is no flag, then the object is not being monitored. Note that groups within groups do not show a status monitor when the event is clear (green).
- If there is a yellow hexagon, there is an error state (yellow hexagon). An error state indicates there is a problem with the evaluation of the event condition, as opposed to a threshold being met. Examples of error states are: registering an Archive Full event against a database in non-archivelog mode, registering an event that monitors segments but specifying a filter that excludes all available segments.

Groups inherit the worst state of any of the members. If one target in a group is down (status of the target is unknown), the group displays a gray flag.

Note: For status monitors to display on a group or object, an Intelligent Agent must be running on the node where the object is located.

See Chapter 6, "Events" for more information on events.

Expanding Objects

Some group objects, such as database objects and defined group objects, can be expanded in the Group detail view by double-clicking on the object's icon. You can double-click on some objects to open property sheets. The property sheets allow you to both view and alter the properties of the objects. You can double-click on databases to display property sheets.

Some group objects, such as databases, can also be expanded within the Console Navigator. All groups appear in the Navigator's Group container.

See Figure 4-1, "Navigator and Group Panes" for an illustration of an expanded node in the Group pane.

Groups

When you double-click on a group icon, the Edit Group property sheet displays for that group. You can add or remove objects from the group via the Available/Selected Targets lists on the General page. In addition, you can delete objects from the group by selecting them and pressing the Delete key, or clicking the right mouse button and selecting Remove Item from Group.

Databases and Other Discovered Targets

When you double-click on a database or other discovered target within a group, you connect to that service. The instance property sheet displays if that service is a database. If the connection to the database fails for any reason, the Login Information dialog box displays. See "Preferred Credentials" on page 1-31 for information on preferred credentials.

Launching Applications from a Group

You can launch a database application using an object in the group. Select a database icon in the Group View pane, then select a tool from the Console Tools menu or Tool drawers. You are connected to the database according to the user credentials that have been set up for the system. See "Preferred Credentials" on page 1-31 for more information on user credentials.

Adding Objects to a Group

To add objects to a group, drag and drop the object from its location on the Navigator to the group.

Note: Only one copy of an item can exist in the group.

When you add objects in a group, the updates are reflected in every occurrence of the group. Any updates to a group are automatically saved as the updates are made.

Deleting Objects from the Group

To delete objects in a group view pane, you can select the object and press the Delete key, choose Remove Item from Group from the context-sensitive menu, or remove items from the Selected Targets list on the General page. Objects in the

Navigator can be removed via context-sensitive menu option or by selecting the object and pressing the Delete key.

Modifying a Group

You can modify the properties of a group.

1. Select a group in the Navigator.
2. Click the General tab. The name of the group is automatically entered in the name field. The name cannot be modified.
3. Modify the properties for the group.
4. Click the Apply button when you have finished.

Removing Groups

There are two types of group removal:

- Remove the group from within another group. This does not affect the existence of the group in the system or in any other groups.
- Remove the group completely (delete). This removes the group from every group where it has been copied.

After you select a group, there are multiple ways to remove it:

- Delete the group completely by choosing a group (that is not inside another group) and selecting the Delete menu item from the group's context menu.
- Delete the group completely by choosing a group (that is not inside another group) and pressing the <DELETE> key.
- Remove a sub-group from within another group by expanding the desired group in the Console Navigator and choosing Remove Item from group from the context-sensitive menu. This will remove the sub-group from the selected group, but will not affect the sub-group's existence in other groups.
- Remove a sub-group from within another group by selecting the Delete menu item from the group's context menu. This will remove the sub-group from the selected group, but will not affect the sub-group's existence in other groups.
- Remove a sub-group from within another group by pressing the <DELETE> key. This will remove the sub-group from the selected group, but will not affect the sub-group's existence in other groups.

Viewing Reports for Targets within a Group

If you have already configured the Enterprise Manager Reporting website, you can view a variety of generated reports for objects within the group. See Chapter 8, "Enterprise Manager Reporting" for more information.

The Job system allows you to automate standard and repetitive tasks, such as executing a SQL script or executing an operating system command. With the Job system, you can create and manage jobs, share jobs with other administrators, schedule execution of jobs, and view information about the jobs. Jobs can be scheduled on a single node or multiple nodes in the network, provided that the node has an Intelligent Agent running on it. The topics discussed in this chapter include:

- Job Process
- Job Detail View
- Job Menu
- Creating, Modifying, or Viewing a Job
- Oracle Job Tasks

Job Process

The Job process includes:

1. Creating a job. This involves:
 - a. Determining the type and destination of the job.
 - b. Determining the tasks.
 - c. Determining task dependencies of the job.
 - d. Determining the parameters for each task.
 - e. Scheduling the times that the job executes.
 - f. Assigning permissions to other administrators for notification purposes.
2. Submitting a job to the selected destinations in the network system.
3. Viewing the job history to review the results of the job.

Job Tasks

The Job system provides a variety of predefined job tasks, or you can submit your own tasks by executing a SQL*Plus script or running an operating system program. Job tasks are implemented in the Tool Command Language (Tcl) scripts with Oracle extensions (OraTcl) to include database-specific commands. You can write your own Tcl script and submit it with the Run Tcl job task. For more information on custom job scripts, see the *Oracle Intelligent Agent User's Guide*.

The tasks are grouped by the target type of the task:

- Database
- Node
- Listener
- HTTP Server

Note: All target types include Node tasks.

The tasks allow you to perform such operations as:

- Execute operating system commands or shell scripts.

- Execute SQL and DBA commands.
- Perform database administration tasks such as starting up and shutting down Oracle databases.
- Start up and shut down Listeners.

See the online help for Oracle job tasks and "Oracle Job Tasks" on page 5-29 for information on Oracle predefined job tasks and their parameters.

You can combine two or more tasks into one job, called a composite job. Composite jobs consist of separate tasks that are constructed such that some tasks may or may not execute upon completion of another 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. Here, you specify a dependency between the two tasks that determine whether the next task is executed. The Job system allows you to specify one of three dependencies for any task: Always (default), Only on Success, or Only on Failure.

You can create jobs that can be used as *fixit* jobs that are to be run when a condition is signalled by the Event system. Fixit jobs are not scheduled. See Chapter 6, "Events" for information on monitoring events in the system.

Note: You need to set up a password file to perform administration tasks, such as start up or shut down, on a remote database. See the "Configuring a Remote Database for Backup or SYSDBA Administration" in the *Oracle Enterprise Manager Configuration Guide* for more information.

Writing SQL*Plus Scripts

Creating your own job tasks using the SQL*Plus command language allows you to automate any number of complex database operations via the Job system and Intelligent Agent(s). The success or failure of a given SQL*Plus script is determined by the exit condition returned when the script completes. Because a SQL*Plus script can return an error condition that may not be recognized by the Intelligent Agent, such as a non-ORA error message, your job task can appear to complete successfully even though a command issued from within your script has failed. To avoid this situation, you must specify an operational clause when using a SQL*Plus EXIT command in your script.

For example:

```
> EXIT sql.sqlcode  
> EXIT warning  
> EXIT 666
```

Using the EXIT command without specifying an operational clause (default) commits and exits with a value of SUCCESS. By explicitly defining the conditions under which your script terminates, the Intelligent Agent can ascertain whether your job has succeeded or failed. For more information on SQL*Plus and the SQL*Plus command language, see the *SQL*Plus User's Guide and Reference*.

Job Credentials

Jobs are normally run with the preferences of the administrator who submitted the job. This ensures that jobs cannot be used to perform functions the administrator could not perform if logged into the machine directly. For example, to write a job output file to the `ORACLE_HOME/network/agent/` directory, the administrator must have permissions to write to that directory on that node.

Because jobs are categorized by the type of target they act on, the job system knows what credentials to pass to the Intelligent Agent. The Job system uses Enterprise Manager System Preferences (Preferred Credentials) to determine what preference information needs to be passed. When a job runs on a node, the job system passes the administrator preferences for the managed node. In addition, the Job system gives you the option of overriding the node preferred credentials when defining a job. This allows the creator of the job to run the job on the node using a different username and password. When a job runs on a service, such as a database, the job system also passes the administrator preferences for the service. See "Preferred Credentials" on page 1-31 for information on administrator preferences.

Important: You must set up valid user credentials for the nodes on which you want to run jobs. Node credentials are required for all jobs. If credentials are not set up correctly for an Windows NT node, you may get the "Failed to Authenticate User" error message. Make sure the Windows NT node account specified in your preferred credentials possesses the "log in as batch jobs" user right. See the *Enterprise Manager Configuration Guide* or your Windows NT documentation for instructions on creating NT user accounts.

Administrator preferences for nodes and/or services are given the following prioritization:

1. Preferred Credential Overrides (Highest Priority)

2. Preferred Credentials for the selected node or service.
3. Preferred Credentials for the Default target.
4. Null Credentials (Lowest Priority) **Note:** Jobs and events will fail.

Submitting Jobs

The Job system is simple to use because the task of scheduling and managing jobs is centralized in the Enterprise Manager Console. The administrator only needs to submit a job once, regardless of the number of targets on which the job will run.

When you submit a job, the Management Server sends the job information to the appropriate Intelligent Agents on the targets you selected. The Intelligent Agents are responsible for executing the job on the specified schedule and returning job status messages to the Console through the Management Server. Once submitted, jobs will run regardless of whether you are logged in or not.

Note: There is usually a slight delay between submitting the job and the notification by the Intelligent Agent.

To schedule a job, you do not have to connect at the time of job creation to the node on which the job will be run. You only need to submit the job from the Console and specify the targets on which it should run. The target can include nodes, databases, listeners, user-defined groups that have been created with the Group system, or any other discovered services.

The Job system of Enterprise Manager allows you to efficiently run jobs on multiple remote nodes by transferring job information to the Intelligent Agents servicing the nodes. When a job is executed, it is run by the Intelligent Agent on that node, thus minimizing network traffic between the remote node and the Console and Management Server. In addition, jobs can be run on multiple nodes simultaneously because there is an Intelligent Agent residing on each node. Jobs can only be run on nodes where an Intelligent Agent is running. If you send a job to a group, the job is only scheduled on the nodes in the group where the Intelligent Agent is running.

When you submit a job to one or more remote sites, it is possible that any one of those site may be down. If a site or its Intelligent Agent is down, the Management Server queues any job requests that could not be delivered to the site. Once the site can be contacted, the Management Server submits the queued job to the Intelligent Agent, which in turn executes the job on the node.

Important: If the Agent goes down for any period of time while the job is running, the Agent will return a job status message "Agent was down." This does not affect job operation, but merely indicates that the repeating job did not run as scheduled during the period the Agent/node was down.

Cancelling Jobs

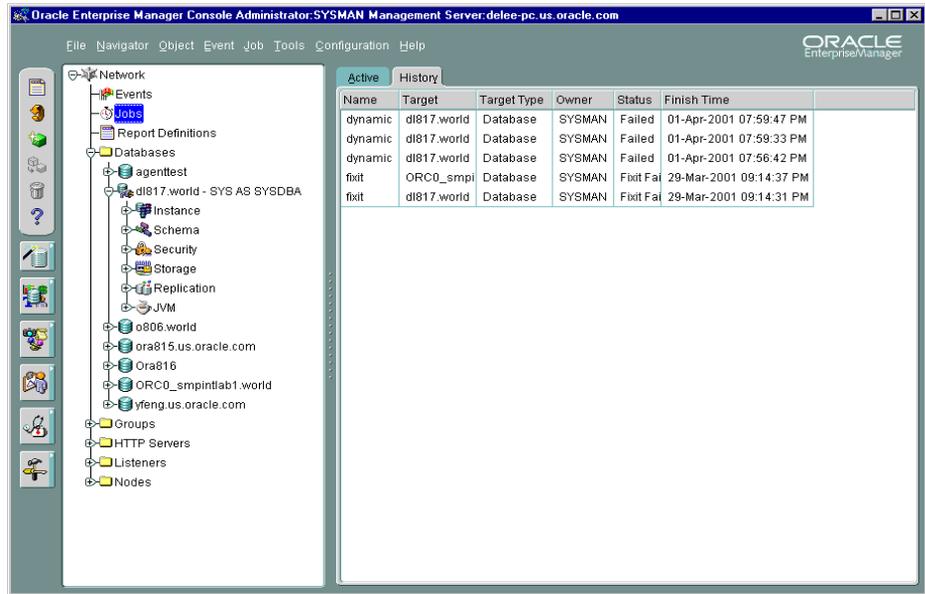
You can cancel a job by selecting the desired job from the Job Active window and choosing Remove Job from the Job menu. Care should be taken when cancelling a job. Cancelling a job that is currently running will interrupt the job process and terminate the job. Problems can arise when the job is composed of multiple job tasks with sequential dependencies.

Job Detail View

You can view the different pages of job information by selecting the page tabs in the Job detail view. There are two pages in the detail view:

- Active
- History

You can switch between the pages by clicking the tab of each page. The rows in both pages can be sorted on any column by clicking the column heading.

Figure 5–1 Job Detail View in the Console

The screenshot displays the Oracle Enterprise Manager Console Administrator interface. The title bar reads "Oracle Enterprise Manager Console Administrator:SYSMAN Management Server:delee-pc.us.oracle.com". The menu bar includes "File", "Navigator", "Object", "Event", "Job", "Tools", "Configuration", and "Help". The Oracle logo is in the top right corner.

The left-hand navigation pane shows a tree structure under "Network". The "Jobs" folder is expanded, showing a list of jobs. The "Active" tab is selected in the main content area, and the "History" tab is also visible. The "History" tab displays a table of job execution records.

| Name | Target | Target Type | Owner | Status | Finish Time |
|---------|-------------|-------------|--------|----------|-------------------------|
| dynamic | dl817.world | Database | SYSMAN | Failed | 01-Apr-2001 07:59:47 PM |
| dynamic | dl817.world | Database | SYSMAN | Failed | 01-Apr-2001 07:59:33 PM |
| dynamic | dl817.world | Database | SYSMAN | Failed | 01-Apr-2001 07:58:42 PM |
| fixit | ORCO_smpci | Database | SYSMAN | Fixit Fa | 29-Mar-2001 09:14:37 PM |
| fixit | dl817.world | Database | SYSMAN | Fixit Fa | 29-Mar-2001 09:14:31 PM |

Active Job Page

The Active page contains a summary of the active jobs on the network. These are jobs that you have submitted to the job system and are not yet completed. Each row is an execution of a particular job scheduled on a specific destination. While a job may execute multiple times, the job listed in the Active page is the one that is currently scheduled or running. You can use the Edit Job menu option to display the details of the selected job. When selecting a job from the Active pane, the only job attribute you can modify is the job permission. See "Creating, Modifying, or Viewing a Job" on page 5-13.

You can double-click on a job listed in the Active page to view the job details.

Name

Name of the job.

Target

Destination of the job. (Displayed only when Show Targets is selected.)

Target Type

database, listener, node, HTTP Server, or other managed targets.

Owner

Administrator submitting the job.

Status

Status of job (Displayed only when Show Targets is checked.) is one of the following:

- *Submitted*: The job has been submitted to the job target running an Intelligent Agent.
- *Scheduled*: The job has been successfully delivered to the Intelligent Agent and is scheduled for execution.

Note: Under certain circumstances, a job will remain in a Submitted state. The most likely cause would be the Intelligent Agent on the node to which you are trying to submit the job is down, or the node is not connected to the network.

- *Started*: The job execution has started. After the job executes, the job execution is displayed in the Job History page. If this is the last scheduled execution of the

job, the job is removed from the Active Jobs page. Otherwise, the job remains in the Active Jobs page and has the status of Scheduled. Unless you view the Active Jobs page at the exact time that the job is executing, you would not see the Running status.

- *Pending Deletion*: The job has been selected for deletion. When the deletion is successful, the job is removed from the Active Jobs page and added to the Job History page.
- *Fixit*: The fixit job has been submitted.
- *Fixing*: The fixit job is executing. A fixit job remains in the Active Jobs page until it is deleted.

Date/Time

This is the time the Intelligent Agent returns after the job has been scheduled by the Intelligent Agent.

Context-sensitive Menu options

The following options are available by selecting a job and clicking the right mouse button.

View Published Reports

Displays the Job status report. The Enterprise Manager Reporting environment must be configured before using this menu option. See Chapter 8, "Enterprise Manager Reporting" for more information.

Edit/View Job

Displays the property sheet for the selected job. Only the permissions, notifications, and target list can be changed.

Create Like

Displays a copy of the selected job. You can edit the property sheet and submit this job.

Copy to Library

Copies the selected job to the Job Library if it does not already exist there.

Remove Job

Delete the selected job. If the job has not been saved to the Job Library, a warning dialog appears indicating that you are about to perform a remove operation. You may wish to copy the job to the job library before removing it.

History Page

Job History contains a list of previous job executions. These are jobs that have been submitted to an Intelligent Agent and have executed successfully or unsuccessfully. You cannot modify these jobs.

- Job Name is the name of the job.
- Target of the job.
- Owner of the job.
- Target type
- Status of job is one of the following:
 - Completed: The job has executed successfully.
 - Failed: The job execution has failed.
 - Deleted: The job has been deleted.
 - For the other status categories, see "Active Job Page" on page 5-8.
- Finish Time is the time when the job finished, failed, or was deleted.

Refreshing the History Page

You can refresh the job history list at any time by clicking on the Refresh icon in the Console toolbar or choosing Refresh Job History from the Console's Job menu. Job history is automatically refreshed each time you move from the Active tab to the History tab.

Clearing the History Page

You can clear the History page by choosing Clear Job History from the Console's Job menu, or from the context-sensitive menu.

Displaying Job Output

You can double-click on a job listed in the Job History page to display the Job property sheet and view the Job Output dialog box, if output exists for the job. If no output is produced by a job, a message displays that states that there is no output for the job. If the output includes only blank spaces, the dialog box is blank.

Context Menu options

The following options are available by selecting a job and clicking the right mouse button.

View Job

Displays the property sheet for the selected job.

Create Like

Displays a copy of the selected job. You can edit the property sheet and submit this job.

Copy to Library

Copies the selected job to the Job Library if it does not already exist there.

Remove Job

Delete the selected job. If the job has not been saved to the Job Library, a warning dialog appears indicating that you are about to perform a remove operation. You may wish to copy the job to the job library before removing it.

You can save the jobs from the History page to a file, then clear the jobs from the History page. This prevents the History page from being overloaded with obsolete jobs that occurred in previous days. Choose the Report Job History option from the Job menu to save the history to a report. This report is a file on the machine where the Enterprise Manager Console is running.

You can create a new job similar to a job in the History page with the Create Like option. See "Creating, Modifying, or Viewing a Job" on page 5-13 for more information.

Job Menu

The Job menu allows you to create, modify, save, submit, and manage jobs. The menu options are enabled depending on the items selected in the Job pane. See Figure 5-1, "Job Detail View in the Console" for an illustration of the Job menu.

Create Job

Allows you to create a new job. See "Creating, Modifying, or Viewing a Job" on page 5-13 for more information.

Create Job Like

Allows you to create a new job like the selected job in the Job pane. See "Creating, Modifying, or Viewing a Job" on page 5-13 for more information.

Edit Job

Allows you to modify the job selected in the Job pane. The property sheet is the same as the property sheet for creating a new job, however, you can only modify job permissions. See "Creating, Modifying, or Viewing a Job" on page 5-13 for more information.

Copy Job to Library

Copies the selected job to the Job Library if it does not already exist there.

View Job

Displays the property sheet for the selected job in the Job pane. The property sheet is in read-only format. Active jobs can be removed but not modified. See "Creating, Modifying, or Viewing a Job" on page 5-13 for more information.

Remove Job

Removes the selected job from the Active or History page of the Job pane. When you delete a job, there is usually a slight delay while the request is processed. See "Cancelling Jobs" on page 5-6 for specifics on job cancellation.

Job Library

Displays the Job Library dialog. See "Job Library" on page 5-12 for more information.

Clear Job History

Clears the jobs listed in the Job History page.

Refresh Job History

Refreshes the job history list. Job history is refreshed each time you move from the Active tab to the History tab. However, to refresh the job history list while currently viewing the History pane, you must select this menu item.

Remove Job

Clears the selected job listed in the Job History page.

Job Library

The Job Library dialog contains a list of the jobs that you have created and saved. In the dialog, you can view summary information about a job:

- **Job Name** is the name of the job.
- **Description** is the user-supplied description of the job.
- **Owner** is the administrator that is assigned as the owner of the job.

These jobs can be submitted to the job system with the Submit button. You can use the Edit button to modify a job selected in this page. You can also double-click on a job listed in the Job Library page to edit the job. You can create a new job based on an existing job with the Create Like button.

Creating, Modifying, or Viewing a Job

When you create, modify, or view details of a job, similar property sheets display. See Figure 5-3, "Job Tasks Page" for an illustration of a Job property sheet. The property sheets contains:

- General Page
- Task Page
- Parameters Page
- Schedule Page
- Access Page
- Progress Page (this page only appears when a job is selected from the Active or History pane)

Attention: When submitting a job that consists of multiple tasks, an error may occur if the string of arguments that was sent is longer than the internal buffer. If that error occurs when submitting a job, divide the tasks among multiple jobs and resubmit the jobs.

Creating a New Job

1. Select Create Job from the Job menu to display the Create Job property sheet.
2. Complete the pages of the Create Job property sheet.
3. Determine whether the job is ready to submit.
 - a. Select the Submit option and click Submit to send the job to the Intelligent Agents at the selected destinations. The job appears in the Active page.
- OR -
 - b. Select the Add to Library option and click Add. The job appears in the Job Library. You can modify or submit a saved job at a later time.

- OR -

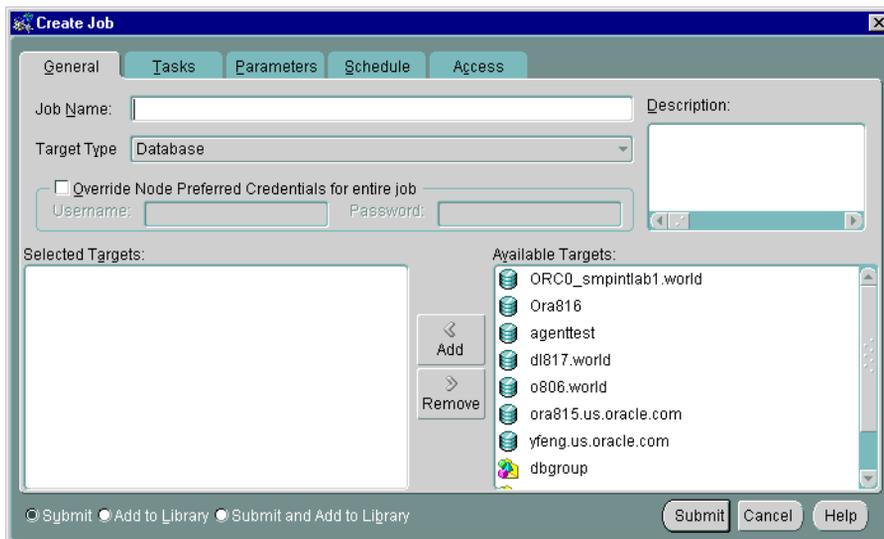
- c. Select the Submit and Add to Library option and click Submit and Add to send the job to the Intelligent Agents at the selected destinations and save the job to the job library. The job appears in the Active page and the Job Library. You can modify or submit a saved job at a later time.

Note: There is usually a slight delay between the time you submit the job and Intelligent Agent notification.

General Page

The General page allows you to specify the primary attributes of a job, such as, job name, description, target type, targets, etc.

Figure 5–2 Job General Page



Job Name

Enter the name of the new job.

Description

Enter the optional description of the job.

Target Type

Select the target type from the pull-down list: Database, Listener, Node, Group, HTTP server, or other service that is integrated into the Console.

Override Node Preferred Credentials for Entire Job

Allows the submitted job to bypass the Console's current preferred credential settings and use a specified Username and Password.

Selected Targets/Available Targets

Select the targets of the job in the Available Targets list and click the Add button to move the target to the Selected Targets list. The targets are determined by the Job Type. The targets include databases, listeners, nodes, HTTP Servers, and groups of these objects.

- For an operating system task, a list of nodes and groups containing nodes displays.
- For a database task, a list of databases and groups containing databases displays.
- For a listener task, a list of listener and groups containing listeners displays.
- For an HTTP Server task, a list of HTTP Servers and groups containing HTTP Server displays.

Note: Only network objects that have been discovered correctly and have an Intelligent Agent running are included in the list of available targets. See "Discovering Targets" on page 3-6 for more information.

Job Task Page

The Task page allows you to choose the tasks that you want the job to perform.

Available Tasks

Tree list of available job tasks. Tasks vary depending on the Target Type selected on the General page. Select a task and click on the < (Add) button to include the task in the job. You can add multiple tasks to the job from the Available Tasks scrolling list. See the online help for Oracle job tasks and "Oracle Job Tasks" on page 5-29 for information on Oracle predefined job tasks and their parameters.

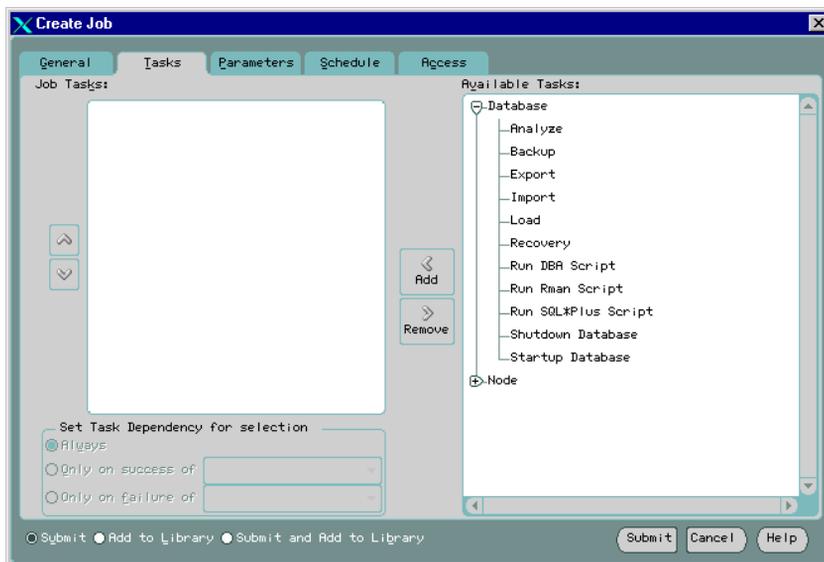
Job Tasks

Tasks currently selected for the current job. You can remove tasks from this list by selecting the task and clicking on the >> (Remove) button.

Up/Down Arrows

Use the arrow buttons to change the order of the tasks or to make a task conditional on a previous task. Select a task in the Job Tasks list and click on the up or down arrow button to position the task.

Figure 5–3 Job Tasks Page



Conditions for running a task

Select a task in the Job Tasks window and select from the following:

- Always - The task is always executed regardless of the failure or success of other tasks.
- Only on success of - The task is only executed if the task selected in the list is successful.
- Only on failure of - The task is only executed if the task selected in the list has failed.

Note: If any task does not execute, control moves to the next task on the same level as the task that did not execute.

Important: If your targets are running with pre-9i Intelligent Agents, you can add up to five job tasks per job. Adding more than five tasks will generate an error message stating the maximum number of input files have been exceeded. This limitation does not apply to targets running 9i Intelligent Agents.

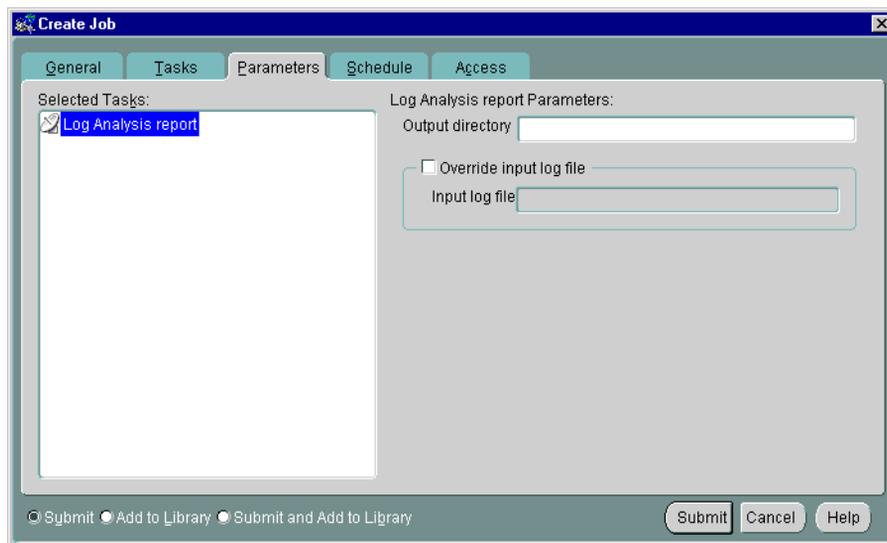
Stopping Jobs

Normally, a job stops when all tasks have been executed. In some cases, you may want the job to stop before completing the task sequence, which might be the case when one task in the sequence fails. To handle situations like this, you can include the Halt Job task as part of a composite job to stop execution at any point within the task sequence. You specify the Halt Job task dependency as you would any other task.

Job Parameters Page

On the Parameters Page, you specify parameter settings for the selected job tasks. To set the parameters for a task, select the task in the Selected Tasks list. The parameters for the selected task are displayed on the right side of the Parameters Page.

Figure 5–4 Job Parameters Page



Selected Tasks

Select the task for which you want to set parameters.

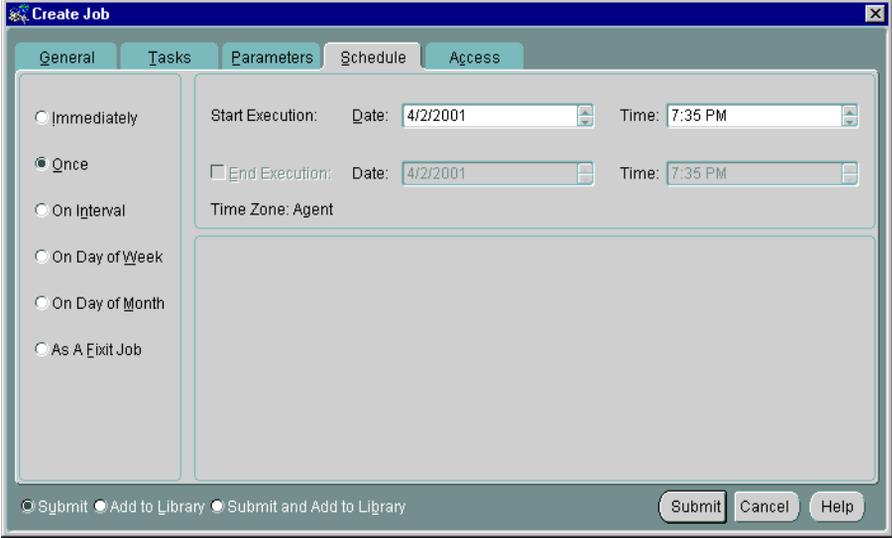
Task Parameters

Specify the parameters for the selected task. You can enter values in the entry boxes or select values from the pull-down lists. The parameters vary according to the job task. See the online help for Oracle job tasks and "Oracle Job Tasks" on page 5-29 for information on Oracle predefined job tasks and their parameters.

For some jobs, you can override the preferred credentials for connecting to the service. This allows you to enter a username and password. See "Job Credentials" on page 5-4 and "Preferred Credentials" on page 1-31 for information on administrator preferences.

Job Schedule Page

The Schedule page allows you to schedule the execution of the job task. Select the frequency that you want the task executed. The choices are Immediately, Once, On Interval, On Day of Week, On Date of Month, or As a Fixit Job.

Figure 5–5 Job Schedule Page

The screenshot shows a 'Create Job' dialog box with the 'Schedule' tab selected. The dialog has five tabs: General, Tasks, Parameters, Schedule, and Access. The 'Schedule' tab contains the following options and fields:

- Radio buttons for scheduling options:
 - Immediately
 - Once
 - On Interval
 - On Day of Week
 - On Day of Month
 - As A Exit Job
- Start Execution: Date: 4/2/2001, Time: 7:35 PM
- End Execution: Date: 4/2/2001, Time: 7:35 PM
- Time Zone: Agent
- Buttons at the bottom: Submit, Cancel, Help
- Radio buttons at the bottom left: Submit, Add to Library, Submit and Add to Library

Immediately

Submits the task as soon as you finish the setup process. The task executes only one time.

Once

Schedules the task only one time at the date and time you choose.

On Interval

Allows you to schedule a specific time interval between task executions. The interval can be a combination of hours and minutes, or number of days. Select the value you want to change and click on the scroll buttons. You can also type in a new value.

On Day of Week

Allows you to schedule the task on one or multiple days (Sunday, Monday, etc.) of the week. Click on the days of the week to select the days you want the task scheduled.

On Date of Month

Allows you to schedule the task on one or multiple days (1 - 31) of the month. Click on the dates of the month to select the dates you want the task scheduled.

Note: If you choose a day, such as 31, that is not in a month, the job will not be run in that month.

As a Fixit Job:

Check this box if you want to use this job as fixit job to correct an event condition. The fixit job must be submitted to the target where the event is being monitored. A fixit job cannot be scheduled.

The job can be selected from the Fixit Job list in the Event property sheet's Fixit Jobs page after it has been successfully submitted to an Intelligent Agent. For information on fixit jobs with events, see "Event Fixit Jobs Page" on page 6-50.

Start Execution

Choose the first date and time that you want the task executed. This is the starting time for any task scheduled on an interval.

Select the month, day, or year in the Date field and click on the scroll buttons to change the value. You can also type in new values.

Select the hour, minute, or AM/PM in the Time field and click on the scroll buttons to change the value. You can also type in new values.

End Execution

Choose the last date and time that you want the task executed. This option does not apply if you chose the Immediately or Once execution options.

- Select the month, day, or year in the Date field and click on the scroll buttons to change the value. You can also type in new values.
- Select the hour, minute, or AM/PM in the Time field and click on the scroll buttons to change the value. You can also type in new values.

Time Zone

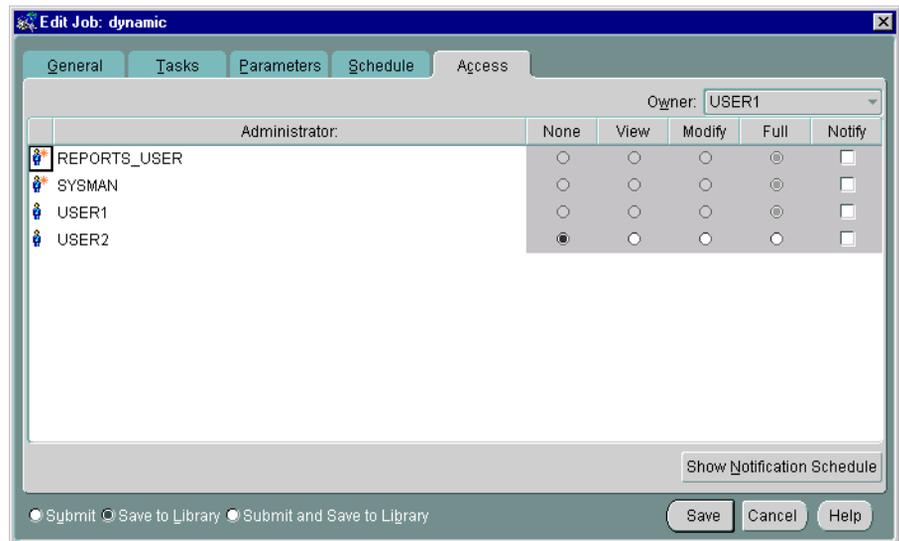
Static text displaying the time zone to be used for job execution.

Note: Only the Agent time zone is available with this release. Here, the Intelligent Agent schedules the task execution at each target based on the actual system time of each Intelligent Agent. Tasks are not necessarily run simultaneously.

Job Access Page

Determine the permissions that you want to assign to administrators with the Access page. This allows other administrators to view or modify the job. Notifications can be assigned with this page. Any permissions assigned on this page supersede any user default permissions that have been assigned with User Preferences.

Figure 5–6 Job Access Page



None

Does not allow the administrator to view this job anywhere.

View

Allows the administrator to view the job and inspect job properties.

Modify

Allows the administrator to suspend and resume the job. The administrator will also be able to enable notifications for active jobs.

Full

Allows the administrator to delete the job from the Active or History pages of the Job window, modify permissions for other administrators, and enable notification.

Notify

Allows the administrator to receive enhanced notifications (paging and email) for the job. Notify permission cannot be assigned if the administrator's permission level is set to None.

Note: All administrators possessing at least the View permission will receive notifications through the Console when a job is executed.

Any permissions assigned on this page supersede any administrator default permissions. See "Access" on page 1-29 for more information.

Show Notification Schedule

Show Notification Schedule displays when administrators are scheduled to receive notifications.

To remove an administrator from receiving an enhanced notification, display the context menu (press the right mouse button) on any time block. The context menu provides options for adding and removing recipients of the notifications. Administrators that appear via the Add Recipient and Remove Recipient menu options are those whose schedules match the selected time slot.

Skipped Job Notification

When using a 9i version of the Intelligent Agent, notifications are also sent to administrators whenever a job is skipped, as might be the case when the Intelligent Agent is unavailable, when the target is blacked out (see the *Intelligent Agent User's Guide* for more information), or when the length of previous job executions run beyond the time the next execution is scheduled to begin.

Job Progress Page

The Job Progress page is available for jobs in the Active and History pages of the Job window. The Progress page provides a log of the job's activities.

The Progress page contains all status changes that have been received for a specific job. Each row in the page summarizes a status change of the job. If you display the Progress page for an execution in the History page, the page typically displays Submitted, Scheduled, Started, and Completed or Failed statuses for that execution.

If you display an execution from the Active Jobs page, the Progress page displays only those status changes that have been received.

When you display the Progress page, the page displays the statuses only for the target and execution time of the job occurrence selected. To view the status changes associated with other targets or execution times, select other targets or execution times from the Target or Execution pull-down lists. You can also select <All> in either list to view all statuses. If the job has been Deleted on a destination, the Deleted status always displays at the top of the Progress Page.

The following options are available on the Progress page:

Target

Select the target of the job occurrences you want to view from the pull-down list. Select <All> for all destinations. The list of job occurrences changes according to the selection.

Execution

Select the execution time of the job occurrences you want to view from the pull-down list. Select <All> for all executions. The list of job occurrences changes according to the selection.

Save List

Select the Save List button to save the list of job occurrences as a local file using the standard Windows file dialog box.

Notification Details

This option displays the notifications for this job.

Show Output

If output exists for the selected occurrence of a job, you can display the output in the Output dialog box. You can also double-click on a selected job to display output.

The columns in the Progress page contain the following information:

Status

See "Active Job Page" on page 5-8 and "History Page" on page 5-10 for information on the status of a job.

Target

This is the target of the specific occurrence of the job.

Date/Time

This is the time the Management Server was notified by the Intelligent Agent that a status change had occurred.

Job Output Dialog Box

The Output dialog box is displayed by double-clicking on an entry in the Progress page, or selecting an entry and clicking on the Show Output button, if enabled. This dialog displays any output, including error messages, as a result of the execution of an occurrence of a job. If no output is produced by a job, a message displays stating there is no output for the job. If the output includes only blank spaces, the dialog box is blank.

With the Output dialog box displayed, the following options are available:

Close

Select the Close button to exit the dialog box after viewing it.

Save As

Select the Save As button to save the contents of the dialog box to a text file.

Changing the Maximum Limit for Job Output Because the output of some jobs may be quite large, Oracle Enterprise Manager provides you with the option of specifying the maximum size for any job output returned by the Intelligent Agent. If the job output exceeds the maximum limit, any output generated beyond this maximum is truncated. By default, the maximum job output size is set to 128K (smallest allowable value). The largest permissible value is two megabytes.

You can set this parameter (`oms.vdg.joboutput.maxsize`) in the following file:

```
$ORACLE_HOME/sysman/config/omsconfig.properties
```

Example omsconfig.properties entry:

```
oms.vdg.job_output_maxsize=128K
```

Units must be specified in kilobytes (K) or megabytes (M).

Modifying Active Jobs

Certain job properties can be dynamically modified for submitted jobs in the Active Jobs page. These job properties are: job targets, job permissions, and enabling notification. Dynamic modification of these properties means you can select the

active job, change the properties and apply the changes. The changes will be dynamically applied to all targets of the job. The other job properties (tasks, task parameters, and job schedule) are currently not dynamically modifiable. See the next section *Modifying Active Jobs* for more information.

The owner of the job, i.e., the Enterprise Manager administrator that submitted the job, can change any of the dynamically modifiable properties: targets, permissions, notification. Administrators who have "Full" permission for the job can change the job permissions and enable notifications for any administrator. Administrators who have "Modify" permissions.

Alternative Method of Modifying an Active Job

If you want to change other job attributes besides targets, permissions, and notifications, you need to first delete the job from the Active page, then re-submit the job with the necessary changes. It is more convenient to save the job definition first in the Job Library, and then make the necessary changes. You must be the job owner in order to modify it.

1. If you have not already done so, copy the job to the Job Library using the Copy to Library menu option.
2. Select Job Library from the Job menu. The Job Library dialog appears.
3. Select the job from the library.
4. Click Edit. The Job property sheet appears.
5. Update the pages of the Job property sheet and determine whether the job is ready to submit.
 - a. Select the Submit option and click OK to submit the job to the Intelligent Agents at the selected destinations. The job appears in the Active window.
- OR -
 - b. Select the Save to Library option and click OK. The job appears in the Job Library. You can modify or submit a saved job at a later time.
- OR -
 - c. Select the Submit and Save to Library option and click OK to submit the job to the Intelligent Agents at the selected destinations and save the job to the job library. The job appears in the Active window and the Job Library. You can modify or submit a saved job at a later time.

Viewing Job Details

To view the details of a particular job, double-click on a job in the Active or History Job pane. The Job property sheet for that job appears.

Example: Creating a Job

This example illustrates how to complete the General, Tasks, Parameters, and Schedule Pages when creating a job. It also describes how to save and submit a job.

1. Select Create from the Job menu to create a new job. The Create Job property sheet displays.
2. Enter a name for the new job in the Job Name field of the General Page. You may also enter a description for the job in the Description field.
3. Select Database from the Target Type pull-down list.
4. Select a target from the Available Targets list, then click on the << (Add) button to add the target to the Selected Targets list. These are targets where an Intelligent Agent is running. The Job Credentials must be set up correctly for these targets. See "Job Credentials" on page 5-4 for more information.
5. Repeat the previous step for another target. You are choosing the targets where the job will be run.
6. Click on the Task Page tab of the Create Job property sheet.
7. Select Run SQL*Plus Script from the Available Tasks list, then click the << (Add) button to add the task to the Selected Tasks list. For this example, add only the Run SQL*Plus task. You can specify multiple tasks for a job and make a task conditional on a previous task.
8. Make sure the task is set to run Always. If you specified multiple tasks for this job, you could make a task conditional on a previous task.
9. Click on the Parameters Page tab of the Create Job property sheet to set the parameters:
 - Enter "SELECT * FROM dba_users;" in the Script Text box.
 - Do not check the Override Preferred Credentials box. If you do not override the credentials, the information that is set up with the administrator Preferred Credentials property sheet is used. See "Job Credentials" on page 5-4 for permissions needed to run job tasks. This particular job task requires database credentials that permit access to the data dictionary views. Make sure the Preferred Credentials for the chosen target have this.

10. Click on the Schedule Page tab of the Create Job property sheet to schedule the execution of the job.
11. Select the On Interval under Run Job to execute the job on a specific interval.
12. Set the Start Execution Date of the job to 9/1/2001. Select the month value in the Start Execution Date field and enter 7. You can also click the up and down arrows to change the value when a number is selected.
13. Repeat the process in the previous step for the day and year values of the Start Execution Date.
14. Change the Start Execution Time to 12:00 AM. Use the same procedure that you used to set the date.
15. Check the End Execution box to set a final execution date for this job.
16. Set the End Execution Date of the job to 9/3/2001. Set the End Execution Time of the job to 12:00 AM.
17. The Time Zone should be set to Intelligent Agent (currently static text). This job will execute at the local time zone where the Intelligent Agent is located. This is the time zone of the destination.
18. Select the Every ... Days button to set the job frequency for day interval. Click on the up arrow to change the value to 3 days.
19. Click on the Access Page tab of the Create Job property sheet to assign permissions on this job for other administrators.
20. Allow all other Enterprise Manager administrators to view and receive notifications for this job.
21. Click the Submit and Add to Library button to save the new job in the Job Library and submit the job to the selected destinations.
22. If you want to modify this job later, select the job in the Job Library dialog and choose the Edit option. You can also double-click on the job.

A submitted job is sent to the Intelligent Agents at the selected destinations. The Intelligent Agent for a target begins processing the job, the job appears in the Active Jobs page in the Job window. If the job is processed successfully, the job will start executing on 9/1/2001 at 12:00 AM. After an execution of a job, it is moved to the Job History page of the Job window. You can view the progress of the job and any output in the Job Progress Page.

Note: If you have a domain user set up, you must set the domain password to be the same as the local password in order for scheduled jobs to run when they are submitted using the domain user account. (Windows NT only)

Required Administrator Permissions

The following table summarizes the permissions required to perform various activities against jobs in the Enterprise Manager Console. The owner of a job refers to the Enterprise Manager administrator that submitted the job.

Table 5–1 Administrator Permissions for Jobs

| Action | None | View | Modify | Full | Owner | Super User | Comments |
|---|------|------|--------|------|-------|------------|--|
| JOBS - Dynamic modification | | | | | | | |
| Add/remove targets | No | No | No | No | Yes | No | |
| Change permissions, including your own permissions | No | No | No | Yes | Yes | Yes | |
| Set Notification checkbox for any administrator | No | No | Yes | Yes | Yes | Yes | |
| Change all other job properties: tasks, parameters, fixit job, schedule | No | No | No | No | No | No | Not supported in 9i |
| Change owner | No | No | No | No | No* | No | * New behavior. When administrator is deleted, all jobs are reassigned to the new owner. |
| JOBS - In the Library | | | | | | | |
| Change owner (library) | No | No | No | Yes | Yes | Yes | |
| Add/remove targets | No | No | Yes | Yes | Yes | Yes | |
| Change description, tasks, parameters, schedule, fixit job | No | No | Yes | Yes | Yes | Yes | |
| Change permissions; enable/disable Notify preferences | No | No | Yes | Yes | Yes | Yes | |
| Delete job | No | No | No | Yes | Yes | Yes | |

| Action | None | View | Modify | Full | Owner | Super User | Comments |
|------------------------------|------|------|--------|------|-------|------------|----------|
| Submit job from the library | No | Yes | Yes | Yes | Yes | Yes | |
| JOBS - In the Console | | | | | | | |
| Delete active job | No | No | No | No | Yes | Yes | |
| Clear history | No | No | No | Yes | Yes | Yes | |

Oracle Job Tasks

This section lists the Oracle predefined job tasks and parameters for:

- Oracle databases
- Operating systems or hosts (Nodes)
- Listeners
- HTTP Servers

This information is entered in the Job Task Page and Job Parameters Page of the Create Job property sheet. The name and the parameters are listed for each task.

Oracle Database Tasks

These are the tasks that can be run on databases and database groups. In addition, you can run operating system or host job tasks.

- Run SQL*Plus Script
- Run DBA Script
- Shutdown Database
- Startup Database

Note: You need to set up a password file to perform administration tasks on a remote database. See the *Oracle Enterprise Manager Configuration Guide* for more information.

Enterprise Manager Wizard Database Tasks

Specific database job tasks are used by the Enterprise Manager data and backup management wizards that are accessed through the Console Navigator popup and main menus. The job tasks are:

- Analyze
- Import
- Export
- Load
- Backup
- Recovery

Since these job tasks are used only by their respective wizards, the tasks will not have directly editable parameters. To modify parameters for any Wizard database task, click on the Load Wizard button located on the Parameters page of the Job property sheet to activate the associated Wizard. For more information about these wizards and associated job tasks, see the Enterprise Manager online help.

Run SQL*Plus Script

This job executes a SQL*Plus script, allowing any legal SQL or PL/SQL scripts to be run, including all SQL*Plus formatting commands. You can copy and paste the text of the script into the Script Text box of the Parameters page (Create Job property sheet), or simply type SQL commands in the Script Text box.

Parameters:

1. SQL Parameters. Enter one or more arguments that you want the script to use.
2. Override Preferred Credentials. You can use the preferred credentials that have been set up for the database, or you can enter a username and password. If you check the box to override the credentials, then you need to enter:
 - a. User Name. Username for accessing the database.
 - b. Password. Password for the username.

Note: See "Preferred Credentials" on page 1-31 for more information.

3. Script Text. You can copy and paste your script into the Script Text box.

Hint: If you need to determine whether a SQL error has occurred during the running of a SQL script, include "WHENEVER SQLERROR EXIT SQL.SQLCODE" at the beginning of the script. If a SQL error occurs, the job status is set to failed.

Run DBA Script

This job executes a Server Manager line mode script that contains DBA commands.

Parameters:

1. **Override Preferred Credentials.** You can use the preferred credentials that have been set up for the database, or you can enter a username and password. If you check the box to override the credentials, then you need to enter:
 - a. **User Name.** Username for accessing the database.
 - b. **Password.** Password for the username.
 - c. **Connect As.** Select the role you want to connect as from the pull-down list.

Note: See "Preferred Credentials" on page 1-31 for more information.

2. **Script Text.** You can copy and paste your script into Script Text box.

Shutdown Database

This job task shuts down an Oracle database instance.

Parameters:

1. **Mode:**
 - Immediate
 - Abort
2. **Connect As:**
 - SYSDBA
 - SYSOPER
3. **Override Preferred Credentials.** Check the box if you want to override the preferred credentials that have been set up for the database. If you check the box to override the credentials, then you need to enter:
 - a. **User Name.** Enter the username for accessing the database.
 - b. **Password.** Enter the password for the username.

Note: See "Preferred Credentials" on page 1-31 for more information.

Startup Database

This job task starts up an Oracle database instance.

Parameters:

1. **Startup State.** Select the start up state from the pull-down list:

- Startup instance, mount, and open database
 - Startup instance and mount database
 - Startup instance only
2. **Parameter File.** Enter the initialization parameter filename you want to use for the database. This file is located on the node where the Intelligent Agent and database reside. For example with a database on a Unix platform:

```
/private/oracle/admin/ora8db/myinit.ora
```

If you do not enter a filename, the default platform-specific initialization file is used.

3. **Override Preferred Credentials.** Check the box if you want to override the preferred credentials that have been set up for the database. If you check the box to override the credentials, then you need to enter:
 - a. **User Name.** Enter the username for accessing the database.
 - b. **Password.** Enter the password for the username.

Note: See "Preferred Credentials" on page 1-31 for more information.

4. **Mount Mode.** Select the mount option from the pull-down list:
 - Exclusive
 - Normal
 - Parallel
5. **Connect As.** Select the connecting role from the pull-down list:
 - SYSDBA
 - SYSOPER
6. **Restrict Connections.** Check this box if you want to start the database in Restricted mode.
7. **Force Startup.** Check this box if you want to start up the database with the Force option. Refer to the Oracle 8i Administrator's Guide for more information on startup options.

Halt Job

Normally, a job stops when all tasks have been executed. In some cases, you may want the job to stop before completing the task sequence, which might be the case

when one task in the sequence fails. To handle situations like this, you can include the Halt Job task as part of a composite job to stop execution at any point within the task sequence. You specify the Halt Job task dependency as you would any other task.

Operating System or Node Tasks

These are the tasks that can be run on the host's operating system.

- Broadcast Message
- Run OS Command
- Run Tcl Script
- Halt Job

Broadcast Message

This job allows you to submit a message to the selected target using the platform-specific mechanism. To send the message to a target, you may need to have permissions on specific directories. For example, you may need permissions on `/dev/console` (system console device) to send a message to a Unix destination.

Note: On a Windows platform, this task sends the message to ALL users on the network. To send a message to specific users, use the Run OS Command task to execute the `net` command with the `send` option. See the Windows online help for information on `net` command line arguments. You can also enter

```
net send /help
```

at the MSDOS command prompt.

Parameters:

Message Text. Enter the message text that you want sent to the selected destinations.

Run OS Command

This is a generic method of running any program or script that is executable on that host, provided your credentials allow you to do that.

Parameters:

1. OS command or shell script name. The command or script must be accessible from the node where the Intelligent Agent and database reside. You may have

to include the path for the Intelligent Agent to locate and execute the command or script. For example: `ls`

2. One or more arguments to the command. For example: `-l /export/oracle`

Run Tcl Script

This job executes a Tcl script. This is a generic method of running any Tcl script that is executable on that host, provided the preferred credentials allow that. See "Preferred Credentials" on page 1-31 for more information.

Parameters:

1. Parameters. One or more command-line arguments that you want the script to use. The arguments must be delimited by quotes.

Note: Multiple parameters, such as "one two three", are treated as only one parameter. To ensure that the parameters entered in the field are treated as separate arguments and to ensure that the Tcl script functions in future releases, include the following at the beginning of the Tcl script:

```
set argc [llength $argv]
if { $argc == 1 } { set argv [lindex $argv 0]}
```

2. Script Text. Type or copy the Tcl script into the Script Text box. To use an existing script file, click Import to display the Import File dialog.

Tcl Script Examples

For information on writing Tcl job tasks, see the *Intelligent Agent User's Guide*. For information on Tcl, see "Tcl and the Tk Toolkit," by John K. Outsterhout, published by Addison-Wesley Publishing Company, 1994. For examples of Tcl job scripts, review the scripts located in `ORACLE_HOME\network\agent\jobs\oracle` subdirectories on the machine where an Intelligent Agent has been installed. Do not edit these Tcl scripts.

The following is an example of a Tcl script (Unix platform) that logs on to a database and runs a SQL statement:

```
set argc [llength $argv]
if { $argc == 1 } { set argv [lindex $argv 0]}
set connect_str [lindex $argv 0]
```

```

set sql_statement [lindex $argv 1]
set lda [oralogon $connect_str]
set curl [oraopen $lda]
orasql $curl $sql_statement
set result_row [orafetch $curl]
while {$oramsmsg(rc) == 0} {
    puts $result_row
    set result_row [orafetch $curl]
}
oraclose $curl
oralogoff $lda

```

When the script is executed with the Run Tcl Script task, the following are examples of command line arguments that should be entered in the Parameters field:

```
"scott/tiger@or817.world" "select * from emp"
```

The following is an example of a Tcl script (Unix platform) that displays the contents of a file if it exists and triggers a third-party event if it does not exist:

```

set argc [llength $argv]
if {$argc == 1} {set argv [lindex $argv 0]}
set myfile [lindex $argv 0]
append mymessage "File not found:" $myfile
if {[file exists $myfile]} {
    catfile $myfile
} else {
    puts $mymessage
    orareporevent /user/host/file/alert $oramsmsg(nodename) 1 $mymessage
}

```

When the script is executed with the Run Tcl Script task, the following is an example of a command line argument that should be entered in the Parameters field:

```
"/export/oracle/network/agent/dbsnmp.ver"
```

Note: When `orareporevent` is used to trigger a third-party event with a job script, you need to create and register an event that has the "Unsolicited events" box checked. See "Event General Page" on page 6-42 for more information.

Listener Tasks

These are the tasks that can be run on Listeners. In addition, you can run operating system or host job tasks.

- Shutdown Listener
- Startup Listener

Shutdown Listener

This stops the Listener. The preferred credentials for the node must have a user that has system administration privileges. See "Preferred Credentials" on page 1-31 for information on user preferences.

Parameters:

Password. Enter a password for the listener if you choose to override the default password.

Startup Listener

This can be invoked to start the Listener. The preferred credentials for the node must have a user that has system administration privileges. See "Preferred Credentials" on page 1-31 for information on user preferences.

Parameters:

None

Important: See "Numeric Pager Job/Event Ids" on page 6-57 for specific ids.

HTTP Servers

These job tasks provide limited control your web servers. Although you can start or stop a managed HTTP server directly from the Console Navigator, you can also use the Job system directly to schedule web server shutdowns or startups.

- Shut Down HTTP Server
- Start Up HTTP Server

No parameters are required for either job task.

Job Tasks Run through Wizards

Some Enterprise Manager wizards and applications use the job system to perform specific operations. Job tasks used by these wizards/applications appear in the job tasks list, but cannot be used directly as with regular job tasks discussed in the previous section. If one of these job tasks is selected, a button appears on the Job property sheet Parameters page allowing you to start the related application/wizard. The following job tasks are used in conjunction with specific wizard/applications:

- Backup
- Recovery
- Export
- Import
- Load
- Analyze
- Run RMan script

The Event system allows you to monitor your network for specific conditions, such as loss of service or lack of storage, that may occur in your managed environment. You select tests to run on managed targets (databases, nodes, listeners, or other services), then set the threshold parameters for which you want to be notified. You can share events with other administrators, in addition to being able to notify specific administrators when an event condition occurs. For some event tests, you can also choose to execute a *fixit* job that automatically corrects the problem.

The following topics are discussed in this chapter:

- What's New in Events
- Event System Overview
- Event Detail View
- Event Menu
- Event Viewer
- Event General Page
- Oracle Event Tests
- Event System Features and Requirements

What's New in Events

This section discusses the enhancements to the Events System in Enterprise Manager 9.0.

Dynamic Modification of Events This feature allows administrators to dynamically change parameters of a registered event. Administrators can select a registered event, add and/or remove targets, change some attributes, then apply the changes to all the targets of that event without deregistering the event prior to editing. Certain restrictions apply for targets running pre-9i Agents.

Event Schedules This feature provides more flexibility in scheduling the evaluation of an event: at specific intervals, on specific days of the week, or on specific days of the month. It also allows administrators to specify when the first event evaluation starts, a feature which is useful for scheduling resource intensive events during off-peak periods. Note: Events containing targets running pre-9i Intelligent Agents are restricted to interval scheduling only.

User-Defined Events (Oracle Diagnostics Pack) This feature allows administrators to write custom operating system-specific scripts and integrate them into the Enterprise Manager event system as new event tests. This expands the breadth and flexibility of the events system by allowing administrators to write and incorporate custom scripts. Also, administrators can tie in their existing monitoring scripts into the events system, and thus take advantage of the services provided by the Enterprise Manager framework, such as paging/email notifications for events and other collaborative administration of services.

Usability Improvements in Event Property Sheet These refer to improvements in general usability of the event system. These include: simplifying the General page, user-interface improvements in the Parameters page, changing the Unsolicited event option from a checkbox to an event test, allowing a fixit job to be evaluated from the Events property sheet.

Enhancements to Database Monitoring (Oracle Diagnostics Pack) New database event tests have been added that are based on metrics that are currently instrumented by the data collection services. These metrics can then be monitored by both the real-time Performance Manager charts, as well as in a lights out environment via the events system.

Event Handler Enhancements The Event Handler is now a production feature and is now an integral part of the Oracle Management Server. It allows administrators to

specify customizable responses to event occurrences by logging event information to a file and/or executing any user-specified command. See Chapter 7, "Enterprise Manager Event Handler" for more information.

Event System Overview

The Event system allows you to efficiently monitor large enterprise. Using the Event system and Intelligent Agents, you can effectively monitor any number of databases, nodes, or other services 24 hours a day, and be alerted when a problem or specific condition is detected. You can also pinpoint only the services you wish to monitor. The Event system can be extended to include other third-party applications that detect events independent of the Intelligent Agents.

In the Event system, event settings are stored based on the administrator registering the event. This allows administrators of large systems to customize their event systems to their preferences and tasks. Administrators receive messages for events for which they have been selected to receive notifications by other administrators.

The Event system includes the following processes:

1. Creating an event by completing the Event property sheet pages. This involves:
 - a. Determining the monitored targets.
 - b. Selecting the event tests that you want to run.
 - c. Determining the threshold parameters for the event tests.
 - d. Determining how often the event condition is to be checked.
 - e. Specifying a fixit job to be run when an event triggers. (Optional)
 - f. Assigning permissions to allow other administrators to share the event or be notified if the event condition is met.
2. Saving and modifying an event.
3. Registering, or submitting, an event to the Intelligent Agents on the monitored targets.
4. Interpreting and correcting an event occurrence.
 - a. Logging information pertinent to your interpretation of the event to the Event log.
 - b. Assigning the Event to a different administrator if appropriate.

Using Events

You need to create and register events, which are simply a group of event tests that you want to run on your managed systems. Oracle Enterprise Manager includes a variety of predefined event tests that you can use when creating events. The event tests are grouped by target type, for instance:

- Database
- Listener
- HTTP Server
- Concurrent Manager
- Node

Creating Events

You can create events using the predefined event tests that have been installed with Oracle Enterprise Manager. See "Event Categories and Types" on page 6-9 for more information.

The events are created with information entered in the Event property sheet. You determine parameters such as the target that is monitored, the specific tests to perform, the frequency that the event test is executed, and whether other administrators can share the events and which administrators should be notified if the event condition is met. See "Access" on page 1-29 for more information. Some event tests have parameters with threshold values that you can customize for your system. See "Event Parameters Page" on page 6-45 for more information. To use the Event system, an administrator must have sufficient privileges to access database objects from the Console. Under most circumstances, full DBA privileges are not required, nor would be appropriate to assign full DBA privileges to every administrator. For this reason, the OEM_MONITOR role was created.

Enterprise Manager Monitor Role Beginning with Oracle 8.0.6 databases and higher, the OEM_MONITOR role is created by the Oracle database creation scripts. This role permits access to database functionality within Enterprise Manager. For example, running events against a database (tablespace full, buffer cache hit ratio) or browsing through the objects in a database via the Console Navigator tree. These types of functionality require database credentials on which to perform these operations. Rather than granting the powerful DBA role to the database credentials, many administrators prefer to provide only the necessary privileges required to do these operations. Granting the OEM_MONITOR role to the database credentials,

ensures that the user has the minimum sufficient privileges required for these operations.

Note: You need to create the OEM_MONITOR role using the SYS account.

If you need to create the OEM_MONITOR role manually, here are the steps you need to perform:

1. Create a role called OEM_MONITOR

```
drop role OEM_MONITOR;  
create role OEM_MONITOR;
```

2. Grant the 'connect' role to OEM_MONITOR

```
grant connect to OEM_MONITOR;
```

3. Grant the system privileges 'Analyze any' & 'Create table' to OEM_MONITOR

```
grant analyze any to OEM_MONITOR;  
grant create table to OEM_MONITOR;
```

4. Create the SELECT_CATALOG_ROLE role as defined in sc_role.sql .

5. Grant the SELECT_CATALOG_ROLE to the OEM_MONITOR role

```
grant select_catalog_role to OEM_MONITOR;
```

You are now ready to grant the OEM_MONITOR role to the database user that will be used as “database preferred credentials” in Enterprise Manager. In addition to granting the OEM_MONITOR role to a user, you must also ensure that the QUOTA for the user account is set to UNLIMITED.

The “Continued Row” event test needs to analyze results into a table so it needs both the "analyze any" and "create table" privileges.

Note: The "analyze any" privilege is used by the "index rebuild" event to compute statistics.

Registering Events

Events are registered, or submitted, to specific targets, such as nodes, listeners, or databases. The status of a registered event is viewed in the Registered page of the Event pane. **Note:** The "Show Targets" checkbox is checked at the bottom of the Registered page.

The event scripts are executed on nodes with the permissions of the Intelligent Agent. However, some of the database event tests, such as Continued Rows, require access to system tables and require additional permissions. You need to set up preferred credentials for the monitored database with an administrator that has system privileges. See "Preferred Credentials" on page 1-31 for more information.

The Intelligent Agent is responsible for detecting when a specific event condition has occurred. The Intelligent Agent first notifies a Management Server, which in turn notifies interested administrators either through the Oracle Enterprise Manger Console, or by external means such as Email or Paging.

The Management Server is responsible for registering event information with the appropriate Intelligent Agents on nodes in the network. You determine the frequency that an Intelligent Agent checks an event. See "Event Schedule Page" on page 6-46 for details on setting the frequency interval for an event. An exception to this is the Up/Down (node) event test, which is checked at an interval set by the system itself. See "Fault Management Event Tests" on page 6-10 for more information on this event test.

Event Occurrences

When an alert condition occurs, the Intelligent Agent is responsible for notifying the Management Server. Each event is logged in the repository and can be viewed and acknowledged in the Alerts page of the Console. See Figure 6-4, "Event Menu and Detail View" for an illustration of the Event pane.

Event Notifications

Events can consist of multiple event tests. If any one of these tests identify a specified condition, the event is triggered and a notification is sent to the Console. If enhanced notification is configured for your system, paging and/or email notifications are sent.

Event notification occurs as follows:

- A notification is sent when the threshold of an event test exceeds the level specified by parameter values. If the event does not have parameters, a notification is sent when the event occurs.

- If the event test condition remains above the threshold specified, a new notification is not sent. If the condition does not exist when the next test is run, the event clears. Notifications are also sent (email/paging) when an event clears.
- If an event test condition changes from warning to critical or critical to warning, a new notification is sent to the Event pane or via E-mail or paging.
- If you acknowledge and move an alert to history, a new notification is not sent to the Alerts page unless a moved warning changes to a critical alert.

Notifying Administrators

Enterprise Manager administrators can be notified in various ways, such as electronic mail or paging, depending on the administrator's setup and permissions. You need to set up the notification services and determine the administrators that need to be notified for the events. See "Event Access Page" on page 6-47 and "Access" on page 1-29 to determine the administrators that receive notifications. See "Notification" on page 1-20 to determine how and when an administrator is notified.

If you plan to notify administrators with email or paging, you need to make sure the following is set up properly:

- The settings for the system modem.
- The notification schedules for the administrators.
- The mail and paging services that are used to contact administrators.
- The mail address and paging numbers for each administrator.

Interpreting Events

An event is composed of one or more event tests. While an individual event test may result in a different status (For example, some clear, some are in alert), there is a general status for the Event. To determine the general severity for the event, the following rules apply in succession:

- a. If the event includes an UpDown event test, and this test triggers, then the general status of the Event is "Unknown" (gray flag)
- b. Otherwise, if the event includes a test that reaches an alert state, then the general status of the Event is "Critical" (red flag)
- c. Otherwise, if the event includes a test that reaches a warning state, then the general status of the Event is "Warning" (yellow flag)

- d. Otherwise, if the event includes a test that is in error, then the general status of the Event is "Error" (yellow hexagon)
- e. Otherwise, all tests should be clear, so the general status of the event is "Clear"

You can still see the individual status of each event test in the Event Viewer.

Event Colors and Icons All events return values and some events produce output messages. The events return different status icons depending on the severity of the event. These severity levels are determined by parameter thresholds you set for the event tests during event creation. The colors are displayed on the event severity icon that is located:

- Next to the event name listed in the Alerts page of the Events detail view.
- On the object in the Group detail view if it is part of a group. See Chapter 4, "Working with Groups" for information.

The colors of the event severity icons are:

- **Error State (yellow hexagon with an exclamation point)**
An error state indicates there is a problem with the evaluation of the event condition, as opposed to a threshold being met. Examples of error states are: registering an Archive Full event against a database in non-archivelog mode, registering an event that monitors segments but specifying a filter that excludes all available segments.
- **Event cleared (green flag)**
- **Warning (yellow flag)**
- **Critical (red flag)**
- **Unknown (gray flag)**
A gray flag represents an "unknown" state where it is not possible for Enterprise Manager to ascertain the event status because the node is unreachable or the Intelligent Agent is not available. The gray flag will appear on the group pane and as the flag for the event in the Alert tab if your event includes at least one up/down event test (any target: node/database/listener). When the gray flag occurs, it will be set for the Event. When you see the event in the Event viewer, the flag for the up/down event test will be gray, and the flags for the other event tests will remain the color of their original state.

If you have an event that does not include any up/down event test, then even if the target node or Intelligent Agent become unavailable, the unknown state will not trigger for that event; the current severity for the event will be unchanged.

Note: Some events, such as Probe and User Blocks events, do not return a warning value because the warning threshold parameter is not used. The event has either occurred or not occurred.

Correcting Problems

When an event occurs, you need to correct the problem. In some cases, you can create a fixit job that responds to specific event conditions. See "Event Fixit Jobs Page" on page 6-50 for more information. These situations are noted in the online help for Oracle events.

In other cases, the solution may require the attention of a system administrator. For example, space management event conditions may require an administrator to increase space requirements and resource management conditions may require an administrator to adjust initialization parameters. The online help for Oracle Event Tests has recommendations on how to resolve many of the common event condition.

If the Diagnostics Pack is installed, advice and/or related tools and charts are available to help administrators diagnose the problem. For additional information on Oracle database problems, refer to the Oracle Server Administrator's, Tuning, and Reference Guides. For network problems, refer to the Oracle networking guides for your system.

Event Categories and Types

The Oracle event tests for the database, listener, and node destination types are grouped into categories:

- Fault Management event tests
- Space Management event tests
- Resource Management event tests
- Performance Management event tests
- Unsolicited event tests

- User-defined Monitoring

Only the UpDown event tests are included with Oracle Enterprise Manager. These fall under the 'Fault' category for the selected target type. Additional advanced events for all categories are available with the optional Oracle Diagnostics Pack. Beginning with the Oracle Diagnostics Pack for Enterprise Manager version 2.2, operating system-specific tests are also available for NT and various UNIX platforms.

See the online help for Oracle predefined event tests, "Oracle Event Tests" on page 6-56, and the Diagnostic Pack documentation for information on events and their parameters. You can also refer to the *Enterprise Manager Event Test Reference Manual* for a comprehensive look at all available event tests. All the Node events are supported on Unix and Windows NT platforms. For other platforms, see your platform-specific documentation.

Fault Management Event Tests

This category of event tests monitors for catastrophic conditions on the system, such as a database, node, or listener is down. Immediate action must be taken by the administrator. Examples of event tests available in this category include:

- Alert
- UpDown

Most of the fault management event tests do not require any threshold values because the event test only checks whether the service is up or down or if the event condition occurred. For the Alert event test, the event test checks whether error messages are written into the database alert log file.

The UpDown event tests are provided with the Enterprise Manager base product. These event tests check whether a database, listener, or node is available. With the UpDown event test for databases or listeners, you can use the Startup Database or Startup Listener task as a fixit job to re-start the database or listener. To avoid executing that job when the database or listener is brought down intentionally, you need to remove the event registration or blackout the target.

Space Management Event Tests

This category of event tests track possible space problems, such as running out of space on a disk or archive device. Examples of space management event tests in this category include:

- Disk Full

- **Archive Full**

To check for space management events, set a threshold on the free space left. For example, set an alert if the free space on a disk falls below a specific number of bytes. In order to properly choose the threshold value, you need to know the characteristics of the tablespaces. For example, you would want to know whether the tablespaces contain online transaction processing (OLTP) tables or decision support tables. The former usually has a very fast growth rate, while the latter almost never grows.

Resource Management Event Tests

This category of event tests track possible resource problems, such as exceeding datafile or lock limits. Examples of resource management event tests in this category include:

- **Datafile Limit**
- **Lock Limit**

To check for resource management events, set a threshold on the percentage of a resource used. For example, you can set an alert if the percentage of the datafile resource used is greater than a specified value.

Performance Management Event Tests

This category of event test monitors the system for performance problems, such as excessive disk input/output or library cache miss rate. Examples of events in this category include:

- **Disk I/O**
- **Library Cache**

To check for performance management events, set a threshold on a system value. For example, you can set an alert if the library cache miss rate is greater than a specific value. The set of threshold values is system specific, depending on the hardware platform, number of users, and other factors.

Unsolicited Event Tests

Unsolicited event tests are events that have been initiated outside the Enterprise Manager Event system. An event is considered unsolicited if it is raised by a process other than the Oracle Intelligent Agent, but is running on the same node as the Intelligent Agent. These events are usually checked and provided by third-party

software. Creating an unsolicited event allows you to integrate and monitor third-party events. Essentially, there are two phases to setting up an unsolicited event:

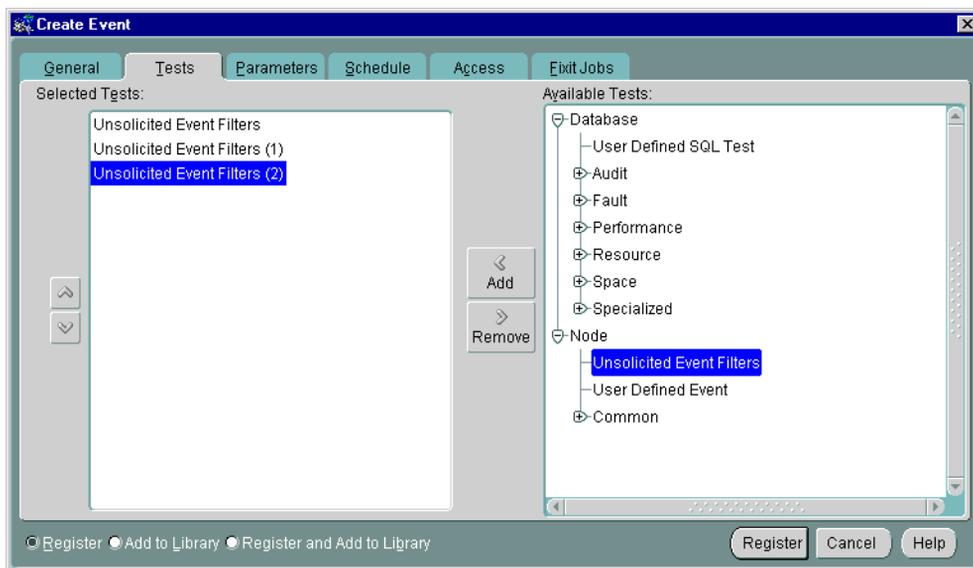
- Registering interest in an unsolicited event
- Raising the unsolicited event

Registering Interest in an Unsolicited Event

In order to receive unsolicited events, you must create and register an event that is expecting to receive unsolicited events. The event should have the event test "Unsolicited Event Filters." This event test also allows you to filter on only those unsolicited events you are interested in.

To register interest in an unsolicited event, choose the Unsolicited Event Filters event test in the Test page and complete the Parameters pages.

Figure 6–1 Test Page: Unsolicited Event



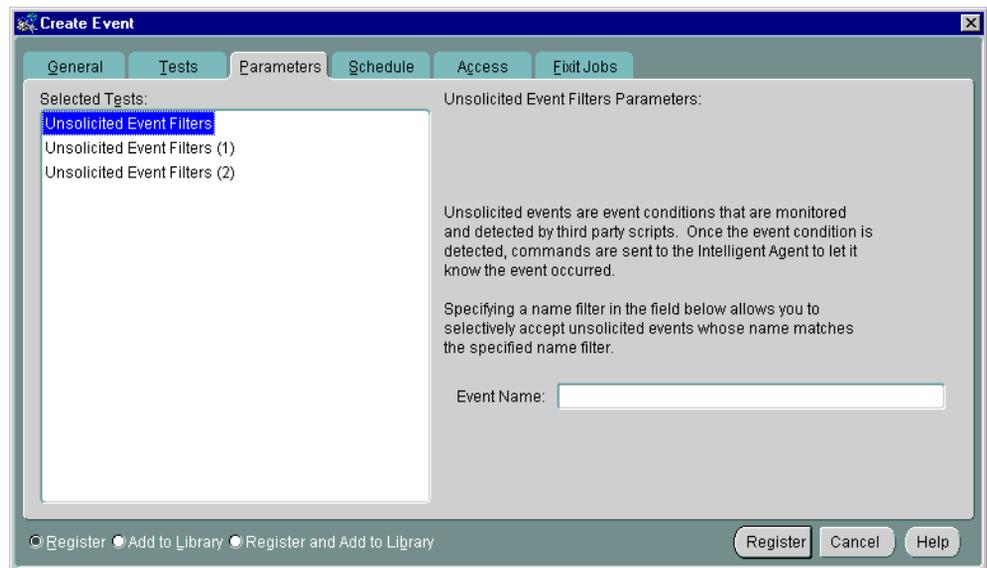
You can have more than one unsolicited event test per event. Information on how to fill out the Parameters page is discussed in the next section. After completing the

unsolicited event, you can save and submit the event. See "Event General Page" on page 6-42 for more information.

Setting the Parameters Property Sheet for Unsolicited Events

Because unsolicited events originate outside the Event system, you may wish to screen only for specific external events. The Parameters page for the Unsolicited Event Test allows you to filter unsolicited events based upon the event name.

Figure 6–2 Parameters Page: Unsolicited Event



Event Name

This is the four-part name of the event of the form:

`/vendor/product/category/name`

You can enter any character string but all four parts and the forward slashes (/) are required. The `eventname` is assumed to be in 7-bit ASCII, so that it never changes regardless of platform or language. The name of the event that fires must match the value specified in this parameter field in order for the unsolicited event to fire.

You can enter a wildcard "*" to specify no filtering. In this case, all unsolicited events that are raised by third-party applications will trigger this unsolicited event.

Raising Unsolicited Events

When third-party applications detect their own external events, they can notify the Intelligent Agent by raising the event. To raise unsolicited events, users have a choice of a command-line interface (`oemevent` executable) or an OraTcl verb (`orareporevent`). The related syntax is as follows:

```
oemevent [event_name] [object_name] [severity] [message]
orareporevent [event_name] [object_name] [severity] [message]
```

where `event_name` is the name of the event that triggered the unsolicited event. `object_name` (valid discovered target name) is the name of the object that the event is monitoring, `severity` is the level of severity for the event, and `message` is the text string to be displayed in the Enterprise Manager Console. For additional details, please refer to the *Intelligent Agent User's Guide*.

Note that the severity is specified as a character string in `oemevent` and as an integer in `orareporevent`. Also, note that the `event_name` must be a four-part string of the form `/a/b/c/d`, where the different elements may be used to organize the event test within a hierarchy of event tests. For example, `/myevents/node/files/filefound` may be an event test you developed. It relates to nodes, more specifically space on nodes, and it monitors for the existence of a particular file.

For information on OraTcl and event scripts, see the *Oracle Intelligent Agent User's Guide*.

Raising Unsolicited Events through the Enterprise Manager Job System

Typically, unsolicited events are evaluated and raised by third-party software. Enterprise Manager allows you to implement monitoring of unsolicited events through the Job system and Tcl. You create a Tcl job and submit it as a periodic job. The Tcl contains logic to evaluate the underlying test and decide whether it needs to raise the event and at what severity level. Since the job is submitted as a periodic job, the underlying test is evaluated periodically like all regular Enterprise Manager event tests. Techniques such as those in the following examples, allow users of Enterprise Manager to implement and customize event monitoring specific to their environments.

Example 1: Simple Job Raising an Unsolicited Event It is possible to submit a job with an imbedded OS command task that executes the `oemevent` program and passes the program all necessary arguments. All users that have registered for the unsolicited event raised by `oemevent` will receive the event notification. The event has to be known to the administrator submitting the job that raises it.

The job that raises the event may contain enough logic to evaluate the underlying test and decide whether it needs to raise the event and at what severity level. Such a job may be submitted as a periodic job so that the underlying test is evaluated periodically, which is similar to regular Enterprise Manager event tests.

Unsolicited events are evaluated in their own process and within the proper OS security protocols and do not pose security or robustness threats to the system. Introduced here is a procedure where the user must submit a job in order to monitor for an external event.

The following example illustrates how to implement an event test that triggers when a particular file is found. Let's call this event `/myevents/node/files/filefound`.

The following Tcl script needs to be submitted as the job:

```
# event name
set event_name /myevents/node/files/filefound
# filename to look for comes at the first (and only) argument
set file_name [lindex $argv 0]
# check for the file, and if it's found trigger the event as critical
if { [file exists $file_name] } {
    orareporevent $event_name $oramsmsg(oraobject) 2 "$file_name found"
}
```

In order to receive this event, a user needs to register an event with the Unsolicited Event Filters test selected and configured to filter an event name of the format:

```
/myevents/node/files/filefound.
```

This event should be registered against a node and will trigger against it. The message associated with the event occurrence will contain the values of all parameters passed into `orareporevent`.

Although this event is fairly straightforward, there are two problems:

1. The event never clears – The event should eventually clear after the file disappears.
2. The event will trigger every time the above script is evaluated, even if it has triggered previously – You will receive multiple copies of the same alert. An event should not trigger unless there is a severity change.

Any other scripting language or executable program can also be used to implement the logic of an unsolicited event test. However, Tcl is preferred because it allows platform-independent implementation and the fact that the code may be sent from

the Enterprise Manager Console 'on-demand' without requiring anything to be installed on the Intelligent Agent side.

Example 2: Unsolicited Events with the Proper Lifecycle As with regular Enterprise Manager events, unsolicited events could be triggered only once per condition detected and could clear automatically if the condition that triggers the event is no longer met. Events adhering to this operational pattern are said to have a "proper lifecycle."

Typically, scripts that implement unsolicited events are composed of two basic parts:

1. The part that evaluates the event and sets its associated severity
2. The part that handles the event reporting and avoids multiple notifications if the severity does not change

The following Tcl script illustrates this two-part script implementation, as well as a technique that allows proper event lifecycle.

```
#-----  
#  
# Tcl Procedure  
#     orarepotevent1  
#  
# Purpose:  
#     Trigger an unsolicited event only previous state is different  
#  
# Arguments:  
#     - event_name: event test to trigger  
#     - severity: new severity  
#     - message: message to be attached to the event report  
#  
#-----  
proc orarepotevent1 {event_name severity message} {  
    # define a 'lock' that its contents define the previous event status  
    # and figure out the event state during the previous execution  
    global oramsmsg  
    append event_lock [tempdir] "/" $oramsmsg(jobid) ".el"  
    if { [file exists $event_lock] } {  
        set f [open $event_lock r]  
        gets $f previous_severity  
        close $f  
    } else {  
        set previous_severity -1  
    }  
}
```

```

# if event test state has changed, trigger the event at new severity
if { $previous_severity != $severity } {
    orareporevent $event_name $oramsg(oraobject) $severity $message
    if { $severity == -1 } {
        rmfile $event_lock
    } else {
        set f [open $event_lock w]
        puts $f $severity
        close $f
    }
}
}

#-----
#
# Event Test Name:
#     /myevents/node/files/filefound
#
# Purpose:
#     Monitor for the existence of a particular file
#     The test triggers at warning level if the file exists, but
#     at critical level if the file is larger than the specified
#     value
#
# Arguments:
#     - filename to look for
#     - critical file size
#
#-----
set event_name /myevents/node/files/filefound
set file_name [lindex $argv 0]
set critical_filesize [lindex $argv 1]

if { [file exists $file_name] } {
    # if the file exists calculate its size in Kilobytes
    set file_size [expr [file size $file_name] / 1024]
    if { $file_size > $critical_filesize } {
        # if file is larger than the critical value, trigger as critical
        orareporevent1 $event_name 2 "Size: $file_size Kb"
    } else {
        # if file is smaller than the critical value, trigger as warning
        orareporevent1 $event_name 1 "Filesize: $file_size Kb"
    }
} else {
    # if file is no longer there, clear the event

```

```
    orareporevent1 $event_name -1 "File does not exist"
}
```

Example 3: An Unsolicited Event Script that Accesses the Oracle Database This example of an unsolicited event test illustrates a situation where the test evaluation involves connecting to an Oracle instance and executing some SQL against it.

This example checks the size of a particular table in the database and triggers the event when a set threshold is crossed. There is a warning value and a critical value. The size of the table is measured by counting the number of its rows.

```
#-----
#
# Tcl Procedure
#     orareporevent1
#
# Purpose:
#     Trigger an unsolicited event only previous state is different
#
# Arguments:
#     - event_name: event test to trigger
#     - severity: new severity
#     - message: message to be attached to the event report
#
#-----
proc orareporevent1 {event_name severity message} {
    # define a 'lock' that its contents define the previous event status
    # and figure out the event state during the previous execution
    global oramsg
    append event_lock [tempdir] "/" $oramsg(jobid) ".el"
    if { [file exists $event_lock] } {
        set f [open $event_lock r]
        gets $f previous_severity
        close $f
    } else {
        set previous_severity -1
    }
    # if event test state has changed, trigger the event at the new severity
    if { $previous_severity != $severity } {
        orareporevent $event_name $oramsg(oraobject) $severity $message
        if { $severity == -1 } {
            rmfile $event_lock
        } else {
            set f [open $event_lock w]

```

```

    puts $f $severity
    close $f
  }
}

#-----
#
# Event Test Name:
#       /myevents/database/space/tablesize
#
# Purpose:
#       Monitor the size of a particular database table
#       The test triggers at warning level when the warning threshold
#       is crossed and at critical level when the critical threshold
#       is crossed
#
# Arguments:
#       - table name
#       - critical threshold
#       - warning threshold
#       - username/password for connecting to target (optional)
#-----
set event_name /myevents/database/space/tablesize
set table_name [lindex $argv 0]
set critical_threshold [lindex $argv 1]
set warning_threshold [lindex $argv 2]

if { $argc == 4 } {
    set connect [format "%s@s" [lindex $argv 3] $oramsg(oraobject)]
} else {
    set connect [format "%s/%s@s" $SMP_USER $SMP_PASSWORD $oramsg(oraobject)]
}

if {[catch {oralogon $connect} lda]} {
    append msg "Cannot connect to target." "\n" $oramsg(errortxt)
    orafail $msg
}

if {[catch {oraopen $lda} cur]} {
    append msg "Cannot connect to target." "\n" $oramsg(errortxt)
    oralogoff $lda
    orafail $msg
}

```

```
set sql [format "select count(*) from %s" $table_name]
if {[catch {orasql $cur $sql}]} {
    append msg "Cannot execute SQL against the target." "\n" $oramsg(errortxt)
    oraclose $cur
    oralogoff $lda
    orafail $msg
}

if {[catch {orafetch $cur} row]} {
    append msg "Cannot execute SQL against the target." "\n" $oramsg(errortxt)
    oraclose $cur
    oralogoff $lda
    orafail $msg
}

set current_tablesize [lindex $row 0]

if { $current_tablesize > $critical_threshold } {
    orareporevent1 $event_name 2 "Table:$table_name #rows:$current_tablesize"
} elseif { $current_tablesize > $warning_threshold } {
    orareporevent1 $event_name 1 "Table:$table_name #rows:$current_tablesize"
} else {
    orareporevent1 $event_name -1 "Table:$table_name #rows:$current_tablesize"
}
```

A number of OraTcl verbs were used in this script. Refer to the *Intelligent Agent User's Guide* for details on OraTcl verbs. Note that the preferred credentials, specified in the Console, are available to the script writer via the SMP_USER and SMP_PASSWORD Tcl global variables. For jobs against a database, the values of those variables are set to the username and password specified as preferred credentials for that database. This script also allows for an optional overwrite of the preferred credentials via an optional forth input argument.

Unsolicited Event Caveats

- When raising unsolicited events against a particular target, then an unsolicited event test must be registered against that event particular target from within the Console. When raising the unsolicited event via `oemevent` or `orareporevent`, the specified object name must match the target name as displayed in the unsolicited event for that target.
- Unsolicited Events cannot be used with Fixit Jobs unless you are using a 9i Intelligent Agent.

User-defined Monitoring

The Event system provides you with two types of user-defined monitoring capability:

- User-defined SQL Event Test
- User-defined Event Test

The User-defined SQL event test is used for database-specific allows you to define custom SQL that returns a single value that is compared to a threshold value specified in the event definition. To monitor for any other conditions, use the User-defined Event Test which allows you to use your own scripts written in any scripting language suited to your environment.

User-Defined SQL Event Test

The User-Defined SQL event test allows you to define your own SQL script that evaluates an event test. The event tests you define should be written as queries, such as SELECT statements, that return condition values for which you are monitoring. These values are checked against the Critical threshold and Warning threshold limits you specify, and trigger the event if the threshold limits are reached.

Example 6–1 Creating a User-defined SQL Event Test

You have a custom application that runs against the Oracle database. Each time it finds an application error, it creates an entry into a table called "error_log". Using the "User-Defined SQL Test", you can write an event test that notifies you when it finds at least 50 errors. Specifically, you define the following SQL statement:

```
select count(*) from error_log
```

This returns the number of rows in the error_log table. Since you want a critical alert raised when it reaches at least 50, you specify the Operator ">=", a Critical Threshold value of 50, and perhaps a Warning Threshold value of 30.

Important:

Support for PL/SQL Functions

If your query for the event condition requires more complex processing than is allowed in a single SELECT statement, you can first create a pl/sql function that contains the extra processing steps, and then use the pl/sql function with the User-Defined SQL event test. Your pl/sql function must still return a value that can be compared against the Critical and Warning thresholds.

Example 6–2 E

You need to trigger a critical alert whenever an employee's salary is \$500 higher than the highest manager's salary. You first define a pl/sql function as follows:

```
create or replace function overpaid_emp return number is
max_mgr_sal number;
max_emp_sal number;
begin
select max(sal) into max_mgr_sal from scott.emp where job = 'MANAGER' or job =
'PRESIDENT';
select max(sal) into max_emp_sal from scott.emp where job != 'MANAGER' and job
!= 'PRESIDENT';
return (max_emp_sal - max_mgr_sal);
end;
```

This pl/sql function returns the difference between the highest employee's salary and the highest manager's salary. If the difference is a positive number, then an employee has the higher pay. If the difference is more than 500, then a critical alert needs to be triggered.

When defining this event this using the User-Defined SQL event test, you define the SQL statement as follows:

```
select overpaid_emp from dual
```

Then use the Operator ">" and Warning threshold of 100 and Critical threshold of 500.

Note that ROLES are not enabled within pl/sql functions, so any privileges that are granted via ROLES will not work from within the function. You may need to grant the privileges directly to the database user account that is used for the event. (The database user account used for the event is either the Preferred Credentials user for the database, or is the credentials specified to overwrite the preferred credentials).

Parameters

- **Override Preferred Credential:** Check this box if you want to change the user name or password or both.
- **Operator:** Select one of the following comparison operators: == (equal); < (less than); > (greater than); <= (less than or equal to); >= (greater than or equal to); != (not equal)
- **Critical Threshold:** Depending on the SQL script, type a number or a text string.
- **Warning Threshold:** Depending on the SQL script, type a number or a text string.

- **Occurrences Preceding Notifications:** Type a numeric value indicating how many times this test must return true before an alert flag is displayed in the Console and before a notification is sent.
- **SQL:** Type the SQL script you want to use. You can also cut and paste SQL from an existing script.

Output

Value returned by the SQL script

Recommended Frequency

60 seconds

User Action

The action depends on the SQL script and hence Oracle cannot make any recommendations.

User-defined Event Tests

The User-defined event test (available with the Oracle Diagnostics Pack) allows you to define your own scripts that monitor conditions particular to your environment. These event tests can be written in any scripting language, as long as the node that runs the script has the appropriate runtime requirements to execute the script.

The power and flexibility of User-defined event tests lie in the ability to integrate any, custom script into the Enterprise Manager Event System and leverage the system's multi-administrator, lights-out scheduling and notification capabilities.

User-defined events are implemented in two phases:

1. Creating your monitoring script.
2. Registering the script as a User-defined event in the Enterprise Manager Console

Creating Your Monitoring Script

Using a scripting language of your choice, create a script that contains logic to check for the condition being monitored. Examples of these are scripts that check for disk or memory usage. All monitoring scripts should contain these basic elements:

- Code to check the status of monitored objects

- Code to evaluate the results
- Code to send the results back to the Enterprise Manager Event system

Code to check status of monitored object

Define logic in the code that checks the condition being monitored. For example, the amount of free space on a particular filesystem, memory usage, etc.

Code to evaluate the results

After checking the monitored condition, the script should return either the value associated with the monitored object OR the event status severity.

If you choose to have the script return the value of the monitored object (e.g. actual disk usage), then it means you want the Enterprise Manager Event system to evaluate the object's current value against Warning and Critical thresholds you specify. You specify these warning and critical thresholds when you register the event.

Otherwise, if you choose to have the script itself evaluate the event status severity of the monitored object, you need perform this evaluation in such a way that it falls under one of following event status severities:

Table 6–1 Severity Levels for Event Status

| Severity Level | Status |
|-----------------------|--|
| <i>Script Failure</i> | The script failed to run properly. This status is represented by numeric value -2. |
| <i>Clear</i> | No problems with the object monitored, hence status is clear. This status is represented by numeric value -1. |
| <i>Warning</i> | The value of the monitored object reached the warning threshold. This status is represented by numeric value 1. |
| <i>Critical</i> | The value of the monitored object reached the critical threshold. This status is represented by numeric value 2. |

Code to return the results back to the Event System

After evaluating the status of the monitored object, the script needs to return this result back to the Event System. The script should return the result by sending tagged information to standard output (stdout) using the syntax that is consistent with the scripting language. The result information to be sent should be enclosed by

a pair of well-known tags. The following are the tags that are recognized by the Event System as it checks the information in stdout:

<oraresult> and </oraresult>

Enclose within these tags the current value of the monitored object OR the event status severity.

Example:

```
print "<oraresult>200</oraresult>"
```

Returns 200 as the value of the monitored object

```
print "<oraresult>2</oraresult>"
```

Returns an event status of 2 (event in critical state)

<oramessage> and </oramessage>

Enclose in these tags the message to be sent with the event notification if the event triggers.

Example:

```
print "<oramessage>Disk usage is high</oramessage>"
```

<orafailure> and </orafailure>

Enclose in these tags the message to be sent if a failure occurs in the script. The occurrence of an <orafailure> in the standard output is equivalent to sending a tagged <oramessage> and an <oraresult> set to -2 (script failure).

Finally, the script itself will need to be entered in the Create Event property sheet when creating the event or be located in the monitored node. The node needs to be monitored by a 9i or higher Intelligent Agent. Make sure the node has the script's runtime requirements (e.g. perl interpreter) and that the script works independently of the event system.

Special conditions

- There must be exactly one `oraresult` in stdout. A missing `oraresult` results in script failure. Having more than one `oraresult` in the output also results in script failure.
- There can be any number of `oramessage` tags - the entire set is sent to the Management Server

- If a notification needs to be generated, and there is no `oramessage` tag, a default message is generated. The message is of this format:

Current result: <value in oraresult>

When the user-defined event is evaluated, it executes the script using the Node credentials associated with the event. These are either the default Node credentials associated with the Enterprise Manager administrator who registered the event or the overwritten Node credentials specified when the event was registered, as explained in the next section. Note that any environment associated with these Node credentials will not be available when the script is run.

Register the user-defined event in the Console

Once you have created the monitoring script, you are ready to add the script's monitoring functionality to the Enterprise Manager Event system. To create and register a user-defined event for your monitoring script:

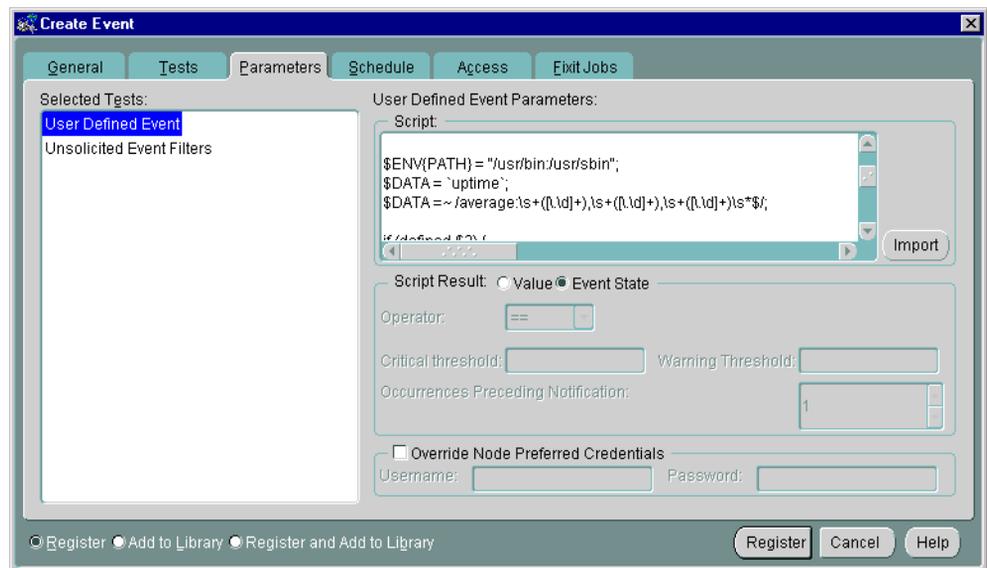
1. Choose the Create Event option from the Event menu to display the Event property sheet.
2. Complete the General page. Select the target node as the node on which the monitoring script will be run.
3. Click on the Tests tab to display available tests for the selected target.
4. If not expanded already, expand the Node object in the Available Tests tree list.
5. Select User Defined Event and click the Add button.
6. Click on the Parameters tab to display the Parameters page.
7. Click on User Defined Event in the Selected Tests list to display the user-defined event test parameters. See Figure 6-3, "User-defined Event Parameters Page".
8. Click Import. The Load File dialog appears.
9. Select the desired script file and click Open. The contents of the script appear in the Script Text window. See Figure 6-3, "User-defined Event Parameters Page" and "User-defined Event Parameters" on page 6-27 for more information on other ways to specify user-defined event parameters.
10. Complete the rest of the Event property sheet.
11. Submit the Event. You have three options when submitting the Event:
 - a. Choose Submit, to register the event against the selected destinations. The new event is not saved to the Event Library.

- b. Choose Add to the Library (or Save to Library if editing an event from the Library) to save the event to the Event Library. The event will not be submitted to the target destinations at this time. The new event appears in the Event Library dialog.
 - c. Choose Submit and Add to Library (or Submit and Save to Library) to submit the event to the selected targets and save the event to the Event Library. The new event appears in the Event Library dialog.
12. Make sure the Event is registered by selecting Events from the Console Navigator and clicking the Registered tab (Detail view). Make sure "Show Targets" is checked at the bottom of the Registered page in order to see the registration status for each target.

User-defined Event Parameters

The User-defined Event parameters page allows you to specify the user-defined event test information required to successfully register the event in the Enterprise Manager Console.

Figure 6–3 User-defined Event Parameters Page



User-defined event test parameters consist of the following:

Script

Enter the monitoring script used for the event evaluation. You can specify this either by entering the full text of the script OR by entering the fully-qualified script name (on the monitored target).

If you choose the enter the full text of the script, and if the script is in a file locally accessible to the console, you can use the "Import" button to load the script from the file instead of manually entering the script.

If your script file resides on the monitored target, you can just specify the fully-qualified filename of the script instead of loading the script text.

Script Result

This parameter indicates the way the results of the event evaluations are returned by your script. You can specify one of two ways in which results are returned: by Value or Event State.

Value: Your script evaluates the condition and returns the value of the monitored metric. Enterprise Manager will then compare the value against specified thresholds.

The following parameters indicate how you want Enterprise Manager to evaluate the value of the monitored metric.

Operator: The operator that Enterprise Manager should use when comparing the value of the monitored metric against the specified thresholds. Select one of the following comparison operators:

- == (equal)
- < (less than)
- > (greater than)
- <= (less than or equal to)
- >= (greater than or equal to)
- != (not equal)

Critical Threshold: The value against which the monitored metric is compared using the specified operator. If it holds true, the event triggers at a Critical level.

Warning Threshold: The value against which the monitored metric is compared using the specified operator. If it holds true, the event triggers at an Warning level.

Occurrences Preceding Notifications: The number of times the event condition should hold true before a notification is sent.

Example:

You may want to create an event that monitors disk space. You can write a script that checks the amount of free disk space and returns that amount as the value to be evaluated. You may want the event to trigger at Warning level when the free disk space is below 500K, and to trigger at Critical level when the free disk space is below 200K. Hence, when defining the event, you would specify the following:

Script: Enter the script text or click Import to load an existing file. If the name of your script is "checkspace.sh" and if it is located on the monitored node, you can, for example, simply enter: `/u1/private/checkspace.sh`.

Event Parameters Page Settings

- Script Result: Choose the "Value" option
- Operator: <
- Critical Threshold: 200000
- Warning Threshold: 500000
- Occurrences Preceding Notification: 1

Event State If you choose this option, the script you write evaluates the event condition and also determines if the event has triggered at a Critical or Warning level, or has not triggered at all (e.g. the event status is Clear or the script has failed to run due to some error). In order to provide the appropriate event status to Enterprise Manager, the script should define and return the appropriate event status. For more information, see "Creating Your Monitoring Script" on page 6-23.

Override Node Preferred Credentials: When your script is executed, it runs as the operating system user specified by the Node credentials associated with the event. These credentials are either the default Node credentials of the Enterprise Manager administrator who is registering this event, or the credentials specified here. It is important to note, however, that any environment associated with the Node credentials will not be used when the script is run.

Output

If the event triggers, the value of the monitored metric is returned. The actual message to be displayed depends on the message you defined in your script via the `<oramage>` tags. If no message is specified, the default message is: Current

result: <value of monitored metric>. If a failure occurs, then the message displayed is the message specified in the <orafailure> tag.

Bundled User-defined Event Sample

Enterprise Manager has bundled a sample user-defined event script that monitors the 5-minute load average on the system. The script performs this function by using the 'uptime' command to obtain the average number of jobs in the run queue over the last 5 minutes.

The script is written in Perl and assumes you have Perl interpreter located in /usr/local/bin on the monitored node.

This script, called `udeload.pl`, is installed in the `$ORACLE_HOME/sysman/admin` directory where `$ORACLE_HOME` is the Oracle directory where the Enterprise Manager is installed.

Full text of the script:

```
#!/usr/local/bin/perl

# Description: 5-min load average.
# Sample User Defined Event monitoring script.

$ENV{PATH} = "/usr/bin:/usr/sbin";

$DATA = `uptime`;
$DATA =~ /average:\s+([\.\d]+),\s+([\.\d]+),\s+([\.\d]+)\s*$/;

if (defined $3) {
    print "<oraresult>$2</oraresult>\n";
} else {
    print "<orafailure>Error collecting data</orafailure>\n";
}
```

Setting Up the Sample Script as a User-defined Event

1. Copy the script (`udeload.pl`) to the monitored target. For example: `/private/myhome`. Make sure you have a 9i version of the Intelligent Agent running on this machine.
2. Edit the script, if necessary, to point to the location of the Perl interpreter on the monitored target. By default, the script assumes the Perl interpreter is in `/usr/local/bin`.

3. As a test, run the script: `udeload.pl` You may need to set its file permissions such that it runs successfully. You should see output of this form:

```
<oraresult>2.1</oraresult>
```
4. In the Enterprise Manager Console, create a new event as follows:
 - a. In the General page, provide a name for the event, say "Test UDE". Choose "Node" as the Target Type. For targets, select the node on which you copied the script.
 - b. In the Tests page, select the "User Defined Event" test.
 - c. In the Parameters page, enter the following:

Script: `/private/myhome/udeload.pl` (... or the fully qualified path to where the script is)

Script Result: make sure the "Value" option is selected

Operator: `>=`

Critical threshold: 0.005

Warning threshold: 0.001

Occurrences Preceding Notification: 1

Override Node Credentials: Specify the credentials of an OS user that can execute the script.

In this example, we want the event to trigger at a Warning level if the 5-minute load average on the machine reaches 0.005, and trigger at a Critical level if the 5-minute load average reaches 0.001. Feel free to change these thresholds depending on your system.
 - d. In the Schedule page, set the time interval upon which you'd like this event to be evaluated. By default this is set to every 5 minutes. As a test, you can reduce this to 1 minute.
 - e. In the Access page, select the Administrators to be notified when the event triggers
5. Click Register to register the event with the Enterprise Manager Event system.
When the 5-minute load reaches at least 0.001, you should see the event trigger in the Enterprise Manager Console as well as have the selected administrators be notified of this event.

Creating, Modifying, and Registering an Event

Events include the target type and the event information that you want to monitor. Events can consist of multiple event tests. To create or modify an event:

1. Choose the Create Event option from the Event menu to display the Event property sheet. (you can also display the Event property sheet by opening an event from the Event Library dialog.)
2. Complete or modify the fields in the General page. On the Tests page, select the desired event tests. Complete the rest of the pages of the property sheet to create a new event.
3. When you have completed the Event property sheet:
 - a. Choose Register, to register the event against the selected destinations. The new event is not saved to the Event Library.
 - b. Choose Add to the Library (or Save to Library if editing an event from the Library) to save the event to the Event Library. The event will not be submitted to the target destinations at this time. The new event appears in the Event Library dialog.
 - c. Choose Register and Add to Library (or Register and Save to Library) to submit the event to the selected destinations and save the event to the Event Library. The new event appears in the Event Library dialog.

If you registered an event, the Intelligent Agent on the target node processes the event and the event appears in the Registered page of the Event pane. If the "show Targets" checkbox is selected, each destination target is listed separately with the event. If the "Show Targets" box is not checked, only the target name, type, and owner is shown.

Note: There is usually a slight delay between the time the event is registered and the actual notification by the Intelligent Agent.

When threshold values are exceeded for the tests in an event, the event appears in the Alerts page of the Event pane. The notification changes the color of the severity flag for the event in the Alerts page. If a destination icon is displayed in the Group pane, the flag on the icon changes color. The colors and their meaning are:

- Unknown (gray flag)
- Event cleared (green flag)

- Warning (yellow flag)
- Critical (red flag)
- Error (yellow hexagon)

Cases where an event notification is Unknown (gray flag) indicate the Intelligent Agent or node where the event is registered is unavailable or inaccessible, or the Intelligent Agent on that node is unavailable.

Warning: Do not register an UpDown event (included in the Oracle DB Fault event) against the database or node where the Repository schema is stored. If the database containing the Repository goes down, the Management Server also shuts down. Hence, the Intelligent Agent cannot inform the Management Server that the database is down.

The property sheet for creating a new event is the same as the property sheet for modifying an event, except that the event name and target type fields are always read-only. See Figure 6-6, "Event General Page" for an illustration of the Event property sheet.

See "Event Categories and Types" on page 6-9 for more information.

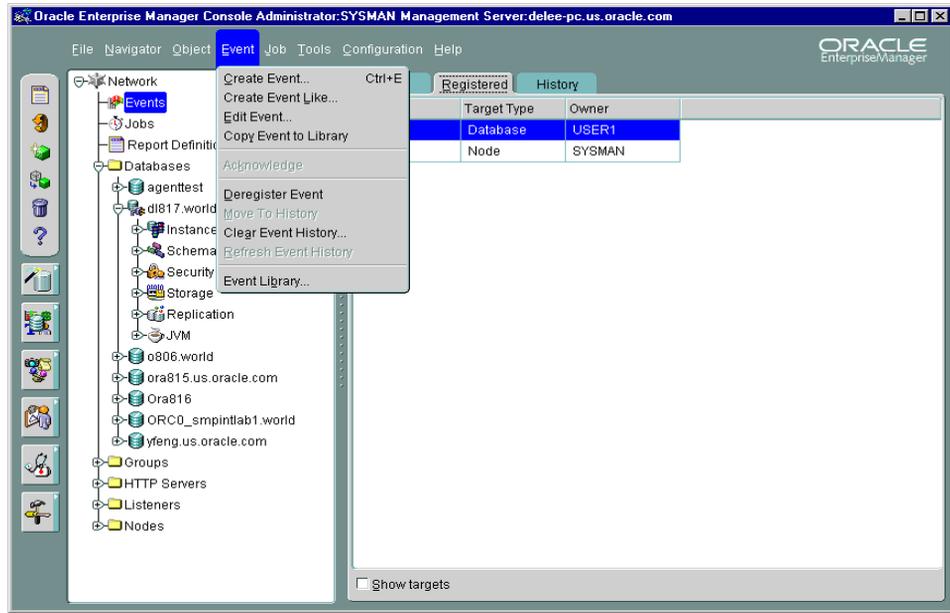
Event Detail View

The Event detail view, which displays when you select the Events object in the Console Navigator, contains the following pages:

- Alerts Page
- History Page
- Registered Page

You can switch between the pages by clicking the tab of each page. The rows in any page can be sorted on any column by clicking the column heading. See Figure 6-4, "Event Menu and Detail View" for an illustration of the Event detail view.

Figure 6–4 Event Menu and Detail View



Alerts Page

The Alerts page displays event tests that have been triggered.

Severity

Severity of the event occurrence: critical (red flag), warning (yellow flag), clear (green flag), unknown (gray flag), or error state (yellow hexagon).

Name

Name of the event.

Target

Target where the event was triggered.

Target Type

Database, listener, node, or HTTP Server.

Date/Time

Time and date of the event occurrence.

Assigned To

Administrators assigned to work on the event occurrence.

Owner

Administrator who owns the event.

Viewing Alerts

To view details of an event that has occurred, double-click on the event in the Alerts or History page to display the Event Viewer property sheet. See "Event Viewer" on page 6-39 for more information. You can enter notes on the nature and progress of the event condition.

Note: Comments entered into the log are viewable/editable by admins with the Modify permission. After you have reviewed an event, you can move it to the History page. See "Event Viewer" on page 6-39 for more information.

History Page

The Event History page displays a history of events that have occurred and have been moved to History by an administrator or cleared by an Intelligent Agent. The Event History page displays the same columns as the Alerts page.

The History page is refreshed automatically each time you move between the History page and the Alerts or Registered page. However, to refresh the event history list while currently viewing the History pane, you must click the Refresh icon located in the Console toolbar.

To clear all entries in the History page, choose Clear Event History from the Console's Event menu. You can delete entries individually by right-clicking on a specific event in the History page and choosing Delete Item(s) from the context-sensitive menu.

Registered Page

The Registered page displays the events that have been registered, or submitted, to monitor test conditions on network objects. The Registered page contains the following information:

Name

Name of the event.

Target

Target where the event is monitored. Displayed only when Show Targets is checked.

Target Type

Type of event destination: database, node, listener, web server, Concurrent Manager,

Status

Current registration status of the event: Registered, Registration Pending, De-Registration Pending, Modification Pending, and Registration Failed. Displayed only when Show Targets is checked. The registered event status is only updated when this page is refreshed.

Owner

Administrator who owns the event. Displayed only when Show Targets is checked.

Show Targets

When checked, the Registered page displays Target and Status information. By default, "Show Targets" is not checked.

Under certain circumstances, an event will remain in a Registration Pending state.

1. If this occurs the Intelligent Agent on the node with which you are trying to register the event is down, or the node is not connected to the network. Check the status of the Intelligent Agent by selecting the node on which the Intelligent Agent is running and viewing the Node property sheet. You can also ping the Intelligent Agent to check its availability.
2. The node with which you want to register the event was defined manually (without using the Intelligent Agent). Connections to a manually defined node will not allow you to utilize remote management functionality such as Jobs or Events. You must first de-register any jobs or events against the node, remove the node from the Console navigator, and then rediscover the node while it is running a 7.3.4 or later Intelligent Agent.

Event Menu

The Event menu allows you to set up event and administrator information. This menu also provides options to register, track, and view specific events. Menu options are enabled or displayed according to the items selected in the Event pane. See Figure 6-4, "Event Menu and Detail View" for an illustration of the Event menu.

Note: When you register or remove an event, there is usually a slight delay while the Intelligent Agent processes the request.

Create Event

Displays the Event property sheet and allows you to create the definition of a new event. See "Event General Page" on page 6-42 for more information.

Create Event Like

Available when an existing event is selected in the Console's Event detail view, this option displays the Event property sheet with the same page and parameter settings as the selected event. You can then save the event as under another event name.

Edit Event

Displays the definition of the selected event and allows you to edit the event. This menu option appears when an event is selected in the Registered page.

Edit Event Occurrence

Displays the definition of an existing event. See "Event General Page" on page 6-42 for more information.

Acknowledge

Acknowledges the selected event in the Alerts page. When an event triggers, an entry is added to the Alerts page. In the severity column, a flag of the appropriate color is displayed along with a pair of eyeglasses. The eyeglasses also appear whenever there is a change in the status of the event (e.g. from 'warning' to 'critical') If you choose to "acknowledge" this event, then it means you are aware of this event occurrence and hence the eyeglasses will disappear. This is useful in multi-administrator environments where the presence or absence of eye glasses indicates whether or not someone has looked at the event.

Copy to Event Library

Copy the selected event in the Event pane to the Event Library.

Deregister Event

Deregisters the event. This menu option only appears when an event test is selected in the Registered page.

Move to History

Moves the selected event in the Alerts page to Event History page of the Event pane. This option is enabled when an item is selected in the Alerts page.

Refresh Event History

Updates the History pane with the most recent entries.

Clear Event History

Clears the contents of the Event History page.

Event Library

Displays the Event Library dialog. See "Event Library Dialog" on page 6-38 for more information.

Context-Sensitive Menus

If you select an item in the Event pane with the right mouse button, the context-sensitive menu for that item appears. This menu is a subset of the Event menu plus selection-specific menu options.

Event Library Dialog

The Event Library dialog displays the events that have been created and saved to the Event Library. The advantage to using the Event Library is that both events and any associated target information can be stored, copied, or modified in the library for future use. When you create an event, you have the option of submitting, saving to the Event Library, or submitting and saving to the Event Library.

This dialog contains the following information:

Event

Name of the event.

Owner

Administrator who created the event.

Editing an Event in the Event Library

Select an event and click Edit to display the property sheet for the library event. The property sheet allows you to view and modify the library event. In addition to editing, you can perform a wide variety of event-related operations such as deleting, registering, and creating new events based on an existing event in the Event Library. If an event of the same name is already actively running, you must first remove the active event from all targets before registering it again.

Refresh

Updates the library events with the current definition at any time.

Oracle Event Tests

Several predefined event tests have been installed with Oracle Enterprise Manager. These appear in the Tests page of the Event property sheet, depending on the target type selected on the General page. You can add these tests to an event. The tests include:

- Database UpDown: checks whether a database is up or down.
- Host UpDown: checks whether a node is up or down.
- Net UpDown: checks whether a listener is up or down.
- HTTP Server UpDown: checks whether a monitored webserver is up or down.

Note: Only the UpDown tests are included with Oracle Enterprise Manager. Additional advanced event tests are available with the optional Oracle Diagnostics Pack. Refer to the *Enterprise Manager Event Test Reference Manual* for a complete list of advanced event tests.

To view the specific tests assigned to an event, double-click on the event in the Event Library dialog and view the Test page of the Event property sheet. See the online help for Oracle events, "Oracle Event Tests" on page 6-56, or the Diagnostic Pack documentation for information on Oracle event tests and their parameters.

Event Viewer

The Event Viewer property sheet displays details on a selected event in the History or Alerts page. When an event triggers, you select the triggered event and bring it up in the Event Viewer. The Event Viewer contains information on why the event triggered. You can also assign the event to a particular administrator and put instructions for other administrators via the Log page.

You can enter optional comments in the Log page, which is good way to share information about an event with other administrators. Once cleared, events are automatically moved to the History page. The pages of the Event Viewer include:

- General
- Log
- Notification Details

Event Viewer: General Page

The Event Viewer General page displays statistics and author information on a selected event. To obtain information on how to respond to an event occurrence, refer to the "User Action" section of the individual event test:

The following statistics are displayed:

Target

Destination of the event.

Target Type

Database, listener, node, or HTTP server.

Last Updated

Time of last update

Owner

Administrator that created the event.

Assigned To

List of administrators to which the event can be assigned. These administrators have at least "view" access to the event.

Show Event Definition

Displays the Edit Event property sheet in view mode.

Test Name

Event test that is performed.

Severity

Severity of the event occurrence: critical, warning, clear, or unknown.

Time/Date

Time and date of the event occurrence.

Message

Message generated from the alert.

Event Viewer: Log Page

The Event Viewer Log page displays an entry whenever an event is moved to history. An event can be moved manually with the Move to History menu option or automatically when the severity of the event changes.

The Log page also allows comments to be entered on a selected event. Any administrator with permissions to modify the event can add comments in this page. Administrators can enter tips on how to resolve the problem which might be useful for other administrators. You enter comments in the text box and select the Apply or OK button to add the comment.

The information displayed in the Log page includes:

Type Entry

Text input field allowing you to add comments.

Entry

Comment that has been entered for this event.

Author

Administrator that entered the comment.

Date/Time

The date and time when the comment was entered.

Event Viewer: Notification Details Page

The Event Viewer Notification Details displays details of email and paging notifications sent for a selected event. The information displayed in Details page includes:

Severity

The severity flag associated with the event occurrence.

Administrator

Administrator that was notified.

Date/Time

The date and time of the notification.

Method

Method of notification: E-mail or page.

Notification Status

Status of the notification, indicating whether the notification was sent, is pending, or has failed.

Message

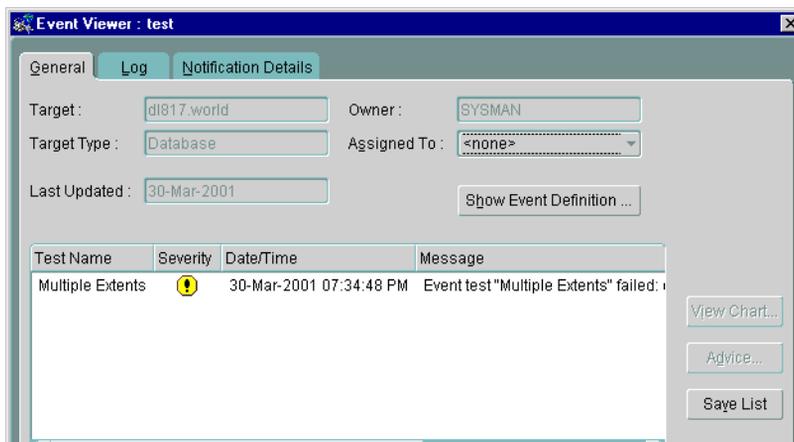
If the notification failed, this message indicates the reason for notification failure.

Responding to Event Occurrences

The online help for each event test will, in general, have a "User Action" section that provides guidelines on how to respond to that particular event tests should it trigger. See the online help Contents page for all available event tests.

Administrators can also obtain diagnostic information about the triggered event from the "View Chart" and "Advice" functionality available from the Event Viewer.

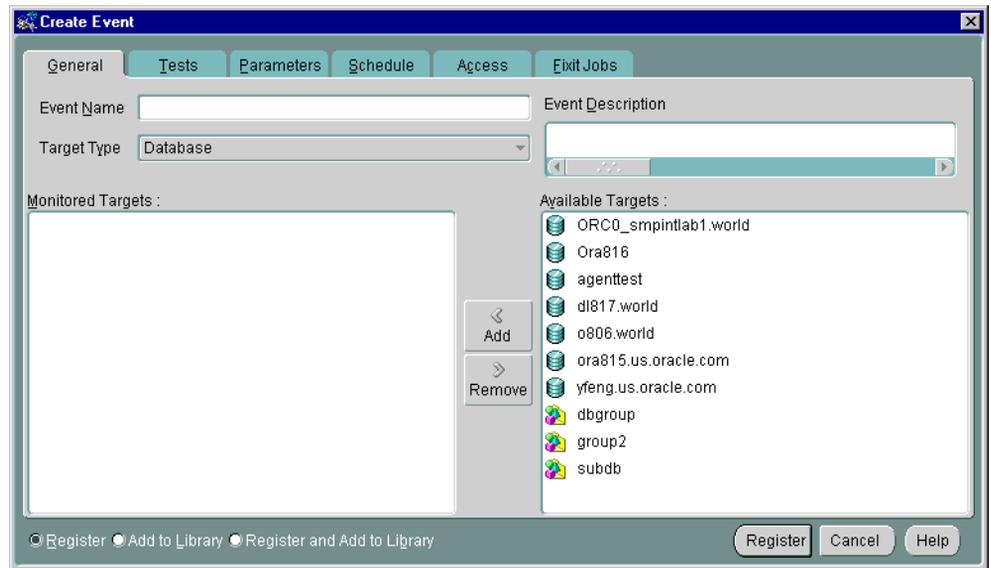
Figure 6–5 *Event Viewer*



The "View Chart" button allows administrators to look at real-time charts related to the event. The "Advice" button provides administrators diagnostic information to help them address the event condition appropriately.

Event General Page

On the General page, you determine the event name, target type, description, and targets to be monitored.

Figure 6–6 *Event General Page***Event Name:**

Enter an event name.

Target Type:

Select the target type you want to monitor from the pull-down list. The types include Database, Listener, Node, or other service that is integrated into the Console.

If the selected Target Type is "Node", then a second pull-down list of operating systems will appear. If you choose 'All', then event tests that apply to all types of nodes, i.e. operating systems, will be available. If you choose a particular operating system, (e.g. Solaris), then additional operating-system specific event tests will be available.

The selection of the Target Type determines the list of Available Target. If you choose "Node" and a particular operating system, such as Solaris, then the list of available destinations will show all Solaris nodes that are running at least an 8.1.7 or higher Intelligent Agent. Any Solaris nodes that use older agents will not be shown.

Events can be registered against targets that have an Intelligent Agent. Targets on manually discovered nodes cannot be used as targets for an event. Hence, these

nodes will not appear on the Available Targets list. When an event is registered against a group, it will only be registered against targets that are running an Intelligent Agent. It will not be registered on any target that has been manually discovered.

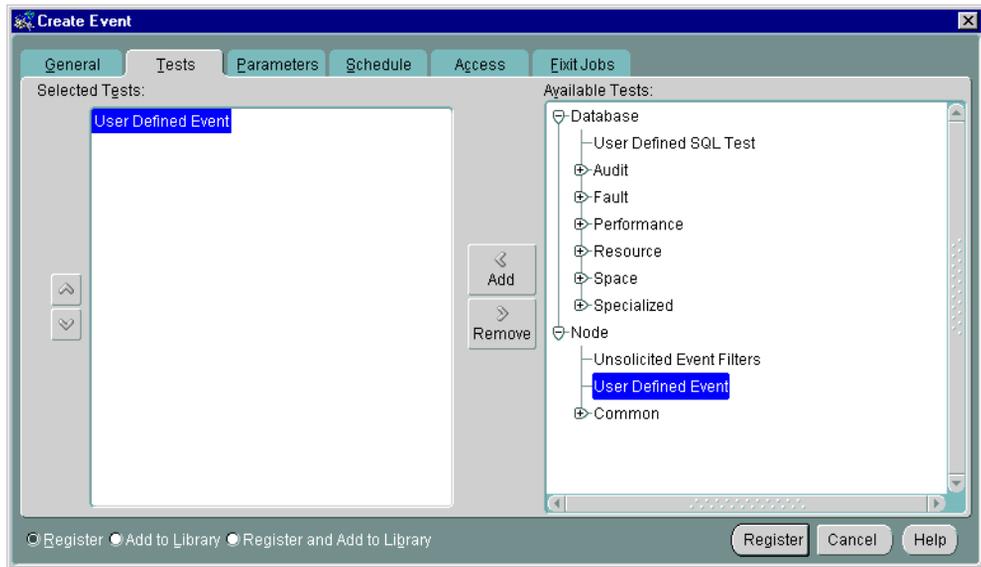
Event Description:

Enter a description or comment for the event

Event Tests Page

On the Tests page, you determine the event tests that you want to perform. Event tests are arranged hierarchically in a tree list for ease of viewing and selection. As with the Console Navigator, you can expand and compress entries in the tree list.

Figure 6–7 *Event Tests Page*



Available Tests:

Select the event tests in the list you want to perform in this event, then click on the << (Add) button to move the events to the Selected Events list. Double-clicking on an Available test will also move it to the Selected Tests list.

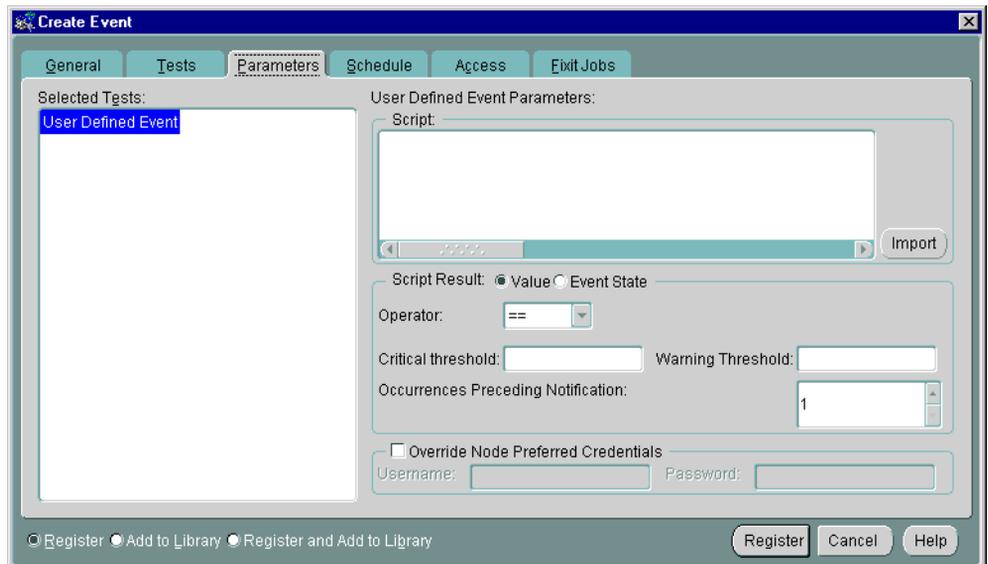
Selected Tests:

Select the event tests in the list you want to remove from this event, then click on the >> (Remove) button. Double clicking on a Selected test will also remove it from the Selected Tests list.

Event Parameters Page

The parameter settings for the selected event tests are entered in the Parameters page of the Event property sheet. The settings and types of parameters vary according to the event test selected. Some event tests do not have parameters. See the online help for Oracle events and "Oracle Event Tests" on page 6-56 for information on tests and their parameters. Further information on event tests is available in the Oracle Enterprise Manager Event Test Reference Manual.

Figure 6–8 *Event Parameters Page*

**Parameters**

The parameters for an event are displayed when the event is selected in the Selected Tests list. The parameters vary according to the event selected. Some events do not have parameters.

You can accept the default values or change the values for the parameters. To enter parameter values for an event, you can enter a value directly into a parameter field.

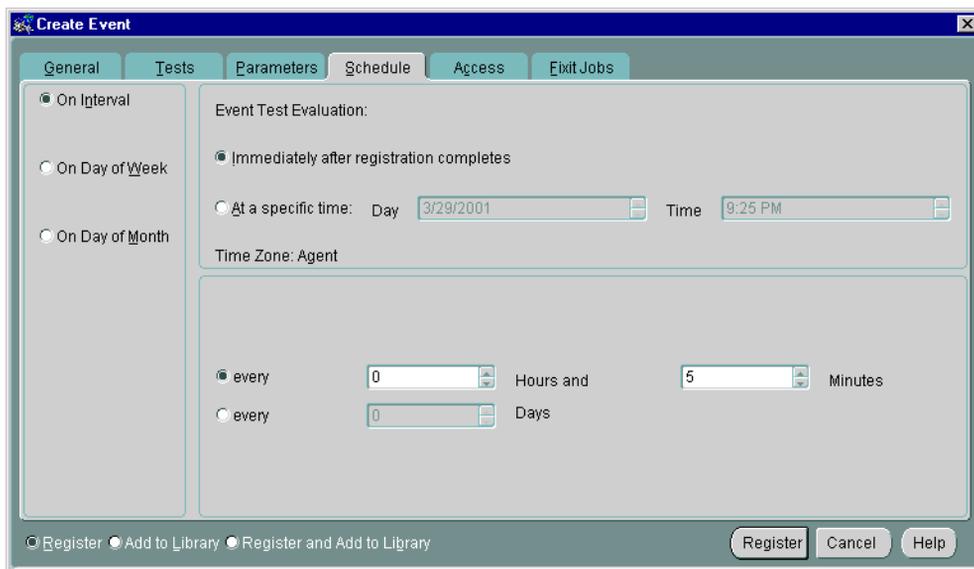
Filtering

Filtering is used in events such as **Chunk Small** and **Maximum Extents**. Examples of filters are = 'SYSTEM', LIKE '%SMP%', and IN ('SYSTEM', 'TOOLS'). Note that the quotes are single quotes. Use uppercase to match the case of the database object names. If you enter a filter value that does not select any objects or is an incorrect value, the event fails.

Event Schedule Page

The **Schedule** page allows you to schedule the evaluation of an event condition. This allows you to schedule resource-intensive events at off-peak times.

Figure 6–9 Event Schedule Page



You can select when you want event evaluations to occur. The choices are:

On Interval

Allows you to schedule a specific time interval at which the event monitors for a specific condition. The interval can be a combination of hours and minutes, or

number of days. Select the value you want to change and click on the scroll buttons. You can also type in a new value. This is the only schedule type allowed when there are targets running pre-9i Intelligent Agents in the "Selected Targets" list found on the General page.

On Day of Week

Allows you to schedule event monitoring on one or multiple days (Sunday, Monday, etc.) of the week. Click on the days of the week to select the days you want the event scheduled. (Available for targets running 9i versions of the Intelligent Agent)

On Day of Month

Allows you to schedule the event on one or multiple days (1 - 31) of the month. Click on the dates of the month to select the dates you want the task scheduled. (Available for targets running 9i versions of the Intelligent Agent)

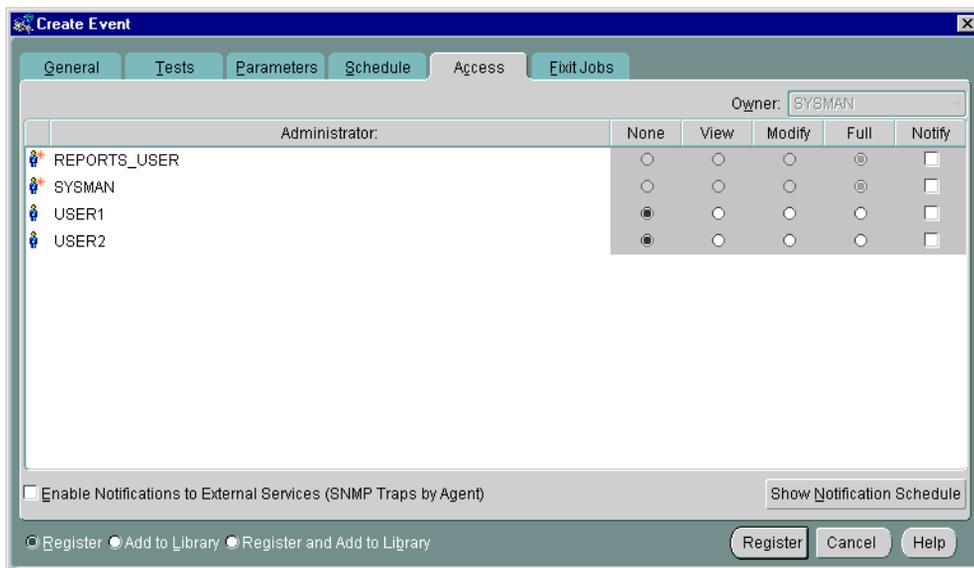
If you choose a day, such as 31, that is not in a month, the event will not be evaluated in that month.

Only the Intelligent Agent time zone is available with this release. Here, the Intelligent Agent schedules event monitoring at each destination based on the actual system time of each Intelligent Agent.

Event Access Page

Determine the administrator access permissions that you want to assign to the event with the Access Page. This allows other administrators to view or modify the event. Notifications are also assigned with this page.

Figure 6–10 Event Access Page



The levels of permission that you can assign to an Enterprise Manager administrator are:

None

Does not allow the administrator to view this event anywhere.

View

Allows the administrator to view the event, inspect event properties, and receive notifications.

Modify

Allows the administrator to modify the event’s log (See "Event Viewer" on page 6-39), enable enhanced notifications for other administrators, change event attributes in the event library, and assign triggered events to other administrators.

Full

Allows the administrator to delete the event, modify permissions for other administrators, change event attributes in the event library, clear the event history, and assign triggered events to other administrators.

Notify

Allows the administrator to receive enhanced event notifications on the objects through paging or email. Other notifications will be routed to that particular administrator's Console. Notify permission cannot be assigned if the administrator's permission level is set to None.

Any permissions assigned on this page supersede any administrator default permissions. See "Access" on page 1-29 for more information. Also, the administrator's notification schedule must be set up in order for them to receive the Email/page notification. Superusers cannot be changed from "Full" permissions.

Enable Notifications to External Services (SNMP Traps by Agent)

When checked, permits external notification (SNMP traps) to be sent from the supported SNMP service on the Intelligent Agent node. See the *SNMP Support Reference Manual* for more information.

Show Notification Schedule

Show Notification Schedule displays the notification schedule for the event. The schedule shown on this page is a combined schedule for all administrators that have been given "Notify" privileges for this event. To view administrators assigned to a particular time slot, use the right mouse button to call up the context-sensitive menu, choose the "Remove Recipient" option, and view the list of administrators. To add or remove notifications for an administrator, display the context menu (press the right mouse button) on any time block. The context menu provides options for adding and removing recipients of the notifications.

Table 6–2 summarized user permissions required to perform specific actions within Enterprise Manager.

Table 6–2 User Permissions Table

| Action | None | View | Modify | Full | Owner | Super User | Comments |
|---|------|------|--------|------|-------|------------|---|
| EVENTS - Dynamic Modification of Registered Events | | | | | | | |
| View progress/details | No | Yes | Yes | Yes | Yes | Yes | Information label appears in General page |
| Receive notifications (if enabled for administrator) | No | Yes | Yes | Yes | Yes | Yes | |
| Set permissions for any administrator including yourself | No | No | No | Yes | Yes | Yes | |

Table 6–2 User Permissions Table

| Action | None | View | Modify | Full | Owner | Super User | Comments |
|--|------|------|--------|------|-------|------------|--|
| Set Notification checkbox for any administrator | No | No | Yes | Yes | Yes | Yes | |
| Enable SNMP traps | No | No | No | No | Yes* | No | * New behavior for 9i |
| Add/remove targets, change description, tests, parameters, schedule, fixit job | No | No | No | No | Yes* | No | * New behavior. Also depends on Intelligent Agent version. |
| Change owner | No | No | No | No | No* | No | * New behavior. When an administrator is deleted, events are reassigned to the new owner |
| EVENTS - In the Library | | | | | | | |
| Change owner (library) | No | No | No | Yes | Yes | Yes | |
| Add/remove targets | No | No | Yes | Yes | Yes | Yes | |
| Change description, tests, parameters, schedule, fixit job | No | No | Yes | Yes | Yes | Yes | |
| Change permissions; enable/disable Notify preferences; enable SNMP | No | No | Yes | Yes | Yes | Yes | |
| Delete event | No | No | No | Yes | Yes | Yes | |
| Submit event from the library | No | Yes | Yes | Yes | Yes | Yes | |
| EVENTS - In the Console | | | | | | | |
| Delete registered event | No | No | No | No | Yes | Yes | |
| Clear history | No | No | No | Yes | Yes | Yes | |
| Assign Event occurrences | No | No | Yes | Yes | Yes | Yes | |

Event Fixit Jobs Page

A fixit job is designed to automatically correct a problem when a particular event condition is encountered. For example, you may want the Intelligent Agent to run a job to restart a database when the database instance has shut down unexpectedly. Fixit jobs are created with the Job system and must be designated as fixit jobs. The jobs must be submitted and running on the same destination that the event is set on.

The Fixit Jobs page consists of the following:

If ANY test triggers, run a fixit job:

When selected, allows a fixit job to be associated with the event. When any event test in the "selected Tests" triggers, the fixit job will run.

Fixit Job:

Drop-down list containing existing fixit jobs. If no fixit jobs currently exist, click Create to display the Create Job property sheet. Note: A newly created fixit job will not show up in the drop-down list during the current editing session. The event must be closed and then re-edited before the new fixit job will appear in the list.

Edit:

Displays the Edit Job property sheet for the fixit job selected in the Fixit Job drop-down list. The fixit job owner can edit some attributes of the fixit job.

Create:

Displays the Create Job property sheet which allows you to create a new fixit job.

Selected Tests

Displays all event tests chosen for the current event.

Note: Each event must use a unique fixit job on each destination where the event is registered. Also, when a single agent is monitoring multiple databases at a destination, create a separate event and fixit job for each database.

Dynamic Modification of Registered Events

Dynamic event modification allows you to actively modify a registered event and have the changes automatically applied to all monitored targets of that event. For example, you can add an additional database to be monitored if you have an existing Tablespace Full event. The Intelligent Agent for the newly added database will now monitor for tablespace full conditions.

However, not all event attributes can be changed. What you are allowed to change depends on the version of the Intelligent Agent used with each monitored target. You may have older versions of the Intelligent Agent running on different targets within your enterprise and these older versions of the Intelligent Agent will only support a subset of modifications you can make using a 9i Agent.

Because pre-9i Intelligent Agents do not support dynamic event modification, if an event contains targets running pre-9i Intelligent Agents in its current Selected

Targets list with the event registered or pending, modification will be limited. If these the pre-9i Agent targets are first removed from the Selected Targets list, 9i or pre-9i targets (without the event currently registered) can be added and full modification will be enabled.

The following are general usage guidelines for dynamic modification of events:

1. Only the Owner of the registered event can modify all parameters for the event. The owner of a registered event is the administrator who originally registered the event. The owner is shown under the "Owner" column of the Registered page of the Events pane, or via the Owner field in the Access property page of the Edit Event property sheet.
2. An event can be registered against multiple targets on different nodes, each of which is monitored by its own Intelligent Agent. The version of the Intelligent Agent determines the amount of event editing that can be performed against that particular target. You can easily determine the version of the Intelligent Agent running a particular target from the target's Node property sheet.

Figure 6–11 Node Property Sheet

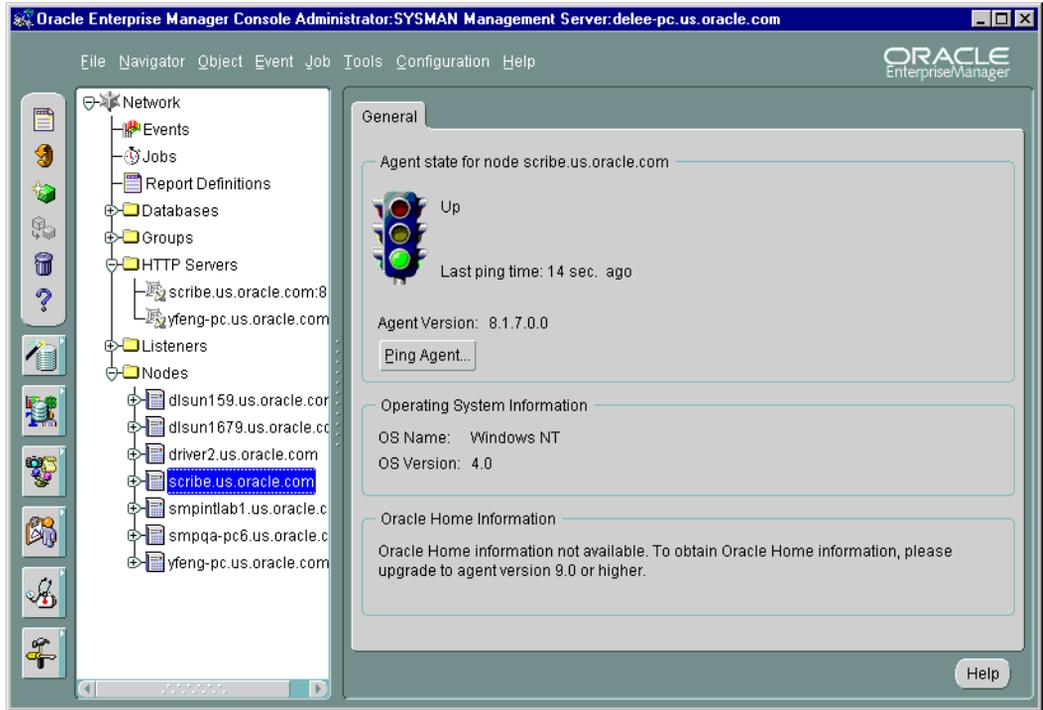


Table 6–3 Modifiable Event Attributes

| Event Attribute | Located in this Property Page of the Event Dialog: | If all current targets for the event are running with a PRE-9i Agent, can it be modified? | If each current target for the event is running with a 9i Agent, can it be modified? | If, for the event, some current targets use 9i Agents and some targets use pre-9i Agents, can the event be modified? |
|---|--|---|--|--|
| Event Description | General | yes | yes | yes |
| Monitored Targets | General | yes | yes | yes |
| | | Adding a target creates a new event registration for that target. | Adding a target creates a new event registration for that target. | |
| | | Deleting a target de-registers the event for that target. | Deleting a target de-registers the event for that target. | |
| Adding or deleting event tests | Tests | no | yes | no |
| Changing test parameters | Parameters | no | yes | no |
| Schedule - polling frequency and start time | Schedules | no | yes | no |
| Permissions | Access | yes | yes | yes |
| Enabling/Disabling SNMP traps | Access | no | yes | no |
| Selecting or Creating a fixit job for the event | Fixit Jobs | no | yes | no |

General Behavior

When dynamically modifying events, there are general system behaviors of which you should be aware:

- When an event has selected targets with the event registered or pending running both pre-9i and 9i Intelligent Agents, then only the attributes that can be modified across all Intelligent Agent versions are supported.

- If you want to modify an attribute that cannot be modified using a pre-9i Intelligent Agent (e.g. test parameters), then you can:
 1. Modify the event by removing the targets running the pre-9i Intelligent Agent. This will enable editing of 9i targets.
 2. Modify the event attributes as necessary, i.e., test parameters.
 3. Submit the changes. The event will be modified on the 9i targets and deregistered from the pre-9i targets.
 4. Modify the event again by adding back the pre-9i target you removed. It will now contain the attribute that was just modified.
- The Event property sheet will automatically enable or disable property pages depending on the changes supported.

For example, if your event originally had a mix of targets running pre-9i and 9i Intelligent Agents, then the Tests, Parameters, Schedule, and Fixit Jobs property pages will be disabled for editing. If during the edit session, you remove the targets running the pre-9i Intelligent Agents, then the Tests, Parameters, Schedule, and Fixit Jobs property pages will now allow editing since the remaining targets support editing of those attributes. However, if any of those attributes are changed in this edit session, you will not be able to bring back the original pre-9i targets you removed. (To bring back the original pre-9i targets, you first have to submit the changes, then re-edit the event to add back the pre-9i targets).

Event Progress Page

The Event Progress page displays when you edit an event from the Registered page of the Events pane. This page provides the current registration status for the event selected: Registered, Registration Failed, Modification Pending, or Registration Pending. In addition, the target and time and date when registration was attempted is shown.

When the Progress page is displayed, it shows only the status for the selected event. If the selected event is registered, or had been submitted for registration on other targets, you can view the status of this event for those targets by selecting the desired target from the Target pull-down list. The status of the event displays for that target. To view the status of this event for all destinations simultaneously, select <All>.

The following options are available on the Progress page:

Target (pull-down list)

Select the destination of the event you want to view from the pull-down list. Select <All> for all destinations for which this event has either been registered or failed to be registered.

Status

Status for the event: Registered, Registration Pending, Modification Pending, or Registration Failed.

Target

Network destination for the event.

Date/Time

Date and Time the event was submitted for registration.

Show Output

Displays the Event Status Message dialog. This button is active only when you have selected a failed event registration. Selecting this option will allow you to view the reasons for the failure.

Save List

Saves the contents of the list to a text file.

Administrator Event Notification

Oracle Enterprise Manager allows you to specify administrators that are notified when a particular event condition occurs. Each administrator can be associated with an email ID and/or a pager number. When using a paging service or email notification, each administrator can be assigned responsibility for specific systems at specific days and times.

For more information on setting up Oracle Enterprise Manager administrators, see "Managing Enterprise Manager Administrators" on page 1-14.

Oracle Event Tests

This section lists the Event system event tests with their parameters and return values. See "Event Parameters Page" on page 6-45 for information on entering parameter values. A list of event tests with numeric pager event Ids is also provided. See "Numeric Pager Job/Event Ids" on page 6-57 for more information.

Event tests are specified for database, listener, and node services. The event tests are also divided into fault, space, resource, and performance management categories.

Only the UpDown event tests are included with Oracle Enterprise Manager. Additional advanced event tests are available with the optional Oracle Diagnostics Pack. See the Oracle Enterprise Manager Event Test Reference Manual for complete information on available event tests. Complete event test information is also available from online help.

Some of the database event tests, such as Chain Row, require access to system tables and require additional permissions. You need to set up preferred credentials for the monitored database with an administrator that has system privileges. See "Enterprise Manager Monitor Role" on page 6-4 and "Preferred Credentials" on page 1-31 for more information.

Numeric Pager Job/Event Ids

The Event Management System provides paging services that notify an administrator with a page when an event has occurred. Alphanumeric pagers provide a brief text message identifying the event. Numeric pagers provide the numeric pager event Ids to identify the event.

For job notifications, you will receive a 6 digit number. The first 3 digits indicate the job-id. The last 3 digits indicate job status.

For event notifications you will receive the event ID with the status code.

For a complete list of pager job/event IDs, see "Paging Status Codes for Numeric Pages" on page 1-26

Event System Features and Requirements

Because the Enterprise Manager framework is a three-tier system that can manage a heterogeneous environment, it is important to keep in mind various software version requirements necessary for proper event system operation. Table 6-4, "Event Features and Associated Requirements" lists event system features and associated software version requirements.

Table 6–4 Event Features and Associated Requirements

| Feature Name | Description | Enterprise Manager Version | Required Agent | Management Server/Console Required | Works In Browser |
|---|---|-----------------------------------|--|---|-------------------------|
| Advanced Events | All events for databases, nodes, listeners. See Enterprise Manager online help for more information. | Diagnostics Pack 1.5.5 and higher | All supported agents, latest recommended | For Enterprise Manager 2.x, the Management Server and Console that corresponds with that Pack | yes |
| Event Handler | Component that allows you to log event information or execute custom commands in response to an event occurrence. See | 9i | n/a | 9i | n/a |
| Improved Node Up/Down Monitoring | Enhancement to the Node Up/Down event test. Provides more information on whether or not the node is down, the agent is down, etc. | 2.2 and higher | all supported | 2.2 and higher | yes |
| User-Defined SQL Test | Allows you to write your own custom SQL to monitor database events | Diagnostics Pack 2.1 and higher | 8.1.6 and higher | 2.1 and higher | yes |
| Enhanced monitoring for target subcomponents | "For events whose targets involve multiple subcomponents (e.g. monitor tablespace full for ALL tablespaces), information on which subcomponent is in alarm is now provided | "2.2 and higher | 8.1.7 and higher | 2.2 and higher | yes |
| Context sensitive help for Event tests | "In the Parameters tab of the Event dialog, invoking ""Help"" will bring up information pertinent to the current selected event test | "2.2 and higher | n/a | 2.2 and higher | yes |
| Events with synonymous event tests | "Events can be created that have more than one of the same event test (e.g. a ""Tablespace Full"" test for ""SYSTEM"", another ""Tablespace Full"" event test for ""USER"") | "2.2 and higher | all supported by Enterprise Manager 2.2 | 2.2. and higher | yes |
| Job and Events Notification filters | | | | | |

Table 6–4 Event Features and Associated Requirements

| Feature Name | Description | Enterprise Manager Version | Required Agent | Management Server/Console Required | Works In Browser |
|--|--|-----------------------------------|--|---|-------------------------|
| ■ Filters that apply to both paging & email | Allows you to filter pages & emails based on job and event status | 2.1 | all agents supported by Enterprise Manager 2.1 | 2.1 | yes |
| ■ Different filters for paging & email | Allows separate filters for pages & emails based on job and event status | 2.2 and higher | all agents supported by Enterprise Manager 2.2 | 2.2 and higher | yes |
| Customization for paging & email messages | Allows you to customize the messages for email and pages | Diagnostics Pack 2.2. and higher | all agents supported by Enterprise Manager 2.2 | 2.2 and higher | yes |
| Advanced O/S event tests | New event tests that monitor operating system specific metrics | 2.2 and higher | 8.1.7 and higher | 2.2 and higher | yes |
| User-defined Events | Allows you to define events based on any user-specified monitoring script. | 9i Diagnostics Pack | 9i Intelligent Agent | 9i and higher | yes |
| Dynamic modification of registered events | Allows you to dynamically change attributes of registered events. | 9i | all Intelligent Agents supported by Enterprise Manager 9i. 9i versions of the Intelligent Agent allows full modification | 9i | yes |
| Event Schedules | Allows you to specify event evaluations based on a schedule. | 9i | 9i | 9i | yes |
| Event Integration with Performance Manager charts | Allows you to create events from Performance Manager charts. | 9i Diagnostics Pack | 9i | 9i | yes |

Table 6–4 Event Features and Associated Requirements

| Feature Name | Description | Enterprise Manager Version | Required Agent | Management Server/Console Required | Works In Browser |
|---|---|---|--|---|-------------------------|
| Concurrent Manager Events | Events to monitor error conditions against the Oracle Applications Concurrent Processing Server | 2.0.4 and higher | 8.1.5 and higher | 2.0.4 and higher | yes |
| Forms Server Events | Events to monitor error conditions against the Oracle Developer Forms Server | 2.0.4 and higher (2.0.4 console needs Forms Extensions. | 8.0.6 and higher (requires Forms Agent Extensions. | 2.0.4 and higher (2.0.4 console needs Forms Extensions. | yes |
| Program Filtering in Concurrent Manager Events | Allows you to monitor particular Oracle Applications Concurrent Programs. Also allows you to exclude particular Concurrent Programs from being monitored. | 2.2 and higher | 8.1.7 and higher | 2.2 and higher | yes |

Enterprise Manager Event Handler

Enterprise IT practices may require that responses to certain event occurrences be handled in certain ways. For example, if the database updown event triggers, administrators may want to automatically open an in-house trouble-ticket so that the appropriate IT staff can respond to this event occurrence. The ability to provide customized automatic responses to event occurrences can be achieved by using the Event Handler. This chapter discusses the following topics:

- Event Handler Overview
- How the Event Handler Works
- Setting Up the Event Handler
- Known Issues
- Differences between UNIX and Windows NT
- Running the Event Handler in a multi-Management Server Environment
- Migrating from Prior Releases

Event Handler Overview

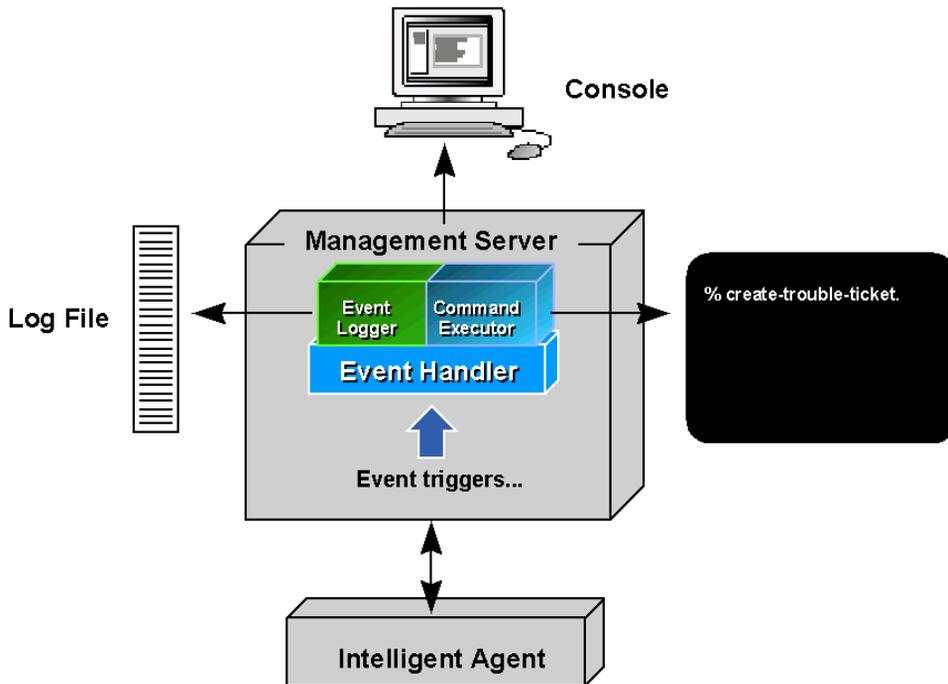
The Event Handler is an integral part of the Oracle Management Server. It listens for event notifications and responds to these events in ways specified by the administrator. The Event Handler's response capability is performed by its two components:

- *Event Logger* - allows the Event Handler to log events to designated log files
- *Command Executor* - allows simple operating system commands to be executed in response to an event occurrence.

You can use either or both components in response to a triggered event.

Prior to passing event notifications for further processing, the Event Handler also provides a simple filtering mechanism that allows system administrators to specify the conditions by which the events are passed to either or both components.

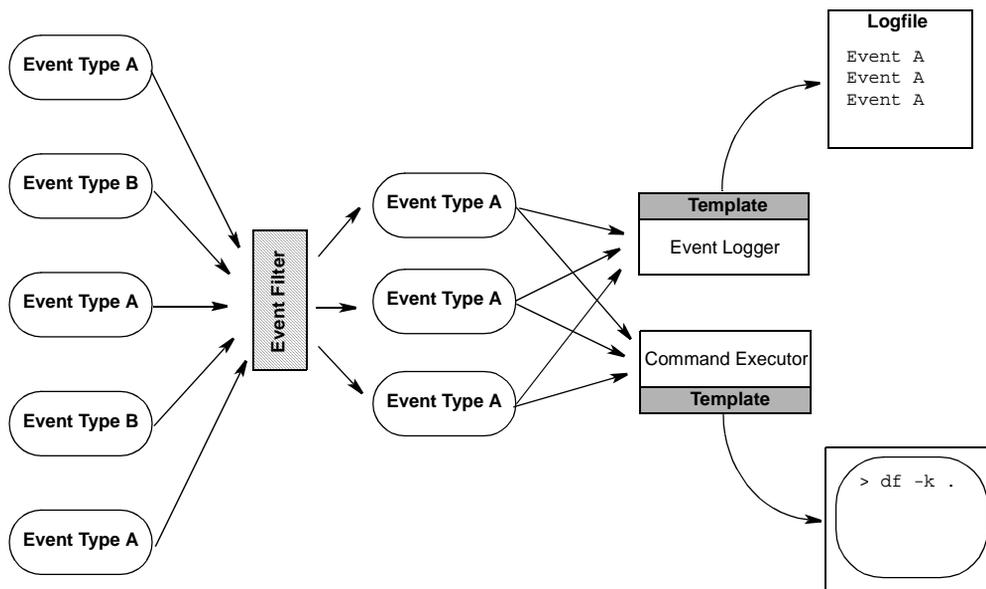
Figure 7-1 Event Handler Architecture



How the Event Handler Works

When the Event Handler starts, information from the *filters* are used to determine which events the Event Handler should select and pass on to the Event Logger and/or Command Executor. Once these components receive the event, they further process the event based on the *templates* set up for them. Templates provide a way to customize the behavior of the components. For the Event Logger, this means specifying which events should be logged and the specific log file to be used. For the Command Executor, this means specifying the types of events it should respond to and the operating system command it should execute in response to that event.

Figure 7-2 Event Handler Process



Setting Up the Event Handler

By default, the Event Handler has been pre-configured with default parameters and can be enabled immediately after installing Enterprise Manager. The default configuration implements the Event Logger only. To enable the Command Executor and/or customize the Event Handler's filtering capability, you will need to customize the Event Handler configuration. The two methods are outlined below.

Quickstart Method (Default)

1. Before enabling the Event Handler, the Management Server must first be stopped. To stop the Management Server, issue the following command:

```
% oemctl stop oms <superuser>/<password>
```

2. Enable the Event Handler by typing the following:

```
% oemctl enable eventhandler
```

3. Start the Event Handler by starting the Management Server

```
% oemctl start oms
```

To view the default configuration of the Event Handler type the following:

```
% oemctl dump eventhandler
```

The Event Handler is now ready to use. This default configuration will log all events to a file called `eventhandler.log`, which is located in the `%ORACLE_HOME/sysman/log` directory. By default, the format of an Event Logger message is:

```
<name>;<occurrence number>;<timestamp>;<assignee, if any>;<severity>
```

and is overwritten each time the Event Handler starts.

The format and behavior of the default log message can be modified slightly by using the following properties in the `omsconfig.properties` file.

```
/com/oracle/sysman/em/eventlogger/logfile=<full logfile path>
/com/oracle/sysman/em/eventlogger/separatorstring=<separator string for logfile entries>
/com/oracle/sysman/em/eventlogger/appendonstart=<true/false>
```

The `separatorstring` property is used by the default logger template **ONLY** and cannot be used with user-defined logger templates. This string separates placeholder entries within a single event occurrence, not different occurrences of the event.

The `appendonstart` property determines whether or not the log file will be overwritten each time the Event Handler starts. The default is `false`, which means overwrite. Set this to `true` if new log entries should be appended to an existing log file.

Customizing the Event Handler Setup

To change the default configuration, you can customize the Event Handler as described in this section.

1. Before enabling the Event Handler, check to make sure the Management Server is not running. To stop the Management Server, issue the following command:

```
% oemctl stop oms <superuser>/<password>
```

2. Enable the Event Handler by typing the following.

```
% oemctl enable eventhandler
```

3. Configure the Event Handler parameters.

The Event Handler parameters are stored in the Enterprise Manager repository. In order to change the parameter settings, you must export the parameters to a file, change the parameters, then import them back into the repository. These steps are illustrated below.

Note: Make sure the Event Handler is first enabled as explained in step 2.

Export parameters to a text file

At the command line enter the following:

```
% oemctl export eventhandler <filename>
```

Example: % oemctl export eventhandler myEventHandler

This example exports the parameters to a text file called myEventHandler.

Change the parameters

Use any text editor to edit the contents of the file containing the exported parameters.

Details on the parameters are explained in "Event Handler Configuration Parameters" on page 7-7. It is important to follow the exact syntax for the parameters.

Import the parameters

Once you complete the parameter changes, they must be imported back to the repository. At the command line enter the following:

```
% oemctl import eventhandler <filename>
```

Example: % oemctl import eventhandler myEventHandler

This example imports the Event Handler settings defined in the file myEventHandler back into the Enterprise Manager repository.

Important: Importing the parameter file will completely override any previous Event Handler settings.

4. Start the Management Server.

Starting the Management Server will start the Event Handler with the new settings.

```
% oemctl start oms
```

Event Handler Configuration Parameters

The Event Handler parameters are single-line entries that specify the events to which the Event Handler should respond and actions to be taken in response to these events.

Important: The syntax for each entry should be followed exactly. There must be NO linefeed or carriage returns within a single entry.

Event Handler parameters fall into three categories: Blackouts, Filters, and Templates.

Blackouts

Syntax:

```
eventhandler.respect_blackouts = <true/false>
```

The blackouts parameter tells the Event Handler whether or not to act on an event if the event triggered on a target that has paging and email blackouts set. This parameter can be toggled true or false.

A setting of False (default setting) instructs the Event Handler to continue processing events even if paging and/or email blackouts have been set for those events.

A setting of True prevents the Event Handler from processing events on targets that have paging/email blackouts.

Filters

When the Event Handler starts, it uses "filters" to determine which events are passed on to the Event Logger and/or Command Executor components. The system administrator can designate what events, if any, are sent to the Event Logger and Command Executor components. This is called "filtering." Events may be filtered on a global basis (applied to both components) or on a per component basis.

Filters apply to either the Event Logger or the Command Executor. Filters are defined in external files and imported into the Management Server by using the *oemctl import eventhandler* command. Each entry specifies the conditions by which the events are passed to the components. An event passes through the filter if it meets the conditions specified by the filter. Events that don't satisfy the condition are ignored by the Event Handler.

Each filter is uniquely identified by a name. All entries relating to a filter are grouped under this name. The filter conditions themselves are based on the following event properties:

Event properties for filters:

- `eventname` -- this is the name of the event
- `node` - this is the monitored node on which the event occurred
- `targetname` - name of the target
- `targettype` - type of the target. It is one of the following values:
 - `oracle_sysman_node` (target is a node)
 - `oracle_sysman_database` (target is a database)
 - `oracle_sysman_listener` (target is a net listener)
 - `oracle_sysman_cmanager` (target is a concurrent manager)
 - `oracle_sysman_ops` (target is an ops node)
 - `oracle_sysman_webserver` (target is an apache webserver)
 - `oracle_sysman_hotstandby` (target is a standby database)
- `owner` - owner of the event
- `severity` - status of the event. It is one of the following values: `alert`, `warning`, `error`, `clear`, `nodedown`

Filter Syntax The syntax for filters is as follows:

Syntax for global filters:

```
/com/oracle/sysman/em/eventHandler/global_filters/<filter-name>/<property-name> = <value>
```

Example:

```
/com/oracle/sysman/em/eventHandler/global_filters/myFilter/node = dlsun1234
```

Syntax for filters for the Event Logger only:

```
/com/oracle/sysman/em/eventHandler/eventlogger_filters/<filter-name>/<property-name> = <value>
```

Example:

```
/com/oracle/sysman/em/eventHandler/eventlogger_filters/myFilter2/owner = mary
```

Syntax for filters for the Command Executor only:

```
/com/oracle/sysman/em/eventHandler/commandexecutor_filters/<filter-name>/<property-name> = <value>
```

Example:

```
/com/oracle/sysman/em/eventHandler/commandexecutor_filters/myFilter3/severity = alert
```

Important: The 'value' specified must either be an exact match or a single wildcard character "*" to specify all possible values. Regular expressions are not supported. For example, 'myevent*' is not an acceptable value. The sense of the condition can be negated by prefixing a "!" in front of the value.

The following rules apply to all event filters:

1. All conditions specified by a given filter must hold true for the event.

Example: For the global_filter MyFilter:

```
/com/oracle/sysman/em/eventHandler/global_filters/MyFilter/eventname = cputest
/com/oracle/sysman/em/eventHandler/global_filters/MyFilter/node = prodserver.us.oracle.com
```

If the name of the event is 'cputest' and if it occurred on node 'prodserver.us.oracle.com', then the event will be passed to both Event Handler components.

2. The event must pass at least one filter.
3. An event is forwarded to a component (Event Logger or Command Executor) if it passes through either a global filter or a filter for that particular component.

By default, all events are suppressed, and at least one filter (global or per component) must be present in order for events to be forwarded to any of the adapters. See Sample Filters and Templates: on page 7-19 for examples of filters.

Assuming the event has passed through the filters, they are forwarded on to the event adapters, Event Logger or Command Executor.

Important: The default Event Handler configuration provides a global filter that allows all events to be passed to both components: Event Logger and Command Executor. In most cases, this should be sufficient. Further selection of the type of events to respond to can be specified via templates which are discussed in the next section.

Templates

Templates tell the Event Logger and Command Executor adapters how to respond to the event occurrence. For the Event Logger, a template specifies which events should be logged and how this information should be formatted and to which file the information should be logged. For the Command Executor, a template specifies the events the adapter should respond to and the operating system command it should execute in response to that event.

Event Logger Templates The Event Logger logs events that have passed through the event filters (as discussed in the previous section). You specify how the event information is logged via templates.

Templates are configuration entries that tell the Event Logger: the events to which the templates apply, the log file to use, and the format by which the event information should be written.

You can have multiple templates defined. Each template must be uniquely identified by name. Each template should specify the following:

The events to which the template applies

Use this format:

```
/com/oracle/sysman/em/eventlogger/templates/<template-name>/<property-name> = <value>
```

where:

- **<template-name>** is your name for this template
- **<property-name>** is the property of the event used to determine the events to which this template applies
- **<value>** is the value associated with the **<property-name>**

You can use any of the following event properties:

- *eventname* : name of the event
- *node* : the node on which the event triggered
- *targetname*: name of the target
- *targettype*: type of target
 - oracle_sysman_node (target is a node)
 - oracle_sysman_database (target is a database)
 - oracle_sysman_listener (target is a net listener)
 - oracle_sysman_cmanager (target is a concurrent manager)
 - oracle_sysman_ops (target is an ops node)
 - oracle_sysman_webserver (target is an apache webserver)
 - oracle_sysman_hotstandby (target is a standby database)
- *owner*: owner of the event
- *severity*: status of the event. Can be any one of the following: alert, error, warning, clear, nodedown

To specify more than one event property, use multiple entries.

The following example specifies the template "MyTemplate" should be used when an event is triggered on node dlsun1234 AND the event severity is alert:

```
/com/oracle/sysman/em/eventlogger/templates/MyTemplate/node = dlsun1234
/com/oracle/sysman/em/eventlogger/templates/MyTemplate/severity = alert
```

If, in a single template, you would like to use the SAME event property multiple times in a logical AND relationship, you need to append a number to the event property name such that they're unique.

For example:

```
/com/oracle/sysman/em/eventlogger/templates/HRTemplate/eventname1=!spaceEvent
/com/oracle/sysman/em/eventlogger/templates/HRTemplate/eventname2=!cpuEvent
/com/oracle/sysman/em/eventlogger/templates/HRTemplate/message=Event %eventname% triggered on node %node% and
has severity %severity%
/com/oracle/sysman/em/eventlogger/templates/HRTemplate/logfile=%ORACLE_HOME%/sysman/log/eventhandler.log
```

In the above example, the event logger will log a message of the specified format to a log file if the eventname is neither 'spaceEvent' nor 'cpuEvent'. This condition is

expressed as "eventname is not spaceEvent" AND "eventname is not cpuEvent". Note the addition of numbers to the eventname property (eventname1 and eventname2) as a way to uniquely identify the same property within the template HRTemplate.

To specify more than one property in a disjointed relationship (OR, for example), use separate templates as illustrated in the next example.

This example specifies "MyTemplate1" should be used if the event triggered on node dlsun1234, OR if the event triggered on target orcl817, use "MyTemplate2".

```
/com/oracle/sysman/em/eventlogger/templates/MyTemplate1/node = dlsun1234
```

...

```
/com/oracle/sysman/em/eventlogger/templates/MyTemplate2/targetname = orcl817
```

...

Format for Event Information

You must also specify the message format to use when logging the event information to a log file. The formatting string used can contain placeholders, which are symbolic representations for pertinent pieces of information about the event. Placeholders are enclosed within "%" characters to distinguish them from ordinary words in the template string. Available placeholders are:

Table 7-1 Event Handler Place Holders

| Place Holder | Definition |
|--------------|--|
| %eventname% | The name of the event. |
| %severity% | The severity of the event as a string. (Alert, Clear, Warning, Node Down) |
| %timestamp% | The timestamp of the event occurrence. (MM-dd-yyyy hh:mm:ss Example: 05-22-01 05:22:00 AM) |
| %targetname% | Name of the target. |
| %targettype% | Type of the target. (oracle_sysman_node, oracle_sysman_database, oracle_sysman_listener) |
| %occ_no% | The occurrence number of the event. |
| %assignee% | The assignee for this event. |
| %node% | The node on which the event occurred, not to be confused with target. |

Table 7-1 Event Handler Place Holders

| Place Holder | Definition |
|--------------|--|
| %output% | The output associated with the event occurrence. |
| %owner% | The owner of the event. |

To specify the message format that the template should use, the following format should be used:

```
/com/oracle/sysman/em/eventlogger/templates/<template-name>/message = <message format>
```

Example:

```
/com/oracle/sysman/em/eventlogger/templates/MyTemplate/message = %eventname% was triggered on %node% at
severity %severity%
```

This example generates a logged message of the form:

```
TablespaceUsage was triggered on dlsun1234 at severity warning
```

Log file

Each template must specify the log file to which it will write:

```
/com/oracle/sysman/em/eventlogger/templates/<template-name>/logfile=<logfilename>
```

Example:

```
/com/oracle/sysman/em/eventlogger/templates/MyTemplate/logfile = /u1/myhome/myevents.log
```

An optional property can be specified to indicate whether or not the logfile should be appended or overwritten for each session that the Event Handler starts:

```
/com/oracle/sysman/em/eventlogger/templates/<template-name>/appendonstart = <true/false>
```

The default value is false, meaning each time the Event Handler starts, any old logfile entries will be overwritten by new log entries.

Note: Forward slashes ("/") should always be used when specifying a path to ensure compatibility with both UNIX and Windows systems.

Multiple Event Logger Templates In cases where the conditions of more than one template are met, all matching templates will be executed. Since each template has its own log file, it is possible to log events to multiple log files on one event notification.

An example of an entry in a template file would be:

```
/com/oracle/sysman/em/eventlogger/templates/foo/eventname=cputest
```

```
/com/oracle/sysman/em/eventlogger/templates/foo/message=%eventname% fired on %node%: Cpu usage on %targetname% is high! occ_no: %occ_no% Severity: %severity% Time: %timestamp%
```

```
/com/oracle/sysman/em/eventlogger/templates/foo/logfile=%ORACLEHOME%/sysman/log/ev.log
```

```
/com/oracle/sysman/em/eventlogger/templates/foo/appendonstart=true
```

The template definition above assigns all events named `cputest` to the template named `foo`. The optional `appendonstart` entry has also been specified. Whenever a `cputest` event fires, the logged output will appear in the file `%ORACLE_HOME%/sysman/log/ev.log` as follows:

```
cputest fired on smptest16: Cpu usage on smptest16 is high! occ_no: 21 Severity: Alert Time: 10-21-2001 02:39:29 PM
```

The Command Executor Templates The Command Executor executes simple commands in response to event occurrences. The command executor looks at a set of user-defined templates to decide what command to execute in response to event occurrences.

Templates are configuration entries that tell the Command Executor: the events to which the templates apply and the command to execute.

You can have multiple templates defined. Each template must be uniquely identified by name. Each template should specify the following:

The events to which the template applies Use this format:

```
/com/oracle/sysman/em/commandexecutor/templates/<template-name>/<property-name> = <value>
```

where:

- **<template-name>** is your name for this template
- **<property-name>** is the property of the event used to determine the events to which this template applies, and

- **<value>** is the value associated with the <property-name>

You can use any of the following event properties:

eventname : name of the event

node : the node on which the event triggered

targetname: name of the target

targettype: type of target

owner: owner of the event

severity: status of the event. Can be any one of the following: alert, error, warning, clear, nodedown

As in the Event Logger, to specify more than one event property, use multiple template entries.

Command to Execute

Use this format:

```
/com/oracle/sysman/em/commandexecutor/templates/<template-name>/command = <value>
```

where:

<value> is the command to execute

To include information about the event in the command, use placeholders. Placeholders are symbolic representations about pieces of information about the event. Placeholders are enclosed within "%" characters to distinguish them from ordinary words in the command string. For a list of available placeholders, see Table 7-1, "Event Handler Place Holders".

Optional: length of execution time

Optionally, you can also specify the length of time (in seconds) that the Event Handler will wait for a process to terminate after execution. For example, if a command begins a process that takes longer to run than what is normally acceptable, the Event Handler will automatically terminate the process.

Use this format to specify the execution time:

```
/com/oracle/sysman/em/commandexecutor/templates/<template-name>/exectimeout =<value>
```

where <value> is expressed in seconds.

By default, if the `exectimeout` parameter is not specified, the Event Handler will terminate the process after 40 seconds.

A typical entry for a template would be:

```
/com/oracle/sysman/em/commandexecutor/templates/foo/eventname=cputest
```

```
/com/oracle/sysman/em/commandexecutor/templates/foo/command=net send my-machine-name %eventname%
fired on %node%: CPU usage on %targetname% is high! occ_no %occ_no% Severity: %severity% Time:
%timestamp%
```

where "my-machine-name" is the name of the machine to which you want to send a message.

The template definition above assigns all events named `cputest` to the template named `foo`. Whenever a `cputest` event fires, the following message will be sent to machine "my-machine-name":

```
cputest fired on smptest16: Cpu usage on smptest16 is high! occ_no: 21 Severity: Alert Time:
10-21-1999 02:39:29 PM
```

There may be situations where the command you want to execute has an argument consisting of several items, for example:

```
foo a b c "this is a test" "d=e"
```

where:

`foo` is the executable command, and

- `a` is its first argument
- `b` is its second argument
- `c` is its third argument

`this is a test` is its fourth argument

`d=e` is its fifth argument.

In this case, you can use quotes (") to group items within a single argument together as indicated in the example above, e.g. "this is a test". To include literal quotes as part of the argument, you need to prefix these quotes with backslashes (\). For example:

```
foo a b c "d=\"e\" " "this is \"quoted\" "
```

will be pass the following arguments to `foo`:

a is the 1st argument

b is the 2nd argument

c is the 3rd argument

d="e" is the 4th argument

this is "quoted" is the 5th argument

Summary of Event Handler Configuration Commands

Typically, the way to configure the Event Handler would be to export the current configuration to a file, edit the file to change the entries, and then import the file back into the Enterprise Manager repository.

When a new Enterprise Manager repository is created, configuration entries are automatically created for all event notifications to be passed to the Event Handler, and for the event logger to log all event notifications into the file `$ORACLE_HOME/sysman/log/eventhandler.log`. However, the Event Handler is disabled by default.

The following is a summary of Event Handler Configuration Commands.

Enabling the Event Handler

To start the Event Handler, execute the following command:

```
oemctl enable eventhandler
```

Note: The Management Server must be stopped before executing this command.

Disabling the Event Handler

If at a subsequent time you need to disable the Event Handler, type

```
oemctl disable eventhandler
```

Viewing Current Event Handler Configuration Settings

To print out the current Event Handler configuration for viewing, type:

```
oemctl dump eventhandler
```

This will dump out the current Event Handler configuration to standard output. It will also indicate the Management Servers that are currently enabled with the Event Handler.

Creating a Configuration File from the Current Event Handler Configuration Registry Entries

To export the current Event Handler configuration registry entries into a file, type:

```
oemctl export eventhandler <filename>
```

You can then edit the configuration entries in the exported file. To import any changes, see the next section.

Importing a Configuration File

To import a file containing Event Handler configuration entries into the Enterprise Manager Repository, type:

```
oemctl import eventhandler <filename>
```

Importing the configuration file will completely override any previous Event Handler settings.

Important: None of the Event Handler configuration commands take credentials since all Event Handler configuration commands inherit the repository credentials from the `omsconfig.properties` file. For this reason, before using the Event Handler configuration commands, you must first configure the Management Server.

Troubleshooting Tips

- If the event logger/executor does not seem to respond to events, check the following:
 1. Make sure there are no linefeed characters within any single entry in the import file. The import utility will check for errors upon execution.
 2. Make sure you have set a filter that allows events to pass through to them. This is part of the default configuration.

Example:

```
/com/oracle/sysman/em/eventHandler/global_filters/allEvents/eventname=*
```

3. Check the syntax of any templates associated with the logger/executor. Try using a simple template or any of the samples given below.

4. When using the logger on unix, make sure you have the appropriate permissions to create the log file. It will use the permissions of the operating system user who started the Management Server. Try creating a file in the directory where the logger's log file should have been created.
5. When using the command executor on unix, make sure you have the appropriate permissions to execute the command. It will use the permissions of the operating system user who started the Management Server. Try running the command directly on the operating system to make sure it works.
6. Make sure the Event Handler service is available by typing the following command at the command prompt:

```
>oemctl dump eventhandler
```

You can use this command at any time to check the current configuration of the Event Handler.

7. When using templates, make sure you specify both the event condition on which the template applies as well as the message format (for the Event Logger) or the command to be executed (for the Command Executor)
 - The Event Handler is an English-only release.

Sample Filters and Templates:

The following are sample filters and templates. Some of these entries can be found in the %ORACLE_HOME%/sysman/admin/*EventHandler.examples* file.

Filters:

Pass all events to both event logger and command executor

```
/com/oracle/sysman/em/eventHandler/global_filters/allNodes/node = *
```

Pass all events to the event logger

```
/com/oracle/sysman/em/eventHandler/eventlogger_filters/allEvents/eventname=*
```

Pass all events to the command executor

```
/com/oracle/sysman/em/eventHandler/commandexecutor_filters/allEvents/node=*
```

Pass on all events except “cputest” to both event logger and command executor

```
/com/oracle/sysman/em/eventHandler/global_filters/not-cputest/eventname =  
!cputest
```

Pass on all events named cputest that did not originate on the node smptest16 to the Event Logger:

```
/com/oracle/sysman/em/eventHandler/eventlogger_  
filters/pass-some-cputest/eventname=cputest  
/com/oracle/sysman/em/eventHandler/eventlogger_  
filters/pass-some-cputest/node=!smptest16
```

Pass all events except cputest to the Command Executor adapter:

```
/com/oracle/sysman/em/eventHandler/commandexecutor_  
filters/pass-no-cputest/eventname=!cputest
```

Pass on all events whose name is foo or whose originating node is skini-pc to the command executor:

```
/com/oracle/sysman/em/eventHandler/commandexecutor_filters/passfoo/eventname=foo  
/com/oracle/sysman/em/eventHandler/commandexecutor_filters/pass-skini/node=skini-pc
```

Templates

Sample template for the event logger:

```
/com/oracle/sysman/em/eventlogger/templates/allEvents/eventname=*  
/com/oracle/sysman/em/eventlogger/templates/allEvents/message=%eventname% fired  
on %node%: Target %targetname%: Output %output% Severity: %severity% Time:  
%timestamp%  
/com/oracle/sysman/em/eventlogger/templates/allEvents/logfile=ev.log  
/com/oracle/sysman/em/eventlogger/templates/allEvents/appendonstart=false
```

A sample log entry using this template would look like:

```
cputest fired on smptest16: Target smptest16: Output Cpu usage is high.  
Severity: Alert Time: 10-21-2001 02:39:29 PM
```

Sample templates for the command executor:

For Windows NT:

```
/com/oracle/sysman/em/commandexecutor/templates/allEvents2/eventname=*
```

```
/com/oracle/sysman/em/commandexecutor/templates/allEvents2/command=net send
my-machine %eventname% fired on %node%: Target %targetname%: Output %output%
Severity: %severity% Time: %timestamp%
```

where `my-machine` is the name of the PC to which the message will be sent.

Whenever any event fires, a message using the above format is sent to machine `my-machine`.

For UNIX:

```
/com/oracle/sysman/em/commandexecutor/templates/allEvents/command=xterm
-display hqsun1:0 -e telnet
```

Here, whenever any event fires, a telnet session is opened.

Complex Example 1: If the event name is `foo` or the originating node is `prod-pc`, log the string "Event `%eventname%` occurred on node `%node%`" into the file `myevents.log`. If the event name is anything other than `foo`, execute the command "mail `admin@acme.com -s %eventname% %node%`":

```
/com/oracle/sysman/em/eventlogger/templates/foaname/eventname=foo
/com/oracle/sysman/em/eventlogger/templates/foaname/message=Event %eventname% occurred on
node %node%
/com/oracle/sysman/em/eventlogger/templates/foaname/logfile=myevents.log
```

```
/com/oracle/sysman/em/eventlogger/templates/prod/node=prod-pc
/com/oracle/sysman/em/eventlogger/templates/prod/message=Event %eventname% occurred on
node %node%
/com/oracle/sysman/em/eventlogger/templates/prod/logfile=myevents.log
```

```
/com/oracle/sysman/em/commandexecutor/templates/anythingelse/eventname=!foo
/com/oracle/sysman/em/commandexecutor/templates/anythingelse/command=mail skini@oracle.com
-s %eventname% %node%
```

Complex Example 2: If the event severity is `Alert`, execute the commands "pager `%eventname% dbapager`" and "mail `dba@acme.com -s %eventname% Highest Priority!!!`" If the severity is anything else, only execute the command "mail `dba@acme.com -s %eventname% Normal Priority`"

```
/com/oracle/sysman/em/commandexecutor/templates/alertsev1/severity=alert
/com/oracle/sysman/em/commandexecutor/templates/alertsev1/command=pager %eventname%
dbapager
```

```
/com/oracle/sysman/em/commandexecutor/templates/alertsev2/severity=alert
/com/oracle/sysman/em/commandexecutor/templates/alertsev2/command=mail dba@acme.com -s
%eventname% Highest Priority!!!
```

```
/com/oracle/sysman/em/commandexecutor/templates/sevanythingelse/severity=!alert
/com/oracle/sysman/em/commandexecutor/templates/sevanythingelse/command=mail dba@acme.com
-s %eventname% Normal Priority
```

Complex Example3: If the eventname is neither 'spaceEvent' nor 'cpuEvent', then log a message of the format: "Event %eventname% triggered on node %node% and has severity %severity%" to a logfile called eventhandler.log in the directory %ORACLE_HOME%/sysman/log.

```
/com/oracle/sysman/em/eventlogger/templates/HRTemplate/eventname1=!spaceEvent
/com/oracle/sysman/em/eventlogger/templates/HRTemplate/eventname2=!cpuEvent
/com/oracle/sysman/em/eventlogger/templates/HRTemplate/message=Event %eventname% triggered
on node %node% and has severity %severity%
/com/oracle/sysman/em/eventlogger/templates/HRTemplate/logfile=%ORACLE_
HOME%/sysman/log/eventhandler.log
```

Known Issues

- The Event Handler may not start if there are any carriage return characters within any of the required entries. Some errors are caught by the import utility. If a problem with the file is encountered during import, an error message is displayed.

Differences between UNIX and Windows NT

For Event Handler entries that require a directory path, use the syntax that is appropriate to the operating system. For example

UNIX:

```
/com/oracle/sysman/em/eventlogger/logfile=/app/oracle/8.1.6/sysman/log/MyEvents.
log
```

Windows NT:

```
/com/oracle/sysman/em/eventlogger/logfile=c:\\orant\\sysman\\log\\MyEvents.log
```

Running the Event Handler in a multi-Management Server Environment

As part of the Management Server, the Event Handler has a high degree of reliability, failover, and load-balancing. However, certain rules apply when multiple Management Servers are connected to the same repository:

- By default, the Event Handler is *not* enabled in a newly configured Management Server and must be explicitly enabled for each Management Server you set up, by using the `oemctl enable eventhandler` command. Conversely, to disable the Event Handler on one or more Management Servers, you must explicitly disable each Management Server by executing the `oemctl disable eventhandler` command.

Note: The Management Server must be shut down when executing these commands.

- If more than one Management Server is Event Handler enabled, then each event notification is handled exactly once and can be handled by any of the enabled Management Servers. There is no way to specify which of the enabled Management Servers should pick up an event notification. This means that the commands executed by the command executor must be available in the same way to all enabled Management Servers. Likewise, if you are using the event logger, the log file must be seen by all enabled Management Servers in exactly the same way, i.e., the same pathname. On Unix systems, for example, this could be achieved by using NFS file systems.
- For situations where some Management Servers connected to a repository have the Event Handler disabled and others enabled, only Event Handler enabled Management Servers will pick up and execute Event Handler directives for event notifications (all Management Servers will continue to process event notifications in the usual way).

If one of the enabled Management Servers dies or is shut down, its Event Handler processing will failover automatically between the other enabled Management Servers. If all enabled Management Servers die (or are shut down) then Event Handler directives will not be processed by any of the remaining (Event Handler -disabled) Management Servers. In this situation, Event Handler operations will enter into the Management Server's reliability queue and will be processed as a batch once one or more of the Management Servers that were enabled for the Event Handler become operational.

Migrating from Prior Releases

If you used the Event Handler in Enterprise Manager 2.2 and wish to use the same configuration in Enterprise Manager 9i, then do the following:

1. Copy all Event Handler entries from the omsconfig.properties file to a separate file. Use this separate file to make the changes described in the next steps.
2. If you're using the Event Logger

In Enterprise Manager 2.2, each template for the event logger shared the same log file. In Enterprise Manager 9i, each template has its own log file. To specify the logfile name, convert the template entry

From:

```
/com/oracle/sysman/em/eventlogger/logfile = <logfilename>
```

To:

```
/com/oracle/sysman/em/eventlogger/templates/<template-name>/logfile=<logfile name>
```

Multiple templates can share the same logfile by specifying the same logfile name.

3. If you're using the Command Executor

No changes need to be done to the command executor templates.

Note: In Enterprise Manager 2.x, if multiple templates match the event condition, only one of the templates will be used. In Enterprise Manager 9i, if multiple templates match the event condition, ALL templates will be used by both the Event Logger and Command Executor.

4. Enable the Event Handler

The Management Server must first be stopped before doing this step. Stop the Management Server by:

```
% oemctl stop oms <superadmin/password>
```

Then enable the Event Handler:

```
% oemctl enable eventhandler
```

5. Export the current settings

Export the Event Handler's current default configuration to another file.

```
% oemctl export eventhandler <config_filename>
```

6. Update the configuration file

Update the configuration file created in step 5 by replacing the default templates with the template settings you created in steps 2 and 3.

7. Import the configuration settings

```
% oemctl import eventhandler <config_filename>
```

where <config_filename> is the file in step 6 that has the updated Event Handler configuration entries.

8. Restart the Management Server to start the Event Handler

```
% oemctl start oms
```

You can verify the Event Handler settings by:

```
% oemctl dump eventhandler
```

Enterprise Manager Reporting

Enterprise Manager Reporting provides administrators with an easy, yet powerful way to quickly view and analyze information about managed applications and systems.

This chapter covers the following topics:

- Key Concepts
- Configuring Enterprise Manager Reporting
- Enterprise Manager Reporting Website
- Creating a Report from an Existing Report Definition
- Editing a Report Definition
- Generating a Report from Enterprise Manager Applications
- Creating a User-defined Report Definition
- Navigating the Enterprise Manager Reporting Website

Enterprise Manager Reporting

The Enterprise Manager reporting system provides flexible reporting functionality to administrators, permitting quick and easy access to information about the status, configuration, and performance of all monitored systems in their enterprise. Administrators can create, schedule, and publish a wide variety of enterprise system reports. When published to a website, these reports can be accessed by a wider audience, enabling anyone from administrators to managers to executives to quickly access information regarding their monitored environment. The reporting functionality is fully integrated with the Enterprise Manager Job scheduling system, allowing reports to be generated automatically at specific times or at regular intervals. Reports can also be generated on-demand, such as when an administrator requests to view a specific report by clicking on a link within the reporting website.

Important: The reporting system is only available for Enterprise Manager Consoles connected to a Management Server. Consoles running standalone only have access to the minimal reporting functionality that is available through the standard database management tools.

See the *Enterprise Manager Configuration Guide* for information on reporting setup and configuration.

Key Concepts

Before using the reporting system to create reports, there are two fundamental concepts you must be familiar with: report definitions and report elements.

What is a Report Definition?

A key concept to understand is that all reports are generated from report definitions. An administrator creates a report definition that generates the desired report. A report definition defines what type of report is generated, its content and appearance, or whether it is published on the reporting website. It also includes various attributes such as an optional schedule. A report is uniquely identified by its definition name. Specifically, a report definition allows you to define the following attributes:

- Definition Name

- Owner
- Report type
- Report content
- When a report should be generated

Enterprise Manager supplies a wide array of predefined report definitions, allowing you to generate reports without having to create new report definitions. Select the Report Definition object in the Console Navigator to display a list of all report definitions in the detail view. See Figure 8–1, "Report Definitions in the Console Detail View".

If none of the predefined definitions meets your reporting requirements, you can modify definition parameters from an existing report definition and save it as a new report definition.

Figure 8–1 Report Definitions in the Console Detail View

| Report Title | Owner | Category | Sub Category | Definition Name |
|---|--------------|-----------|----------------|--------------------------|
| Instance | REPORTS_USER | General | Configuration | EM_DB_InstanceConfig |
| Instance | REPORTS_USER | General | Current Status | EM_DB_InstanceStatus |
| OLAP | REPORTS_USER | General | Configuration | EM_DB_OLAP |
| Replication | REPORTS_USER | General | Configuration | EM_DB_REPLICATION |
| Database Information Related to Repository | REPORTS_USER | General | Configuration | EM_DB_REPOSITORY |
| Schema | REPORTS_USER | General | Configuration | EM_DB_Schema |
| Security | REPORTS_USER | General | Configuration | EM_DB_Security |
| Storage | REPORTS_USER | General | Configuration | EM_DB_StorageConfig |
| Storage | REPORTS_USER | General | Current Status | EM_DB_StorageStatus |
| Administrator Overview | REPORTS_USER | Setup | Administrators | EM_IMPL_ADMINISTRATORS |
| Intelligent Agent Overview | REPORTS_USER | Setup | Agents | EM_IMPL_AGENTS |
| Active Collections | REPORTS_USER | Setup | Collections | EM_IMPL_DG_COLL |
| All Outstanding Alerts | REPORTS_USER | Job/Event | Events | EM_IMPL_EVT_ALERTS |
| Outstanding Alerts in History | REPORTS_USER | Job/Event | Events | EM_IMPL_EVT_HISTORY |
| All Events in Library | REPORTS_USER | Job/Event | Events | EM_IMPL_EVT_LIBRARY |
| Event Notifications Sorted by Administrator | REPORTS_USER | Job/Event | Events | EM_IMPL_EVT_NOTIFY_ADMIN |
| Event Notifications Sorted by Name | REPORTS_USER | Job/Event | Events | EM_IMPL_EVT_NOTIFY_NAME |
| Registered Events Sorted by Name | REPORTS_USER | Job/Event | Events | EM_IMPL_EVT_REG_NAME |
| Registered Events Sorted by Target | REPORTS_USER | Job/Event | Events | EM_IMPL_EVT_REG_TARGET |
| Active Jobs | REPORTS_USER | Job/Event | Jobs | EM_IMPL_JOB_ACTIVE |
| Average Execution Time per Job | REPORTS_USER | Job/Event | Jobs | EM_IMPL_JOB_AVERAGE |
| Overview of Completed Jobs Run Yesterday | REPORTS_USER | Job/Event | Jobs | EM_IMPL_JOB_COMPL1 |
| Overview of Completed Jobs Run Yesterday | REPORTS_USER | Job/Event | Jobs | EM_IMPL_JOB_COMPL7 |
| Overview of Failed Jobs Run Yesterday | REPORTS_USER | Job/Event | Jobs | EM_IMPL_JOB_FAIL1 |
| Overview of Failed Jobs Run Last Week | REPORTS_USER | Job/Event | Jobs | EM_IMPL_JOB_FAIL7 |
| All Jobs in Library | REPORTS_USER | Job/Event | Jobs | EM_IMPL_JOB_LIBRARY |

If your reporting needs go beyond the scope of the predefined report definitions, you can create completely new report definitions. The next section covers the different ways you can create a report.

As shown in Figure 8-1, "Report Definitions in the Console Detail View", existing report definitions are displayed in a multi-column list that provides information and current status for all report definitions. The columns shown are:

- *Status Icon*: Indicates whether a report definition is published (globe icon with a plus "+" subscript), not published (globe icon with a red "x" subscript), or scheduled (globe icon with a clock subscript).
- *Report Title*: Report title that appears on the generated report and on the reporting website.
- *Owner*: Owner of the report definition.
- *Category*: Relates to the generated report location on the reporting website. Major report categories appear as tabs along the top the reporting website. See "Navigating the Enterprise Manager Reporting Website" on page 8-27 for more information on reporting website organization.
- *Subcategory*: Relates to the generated report location on the reporting website. Each major category (tab page) has a series of subcategories listed along the left side of the category page.
- *Definition Name*: A unique report definition name that only appears in the in the Console list of report definitions and not in generated reports.

What is a Report Element?

Report elements are the building blocks of any report definition, and by extension, the generated report itself. By selecting and ordering report elements, you construct the format and content of your report. Enterprise Manager provides three general categories of report elements:

- *HTML*: Customize the HTML for a generated report and call SQL and Javascript functions for additional row-level processing.
- *Queries*: Specify SQL queries to generate charts or tables.
- *Service Levels*: Specify time-based statistics for monitored services.

The categories actually displayed depend on the chosen report type. See "Report Elements Page" on page 8-15 for an explanation of specific report elements for each of these categories.

Ways to Select Targets for Report Generation

Once your Enterprise Manager reporting environment has been configured, you can generate reports immediately by using the predefined report definitions. Regardless of whether you use a predefined report definition or a custom definition, there are two distinctions that must be made regarding report generation:

- Creating individual reports for all targets of a selected type
VS.
- Creating a single report for preselected targets

Creating Individual Reports for All Targets of a Selected Type

Reports generated using this method do not require that you choose specific targets before publishing or saving the report. In this situation, the administrator who views the report chooses the target(s). For example, a super administrator wants to publish a report listing the number of active jobs submitted against a target. They would like this report to be used by other administrators as a helpful utility to allow them to determine the job loads for targets they are managing. Since there are over 560 targets in their managed environment, it is not practical to generate a report for all 560 targets. Instead, the super administrator specifies in the report definition that an individual report be created for all targets of a selected type and then publishes the report to the Enterprise Manager reporting website. A regular administrator goes to the reporting website to find out how many jobs are active for the five targets they are managing. They click on the hyperlink to generate a report. They are then prompted by the system to specify the exact targets they wish to run the report against. They choose the targets and the report is generated for those targets only.

Creating a Single Report for Preselected Targets

Specific targets must be selected from the report definition before generating the report. Hence, the administrator who clicks on that report's hyperlink in the reporting website will see a report for all targets chosen by the owner of the report definition.

Configuring Enterprise Manager Reporting

You set up your reporting environment using the web server supplied with your Oracle installation. Upon installing Enterprise Manager components, all internal configuration of the Enterprise Manager Reporting web site is taken care of automatically.

Configuration requires a two-way exchange of information between the Reporting web server and the Oracle Management Server.

- The web server knows which Management Server it needs to connect to and the password of the REPORTS_USER administrator.
- The Oracle Management Server knows which web server is configured to run against an Enterprise Manager repository

For more information on Reporting setup and configuration, see the *Oracle Enterprise Manager Configuration Guide*.

Enterprise Manager Reporting Website

The primary advantage of the reporting system lies in its ability to publish reports to a website for other administrators and other users to access information on their environment. The reporting website (along with an Apache web server) is installed from the Server CD with Enterprise Manager.

As with any website, there is a home page. See "Enterprise Manager Reporting Website" on page 8-6. The Enterprise Manager reporting website home page provides both a summary of all managed target types and their status. Clicking on any target link displays all reports related to that target. From this page, an administrator, or anyone with intranet access can navigate to any published report for your managed environment.

Figure 8–2 Reporting Website Home Page

Enterprise Manager Reporting Home Page April 18, 2001 10:08:32 PM EDT

From this page you can access any Enterprise Manager report that has been published. Reports are accessed from the System State at a Glance table below and from [Additional Reports](#).

System State at a Glance

| All Targets | Critical | Warning | Clear | Unknown | Error | Unmonitored |
|---------------------------------------|-------------------|-------------------|-------------------|--------------------|-------|--------------------|
| 1 Concurrent Managers | 0 | 0 | 0 | 0 | 0 | 1 |
| 42 Databases | 3 | 0 | 0 | 7 | 0 | 32 |
| 12 HTTP Servers | 0 | 0 | 0 | 1 | 0 | 11 |
| 32 Listeners | 0 | 0 | 0 | 4 | 0 | 28 |
| 16 Nodes | 0 | 3 | 1 | 2 | 0 | 10 |
| 1 Groups | 0 | 0 | 0 | 0 | 0 | 1 |
| All Targets | 3 | 3 | 1 | 14 | 0 | 83 |

TIP To view a report for a specific target, click the appropriate target type in the first column above. Reports that include multiple targets are accessible from any of the included targets. Reports that are not target-specific are accessed from [Additional Reports](#).

When creating a report definition, two pieces of information that you must specify are the Category and Subcategory. These parameters refer to the published report's location on the reporting website. See Figure 8–3, "Reporting Website Categories and Subcategories" to see how these parameters graphically correspond to website navigation. This figure shows the Additional Reports page.

Figure 8–3 Reporting Website Categories and Subcategories

ORACLE
Enterprise Manager

Reporting Home

Category — **General** Job/Event Setup

Configuration
Current Status
Subcategory

Reports for Category : General

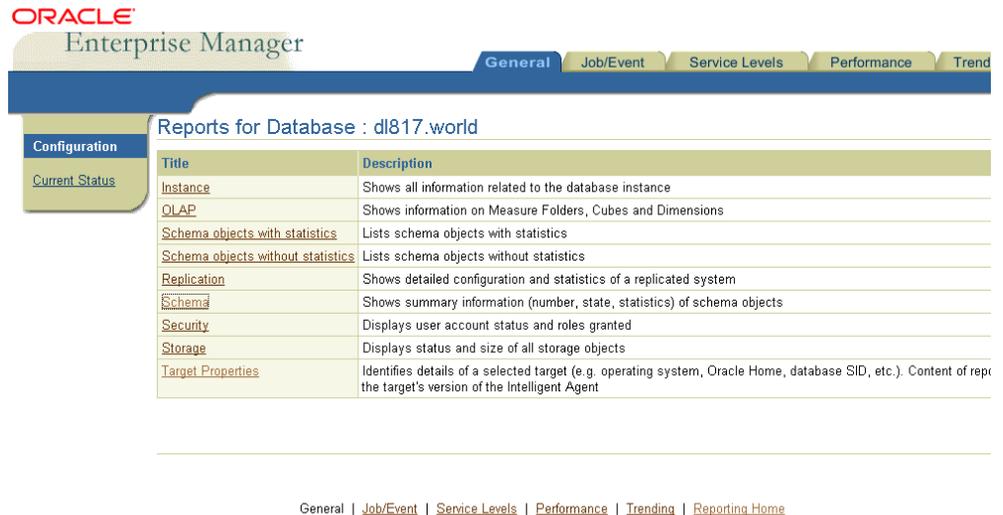
| Title | Description |
|---|---|
| Instance | Shows all information related to the database instance |
| OLAP | Shows information on Measure Folders, Cubes and Dimensions |
| Replication | Shows detailed configuration and statistics of a replicated system |
| Schema | Shows summary information (number, state, statistics) of schema objects |
| Schema objects with statistics | Lists schema objects with statistics |
| Schema objects without statistics | Lists schema objects without statistics |
| Security | Displays user account status and roles granted |
| Storage | Displays status and size of all storage objects |

General | [Job/Event](#) | [Setup](#) | [Reporting Home](#)

If you are accessing reports from the Console, typically you will see specific reporting web pages related to managed objects selected within the Navigator. The ability to display reports in context from the Console is particularly useful when managing large numbers of targets. For example, if you right-click on a database and choose View Published Reports from the context-sensitive menu, a list of reports pertaining to that database are displayed in your browser. Figure 8–4, "In-context Reports" shows the results of choosing the View Published Reports menu item for a database (dl817).

For a complete site map of the reporting website, see "Navigating the Enterprise Manager Reporting Website" on page 8-27.

Figure 8–4 In-context Reports



Creating a Report from an Existing Report Definition

The following report creation scenario assumes you are the owner of the report definition. In cases where you are not the owner (i.e. you are using one of the predefined reports supplied with Enterprise Manager), you must either click Save As to save the report definition under another definition name, or alternatively right-click on the report definition in the detail view and choose Create Like from the context-sensitive menu.

To create a report using an existing report definition:

1. Select Report Definitions from the Console Navigator. A full list of existing report definitions displays in the detail view.
2. Double-click on the desired report definition. The Edit Report property sheet displays
3. On the Parameters page, click on each of the report elements in the Selected Elements list and enter the requisite parameters, if necessary.

Note: If necessary, you can add or remove report elements on the Elements page.

4. On the Publish page, choose whether you want to generate the report only when viewed from the reporting website or only at a scheduled time.
5. Click View Report to preview the generated report. If necessary, you can further modify the report definition and perform this step again. When you view a report, the your own preferred credentials are used. When publishing a report, the preferred credentials of the report definition owner.
6. After you are satisfied with the results, click OK.

Editing a Report Definition

You edit a report definition by double-clicking on a definition entry in the detail view to display the Edit Report property sheet for that report definition. Alternatively, you can right-click on the definition in the detail view and choose Edit from the context-sensitive menu. Simply change the parameters in the property sheet pages as required. However, you must be the owner of the report definition or have Super Administrator privileges in order to modify it. If you are not the report definition owner (REPORTS_USER for predefined definitions supplied with Enterprise Manager), clicking OK to save the report definition will result in your being prompted to save the report definition under another name via the Save As dialog.

Generating a Report from Enterprise Manager Applications

The Enterprise Manager reporting system is integrated with many applications that are part of the Enterprise Manager framework. As such, certain applications can access the reporting system directly to publish data automatically to the web for use by others. No additional reporting system configuration is required. For example, Performance Manager (part of the Diagnostics Pack), utilizes the reporting system to publish charts and saved analyses to the Performance and Trending pages of the reporting website.

Note: Performance and Trending pages only appear on the reporting website if you have the Enterprise Manager Diagnostics Pack installed. You must first select an individual target. These pages do not appear under “Additional Reports.”

Features that are integrated into the Console Navigator, such as database management functionality, access the reporting system via the predefined report definitions supplied with Enterprise Manager. For example, right-click on a database in the Console Navigator to access the context-sensitive menu and choose View Published Reports (this menu option also appears in the Console Object menu). The reporting website page appears with a list of published reports that can be run against the selected database. Selecting a specific Navigator object, such as Schema, and choosing View Published Reports from the Console's Object menu, displays the Target report, which allows you to view information such as:

- Schema Objects Summary (non SYS and SYSTEM)
- Invalid Objects
- Procedural Object Errors
- Objects (non SYS and SYSTEM) with statistics
- Objects (non SYS and SYSTEM) without statistics
- Tables with disabled primary keys
- User objects in SYSTEM tablespace

The ability to create reports in-context provides a powerful way to monitor the status of managed targets from the Console.

Creating a User-defined Report Definition

In general, the standard predefined report definitions, or their user-customized variants, should provide sufficient reporting capability. However, there may be cases where you may want to create your own report definitions to meet specific monitoring needs. The reporting system provides you with a high degree of flexibility in extracting data and generating a properly formatted report.

Once you have created a custom report definition, it is added to the list of predefined report definitions, at which point you can view a report just as you would with any predefined report definition.

To create a new report definition:

1. Right-click on the Report Definitions object in the Console Navigator to display the context-sensitive menu.
2. Choose Create Report. The Create Report property sheet displays.

3. Enter the requisite information on the various property pages. For a detailed discussion on how to fill out the property sheet, see "The Report Property Sheet" on page 8-12.
4. Click OK to save the report definition.

The Report Property Sheet

The Report property sheet is the primary user interface to the Enterprise Manager reporting system. It is through this property sheet that you define and control the operation of the reporting system in addition to determining the security of the system. Changes made to the report definitions are automatically reflected on the reporting website if the *Publish to Enterprise Manager reporting website* option is checked on the Report General page.

Report General Page

The Report General page allows you to define the primary report identification and report type parameters. See Figure 8-5, "Report General Page".

Figure 8–5 Report General Page

Table 8–1 Report General Page Parameters

| Parameter | Description/Usage |
|-----------------|---|
| Definition Name | Name of the report definition. This name must be unique. This name is used internally (appears only in the Console and not a generated report). |
| Owner | Name of the report definition creator. This is the fully qualified username of the administrator logged into the Enterprise Manager Console. |
| Report Title | Title appearing in the header of the generated report and on the reporting website. The title also appears in the report definition multi-column list when Report definitions is selected in the Console Navigator. |

Table 8–1 Report General Page Parameters

| Parameter | Description/Usage |
|--|--|
| Report Description | Brief description for the report definition. The description appears on the reporting website. |
| Category | Specifies the report category in which the report will appear on the reporting website. The primary categories (e.g., General, Custom, Job/Event, Service Levels, Setup) appear as main tab pages on the reporting website. See Figure 8–3, "Reporting Website Categories and Subcategories". |
| Subcategory | Specifies the subcategory in which the report will appear on the report website. You may select one of the pre-defined subcategories or type in your own. See Figure 8–3, "Reporting Website Categories and Subcategories". |
| Publish to Enterprise Manager Reporting website | Selected by default (when the webserver is configured), specifies that the report generated from the report definition be published to the Enterprise Manager reporting website. This option must be selected in order to select options on the Report Publish page. Publishing the report allows you to view the report on the reporting website. |
| Report Type | Specifies the target types to be used for the report. |
| Create individual reports for all targets of selected type | Allows you to create a report definition that, when it is viewed, interactively prompts an administrator for the information sources. Alternatively, from the Reporting Website, the administrator can select a target and then access the report. |
| Create a single report for the targets selected below | Allows you to create a report definition using information sources chosen from the Available Targets list. |
| Available Targets | List of all available targets from which a report can be generated. Entries in this list vary according to the report type selected |
| Selected Targets | List of information targets from which the report is to be generated. To add entries to this list, select an entry in Available Targets list and click Add. You can remove entries from the Selected Targets list by selecting the desired entry and clicking remove |

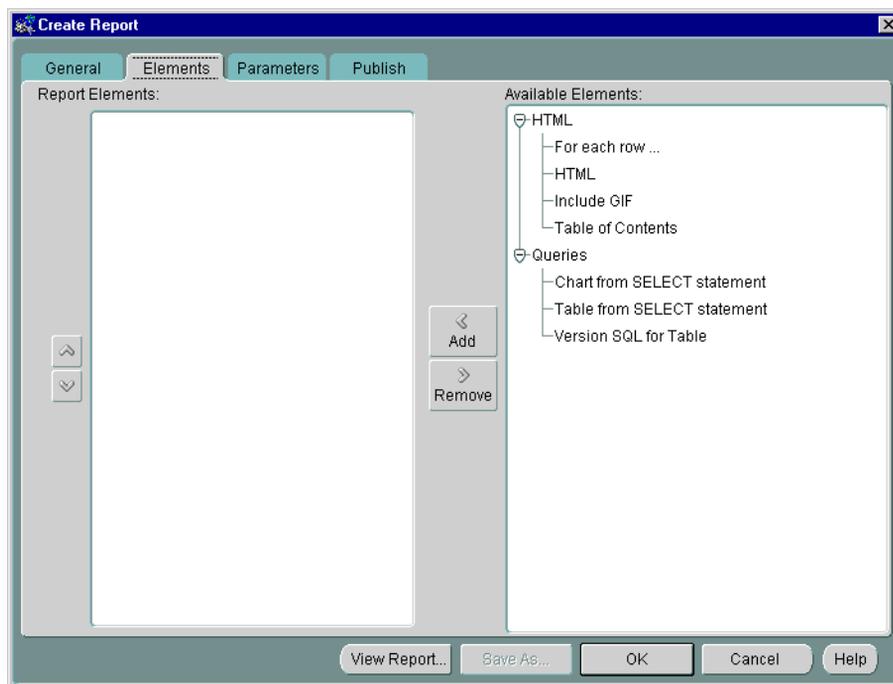
Table 8–1 Report General Page Parameters

| Parameter | Description/Usage |
|------------------|--|
| View Report | Executes the report definition and displays the generated report in a web browser. |
| Save As | Saves the current report definition under a different report definition name. This button is disabled when creating a new report definition. |
| OK | Saves the current report definition to the repository. |
| Cancel | Close the Report Definition property sheet without implementing any changes. |

Report Elements Page

The Elements page allows you to select one or more report elements to be included in the report definition. Report elements correspond to specific types of content to be included in a report. Essentially, you create a report by assembling and ordering elements. Figure 8–6, "Report Elements Page" shows the elements page and Table 8–2, "Report Elements Page Parameters" describes the user interfaces. See Table 8–3, "Report Element Descriptions" for a detailed description of all report definition elements and associated parameters.

Figure 8–6 Report Elements Page



For the predefined report definitions supplied with Enterprise Manager, these elements have already been selected. You need only specify the element parameters.

Table 8–2 Report Elements Page Parameters

| Parameter | Description/Usage |
|--------------------|---|
| Available Elements | <p>Tree list displaying a hierarchy of available report elements. Report elements in this tree list vary according to the Report Type chosen on the General Page. Major report element categories are:</p> <ul style="list-style-type: none"> ■ <i>HTML</i>: Customize the HTML for a generated report and call SQL and Javascript functions for additional row-level processing. ■ <i>Queries</i>: Specify SQL queries to generate charts or tables. ■ <i>Service Levels</i>: Specify time-based statistics for monitored services. |

Table 8–2 Report Elements Page Parameters

| Parameter | Description/Usage |
|--------------------|---|
| Report Elements | Elements selected to be included in the generated report. |
| Add/Remove Buttons | Adds selected report elements from the Available Elements tree list to the Report Elements list or Removes report elements from the Report Elements list. Note: You can also add/remove elements by double-clicking on the specific element. |
| Up/Down Arrows | Positions a selected element within the Report Elements list. The up/down arrows allow you to determine the order in which the information corresponding to a specific element should appear in the generated report |

Table 8–3 Report Element Descriptions

| Category | Report Element | Description/Usage |
|----------|-----------------|--|
| HTML | For each row... | <p>The For each row report element provides you with the highest level of flexibility for your reporting needs; It allows you to generate custom report output without having to develop a new report element. By associating a Javascript procedure with each row of information returned by a SQL SELECT statement, you can perform a multitude of actions to create custom formatting or additional data processing.</p> <p>Parameters:</p> <p>Javascript function to call: Name of the Javascript used to process each row of data returned by the SQL SELECT statement. Javascript functions can be added to a report definition using the HTML report element.</p> <p>Select Statement: SQL SELECT statement needed to return data to be used as input parameters by the Javascript function.</p> |
| | HTML | <p>The HTML report element allows you to insert any sequence of alphanumeric characters directly into a generated report. This is a flexible report element in that you can use it to perform a variety of functions. For example, you can:</p> <ul style="list-style-type: none"> ■ Insert boilerplate HTML into your report ■ Insert HTML to override default formatting ■ Insert Javascript procedures for use by the For each row report element <p>Parameters:</p> <p>Specify HTML: HTML or Javascript coding to be inserted into the report.</p> |

Table 8–3 Report Element Descriptions

| Category | Report Element | Description/Usage |
|----------|-------------------|--|
| | Include GIF | <p>The Include GIF report element allows you to insert a GIF image into a generated report.</p> <p>Parameters:</p> <p><i>Specify Name of GIF file:</i> Name of GIF file. The specified GIF file will be copied from its original location to the appropriate report subdirectory.</p> <p><i>Browse:</i> Displays the Choose File dialog box.</p> <p><i>File Tag:</i> File is copied from the location of origin to the subdirectory of the generated report's index.html file. Specifying a File Tag renames the gif file when it is copied into its respective report directory. Flat directory references from within generated report. Not being used as a true alias. When referencing the "tag" from the HTML report element, you must specify the complete filename with extension.</p> <p>You can also embed an image within a report using the HTML tag ()</p> |
| | Table of Contents | <p>The Table of Contents report element allows you to insert a hyperlinked table of content at any point within a generated report. This report element uses headers defined in the report to generate an HTML hyperlinked list, each entry taking you directly to the report section associated with its respective header.</p> <p>Parameters:</p> <p>None</p> |

Table 8–3 Report Element Descriptions

| Category | Report Element | Description/Usage |
|----------------|-----------------------------|--|
| Queries | Chart from SELECT statement | <p>This report element allows you to create one or more bar, line, and pie charts for a generated report using information obtained from a SQL SELECT statement. The data returned by the SELECT statement must conform to the input parameter requirements for each chart type.</p> <p>Parameters</p> <p><i>SQL:</i> SQL SELECT statement used to return data required to generate the desired chart type. See below for input data requirements.</p> <p><i>Chart Type:</i></p> <p>Bar: This selection generates a typical bar chart and requires the data source to consist of one key column (used for labeling) and one or more numeric data columns. The key column must be the first column in the table.</p> <p>Line: This selection generates a line chart that plots the tabular data against the X-Y axis. As with the bar chart, the data source must consist of a single key column and one or more numeric data columns.</p> <p>Pie: This selection generates a pie chart from a single row of data. If more than one row is returned by the SELECT statement, a new pie chart is generated for each row.</p> <p>Note: For all charts, only the key column can be non-numeric. Non-numeric data appearing anywhere except the first column generates a diagnostic message.</p> <p><i>Orientation:</i> (Applicable to Bar charts only)</p> <p>Horizontal (Default Setting): Produces bar charts with bars originating from the Y-axis.</p> <p>Vertical: Produces bar charts with bars originating from the X-axis.</p> <p>Advanced: Displays the Advanced Options dialog which allows you to change chart dimensions and levels of label cascading (number of label levels along an axis).</p> |

Table 8–3 Report Element Descriptions

| Category | Report Element | Description/Usage |
|----------|-----------------------------|---|
| | Table from SELECT statement | <p>This report element allows you to create one or more tables in a generated report using information obtained from a SQL SELECT statement.</p> <p>Parameters</p> <p><i>SQL:</i> SQL SELECT statement used to return one or more rows of tabular data.</p> <p><i>Orientation:</i></p> <p>Horizontal (Default Setting): Produces a typical row/column format for all tabular data. There is a maximum limit of 100 rows.</p> <p>Vertical: Produces a layout in which a single row table is generated for each column of data found in the information source. The column label appears on the first (leftmost) column with a single row of data in the second column. For each row returned by the SELECT statement, a new table is generated. The order in which the table columns are displayed is determined by the SELECT statement.</p> |

Table 8–3 Report Element Descriptions

| Category | Report Element | Description/Usage |
|-----------------------|---|--|
| | Version SQL for Table | <p>Versions of SQL used by older versions of the Oracle Server may not support certain SELECT statement options used to extract information for inclusion into a report. Parameters on this property page allow you to manually define specific SELECT statements to be used with different versions of the database. Defining alternate database version compatible SELECT statements allows you to choose information targets that may contain multiple versions of the database.</p> <p>Parameters:</p> <p><i>Database Version (>=):</i> Lists available SQL (database) versions. A version number selected from this list corresponds to the user-defined SQL statement that is compatible with database versions that are greater than or equal to the specified database version number.</p> <p><i>Add:</i> Displays the Database Version dialog box and allows you to add a new database version number.</p> <p><i>Remove:</i> Deletes the database version number that is selected in the Database Version (>=) list.</p> <p><i>SQL:</i> SQL statement used for the query.</p> <p><i>Database Option Name:</i> Specific options (Replication, OLAP, Generic) used for the query. If Generic is selected, an option check will not be performed for this report element. More options may appear depending on the options installed with the database.</p> |
| Service Levels | Availability by service | Shows availability information for selected services. |
| | Low Level Capture of Availability State Changes | Shows sequential service level availability state changes for selected services. This includes messages from the agent regarding outages and restored availability. |
| | Overall Availability | Displays combined availability of the services as well as the availability of each individual service. |
| | | <p>Note: All Service Level reports require Up/Down events to be registered on monitored targets.</p> |

Table 8–3 Report Element Descriptions

| Category | Report Element | Description/Usage |
|----------|-----------------------------|---|
| | Downtime Details | Shows downtime details for selected services including percentage downtime, number of times down, total downtime in minutes, and comments/annotations pertaining to downtime |
| | Simple Availability Element | Shows the percentages of uptime, downtime and unknown time as well as the number of downtimes and total downtime for selected services. |
| | | <p>Note: All Service Level elements use the same time period parameters.</p> <p>From the Parameters page, you can set the time period for this report definition element. The default period is the current month.</p> <p>It is not necessary to set the time period for each report element (if you have multiple elements). The time period settings chosen for the first report element in a report will automatically apply to all elements in the report.</p> <p>The options are:</p> <ul style="list-style-type: none"> ■ <i>Current</i> - This option is for the current period, either Day, Week, Month, or Year. ■ <i>Previous</i> - This option is for the previous period, either Day, Week, Month, or Year.* ■ <i>Time Span</i> - This option lets you define the length of time for this report: Week, Month, or Year. You can then define the date at which the report is to start by editing the information in the Start Date field. ■ <i>Date Range</i> - This options lets you define a range of dates this report should encompass. In the Start Date field, enter the date that reflects the data you want to study. In the End Date field, enter the date that reflects the data you want to study. <p>Note: All times are in the time zone of the Intelligent Agent.</p> <p>If the current month is November and you select Previous Month as a reporting period, your report will contain data for the month of October. If the current year is 2000 and you select Previous Year as a reporting period, your report will contain data for the year 1999.</p> <p>Note: The reporting system does not distinguish between service downtime resulting from a scheduled target blackout and legitimate User service downtime. See the Intelligent Agent User's Guide for more information on target level blackouts.</p> |

Report Parameters Page

The Parameters page allows you to define the information presented by a specific report element. Figure 8–7, "Report Parameters Page" shows the parameters for the *For each row* element, which allows you to define specialized data processing functions for each row of information returned by a SQL SELECT statement.

Figure 8–7 Report Parameters Page

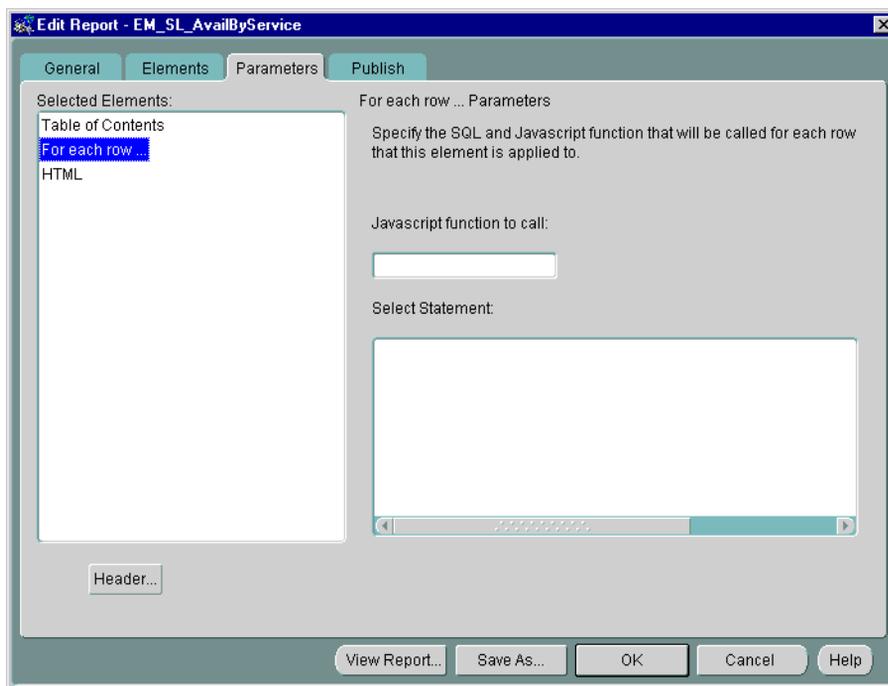


Table 8–4 Report Parameters Page Parameters

| Parameter | Description/Usage |
|--------------------|--|
| Selected Elements | Lists all report elements chosen on the Elements page. |
| Element Parameters | Displays all modifiable parameters (if any) for the selected report element. See Table 8–3, "Report Element Descriptions" for specific element parameters. |

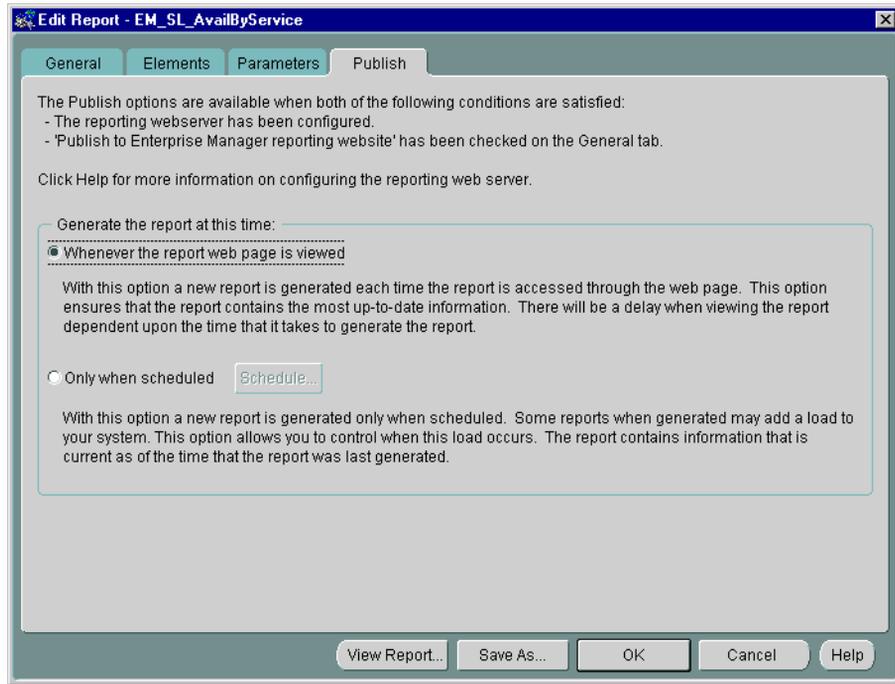
Table 8–4 Report Parameters Page Parameters

| Parameter | Description/Usage |
|-----------|--|
| Header | Allows you to edit the default header associated with the selected report element. This option allows you to modify the text of the header, its hierarchical level (1 being the highest), or whether a header should be displayed at all in the generated report. Headers are used by the Table of Contents report element to generate an HTML hyperlinked list. |

Report Publish Page

The Publish page allows you to publish generated reports to the Enterprise Manager Reporting website. Options on this page are only available when *Publish to Enterprise Manager reporting website* is selected on the General page. See Figure 8–8, "Report Publish Page".

Figure 8–8 Report Publish Page



This page allows you to select when the report should be generated: on-demand or according to a set schedule. Two options are available:

Whenever the report web page is viewed: New reports are generated whenever the report link on the reporting website is accessed from a web browser. Hence, the report is always current in that it presents real-time information.

Only when scheduled: Reports are generated based on a set schedule. Hence, report content does not present real-time information. To specify the schedule click the Schedule button to launch the Create Jobs property sheet. You can schedule report generation just as you would a normal Enterprise Manager job, however, the job task used to schedule a report cannot be accessed outside the reporting system.

Note: You must choose a target running a 9i version of the Intelligent Agent in order to schedule jobs. See "Job Schedule Page" on page 5-18 for more information about scheduling jobs.

Navigating the Enterprise Manager Reporting Website

The following tables provide a complete listings of all predefined reports available on the Enterprise Manager reporting website and in the Console Report Definition detail view. Availability of reports may vary depending on the options installed in your enterprise environment.

You can view the reporting website using one of the following methods:

From a browser:

1. Start a browser.
2. Enter the following URL: `http://<ReportingWebserverName>;port#/em/OEMNavigationServlet`. The default port number used is 3339.

From the Enterprise Manager Console:

1. Start the Enterprise Manager Console.
2. Choose View Published reports from the Console's Object menu.

Both methods assume that you have already configured your reporting environment.

Table 8–5 Database Reports

| Category | Subcategory | Report Title | Description |
|----------|---------------|-----------------------------------|--|
| General | Configuration | Instance | Shows all information related to the database instance. |
| | | OLAP | Shows information on Measure Folders, Cubes and Dimensions |
| | | Schema objects with statistics | Lists schema objects with statistics |
| | | Schema objects without statistics | Lists schema objects without statistics |
| | | Replication | Shows detailed configuration and statistics of a replicated system |
| | | Schema | Shows summary information (number, and state) of schema objects |
| | | Security | Displays user account status and roles granted |
| | | Storage | Displays status and size of all storage objects |

Table 8–5 Database Reports

| Category | Subcategory | Report Title | Description |
|------------------|-----------------------|------------------------------------|--|
| | | Target Properties | Identifies details of a selected target (e.g. operating system, Oracle Home, database SID, etc.) Content of the report depends on the target's version of the Intelligent Agent. |
| | Current Status | Database Object Space Usage | Shows space usage reports for: <ul style="list-style-type: none"> ■ Objects unable to extend ■ List of Objects which are nearing Max Extents ■ Overextended segments (non SYS and SYSTEM) |
| | | Database Top 10 | For a selected database, shows the top 10: <ul style="list-style-type: none"> ■ SQL statements that have been executed. ■ Accessed tables. ■ Procedures that have been executed. |
| | | Disk Space Used by Tables | Displays the disk space used by tables (for SYS and non-SYS). |
| | | Instance | Displays instance statistics and process state |
| | | Storage | Shows extent, segment and I/O information |
| Job/Event | Events | Outstanding Alerts | Shows information on outstanding alerts (with status of critical, warning, unknown, or error). |
| | | Alert History | Shows information on alerts for a target that has moved to the event history. |
| | | Registered Events | Lists all registered events for a target. |
| | Jobs | Active Jobs | Displays details for jobs scheduled on a target. |
| | | Failed Jobs from the last 24 hours | Lists jobs for a target that failed in the last 24 hours. |

Table 8–5 Database Reports

| Category | Subcategory | Report Title | Description |
|-----------------------|--------------------|---------------------------------------|---|
| | | Failed Jobs from the Last 7 Days | Lists jobs for a target that failed in the last 7 days. |
| | | Completed Jobs from the Last 24 Hours | Lists jobs for a target that completed in the last 24 hours. |
| | | Completed Jobs from the Last 7 Days | Lists jobs for a target that completed in the last 7 days. |
| | | Average Execution Time per Job | Shows information on execution times for jobs completed against a target. |
| Service Levels | Summary | Overall Availability | Displays combined availability of the services as well as the availability of each individual service. |
| | | Availability by Service | Shows availability information for selected services. |
| | Details | Downtime Details | Shows downtime details for selected services including percentage downtime, number of times down, total downtime in minutes, and comments/annotations pertaining to downtime. |
| | | Service Level Availability Timeline | Displays sequential service availability state changes. |
| | Diagnostics | Availability Diagnostics | Shows captured low-level service availability data. |

Table 8–6 Additional Reports

| Category | Subcategory | Report Title | Description |
|---------------------------------------|---|--|---|
| Job/Event | Events | Outstanding Alerts Sorted by Target | Displays details, sorted by target name, on all outstanding alerts with status of critical, warning, unknown, or error. Note: If there are no alerts, the Report Title “No Outstanding Alerts” is displayed. |
| | | Outstanding Alerts Sorted by Event | Displays details, sorted by event name, on all outstanding alerts with status of critical, warning, unknown, or error. |
| | | Alert History Sorted by Target | Shows information, sorted by target name, on alerts that have been moved to the event history. |
| | | Outstanding Alerts in History Sorted by Event | Shows information, sorted by event name, on alerts that have been moved to the event history. |
| | | Registered Events Sorted by Target | Provides information, sorted by target for all registered events |
| | | Registered Events Sorted by Event | Provides information, sorted by event name, for all registered events. |
| | | Events in Library | Displays details on all events saved to the event library. |
| | | Notifications for Events Sorted by Administrator | Lists all paging and email notifications, sorted by administrator name, that were sent due to event status changes. |
| | | Notifications Sorted by Event | Lists all paging and email notifications, sorted by event name, that were sent due to event status. |
| | | Jobs | |
| Active Jobs Sorted by Job | Provides information, sorted by job name, for all jobs scheduled. | | |
| Failed Jobs from the Last 24 Hours | Lists all jobs that failed in the last 24 hours. | | |
| Failed Jobs from the Last 7 Days | Lists all jobs that failed in the last 7 days | | |
| Completed Jobs from the Last 24 Hours | Lists all jobs that completed in the last 24 hours. | | |

Table 8–6 Additional Reports

| Category | Subcategory | Report Title | Description |
|-----------------|-----------------------|--|---|
| | | Completed Jobs from the Last 7 Days | Lists all jobs that completed in the last 7 days. |
| | | Jobs in Library | Displays details on all jobs saved to the job library. |
| | | Notifications for Jobs Sorted by Administrator | Lists paging and email notifications, sorted by administrator name, that were sent due to job status changes. |
| | | Notifications Sorted by Job | Lists paging and email notifications, sorted by job name, that were sent due to job status changes. |
| | | Active Jobs | Shows information on execution times for all completed jobs. |
| Setup | Administrators | Administrator Overview | Provides information on all Enterprise Manager administrator accounts. |
| | Agents | Intelligent Agent Overview | Displays status and other details on discovered Intelligent Agents. |
| | Collections | Active Collections | Shows all active, operational collections defined in Oracle Capacity Planner. |
| | Targets | All Targets | Lists all targets that have been manually or automatically discovered. |

Enterprise Security Management

This chapter describes the component of Oracle Enterprise Manager used to administer Enterprise User Security for the Advanced Security Option. The chapter explains use of Enterprise Manager within a simple scenario in which an Oracle Internet Directory Server is used as the central repository for users in a large organization. It contains the following sections

- Overview of Enterprise Security Manager
- Introduction to Directory Servers
- Entailing and Configuring Your Enterprise Security Environment
- Administering Users
- Administering Oracle Contexts

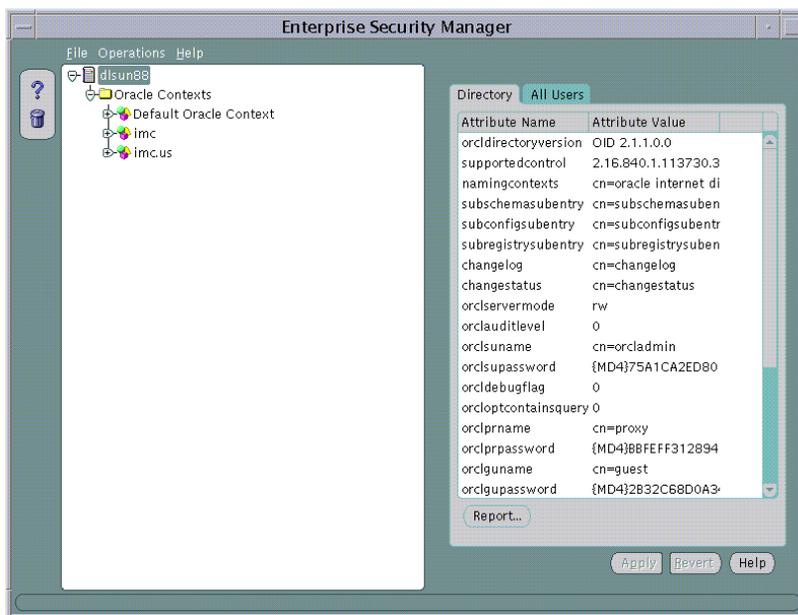
Overview of Enterprise Security Manager

Oracle Enterprise Security Manager provides an easy-to-use graphical interface to administer enterprise user security and access control for large numbers of databases in your enterprise environment through a LDAP-compliant directory server such as Oracle Internet Directory. You use Oracle Enterprise Security Manager to perform the following tasks:

- Manage Database Security Under Oracle Contexts in a Directory
- Manage Users in a Directory

Upon logging in, Enterprise Security Manager appears as shown in Figure 9–1, "Enterprise Security Manager", given that the Directory contains at least the Oracle 9i Default Oracle Context.

Figure 9–1 Enterprise Security Manager



Enterprise Security Manager manages one Directory Server, identified at the top of the main application tree. It has a series of menu operations that apply to this Directory Server.

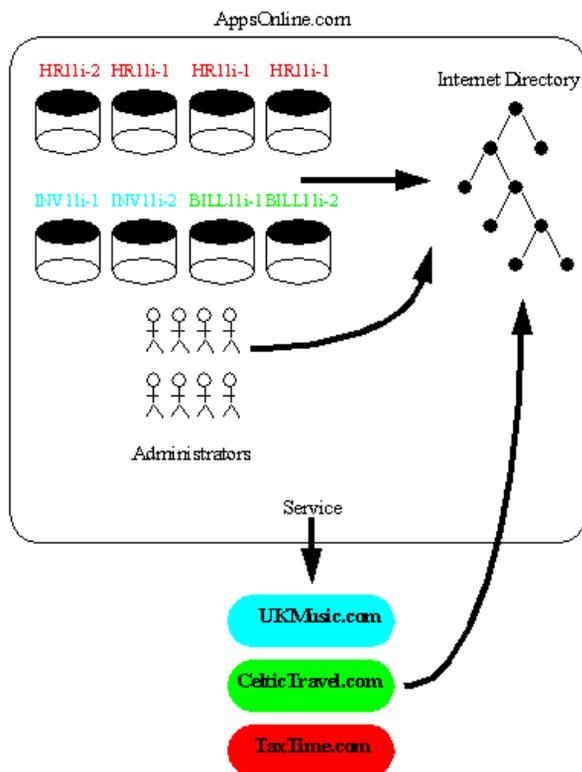
Users are managed in the Directory using Enterprise Security Manager. The application shows the directory to which it is connected and allows you to add, delete and browse Users in that Directory. Enterprise Security Manager may also be used to manage Oracle Contexts in the Directory. An Oracle Context is an area of structured information in the Directory recognizable to Oracle *8i* and Oracle *9i* products as well as an administrator hierarchy for management of the data in Oracle Contexts for different Oracle product areas.

This chapter is presented in two parts; Administering Users and Administering Oracle Contexts. It will use the example the “AppsOnline” Application Service Provider to illustrate both facets of Enterprise User Security management.

Introduction to Directory Servers

A Directory Server may be used as a general purpose means to centralize definitions of user and server access information over an entire network. As well as just naming information, the Directory may be employed to centralize password definitions, digital certificates and application authorizations for the users that it defines. This is possible, in the particular case of Oracle Internet Directory, as it allows for secured access and modification of sensitive information held in the Directory such as passwords or application authorizations.

This chapter shall use as its example an Application Service Provider called, “AppsOnline”. AppsOnline has a large set of Oracle *9i* Databases that it uses to host different types of Application Software for its customers. AppsOnline needs to manage administrative access to these databases for its IT staff.

Figure 9–2 AppsOnline Hierarchy

AppsOnline maintains Oracle 9i databases upon which are hosted three types of Application for its customers; Human Resources, Inventory and Billing. One customer, “TaxTime.com” subscribes to AppsOnline for its Human Resources Applications. A second customer, “CelticTravel.com” subscribes to the company for its Billing Applications. A third company, “UKMusic.com” subscribes to the company for its Inventory Management Applications.

AppsOnline dedicates some of its databases to each customer and manages these databases on behalf of the customer. The company has used a Oracle Internet Directory to hold information about their own employees, the databases on which they host Applications and the customers for whom they provide a service. In the course of their business they may wish to manage administrative access to their databases by their IT employees and manage access rights to information in these databases based upon each type of customer Application that they support.

This chapter will illustrate how Oracle Enterprise Manager may be used in this example scenario.

Entailing and Configuring Your Enterprise Security Environment

Task1: Configure an Oracle Internet Directory.

Task2: Install Oracle Enterprise manager

Task3: Configure Oracle Enterprise Manager for Enterprise User Security

Task4: Start Oracle Enterprise Security Manager

Task5: Log On To the Directory

Task1: Configure an Oracle Internet Directory

Oracle 9i Enterprise User Security is based wholly around an Oracle Internet Directory. The Directory Server must be properly installed and configured before Enterprise Manager may be used to manage Enterprise User Security. The following stages of Oracle Internet Directory configuration must be complete before proceeding

1. Either an Oracle 8i a 9i Internet Directory is installed, running and accessible over both standard LDAP and Secure Sockets Layer enabled LDAP (LDAP/SSL). For more information please refer to the *Oracle Internet Directory Administrators Guide*.
2. The Oracle Internet Directory has been configured to support Oracle 9i Directory Schema Objects and contains an Oracle 9i Default Oracle Context. In the case of a version 9i Oracle Internet Directory these requirements may already be in place. However, the Oracle 9i Directory Schema Objects and Default Oracle Context may be configured on the Directory Server using The Oracle Net Configuration Assistant. For more information please refer to the Oracle Net Configuration Assistant Administrators Guide.

Task2: Install Oracle Enterprise Manager

Oracle Enterprise Manager is automatically installed with the Oracle 9i Enterprise Edition Server Install and includes all necessary functionality for Enterprise User Security. Oracle Enterprise Manager is also installed by default with the Oracle 9i Infrastructure Install at the same time as Oracle Internet Directory. Oracle Enterprise Manager may also be installed separately in its own ORACLE_HOME using the custom install option.

Task3: Configure Oracle Enterprise Manager for Enterprise User Security

Oracle Enterprise Manager may be used to manage Enterprise User Security in two modes of operation. The Oracle9i Enterprise Manager Console may be used to connect to the Oracle 9i Management Server (OMS) and discover a Directory Server to manage. Alternatively, a dedicated application called, “Enterprise Security Manager” may be launched from the same ORACLE_HOME as Enterprise Manager and used to connect directly to the Directory Server. In either mode of operation functionality is identical. Only the latter mode, using the Enterprise Security Manager application, will be used in this chapter.

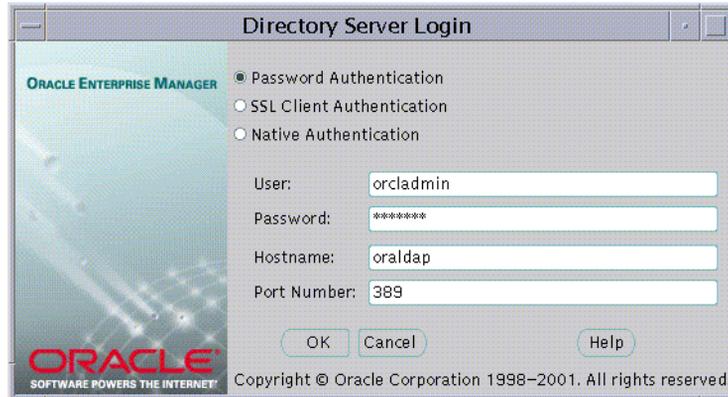
Enterprise Security Manager does not require any special configuration for it to run. However all Oracle Databases in the enterprise that need to avail of Enterprise User Security should be accessible over Oracle Net from the Enterprise Manager ORACLE_HOME.

Task3: Start Oracle Enterprise Security Manager

To launch Enterprise Security Manager from the Enterprise Manager ORACLE_HOME, enter the following at the command line:

```
oemapp esm
```

This will cause the Directory Log On box to appear

Figure 9–3 Directory Login Dialog


Task4: Log On To the Directory

Enterprise Security Manager offers three ways to connect to a Directory Server by selecting the appropriate option in the Log On Box. These options are listed in the table below

Table 9–1 Directory Connection Methods

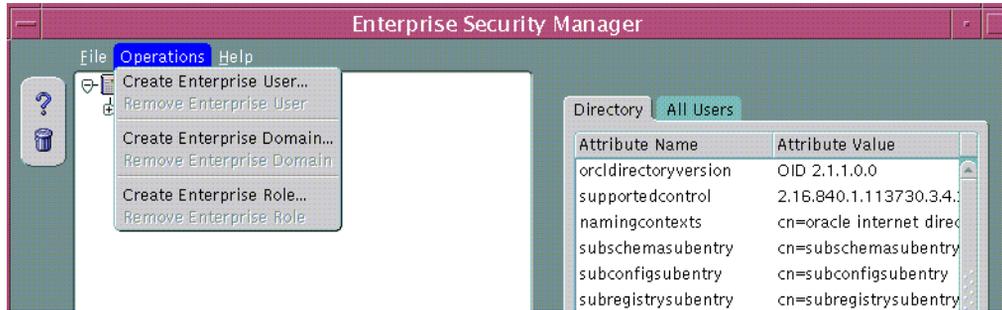
| Authentication Type | Description |
|---------------------------|---|
| Password Authentication | Uses Simple Authentication requiring a distinguished name or a known directory nickname and a password |
| SSL Client Authentication | Uses two-way SSL Authentication in which both the client and server use Oracle Wallets containing digital certificates. The subsequent connection will then be encrypted. |
| Native Authentication | Applies only to Microsoft Windows NT or Windows 2000 and uses Operating System level authentication to log on to a Microsoft Active Directory |

For example, Password Authentication may be selected when using the *orcladmin* Oracle Internet Directory super user name and password to log on.

Administering Users

Enterprise Security Manager may be used to Create Users in the Directory. This is done by selecting “Create Enterprise User...” from the Operations Menu.

Figure 9–4 Operations Menu



The Create User Window will appear in which to enter the name and location of the new User in the Directory.

Note: Functionality for the creation of Oracle Wallets will only appear in the Create User or Edit User screens when running in an ORACLE_HOME that has been configured for this purpose to use Oracle PKI Products. This functionality is not available in the Oracle 9i version 9.0.0 Beta release of Oracle Enterprise Manager.

Specifying a new User Name

Figure 9–5 Create User Property Sheet: User Naming Page

The screenshot shows a 'Create User' dialog box with the 'User Naming' tab selected. The fields are as follows:

- Base:** ou=Europe, o=IMC, c=US
- First Name:** Billy
- Surname:** Bragg
- User ID:** bbragg
- Apply Suffix:** (empty)
- Email Address:** Billy@acme.com
- Common Name:** cn= Billy Bragg

The following fields are mandatory for creation of a new User in the Directory:

Table 9–2 Create User Property Sheet: User Naming Page Mandatory Fields

| Field | Description |
|------------|---|
| Base | The entry point in the Directory at which the new User will be created |
| First name | First half (Christian Name) of the new User's full name |
| Surname | Second half (Surname) of the new User's full name |
| User ID | The Logon identifier that the user may use to access databases and applications |

The following additional fields are not mandatory for creation of a new User in the Directory but may be recorded for the new User if desired.

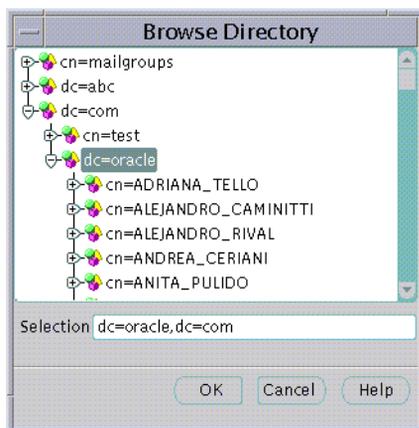
Table 9–3 Create User Dialog: Non-mandatory Fields

| Field | Description |
|---------------|---|
| Apply Suffix | This is the current value of any common user ID suffix that is always applied to the end of the User ID for a new User. For example, <User ID>.us.acme.com |
| Email Address | The email address to record in the Directory for the new User, if desired. |
| cn= | This is the Common Name component (cn=) of the Distinguished Name of the new User in the Directory. By default it is set to the full name of the new User, however you can override the value if you wish to force a particular value for the “cn=” portion of the User’s Distinguished Name. |

Specifying a Directory Base

All Users in the Directory must exist at a particular “Base” within the Directory. The Base can be any existing Directory Entry such as Country Entry (e.g “c=US”) or an Organization Entry (e.g “o=Acme, c=US”). Many Users would typically share the same Base. This Base identifies all the Users contained under it as belonging to the same high level organization.

The Base at which to create a new User can be entered in the Base field in the Create User screen. However, you may explore the entire Directory to choose a suitable Base by clicking on the Browse... button. The Browse Directory dialog will appear.

Figure 9–6 Browse Directory Dialog

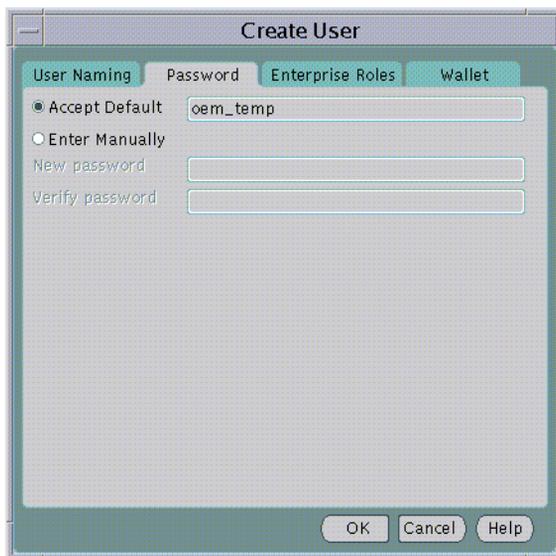
The Browse Directory screen lets you navigate the directory by drilling down into each entry from the top of the Directory Tree. When a Directory Entry is selected its Distinguished Name is placed in the Selection field. To accept the selected Distinguished Name choose the OK button. This value will then be returned as the selected Base for a new Directory User.

Note: This value will be preserved for all subsequent operations that create or search for Users in the Directory. However you may change it as many times as you like.

Specifying a new User Password

The second Tab Panel of the New User screen allows you to set an initial password for the new User in the Directory. This will be the new User's initial password for:

- Directory log on
- Database log on to databases that support Password Authenticated Global Users
- A new Oracle Wallet, if created for the new User at this time.

Figure 9–7 Create User Property Sheet: Password Page

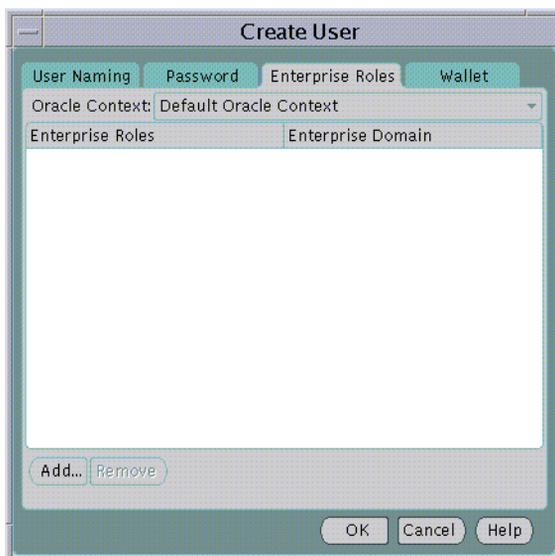
The screenshot shows a dialog box titled "Create User" with four tabs: "User Naming", "Password", "Enterprise Roles", and "Wallet". The "Password" tab is selected. It contains two radio buttons: "Accept Default" (selected) and "Enter Manually". The "Accept Default" option has a text field containing "oem_temp". The "Enter Manually" option has two text fields labeled "New password" and "Verify password". At the bottom of the dialog are three buttons: "OK", "Cancel", and "Help".

When Entering a password you may choose to accept a default first time password for the new User or manually enter the first time password for the new User. In either case, the new User must change their own password immediately after its first use.

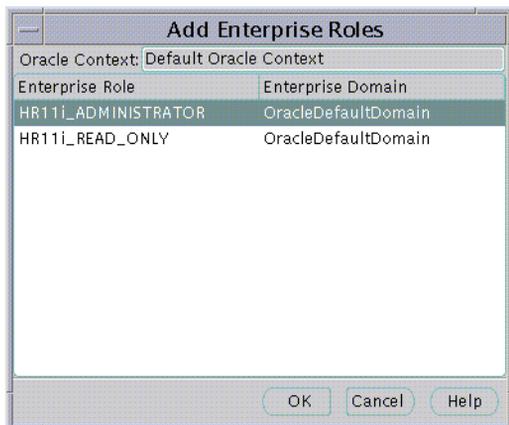
Specifying an Initial Enterprise Role Assignment

Enterprise Roles are discussed later in this Chapter. At the time of User creation you may select any previously configured Enterprise Roles and grant them to the new User.

Figure 9–8 Create User Property Sheet: Enterprise Roles

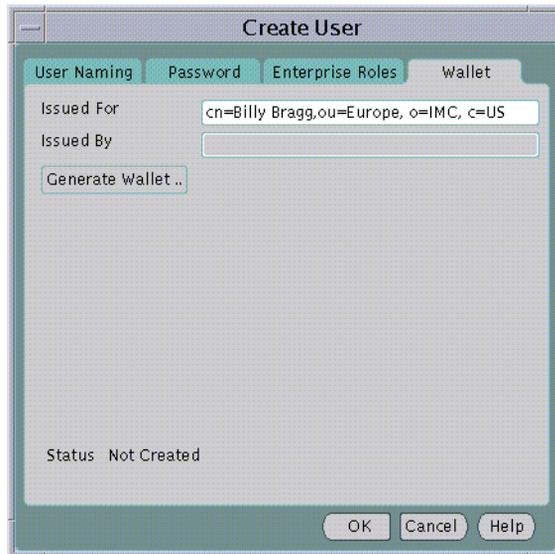


To select one or more Enterprise Roles to grant to the new User at this time choose **Add...** in the Enterprise Roles page of the Create User screen. The Add Enterprise Roles Page will appear from which you can choose any Enterprise Roles in your Oracle Context to assign to the new User.

Figure 9–9 Add Enterprise Roles Dialog

Specifying an Oracle Wallet

An Oracle Wallet containing a new Digital Certificate, Private Key and Certificate Trustpoints may be generated for the new User in an encrypted binary format. The Oracle Wallet will be stored with the new User in the Directory Server as part of the Directory Entry for the User.

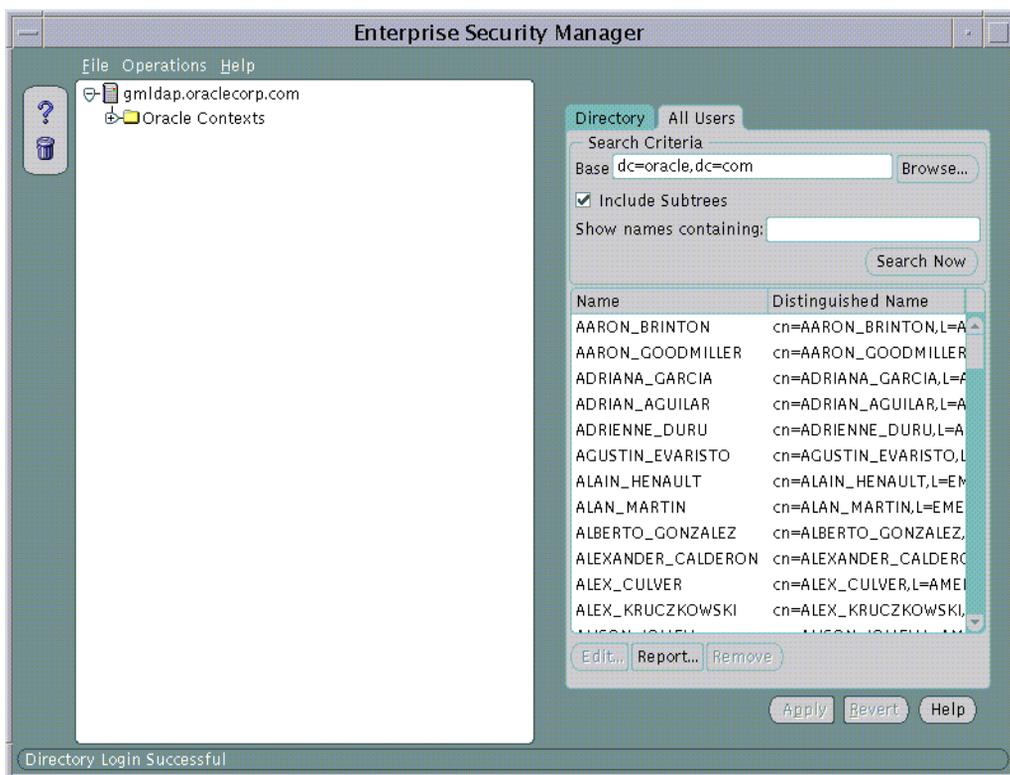
Figure 9–10 Create User Property Sheet: Wallet

The Distinguished Name under which the new User will be created is used by default as the Distinguished Name for the Digital Certificate to be contained in the new User's Oracle Wallet. It is always good practice to let the Distinguished Names of User Certificates correspond to their Distinguished Names in the Directory. However, you may edit the Distinguished Name to be used for the Certificate before generating the Wallet by editing the contents of the Issued For: field.

An Oracle Wallet will be created when you click on the Generate Wallet... button.

Browsing Users in the Directory

Enterprise Security Manager allows you to browse all Users that are currently stored in the Directory. This is done by selecting the All Users page from the Directory at the top of the main application tree

Figure 9–11 All Users Page

To Search for one or more users the directory, the Search Criteria must be set and the Search Now button used to perform a new search for Users based upon the given Search Criteria. The All Users page will refresh to show the results of this search. There are three factors to User Search Criteria:

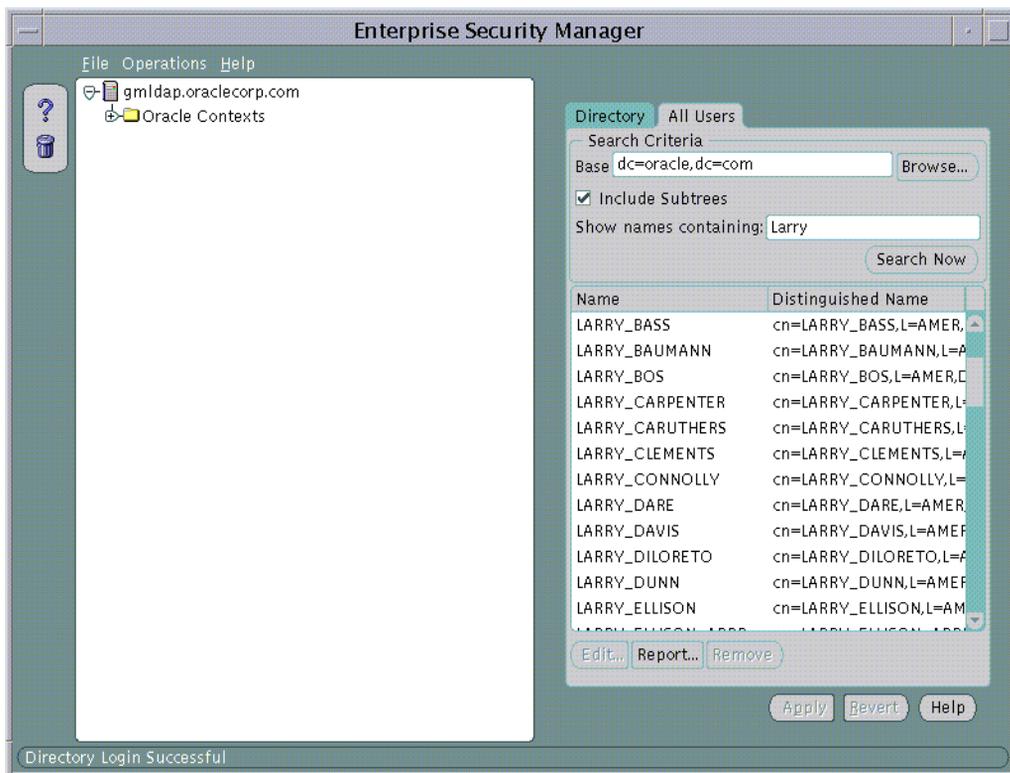
Table 9–4

| Search Criteria | Affect on the Search |
|-----------------|--|
| Base | This is the Base Entry in the Directory at which the search will be performed. Any Users returned in the search will exist under this Base in the Directory. |

Table 9–4

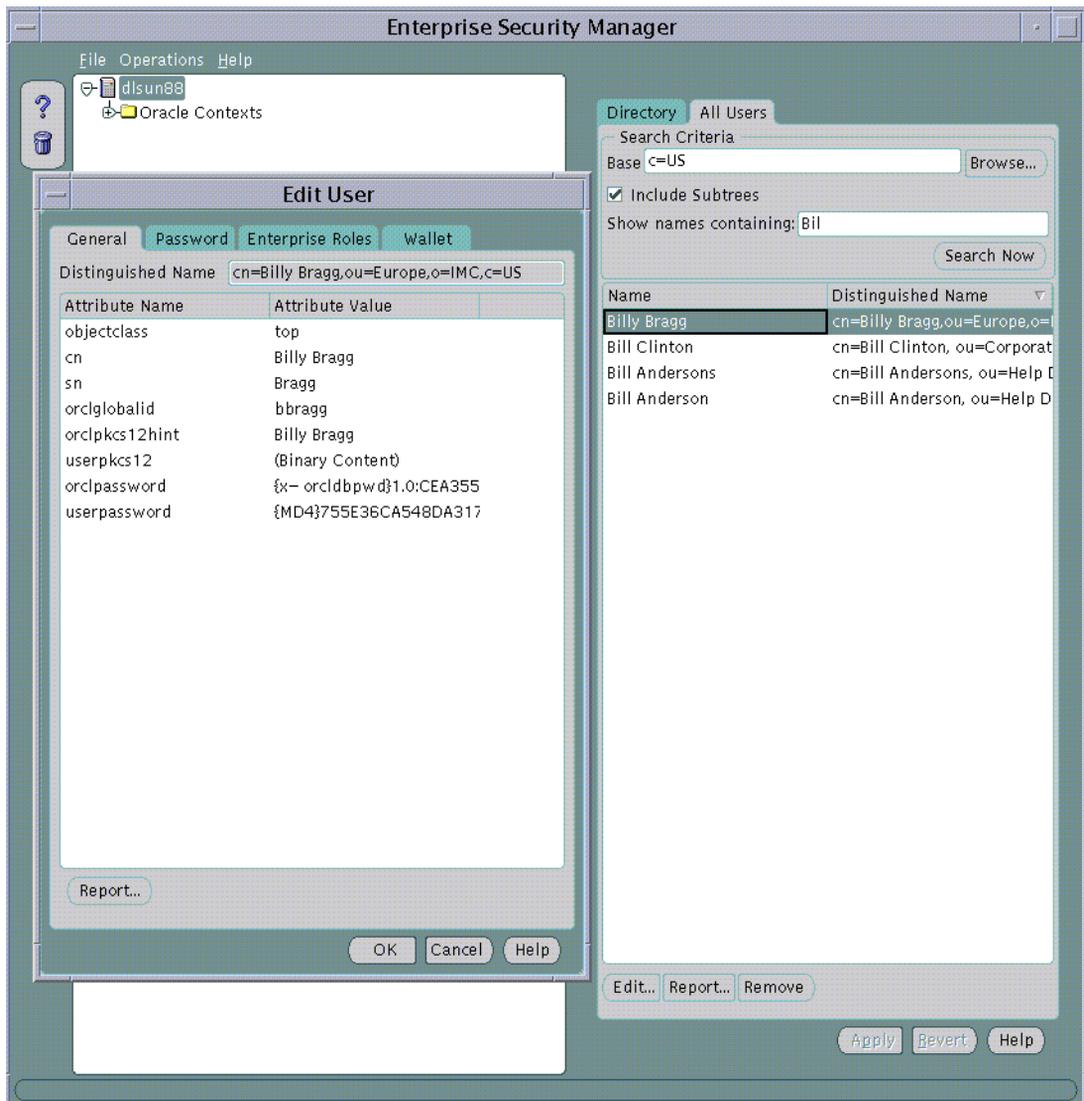
| Search Criteria | Affect on the Search |
|------------------------|---|
| Include Subtrees | This determines whether to show all Users in the Directory anywhere under the selected Base or to only show those Users that exist specifically at that Base location in the Directory. |
| Show Names Containing | This limits the entire search to contain only those Users whose Directory Entries have a Common Name that starts with a specified pattern. This is useful if the exact name or Base of the desired User is not known. |

For example, the Search Criteria may be set to search this Directory for a User given only that the Base is dc=oracle, dc=com and the first name is “Larry”

Figure 9–12 Base Search Criteria

After searching for Users in the Directory, any one user can be chosen from the list and edited. This is achieved either by selecting the User from the list in the All Users page and choosing the Edit... button or by double clicking on that User in the list.

Figure 9–13 Editing a User



When a User in the Directory is selected for Edit, its password, Enterprise Role assignments and Oracle Wallet can be modified in the same way as discussed during creation of a new User in the Directory.

Administering Oracle Contexts

An Oracle Context is a top level Entry in the Directory underneath which is contained the data used by any Directory aware Oracle product. Enterprise Security Manager allows you to manage database and security related information in the Directory under an Oracle Context.

Note: Users do not need to be contained in the Directory within an Oracle Context. It is assumed that the Directory may define its Users for a wide variety of purposes. Oracle does not require that Users in a Directory to be created within an Oracle Context though it is still possible to do so.

Oracle Context Versions

An Oracle Context in the Directory may either be a version *8i* or version *9i* Oracle Context. For Enterprise User Security there is some functionality that can only be managed using a *9i* Oracle Context, for example, “Password Authenticated Global Users”. Enterprise Manager for Oracle *9i* may be used to manage version *9i* Oracle Contexts as well version *8i* Oracle Contexts in the Directory.

Oracle Enterprise Security Manager displays in its main application tree all the Oracle Contexts that exist in the Directory Server. It will display both version *9i* and version *8i* Oracle Contexts, should they exist. In the example below Enterprise Security Manager is connected to an Oracle Internet Directory that has been configured to support the Oracle *9i* Directory Schema and an Oracle *9i* Default Oracle Context.

Specifying Properties of an Oracle Context

An Oracle Context has a number of general properties that can be viewed and managed in the General page when an Oracle Context is selected on the tree:

Figure 9–14 Viewing an Oracle Context Properties

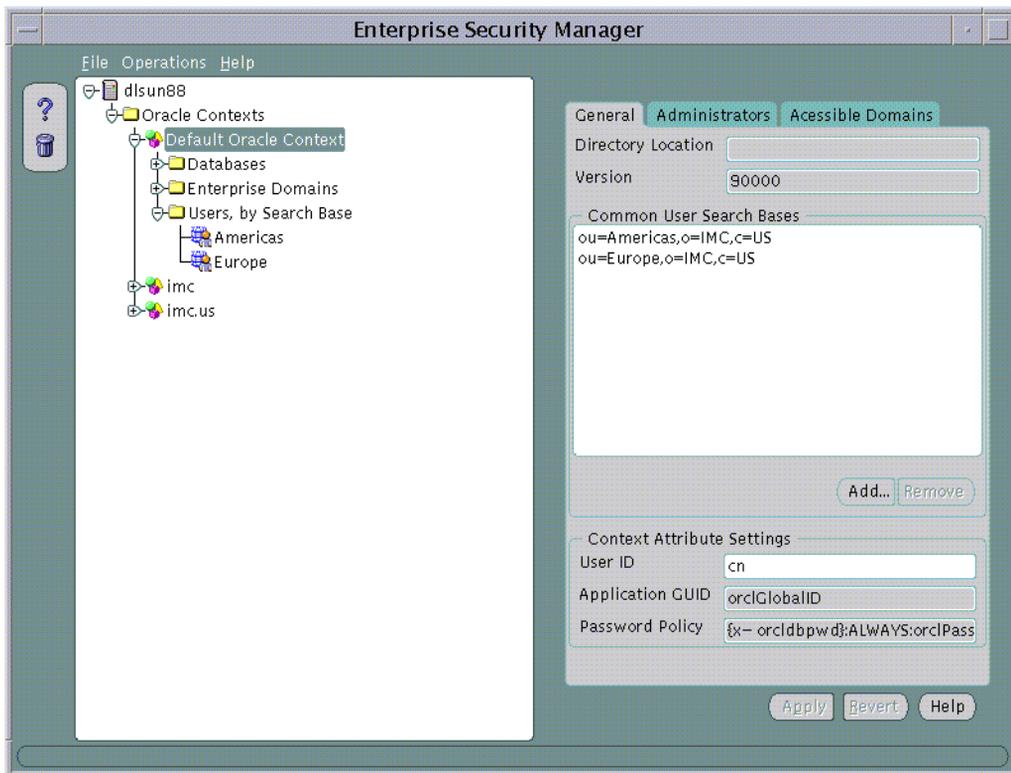


Table 9–5 Context Property Description

| Property | Description |
|--------------------|---|
| Directory Location | This is the Directory Base of the Oracle Context. In the case of the Default Oracle Context this value is empty as the Directory Base is the root of the Directory tree |
| Version | This identifies whether the Oracle Context supports 8i or 9i functionality |

Table 9–5 Context Property Description

| Property | Description |
|--------------------------|---|
| Common User Search Bases | This is the list of Base locations in the Directory at which Users may commonly exist. Identifying a list of User Search Bases allows you to quickly browse the users at those Directory Locations and also indicates to 9i Databases in the Oracle Context where they may find Directory Users that connect to them. |
| User ID | This is the name of the Attribute in a User Entry that determines the value of that Users's User ID. User Entries have many different attributes. This setting controls the User ID with which Users can authenticate to Oracle 9i databases, Directory Servers or Directory enabled Applications. Its default value is, "cn", the Common Name of the Directory User. |
| Application GUID | This is the name of the Attribute in a User Entry in which unique Application GUID values will exist. It cannot be modified in this release |
| Password Policy | This is the Password Policy syntax used by Oracle 9i database when authenticating Password Authenticated Global Users. It cannot be modified in this release. |

Specifying User Search Bases

User Search Bases can be added to or removed from a version 9i Oracle Context using the Oracle Context General page.

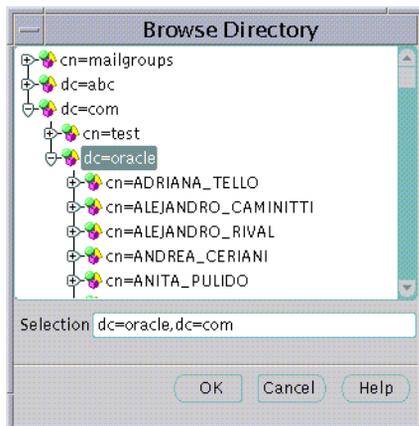
Note: This functionality is not available in version 8i Oracle Contexts.

To remove a User Search Base from the Oracle Context:

1. Select a Search Base in the Common User Search Bases List and choose Remove... The Search Base will be removed from the List.
2. Choose Apply; the User Search Base will be removed from the Oracle Context in the Directory

To add a new User Search Base to an Oracle Context:

1. Choose Add... The Common User Search Bases screen will appear.

Figure 9–15 User Search Base Dialog

2. Navigate the Directory to select a desired Directory Entry as a User Search Base. You may also edit the contents of the Selection field in this screen to manually define the User Search Base.
3. Choose OK in the Common User Search Bases screen. The selected Entry will be added to the list of User Search Bases in the Oracle Context General Page.
4. Choose Apply; the User Search Base will be added to the Oracle Context in the Directory

Specifying Oracle Context Administrators

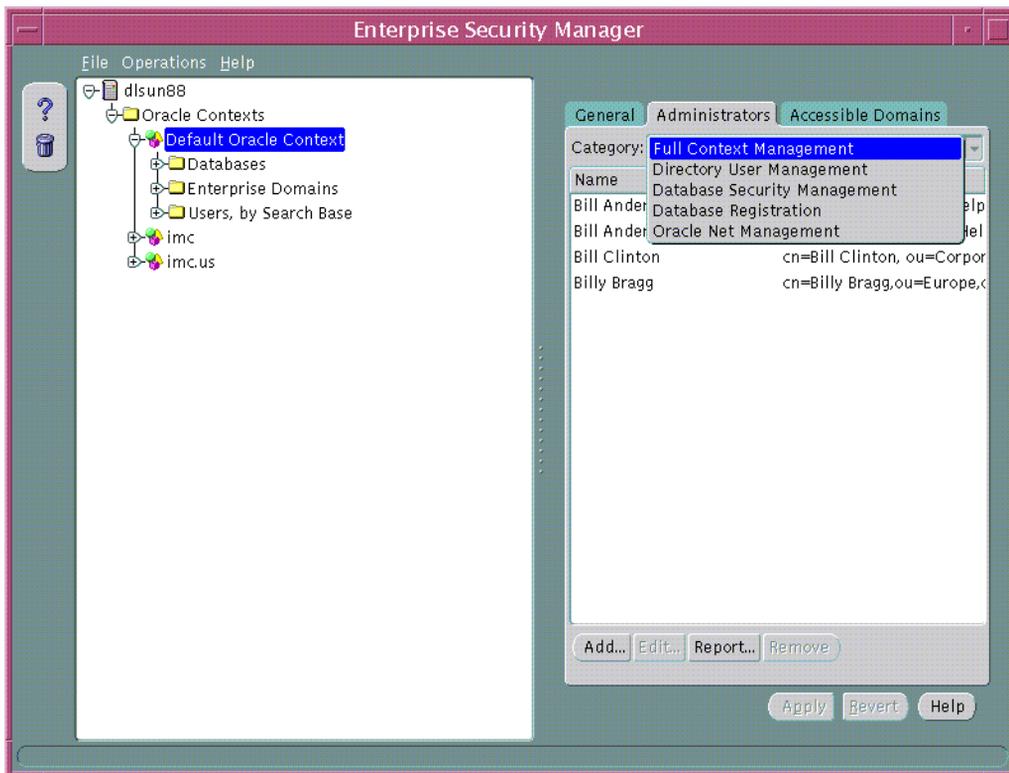
An Oracle Context may define sets of Directory Users that are enabled as different categories of Administrator. Each category has varying levels of privilege for operations within an Oracle Context. Some administrator categories are only available to version 9i Oracle Contexts and some are available to both version 8i and version 9i Oracle Contexts. The Administrator Categories for an Oracle Context are as follows:

Table 9–6 Oracle Context Administrator Categories

| Administrator Category | Definition | Version 9i | Version 8i |
|-------------------------------|---|-------------------|-------------------|
| Full Context Management | All possible Administrator privileges for all product areas in the Oracle Context | YES | NO |
| Directory User Management | Ability to view Directory User password reminders | YES | NO |
| Database Security Management | Ability to manage all Enterprise Domains and Enterprise Roles in the Oracle Context | YES | YES |
| Database Registration | Ability only to register a new database in the Oracle Context | YES | YES |
| Oracle Net Management | Ability to manage Oracle Net objects in the Oracle Context | YES | NO |

Oracle Context Administrators are managed using the Administrators Page of an Oracle Context selected on the main application tree.

Figure 9–16 Oracle Context: Administrators Page



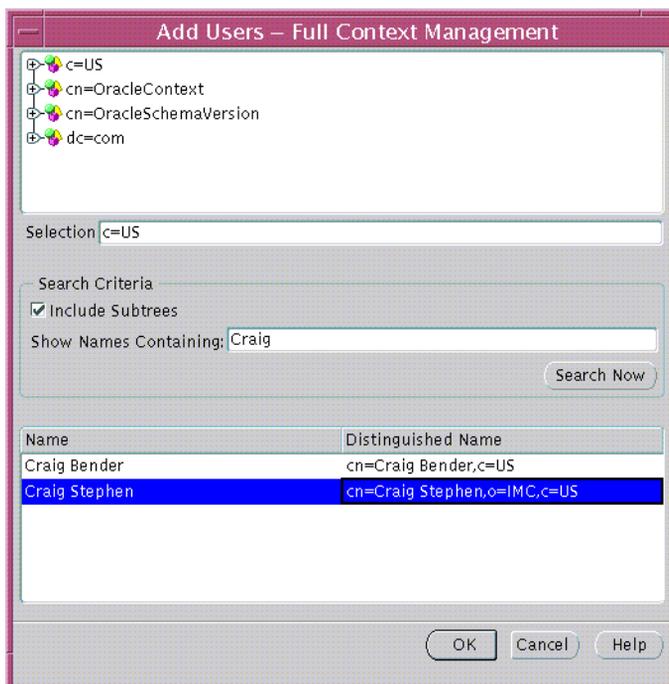
To remove a User from a list of Oracle Context Administrators:

1. Choose the type of Administrator to remove from the Categories combo box. The list of Administrators will refresh to show those of the type that you have selected.
2. Select a User by clicking on that User in the list of Administrators.
3. Choose Remove. The selected User will be removed from the list.
4. Choose Apply; the User will be removed as an Oracle Context Administrator of the category that you have selected.

To add a new User a list of Oracle Context Administrators:

1. Choose Add... The Add Users screen will appear. This page is used to locate and select one or more Users in the Directory. There are three components to the page. At the top is a Directory Search Tree. In the middle are Search Criteria controls that identify the Users to be returned by the search. At the bottom of the page is the result of the search from which one or more desired Users may be selected.

Figure 9–17 User Search Results



2. Navigate the Directory to select a desired Directory Entry as a User Search Base. You may also edit the contents of the Selection field in this screen to manually define the User Search Base.
3. Set the “Include Subtrees” Search Criteria option. The effect of selecting this option will be to search for Users not only as the specified Base but also in all possible levels underneath that Base in the Directory.
4. Enter any known User Name in the Show Names Containing field to which Users returned by the search must conform. The effect of using the Show

Names Containing field is to limit the search only to Users in the Directory who have a Common Name value that is or starts with the specified text.

5. Choose Search Now. If there are any Users in the Directory at the Base you have selected that match your Search Criteria they will be listed in the screen.
6. Select the desired User either by clicking on the it in the list and choosing OK or by double clicking on it. Multiple Users can be selected from the list by selecting a range of Users and choosing OK. The new Users will then appear in the list of Administrators under the category that you have selected.
7. Choose Apply; the new Administrators will be added to the Oracle Context in the Directory under the category that you have selected.

Note: This screen is used at all points in Enterprise Security Manager where it is necessary to choose one or more Users from the Directory.

Accessible Domains

When an Oracle Context is selected in the main application tree you may manage the list of Enterprise Domains within that Oracle Context whose databases may accept password authenticated connections from users that have their "Database Access Restriction" enabled. To add an Enterprise Domain to the list choose "Add.." and select one of the current Enterprise Domains from the resulting dialog. To remove an Enterprise Domain from the list, select it in the Accessible Domains page and choose "Remove.."

A "Database Access Restriction" may be applied to whole subtree of Users in the Directory when it is selected under the "Users, by Search Base" tree under an Oracle Context. With this option is set, all users under that subtree may only use their passwords to access databases that exist in Enterprise Domains that have been included in the list of Accessible Domains for the Oracle Context.

The default condition for any Enterprise Domain is not to be a member of the Accessible Domains for its Oracle Context. By identifying any Enterprise Domain to be one of the Accessible Domains and also by electing certain Users to have a Database Access Restriction, you are enforcing that it is only certain known databases that may access those Users' database logon settings in the Directory.

Note: This feature is only available to version 9 Oracle Contexts.

Managing Database Security

The Directory may be used as a central repository that controls authentication and authorization on multiple databases for Users. Enterprise Security Manager allows you to manage an Oracle Context in the Directory for the purpose of database security.

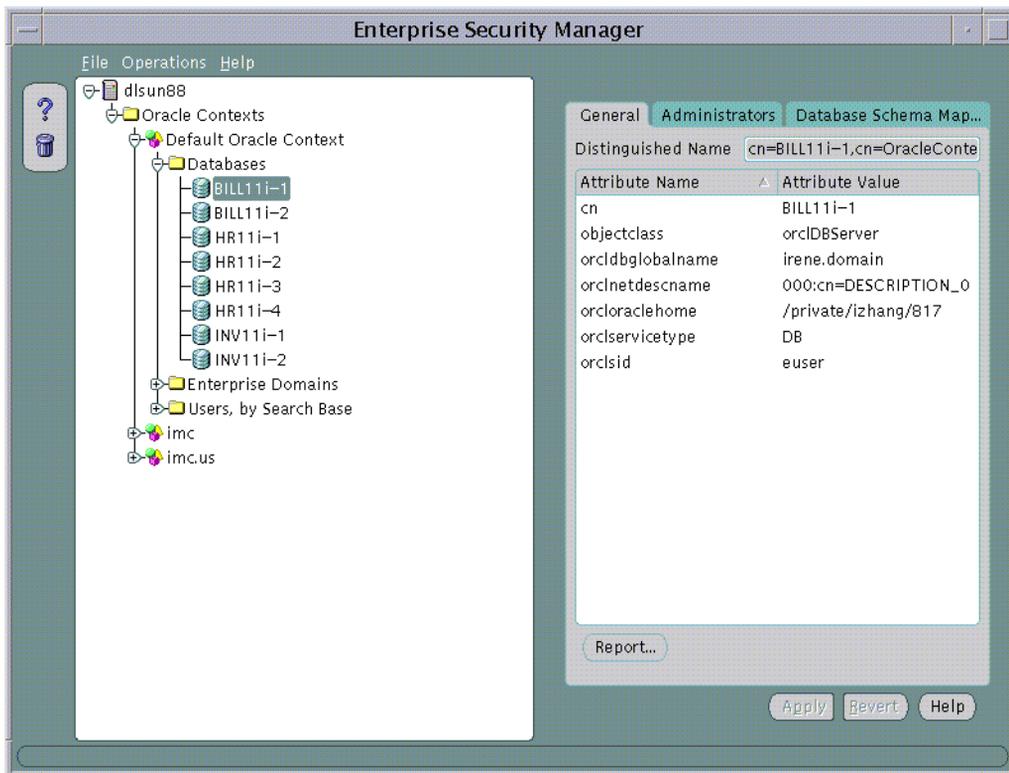
Oracle *8i* or *9i* Databases are published to the Directory within an Oracle Context using the Oracle Database Configuration Assistant. For more information see the Oracle DBCA Guide. Once databases have been published to the Directory, Enterprise Security Manager may be used to manage User access to those databases. This is achieved using the following Objects in the Oracle Context:

Table 9–7 Oracle Context Objects

| Object in the Oracle Context | Description |
|-------------------------------------|---|
| Database | This is a Directory Entry representing a published database. |
| Enterprise Domain | This is a grouping of databases published in the Directory upon which a common User access model for database security can be implemented |
| Enterprise Role | This is an Authorization that spans multiple databases within an Enterprise Domain. It is an “Enterprise Level” Role to which can be granted individual roles on each of the databases in an Enterprise Domain. |

Enterprise Security Manager displays Databases and Enterprise Domains in its main application tree. Using our example of the AppsOnline Application Service provider, each of the company’s databases have been published into the *9i* Default Oracle Context in the Directory.

Figure 9–18 Security Manager Application Tree



In this example AppsOnline manages Oracle 9i databases that host Applications for three customers; “UKMusic.com”, “CelticTravel.com” and “TaxTime.com”. Applications for UKMusic are hosted using databases INV11i-1 and INV11i-2. Applications for CelticTravel are hosted using databases BILL11i-1 and BILL11i-2. Applications for TaxTime are hosted using databases HR11i-1, HR11i-2, HR11i-3 and HR11i-4.

Given that the types of application hosted for each customer are different, only those databases that are used to support a common application type implement the same security model for their User Access. AppsOnline has decided to define three Enterprise Domains, one for each customer that it services.

Administering Databases

After a database has been published to an Oracle Context in the Directory, Enterprise Security Manager may be used to view and modify security characteristic of that database.

Managing Database Administrators

An Database Administrator is a Directory User that only has privileges to modify that Database in the Oracle Context. Database Administrators may be managed using the Administrators Page when a Database is selected under an Oracle Context in the main application tree.

To remove a User from the list of Database Administrators:

1. Select a User by clicking on that User in the list of Administrators.
2. Choose Remove. The selected User will be removed from the list.
3. Choose Apply; the User will be removed as an Database Administrator for that database in the Oracle Context.

To add a new User to the list of Enterprise Domain Administrators:

1. Choose Add... The Add Users screen will appear. This page is used to locate and select one or more Users in the Directory as discussed earlier. Select one or more desired users from the Directory to add as Database Administrators. The new Users will then appear in the in the Administrators Page.
2. Choose Apply; the new Administrators will be added to the database in the Oracle Context.

Managing Database Schema Mappings

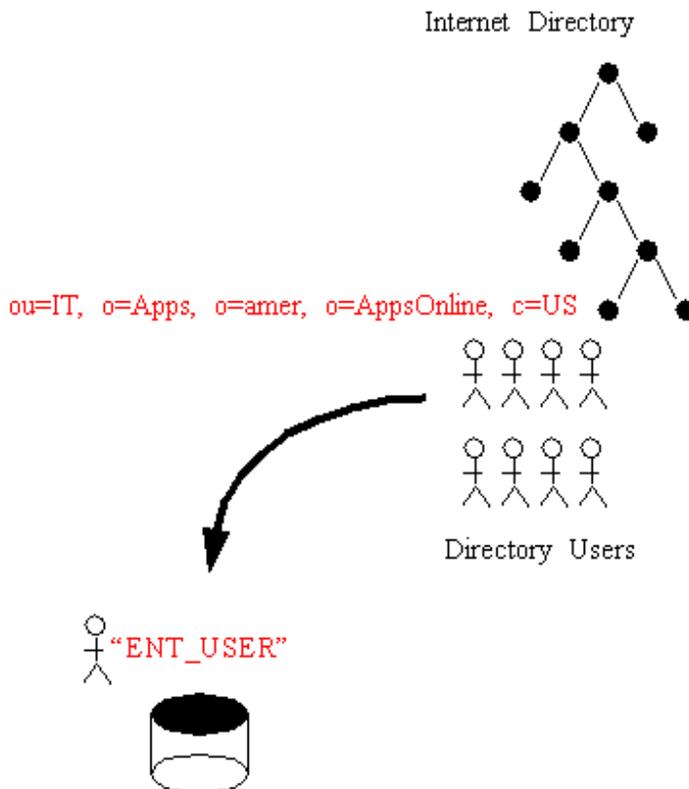
Database Schema Mappings allow databases that are registered in the Directory to accept connections from users without having any dedicated database schemas for them. For example, when user SCOTT connects to a database there must actually exist a database schema called “SCOTT” for that log on to be successful. This becomes difficult to maintain if there are thousands of Users and perhaps hundreds of databases in a very large enterprise.

Users that exist in the Directory do not need to have dedicated schemas on every Oracle *8i* or *9i* database to which they might connect.

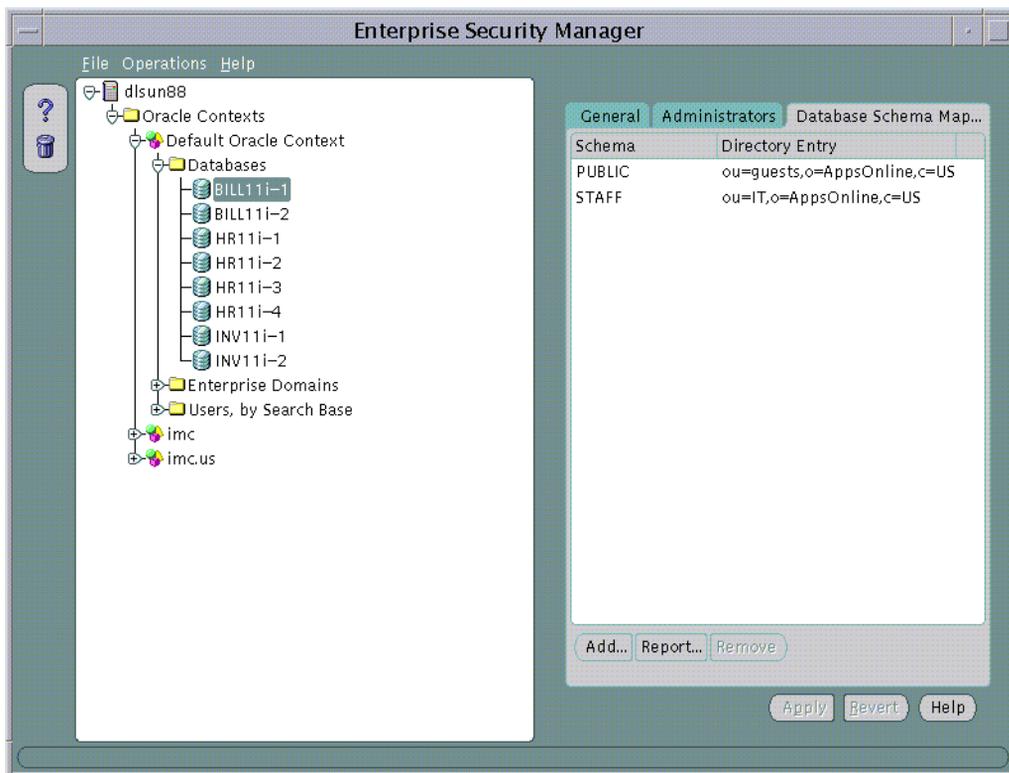
A database may use a “Schema Mapping” to share one database schema between any number of Users that exist in the Directory. The Schema Mapping is a pair of

values; the Base in the Directory at which Users exist and the name of the database schema that they will use.

Figure 9–19 Database Schema Mappings



Database Schema Mappings may be managed using the Database Schema Mappings Page when a database is selected under an Oracle Context in the main application tree. This page contains a list of database schema name and Directory Base pairs.

Figure 9–20 Database Schema Mapping Page

To remove a Mapping from the list of Database Schema Mappings in the Enterprise Domain:

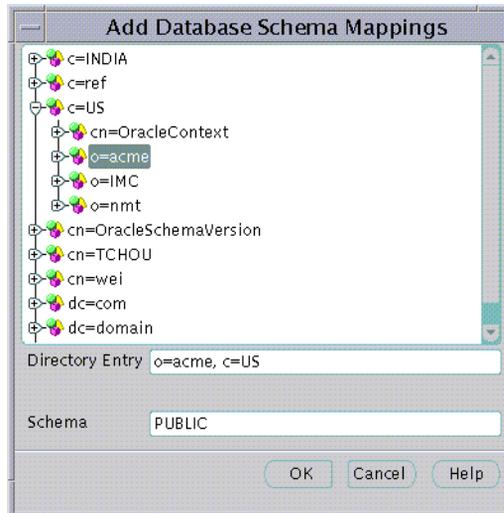
1. Select a Mapping by clicking on that Mapping in the list.
2. Choose Remove. The selected Mapping will be removed from the list.
3. Choose Apply; the Mapping will be removed from the Enterprise Domain and no longer used by any databases in the Enterprise Domain.

To add a new Mapping to the list of Database Schema Mappings in the Enterprise Domain:

1. Choose Add... The Add Database Schema Mappings screen will appear. This page is used to locate and select one Base in the Directory and pair it with a database schema name to make a Database Schema Mapping. There are two

components to the page. There is a Directory Search Tree from which to select a Base and a field in which to enter a schema name.

Figure 9–21 Add Database Schema Mappings



2. Navigate the Directory to select a desired Directory Entry as a Base for the Database Schema Mapping. This may be any Directory Entry but should be above the subtree of Users in the Directory for which you want to perform the mapping. You may also edit the contents of the Selection field in this screen to manually define this Base.
3. Enter the name of the database schema for which this Mapping will be made and choose OK. This must be a valid name for a schema that already exists on that database. The new Database Schema Mapping will then appear in the Database Schema Mappings Page.
4. Choose Apply; the new Database Schema Mapping will be added to the selected database in the Oracle Context.

Administering Enterprise Domains

An Oracle Context will always contain at least one Enterprise Domain called, "OracleDefaultDomain". The OracleDefaultDomain is part of the Oracle Context when it is first created in the Directory. When a new database is registered into an

Oracle Context it automatically becomes a member of the OracleDefaultDomain in that Oracle Context. You may create and remove your own Enterprise Domains but you cannot remove the OracleDefaultDomain from an Oracle Context.

To create a new Enterprise Domain:

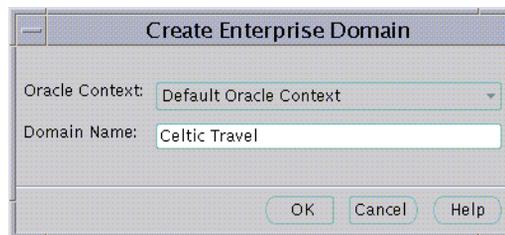
An Enterprise Domain can be created in an Oracle Context either from the Operations Menu or by using a Right Mouse Button click on an Oracle Context selected in the main application tree:

Figure 9–22 Creating an Enterprise Domain



The Create Enterprise Domain screen will appear.

Figure 9–23 Create Enterprise Domain Dialog



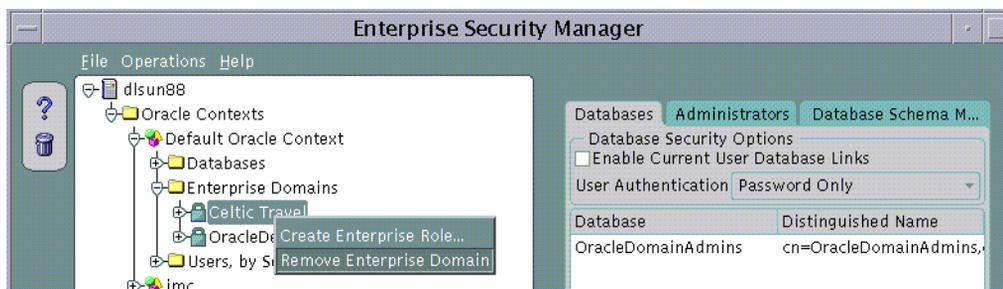
1. Choose the Oracle Context in which the Enterprise Domain is to be created from the Oracle Context drop down list. If the Create Enterprise Domain screen has been invoked using a Right Mouse Button click from an Oracle Context in the main application tree then the name of that Oracle Context will already be selected.
2. Enter the name of the new Enterprise Domain in the Domain Name field.

3. Choose OK. The new Enterprise Domain will be created in the Oracle Context and appears on the main application tree.

To remove an Enterprise Domain:

1. Click on the Enterprise Domain to remove in the main application tree.
2. Choose Remove Enterprise Domain either from the Operations Menu or by using a Right Mouse Button Click on the Enterprise Domain in the main application tree.

Figure 9–24 Remove Enterprise Domain Menu Option

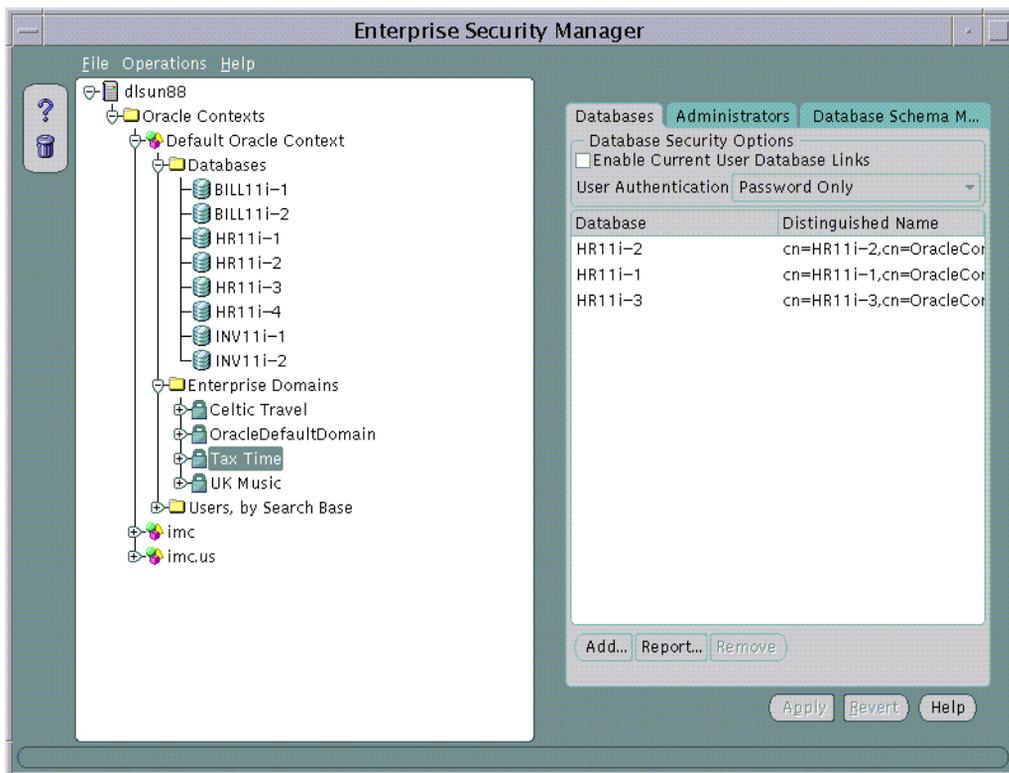


3. Enterprise Security Manager will ask you to confirm the operation before the Enterprise Domain is removed from the Oracle Context.

Note: You cannot remove an Enterprise Domain from an Oracle Context if that Enterprise Domain still contains any Enterprise Roles.

Specifying Database Membership of an Enterprise Domain

Database membership of an Enterprise Domain in the Oracle Context may be managed using the Databases Page when an Enterprise Domain is selected on the main application tree:

Figure 9–25 Security Manager Databases Page

To remove a database from an Enterprise Domain:

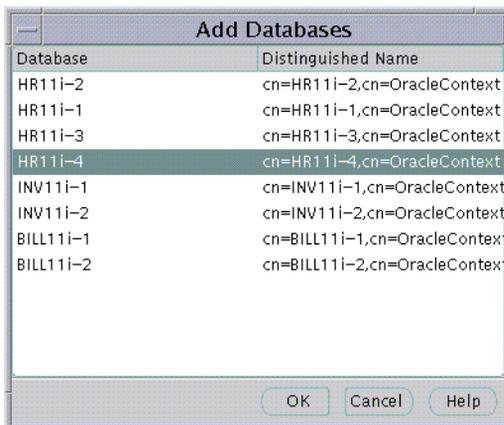
1. Select a database in the list and choose Remove... The database will be removed from the list.
2. Choose Apply; the database will be removed from the Enterprise Domain in the Oracle Context.

To add a database to an Enterprise Domain:

Note: You may only add databases as members of an Enterprise Domain that exist in the same Oracle Context as the Enterprise Domain. An Enterprise Domain cannot contain as its members, databases published in a different Oracle Context. Neither can any database in an Oracle Context be added as a member of two Enterprise Domains.

1. Choose Add... The Add Databases screen will appear. This screen lists all the databases in the Oracle Context

Figure 9–26 Add Databases Dialog



2. Select a database to add as a new member of the Enterprise Domain.
3. Choose OK in the Add Databases screen. The selected database will be added to the list of databases in the Databases Page.
4. Choose Apply; the new database will be added to the Enterprise Domain in the Oracle Context.

Managing Database Security Options for an Enterprise Domain

The Databases Page may be used to manage database security options that will apply to all the databases that are members of the Enterprise Domain. These options are as follows:

Table 9–8

| Database Security Option | Description |
|------------------------------------|---|
| Enable Current User Database Links | Any pair of databases will only allow use of Current User Database Links if they exist in an Enterprise Domain in which this setting is enabled. |
| User Authentication | All databases in the Enterprise Domain will enforce the type of authentication that its clients must use based on this property. Its values are: <ul style="list-style-type: none"> ▪ Password Authentication only. ▪ Oracle Net SSL Authentication only using Oracle Wallets. ▪ Either Password or Oracle Net SSL Authentication. |

Managing Enterprise Domain Administrators

An Enterprise Domain Administrator is a Directory User that only has privileges to modify the content of that Enterprise Domain. Enterprise Domain Administrators may be managed using the Administrators Page when an Enterprise Domain is selected under an Oracle Context in the main application tree.

To remove a User from the list of Enterprise Domain Administrators:

1. Select a User by clicking on that User in the list of Administrators.
2. Choose Remove. The selected User will be removed from the list.
3. Choose Apply; the User will be removed as an Enterprise Domain Administrator for that Enterprise Domain in the Oracle Context.

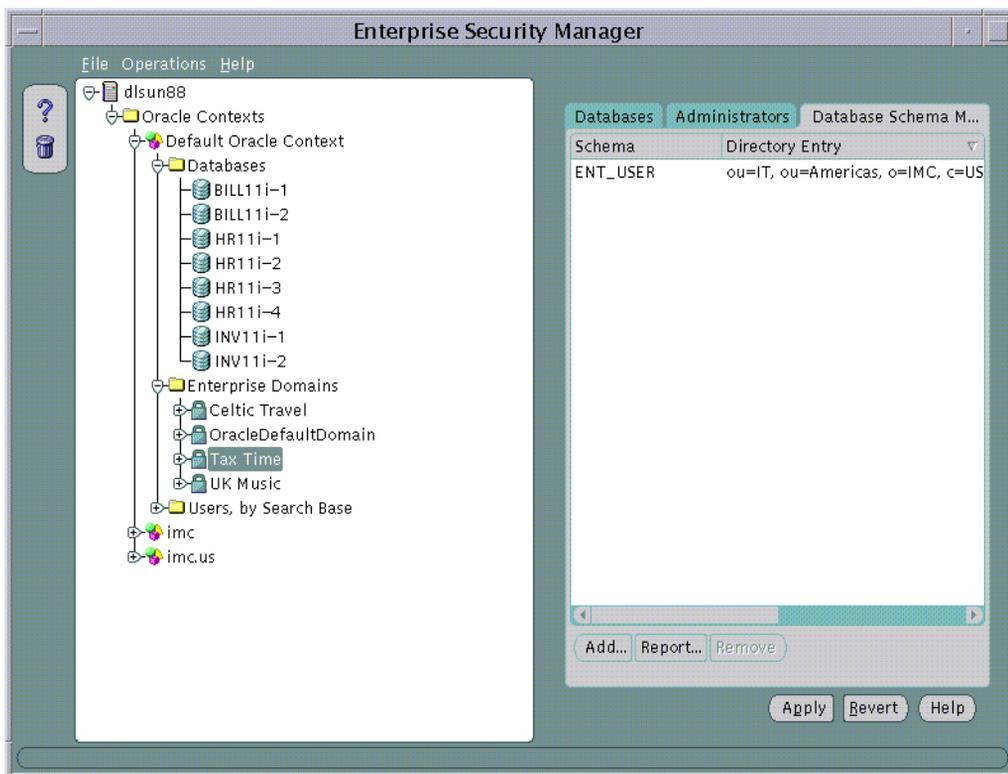
To add a new User to the list of Enterprise Domain Administrators:

1. Choose Add... The Add Users screen will appear. This page is used to locate and select one or more Users in the Directory as discussed earlier. Select one or more desired users from the Directory to add as Enterprise Domain Administrators. The new Users will then appear in the Administrators Page.
2. Choose Apply; the new Administrators will be added to the Enterprise Domain in the Oracle Context.

Managing Enterprise Domain Database Schema Mappings

Database Schema Mappings may be managed for each database in an Oracle Context as discussed earlier. Schema Mappings may also be performed for each Enterprise Domain in an Oracle Context using the Database Schema Mappings Page with an Enterprise Domain selected in the main application tree. These Mappings apply to all databases that are members of the Enterprise Domain. Therefore, each database in the Enterprise Domain must have a schema of the same name used in the Mapping.

Figure 9–27 Matching Database and Schema Names Used in the Mappings



To remove a Mapping from the list of Database Schema Mappings in the Enterprise Domain:

1. Select a Mapping by clicking on that Mapping in the list.

2. Choose Remove. The selected Mapping will be removed from the list.
3. Choose Apply; the Mapping will be removed from the Enterprise Domain and no longer used by any databases in the Enterprise Domain.

To add a new Mapping to the list of Database Schema Mappings in the Enterprise Domain:

1. Choose Add... The Add Database Schema Mappings screen will appear. This page is used to locate and select one Base in the Directory as discussed earlier. Enter a new Database Schema Mapping to add to the Enterprise Domain.
2. Choose Apply; the new Database Schema Mapping will be added to the Enterprise Domain selected in the Oracle Context.

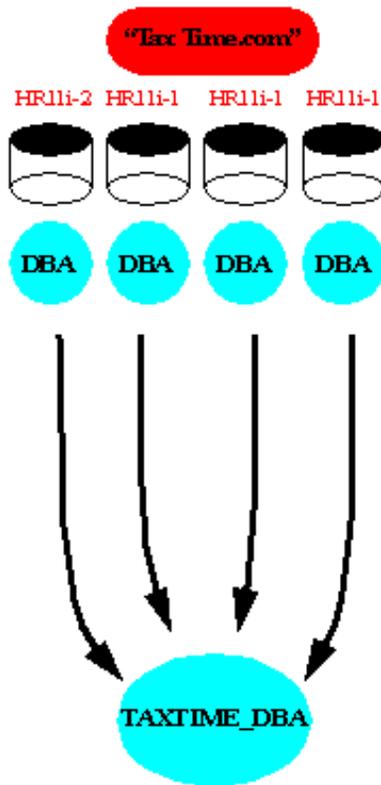
Administering Enterprise Roles

An Enterprise Domain within an Oracle Context may contain one or more Enterprise Roles.

In the example discussed earlier, AppsOnline has created three Enterprise Domains that group the databases it uses to serve each of its customers. This permits the company to define Enterprise Roles for each Enterprise Domain. An Enterprise Role is a set of Oracle Role based authorizations across on or more databases in an Enterprise Domain.

A simple Enterprise Role is defined by AppsOnline for DBA privileges on its databases in the “Tax Time” Enterprise Domain:

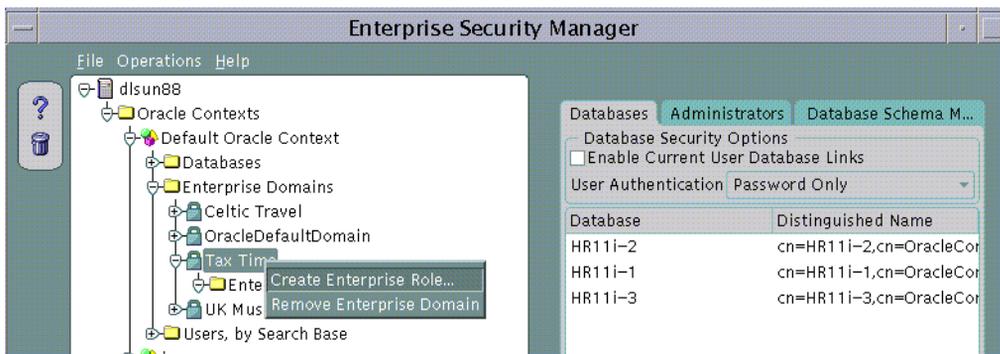
Figure 9–28 "Tax Time" Enterprise Domain



Creating a new Enterprise Role:

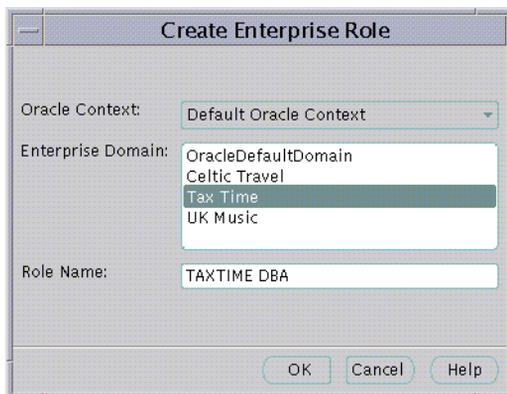
An Enterprise Role can be created in an Enterprise Domain either from the Operations Menu or by using a Right Mouse Button click on an Enterprise Domain selected in the main application tree:

Figure 9–29 Enterprise Role Creation



The Create Enterprise Role dialog appears.

Figure 9–30 Create Enterprise Role Dialog



1. Choose the Oracle Context containing the Enterprise Domain in which the new Enterprise Role is to be created from the Oracle Context drop down list. If the Create Enterprise Role screen has been invoked using a Right Mouse Button click from an Enterprise Domain selected in the main application tree, then the name of that Oracle Context will already be selected.
2. Choose the Enterprise Domain in which the new Enterprise Role is to be created from the Enterprise Domain list. If the Create Enterprise Role screen has been

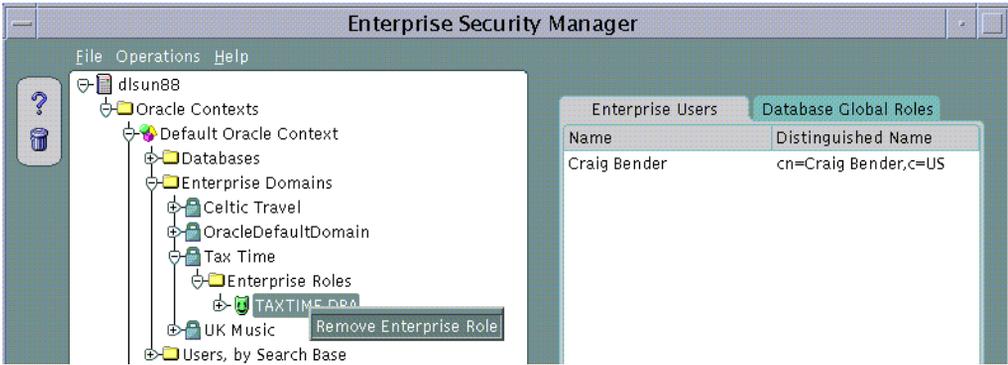
invoked using a Right Mouse Button click from an Enterprise Domain selected in the main application tree, then the name of that Enterprise Domain will already be selected.

- 3. Enter the name of the new Enterprise Role in the Role Name filed.
- 4. Choose OK. The new Enterprise Role will be created in the Enterprise Domain and appears on the main application tree.

Removing an Enterprise Role:

- 1. Click on the Enterprise Role to remove in the main application tree.
- 2. Choose Remove Enterprise Role either from the Operations Menu or by using a Right Mouse Button Click on the Enterprise Domain in the main application tree.

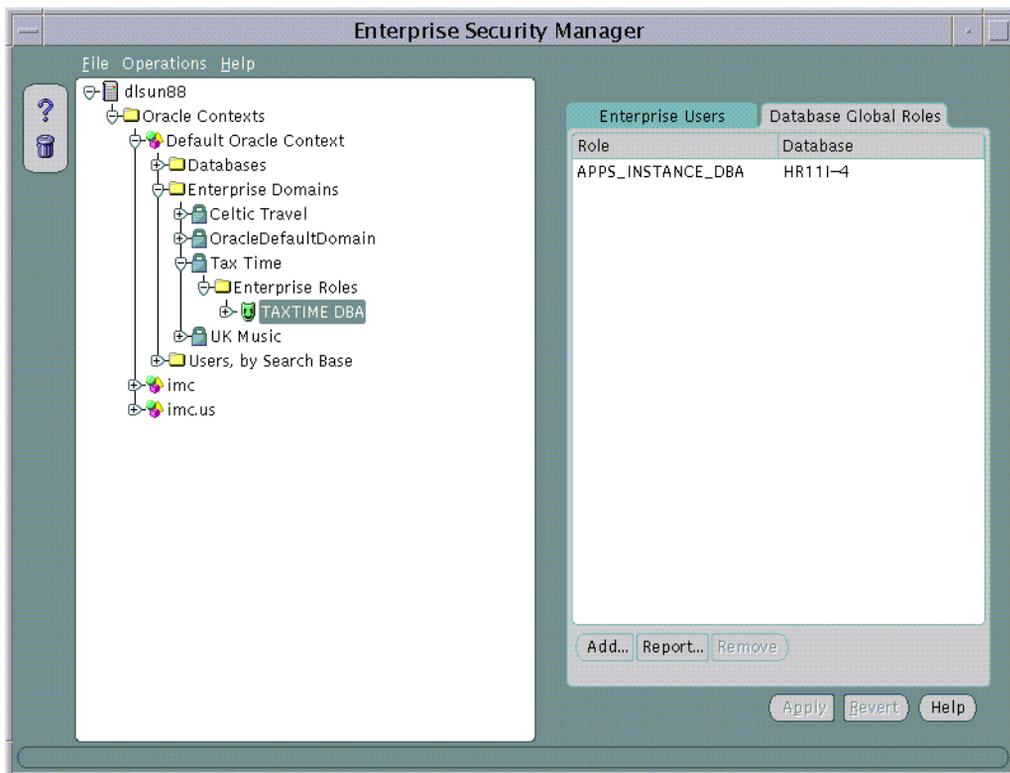
Figure 9-31 Removing an Enterprise Role



- 3. Enterprise Security Manager will ask you to confirm the operation before the Enterprise Role is removed from the Enterprise Domain.

Specifying Database Global Role Membership of an Enterprise Role

Database Role membership of an Enterprise Role in an Enterprise Domain may be managed using the Database Global Roles Page when an Enterprise Role is selected on the main application tree. This page lists the names of each Global Role that belongs to the Enterprise Role along with the name of the database on which that Global Role exists.

Figure 9–32 Database Global Roles Page

When populating an Enterprise Role with different database roles it is only possible to reference roles on databases that are configured to be “Global Roles” on those databases. A Global Role on a database is identical to a normal Role, except that the administrator of the database has elected it only to be authorized via the Directory. A database administrator cannot locally grant and revoke Global Roles to users of the database.

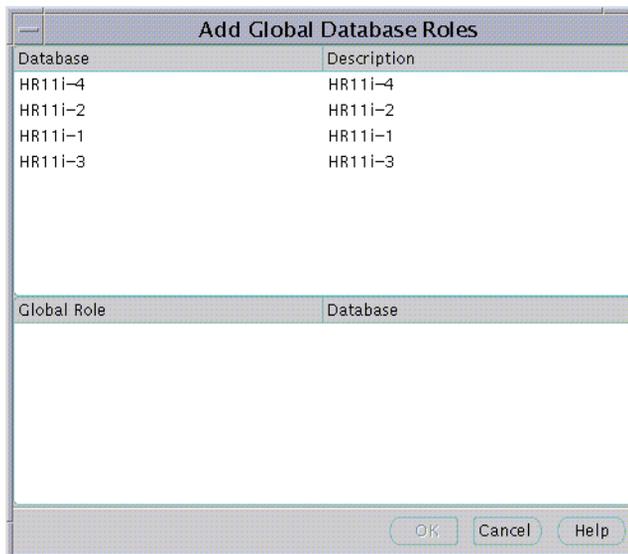
Removing a Database Global Role from an Enterprise Role:

1. Select a Global Role in the list and choose Remove... The Global Role will be removed from the list.
2. Choose Apply; the Global Role will be removed from the Enterprise Role in the Enterprise Domain.

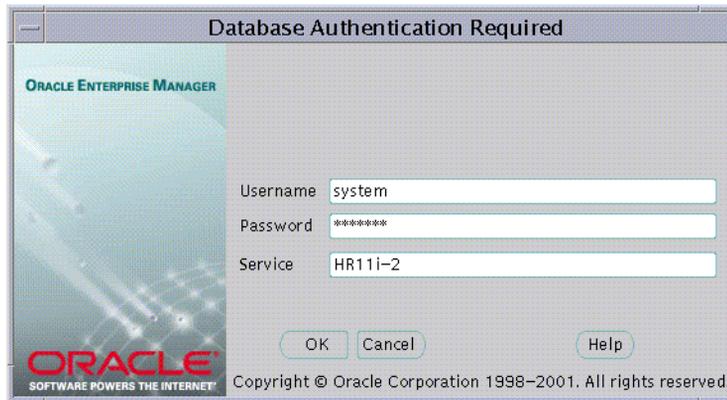
Adding a Global Role to an Enterprise Role:

1. Choose Add... The Add Database Global Roles screen will appear. This screen lists all the databases in the Enterprise Domain from which Global Roles may be selected to add to this Enterprise Role

Figure 9–33 Add Global Database Roles Dialog



2. Select a database from which to obtain Global Roles. A screen will appear in which you must enter logon details to authenticate to the database and fetch Global Roles. Typically this would be a DBA logging on to that database.

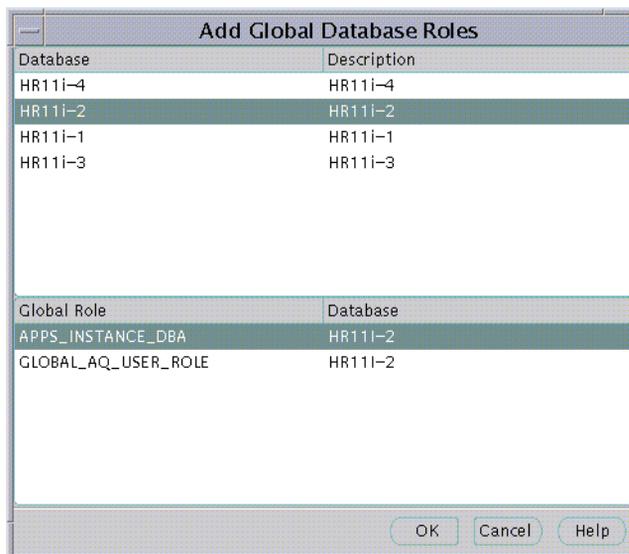
Figure 9–34 Database Logon

The name of the database appears in the Service field by default. You may use this name to connect to the database if your ORACLE_HOME has LDAP enabled as it Oracle Net Naming method or if this name appears as a TNS alias in your local Oracle Net configuration. Otherwise you may overwrite the content of the Service field with any other TNS alias configured for that database or by a connect string in the format:

```
<host>:<port>:<oracle sid>
```

For example, "cartman:1521:broncos"

3. Choose OK. Enterprise Security Manager will connect to the given database and fetch the list of Global Roles supported on that database. The list of values, if any, will appear in the Add Database Global Roles screen.

Figure 9–35 Add Global Database Roles Dialog

4. Select on or more of the Global Roles from the list of returned values and choose OK. These Global Roles will then appear in the Database Global Roles Page
5. Choose Apply; the new Global Roles will be added to the Enterprise Role in the Enterprise Domain.

Managing Enterprise Role Grantees

An Enterprise Role Grantee is a Directory User to whom has been granted an Enterprise Role and therefore all database Global Roles contained within that Enterprise Role. Enterprise Role Grantees may be managed using the Enterprise Users Page when an Enterprise Role is selected under an Enterprise Domain in the main application tree.

Removing a User from the List of Enterprise Role Grantees:

1. Select a User by clicking on that User in the list of Grantees.
2. Choose Remove. The selected User will be removed from the list.

3. Choose Apply; the User will be removed as a Grantee for that Enterprise Role in the Enterprise Domain.

Adding a New User to the list of Enterprise Role Grantees:

1. Choose Add... The Add Users screen will appear. This page is used to locate and select one or more Users in the Directory as discussed earlier. Select one or more desired users from the Directory to add as Enterprise Role Grantees. The new Users will then appear in the Enterprise Users Page

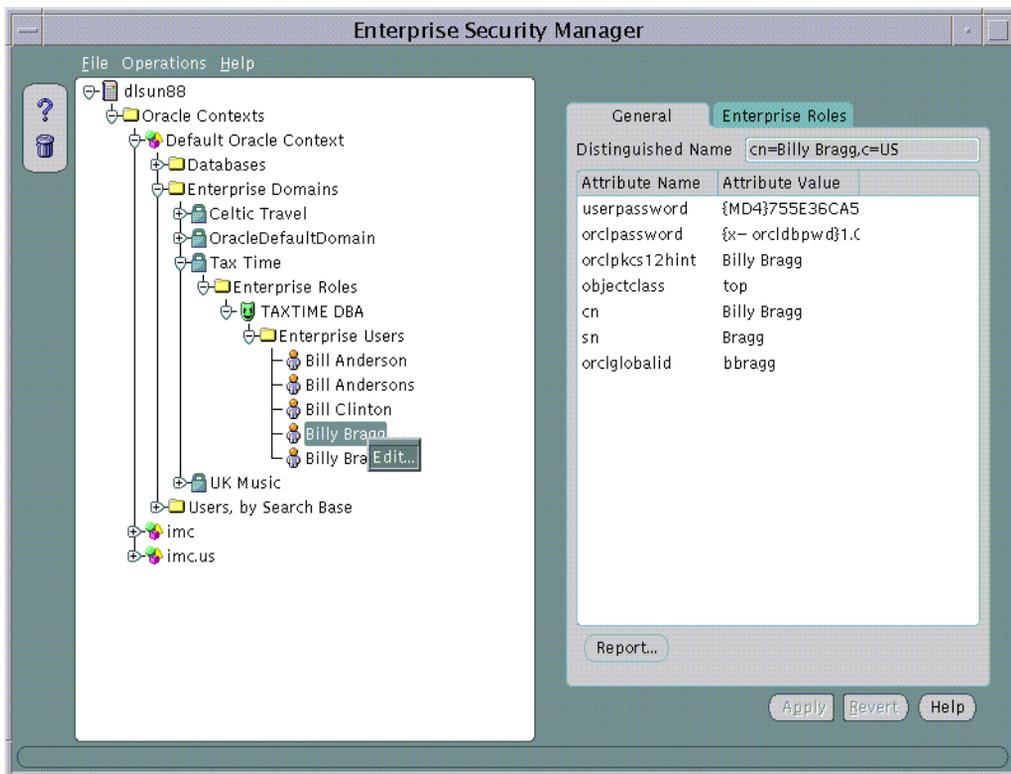
Figure 9–36 Enterprise Users Page



2. Choose Apply; the new Grantees will be added to the Enterprise Role in the Enterprise Domain.

Enterprise Role Grantees will also appear in the Enterprise Users tree under a selected Enterprise Role. A User selected on this tree can be edited as discussed in Part 1.

Figure 9-37 Enterprise Role Grantees



Part II

Database Administration Tools

- Chapter 10, "Database Administration"
- Chapter 11, "Managing Backup and Recovery"
- Chapter 2, "The Standalone Console"

Database Administration

Database administration functionality and wizards are integrated into Oracle Enterprise Manager. You can access the database administration functionality through the Console. The Console can either be launched with a connection to an Oracle Management Server, which utilizes Oracle Enterprise Manager's three-tier framework, or launched standalone, which connects directly to a database.

The databases folder contains all databases that are accessible to you. You can expand a specific database to administer any of the following from a unified tree view without launching separate tools:

- Instances, including startup, shutdown, and initialization.
- Schemas, including tables, indexes, and all other schema objects.
- Security, including user accounts, roles, and privileges.
- Storage, including tablespaces, datafiles, and rollback segments.
- Replication, including multimaster and materialized view replication.
- JVM, including namespaces, CORBA and EJB components, and their permissions.
- OLAP, including tools for developing and deploying internet-based business intelligence applications and services that support complex statistical, mathematical, and financial calculations within a multidimensional data model.
- Workspace, including a virtual environment that one or more users can share to make versioned changes to data.
- Other database features, depending on the products installed with your database.

This integrated access to database administration functionality simplifies switching between DBA tasks and provides an accurate view of database configuration status.

The Backup and Recovery wizards are also available to help you back up or restore and recover various objects such as the database, datafiles, and tablespaces. The Backup wizard also allows you to make an image copy of the datafiles and the current controlfile.

Common Features of DBA Management Functionality

This section discusses the common features shared by the database administration functionality in Enterprise Manager.

Tree Views

The Console displays a tree view of connected databases, which can be expanded to show subordinate objects.

General Information about Databases

When you select a database node in the tree, a non-editable General page appears on the right where you can view information about the host, port, SID, TNS descriptors, and listener.

Comprehensive Overview Pages

When you select one of the database management functionality nodes such as Instance, Schema, and so on, comprehensive overview pages with links to related Quick Tours or functional overviews appear on the right.

Property Sheets

When relevant, if you select an object in the tree, a property sheet appears on the right where you can view or edit database properties. Wizards also display tree views and property sheets as necessary.

Multi-Column Lists

In most cases when you select a folder under one of the database management functionality nodes such as Schema (with the exception of Advanced Queues), Instance, and so on, a multi-column list of all the folder's objects appears on the right side of the window, providing a quick summary of information about each object in the selected folder.

Database Version Awareness

All database administration functionality and wizards are aware of the features that are available in each database version. When you select a database in a tree view, the tool only displays objects and properties that are enabled in that database version.

Database Reports

You can extract information from the database such as object definitions, object dependencies, database configuration, or reports, including custom SQL queries.

Logging of Database Changes

You can now log all Data Definition Language (DDL) and Data Manipulation Language (DML) changes made by an application when connected to a database.

Showing Object DDL

Data Definition Language (DDL) commands set up the data such as creating and altering databases and tables. You can display the Data Definition DDL for objects.

Show SQL

Though one of the benefits of Enterprise Manager is that DBA tasks can be performed without manually entering SQL, you do have the option of viewing the SQL code generated for you. By selecting Show SQL button, you can review this code before implementing any changes, as well as copy and paste it into your own SQL scripts if you wish.

Show Dependencies

Database object dependencies and dependents can be viewed by right-mouse clicking an object in the tree view and choosing Show Dependencies. Dependencies show what the selected object depends on, such as the tablespace location and the owner of the selected object. Dependents rely on the selected object, such as which indexes will be dropped and which synonyms will be affected if you drop the selected object.

Right-Mouse Commands

With database administration functionality, you can right-mouse click any folder or object in a tree list to perform administrative tasks. Right-mouse clicking an object shows all the tasks that can be performed on the object, such as connecting to or disconnecting from the database, creating users, adding or removing profiles, assigning privileges, showing dependencies, and bringing up wizards.

DB Search Capabilities

Database Search allows you to search for any object in a database given a flexible set of criteria:

- Names of the objects that you want to find. You can enter wild card characters for the object name.
- Database that you want to search.
- Object types that you want to include in the search.
- Schemas that you want to include in the search.

The object definitions that match the search criteria are displayed in a multi-column table.

DBA Management Functionality and Wizards

This section describes DBA Management functionality and wizards.

| DBA Management Functionality | Task | See Page |
|-------------------------------------|---|-----------------|
| Instance Management | Manages instances and sessions | 10-7 |
| Schema Management | Manages schema objects | 10-13 |
| Security Management | Manages security parameters | 10-16 |
| Storage Management | Manages database storage | 10-19 |
| Replication Management | Enables an administrator to quickly set up, configure, and manage an Oracle replication environment | 10-22 |
| Oracle 9i JVM | Enables you to manage the namespace, browse CORBA and EJB components published in the namespace, change permissions on the published components, and execute the main() method in schema-resident Java classes and view the output. | 10-23 |
| OLAP Services | Develops and deploys internet-based business intelligence applications and provides services that support complex statistical, mathematical, and financial calculations within a multidimensional data model | 10-23 |
| Workspace Management | Allows you to version-enable tables and create, modify, refresh, and merge workspaces | 10-24 |
| SQL*Plus Worksheet | Executes SQL and PL/SQL commands | 10-24 |
| Wizards | Assist with importing, exporting, loading, backing up, and recovering data, as well as analyzing and creating tables and views | 10-25 |

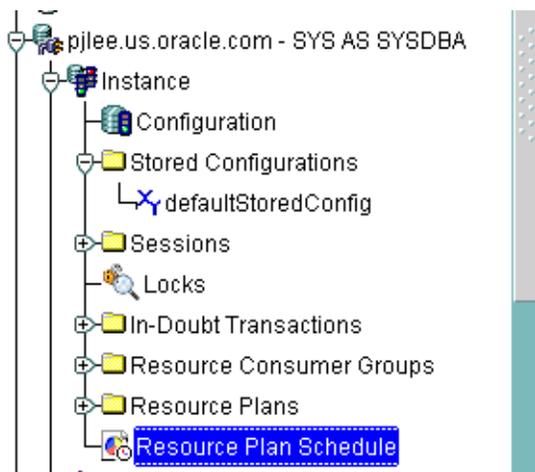
Instance Management

Instance Management functionality helps you manage database instances and sessions in your Oracle environment. With the Instance Management functionality you can:

- Start up and shut down a database.
- View and edit the values of instance parameters.
- Manage users' sessions, and view currently running SQL and its explain plan.
- Manage in-doubt transactions.
- Monitor long-running operations.
- Control processing resources via Resource Plans.
- Manage stored configurations (only when connected to Oracle Management Server).
- Administer locks and sessions consuming the highest amounts of resources (if the Diagnostics Pack is installed).

When you expand the Instance node under the database in the tree view, the following list of objects and folders appears:

- Configuration
- Stored Configurations (only when connected to Oracle Management Server)
- Sessions
- Locks
- In-Doubt Transactions
- Resource Consumer Groups
- Resource Plans
- Resource Plan Schedule

Figure 10–1 Instance Management

Configuration Operations

When you select the Configuration node under Instance, a property sheet of tabbed pages appears on the right for viewing information about the database instance and editing database properties. In this property sheet, the following information can be viewed and/or edited:

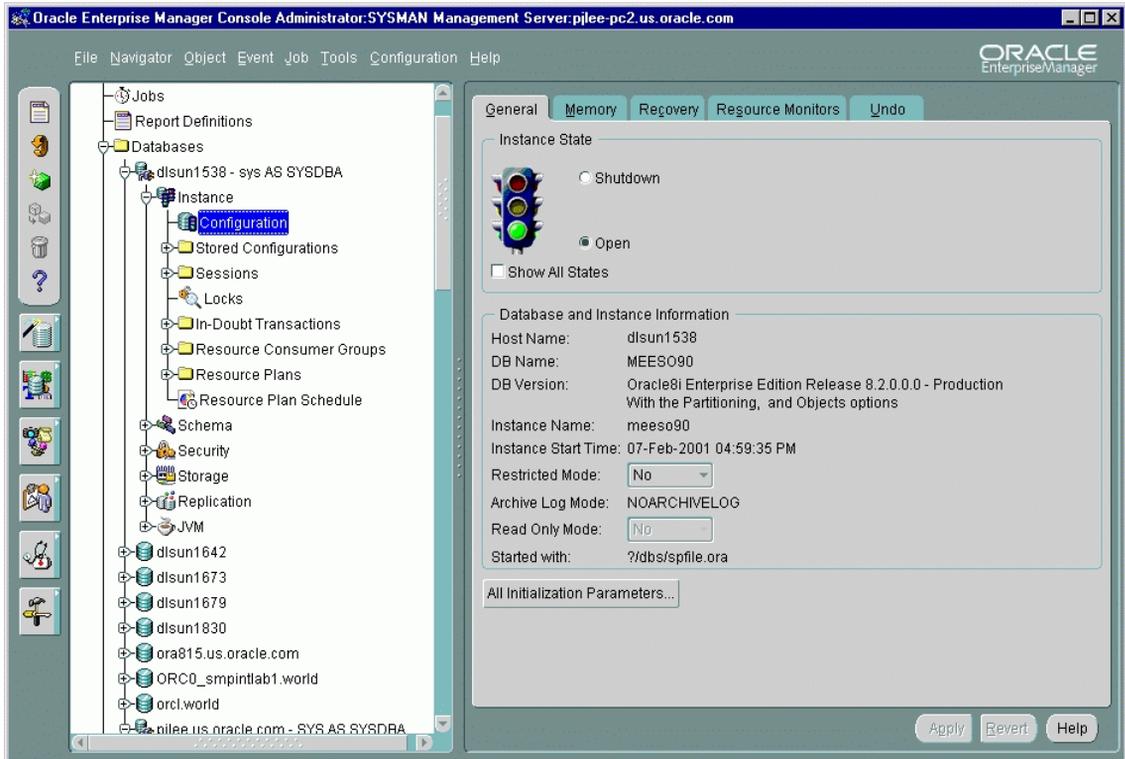
- Status of the instance, including the database version and any installed options, and allows you to start up and shut down a database.

Note: For a cluster database, do not accept the option to restart the database unless you are sure that no instance is running other than the current one. If some more instances are running; then, you need to arrange for their shut down using the right mouse menu of the cluster database or individual instances.

- Location of the spfile if the database had been started with an spfile
- Persistent parameters which allow you to modify, apply changes, and re-initialize the database.

Note: The Configured mode for a cluster database displays an additional "Instance Name" column, which helps distinguish the parameters as either database-wide or instance-specific. If this column is blank for a parameter; then, it implies that the parameter's value is available database wide (i.e. for all instances). A string in this column specifies the SID of a specific cluster database instance to which the parameter's value is applicable.

- Memory usage of the current database
- Estimated mean time to recover the database from an instance crash
- Current state of redo log archival
- Performance statistics of an active plan and of each consumer group associated with the active resource plan
- Information about the undo tablespace including the name of the current undo tablespace and the retention time.

Figure 10–2 Instance Management Window

Stored Configurations

When the database is connected to the Oracle Management Server, the Stored Configurations folder appears in the tree view with which you can create multiple database start-up configurations without the need to track initialization parameter files (INIT<SID>.ORA). Stored configurations exist in the Oracle Enterprise Manager repository (they are not external files) and can be created, edited, and deleted. You can also add and delete parameters and export a configuration to a file.

Note: If you are connected to an Oracle9i database, you can also start up the database by using the SPFILE on the server side. The database knows the location of the SPFILE and will look for it when it starts up to find the startup parameters. An SPFILE is similar to an init.ora file but located on the server-side and maintained by the server.

Sessions List

The Sessions List page displays the top number of sessions that you specify using database instance resources in real time. Sessions are displayed in descending order based upon the delta value of the statistic chosen as the sort statistic. You can use the information in the chart to isolate executing SQL or to kill a problem session.

Sessions Folder

The Sessions folder lists all users connected to the discovered database. When you select a user in the list, the Sessions property sheet appears with which you can edit user properties, view information about the status of each user, view current SQL or the last run SQL for the database session, and view the database session explain plan.

Locks

The Locks list contains information about the locks currently held by the Oracle server and outstanding requests for a lock or latch. Locks are mechanisms that prevent destructive interaction between transactions accessing the same resource--either user objects such as tables and rows or system objects not visible to users, such as shared data structures in memory and data dictionary rows. In all cases, Oracle automatically obtains necessary locks when executing SQL statements, so users need not be concerned with such details. Oracle automatically uses the lowest applicable level of restrictiveness to provide the highest degree of data concurrency yet also provide fail-safe data integrity. Oracle also allows the user to lock data manually.

Note: Background sessions holding locks are not problematic and should not be killed.

In-Doubt Transactions

The In-Doubt Transactions folder contains information about distributed transactions that failed in the PREPARED state. You can sort the Transactions list on each of the columns by clicking on the column heading.

The In-Doubt Transactions property sheet displays information about distributed transactions in which a commit was interrupted by a system, network, or any failure resulting from external factors.

Resource Consumer Groups

The Resource Consumer Groups folder lists sets of users who have similar resource usage requirements. When you select a resource consumer group object in the

folder, a property sheet appears in which you can view or specify properties and assign or remove users from the resource consumer group.

Resource Plans

The Resource Plans folder lists objects that represent resource plans, which are ways of allocating resources among consumer groups. Resource plans contain directives that specify the resources to be given to each group and can be specified in hierarchical fashion using subplans.

The Resource Plans property sheet, which appears when you select an object representing a Resource Plan, allows you to choose available groups/subplans to include in the resource plan, select the percentage of CPU resources allocated to a group, and then activate the plan. You can also view the degree of parallelism for each consumer group.

Resource Plan Schedule

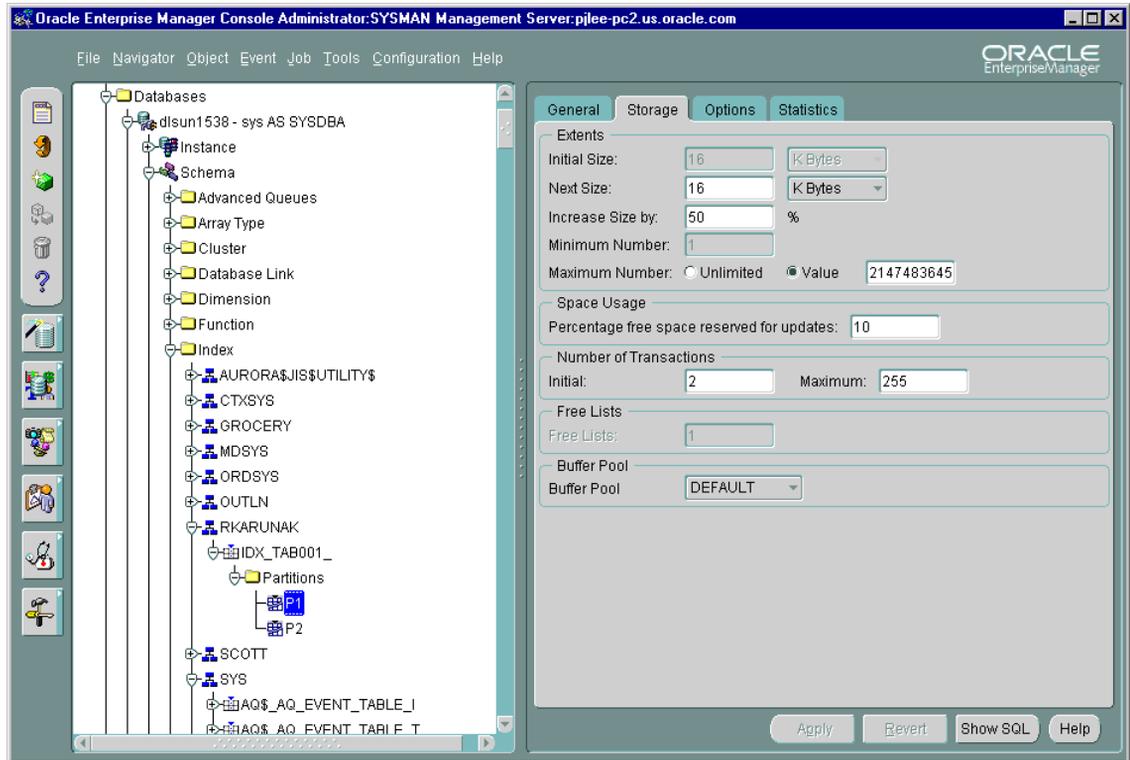
The Resource Plan Schedule property sheet allows you to automate when to activate a resource plan.

Note: The scheduling job is implemented using DBMS_JOB.

Schema Management

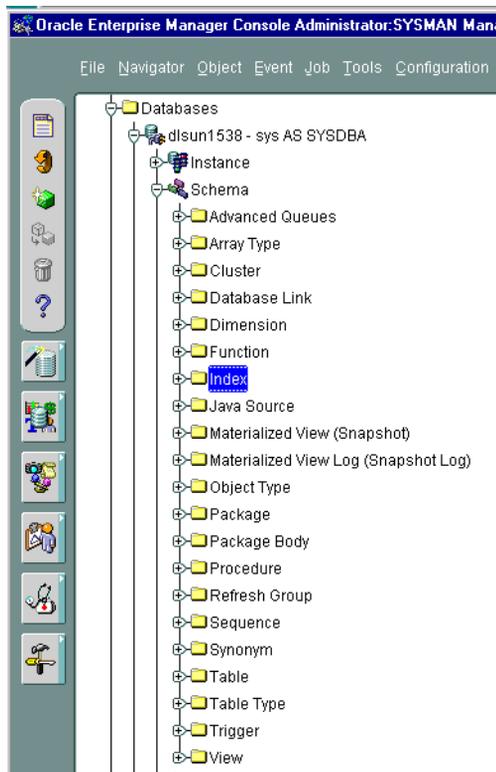
With the Schema Management functionality, you can create, alter, or drop database schema objects such as clusters, indexes, materialized views, tables, and views, as well as view dependencies of schema objects. The Schema Management functionality also supports index organized tables, partitioned tables and indexes, advanced queues, Java stored procedures, and unicode. In 9i, the unicode feature allows you to select a column of "character" type and specify the length in bytes or characters.

Figure 10–3 Schema Management Window



When you expand the Schema node under the database in the tree view, a list of schema objects appears.

Figure 10–4 Schema Objects



Tree List by Schema

Databases contain at least one named schema for each database user. Each schema object belongs to one of these named schemas, regardless of object type. Several objects belonging to the same schema can be edited by opening the View menu and selecting By Schema. The tree view then reorders all schema objects within a set of schema folders listed alphabetically by name.

Editing an Object

To edit an object, you use the object's property sheet, which appears when you select the object in the tree view. You can then modify the object's parameters.

The Schema Management functionality also includes the Table Data Editor content viewer, which allows you to view, update, and delete the contents of a table and display the contents of a view or synonym by selecting a right-mouse command on a table in the tree view.

Creating Objects

Schema Management allows you to create an object or a clone of an object by selecting Create or Create Like from the Object menu. When creating a clone of an object, all attributes are identical except for the name. Parameters for new objects and cloned objects are specified in property sheets which appear when you select Create and the object from the Create dialog or Create Like from the Object menu.

Security Management

In a large network environment, security parameters for objects, administrators, and users are in constant change. With the Security Management functionality, an administrator can make these necessary changes quickly and efficiently.

When you expand the Security node under the database in the tree view, folders for users, roles, and profiles appear.

Figure 10-5 Managing Users, Roles, and Profiles

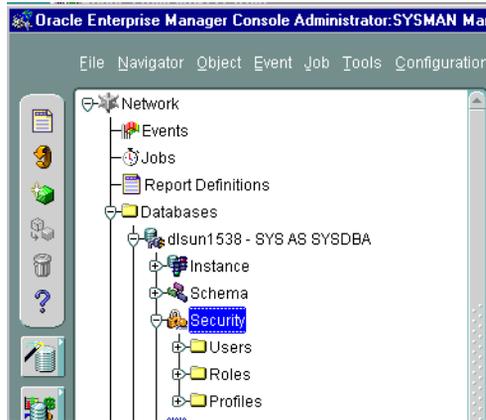
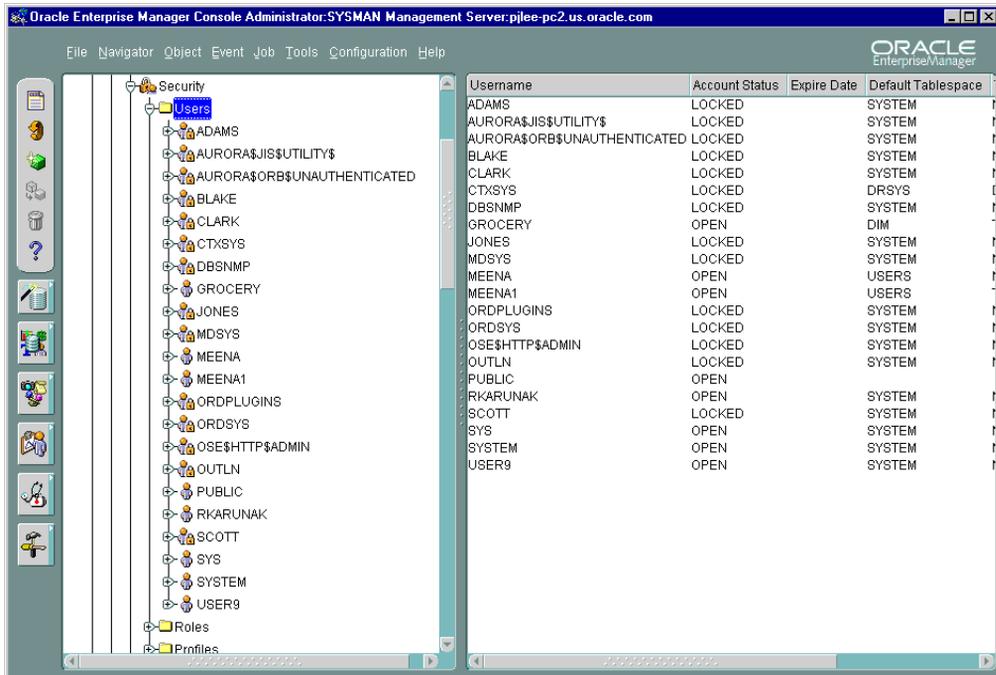


Figure 10-6 Security Management Window



User Operations

The Security Management functionality helps you manage the database users in your network by helping you create users and clones of users, add and remove user permissions and roles, grant or revoke the switch privilege of resource consumer groups for a user or role, alter user properties, including account status and default profiles, and set up database users to act as proxy for a user. Security Management capabilities also allow you to easily see users' dependents and dependencies.

Role Operations

With Security Management role operations functionality, you can modify role properties as easily as user properties. You can also create roles and clones of roles, add and remove permissions from roles, and see grantees of roles, including consumer groups.

Profile Operations

A profile is a set of limits on a user's database resources. As with users and roles, you can create a profile or a clone of a profile, alter a profile's properties, and assign and remove profiles from users. You also have the ability to see profile dependents and dependencies, as well as grantees of profiles.

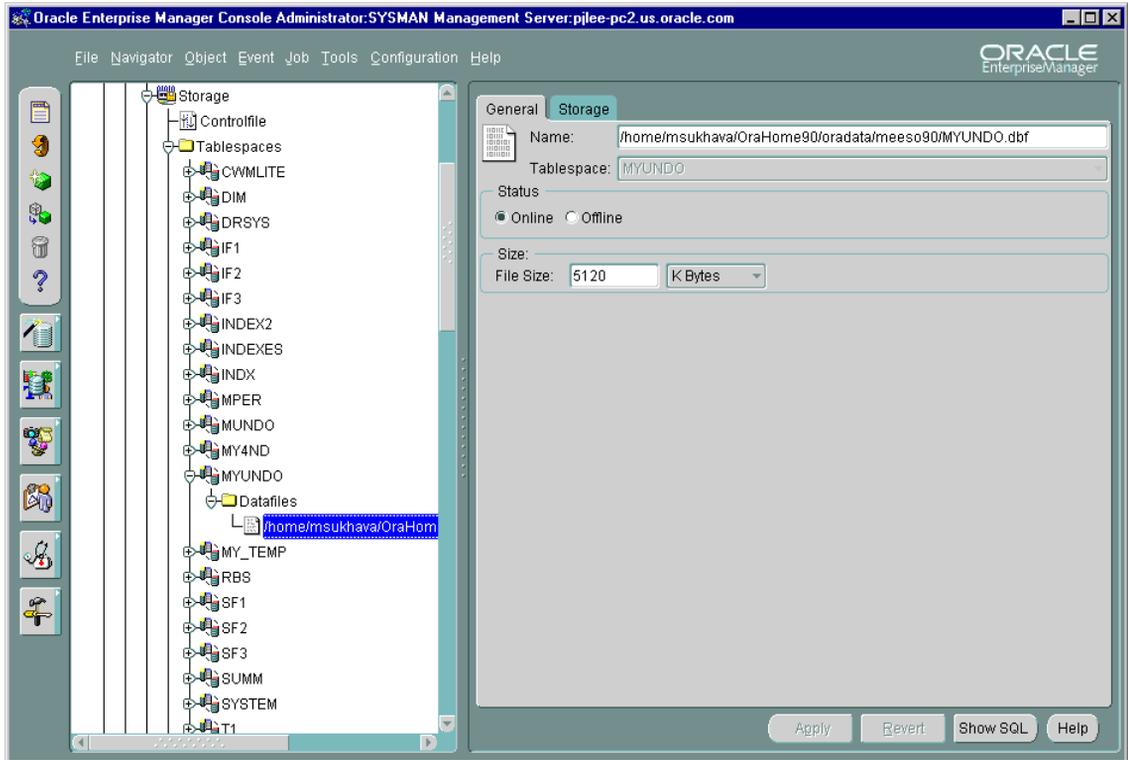
Profiles, roles, and the users to which they are assigned can easily be seen in security lists provided by Security Management. Administrators can then use property sheets to determine security parameters, simplifying the process of making changes.

The Security Management functionality also supports Oracle password management, which increases system security. Supported functionality includes: account locking, password lifetime and expiration, password history, password complexity, verifications, and export/import of passwords.

Storage Management

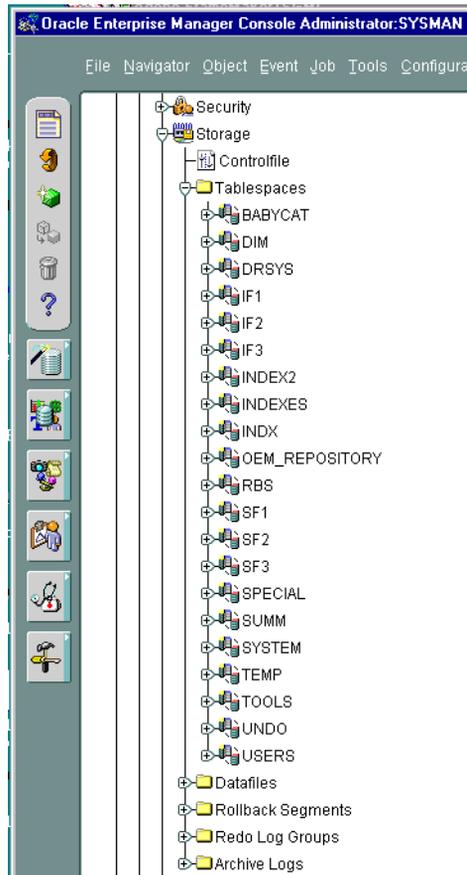
The Storage Management functionality helps you administer tablespaces (permanent, temporary, and undo), datafiles, redo logs, archive logs, and rollback segments for optimum database storage.

Figure 10–7 Storage Management Window



When you connect to a database, the Storage Management branch of the tree view lists an icon for the Controlfile and five folders which contain all the storage objects in the selected database. The five folders include:

- Tablespaces
- Datafiles
- Rollback Segments
- Redo Log Groups
- Archive Logs

Figure 10–8 Managing Database Storage Parameters

The following sections describe the Storage Management operations that can be performed with the objects in each of these folders:

Controlfile Operations

When you select the Controlfile icon, a property sheet appears where you can see the number of controlfiles created for the database and other statistics.

Tablespace Operations

Using the contents of the Tablespaces folder, you can create, edit, or drop a tablespace, switch to a new default temporary tablespace, add a datafile or rollback segment, take a tablespace off- or on-line, make a tablespace read-only or writable, and set tablespace storage parameters, including multiple block sizes which is key in facilitating the transportability of tablespaces from one database type to another. You can also click the tablespace to see the used and free space of the tablespace or datafile.

In Oracle9i, you can also allocate your undo space in a single undo tablespace, instead of distributing them into a set of statically allocated rollback segments. For each Oracle instance, you will only have to allocate enough disk space for the workload in that instance in an undo tablespace.

Datafile Operations

With the contents of the Datafiles folder, you can create a datafile or a clone of a datafile, edit a datafile, and take a datafile off- or on-line. You can also click the datafile to see the used and available space.

Rollback Segment Operations

Using the Rollback Segments folder, you can create, alter, drop, or shrink a rollback segment as well as take one off- or on-line.

Redo Log Group Operations

Using the Redo Log Groups folder, you can switch the current redo log group, trigger a checkpoint in a redo log group, create a new redo log group, and rename, remove, or add new redo log group members.

Archive Log Operations

The archive log folder allows you to view the current archive logs in the database.

Replication Management

Replication Management enables an administrator to quickly set up, configure, and manage an Oracle replication environment. Specifically, the Replication Management functionality provides a comprehensive wizard to prepare a database for supporting multimaster and/or snapshot replication. Once set up, additional wizards help you replicate schema objects using either multimaster or a combination of multimaster and snapshot replication. After you have configured

your replication environment, you can use Replication Management and the other database administration functionality in the Oracle Enterprise Manager Console to monitor and manage your replication environment.

Oracle 9i JVM

Oracle 9i JVM is the name of the Java engine embedded in Oracle database. CORBA and EJB components implemented in Java can be stored and executed inside the database. Client applications access these components through a name service.

Use the Oracle Enterprise Manager Console to:

- Manage the namespace
- Browse CORBA and EJB components published in the namespace
- Change permissions on the published components
- Execute the main() method in schema-resident Java classes and view the output

OLAP Services

Oracle OLAP Services is an Oracle9i database installation option that provides tools for developing and deploying internet-based business intelligence applications. OLAP (Online Analytical Processing) products provide services that support complex statistical, mathematical, and financial calculations within a multidimensional data model.

Oracle OLAP Services consists of the following components:

- Oracle's Java API for OLAP
- One or more OLAP services that run as child processes of a database instance
- An OLAP metadata repository in each database instance
- Tools within Oracle Enterprise Manager for creating OLAP metadata and managing OLAP services

For information on OLAP Services, see *Oracle9i OLAP Services Concepts and Administration Guide*. For information on Oracle's Java API for OLAP, see *Oracle9i OLAP Services Developer's Guide to the Oracle OLAP API*. For information on data warehousing, see *Oracle9i Data Warehousing Guide*.

Workspace Management

Workspace Management allows you to version-enable tables and create, modify, refresh, and merge workspaces.

Oracle Workspace Manager provides a long transaction framework, in which multiple data versions are stored in the database as different workspaces. Users can create new versions of data to update, while maintaining a copy of the old data.

Versioning improves concurrent access of data in the database and allows multiple what-if analyses to be run against the data simultaneously.

For detailed information about Workspace Manager concepts and the application programming interface (API), see the *Oracle Workspace Manager User's Guide*.

SQL*Plus Worksheet

When you need to administer your database environment with SQL, PL/SQL, or SQL*Plus commands, use Oracle SQL*Plus Worksheet. With Oracle SQL*Plus Worksheet, you can enter SQL and PL/SQL code and DBA commands dynamically and run scripts which are stored as files.

The SQL*Plus Worksheet window consists of an Input pane (top) where commands are entered, and an Output pane (bottom) where the results of your commands appear after you click the Execute button.

SQL*Plus Worksheet maintains a history of the commands you have entered, allowing you to edit and re-execute an earlier command without having to retype it. The last 50 command executions can be displayed by clicking the Command History button. Selections from the Command History dialog box can then be copied and inserted into the Input pane.

With SQL*Plus Worksheet, you can have multiple copies of the worksheet open at a time, each of which is separate from the others; so work can be committed or rolled back in each worksheet independently.

Note: Additional information on the database administration functionality and wizards in the Oracle Enterprise Manager can be found in the Oracle Enterprise Manager Online Help.

Wizards

For help with database administration tasks, Oracle Enterprise Manager offers a variety of wizards:

- **Analyze Wizard:** The Analyze wizard allows you to collect statistics about the objects and store them in the data dictionary, delete statistics about the objects from the data dictionary, validate the structure of the objects, and identify migrated and continued rows of tables or clusters.
- **Backup and Recovery Management Wizards:** The Backup and Recovery wizards are also available to help you back up or restore and recover various objects such as the database, datafiles, and tablespaces. The Backup wizard also allows you to make an image copy of the datafiles and the current controlfile.
- **Create Table Wizard:** The Create Table Wizard facilitates the creation of a table.
- **Cube Wizard:** The Create Cube Wizard helps you build a cube object. Cubes represent multidimensional data stored in your data warehouse fact tables.
- **Data Management Wizards (Import/Export/Load):** Oracle Data management wizards automate the transfer of data to and from an Oracle database.
- **Dimension Creation Wizard:** The Create Dimension Wizard will help you build a dimension object. Dimensions represent columns in your data warehouse dimension tables as levels and attributes. Dimensions typically define hierarchical relationships between their levels.
- **Resource Plan Wizard:** The Resource Plan Wizard helps you group user sessions that have similar processing and resource usage requirements and allocate resources among the consumer groups.
- **Summary Advisor Wizard:** The Summary Advisor Wizard provides advice as to which materialized views should be created, dropped, or retained.
- **View Wizard:** The View Wizard facilitates the creation of a view, a tailored presentation of the data contained in one or more tables (or other views).

For more information on wizards, see the Oracle Enterprise Manager Quick Tour or the Oracle Enterprise Manager Online Help.

Managing Backup and Recovery

This chapter describes how to use the Oracle Enterprise Manager Backup Management wizards to administer your database backup and recovery environment.

The following topics are covered:

- Accessing the Backup Management Wizards and Property Sheets
- Backup Wizard
- Recovery Wizard
- Create Backup Configuration
- Catalog Maintenance Wizard
- Backup Configuration Library
- Recovery Catalog Setup and Registration

The Oracle Enterprise Manager Backup, Recovery, and Catalog Maintenance wizards, Backup Configuration Library, and the Create Backup Configuration property sheets are only available for Oracle8 and above databases.

The wizards provide a graphical user interface to Recovery Manager, an Oracle utility you use to back up, restore, and recover database files.

If your target database is pre-8.1.x and not configured for remote SYSDBA operation, see "Configuring a Remote Database for Backup or SYSDBA Administration" on page 11-35.

For more information on backup and recovery strategies, see your *Oracle9i Recovery Manager User's Guide and Reference*.

Oracle9i Backup and Recovery Documentation Roadmap

Conceptual Information

- *Oracle9i Backup and Recovery Concepts*: This book describes the basic concepts involved in backup and recovery.
- *Oracle9i Concepts*: This book describes the basic architecture of the database server. Refer to this manual for information about data structures and memory processes involved in backup and recovery.

Administrative Information

- *Oracle9i Recovery Manager User's Guide and Reference*: This book describes how to use Recovery Manager (RMAN) to perform backup and recovery.
- *Oracle9i User-Managed Backup and Recovery Guide*: This book describes how to use operating system commands to perform backup and restore operations, and SQL*Plus to perform recovery.
- *Oracle9i Utilities*: This book describes how to use Export and Import to perform logical backup and restore operations.

Accessing the Backup Management Wizards and Property Sheets

The Backup Management wizards and property sheets consist of:

- Backup
- Recovery
- Catalog Maintenance
- Create Backup Configuration
- Backup Configuration Library

You can access the Backup Management wizards and property sheets using one of the following methods:

- From the Console Navigator tree, select the database you want to administer; then, choose the tool from the context-sensitive Backup Management menu.
- From the Storage Management container of the Console Navigator tree, select the tablespace or datafile you want to administer; then, choose the tool from the context-sensitive Backup Management menu.
- From the Console's Object->Backup Management menu.
- From the Console's Tools->Database Wizards->Backup Management menu.

Note: The Backup Management wizards and property sheets are only available when you are connected to a Management Server.

Backup Wizard

The Backup Wizard provides an intuitive graphical user interface for the backup facility of Recovery Manager, an extremely powerful and flexible command line backup and recover utility designed for the Oracle8 and above databases. This wizard guides you through the entire backup process.

Before attempting to use the Backup Wizard, make sure the following requirements are met:

- The Oracle target database you want to backup is version 8 or above
- The application is connected to a Management Server
- The preferred credentials is SYSDBA or you have created a backup configuration and overridden the preferred credentials.
- The job and event systems are fully functional
- A service name entry exists for the target database in its tnsnames.ora file which matches the entry in the tnsnames.ora file in the Oracle Enterprise Manager home.

You can access the wizard through the Oracle Enterprise Manager Console if you are connected to a Management Server.

For more information on backups and related strategies, see your *Oracle9i Recovery Manager User's Guide and Reference*.

Backup Wizard: Introduction

The Backup Wizard helps you to back up various objects such as the database, datafiles, tablespaces, and archivelog, or to make an image copy of the datafiles and the current controlfile.

The wizard will step you through the process of choosing the objects you want to back up or the objects of which you want to make an image copy.

When you start the Backup Wizard for the first time, the wizard presents you with default settings for most backup parameters so you can quickly create a backup.

Nevertheless, for effective backup operations, you need to specify parameters that match your environment, such as type and number of backup devices. Instead of entering these parameters every time you run the Backup wizard, you can define these parameters in one or more backup configurations.

Then, the wizard will guide you in submitting a backup job through Enterprise Manager to complete the operation.

A checkbox “Display this page next time” is available where you can specify not to show this page once you are familiar with the Backup Wizard. By default, the checkbox is selected. If you deselect the checkbox, the wizard starts on the Strategy Choice page the next time.

Backup Wizard: Strategy Choice

The Strategy Choice page allows you to specify whether you want to use a predefined backup strategy or customize your own. There are two options from which to choose:

- **Predefined backup strategy:** Select the appropriate backup strategy. For backup frequency guidelines, refer to the *Oracle9i Recovery Manager User's Guide and Reference*.
- **Customize backup strategy:** Select the information you want to backup and the schedule for the execution of the backup. Refer to the guidelines documented in the *Oracle9i Recovery Manager User's Guide and Reference*.

After choosing your strategy choice, press Next to continue.

Proceed to Predefined Backup Strategy on page 11-6 if you have chosen Predefined Backup Strategy as your strategy choice.

Proceed to Customize Backup Strategy on page 11-9 if you have chosen Customize Backup Strategy as your strategy choice.

Predefined Backup Strategy

The following pages appear if you choose "Predefined backup strategy" as your strategy choice:

- Backup Wizard: Backup Frequency
- Backup Wizard: Backup Time
- Backup Wizard: Configuration
- Backup Wizard: Multiple Targets

Backup Wizard: Backup Frequency

The Backup Frequency page allows you to specify how often you want to perform a backup and on which day of the week.

Choose the type of description that best fits your database.

- My database is not frequently updated (DSS--Decision Support System)

Full backup once-a-week

Backup day:

Choose the backup day from the scroll-down list.

- My database is moderately updated (OLTP--On Line Transaction Processing) and is not very large

Full backup everyday

- My database is frequently updated and is large or medium

Full backup once-a-week and incremental everyday

Full backup day:

Choose the full backup day from the scroll-down list.

After choosing your backup frequency, press Next to continue. Proceed to Backup Wizard: Backup Time on page 11-7.

Backup Wizard: Backup Time

The Backup Time page allows you to specify the start time for performing the backup.

If your database is running in ARCHIVELOG mode, the backup is taken when the database is open. When you run a database in ARCHIVELOG mode, you allow Oracle to archive the online redo log. You can either perform the archiving manually or enable automatic archiving.

If the database is running in NOARCHIVELOG mode, the backup job closes the database, takes the backup, and then reopens the database. When you run your database in NOARCHIVELOG mode, you disable the archiving of the online redo log. The choice of whether to enable the archiving of filled groups of online redo log files depends on the availability and reliability requirements of the application running on the database.

Refer to the *Oracle9i Recovery Manager User's Guide and Reference* for information on choosing between NOARCHIVELOG and ARCHIVELOG mode.

Refer to the Instance Management online help for information on setting up backup modes.

After specifying your backup time, press Next to continue. Proceed to Backup Wizard: Configuration on page 11-7.

Backup Wizard: Configuration

The Configuration page allows you to choose the configuration for backup and view the details that you have set up previously using the Create Backup Configuration option.

Choose the configuration for this backup

Allows you to choose a configuration you have previously set up using the Create Backup Configuration Property Pages.

If you are using an image copy, the configuration library of backup sets is filtered out so that only the configurations for image copy remain. If a configuration for image copy does not exist, an empty drop-down list appears and an message appears, asking you to exit the Backup Wizard and create a backup configuration for image copy.

Description of the configuration

The description of the configuration.

Summary of the configuration:

If you are using a backup set, the following items appear in the summary:

- Name of the configuration
- Type of Channel (Backup set using disk or Backup set using tape)
- Channel Name (User-specified name of the channel)
- File Name (Unique backup set name)
- Drive and path where backup sets are stored.
- Recovery Catalog Credentials if you are using a recovery catalog

If you are using an image copy, the following items appear in the summary:

- Name of the configuration
- Image Copy as the Type of Channel
- Channel Name (User-specified name of the channel)
- Recovery Catalog Credentials if you are using a recovery catalog

Refer to "Create Backup Configuration" on page 11-23 for information on creating a backup configuration.

After choosing your configuration, press Next to continue. Proceed to Backup Wizard: Multiple Targets on page 11-8.

Backup Wizard: Multiple Targets

The Multiple Targets page allows you to specify the target database(s) to submit the job. You can select from the list of databases shown on the Available targets window.

Move the selection(s) to and from the Available targets and Selected targets windows by using arrow buttons between them. By default, the database to which you are connected is shown in the Selected targets window.

Note: To submit the same backup to multiple targets, the databases must have the same structure and the same disk/tape configuration.

Backup Wizard: Summary

The Summary page appears when you click the Finish button. Information about the backup management job you just created using the Wizard is summarized before submission to the Oracle Enterprise Manager job system.

Clicking OK submits the job the Oracle Enterprise Manager job system.

Clicking Cancel returns you to the wizard.

Customize Backup Strategy

Customize backup strategy allows you to elect the information you want to backup and the schedule for the execution of the backup.

Refer to the guidelines documented in the *Oracle9i Recovery Manager User's Guide and Reference*.

Backup Wizard: Backup Selection

Your database contains a wide variety of types of data. When developing your backup strategy, you must decide what information you want to backup. The basic principle you should use when deciding what to back up is to prioritize data depending on its importance and the degree to which it changes.

Note: If your database is in NOARCHIVELOG mode, you can only perform a full database backup. If the database is in NOARCHIVELOG mode and open at the time of the backup job, it is shut down during the backup, started in MOUNT mode, backed up, and then brought up once the backup is complete.

Choose from the following basic backup types:

Entire database

Entire database backup contains the control file along with all database files that belong to a database. Whole database backups are the most common type of backup. This option backs up the whole database at once. If you operate in ARCHIVELOG mode, you also have the option of backing up different parts of the database over a period of time, thereby constructing a whole database backup piece by piece.

Tablespace

A tablespace backup is a backup of a subset of the database. Tablespace backups are only valid if the database is operating in ARCHIVELOG mode.

Datafile

A datafile backup is a backup of a single datafile. Datafile backups, which are not as common as tablespace backups, are only valid if you run the database in ARCHIVELOG mode.

Archived redo log

An archived redo log is an online redo log that Oracle has filled with redo entries, rendered inactive, and copied to one or more log archive destinations. Archive redo logs do not change, for example, but they are crucial for recovering your database, so you should maintain multiple copies if possible. This option is available only in ARCHIVELOG mode.

Use an image copy

Check this box if you want to back up a datafile using an image copy. Oracle supports performing a backup using an image copy of datafiles, controlfiles, or archivelogs. You can only perform an image copy of a controlfile with an image copy of a datafile. Using an image copy of only the controlfile is not likely to occur.

If you select the Datafile radio button and the Use an image copy checkbox, the Configuration page appears.

After choosing your backup type, press Next to continue.

Proceed to Backup Wizard: Archive Logs on page 11-12 if you have chosen Entire database or Archive Logs as your backup type.

Proceed to Backup Wizard: Tablespaces on page 11-10 if you have chosen Tablespace as your backup type.

Proceed to Backup Wizard: Datafiles on page 11-10 if you have chosen Datafiles as your backup type.

You can submit a backup job directly from the Job System, but the recommended method is through the wizard.

Note: If the database was OPEN and in ARCHIVELOG MODE when the backup job was created and the database is in MOUNT state when the job runs; then, the backup job will fail because of "Alter System Switch Logs."

Backup Wizard: Tablespaces

A tablespace backup is a backup of a subset of the database. Tablespace backups are generally valid if the database is operating in ARCHIVELOG mode.

The Tablespace page allows you to select the tablespaces you want to back up. Choose from the list of tablespaces shown on the Available Tablespaces window.

Move the selection(s) to and from the Available Tablespaces and Selected Tablespaces windows by using arrow buttons between them.

You may choose to include the control files with the backup.

After selecting the tablespaces you want to back up, press Next to continue.

Proceed to Backup Wizard: Archive Logs on page 11-12.

Backup Wizard: Datafiles

The Datafiles page allows you to select the datafiles you want to back up or the datafiles of which you want to make an image copy. Choose from the list of datafiles shown on the Available Datafiles window. Full path and name of the datafile are

shown. At least one datafile must be selected and moved to the Selected Datafiles window.

Datafile backups, which are not as common as tablespace backups, are only valid if you run the database in ARCHIVELOG mode.

Move the selection(s) to and from the Available Datafiles and Selected Datafiles windows by using arrow buttons between them.

You may choose to include the control files with the backup.

You may choose not to include the control files with the image copy.

After selecting the datafiles you want to back up, press Next to continue.

Proceed to Backup Wizard: Location on page 11-11.

Backup Wizard: Location

Choose the file locations.

The file location information is presented in a table with two columns: "Selected file(s)" and "Copy file(s) to."

Copy all files to the base location

If you choose the "Copy all files to base location" option, which is the default selection, the locations in the "Copy file(s) to" column are read-only. The files will be copied to the base location specified.

Customize

Select the "Customize" option to make the "Copy file(s) to" column of the table editable.

Selected file(s)

The datafiles of which you have selected to make an image copy. The "Selected file(s)" column is read-only.

Copy file(s) to

The locations in the "Copy file(s) to" column are read-only if you have chosen the "Copy all files to base location" option, which is the default selection. They are computed by appending the file names from the "Selected file(s)" column to the base location given in the "Copy all files to base location" field. The values of the locations change as you edit the base location.

The file names are deduced from the "Selected file(s)" column based on the common delimiters including '/', '/', and ']'.

Note: The deduction is not guaranteed to be correct if the operating system specific delimiter is not one of the above. If the deduction is incorrect, you can make the "Copy file(s) to" column of the table editable by selecting the "Customize" option. Then you can modify the location of each file.

Proceed to Backup Wizard: Archive Logs on page 11-12.

Backup Wizard: Archive Logs

The Archive Logs page allows you to specify the following options:

- No (do not back up any archive logs)
- Yes, all archive logs
- Yes, selected archive logs (allows a range)

From

Date and time for the first archive logs to backup. These fields are enabled when you select "Yes, selected archive logs."

Until

Archive date and time for the last archive logs to backup. These fields are enabled when you select "Yes, selected archive logs."

delete archive logs after they have been backed up

Deleting archive logs saves space.

An archived redo log is an online redo log that Oracle has filled with redo entries, rendered inactive, and copied to one or more log archive destinations. Archive redo logs do not change, for example, but they are crucial for recovering your database, so you should maintain multiple copies if possible.

After specifying the archive log options, press Next to continue.

Proceed to Backup Wizard: Backup Options on page 11-13 if you have chosen Entire database, Tablespace, or Datafile as your backup type.

Proceed to Backup Wizard: Configuration on page 11-14 if you have chosen Archive Logs as your backup type.

Backup Wizard: Backup Options

The Backup Options page allows you to choose from a full or an incremental backup.

Full backup

A full backup backs up all blocks into the backup set, skipping only datafile blocks that have never been used. The server process does not skip blocks when backing up archived redo logs or control files.

A full backup has no effect on subsequent incremental backups, which is why it is not considered part of the incremental strategy. In other words, a full backup does not affect which blocks are included in subsequent incremental backups.

Incremental backup

Incremental backups are a method by which you only backup modified blocks. An incremental level 0 backup, performs the same function as a full backup in that they both backup all blocks that have ever been used except a level 0 will affect what blocks are copied out by subsequent incremental backups.

Incremental backups of levels greater than 0 back up only blocks that have changed since previous incremental backups. Blocks which have not changed will not be backed up.

- **Non-cumulative backup**

A type of incremental backup in which you back up all blocks that have changed since the most recent backup at level n or lower. For example, in a differential level 2 backup you back up all blocks modified since the last level 2, level 1, or level 0 backup.

A non-cumulative backup copies less data and therefore takes a shorter time than the cumulative backup, but recovery time is longer.

- **Cumulative backup**

A type of incremental backup that allows you to back up all the blocks used since the most recent backup at level n-1 or lower. For example, in a cumulative level 2 backup you back up all blocks used since the most recent level 1 or level 0 backup.

A cumulative backup copies more data and therefore takes longer than the non-cumulative backup, but recovery time is shorter.

Proceed to Backup Wizard: Configuration on page 11-14 if you have chosen your backup option.

Backup Wizard: Configuration

The Configuration page allows you to choose the configuration for backup and view the details that you have set up previously using the Create Backup Configuration option.

If you are using an image copy, the configuration library of backup sets is filtered out so that only the configurations for image copy remain. If a configuration for image copy does not exist, an empty drop-down list appears and a message appears, asking you to exit the Backup Wizard and create a backup configuration for image copy.

Choose the configuration for this backup

Allows you to choose a configuration you have previously set up using the Create Backup Configuration Property Pages.

Description of the configuration

The description of the configuration.

Summary of the configuration:

If you are using a backup set, the following items appear in the summary:

- Name of the configuration
- Type of Channel (Backup set using disk or Backup set using tape)
- Channel Name (User-specified name of the channel)
- File Name (Unique backup set name)
- Drive and path where backup sets are stored.
- Recovery Catalog Credentials if you are using a recovery catalog

If you are using an image copy, the following items appear in the summary:

- Name of the configuration
- Image Copy as the Type of Channel
- Channel Name (User-specified name of the channel)
- Recovery Catalog Credentials if you are using a recovery catalog

After choosing your configuration, press Next to continue. Proceed to Backup Wizard: Schedule on page 11-14.

Backup Wizard: Schedule

The Schedule page enables you to schedule the execution of a backup.

Run Job

Select the frequency of backup. The choices are Immediately, Once, On Interval, On Day of Week, and On Date of Month.

- Immediately submits the task as soon as you finish the wizard. The task executes only one time.
- Once schedules the task only one time at the date and time you choose.
- On Interval enables you to schedule a specific time interval between task executions. The interval can be a combination of hours and minutes, or number of days. Select the value you want to change and click the scroll buttons. You can also type in a new value.
- On Day of Week enables you to schedule the task on one or multiple days (Sunday, Monday, etc.) of the week. Click the days of the week to select the days you want the task scheduled.
- On Date of Month enables you to schedule the task on one or multiple days (1 - 31) of the month. Click the dates of the month to select the dates you want the task scheduled.

Note: If you choose a day, such as 31, that is not in a month, the job will not be run in that month. Choose the first day of the month.

Start Execution

Choose the first date and time that you want the task executed. This is the starting time for any task scheduled on an interval.

- Select the month, day, or year in the Date field and click the scroll buttons to change the value. You can also type in new values.
- Select the hour, minute, or AM/PM in the Time field and click the scroll buttons to change the value. You can also type in new values.

End Execution

Choose the last date and time that you want the task executed. This option does not apply if you chose the Immediately or Once execution options.

- Select the month, day, or year in the Date field and click the scroll buttons to change the value. You can also type in new values.
- Select the hour, minute, or AM/PM in the Time field and click the scroll buttons to change the value. You can also type in new values.

Time Zone

Shows the time zone. The agent schedules the task execution at each destination based on the actual system time of each agent. Tasks are not necessarily run simultaneously.

Run on Multiple Targets

The Run on Multiple Targets option allows you to access the Multiple Targets page so that you can specify the destination target(s) to submit the job.

After specifying the scheduling options, press Next to continue.

Proceed to Backup Wizard: Job Information on page 11-17.

Backup Wizard: Job Information

The Job Information page allows you to specify the name and description for the backup job and what you would like to do with the job as it will appear in the Oracle Enterprise Manager Console Job System.

The choices for what to do with the job are listed below:

- Submit the job now. The job is submitted to the Management Server.
- Do not submit the job now, but add it to the Job Library for later use. The Enterprise Manager job is added to the Job Library. From the Oracle Enterprise Manager Console, you can edit or submit the job at a later date.
- Submit the job now and add it to the Job Library

You can view the status of the job by selecting the Active and History page tabs in the Console.

Note: If a service name entry does not exist for the target database in its tnsnames.ora file which matches the entry in the tnsnames.ora file in the Oracle Enterprise Manager home, the following error message appears:

```
ora-12154: TNS:could not resolve service name
```

```
Last Message : The job failed
```

For the backup job to run, you must update the tnsnames.ora file in the target database node, bounce the agent, and rediscovering the target node in the Oracle Enterprise Manager Console.

Backup Wizard: Summary

The Summary page appears when you click the Finish button. Information about the backup management job you just created using the Wizard is summarized before submission to the Oracle Enterprise Manager job system.

Clicking OK submits the job the Oracle Enterprise Manager job system.

Recovery Wizard

The Recovery wizard helps you restore and recover various objects like databases, datafiles, and tablespaces.

Before attempting to use the Recovery Wizard, make sure the following requirements are met:

- The Oracle target database is version 8 or above
- The application is connected to a Management Server
- The preferred credentials is SYSDBA or you have created a backup configuration and overridden the preferred credentials.
- the job and event systems are fully functional.

You can access the wizard through the Oracle Enterprise Manager Console if you are connected to a Management Server.

Note: You can submit a recovery job directly from the Job System, but the recommended method is through the wizard.

Recovery Wizard: Introduction Page

The Recovery Wizard guides you through the process of specifying what you want to restore and recover and submits a recovery job through the Enterprise Manager to complete the operation.

A checkbox "Display this page next time" is available where you can specify not to show this page once you are familiar with the Recovery Wizard. By default, the checkbox is selected. If you deselect the checkbox, the wizard starts on the Recovery Selection page the next time.

Press Next to continue. Proceed to Recovery Wizard: Recovery Selection on page 11-19.

Recovery Wizard: Recovery Selection

The Recovery Selection page of the Recovery Wizard allows you to select from the following types of recovery operations:

- Database
- Tablespaces
- Datafiles

Note: If the database is mounted, but not open, all three options are available.

If the database is open and in ARCHIVELOG MODE, only tablespaces and datafiles are available.

The type of recovery you select determines which procedure the Restore Wizard guides you through.

Note: Depending on the status of the target database (ARCHIVELOG, NOARCHIVELOG, mounted and open, mounted only, or started), some options will be disabled or not displayed.

For more information on recovery operations and related strategies, see the *Oracle9i Recovery Manager User's Guide and Reference*.

Database

A recovery of an entire database is a recovery of all database files that belong to a database. This selection only appears if the database is in the "MOUNT" state.

Note: Use the Instance Management functionality to open the database once the job has completed. You can view the status of the job by selecting the Active and History page tabs in the Console's Job window.

Tablespace

A tablespace recovery is a recovery of a subset of the database. Tablespace recoveries are generally valid if the database is operating in ARCHIVELOG mode.

Datafile

A datafile recovery is a recovery of a single datafile. Datafile backups, which are not as common as tablespace recoveries, are generally valid if you run the database in ARCHIVELOG mode.

Note: If you are in NOARCHIVELOG mode, your database must be mounted in order to perform a restore. To perform a full database recovery, your database must be in the MOUNTED mode. Use the Instance Management functionality to open the database after the job has completed. You can view the status of the job by selecting the Active and History page tabs in the Console's Job window.

Perform Recovery Without Restoring the Datafiles

A checkbox "Perform recovery without restoring the datafiles" is available. By default, the checkbox is deselected. If you select the checkbox, a recover is performed without a restore. The Rename page will not appear if you have selected the "Perform recovery without restoring the datafiles" option.

Use the "Perform recovery without restoring the datafiles" option if the datafile exists and is not corrupted and the database only requires to recover (apply the redo logs) to the datafile.

After choosing your recovery selection, press Next to continue.

Proceed to Recovery Wizard: Restore Until on page 11-20 if you have chosen Entire database as your recovery selection.

Proceed to Recovery Wizard: Tablespaces Page on page 11-20 if you have chosen Tablespace as your recovery selection.

Proceed to Recovery Wizard: Datafiles Page on page 11-21 if you have chosen Datafiles as your recovery selection.

Recovery Wizard: Restore Until

If you press the Finish button now, the database will be restored to the most recent time possible.

If you want to restore to a point previous to now, then you must check the Until checkbox and enter a date and time when the date and time fields are activated.

Note: Use the Instance Management Functionality to open the database after the job has completed. You can view the status of the job by selecting the Active and History page tabs in the Console's Job window.

This feature is available if your database is in the MOUNTED mode.

Press Next to continue. Proceed to Recovery Wizard: Rename Page on page 11-21.

Recovery Wizard: Tablespaces Page

A tablespace backup is a backup of a subset of the database. Tablespace backups are generally valid if the database is operating in ARCHIVELOG mode.

The Tablespace page allows you to select the tablespaces you want to recover. Choose from the list of tablespaces shown on the Available Tablespaces window.

Note: Tablespaces are displayed with a different icon if they require recovery.

Move the selection(s) to and from the Available Tablespaces and Selected Tablespaces windows by using arrow buttons between them.

Press Next to continue. Proceed to Recovery Wizard: Rename Page on page 11-21.

Recovery Wizard: Datafiles Page

A datafile recovery is the recovery of a single datafile. Datafile recoveries, which are not as common as tablespace recoveries, are generally valid if you run the database in ARCHIVELOG mode.

The Datafiles page allows you to select the datafiles you want to recover. Datafiles which require recovery are displayed with a different icon. Choose from the list of datafiles shown on the Available Datafiles window. Full path and name of the datafile are shown.

Move the selection(s) to and from the Available Datafiles and Selected Datafiles windows by using arrow buttons between them.

You may choose to include the control files with the recovery.

Press Next to continue. Proceed to Recovery Wizard: Rename Page on page 11-21.

Recovery Wizard: Rename Page

The Rename page enables you to restore the selected datafile(s) to a new location. When datafiles are restored to a new location, they are considered datafile copies. For this reason, a switch is automatically performed.

Original Name

The full path and filename of the selected datafile(s). This field is not editable.

New Name

Enter a new filename and/or a new path.

You can copy all or sections of the Original Name entry and paste it into the New Name field by highlighting the desired text and selecting the desired action from the context-sensitive right mouse menu.

Press Next to continue. Proceed to Recovery Wizard: Configuration Page on page 11-22.

Recovery Wizard: Configuration Page

The Configuration page allows you to choose the configuration for recovery and view the details that you have set up previously using the Create Backup Configuration option.

Choose the configuration for this recovery

Allows you to choose a configuration you have previously set up using the Create Backup Configuration Property Pages.

Description of the configuration

The description of the configuration.

Summary of the configuration:

- Name of the configuration
- Type of Destination (disk or tape)
- Channel Name (User-specified name of the channel)
- Drive and path where backup sets are stored or recovered.
- Recovery Catalog Credentials if you are using a recovery catalog

Recovery Wizard: Summary

The Summary page appears when you click the Finish button. Information about the backup management job you just created using the Wizard is summarized before submission to the Oracle Enterprise Manager job system.

Clicking OK submits the job the Oracle Enterprise Manager job system.

Clicking Cancel returns you to the wizard.

Create Backup Configuration

A configuration is a set of defaults you set up for backup and recovery. You can use the configuration for one database or many databases depending if the systems are the same.

Before attempting to use the Oracle Enterprise Manager Backup Management wizards, make sure the following requirements are met:

- The Oracle target database is version 8 or above
- The application is connected to a Management Server
- The preferred credentials is SYSDBA or you have created a backup configuration and overridden the preferred credentials.
- the job and event systems are fully functional

You can access the wizards through the Oracle Enterprise Manager Console if you are connected to a Management Server.

Create Backup Configuration: General Page

The General page allows you to give a name and description to a set of defaults used for backup, recovery, and catalog maintenance operations.

You can access the wizards through the Oracle Enterprise Manager Console if you are connected to a Management Server.

Create Backup Configuration: Channels Page

Choose whether the configuration will be used for backups using an image copy or for backups using a backup set. A backup set can be either on disk or tape, but an image copy can only be on disk.

Backup Set

The Channels page allows you to specify a channel or channels. A channel establishes a connection from the database to the storage device for backup or restore operations. A channel can be either disk or tape-based. Multiple channels can be created to allow parallel backup/recovery by a single job.

Note: If you are connected to an appliance database, refer to the Oracle*9i* Appliance Administrator's Guide for information on features unique to appliance backups.

Note: At least one channel must exist before performing a backup, restore, or recover operation.

Attention: Oracle9i can only allocate one Recovery Manager channel at a time, thus limiting the parallelism to one stream. The Oracle9i Enterprise Edition allows unlimited parallelism. See *Oracle9i New Features* for details.

Definition of Channel

Select from one of the following types:

- Disk: Backup sets written to disk.
- Tape: Backup sets written to tape.

Note: You can have multiple channels, but the channels defined must have the same type.

Channel Name

User-specified name of the channel.

Note: If you want to backup multiple databases on the same machine using the same configuration, you must use %u in the format string in the configuration.

Format

<Directory>b_%u_%s_%p

<Directory>

Drive and path where backup sets are stored. You must specify a proper directory for the channel. The directory field must end with a proper delimiter, which is OS dependent.

File Name

Unique backup set name. The following parameters can be used:

- b is the prefix for backup. It is not necessary to have the prefix. You can modify it to anything you want.
- %p Backup piece number within the backup set. This value starts at 1 for each backup set and is incremented by 1 as each backup piece is created.
- %u Unique name.

Note: If you want to backup multiple databases on the same machine using the same configuration, you must use %u in the format string in the configuration.

- %s Backup set number. The counter value starts at 1 and is unique for the lifetime of the control file.
- %t Backup set timestamp. **Note:** The combination of %s and %t can be used to form a unique name for the backup set.

Parameters (for Tape)

Parameters regarding the device to allocate. The Parameters field is active when channel type is set to Tape. For information on parms parameter, see the *Oracle9i Recovery Manager User's Guide and Reference*.

Channel Limits

Press the Channel Limits button to access the Channels Limits page in order to set the limits for any backup.

Insert

Allows you to create another channel definition.

Note: The channels defined must be the same type. For example, all disk or all tape.

Remove

Deletes the selected channel.

Image Copy

The Channels page allows you to specify a channel or channels. A channel establishes a connection from the database to the storage device for backup or restore operations. Multiple channels can be created to allow parallel backup/recovery by a single job.

Image copies can only be written to disk.

In this panel, you can specify the number of channels required, the base location, and the channel limits for all the channels. You will not have to specify a name for each channel since it is generated automatically.

Note: At least one channel must exist before performing a backup, restore, or recover operation.

Attention: Oracle9i can only allocate one Recovery Manager channel at a time, thus limiting the parallelism to one stream. The Oracle9i Enterprise Edition allows unlimited parallelism. See *Oracle9i New Features* for more information about the features available with Oracle9i and Oracle9i Enterprise Edition.

Number of channels

Specify the number of channels for the image copy.

Base Location

The base directory is the location to which you want to copy all the selected files.

You must specify a proper directory for the channel. The directory field must end with a proper delimiter, which is OS dependent.

Note: Unlike a backup set, the image copy channel does not need a format because the copy is a one-to-one just like the "cp" command at the OS level.

Channel Limits

You can specify one set of channel limits, which applies to all the channels in an image copy configuration. Assigning different limits for different channels in an image copy is not a necessity.

Limits

The Limits page allows you to set the limits for any backup or copy operation. For any setting, you move the slider bar to change its value or type in the value. The number in the field changes according to the position of the slider bar.

Maximum Capacity (Mb)

When checked, it allows you set the maximum number of megabytes that a backup operation can write to a single backup piece.

Maximum Read Rate (Kb/s)

When checked, it allows you to control the number of blocks per second read by a backup or copy operation from or to any input datafile. Controlling the read rate ensures that a backup or copy operation does not consume excessive disk bandwidth, which can degrade online performance.

Maximum Open Files

When checked, it allows you to control the maximum number of input files that a backup operation can have open simultaneously. Setting maximum number of open files is particularly useful when backing up a large number of archivelogs into a single backup set.

Create Backup Configuration: Recovery Catalog Page

The Recovery Catalog page allows you to choose where you want the backup information to be stored.

Note: For Oracle9i, a recovery catalog is created if you specify for the Enterprise Manager repository to be located in a local database. Refer to the Configuration Assistant online help for details.

The recovery catalog contains the following information:

- datafile and archivelog backup sets and backup pieces
- datafile copies
- archived redo logs and copies of them
- tablespaces and datafiles in the target database
- named user-created sequences of commands called stored scripts.

The choices are listed below.

In the target database's control file

The target database's control file. For information regarding the pros and cons of using a recovery catalog rather than a control file, see the *Oracle9i Recovery Manager User's Guide and Reference*.

In the Recovery Catalog

A repository of information that is used and maintained by the Recovery Manager. For information regarding the pros and cons of using a recovery catalog rather than a control file, see the *Oracle9i Recovery Manager User's Guide and Reference*.

Username

A user which contains the schema for the recovery catalog.

Password

The password of the user which contains the schema for the recovery catalog.

Service Name

The service name of the database where the recovery catalog resides.

If you have chosen to use a recovery catalog and clicked OK, the Create Backup Configuration checks that:

- the user exists
- the recovery catalog is installed
- the database is registered. If the database is not registered, it registers it.

Important: The recovery catalog and the Oracle Enterprise Manager repository should not reside in the target database (database to be backed up). The recovery catalog can reside in the same database as your Oracle Enterprise Manager repository. Oracle recommends placing the recovery catalog in a separate tablespace. As with any important data, you should back up your recovery catalog regularly.

See the *Oracle9i Recovery Manager User's Guide and Reference* for information on operating with a recovery catalog.

Create Backup Configuration: Backup Parameters Page

The Backup Parameters page allows you to set storage parameters for the current backup set.

Override Recovery Manager defaults

Check the "Override Recovery Manager defaults" box to use this page to override the Recovery Manager default settings that the Recovery Manager has calculated.

This checkbox is disabled when "Image Copy" on the "Channels Page" is selected. The checkbox is enabled only when "Backup Set" is selected and the page is not read-only.

Maximum files at a time in a backup set

When checked, it allows you to set the maximum number of files that can be placed in a single backup set. If the number of files selected for the current backup exceed this number, multiple backup sets are created. In addition, multiple channels, if defined and available, will also be used.

Maximum size of a backup set

When checked, it allows you to set the maximum file size of a backup set. You can specify file size in megabytes or kilobytes. Specifying a set size for backup sets permits better load balancing when performing backups.

Maximum size of a backup set for archivelogs

When checked, it allows you to set the maximum file size of a backup set for archivelogs. You can specify file size in megabytes or kilobytes. Specifying a set size for backup for archivelogs permits better load balancing when performing backups.

Create Backup Configuration: Preferred Credentials Page

The Preferred Credentials page allows you to specify preferred credentials for running backup jobs. These configurations will take precedence over the preferred credentials set in the Oracle Enterprise Manager Console.

Use Preferred Credentials if you do not want to set the login credentials to SYSDBA in the Oracle Enterprise Manager Console. These credentials will only be used for backup and recovery jobs.

Note: The Backup Configuration you have set become your default backup configuration if you use the Backup and Recovery wizards and submit a job.

Catalog Maintenance Wizard

The Catalog Maintenance wizard helps you perform basic recovery catalog operations like register the database, reset the database, and re-synchronize the catalog.

Before attempting to use the Catalog Maintenance wizard, make sure the following requirements are met:

- At least one backup configuration set exists which uses a recovery catalog.
The recovery catalog is a separate database normally residing on a remote system that contains information about the structure and previous backups of the target database.
One recovery catalog can manage many databases. It is recommended that you use resync catalog for every database that uses a recovery catalog on a regular basis.
- The Oracle target database is version 8 or above
- The application is connected to a Management Server
- The preferred credentials is SYSDBA or you have created a backup configuration and overridden the preferred credentials.
- the job and event systems are fully functional

Note: You can submit a catalog maintenance job directly from the Job System, but the recommended method is through the wizard.

Catalog Maintenance Wizard: Introduction Page

The Catalog Maintenance wizard guides you through the process of defining the recovery catalog operation and submits a catalog maintenance job through the Enterprise Manager to complete the operation.

A checkbox “Display this page next time” is available where you can specify not to show this page once you are familiar with the Catalog Maintenance Wizard. By default, the checkbox is selected. If you deselect the checkbox, the wizard starts on the Operation Choice page the next time.

You can view the status of the job by selecting the Active and History page tabs in the Console's Job window.

Press Next to continue. The Catalog Maintenance Wizard: Operation Choice Page appears.

Catalog Maintenance Wizard: Operation Choice Page

The Operation Choice page allows you to manage the recovery catalog.

In order for the Backup wizard to use the recovery catalog, the database must be registered first.

Register database

Register the target database with the Recovery Catalog. The target database must be registered with the Recovery Catalog before the Backup wizard can use it. You only need to register the database once.

Resync catalog

Re-synchronizes the Recovery Catalog with the target database so that the recovery catalog is updated with current information from the control file of the target database. The recovery catalog must be periodically resynced from the target database in order to ensure the catalog is up-to-date. The recovery catalog is not updated automatically when a log switch occurs or when a log is archived. Also, any structural changes to the target database would require re-synchronization of the Recovery Catalog.

Depending on how often your target database structure changes (including archive logs), you must decide how often to resynchronize the catalog. It is recommended that you should resynchronize the catalog at least once a day. If your site generates many archived logs each day, then you should resynchronize the catalog more frequently.

Reset database

Reset the Recovery Catalog for the target database. Resetting the database is rarely performed and should only be done if all the information has been lost. You must reset the recovery catalog if the target database had been previously opened with the RESETLOGS option.

Press Next to continue. The Catalog Maintenance Wizard: Configuration Page appears.

Catalog Maintenance Wizard: Configuration Page

The Configuration page allows you to choose the configuration which has the recovery catalog information that you have set up previously using the Create Backup Configuration option.

Choose the configuration

Allows you to choose a configuration you have previously set up using the Create Backup Configuration Property Pages.

Description of the configuration

The description of the configuration.

Summary of the configuration:

- Name of the configuration
- Type of Destination (disk or tape)
- Channel Name (User-specified name of the channel)
- File Name (Unique backup set name)
- Drive and path where backup sets are stored.

For users registering a database or resynchronizing a catalog, press Next continue.

Proceed to Catalog Maintenance Wizard: Multiple Targets on page 11-31 if you have chosen to register a database.

Proceed to Catalog Maintenance Wizard: Schedule on page 11-31 if you have chosen to resynchronize the catalog.

For users resetting the database, press Finish to submit a catalog maintenance job through the Enterprise Manager to complete the operation.

Catalog Maintenance Wizard: Multiple Targets

The Multiple Targets page allows you to specify the target database(s) to submit the job. You can select from the list of databases shown on the Available targets window.

Move the selection(s) to and from the Available targets and Selected targets windows by using arrow buttons between them. By default, the database to which you are connected is shown in the Selected targets window.

Catalog Maintenance Wizard: Schedule

The Schedule page enables you to schedule the execution of a catalog maintenance job.

Run Job

Select the frequency of catalog maintenance job. The choices are Immediately, Once, On Interval, On Day of Week, and On Date of Month.

- Immediately submits the task as soon as you finish the wizard. The task executes only one time.
- Once schedules the task only one time at the date and time you choose.
- On Interval enables you to schedule a specific time interval between task executions. The interval can be a combination of hours and minutes, or number of days. Select the value you want to change and click the scroll buttons. You can also type in a new value.
- On Day of Week enables you to schedule the task on one or multiple days (Sunday, Monday, etc.) of the week. Click the days of the week to select the days you want the task scheduled.
- On Date of Month enables you to schedule the task on one or multiple days (1 - 31) of the month. Click the dates of the month to select the dates you want the task scheduled.

Note: If you choose a day, such as 31, that is not in a month, the job will not be run in that month. Choose the first day of the next month instead.

Start Execution

Choose the first date and time that you want the task executed. This is the starting time for any task scheduled on an interval.

- Select the month, day, or year in the Date field and click the scroll buttons to change the value. You can also type in new values.
- Select the hour, minute, or AM/PM in the Time field and click the scroll buttons to change the value. You can also type in new values.

End Execution

Choose the last date and time that you want the task executed. This option does not apply if you chose the Immediately or Once execution options.

- Select the month, day, or year in the Date field and click the scroll buttons to change the value. You can also type in new values.
- Select the hour, minute, or AM/PM in the Time field and click the scroll buttons to change the value. You can also type in new values.

Time Zone

Shows the time zone. The agent schedules the task execution at each destination based on the actual system time of each agent. Tasks are not necessarily run simultaneously.

Run on Multiple Targets

The Run on Multiple targets option allows you to access the Choose Targets page so that you can specify the target(s) to submit the job.

Catalog Maintenance Wizard: Summary

The Summary page appears when you click the Finish button. Information about the backup management job you just created using the Wizard is summarized before submission to the Oracle Enterprise Manager job system.

Clicking OK submits the job the Oracle Enterprise Manager job system.

Backup Configuration Library

The Backup Configuration Library page displays configurations created and saved using the Backup Configuration option.

Note: If you are connected to an appliance database, you can only view backup configurations for appliance databases. If you are connected to a normal database, you can only view backup configurations for normal databases. Refer to the *Oracle9i Appliance Administrator's Guide* for information on features unique to appliance backups.

Name: The name of the configuration

Description: The description of the configuration

Use Recovery Catalog: Whether the configuration uses a recovery catalog

This is useful if you want to perform the following tasks:

- use the same configuration at different times
- make minor modifications to an existing configuration without having to redefine it from scratch
- create a configuration similar to an existing configuration without having to define it from scratch
- delete an existing configuration

Double-click an entry in the Backup Configuration Library list to start the Backup Configuration option with the stored parameters.

Configuring a Remote Database for Backup or SYSDBA Administration

For target databases which are pre-8.1.x, before using one of the backup management wizards or starting up or shutting down a database through Oracle Enterprise Manager, you need to set up your database for remote SYSDBA management.

The following procedure outlines the operations you may need to perform on both the server and client if they have not been performed already through the Database Configuration Assistant. These steps are not necessary for Oracle 8.1.x and later databases.

Additional Information: Refer to the operating system-specific documentation for your Oracle database for the exact name of the password file creation utility for your system.

Server Side (Windows NT)

1. From the command prompt, run the ORAPWD executable to create a new password file.

Note: The name of the ORAPWD executable depends on the database version.

- Oracle 7.3.X: ORAPWD73
 - Oracle 8.0.X: ORAPWD80
-
-

For example,

```
$ORACLE_HOME\bin\orapwd file=<fname> password=<password> entries=<users>
```

where

fname is the name of password file (mandatory),

password is the password for SYS (mandatory),

entries is the maximum number of distinct DBAs and OPERs (optional),

There are no spaces around the equal-to (=) character.

The <fname> will be created in the Oracle_Home/Database directory.

2. Edit the `init.ora` file located in the `Oracle_Home/Admin/<SID>/pfile` directory. Add or change the following parameter
`remote_login_passwordfile=exclusive` in the `init.ora` file.
3. Shut down your database and then restart it from Control Panel > Services.
4. Grant SYSDBA and/or SYSOPER roles to users who will be performing remote DBA operations.

Note: The grant is necessary even if the user already has this privilege set. The GRANT command will flush the username and the password to the password file if one is defined. After each reset/recreate of the password file, grants for all users with SYSOPER and SYSDBA have to be reset to ensure that the password file has all the necessary usernames stored.

5. Check which users are defined in the password file by using the `V$PFILE_USERS` view. The view will show which users are currently present in the password file.

Server Side (UNIX)

1. Login as the owner of the software (for example, Oracle) and set your environment variables. The following is a CSH example.

```
setenv ORACLE_HOME the_database_home
setenv ORACLE_SID the_database_sid
```

2. Change to the `db`s directory in your Oracle home.

```
cd $ORACLE_HOME/db
```

3. Edit the `init.ora` file. Add or change the following parameter
`remote_login_passwordfile=exclusive` in the `init.ora` file.
4. Shut down your database and then restart it.
 - a. Start SQL*Plus Worksheet.
 - b. Log in as a user with the SYSDBA role.
 - c. Type

```
shutdown immediate
```

startup

Shutting down the database is necessary for the database to pick up the changes in the `init.ora` file.

5. Run the ORAPWD executable to create a new password file.

Note: The name of the ORAPWD executable depends on the database version.

- Oracle 7.3.X: ORAPWD73
 - Oracle 8.0.X: ORAPWD
-
-

For example,

```
$ORACLE_HOME/bin/orapwd file=<fname> password=<password> entries=<users>
```

where `fname` is the name of password file (mandatory),

`password` is the password for SYS (mandatory),

`entries` is the maximum number of distinct DBAs and OPERs (optional).

There are no spaces around the equal-to (=) character.

The `<fname>` will be created in the `$Oracle_Home/dbs` directory.

6. Grant SYSDBA and/or SYSOPER roles to users who will be performing remote DBA operations

Note: The grant is necessary even if the user already has this privilege set. The GRANT command will flush the username and the password to the password file if one is defined. After each reset/recreate of the password file, grants for all users with SYSOPER and SYSDBA have to be reset to ensure that the password file has all the necessary usernames stored.

7. Check which users are defined in the password file by using the `V$PWFILERS_USERS` view. The view will show which users are currently present in the password file.

Recovery Catalog Setup and Registration

The *recovery catalog* is a repository of information that is used and maintained by Recovery Manager. Recovery Manager uses the information in the recovery catalog to determine how to execute requested backup and restore actions.

Because most of this information is also available from the target database's control file, you have the option of using the control file instead of creating a recovery catalog. This operational mode is appropriate for small databases. No setup is required if you are using the control file. However, Oracle recommends using a recovery catalog. If the control file is lost, the database cannot be recovered.

To use Oracle9i Recovery Manager with a recovery catalog, you must first install the recovery catalog and then register your database. It is recommended that you install the recovery catalog on a different location than the target database.

Note: For Oracle9i, a recovery catalog is created if you specify for the Enterprise Manager repository to be located in a local database. Refer to the Configuration Assistant online help for details.

For more information on recovery catalog maintenance, Recovery Manager, and backup and recovery strategies, see the *Oracle9i Recovery Manager User's Guide and Reference*.

Important: Your Oracle Enterprise Manager Job system must be functioning properly before attempting to install the recovery catalog. You will need the Job system to register the target database in the recovery catalog.

9i Procedure

For Oracle9i, a recovery catalog is created if you specify for the Enterprise Manager repository to be located in a local database. Refer to the Configuration Assistant online help for details.

The recovery catalog will be created in the CATTBS tablespace for you by default with the recovery catalog user and password of rman/rman.

If you want to create the recovery catalog user and schema with a script, follow the procedure below:

1. SQL Statements

```
CREATE TABLESPACE "CATTBS"  
  LOGGING  
  DATAFILE 'CATTBS.dbf' SIZE 10M AUTOEXTEND  
  ON MAXSIZE UNLIMITED EXTENT MANAGEMENT LOCAL;
```

```
CREATE USER rman IDENTIFIED BY rman
DEFAULT TABLESPACE CATTBS
TEMPORARY TABLESPACE TEMP QUOTA UNLIMITED ON CATTBS;
GRANT RECOVERY_CATALOG_OWNER TO rman;
GRANT CONNECT, RESOURCE TO rman;
```

2. RMAN Commands

- a. Start RMAN from command-line using

```
rman CATALOG rman/rman@<database alias>
```

- b. After RMAN has started, issue the following command

```
CREATE CATALOG;
```

The creation of the catalog could take several minutes.

Pre-8i and 8i Procedures

To set up a recovery catalog, you must complete the following procedures:

- Create a Tablespace
- Create a User
- Run the `catrman` Script (for pre-8i only)
- Create the Recovery Catalog (for 8i) on the Target Machine

Create a Tablespace

1. Start Storage Management.
2. Log in as a user with the DBA role.
3. Select Create from the Tablespace menu. The Create Tablespace property sheet appears.
4. In the Name field, type the name of the new tablespace. For example, `cattbs`.
5. Click the Add button in the Datafiles section. The Create Datafile property sheet appears, allowing you to specify a new datafile which will belong to the new tablespace.
6. In the Name field, type in complete path and name of the datafile. For example:
`c:\orant\oradata\cattbs.dbf`.

7. In the Size section, enter the size of the new datafile. For example, 10 M. The datafile size will depend on the number of databases and how often they are backed up.
8. Click the OK button in the Create Datafile property sheet.
9. Click the Create button in the Create Tablespace property sheet.

Create a User

1. Start Security Management.
2. Log in as a user with the DBA role.
3. Choose Create from the User menu. The Create User property sheet appears.
4. In the General Page, fill in the following information:
 - In the Name field, enter the name of the new user. For example, `rman`.
 - In the Password and Confirm Password fields, enter a password. For example, `rman`.
 - Choose the default tablespace. For example, `CATTBS`.
 - Choose the temporary tablespace. For example, `TEMPORARY_DATA` or `TEMP`.
5. In the Roles Page, grant the `RESOURCE` and `RECOVERY_CATALOG_OWNER` roles to the user.
6. In the Quotas Page, specify an unlimited quota for the default tablespace. In this example, the default tablespace is `CATTBS`.
7. Click the Create button after specifying the requisite parameters.

Run the `catrman` Script (for pre-8i only)

1. Start SQL*Plus on the machine where the database resides.
2. Log in as the recovery catalog user you created. For example, `user=rman, password=rman`.
3. Execute `spool create_rman.log` so that errors will be written in a log file.
4. Execute the `catrman` script located in the `Oracle_Home/rdbms/admin` or `Oracle_Home\rdbms\admin` directory.

If you are using SQL*Plus Worksheet, type `@<full pathname and name of script>` in the SQL*Plus Worksheet input panel and press the Execute button. For example, type `@<Oracle_Home>/rdbms/admin/catrman` and press the Execute button.

Create the Recovery Catalog (for 8i) on the Target Machine

1. Connect to the recovery catalog from the operating system command line:

```
%> rman catalog rman/rman@<service name for database>
```

The correct output is shown below:

```
RMAN-06008: connected to recovery catalog database
RMAN-06428: recover catalog is not installed
```

2. Issue the `create catalog` command to create the catalog.

- For UNIX, type:

```
RMAN> create catalog tablespace 'cattbs';
```

- For Windows NT, type:

```
RMAN> create catalog tablespace 'CATTBS';
```

Registering the Recovery Catalog

To register the recovery catalog for the first time, follow the steps 1 through 7.

1. Start the Oracle Enterprise Manager Console.
2. Click the right mouse button on the database in the Navigator tree. The context-sensitive Backup Management menu appears.
3. Modify a backup configuration you are already using or choose Create Backup Configuration from the Backup Management menu so that you can create a backup configuration that uses a recovery catalog. The Create Backup Configuration property sheet appears.
4. Fill out the General and Channels property pages.
5. In the Recovery Catalog Page, fill in the following information:
Choose "in a recovery catalog" as where you want your backup information stored.
In the Username field, enter the name of the user. For example, `rman`.
In the Password field, enter a password. For example, `rman`.
In the Service field, enter the database where the Recovery Catalog resides.
6. Fill out the Preferred Credentials page.
7. Press the Create button. The database you selected will automatically be registered with the recovery catalog.

Note: You only need to register the database once.

To use the same configuration on subsequent databases, follow steps 8 through 16.

8. Click the right mouse button on the database in the Navigator tree. The context-sensitive Backup Management menu appears.
9. Choose Catalog Maintenance from the Backup Management menu so that you can register the target database in the recovery catalog. The Catalog Maintenance appears. Click Next.
10. In the Operation Choice Page, choose Register Database. Click Next.
11. In the Configuration Page, ensure that you are using the Backup Configuration you have created/modified. Click Next.

12. In the Multiple Targets Page, choose the destination target(s) to submit the job.
13. Click the Finish button. At this point, the database registration is sent as a job to the Oracle Enterprise Manager Job system.
14. When the summary screen appears, click OK to complete the operation.
15. In the Console, click the registration job in the Active Jobs list to see the current state of the job.
16. Once the job is completed, check the job history in the Jobs property sheet to make sure that the job completed successfully.

When the job completes successfully, your backup and recovery environment is configured. For more information on recovery catalog maintenance, Recovery Manager, and backup and recovery strategies, see the *Oracle9i Recovery Manager User's Guide and Reference*.

Dropping the Recovery Catalog

If you do not want to maintain a recovery catalog, then you can drop the recovery catalog schema from the tablespace. The drop catalog command deletes all information from the recovery catalog. Hence, if you have no backups of the recovery catalog schema, then all backups of all target databases managed by this catalog become unusable.

The drop catalog command is not appropriate for "unregistering" a single database from a catalog that has multiple target databases registered. If you try to delete the information for one target database by dropping the catalog, you thereby delete the information for all target databases.

To drop the recovery catalog schema:

1. Use RMAN to connect to the target and recovery catalog databases.

```
%> rman cattbs rman/rman@cattbs
```

2. Issue the drop catalog command:

```
RMAN> drop catalog
```

For drop catalog command syntax, see the *Oracle9i Recovery Manager User's Guide and Reference*.

Upgrading the Recovery Catalog

If you use a version of the recovery catalog that is older than that required by the RMAN executable, then you must upgrade it. For example, you must upgrade the catalog if you use an Oracle9i RMAN with an Oracle9i recovery catalog.

Note: You will receive an error if the recovery catalog is already at a version greater than that required by the RMAN executable. RMAN permits the command to be run if the recovery catalog is current, however, so that you can re-create packages if necessary. Check the message log for error messages generated during the upgrade.

To upgrade the recovery catalog:

1. Use RMAN to connect to the target and recovery catalog databases.

```
%> rman cattbs rman/rman@cattbs
```

2. Issue the upgrade catalog command:

```
RMAN> upgrade catalog
```

3. Enter the update catalog command again to confirm:

```
RMAN> upgrade catalog
```

For upgrade catalog command syntax, see the *Oracle9i Recovery Manager User's Guide and Reference*.

A

Keyboard Navigation

Oracle Enterprise Manager supports standard keyboard navigation. Standard keyboard navigation includes the use of the tab key, mnemonics (using the Alt key and the underlined character), and accelerators (such as Alt+F4 to exit a window).

The following table contains keyboard actions that are not commonly known or for which there is no firm standard.

| Keyboard Action | Result |
|--|--|
| F10 (release), Space | Drops the system menu for a window or dialog |
| When focus is on a selected tree item or a selected table item, type Shift + F10 | Drops the context menu for the selected item |
| With focus on an edit field within a table, type in a new value and press Enter | Accepts new value is accepted and the focus is moved to the next row of the table. |
| With focus on a drop down list within a table, press Space. | Changes the drop down list from opened to closed or from closed to open. |

Accelerators for picture buttons are documented in the Help for the dialog or window where the picture buttons appear.

Firewalls and Virtual Private Networks

This appendix discusses how to configure firewall and virtual private networks (VPNs) to allow communication between various components of Oracle Enterprise Manager.

This appendix covers the following topics:

- Firewall Communication for Enterprise Manager
- Virtual Private Network Configuration for Enterprise Manager
- Running the Console in Standalone Mode
- Performance Manager, Capacity Planner, and Firewalls

Firewall Communication for Enterprise Manager

Firewalls protect a company's IT infrastructure by providing the ability to restrict network traffic by examining each network packet and determining the appropriate course of action. Firewall configuration typically involves restricting the ports that are available to one side of the firewall, for example the Internet. It can also be set up to restrict the type of traffic that can pass through a particular port such as HTTP. If a client attempts to connect to a restricted port (a port not covered by a security 'rule') or uses a protocol that is incorrect, then the client will be disconnected immediately by the firewall. Firewalls can also be used within a company Intranet to restrict user access to specific servers.

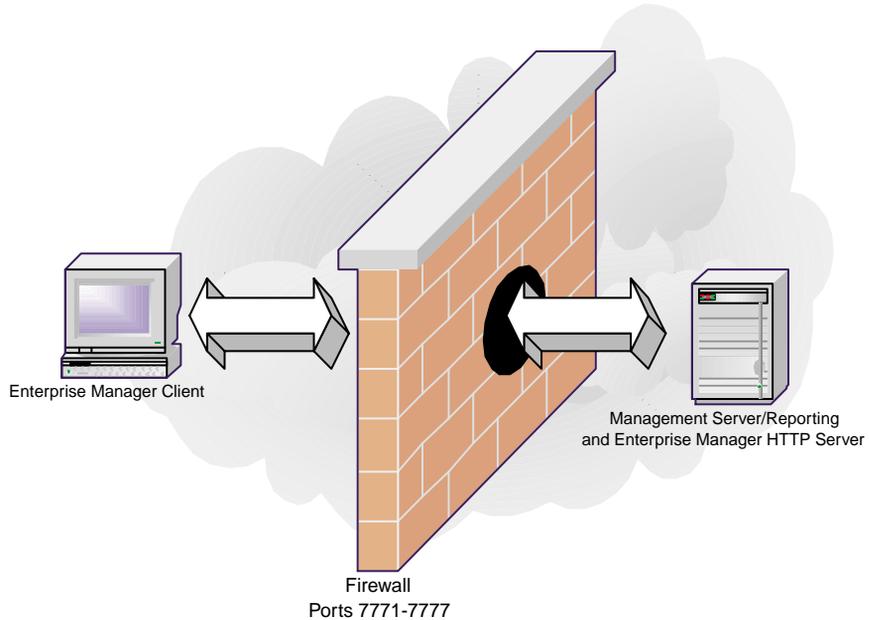
The various components of Enterprise Manager 9i (Console, Oracle Management Server, and Intelligent Agents) can be deployed on different nodes, which in turn can be separated by firewalls. This section describes how firewalls can be configured to allow communication between the different components of Enterprise Manager. The three most common deployments are covered:

- *Firewall Between the Console and Management Server*
- *Firewall Between the Management Server and Agent(s) on Monitored Nodes*
- *Firewalls and Network Address Translation (NAT)*

Firewall Between the Console and Management Server

In this configuration, the Enterprise Manager Console and Management Server are separated by a firewall.

Figure B-1 Console and Management Server on Opposite Sides of a Firewall



To enable network communication between the Enterprise Manager Console and Management Server, several network ports must be opened in the firewall to allow TCP traffic. The port range of 7771-7777 covers all these. If the Console is running in a browser, then the firewall needs to allow HTTP traffic over port 3339 from the Enterprise Manager Website HTTP server to any browser client. Functional assignments for these ports are shown in the following table.

Table B-1 Port Usage

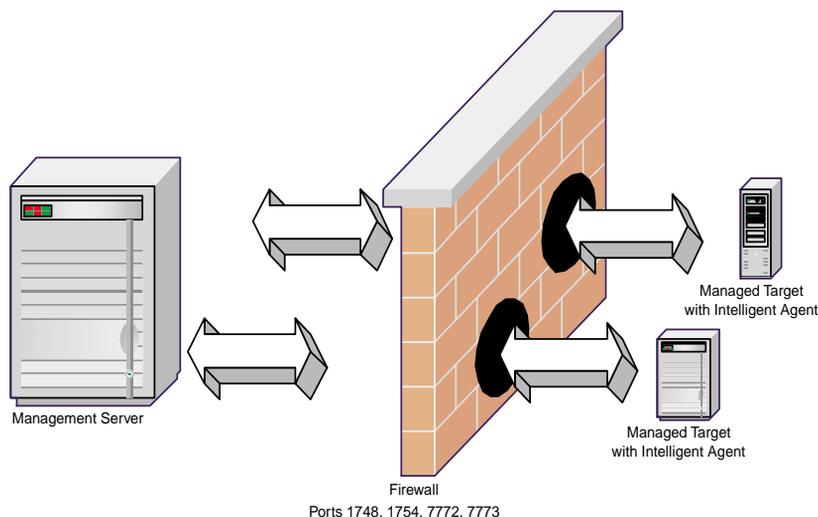
| Port Number | Usage |
|------------------|--|
| 3339 | Communication between the Enterprise Manger HTTP server and the Enterprise Manager browser client. |
| 7771, 7773, 7776 | Communication between the Enterprise Manager Console and the Management Server. |
| 7774 | Communication between the Oracle Applications Manager and the Management Server. |
| 7775, 7777 | Communication between the paging server and the Management Server. |

Special configuration is not required for either the Console or the Management Server in this case.

Firewall Between the Management Server and Agent(s) on Monitored Nodes

In this configuration, the Intelligent Agent that runs on the managed node and the Management Server are on opposite sides of the firewall, as shown in the following illustration.

Figure B-2 Firewall Between the Management Server and Agent



To enable network communication between the Management Server and Intelligent Agents on managed targets, several network ports must be opened in the firewall to allow TCP traffic. Functional assignments for these ports are shown in the following table.

Table B-2 Port Usage

| Port Number | Usage |
|-------------|---|
| 1748, 1754 | Management Server communicating with the Agent to discover new targets. |
| 7772 | Agent communicating with the Management Server. |

Table B-2 Port Usage

| Port Number | Usage |
|-------------|---|
| 7773 | Agent communicating with the Management Server via SSL. |

No special setup and configuration is required for the Management Server or Intelligent Agents in this situation.

If the Management Server and administered database (or other managed target) are separated by a firewall, then the Management Server acts as a proxy for the Enterprise Manager Console, resulting in the remote database viewing the Management Server as the client. For this reason, there must be a SQL*Net proxy between the Management Server and the administered database. If the Console is launched in Standalone Mode, there must be a SQL*Net proxy between the Console and the Management Server, and between the Management Server and ALL collections services (Data Gatherer) connections.

Firewalls and Network Address Translation (NAT)

Some firewalls use a feature called Network Address Translation (NAT). This feature masks the true IP address of a client by translating it to a different IP address. Packets sent from a remote client to a server through the firewall will be known to the server by this translated address. As the client and server communicate, the NAT software handles the mapping of the true IP address to its translated address. Of the two Enterprise Manager configurations previously discussed, only an Enterprise Manager Console and Management Server can be separated by firewalls using NAT. No changes are required for Enterprise Manager to support NAT in this configuration.

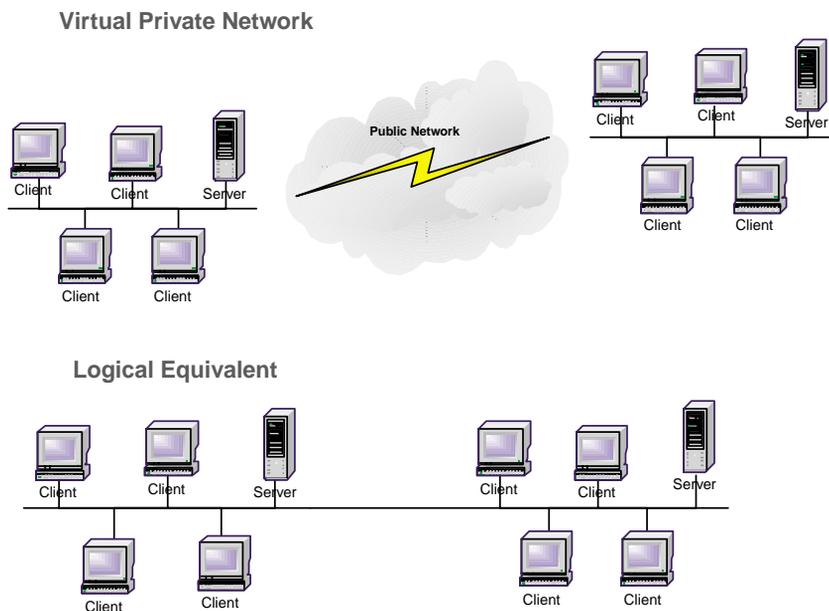
The Management Server and Intelligent Agent cannot be separated by firewalls using NAT because the Management Server and Agent communication includes the other's host address information, which is stored in the data packet rather than in the IP header. Since NAT only looks for (and translates) addresses in the IP header, NAT will not work with Management Server/Agent communication.

Virtual Private Network Configuration for Enterprise Manager

Virtual Private Networks (VPNs) allow remote employees to connect in a secure fashion to a corporate server located in the corporate Local Area Network (LAN) using the routing infrastructure provided by a public network (such as the Internet).

From the user's perspective, the VPN is a point-to-point connection between the user's computer and a corporate server. The nature of the intermediate network is irrelevant to the user because it appears as if the data is being sent over a dedicated private link.

Figure B-3 Virtual Private Network



In order to provide a secure point-to-point channel of communication, VPN software includes services such as user authentication and data encryption. It also implements security standards defined by the IP Security (IPSEC) protocol. IPSEC is a series of guidelines for the protection of Internet Protocol (IP) communications. It specifies standardized ways for securing private information transmitted over public networks. Communication between security systems developed by different vendors is possible if they comply with the IPSEC standards.

To create secure VPNs, VPN software typically operates in IPSEC Tunnel Mode. In this mode, data sent from a client is first encrypted and then encapsulated before being transmitted over an insecure, public network such as the Internet. Upon arriving at its destination, VPN software unpacks, decrypts and authenticates the data received, then forwards it on to its final destination.

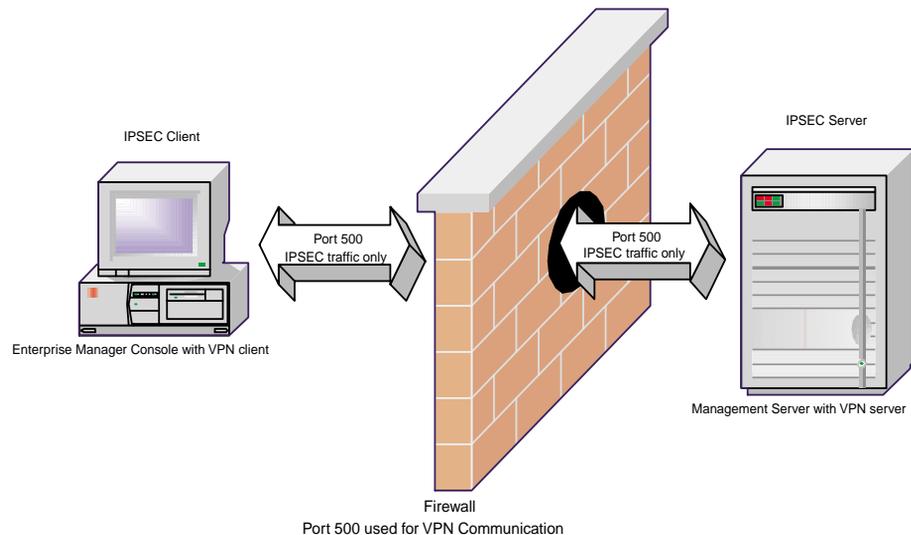
Many e-businesses use both VPNs and firewalls as part of their security infrastructure. In these configurations, the firewall must allow IPSEC-compliant

traffic to pass through (port 500 is used by default). Application data that is sent via VPN is first encapsulated and tunnelled through port 500 in the firewall, unpacked, and sent to its final destination. Targets that have been set up to use VPN thus avoid having to open up additional ports in the firewall. Applications that run on VPN-enabled nodes can also communicate safely and securely across the firewall.

VPN Connections Between the Enterprise Manager Client and Management Server

As previously discussed, VPNs that comply with IPSEC standards allow the secure transfer of information over the internet: Remote clients can connect to a secure server with minimum configuration and maximum security. It is also possible to use VPNs in conjunction with firewalls. The following example shows a VPN environment with the Enterprise Manager Console and the Management Server on opposite sides of the firewall.

Figure B-4 Firewall Configuration In a VPN Environment



In this example, both the Console and Management Server machines have VPN software configured to provide a secure communication channel between the two. Specifically, the machine running Enterprise Manager client must have the VPN client software installed. The machine running the Management Server must have the VPN gateway software installed. Additionally, the firewall must be configured to allow only IPSEC traffic (IPSEC by default uses port 500). In this configuration,

all the network traffic between the Console and the Management Server will be tunneled automatically through port 500 by the VPN software.

No additional configuration is required for Enterprise Manager components since the VPN software handles communication tasks automatically.

When the Enterprise Manager Console is launched, the user may be prompted by a VPN client software dialog to enter user security information. Once a valid username and password are provided to the VPN client, subsequent communication between the Console and Management Server across the virtual network will appear seamless.

No additional changes are required for the firewall configuration if IPSEC traffic is already allowed.

VPN Connections Between the Management Server and Intelligent Agents

Some VPN providers may allow server processes on different nodes to communicate. In these configurations, it is possible to deploy the Management Server on one VPN-enabled node and the Agent on another VPN-enabled node. The same principles as described in the previous section apply. It is important to note that communication between the Management Server node and Agent node is bi-directional, so each would need to function as both a VPN client and VPN server. Hence, both the VPN client and server software must be installed on each node.

Note: Sun Solaris version 8 supports VPN server process communication. Refer to the Solaris System Administrator's Guide for more details.

Running the Console in Standalone Mode

If the Enterprise Manager Console is launched in Standalone mode, the Console connects directly to a managed target (e.g. database) in the traditional client-server mode, using SQL*Net to communicate. If a firewall separates the Console and its target, several options are available. These include:

1. Use VPN software on the Enterprise Manager Console node and target node.
In this case, the setup will be similar to the Console - Management Server using VPN setup as described in the previous section.
2. Use Oracle Net features that support firewall configurations. These include:

- Oracle Net Firewall Proxy.
Several firewall vendors (e.g. CheckPoint) include an Oracle Net proxy capability which allows SQL*Net traffic to pass through its firewalls. This functionality is primarily available from the firewall vendors.
- Oracle Net's Connection Manager
Oracle Net's Connection Manager provides database connection pooling capabilities. Client applications connect to Connection Manager which in turn redirects the connection to the database. In this case, firewalls need to allow connections from the client to Connection Manager.

Refer to the Oracle Net documentation for more details.

Performance Manager, Capacity Planner, and Firewalls

The Performance Manager or Capacity Planner applications can be launched separately in order to connect directly to the Intelligent Agent (which incorporates the data collection services) on a target node. If a firewall separates Performance Manager and the Agent, or Capacity Planner and the Agent, then the firewall needs to be configured as follows:

- Port 1808 over TCP: Used for communication between Performance Manager and Agent; or Capacity Planner and the Agent.
- Port 1809 over TCP: Used for communication between the Performance Manager and the Agent over SSL or for Capacity Planner and the Agent over SSL

No additional configuration is required for Performance Manager, Capacity Planner or the Intelligent Agent.

OEMUTIL Utility

OEMUTIL is a command-line utility that performs various job-related and event-related functions, providing a command-line alternative to performing these same operations from within the Enterprise Manager Console. This allows job and event-related operations to be submitted as batch jobs which can run unattended and later checked for completeness.

This chapter provides information on how to setup and use the OEMUTIL utility. This utility is available in both Enterprise Manager 2.2 and 9i. The following topics are discussed:

- Starting OEMUTIL
- Using OEMUTIL
- OEMUTIL Commands
- OEMUTIL Issues

Starting OEMUTIL

To enable OEMUTIL, set the environment variable `ORACLE_OEM_CLIENTTRACE` to "true" at the command line.

Windows NT or 2000:

```
>set ORACLE_OEM_CLIENTTRACE=true
```

UNIX:

```
>setenv ORACLE_OEM_CLIENTTRACE=true
```

Using OEMUTIL

OEMUTIL can perform a single function or command (e.g. submit a new Job) or perform multiple commands in succession. For example, you want OEMUTIL to submit job A and B from the job library, and then deregister Event C.

Performing a single command:

To use OEMUTIL to execute a single task, run OEMUTIL at the command line using the following syntax:

```
> oemapp oemutil <username>/<password>@<oms> <command> <parameters>
```

where:

- `<username>` is a valid Enterprise Manager administrator
- `<password>` is the Enterprise Administrator's password
- `<oms>` is the name of the machine running the Oracle Management Server
- `<command><parameters>` is the OEMUTIL command and its associated parameters.

Performing Commands in Succession:

You can use OEMUTIL to execute multiple commands in succession by first creating a single file consisting of the commands you want to execute and run OEMUTIL using the following syntax:

```
> oemapp oemutil -cmdfile <command file name>
```

where:

- `-cmdfile` is the option that instructs OEMUTIL to accept a single file containing the commands to be executed.
- `<command file name>` is the name of the ASCII file containing the various commands you want to execute. The commands in the file will be executed in the order they are listed. The result of each command execution will be displayed sent to standard output. If one command in the sequence fails, then the failure is displayed and OEMUTIL proceeds to execute the next command in sequence.

The command file may contain any number of commands. Each command must be on a separate line along with its corresponding arguments. Command arguments may be quoted if they have white space or special characters in them such as job and event names. Characters can be "escaped" by using the backslash character (`\`). For example, to insert a literal quote, use `\`. A command file may look something like the following example.

Example C-1 Sample Command File

```
omsCredentials sysman/sysman@myomsmachine
submitJob fileListing SYSMAN:dbs|oracle_sysman_group ls "-l"
submitJobFromLibrary backupJob sysman mypc.us.oracle.com
deregisterEvent spaceEvent sysman o817.mypc1
```

OEMUTIL Commands

The following section summarizes all commands and associated parameters for OEMUTIL.

omsCredentials

The *omsCredentials* command specifies the credentials to use when logging into the Oracle Management Server. Logging in to the Management Server is required before any other command can be run. All subsequent commands in the command file will use these same credentials until the next *omsCredentials* command is encountered. There can be multiple *omsCredentials* commands in a single command file, allowing you to use a one batch command file to perform operations using any number of Management Servers.

Syntax

If you are going to use a batch command file with OEMUTIL, then the *omsCredentials* command is required and *must be the first command* in the command file.

If you are issuing commands directly to OEMUTIL (not providing a batch file), then the *omsCredentials* command is not required.

```
omsCredentials <username>/<password>@<oms>
```

where:

■ .

Table C-1 *omsCredentials* Command Parameters

| Parameter | Value |
|------------|---|
| <username> | A valid Enterprise Manager administrator. This is the same account used to logon to the Enterprise Manager Console. |
| <password> | The Enterprise Administrator's password |
| <oms> | The name of the machine running the Oracle Management Server. |

Example:

```
omsCredentials sysman/sysman@dlsun966
```

submitJob

The *submitJob* command allows you to submit a new job against node(s). The job will be submitted with a schedule set to "Immediate".

Syntax

If running OEMUTIL with this single command, the syntax is:

```
oemapp oemutil <username>/<password>@<oms> submitJob <jobName> <nodeName>  
<osCommand> <osParameters>
```

If specifying this command in a command file, the syntax is:

```
submitJob <jobName> <nodeName> <osCommand> <osParameters>
```

Table C-2 *submitJob Command Parameters*

| Parameter | Value |
|--------------|--|
| username | Name of a valid Enterprise Manager user. |
| password | Corresponding password of Enterprise Manager user |
| oms | Name of the machine running the Management Server. |
| jobName | Name to assign to a job. |
| nodeName | <p>Name of the target node where the job will run. The name must have been previously discovered in the Console. The name should match the discovered node name in the Navigator tree in the console.</p> <p>You may also specify a group name if you'd like to run the job against the multiple nodes in a group. Specify the group using the syntax:</p> <pre>groupOwner:groupName oracle_sysman_group.</pre> <p>Example:</p> <p>To specify a group called dbms owned by sysman, use the syntax:</p> <pre>SYSMAN:dbms oracle_sysman_group</pre> <p>If you are specifying a group as a command-line parameter to OEMUTIL, then you need to enclose the group name in quotes, e.g.</p> <pre>"SYSMAN:dbms oracle_sysman_group"</pre> |
| osCommand | The OS command to run. |
| osParameters | Any parameters associated with the OS command. |

Success indicated by OEMUTIL means the job has been successfully submitted to the Management Server. Use the Enterprise Manager Console to monitor the actual status of the job.

You can also submit jobs that use different schedules such as 'on day of week' or 'on day of month' or jobs that run against other target types such as 'databases' or 'http servers', but the procedure is less direct:

1. Define the job using the Console.
2. Save the job to the Job Library.

- Using OEMUTIL, submit the job from the library via the `submitJobFromLibrary` command. See the next section for information on the `submitJobFromLibrary` command.

submitJobFromLibrary

The *submitJobFromLibrary* command allows you to submit a job that is defined in the Job Library. The submitted job uses the properties of the job as it is defined in the Job Library (tasks, parameters, schedule, permissions, etc) except for job targets. The job target needs to be specified as a parameter to this command.

Important: The job that is saved in the library must be assigned at least one valid target. However, when submitting this job from the library, the target provided to the OEMUTIL command will be used.

Syntax

If running OEMUTIL with this single command, the syntax is:

```
oemapp oemutil <username>/<password>@<oms> submitJobFromLibrary <jobName>  
<ownerName> <targetName> <admin to be notified>
```

If specifying this command in a command file, the syntax is:

```
submitJobFromLibrary <jobName> <ownerName> <targetName> <admin to be notified>
```

Table C-3 *submitJobFromLibrary* Command Parameters

| Parameter | Value |
|------------------|--|
| username | Name of a valid Enterprise Manager administrator. |
| password | Enterprise Manager administrator's password. |
| oms | Name of the machine on which the Management Server is running. |

Table C-3 *submitJobFromLibrary Command Parameters*

| Parameter | Value |
|------------|--|
| jobName | <p>Name of the job to be submitted. The name should match the name of the job as it is defined in the Job Library.</p> <p>If the job name has space, whitespaces or other special characters, then you will need to use the command file option. Put quotes around the name containing spaces, whitespaces or other special characters.</p> <p>Example: "ORCL backup_job"</p> |
| ownerName | Name of the owner of the job to be submitted. |
| targetName | <p>Name of the target against which the job is to be submitted. The target must have been discovered by the Intelligent Agent. The target name must match the name displayed in the Console Navigator tree.</p> <p>The target specified in this parameter will be used when submitting the job. Any targets predefined in the job as it exists in the Job Library will be ignored.</p> <p>To submit the job against multiple targets, define a group that contains these targets, and specify the group name as the target. Specify the group using the syntax:</p> <pre>groupOwner:groupName oracle_sysman_group.</pre> <p>Example: To specify a group called "dbs" owned by sysman, use the syntax:</p> <pre>SYSMAN:dbs oracle_sysman_group</pre> <p>If you are specifying a group as a command-line parameter to OEMUTIL, then you need to enclose the group name in quotes.</p> <p>Example: "SYSMAN:dbs oracle_sysman_group"</p> |
| admin | (optional) Name of the Enterprise Manager Administrator for whom Notify permissions are to be set. This Administrator must have at least View permissions for the job. |

Success indicated by OEMUTIL means the job has been successfully submitted to the Management Server. Use the Console to monitor the actual status of the job.

registerEventFromLibrary

The *registerEventFromLibrary* command allows you to register an Event that is defined in the Event Library.

Important: The event that is saved in the library must have at least one valid target. However, when registering this event from the library, the target provided to the OEMUTIL command will be used.

Syntax

If running OEMUTIL with this single command, the syntax is:

```
oemapp oemutil <username>/<password>@<oms> registerEventFromLibrary <eventName>
<ownerName> <targetName> <admin to be notified>
```

If specifying this command in a command file, the syntax is:

```
registerEventFromLibrary <eventName> <ownerName> <targetName> <admin to be notified>
```

Table C-4 *registerEventFromLibrary* Command Parameters

| Parameter | Value |
|-----------|--|
| username | Name of a valid Enterprise Manager administrator. |
| password | Enterprise Manager administrator's password. |
| oms | Name of the machine on which the Management Server is running. |
| eventName | Name of the event to be submitted. The name should match the name of the event as it is defined in the Event Library. If the event name has space, whitespaces or other special characters, then you will need to use the command file option. Put quotes around the name containing spaces, whitespaces or other special characters. Example: "Check Tablespace usage" |
| ownerName | Name of the owner of the event to be submitted. |

Table C-4 registerEventFromLibrary Command Parameters

| Parameter | Value |
|------------|--|
| targetName | <p>Name of the target against which the event is to be registered. The target must have been discovered by the Intelligent Agent. The target name must match the name displayed in the Console Navigator tree.</p> <p>To register the event against multiple targets, define a group that contains these targets, and specify the group name as the target for this event.</p> <p>Specify the group using the syntax:</p> <pre>groupOwner:groupName oracle_sysman_group.</pre> <p>Example:</p> <p>To specify a group called dbs owned by sysman, use the syntax:</p> <pre>SYSMAN:dbs oracle_sysman_group</pre> <p>If you are specifying a group as a command-line parameter to OEMUTIL, then you need to enclose the group name in quotes.</p> <p>Example:</p> <pre>"SYSMAN:dbs oracle_sysman_group"</pre> |
| admin | <p>(optional) Name of the Enterprise Manager Administrator for whom Notify permissions are to be set. This Administrator must have at least View permissions for event.</p> |

Success in using this command means the event has been sent to the Management Server for registration. To confirm that the event has been registered with the Intelligent Agent, use the Enterprise Manager Console to verify that the status of the event is "Registered".

deregisterEvent

The *deregisterEvent* command allows you to deregister an Event.

Syntax

If running OEMUTIL with this single command, the syntax is:

```
oemapp oemutil <username>/<password>@<oms> deregisterEvent <eventName> <owner>  
<targetName> <targettype>
```

If specifying this command in a command file, the syntax is:

```
deregisterEvent <eventName> <owner> <targetName> <targettype>
```

Table C-5 *deregisterEvent Command Parameters*

| Parameter | Value |
|------------|--|
| username | Name of a valid Enterprise Manager administrator. |
| password | Enterprise Manager administrator's password. |
| oms | Name of the machine on which the Management Server is running. |
| eventName | Name of the event to be deregistered. If the event name has space, whitespaces or other special characters, then you will need to use the command file option. Put quotes around the name containing spaces, whitespaces or other special characters. Example: "Check Tablespace usage" |
| owner | Name of the owner of the event. The owner is the Enterprise Manager Administrator who originally registered the event. |
| targetName | Name of the target against which the event is to be deregistered. The target must have been discovered by the Intelligent Agent. The target name must match the name displayed in the Console Navigator tree. |

Table C-5 *deregisterEvent Command Parameters*

| Parameter | Value |
|------------|--|
| targettype | The type of target against which the event is to be deregistered. The valid target types are: <ul style="list-style-type: none"> ▪ oracle_sysman_database (Target is a database) ▪ oracle_sysman_node (Target is a node) ▪ oracle_sysman_listener (Target is a net listener) ▪ oracle_sysman_cmanager (Target is a concurrent manager) ▪ oracle_sysman_ops (Target is an Real Application Cluster node) ▪ oracle_sysman_webserver (Target is an apache webserver) ▪ oracle_sysman_hotstandby (Target is a standby database) |

changeCredentials

The *changeCredentials* command allows you to change preferred credentials for database targets in the Enterprise Manager repository.

This command does not apply to any other target type. It also does not change the credentials in the databases themselves, nor does it update the credentials in jobs and events that have already been submitted. Jobs already submitted and registered events must be subsequently de-registered/re-registered in order for them to get the new credentials.

Syntax

If running OEMUTIL with this single command, the syntax is:

```
oemapp oemutil <username>/<password>@<oms> changeCredentials <EM username>
<targetName> <user> <password> <role>
```

If specifying this command in a command file, the syntax is:

```
changeCredentials <EM username> <targetName> <user> <password> <role>
```

Table C-6 *changeCredentials Command Parameters*

| Parameter | Value |
|-----------|---|
| username | Name of a valid Enterprise Manager administrator. |

Table C-6 *changeCredentials Command Parameters*

| Parameter | Value |
|-------------|--|
| password | Enterprise Manager administrator's password. |
| oms | Name of the machine on which the Management Server is running. |
| EM username | Name of the Enterprise Manager Administrator whose database credentials are to be changed. |
| targetName | Name of the database target against which credentials are to be changed. If you are changing the DEFAULT database credentials, specify <default> as the targetName. If you use <default>, you might have to place quotes around the entry depending on your platform. For example, "<default>" |
| user | Name of the database user. |
| password | Password associated with database user. |
| role | Role associated with the database user: NORMAL, SYSDBA, SYSOPER The database user role must be specified. |

OEMUTIL Issues

- For any command, if the target node name does not match the name displayed in the Console Navigator, you will receive the following error:

oracle.sysman.emSDK.client.omsClient.BadAttributeException: VD-3: Some of the targets specified have been removed or do not have agents.
- The job used in the submitJobFromLibrary command must have at least one valid target when it is saved in the Job Library. Otherwise, an exception will occur.
- The event used in the registerEventFromLibrary command must have at least one valid target when it is saved in the Event Library. Otherwise, an exception will occur.
- If you specify an invalid database target using the changeCredentials command, the command will appear to succeed, but will have no effect.

Repository Views

The Enterprise Manger Configuration Assistant creates repository views whenever a new repository is created. These views are created on top of the repository tables. They enable users to view information from the repository without the danger of manipulating data the wrong way.

Administrator Views

SMP_VIEW_ADMINISTRATORS

This view shows a list of all administrators which have been defined on the machines. Information will be useful to system administrators.

The boolean values are represented as a numerical value so that you can change these values into a string appropriate for the Globalization Support settings which are currently active. These values can then be decoded into proper localized values when the report is run

Table D-1 SMP_VIEW_ADMINISTRATORS

| Columns | Descriptions |
|--------------------|--|
| ADMINISTRATOR_NAME | Name of defined database administrator that is used throughout the repository |
| SUPERUSER | Shows whether the database administrator is a superuser. Possible values: 1 (YES) and 0 (NO) |
| JOB_SYSTEM | Shows whether the database administrator can access the JOB system. Possible values: 1 (YES) and 0 (NO) |
| EVENT_SYSTEM | Shows whether the database administrator can access the EVENT system. Possible values: 1 (YES) and 0 (NO) |

SMP_VIEW_ADMIN_CREDENTIALS

List of all the preferred credentials defined per administrator. Every target known in the navigator will have an entry in this view for each administrator who has setup preferred credentials for this target. This view is of interest for system administration.

Table D-2 SMP_VIEW_ADMIN_CREDENTIALS

| Columns | Descriptions |
|--------------------|---|
| ADMINISTRATOR_NAME | Name of defined database administrator used throughout the repository |

Table D-2 SMP_VIEW_ADMIN_CREDENTIALS(Cont.)

| Columns | Descriptions |
|-----------------|---|
| TARGET_NAME | Name of the target. The target name uniquely identifies the target. Several targets can exist with the same name, each with a different type. The column TARGET_NAME links with TARGET_NAME in the SMP_VIEW_NODE_SERVICES view. |
| TARGET_TYPE | Type of the target |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |

SMP_VIEW_ADMIN_SETUP

This view shows the notification setup per administrator. This information is important to system administrators.

Table D-3 SMP_VIEW_ADMIN_SETUP

| Columns | Descriptions |
|--------------------|--|
| ADMINISTRATOR_NAME | Name of defined database administrator that is used throughout the repository. The ADMINISTRATOR_NAME column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view |
| EMAIL_ADDRESS | Email address defined for this administrator |
| EMAIL_TITLE | Title of the email message |
| PAGING_SERVICE | Name of the paging service to use for this administrator |
| PAGING_PIN | Paging pin code to use for this administrator |

Service Views

SMP_VIEW_AGENTS

Shows topology information/details of all discovered Intelligent Agents on nodes in the Navigator. Manually added nodes are not included in this view.

Table D-4 SMP_VIEW_AGENTS

| Columns | Descriptions |
|----------------|--|
| NODE_NAME | Name of the node. The NODE_NAME column links with NODE_NAME in the SMP_VIEW_NODES view. |
| AGENT_ALIAS | Name of the machine as recognized by the Agent |
| LAST_CHECKED | The last time and date this node was checked by the Management Server to see if it is reachable. |
| AGENT_TIMEZONE | Offset in hours This value can be subtracted from the all times reported by this Intelligent Agent. |
| AGENT_STATUS | Current status of the Intelligent Agent. Possible values: 1 (UP) and 0 (DOWN) |
| AGENT_STATE | Current condition of the Intelligent Agent. Possible values: 1 (GOOD) and 0 (BAD) |
| OMS_MACHINE | Name of the Management Server machine servicing this node This field is NULL if this is a manually added node. This name is the canonical name of the Management Server machine. The OMS_MACHINE column links with OMS_MACHINE from the SMP_VIEW_OMS_MACHINES view. |
| SEVERITY | Aggregated alert severity of this target: 0 - No events registered against this target 15 - All events are clear 20 - One or more events are in Warning state 25 - One or more events are in Alert state 115 - Agent down, previous state was Clear 120 - Agent down, previous state was Warning 125 - Agent down, previous state was Alert |

SMP_VIEW_TARGETS

Shows topology information, a list of all targets managed by Intelligent Agents, which potential targets are present in the repository for jobs and events. This view is a subset of the V\$SMP_NODE_SERVICES view and contains only these targets

which have an Intelligent Agent running on the node. Manually added targets will not show up in this view.

Table D-5 SMP_VIEW_TARGETS

| Columns | Descriptions |
|-----------------|---|
| TARGET_NAME | Name of the target. The TARGET_NAME combination uniquely identifies the target. Several targets can exist with the same name, each with a different type. The TARGET_NAME column links with TARGET_NAME in the SMP_VIEW_NODE_SERVICES view. |
| TARGET_TYPE | Type identifier of this target. The type is the type returned by the Intelligent Agent. Only two manually added target types are possible: <ul style="list-style-type: none"> ■ Nodes (oracle_sysman_node) ■ Databases (oracle_sysman_database) |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |
| NODE_NAME | Name of node on which this target runs. The NODE_NAME column links with NODE_NAME in the SMP_VIEW_NODES view. |
| USERDATA | Parameters on how to contact this target |
| SEVERITY | Aggregated alert severity of this target. 0 - No events registered against this target 15 - All events are clear 20 - One or more events are in Warning state 25 - One or more events are in Alert state 115 - Agent down |

SMP_VIEW_TARGET_PROPERTIES

Shows topology information, listing all the properties the Intelligent Agent has reported for this target. Only 8.1.7 or higher Agents will transmit target properties during discovery. Manually added nodes will never appear in this list, since they cannot have properties send over by the Intelligent Agent.

Table D-6 SMP_VIEW_TARGET_PROPERTIES

| Columns | Descriptions |
|-----------------|---|
| TARGET_NAME | Name of the target. The TARGET_NAME combination uniquely identifies the target. Several targets can exist with the same name, each with a different type. The TARGET_NAME column links with TARGET_NAME in the SMP_VIEW_TARGETS view. |
| TARGET_TYPE | Type identifier of this target. The type is the type returned by the Intelligent Agent. |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |
| NAME | Name of the property |
| VALUE | Value of the property |

SMP_VIEW_NODES

Shows Topology Information, list of all known nodes in the repository. Both manually added nodes as well as nodes managed by an Agent (nodes defined in the navigator) will be represented in this view. For each node, the current state of the Intelligent Agent running on the node will be reported.

The boolean values are represented as a numerical value so that these values can change into a string appropriate for the Globalization Support settings which are currently active.

These values can then be decoded into proper localized values when the report is run

Table D-7 SMP_VIEW_NODES

| Columns | Descriptions |
|-----------|---|
| NODE_NAME | Name of the node. The NODE_NAME field is the name of the node defined in the navigator. The same name will also appear in the target list as target type, oracle_sysman_node. |

Table D-7 SMP_VIEW_NODES(Cont.)

| Columns | Descriptions |
|--------------|--|
| DISCOVERY | Shows whether the node is discovered or manually added. Possible values: 1 (AUTOMATIC) and 0 (MANUAL) For all nodes with an operational Intelligent Agent, the DISCOVERY will be set to 1, the OMS_MACHINE and LAST_CHECKED fields will contain a value. For all manually added nodes, the fields DISCOVERY and AGENT_STATUS will be set to 0, and the fields OMS_MACHINE and LAST_CHECKED will be set to NULL. |
| LAST_CHECKED | The last time and date this node was checked by the Management Server to see if it is reachable. |
| AGENT_STATUS | Current status of the Intelligent Agent. Possible values: 1 (UP) and 0 (DOWN) |
| OMS_MACHINE | Name of the Management Server machine servicing this node. This field is NULL if this is a manually added node. This name is the canonical name of the Management Server machine. The OMS_MACHINE column links with OMS_MACHINE from the SMP_VIEW_OMS_MACHINES view. |

SMP_VIEW_NODE_SERVICES

Shows topology information which lists all targets present in the repository. Both manually added as well as targets managed by an Intelligent Agent will be represented in this view.

Table D-8 SMP_VIEW_NODE_SERVICES

| Columns | Descriptions |
|-----------------|---|
| TARGET_NAME | Name of the target. The TARGET_NAME combination uniquely identifies the target. Several targets can exist with the same name, each with a different type. |
| TARGET_TYPE | Type identifier of this target. The type is the type returned by the Intelligent Agent. |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |

Table D-8 SMP_VIEW_NODE_SERVICES(Cont.)

| Columns | Descriptions |
|-----------|---|
| NODE_NAME | Name of node on which this target runs. The NODE_NAME column links with NODE_NAME in the SMP_VIEW_NODES view. |
| USERDATA | Parameters on how to contact this target |

Group Views

SMP_VIEW_GROUPS

A System Administration view which lists all groups defined in the repository (Which groups are defined in the navigator).

The boolean values are represented as a numerical value so that these values can change into a string appropriate for the Globalization Support settings which are currently active.

These values can then be decoded into proper localized values when the report is run

Table D-9 SMP_VIEW_GROUPS

| Columns | Descriptions |
|------------------|---|
| GROUP_NAME | Name of the group |
| DESCRIPTION | User description of this group |
| BACKGROUND_IMAGE | Image to use as a background for this group. This is a physical path location to a file on the disc. |
| ICON_SIZE | Size of the icons. Boolean field: 0 (SMALL) or 1 (LARGE) |

SMP_VIEW_GROUP_SERVICES

A System Administration view which lists all targets in a group, showing which targets are placed into which group. This view contains only the targets defined in the group at that level

Table D–10 SMP_VIEW_GROUP_SERVICES

| Columns | Descriptions |
|-----------------|---|
| GROUP_NAME | Name of the group. The GROUP_NAME column links with GROUP_NAME of the SMP_VIEW_GROUPS view. |
| TARGET_NAME | Name of the targets put in this group and if the target is nested in another group (Nested groups) The TARGET_NAME column links with TARGET_NAME of the SMP_VIEW_NODE_SERVICES view. |
| TARGET_TYPE | Type of target The type can be any of the registered types within the navigator. Since a group can be a target in another group |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |

SMP_VIEW_ALL_GROUP_ALL_SERVICES

A System Administration view which lists all targets in a group, recursively. If a group has a group as its member, all targets of the member group will be shown as well. The member groups themselves will not show up in the view as targets of the group.

Table D–11 SMP_VIEW_ALL_GROUP_ALL_SERVICES

| Columns | Descriptions |
|-----------------|---|
| GROUP_NAME | Name of the group. The GROUP_NAME column links with GROUP_NAME of the SMP_VIEW_GROUPS view. |
| MEMBER_NAME | Name of the member group. A group is also considered to be a member of itself The MEMBER_NAME column links with GROUP_NAME of the SMP_VIEW_GROUPS view. |
| TARGET_NAME | Name of the targets put in this group. The TARGET_NAME column links with TARGET_NAME of the SMP_VIEW_NODE_SERVICES view. |
| TARGET_TYPE | Type of target The type can be any of the registered types within the navigator. |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |

SMP_VIEW_TOP_GROUPS

Lists all views which are not part of other groups and have targets in them.

Table D-12 SMP_VIEW_TOP_GROUPS

| Columns | Descriptions |
|------------------|--|
| GROUP_NAME | Logical name of the group |
| GROUP_OWNER | Administrator who created this group |
| DESCRIPTION | Description of the group |
| BACKGROUND_IMAGE | Background image used in the console |
| ICON_SIZE | Size of icons. Boolean field: 0 (SMALL) or 1 (LARGE) |

Operational System Metrics

SMP_VIEW_OMS_MACHINES

An operational data view which lists all Management Servers currently connected to and working with the repository.

Table D-13 SMP_VIEW_OMS_MACHINES

| Columns | Descriptions |
|--------------|---|
| OMS_MACHINE | Name of the machine |
| LAST_CHECKED | Timestamp of the last heartbeat of this Management Server, using the timezone of the Management Server machine. |

SMP_VIEW_SESSIONS

An operational data view which lists all administrators logged on to this repository.

Table D-14 SMP_VIEW_SESSIONS

| Columns | Descriptions |
|--------------------|--|
| ADMINISTRATOR_NAME | Name of database administrator currently connected. The ADMINISTRATOR_NAME column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view. |
| OMS_MACHINE | Name of Management Server machine the database administrator requested to login to. This name is the canonical name of the Management Server machine. The OMS_MACHINE column links with OMS_MACHINE from the SMP_VIEW_OMS_MACHINES view. |
| LOGIN_TIME | Time the administrator logged in on the Management Server machine |

SMP_VIEW_NOTIFICATION_QUEUE

A view for diagnostics and debugging. It lists all the pending notifications still in the queue. The contents of this view will constantly change. If there are records in this view, the Management Server(s) do not have sufficient time to complete the work

Table D-15 SMP_VIEW_NOTIFICATION_QUEUE

| Columns | Descriptions |
|-------------------|--|
| SEQUENCE_NUM | Internal number to process the notifications. Since the Management Server processes the notifications sorted on SEQUENCE_NUM, this may give an estimate of what is to be processed and when. |
| SUBSYSTEM | The subsystem who has generated this operation. Can be: VdeEvent - Events VdjJob - Jobs VdmNotificationManager - Notifications |
| NOTIFICATION_TYPE | The type of notification for the subsystem |

Table D–15 SMP_VIEW_NOTIFICATION_QUEUE(Cont.)

| Columns | Descriptions |
|--------------------|--|
| NODE_NAME | Name of the node responsible for this operation. The NODE_NAME column links with NODE_NAME in the SMP_VIEW_NODES view. |
| TARGET_NAME | Name of the target responsible for this operation. The TARGET_NAME column links with TARGET_NAME in the SMP_VIEW_TARGETS view. |
| TARGET_TYPE | Type of target |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |
| ADMINISTRATOR_NAME | Name of the administrator involved. The ADMINISTRATOR_NAME column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view. |
| TIMESTAMP | Time the notification was received |

SMP_VIEW_NOTIFICATION_HISTORY

A diagnostics and debugging view which lists all the processed notifications. The notification history can be cleaned. The information in this view is only a snapshot of what is still in the repository.

The boolean values are represented as a numerical value so that these values can change into a string appropriate for the Globalization Support settings which are currently active.

These values can then be decoded into proper localized values when the report is run

Table D–16 SMP_VIEW_NOTIFICATION_HISTORY

| Columns | Descriptions |
|-------------|---|
| OBJECT_TYPE | The subsystem type who generated this notification Currently the notification types are: EVENT - Event subsystem JOB - Job subsystem |

Table D–16 SMP_VIEW_NOTIFICATION_HISTORY(Cont.)

| Columns | Descriptions |
|--------------------|---|
| OBJECT_ID | The ID of the object within the sub-system. Events - EVENT_ID Jobs - JOB_ID The OBJECT_ID column links with either JOB_ID in the SMP_VIEW_JOBS view, or EVENT_ID in the SMP_VIEW_EVENTS view, depending on the value of OBJECT_TYPE. |
| TARGET_NAME | Name of the target responsible for this notification. The TARGET_NAME column links with TARGET_NAME in the SMP_VIEW_TARGETS view. |
| ADMINISTRATOR_NAME | Name of the administrator involved. The ADMINISTRATOR_NAME column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view. |
| METHOD | Notification method. Currently these methods are defined: Email - SMTP Paging - Paging Server |
| TIMESTAMP | Time the notification was send |
| STATUS | Shows whether the notification was sent successfully Boolean field: 0 (NO) or 1 (YES) |
| OBJECT_STATUS | Status of the object |

SMP_VIEW_OPERATION_QUEUE

A diagnostics and debugging view which lists all the pending operations still in the queue. The content of this view will constantly change. If there are records in this view, the Management Servers do not have sufficient time to complete the work

Table D–17 SMP_VIEW_OPERATION_QUEUE

| Columns | Descriptions |
|----------------|---------------------------------|
| OBJECT_ID | The ID of either a job or event |

Table D-17 SMP_VIEW_OPERATION_QUEUE(Cont.)

| Columns | Descriptions |
|--------------------|---|
| SUBSYSTEM | The subsystem who has generated this operation. Can be: VdeEvent - Events VdjJob - Jobs VdmNotificationManager - Notifications |
| OPERATION_TYPE | The type of operation for the subsystem |
| NODE_NAME | Name of the node responsible for this operation. The NODE_NAME column links with NODE_NAME in the SMP_VIEW_NODES view. |
| TARGET_NAME | Name of the target responsible for this operation. The TARGET_NAME column links with TARGET_NAME in the SMP_VIEW_NODE_SERVICES view. |
| TARGET_TYPE | Type of target |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |
| ADMINISTRATOR_NAME | Name of the administrator involved. The ADMINISTRATOR_NAME column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view. |
| OMS_MACHINE | Management Server currently working on this operation. Value will be NULL if not yet allocated The OMS_MACHINE column links with OMS_MACHINE from the SMP_VIEW_OMS_MACHINES view. |

Job Definition Views

SMP_VIEW_JOBS

A view of the Job Subsystem which lists all jobs present in the repository:

- Which jobs are defined in the system.
- Jobs can either be ad-hoc or defined in the library

The boolean values are represented as a numerical value so that these values can change into a string appropriate for the Globalization Support settings which are currently active.

These values can then be decoded into proper localized values when the report is run

Table D-18 SMP_VIEW_JOBS

| Columns | Descriptions |
|--------------------|--|
| JOB_ID | <p>ID of this job.</p> <p>The JOB_ID is an unique identifier for this job.</p> <p>Since a job can be submitted at different times, and because the same job can be created more than once, the JOB_NAME is not enough to uniquely identify a job in the repository.</p> <p>Therefore, all queries used to obtain job information must use the JOB_ID identifier.</p> |
| JOB_NAME | <p>Name of the group. JOB_NAME contains the name of the job as entered by the administrator. This name is not unique and can appear several times for different jobs.</p> |
| ADMINISTRATOR_NAME | <p>Name of the administrator owning this job. The ADMINISTRATOR_NAME column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view.</p> |
| DESCRIPTION | <p>Description of the job</p> |
| TARGET_TYPE | <p>Type of the targeted service. A job is always designed to run against a specific set of target targets.</p> <p>This job type is represented by the TARGET_TYPE field which basically determines which different job tasks are possible for this job.</p> |
| TARGET-NLS_TYPE | <p>Type string used for globalization support of the reports.</p> |
| FIXIT_JOB | <p>Shows whether it is a fixit job</p> <p>Boolean field: 0 (NO) or 1 (YES)</p> |
| LIBRARY_JOB | <p>Shows whether it is a job defined only in the library</p> <p>Boolean field: 0 (NO) or 1 (YES)</p> |
| INTERVAL_JOB | <p>Shows whether it is a job to be executed in an interval</p> <p>Boolean field: 0 (NO) or 1 (YES)</p> |

Table D–18 SMP_VIEW_JOBS(Cont.)

| Columns | Descriptions |
|---------------|--|
| MODIFIED_BY | Name of the administrator who last modified this job. The MODIFIED_BY column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view. |
| MODIFIED_DATE | Time and date this job was last modified. The value of the MODIFIED_DATE field is specified in the time zone of the administrator who has modified it. When the job is created, the first set of modification information is always the owner of the job and the creation date. |

SMP_VIEW_JOB_EXECUTIONS

A view of the Job Subsystem which shows the status of each execution of a job. Only the end result of each execution is given in each view.

Table D–19 SMP_VIEW_JOB_EXECUTIONS

| Columns | Descriptions |
|-----------|--|
| JOB_ID | ID of this job. The JOB_ID is an unique identifier for this job. Since a job can be submitted at different times, and because the same job can be created more than once, the job_name is not enough to uniquely identify an job in the repository. Therefore, all queries used to obtain job information must use the JOB_ID identifier. The JOB_ID column links with JOB_ID of the SMP_VIEW_JOBS view. |
| JOB_NAME | Name of the job. JOB_NAME contains the name of the job as entered by the administrator. This name is not unique and can appear several times for different jobs. |
| NODE_NAME | Name of the node on which this job is running. The NODE_NAME column links with NODE_NAME in the SMP_VIEW_NODES view. |

Table D-19 SMP_VIEW_JOB_EXECUTIONS(Cont.)

| Columns | Descriptions |
|--------------------|---|
| TARGET_NAME | <p>Target this job is scheduled/submitted for. The TARGET_NAME combination uniquely identifies the target this job was meant for. Several targets can be present for any particular job.</p> <p>The TARGET_NAME column links with TARGET_NAME of the SMP_VIEW_NODE_SERVICES view.</p> |
| TARGET_TYPE | Type of the targeted service |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |
| ADMINISTRATOR_NAME | Name of the administrator who owns this job. The ADMINISTRATOR_NAME column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view. |
| EXEC_NUM | <p>The execution number. The EXEC_NUM field represents the number of times the job was actually scheduled against a particular target. For each time the job gets to status SCHEDULED, this number is increased by 1.</p> <p>For the SUBMITTED state, the EXEC_NUM value will always be 0, as the Intelligent Agent has not responded for this job yet.</p> |
| TIMESTAMP | Time the action was recorded. The timestamp is the time of the job occurrence on the Intelligent Agent side. |

Table D–19 SMP_VIEW_JOB_EXECUTIONS(Cont.)

| Columns | Descriptions |
|---------|--|
| STATUS | <p>Status of the job notification</p> <ul style="list-style-type: none">■ 1 - Submitted - The Management Server has submitted the request to the Intelligent Agent and is waiting for a confirmation■ 2 - Scheduled - The Intelligent Agent has responded to the submit request and is now waiting till the actual execution time for the job to get executed■ 4 - Running - The job has been started■ 9 - Completed - The job terminated successfully (with an exit code of zero 0)■ 11 - Failed - The job failed. The exit code was non-zero■ 13 - Pending delete - An administrator requested a delete of a scheduled job. Waiting on Intelligent Agent confirmation■ 14 - Deleted - The Intelligent Agent has confirmed the delete of the job <p>The status 0 can never appear in this view as library jobs have no active status and do not interact with the Intelligent Agent.</p> <p>Also, status 15 cannot appear in this view as this is also not an active status of a job.</p> |

SMP_VIEW_JOB_HISTORY

A Job Subsystem view which shows the history of all the job executions. It is only a snapshot of the available information since the job history can be cleanup up and jobs can get manually deleted. It presents information about when and how the job was executed and an overview of the job at this time.

Table D-20 SMP_VIEW_JOB_HISTORY

| Columns | Descriptions |
|-----------------|--|
| JOB_ID | <p>ID of this job. The JOB_ID is an unique identifier for this job.</p> <p>Since a job can be submitted at different times, and because the same job can be created more than once, the job_name is not enough to uniquely identify an job in the repository.</p> <p>Therefore, all queries used to obtain job information must use the JOB_ID identifier.</p> <p>The JOB_ID column links with JOB_ID of the SMP_VIEW_JOBS view.</p> |
| JOB_NAME | <p>Name of the job. JOB_NAME contains the name of the job as entered by the administrator.</p> <p>This name is not unique and can appear several times for different jobs.</p> |
| TARGET_NAME | <p>Target this job is scheduled/submitted for. The TARGET_NAME combination uniquely identifies the target this job was meant for. Several targets can be present for any particular job.</p> <p>The TARGET_NAME column links with TARGET_NAME of the SMP_VIEW_NODE_SERVICES view.</p> |
| TARGET_TYPE | Type of the targeted service |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |
| EXEC_NUM | <p>The execution number. The EXEC_NUM field represents the number of times the job was actually scheduled against a particular target. For each time the job gets to status SCHEDULED, this number is increased by 1.</p> <p>For the SUBMITTED state, the EXEC_NUM value will always be 0 as the Intelligent Agent has not responded for this job yet.</p> |
| TIMESTAMP | Time the action was recorded. The timestamp is the time of the job occurrence on the Intelligent Agent side. |

Table D–20 SMP_VIEW_JOB_HISTORY(Cont.)

| Columns | Descriptions |
|---------|---|
| STATUS | <p>Status of the job notification</p> <ul style="list-style-type: none"> ■ 1 - Submitted - The Management Server has submitted the request to the Intelligent Agent, and is waiting for a confirmation ■ 2 - Scheduled - The Intelligent Agent has responded to the submit request, and is now waiting till the actual execution time for the job to get executed ■ 4 - Running - The job has been started ■ 9 - Completed - The job terminated successfully (with an exit code of zero 0) ■ 11 - Failed - The job failed. The exit code was non-zero ■ 13 - Pending delete - An administrator requested a delete of a scheduled job. Waiting on Intelligent Agent confirmation ■ 14 - Deleted - The Intelligent Agent has confirmed the delete of the job |

SMP_VIEW_JOB_STATUS

A job subsystem view which shows the current status of all active jobs. One line will appear in this view for each target this job is submitted against. For library jobs, the NODE_NAME field is NULL, and the STATUS and EXEC_NUM fields are forced to 0 since no actual executions have taken place. Only active jobs are represented in this view.

Table D–21 SMP_VIEW_JOB_STATUS

| Columns | Descriptions |
|---------|---|
| JOB_ID | <p>ID of this job.</p> <p>The JOB_ID is a unique identifier for this job. Since a job can be submitted at different times, and because the same job can be created more than once, the job_name is not enough to uniquely identify a job in the repository. Therefore, all queries used to obtain job information must use the JOB_ID identifier.</p> <p>The JOB_ID column links with JOB_ID in the SMP_VIEW_JOBS view.</p> |

Table D-21 SMP_VIEW_JOB_STATUS(Cont.)

| Columns | Descriptions |
|--------------------|--|
| JOB_NAME | Name of the job. JOB_NAME contains the name of the job as entered by the administrator. This name is not unique and can appear several times for different jobs. |
| NODE_NAME | Name of the node on which this job is running The name of the node will be NULL for library jobs The NODE_NAME column links with NODE_NAME in the SMP_VIEW_NODES view. |
| TARGET_NAME | The target this job is scheduled/submitted for. The TARGET_NAME, TARGET_TYPE combination uniquely identifies the target this job was meant for. Several targets can be present for any particular job. The TARGET_NAME column links with TARGET_NAME in the SMP_VIEW_TARGETS view. |
| TARGET_TYPE | Type of the targeted service |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |
| ADMINISTRATOR_NAME | Name of the administrator who owns this job. The ADMINISTRATOR_NAME column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view. |
| EXEC_NUM | The execution number. The EXEC_NUM field represents the number of times the job was actually scheduled against a particular target. For each time the job gets to status SCHEDULED, this number is increased by 1. For the SUBMITTED state, as well as library jobs, the EXEC_NUM value will always be 0, as the Intelligent Agent has not responded for this job yet. |
| TIMESTAMP | Time the job notification was recorded |

Table D-21 SMP_VIEW_JOB_STATUS(Cont.)

| Columns | Descriptions |
|---------|---|
| STATUS | Status of the job: <ul style="list-style-type: none">■ 1 - Submitted - The Management Server has submitted the request to the Intelligent Agent and is waiting for a confirmation■ 2 - Scheduled - The Intelligent Agent has responded to the submit request, and is now waiting till the actual execution time for the job to get executed■ 4 - Running - The job has been started■ 9 - Completed - The job terminated successfully (with an exit code of zero 0)■ 11 - Failed - The job failed. The exit code was non-zero■ 13 - Pending delete - An administrator requested a delete of a scheduled job. Waiting on Intelligent Agent confirmation■ 14 - Deleted - The Intelligent Agent has confirmed the delete of the job■ 15 - Expired - The finish time for an internal job has passed |

SMP_VIEW_AGENT_JOBS

View of job subsystem with overview of all active jobs with the Intelligent Agent specific information.

The boolean values are represented as a numerical value so that these values can change into a string appropriate for the Globalization Support settings which are currently active.

These values can then be decoded into proper localized values when the report is run

Table D-22 SMP_VIEW_AGENT_JOBS

| Columns | Descriptions |
|--------------------|--|
| JOB_ID | <p>ID of this job.</p> <p>The JOB_ID is an unique identifier for this job.</p> <p>Since a job can be submitted at different times, and because the same job can be created more than once, the job_name is not enough to uniquely identify a job in the repository.</p> <p>Therefore, all queries used to obtain job information must use the JOB_ID identifier.</p> |
| AGENT_ID | <p>ID attributed by the Intelligent Agent for this job.</p> <p>The AGENT_ID is the unique Intelligent Agent ID for this job. This ID is unique for this Intelligent Agent, although others Intelligent Agents can attribute the same ID to a job or event.</p> |
| JOB_NAME | <p>Name of the group. JOB_NAME contains the name of the job as entered by the administrator.</p> <p>This name is not unique, and can appear several times for different jobs.</p> |
| ADMINISTRATOR_NAME | <p>Name of the administrator owning this job. The ADMINISTRATOR_NAME column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view.</p> |
| DESCRIPTION | <p>Description of the job</p> |
| NODE_NAME | <p>Node on which this job is running. The NODE_NAME column links with NODE_NAME in the SMP_VIEW_NODES view.</p> |
| TARGET_NAME | <p>Name of the targeted service. The TARGET_NAME column links with TARGET_NAME in the SMP_VIEW_TARGETS view.</p> |
| TARGET_TYPE | <p>Type of the targeted service. A job is always designed to run against a specific set of target targets.</p> <p>This job type is represented by the TARGET_TYPE field, which basically determines which different job tasks are possible for this job.</p> |
| TARGET-NLS_TYPE | <p>Type string used for globalization support of the reports.</p> |

Table D-22 SMP_VIEW_AGENT_JOBS(Cont.)

| Columns | Descriptions |
|----------------|--|
| FIXIT_JOB | Shows whether it is a fixit job Boolean field: 0 (NO) or 1 (YES) |
| INTERVAL_JOB | Shows whether the job is to be executed in an interval Boolean field: 0 (NO) or 1 (YES) |
| EXEC_NUM | The execution number. The EXEC_NUM field represents the number of times the job was actually scheduled against a particular target. For each time the job gets to status SCHEDULED, this number is increased by 1. For the SUBMITTED state, the EXEC_NUM value will always be 0, as the Intelligent Agent has not responded for this job yet. |
| MODIFIED_BY | Name of the administrator who last modified this job. The MODIFIED_BY column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view. |
| MODIFIED_DATE | Time and date this job was last modified. The value of the MODIFIED_DATE field is specified in the timezone of the administrator who has modified it. When the jobs is created, the first set of modification information is always the owner of the job and the creation date. |
| STATUS | Status of the job condition 1 - Submitted 2 - Scheduled 4 - Running 9 - Completed successfully 11 - Job failed 13 - Pending delete 14 - Job deleted 15 - Job expired |
| STARTED | Time and date the job started |
| FINISHED | Time and date the job finished |

Table D–22 SMP_VIEW_AGENT_JOBS(Cont.)

| Columns | Descriptions |
|--------------|--|
| NEXT_EXEC | Time and date for the next execution. Only valuable for interval jobs |
| AGENT_STATUS | Shows whether an Intelligent Agent is currently running Boolean field: 0 (DOWN) or 1 (UP) |

Event Definition Views

SMP_VIEW_EVENTS

A view of the Event Subsystem which lists all events defined in the repository, only 1 line for each event defined in the repository.

The boolean values are represented as a numerical value so that these values can change into a string appropriate for the Globalization Support settings which are currently active.

These values can then be decoded into proper localized values when the report is run

Table D–23 SMP_VIEW_EVENTS

| Columns | Descriptions |
|------------|--|
| EVENT_ID | Uniquely distinguishes events from each other. The EVENT_ID is an unique identifier for this job. Since a event can be registered and de-registered at different times, and because the same event can be registered against more than one target, the EVENT_NAME is not enough to uniquely identify an event in the repository. Therefore, all queries used to obtain event information must use the EVENT_ID identifier. The EVENT_ID column links with EVENT_ID from the SMP_VIEW_EVENTS view. |
| EVENT_NAME | Name of this event |

Table D-23 SMP_VIEW_EVENTS(Cont.)

| Columns | Descriptions |
|--------------------|--|
| ADMINISTRATOR_NAME | Name of the administrator who created this event. The ADMINISTRATOR_NAME column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view. |
| DESCRIPTION | Description of the event |
| NODE_NAME | Node on which this event is running. The NODE_NAME column links with NODE_NAME from the SMP_VIEW_NODES view. |
| TARGET_TYPE | Type of target this event is meant for |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |
| LIBRARY_EVENT | Shows whether an event is saved in the event library Boolean field: 0 (NO) or 1 (YES) |
| FIXIT_JOB_ID | ID of the fixit job to execute when this event triggers Value is ZERO (0) if no fixit associated with this event. |
| UNSOLICITED | Shows whether it is a 3rd party event Boolean field: 0 (NO) or 1 (YES) |
| SNMP_TRAP | Shows whether an SNMP trap is sent when event triggers Boolean field: 0 (NO) or 1 (YES) |

SMP_VIEW_EVENT_HISTORY

View of event subsystem with historical overview of all event occurrences currently in the repository.

The boolean values are represented as a numerical value so that these values can change into a string appropriate for the Globalization Support settings which are currently active.

These values can then be decoded into proper localized values when the report is run

Table D-24 SMP_VIEW_EVENT_HISTORY

| Columns | Descriptions |
|-----------------|---|
| EVENT_ID | <p>Needed to uniquely distinguish events from each other. The EVENT_ID is an unique identifier for this job.</p> <p>Since a event can be registered and de-registered at different times, and because the same event can be registered against more than one target, the EVENT_NAME is not enough to uniquely identify an event in the repository.</p> <p>Therefore, all queries used to obtain event information must use the EVENT_ID identifier.</p> <p>The EVENT_ID column links with EVENT_ID from the SMP_VIEW_EVENTS view.</p> |
| EVENT_NAME | Name of this event. |
| OCCURRENCE_ID | Sequence number of event occurrences. These numbers are not necessarily consecutive |
| NODE_NAME | Name of the node on which this event is running. The NODE_NAME column links with NODE_NAME from the SMP_VIEW_NODES view. |
| TARGET_NAME | <p>Name of the target that caused the event to trigger. An event is always registered against a specific set of target services.</p> <p>This event type is represented by the TARGET_TYPE field, which basically determines which different event tests are possible for this event.</p> <p>The TARGET_NAME column links with TARGET_NAME from the SMP_VIEW_NODE_SERVICES view.</p> |
| TARGET_TYPE | Type of target this event is meant for |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |
| OWNER | <p>Administrator who is currently assigned to check this occurrence.</p> <p>The OWNER column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view.</p> |
| TIMESTAMP | Date/Time this occurrence happened |
| MESSAGE | Specific occurrence text |
| AGENT_STATUS | <p>Current status of the Intelligent Agent</p> <p>Boolean field: 0 (DOWN) or 1 (UP)</p> |

Table D–24 SMP_VIEW_EVENT_HISTORY(Cont.)

| Columns | Descriptions |
|----------|---|
| SEVERITY | Current severity level of this occurrence |
| ACTIVE | Shows whether this event occurrence is still outstanding in the console Boolean field: 0 (NO) or 1 (YES) |

SMP_VIEW_EVENT_TEST_HISTORY

View of event subsystem with historic overview of the notifications of all tests per events present in the repository.

The boolean values are represented as a numerical value so that these values can change into a string appropriate for the Globalization Support settings which are currently active.

These values can then be decoded into proper localized values when the report is run

Table D–25 SMP_VIEW_EVENT_TEST_HISTORY

| Columns | Descriptions |
|---------------|--|
| EVENT_ID | Needed to uniquely distinguish events from each other. The EVENT_ID is an unique identifier for this job. Since a event can be registered and de-registered at different times, and because the same event can be registered against more than one target, the EVENT_NAME is not enough to uniquely identify an event in the repository. Therefore, all queries used to obtain event information must use the EVENT_ID identifier. The EVENT_ID column links with EVENT_ID from the SMP_VIEW_EVENTS view. |
| EVENT_NAME | Name of this event |
| TEST_ID | Needed to uniquely distinguish this test from other tests within the event |
| EVENT_TEST | Name of the test within the event |
| OCCURRENCE_ID | Sequence number of event occurrences. These numbers are not necessarily consecutive |

Table D-25 SMP_VIEW_EVENT_TEST_HISTORY(Cont.)

| Columns | Descriptions |
|-----------------|---|
| NODE_NAME | Name of the node on which this event is running. The NODE_NAME column links with NODE_NAME from the SMP_VIEW_NODES view. |
| TARGET_NAME | Name of the target that caused the event to trigger. The TARGET_NAME column links with TARGET_NAME from the SMP_VIEW_NODE_SERVICES view. |
| TARGET_TYPE | Type of target this event is meant for. An event is always registered against a specific set of target targets. This event type is represented by the TARGET_TYPE field, which basically determines which different event tests are possible for this event. |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |
| OWNER | Administrator who is currently assigned to check this occurrence. The OWNER column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view. |
| TIMESTAMP | Date/Time this occurrence happened |
| MESSAGE | Specific occurrence text |
| EVENT_SEVERITY | Overall severity level of the event |
| TEST_SEVERITY | Severity level of the test within the event |
| ACTIVE | Shows whether this event occurrence is still outstanding in the console. Boolean field: 0 (NO) or 1 (YES) |

SMP_VIEW_EVENT_STATUS

View of Event Subsystem showing current status of all events present in the repository.

The boolean values are represented as a numerical value so that these values can change into a string appropriate for the Globalization Support settings which are currently active.

These values can then be decoded into proper localized values when the report is run

Table D-26 SMP_VIEW_EVENT_STATUS

| Columns | Descriptions |
|--------------------|---|
| EVENT_ID | <p>Needed to uniquely distinguish events from each other. The EVENT_ID is an unique identifier for this job.</p> <p>Since a event can be registered and de-registered at different times, and because the same event can be registered against more than one target, the EVENT_NAME is not enough to uniquely identify an event in the repository.</p> <p>Therefore, all queries used to obtain event information must use the EVENT_ID identifier.</p> <p>The EVENT_ID column links with EVENT_ID from the SMP_VIEW_EVENTS view.</p> |
| EVENT_NAME | Name of this event |
| NODE_NAME | Name of the node on which this event is running. The NODE_NAME column links with NODE_NAME from the SMP_VIEW_NODES view. |
| TARGET_NAME | Name of the target that caused the event to trigger. The TARGET_NAME column links with TARGET_NAME from the SMP_VIEW_NODE_SERVICES view. |
| TARGET_TYPE | <p>Type of target this event is meant for</p> <p>An event is always registered against a specific set of target targets.</p> <p>This event type is represented by the TARGET_TYPE field, which basically determines which different event tests are possible for this event.</p> |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |
| ADMINISTRATOR_NAME | Name of the administrator who owns this event. The ADMINISTRATOR_NAME column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view. |
| TIMESTAMP | Date/Time this occurrence happened |

Table D-26 SMP_VIEW_EVENT_STATUS(Cont.)

| Columns | Descriptions |
|--------------|--|
| EVENT_STATUS | Current status of this event 204: Pending registration 205: Registered 206: Registration failed 207: Pending deregistration 208: Deregistered |
| AGENT_STATUS | Current status of the Intelligent Agent Boolean field: 0 (DOWN) or 1 (UP) If the Intelligent Agent is DOWN or BAD, this boolean field will be marked as DOWN |
| SEVERITY | Current severity level of this event 15 - clear 20 - warning 25 - alert |

SMP_VIEW_EVENT_TESTS

View of event subsystem with list of all tests defined per event.

Table D-27 SMP_VIEW_EVENT_TESTS

| Columns | Descriptions |
|------------|--|
| EVENT_ID | Needed to uniquely distinguish events from each other. The EVENT_ID is an unique identifier for this job. Since a event can be registered and de-registered at different times, and because the same event can be registered against more than one target, the EVENT_NAME is not enough to uniquely identify an event in the repository. Therefore, all queries used to obtain event information must use the EVENT_ID identifier. The EVENT_ID column links with EVENT_ID from the SMP_VIEW_EVENTS view. |
| EVENT_NAME | Name of this event |

Table D–27 SMP_VIEW_EVENT_TESTS(Cont.)

| Columns | Descriptions |
|------------|---------------------------------|
| EVENT_TEST | Internal name of the event test |

SMP_VIEW_AGENT_EVENTS

View of Event Subsystem showing Intelligent Agent specific information about all registered events.

The boolean values are represented as a numerical value so that these values can change into a string appropriate for the Globalization Support settings which are currently active.

These values can then be decoded into proper localized values when the report is run

Table D–28 SMP_VIEW_AGENT_EVENTS

| Columns | Descriptions |
|--------------------|---|
| EVENT_ID | <p>Needed to uniquely distinguish events from each other. The EVENT_ID is an unique identifier for this job.</p> <p>Since a event can be registered and de-registered at different times, and because the same event can be registered against more than one target, the EVENT_NAME is not enough to uniquely identify an event in the repository.</p> <p>Therefore, all queries used to obtain event information must use the EVENT_ID identifier.</p> <p>The EVENT_ID column links with EVENT_ID from the SMP_VIEW_EVENTS view.</p> |
| AGENT_ID | ID attributed by the Intelligent Agent for this event. |
| EVENT_NAME | Name of this event |
| EVENT_TEST | Specific test the Intelligent Agent has to evaluate |
| ADMINISTRATOR_NAME | <p>Name of the administrator who created this event. The ADMINISTRATOR_NAME column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view.</p> |
| DESCRIPTION | Description of the event |

Table D–28 SMP_VIEW_AGENT_EVENTS(Cont.)

| Columns | Descriptions |
|-----------------|---|
| NODE_NAME | Node on which this event is running. The NODE_NAME column links with NODE_NAME from the SMP_VIEW_NODES view. |
| TARGET_NAME | Name of the target this event is meant for. The TARGET_NAME column links with TARGET_NAME in the SMP_VIEW_TARGETS view. |
| TARGET_TYPE | Type of target this event is meant for |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |
| FIXIT_JOB_ID | ID of the fixit job to execute when this event triggers Value is ZERO (0) if no fixit associated with this event. |
| UNSOLICITED | Shows whether this is a 3rd party event Boolean field: 0 (NO) or 1 (YES) |
| SNMP_TRAP | Shows whether to send an SNMP trap when event triggers Boolean field: 0 (NO) or 1 (YES) |
| SEVERITY | Current severity level of this event 15 - clear 20 - warning 25 - alert |
| AGENT_STATUS | Shows whether the Intelligent Agent is currently running Boolean field: 0 (DOWN) or 1 (UP) |

Capacity Planner and Data Gatherer Collections

SMP_VIEW_COLLECTIONS

Capacity Planner view showing list of defined Capacity Planner collections in the repository.

The boolean values are represented as a numerical value so that these values can change into a string appropriate for the Globalization Support settings which are currently active.

These values can then be decoded into proper localized values when the report is run

Table D-29 SMP_VIEW_COLLECTIONS

| Columns | Descriptions |
|--------------------|--|
| DG_NAME | Name of node on which the Data Gatherer is running which is collecting the information. |
| NODE_NAME | Name of node on which this collection runs. The NODE_NAME column links with NODE_NAME from the SMP_VIEW_NODES view. |
| TARGET_NAME | Name of the target for which this collection is defined. The TARGET_NAME column links with TARGET_NAME from the SMP_VIEW_NODE_SERVICES view. |
| TARGET_TYPE | Type identifier of this target. |
| TARGET-NLS_TYPE | Type string used for globalization support of the reports. |
| ADMINISTRATOR_NAME | Name of the administrator owning this collection. The ADMINISTRATOR_NAME column links with ADMINISTRATOR_NAME from the SMP_VIEW_ADMINISTRATORS view. |
| ACTIVE | Shows whether the collection is still active Boolean field: 0 (NO) or 1 (YES) |
| LOCAL | Shows whether the collection is stored locally in the repository Boolean field: 0 (NO) or 1 (YES) |

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