Oracle® Enterprise Manager

Getting Started with Oracle Change Management Pack

Release 2.1

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Getting Started with Oracle Change Management Pack, Release 2.1

Part No. A76919-01

Contents

2 Using Change Manager

3 Using Plan Editor

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Preface

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

Purpose of this Guide

This guide provides an overview of the Oracle Change Management Pack applications and their features. As the guide describes how to use the Oracle Change Management Pack applications, it also introduces you to key Oracle Change Management Pack concepts and terminology.

Audience

This guide is written for those who want to use any of the Oracle Change Management Pack applications.

Knowledge Assumed of the Reader

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

How this Guide is Organized

This guide consists of three chapters and two appendices.

Chapter 1, "Overview of the Oracle Change Management Pack"

This chapter provides an overview of important Oracle Change Management Pack concepts and features.

Chapter 2, "Using Change Manager"

This chapter describes how to use Change Manager, the general-purpose interface for the Oracle Change Management Pack.

Chapter 3, "Using Plan Editor"

This chapter describes how to modify and create object definitions using the Plan Editor application of Oracle Change Management Pack.

Appendix A, "Command Line Interface Appendix"

This appendix describes uses for the command line interface for the Oracle Change Management Pack. It also provides syntax and reference information for command line interface commands and describes the exit status codes returned by the command line interface.

Appendix B, "Troubleshooting Appendix"

This appendix describes different ways of troubleshooting problems that may occur when you are using Oracle Change Management Pack applications.

How to Use this Guide

This guide should be read in its entirety to provide you with an overview of each of the Oracle Change Management Pack applications, so that you are familiar with the tasks that can be performed with them. This guide does not describe all the details of using the applications. The online help for the applications provides more detailed information about using these applications.

Oracle Enterprise Manager Pack Information

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

Oracle Change Management Pack

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

Oracle DBA Management Pack

- Includes DBA Studio and Oracle SQL*Plus Worksheet.
- Simplifies DBA operations by allowing you to perform them by pointing and clicking with your mouse rather than manually entering SQL commands.
- Concurrently performs multiple tasks in multiple Oracle Enterprise Manager windows.
- Administers several databases simultaneously.
- Centralizes database administration tasks for both local and remote databases running on any Oracle platform in any location worldwide.

Oracle Diagnostics Pack

- Includes Oracle Performance Manager, Oracle Capacity Planner, Oracle Trace, Oracle TopSessions, and Oracle Event Tests that are provided with the Oracle Diagnostics Pack.

- Monitors, diagnoses, and maintains the health of databases, operating systems, and applications. Real-time analysis is used to analyze current problems, and historical analysis is used to analyze trends that could cause future problems.
- Provides powerful capacity planning features that enable users to easily plan and track future system resource requirements.

Oracle Management Pack for Oracle Applications

- Includes Oracle Performance Manager, Oracle Capacity Planner, and Oracle Event Tests that are provided with the Oracle Management Pack for Oracle Applications.
- Monitors, diagnoses, and maintains the health of Oracle Applications. Real-time analysis is used to analyze current problems, and historical analysis is used to analyze trends that could cause future problems.
- Provides powerful capacity planning features that enable users to easily plan and track future system resource requirements.

Oracle Management Pack for SAP R/3

- Includes Oracle Performance Manager, Oracle Capacity Planner, and Oracle Event Tests that are provided with the Oracle Management Pack for SAP R/3.
- Monitors, diagnoses, and maintains the health of an SAP R/3 system.
- Provides powerful capacity planning features that enable users to easily plan and track future system resource requirements. Real-time analysis is used to analyze current problems, and historical analysis is used to analyze trends that could cause future problems.

Oracle Standard Management Pack

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

Oracle Tuning Pack

- Includes Oracle SQL Analyze, Oracle Expert, Oracle Index Tuning Wizard, Reorg Wizard, and the Tablespace Map.
- Optimizes system performance by identifying and tuning major database and application bottlenecks such as inefficient SQL, poor data structures, and improper use of system resources.

- Proactively discovers tuning opportunities and automatically generates the analysis and required changes to tune the system. Inherent in the product are powerful teaching tools which train DBAs how to tune as they work.
- Instills "Consultant Quality" tuning expertise into developers and DBAs and increases their productivity.

Oracle Enterprise Manager Documentation

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

Oracle Enterprise Manager base documentation

- The *Oracle Enterprise Manager Readme* provides important notes regarding the online documentation, updates to the software, and other late-breaking information.
- The *Oracle Enterprise Manager Administrator's Guide* explains how to use Oracle Enterprise Manager, Oracle's systems management console, common services, and integrated platform tool. This manual also describes how to use the DBA Management Pack.
- The *Oracle Enterprise Manager Concepts Guide* provides an overview of Oracle Enterprise Manager, including the DBA Management Pack.
- The *Oracle Enterprise Manager Configuration Guide* explains how to configure Oracle Enterprise Manager.
- The *Oracle Enterprise Manager Messages Manual* describes the Oracle Enterprise Manager error messages and methods for diagnosing the messages.

Oracle Change Management Pack documentation

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

Oracle DBA Management Pack documentation

- The *Oracle Enterprise Manager Administrator's Guide* provides information on how to use the DBA Management Pack.

- The *Oracle Enterprise Manager Concepts Guide* provides overview information about the DBA Management Pack.

Oracle Diagnostics Pack documentation

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

Oracle Management Pack for Oracle Applications documentation

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

Oracle Management Pack for SAP R/3 documentation

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

Oracle Standard Management Pack documentation

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

Oracle Tuning Pack documentation

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

Your Comments are Welcome

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1

Overview of the Oracle Change Management Pack

The Oracle Change Management Pack is a group of integrated applications used to track and make changes to database object definitions. The Oracle Change Management Pack is a component of Oracle Enterprise Manager.

This chapter provides an overview of important Oracle Change Management Pack concepts and features.

The following section describes new features for this release of Oracle Change Management Pack.

New Features for This Release of Oracle Change Management Pack

The following list describes the major new features for this version of the Oracle Change Management Pack:

- Change Manager application

  Change Manager, a new application, is now the central control panel for Oracle Change Management Pack. In most cases, interaction with the Oracle Change Management Pack is directly or indirectly through Change Manager.

- Improved multiple user support

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

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

  See "Capturing a Baseline from the Oracle Enterprise Manager Console or DBA Studio" on page 1-10 and "Performing a Comparison from the Oracle Enterprise Manager Console or DBA Studio" on page 1-12 for more information.

- History features for Oracle Change Management Pack tasks

  You can now view history entries that show the status of the following Oracle Change Management Pack tasks:

  - Script generation
  - Script execution
  - Capturing baselines
  - Performing comparisons

  By viewing the history entries for pending tasks and completed tasks, you can determine when each Oracle Change Management Pack task was performed and which user performed it. See "Viewing History Entries for Tasks" on page 2-8 for more information on history entries for tasks.

- Launch DBA Studio from Change Manager

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

- Create and view multiple versions of a baseline

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

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

  You can view a particular version of a baseline. See "Working With a Particular Version of a Change Plan, Baseline, or Comparison" on page 2-10 for more information on viewing baseline versions.

- Create and view multiple versions of a comparison

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

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

You can view a particular version of a comparison. See "Working With a Particular Version of a Change Plan, Baseline, or Comparison" on page 2-10 for more information on viewing comparison versions.

- Create and view multiple versions of a change plan

  Oracle Change Management Pack automatically creates a new version of a change plan when necessary to ensure that the history features for change plans work properly.

  You can view a particular version of a change plan. See "Working With a Particular Version of a Change Plan, Baseline, or Comparison" on page 2-10 for more information on viewing change plan versions.

- Command line interface

  The new command line interface allows you to:

  – Generate and optionally execute a script from a current plan for a single named destination database

  – Capture a new baseline using a baseline specification

  – Perform a new comparison using a comparison specification

  Appendix A, "Command Line Interface Appendix" describes how to use the command line interface, and includes information on the syntax for the command line interface commands.

- Improved impact report

  The impact report now provides more information about why a script action is required and how to fix problems in the change plan.

- Improved failure anticipation for scripts

  When a change plan script is generated for a destination database, Oracle Change Management Pack can perform more resource checking than in

previous releases. Any potential resource problems, for example, a tablespace that is too small, that are discovered are reported in the impact report for the script.

See "Dealing with Script Execution Errors" on page 3-18 for more information on using the OCM_FAILURE_PREDICTION property to improve failure anticipation for scripts.

- View text differences for database object definitions

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

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

- Improved user interface for DB Search application

  The user interface for the DB Search application has been simplified. The online help for DB Search includes more information about the new DB Search interface.

- Exclude the SYS and SYSTEM schemas from an operation

  When you capture a baseline using the Advanced mode of DB Capture, search for specific database objects with DB Search, or create a scoped directive for a plan, the user interface now allows you to specify that you want to exclude the SYS and SYSTEM schemas from the operation.

  See the online help for more information.

- Baseline Viewer application

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

Database Objects Supported by Oracle Change Management Pack Applications

The types of database object definitions that Oracle Change Management Pack supports are:

- Cluster
- Database link

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

In this release, Oracle Change Management Pack does not support the following features of the database objects in the previous list:

- Object-oriented features:
  - Tables and snapshot logs that refer to user-defined data types.
  - Object tables
  - Nested tables
  - Object views
- Snapshots that are not read-only

For a more complete list that describes the level of support Oracle Change Management Pack offers for specific database objects and attributes, see the section

on currently unsupported database features and attributes in the *Oracle Change Management Pack Readme*.

Understanding Oracle Change Management Pack Objects

The following types of objects are created only by Oracle Change Management Pack applications and are used to make changes or track changes to other object definitions:

- Change plans

  You can use several Oracle Change Management Pack applications to create change plans. A change plan is an object that serves as a container for change requests. From a change plan, you can generate one or more scripts that can be executed to carry out the changes specified in the change plan at one or more destination databases. Oracle Change Management Pack applications do all the work of determining and ordering the individual steps that must be carried out to execute the change requests in the plan. After a script executes at a destination database, you have the option of keeping or undoing the changes made by the script. See "Using Change Plans to Make Changes" on page 1-19 for more information about change plans.

- Baselines

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

  A baseline specification is used to generate baselines. A baseline specification includes a baseline name, source database, scope specification, and owner. The baseline name can be changed after the baseline specification is created, but the source database, scope specification, and owner cannot. The scope specification for a baseline is a set of criteria that an object must meet to be included in the baseline generated from the baseline specification. The scope specification describes the types of database object definitions to be included in the baseline, the schemas in which to look for those object definitions, and the names of those object definitions. See "Overview of DB Capture" on page 1-9 for more information about baselines.

- Comparisons

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

A comparison specification is used to generate comparisons. A comparison specification is defined by its name, source database, scope specification, and owner. The name can be changed after the comparison specification is created, but the source database, scope specification, and owner cannot. The scope specification for a comparison is a set of criteria that the set of objects to be compared must meet to be included in a comparison generated from the comparison specification. The scope specification describes the types of database object definitions to be included in the comparison, the schemas in which to look for those object definitions, and the names of those object definitions. See "Overview of DB Diff" on page 1-11 for more information about comparisons.

Tracking Applications and Change Applications

With Oracle Change Management Pack, you can track changes by:

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

With Oracle Change Management Pack applications, you can make changes by:

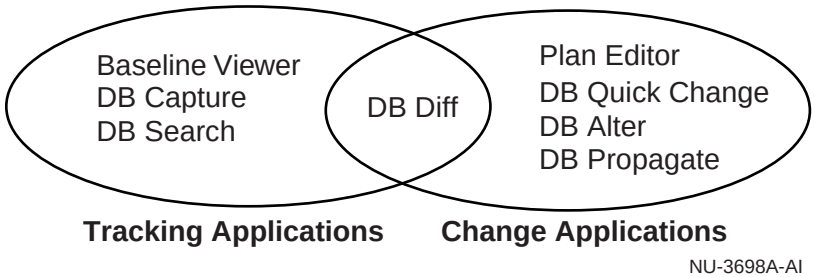
- After creating a comparison, synchronizing one set of definitions to match the other set.
- Reproducing one or more object definitions in a database at multiple databases, which has the same effect as copying definitions from one database to another.

If an object definition of the same name and type already exists at the destination database, that definition is modified to match the source definition.

- Modifying one or more object definitions in a database by specifying the changes to make.

Figure 1–1 displays the two types of Oracle Change Management Pack applications, tracking applications and change applications:

Figure 1–1 Tracking Applications and Change Applications



In Figure 1–1, the left side of the diagram shows Oracle Change Management Pack's tracking applications, which are used to report and track the evolving state of metadata in databases. The right side of the diagram shows Oracle Change Management Pack's change applications, which are used to describe metadata changes and execute scripts to carry out the changes. The DB Diff tool is both a tracking application (because its comparison function reports on the state of object definitions) and a change application (because its Synchronization wizard is used to synchronize one set of object definitions to match the other set of definitions).

- The tracking applications and their functions are:
  - DB Capture

    Captures one or more definitions from one database.
  - DB Search

    Searches for definitions that match a set of search criteria.
  - Baseline Viewer

    Lets you display baselines created earlier using DB Capture.
  - DB Diff

Compares two sets of definitions.

- The change applications and their functions are:
  - DB Diff's Synchronization wizard

    Modifies a set of database definitions to match another set of database definitions.
  - DB Quick Change

    Modifies one definition in one database.
  - DB Alter

    Modifies one or more definitions in one or more databases.
  - DB Propagate

    Reproduces one or more definitions from a database in that database or in another database.
  - Plan Editor

    Allows you to create a change plan, which serves as a container for change requests. Scripts can be generated from a change plan, then executed on one or more databases to make the changes specified by the change requests.

The Oracle Change Management Pack also contains the Change Manager application, which is a general-purpose interface that provides direct or indirect access to all Oracle Change Management Pack features. See "Starting Change Manager" on page 2-1 for more information on starting Change Manager.

The following sections provide additional overview information on the Oracle Change Management Pack applications.

Overview of DB Capture

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

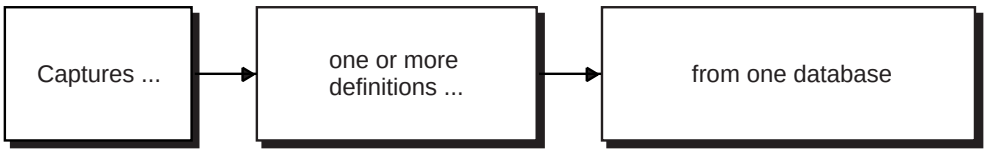
DB Capture can capture object definitions in both of the following forms:

- A baseline. The baseline stores definitions in a form that other Oracle Change Management Pack applications can use. A baseline is created during every capture operation.

- A SQL DDL script. The script contains the SQL statements that correspond to the captured definitions. You can use the script to save a textual version of the definitions or as input to CASE tools that accept SQL DDL input. You can also use individual SQL statements from the script to create definitions in a new database. You have the option of whether or not to create a SQL DDL script.

Figure 1–2 shows the functional capabilities of DB Capture.

Figure 1–2 Functional Capabilities of DB Capture



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

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

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

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

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

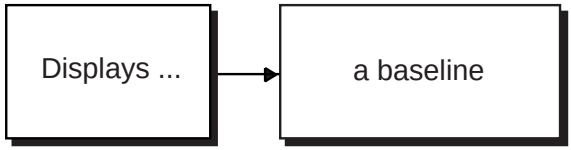
The online help contains more information about the specifics of using DB Capture.

Overview of Baseline Viewer

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

Figure 1–3 shows the functional capabilities of Baseline Viewer.

Figure 1–3 Functional Capabilities of Baseline Viewer



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

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

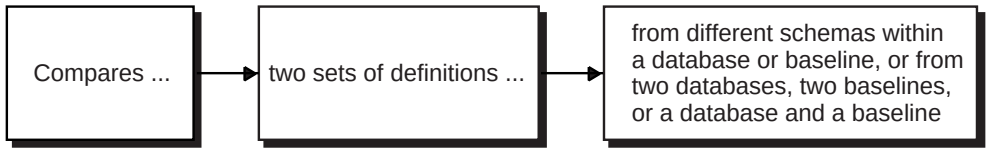
Overview of DB Diff

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

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

Figure 1–4 on page 1-11 shows the functional capabilities of DB Diff.

Figure 1–4 Functional Capabilities of DB Diff



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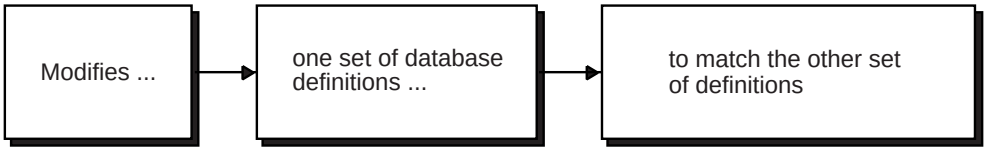
You can also generate a report in HTML format about a DB Diff comparison. The report includes:

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

After the two sets of object definitions have been compared, you can use DB Diff's Synchronization wizard to modify one set of definitions (with the exception of baselines, which are read-only and cannot be modified) to match the other set of definitions. For each selected object definition in the source, if an object definition of the same name and type already exists at the destination database, the destination object will be modified to match the source definition. If a selected object definition in the source does not exist at the destination database, it will be created. The Synchronization wizard does all the work of determining and ordering the individual steps that must be carried out to perform this requested synchronization, taking object definition dependencies into account.

Figure 1–5 shows the functional capabilities of DB Diff's Synchronization wizard.

Figure 1–5 Functional Capabilities of DB Diff's Synchronization Wizard



To start the Synchronization wizard for the DB Diff application, on the DB Diff **Tools** menu, click **Synchronization Wizard**.

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

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

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

DB Diff is started to perform a comparison, then the DB Diff viewer is started to allow you to view the comparison. If the comparison operation finds that certain database definitions are different, you can start the Synchronization Wizard from DB Diff if you want to synchronize the definitions.

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

Overview of DB Quick Change

The DB Quick Change application guides you through the process of making one or more changes to a single database object definition. You indicate changes to object definitions by directly manipulating their representation on property sheets similar to those in Oracle Enterprise Manager's DBA Studio application. The DB Quick Change versions of these property sheets allow you to make some changes that cannot be made using DBA Studio (for example, changing the name of a column in a table).

DB Quick Change does all the work of determining and ordering the individual steps that must be carried out to perform your requested operations, taking object definition dependencies into account.

Figure 1–6 shows the functional capabilities of DB Quick Change.

Figure 1–6 Functional Capabilities of DB Quick Change

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

Overview of DB Alter

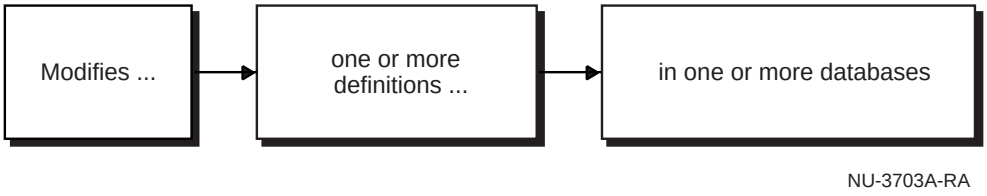
The DB Alter application guides you through the process of making changes to one or more object definitions in one or more databases. You indicate changes to object definitions by directly manipulating their representation on property sheets similar to those in Oracle Enterprise Manager's DBA Studio application. The DB Alter versions of these property sheets allow you to make some changes that cannot be made using DBA Studio (for example, changing the name of a column in a table).

When you specify a group of changes to several database object definitions, DB Alter does all the work of determining and ordering the individual steps that must be carried out to perform your requested operations, taking object definition dependencies into account.

The specified changes can be applied at the source database and at other databases.

Figure 1–7 shows the functional capabilities of DB Alter.

Figure 1–7 Functional Capabilities of DB Alter



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

Overview of DB Propagate

The DB Propagate application guides you through the steps of selecting one or more object definitions from a database, then reproducing those definitions in a destination schema within the source database or in one or more destination databases. For each selected object definition in the source database, if an object definition of the same name and type already exists at the destination database, the destination definition will be modified to match the source definition. If a selected object definition in the source database does not exist at the destination database, it will be created.

DB Propagate does all the work of determining and ordering the individual steps that must be carried out to perform your requested operations, taking object definition dependencies into account.

Figure 1–8 shows the functional capabilities of DB Propagate.

Figure 1–8 Functional Capabilities of DB Propagate

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

Copying Definitions Using Drag and Drop

From the navigator panes in the Oracle Enterprise Manager console and DBA Studio, you can select object definitions in a schema, then drag them and drop them into a different schema (which can be in a different database). If you drag a non-schema object definition, it must be dropped in a different database. When you copy table definitions using the drag and drop method, both the table and its associated data is copied to the destination. DB Propagate is launched to complete drag and drop copy operations. The change plan created by the drag and drop operation is deleted, but a history entry for the copy operation is created and saved.

Note: Database links are used to copy table data from one database to another.

If you attempt to copy table data from one database to another and the impact report includes an ERROR-level message about not being able to find a global name for the source database or destination database, this means that a database link must be created for the database or databases referenced in the error message.

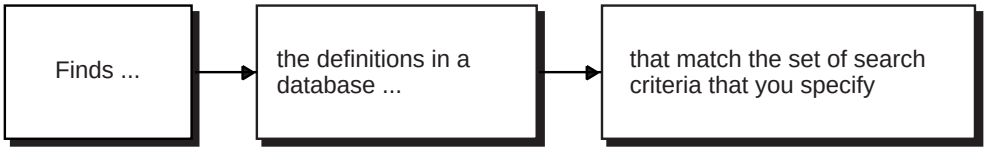
See the section on the CREATE DATABASE LINK statement in the *Oracle SQL Reference Manual* for more information on creating a database link.

Overview of DB Search

The DB Search application lets you search for database objects that match a set of search criteria that you specify. After DB Search completes a search operation, you can view or modify the object definitions that matched the search criteria.

Figure 1–9 shows the functional capabilities of DB Search.

Figure 1–9 Functional Capabilities of DB Search



NE-0001A-RA

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

Overview of Plan Editor

The Plan Editor application allows you to create, modify, and deploy a single change plan. The change plan can modify or reproduce database object definitions in one or more databases.

You can also create change plans with DB Diff's Synchronization wizard, DB Alter, DB Quick Change, and DB Propagate. However, these applications differ from Plan Editor because each of them is designed to create a change plan with specific types of change requests that make specific types of changes.

Plan Editor is a more flexible change plan tool. You can use Plan Editor to create and modify a change plan that includes any type of change request and which can make a wider variety of changes.

The other applications use components from the Plan Editor interface in a framework that guides you through the application's task. As you use the other Oracle Change Management Pack applications, you become familiar with the components that Plan Editor uses to accomplish different tasks.

Figure 1–10 shows the functional capabilities of Plan Editor.

Figure 1–10 Functional Capabilities of Plan Editor

See Chapter 3, "Using Plan Editor" on page 3-1 for more information on using Plan Editor.

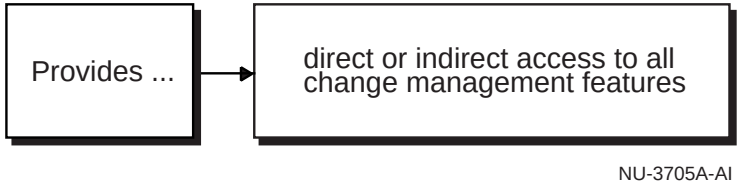
Overview of Change Manager

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

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

Figure 1–11 shows the functional capabilities of Change Manager.

Figure 1–11 Functional Capabilities of Change Manager



See Chapter 2, "Using Change Manager" on page 2-1 for more information on using Change Manager.

Starting the Oracle Change Management Pack Quick Tour

The Oracle Change Management Pack includes a Quick Tour that provides an overview of the Pack and its components. The Quick Tour is an excellent way to

start learning about the applications in the Pack and their uses. To start the Quick Tour, on the **Start** menu, point to **Programs**, then to the Oracle Home where Oracle Enterprise Manager is installed, then to **Change Management Pack**, then click **Change Management Quick Tour**.

Sample Uses for the Oracle Change Management Pack

Some of the common usage scenarios for the Oracle Change Management Pack are:

- Using DB Capture to capture a baseline of the current state of database object definitions, then using DB Diff later to compare the baseline to the current state of those database definitions.
- Using DB Capture to create a baseline specification that describes the object definitions that you want to include in the baseline, then using the specification multiple times to create new versions of the baseline. The definitions included in the baseline versions may differ over time, as changes are made at the source database being used. These baseline versions can be stored by Oracle Change Management Pack, making them an easy way to record important points in a development cycle.
- Using DB Diff's Synchronization wizard to synchronize the current schema or database with a previously-captured baseline of the schema or database. If you capture a set of object definitions for a schema or database in a baseline, you can use the Synchronization wizard later to return those object definitions to the state they were when the baseline was captured.
- Using DB Diff to create a comparison specification that describes the sets of object definitions that you want to compare, then using the specification multiple times to create new versions of the comparison. The differences found during each comparison may change over time, as changes are made to the sets of definitions being compared. These comparison versions can be stored by Oracle Change Management Pack, making them an easy way to record changes to sets of definitions at different points in a development cycle.
- Using DB Quick Change to make one or more changes to a single database object definition, then executing those changes.
- Using DB Alter to specify changes to one or more object definitions in a single database, then executing those changes as a unit
- Using DB Propagate to simplify database life cycle activities such as:
  - Reproducing database object definitions for developers to modify in conjunction with enhancements to an application.

  - Reproducing the developers' enhanced object definitions back at the original database after the developers are satisfied with their modifications.
  - Reproducing a set of object definitions from a development database to a test database and later to multiple production databases.
  - Reproducing needed object definitions when deploying a new or upgraded application to multiple production databases.
- Dragging a database object from the Oracle Enterprise Manager console navigator or from the DBA Studio navigator, then dropping it in a new schema or database in the tree. A drag and drop copy operation displays the DB Propagate application, in which you complete the copying of the database definition. Note that when you drag and drop table definitions, both the table definition and its associated data is copied to the destination. Note that database links are used to copy table data from one database to another.
- Using the history features in Change Manager to track the status of Oracle Change Management Pack tasks performed by your users.

Using Change Plans to Make Changes

This section provides an overview of the process of creating and modifying object definitions using change plans. It introduces you to important Oracle Change Management Pack concepts and terms.

The process for making changes using change plans involves these phases:

1. Planning and defining changes
2. Evaluating the impact of changes
3. Implementing changes

The following sections describe each of these phases. Note that although change plans can be created with the DB Alter, DB Quick Change, DB Propagate, and Plan Editor applications, some of these applications may hide various phases of the process from you to reduce the time it takes to make the desired changes.

Planning and Defining Changes

The first phase of using a change plan to create or modify object definitions is to plan and define the changes that you want to make.

During the planning stage, you plan the changes that you want to make. For example, you may want to make one or more changes to an existing object

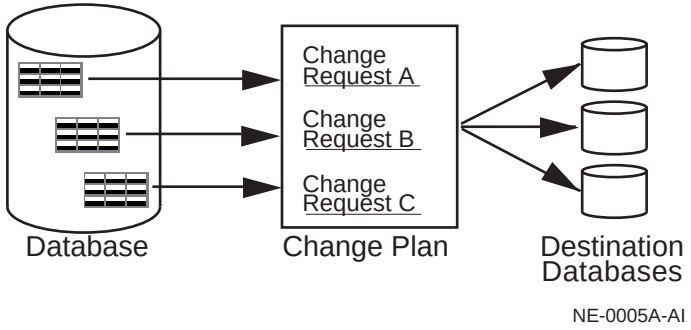
definition in one or more databases. Or, you may want to reproduce one or more object definitions from one schema or database in another schema or database.

During the definition stage, you use Oracle Change Management Pack to create a change plan and change requests, and you specify one or more destination databases. A change plan is a named container for change requests. Change requests describe to Oracle Change Management Pack the types of changes that you want to make. A destination database is a database where you want to apply the change requests in a change plan. See "Creating a Plan with Plan Editor" on page 3-2 for more information about creating a change plan. See "Selecting a Destination Database with Plan Editor" on page 3-11 for more information about selecting a destination database.

To specify one or more changes to make to an existing object definition in one or more databases, you create a change request called a directive that Oracle Change Management Pack uses to make the changes. To reproduce one or more object definitions from one database or schema in another database or schema, Oracle Change Management Pack uses a change request called an exemplar. See "Defining a Directive with Plan Editor" on page 3-5 for more information about defining directives. See "Defining an Exemplar with Plan Editor" on page 3-8 for more information about defining exemplars.

Figure 1–12 shows the planning and defining changes phase:

Figure 1–12 Using a Change Plan: Planning and Defining Changes



Evaluating the Impact of Changes

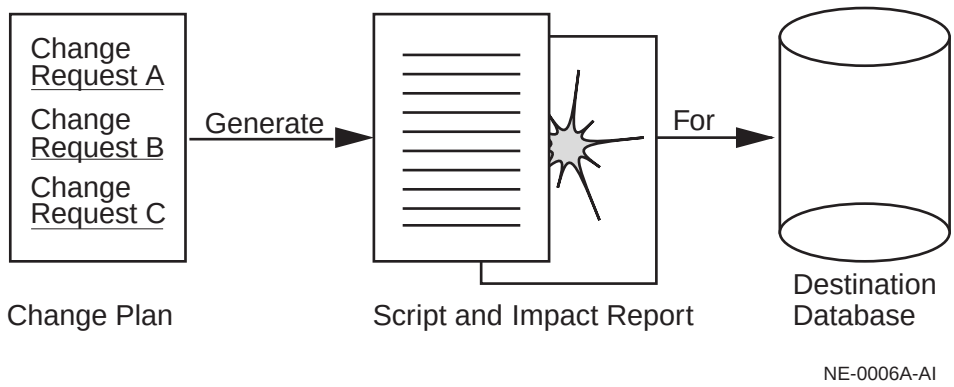
After you finish planning and defining the changes, the next phase of the process is to evaluate the impact of the changes that you want to make.

To evaluate the impact of the change requests at a particular database, you use Oracle Change Management Pack to generate a script and an impact report for a change plan and that destination database. The impact report explains the changes that will be made by the script when it executes at the destination database. It also describes any change requests that cannot be applied at the destination database, and explains how to modify the destination database or change plan so that those changes can be made. See "Viewing the Impact Report and Script Summary with Plan Editor" on page 3-14 for more information about the impact report.

The script is used to implement the desired changes at the destination database. See "Generating a Script with Plan Editor" on page 3-12 for more information about generating a script for a destination database.

Figure 1–13 shows the evaluating the impact of changes phase:

Figure 1–13 Using a Change Plan: Evaluating the Impact of Changes



Implementing the Changes

The last phase of the process is to implement the changes.

To implement the change requests in a change plan at a destination database, you use Oracle Change Management Pack to execute the script at the destination database. See "Executing the Script with Plan Editor" on page 3-16 for more information about executing a script at a destination database.

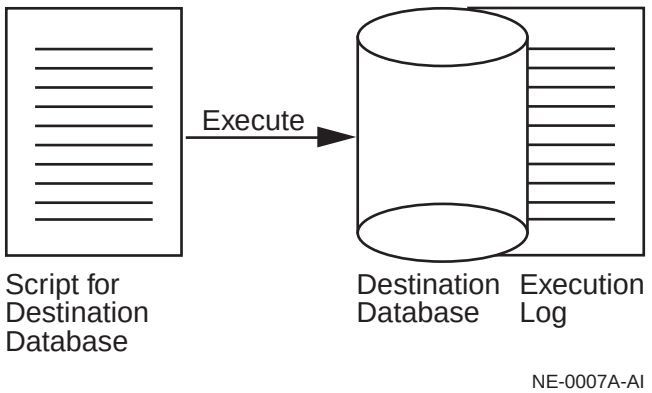
During or after script execution, you can examine the execution log, which displays messages, including the status of the script execution ("Script execution succeeded"

or "Script execution failed."). See "Dealing with Script Execution Errors" on page 3-18 for more information on understanding execution log error messages.

You are also able to keep or undo the changes made by the script at the destination database. See "Executing the Script with Plan Editor" on page 3-16 for more information about keeping or undoing changes made by a change plan script.

Figure 1–14 shows the implementing the changes phase:

Figure 1–14 Using a Change Plan: Implementing the Changes



Learning More About Making Changes Using Change Plans

The DB Alter, DB Quick Change, and DB Propagate applications guide you through the steps of making particular types of changes. Plan Editor allows you to make a wider variety of changes, but does not guide you through the steps of making the changes.

For more information about making changes using Plan Editor, see Chapter 3, "Using Plan Editor" on page 3-1.

Using Help

Online help is provided for all of the Oracle Change Management Pack applications. You can display either the Contents page of the Oracle Change Management Pack help system, or you can display a help topic for your current context in an application.

Displaying the Contents Page for Help

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

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

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

Displaying a Help Topic for Your Current Context in an Application

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

- If a Help button exists, click it.
- If a Help button does not exist, click the object that you are interested in, then press F1.
- Some wizard pages for the Oracle Change Management Pack applications also display property pages. To access help for the wizard page, click the Help button at the bottom left corner of the page. To access help for a property page, click a field in the property page, then click the Help button beneath the property page. If a Help button does not exist beneath the property page, click a field in the property page, then press F1.

Finding a Particular Type of Help Topic

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

- Help topics whose titles begin with words such as "About," "Introduction,"or "Overview" are conceptual topics. These topics usually provide overview information about Oracle Change Management Pack applications or conceptual information that you should be aware of before performing a particular task.

They do not provide step-by-step instructions for accomplishing a task. The Conceptual Topics book on the help system's Contents page includes all of the conceptual topics in the Oracle Change Management Pack help system.

- Help topics whose title begin with the word "To" are task topics. These topics provide step-by-step instructions for accomplishing a task. They do not provide conceptual information that you should be aware of before performing the task. The Task Topics book on the help system's Contents page includes all of the task topics in the Oracle Change Management Pack help system.
- The Oracle Change Management Pack glossary is available by accessing the Glossary book on the help system's Contents page.

2

Using Change Manager

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

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

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

Starting Change Manager

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

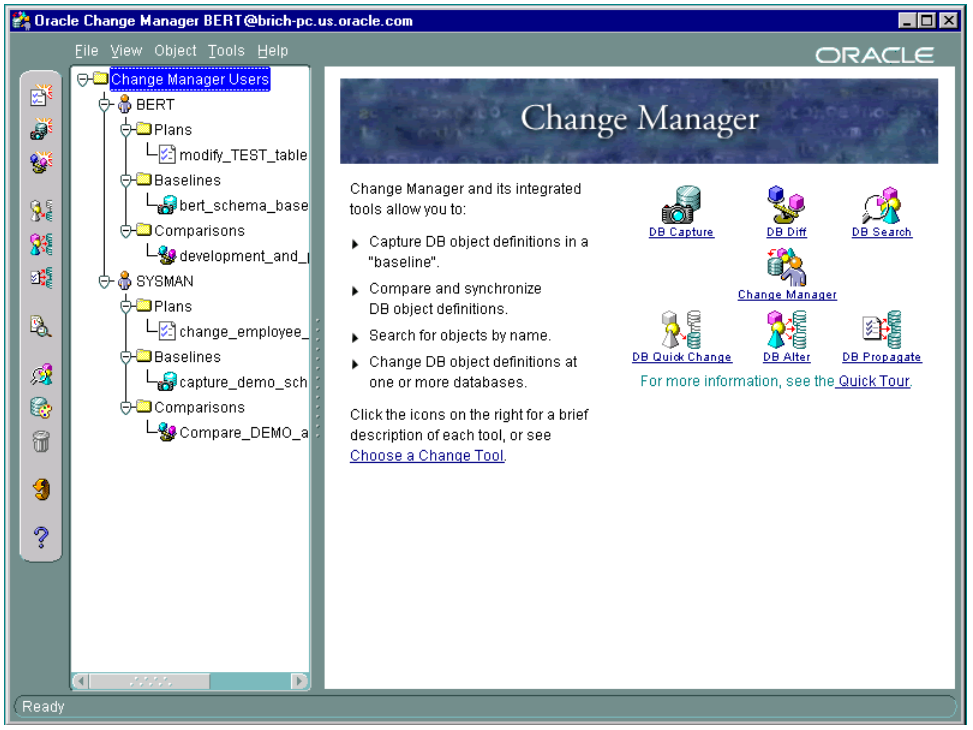
- From the Oracle Enterprise Manager console, use any of these methods:
  - Select a database in the navigator panel, click the right mouse button, point to the **Related Tools** menu option, then click **Change Manager**.
  - On the **Tools** menu, point to **Change Management Pack**, then click **Change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

See "Starting Change Management Pack Applications from Change Manager" on page 2-3 for more information on starting the other Change Management Pack applications from Change Manager and "Starting DBA Studio from Change Manager" on page 2-4 for more information on starting DBA Studio from Change Manager.

Using the Change Manager Main Window

The Change Manager main window (see Figure 2–1) has a navigator tree on the left and a detail view on the right.

Figure 2–1 Change Manager Navigator Tree and Detail View



The navigator tree displays the following Oracle Change Management Pack objects, organized by owner:

- baselines

- comparisons
- change plans

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

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

When the Change Manager Users folder (the root of the Change Manager tree) is selected (as in Figure 2–1), the detail view provides information about Oracle Change Management Pack applications and the operations that they can perform. Click on an application's icon in the detail view to learn more about the operations that the application can perform.

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

Starting Change Management Pack Applications from Change Manager

You start the other Oracle Change Management Pack applications from Change Manager, as follows:

- Baseline Viewer

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

- DB Alter

  On the Change Manager **Tools** menu, click **DB Alter**.

- DB Capture

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

- DB Diff

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

- DB Propagate

  On the Change Manager **Tools** menu, click **DB Propagate**.

- DB Search

  On the Change Manager **Tools** menu, click **Find Database Objects**.

- DB Quick Change

  On the Change Manager **Tools** menu, click **DB Quick Change**.

- Plan Editor

  On the Change Manager **Object** menu, click **Create Change Plan**, then in the Create Change Plan Options dialog box, click **Create Change Plan Manually**.

Starting DBA Studio from Change Manager

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

Working with Baselines

Table 2–1 describes how to use Change Manager to perform different types of baseline operations.

Table 2–1 Performing Baseline Operations

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

Table 2–1 Performing Baseline Operations (Cont.)

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

For more information on working with baselines, see:

- "Viewing History Entries for Tasks" on page 2-8 for more information on viewing history entries for baseline tasks.
- "Working With a Particular Version of a Change Plan, Baseline, or Comparison" on page 2-10 for more information on working with particular versions of baselines.
- "Exporting and Importing Change Plans, Baselines, and Comparisons" on page 2-11 for more information on exporting and importing baselines.

Working with Comparisons

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

Table 2–2 Performing Comparison Operations

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

Table 2–2 Performing Comparison Operations (Cont.)

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

For more information on working with comparisons, see:

- "Viewing History Entries for Tasks" on page 2-8 for more information on viewing history entries for comparison tasks.
- "Working With a Particular Version of a Change Plan, Baseline, or Comparison" on page 2-10 for more information on working with particular versions of comparisons.
- "Exporting and Importing Change Plans, Baselines, and Comparisons" on page 2-11 for more information on exporting and importing comparisons.

Working with Change Plans

Table 2–3 describes how to use Change Manager to perform different types of change plan operations.

Table 2–3 Performing Change Plan Operations

Operation	Steps for Performing the Operation
Create a new change plan	On the **Object** menu, click **Create Change Plan**. Then in the Create Change Plan Options dialog box, select the name of the application that you want to use to create the change plan (the **Create Manually** option lets you use Plan Editor to create the plan). See Chapter 3, "Using Plan Editor" for more information on using Plan Editor to create a change plan.
View and modify a change plan	Select the change plan in the tree. On the **Object** menu, click **Edit Change Plan**. This lets you view and modify the change plan using Plan Editor. See Chapter 3, "Using Plan Editor" for more information on using Plan Editor to edit and modify a change plan.
Delete a change plan	Select the change plan in the tree. On the **Object** menu, click **Remove**. This deletes all versions of the change plan.
Rename a change plan	Select the change plan in the tree. On the **Object** menu, click **Edit Change Plan**. On the General page for the plan in Plan Editor, edit the name of the plan, then click one of the folders in the Plan Editor tree. When the new plan name appears in the Plan Editor tree, exit Plan Editor. On the Change Manager **View** menu, click **Refresh** to see the plan's new name displayed in the Change Manager tree.
Export a change plan to a file	On the Change Manager **Tools** menu, click **Export Plans/Baselines/Comparisons**, then specify the change plan to export and the name of the export file.
Import a change plan from a file	On the Change Manager **Tools** menu, click **Import Plans/Baselines/Comparisons**, then specify the name of the export file and the change plan to import.
Create a new version of a change plan	None. Oracle Change Management Pack automatically creates a new version of a change plan when necessary to ensure that the history features for the change plan work properly.
View a previous version of a change plan	Select the change plan in the tree. On the Change Manager **Object** menu, click **Show Versions**. In the Versions dialog box, click the version you want to view, then click **View**.
Delete a previous version of a change plan	Select the change plan in the tree. On the Change Manager **Object** menu, click **Show Versions**. In the Versions dialog box, click the version you want to delete, then click **Remove**.
View history entries for change plan tasks	On the **View** menu, click **Show History**. In the History dialog box, view history entries for pending plan tasks on the Pending page and view history entries for completed plan tasks on the History page.

For more information on working with change plans, see:

- "Viewing History Entries for Tasks" on page 2-8 for more information on viewing history entries for change plan tasks.
- "Working With a Particular Version of a Change Plan, Baseline, or Comparison" on page 2-10 for more information on working with particular versions of change plans.
- "Exporting and Importing Change Plans, Baselines, and Comparisons" on page 2-11 for more information on exporting and importing change plans.

Viewing History Entries for Tasks

You can view history entries that show the status of the following Oracle Change Management Pack tasks:

- Script generation
- Script execution
- Capturing baselines
- Performing comparisons

By viewing the history entries for pending tasks and completed tasks, you can determine when each Oracle Change Management Pack task was performed and its completion status.

To view the history entries for tasks in the current Oracle Change Management Pack repository, on the Change Manager **View** menu, choose the **Show History** option, which displays the History dialog box. The History dialog box allows you to view both pending tasks and completed tasks.

Viewing and Completing Pending Tasks

Click the Pending tab of the History dialog box to view pending tasks. Pending tasks are script executions that need to be kept or undone. See "Executing the Script with Plan Editor" on page 3-16 for more information on keeping or undoing the changes made by a change plan script.

The history entries on the Pending page of the History dialog box enable you to keep track of the Oracle Change Management Pack pending tasks, which need further attention. Each row on the Pending page is a history entry for one pending task.

When you complete a pending task and refresh the History dialog box, the entry is moved to the History page. You also have the option of manually moving an entry for a pending task to the History page.

On the Pending page, you can perform the operations shown in Table 2–4:

Table 2–4 Operations That Can be Performed on Pending Tasks

Operation	Steps to Perform the Operation
Complete a pending task	Select a pending task and click the **GoTo** button. On the Execution Log page, click **Keep** or **Undo** to keep or undo the changes made by the script execution.
Update the pending tasks display	Click the **Refresh** button. Any new pending tasks are displayed. Any previously pending tasks that have been completed are removed from the Pending page and displayed on the History page.
Manually move a pending task to the History page	Select a pending task and click the **Move to History** button. This moves the pending task to the History page, where you have the option of completing it later.
Save history entries to a file	Click the **Save List** button. The Save List dialog box lets you save some or all of the pending task history entries in a file. You have the option of viewing and printing the information to be included in the file before saving the file.
Sort history entries	Click a column heading on the Pending page. The first time you click a heading, the history entries are sorted in ascending order, using the values in that column. If you click again on the same heading, the history entries are sorted in descending order, using the values in that column.

You are notified of any pending tasks on the Pending page and are given the opportunity to complete them each time you exit Change Manager.

Viewing Completed Tasks

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

The history entries on the History page of the History dialog box enable you to track the Oracle Change Management Pack tasks that have been completed or that have been manually moved from the Pending page to the History page. Each row on the History page is a history entry for one completed task or a pending task that was manually moved from the Pending page. The status for a particular history entry tells you whether the task completed successfully or not.

On the History page, you can perform the operations shown in Table 2–5:

Table 2–5 Operations That Can be Performed on Completed or Manually Moved Tasks

Operation	Steps to Perform the Operation
Remove a task	Select a task and click **Remove**.
Update the History page display	Click the **Refresh** button. Any new completed tasks are displayed.
View a task	Select a task and click **GoTo**. The appropriate Oracle Change Management Pack window is opened in the correct context for viewing the task. If the selected task is a pending task that was manually moved to the History page, after you click **GoTo**, click **Keep** or **Undo** on the Execution Log page to keep or undo the changes made by the script execution.
Save history entries to a file	Click the **Save List** button. The Save List dialog box lets you save some or all of the task history entries in a file. You have the option of viewing and printing the information to be included in the file before saving the file.
Sort history entries	Click a column heading on the History page. The first time you click a heading, the history entries are sorted in ascending order, using the values in that column. If you click again on the same heading, the history entries are sorted in descending order, using the values in that column.

Working With a Particular Version of a Change Plan, Baseline, or Comparison

After you create a baseline specification, you can use the specification to generate multiple baselines over time. Similarly, after you create a comparison specification, you can use it to generate multiple comparisons over time. New versions of a change plan are created automatically when necessary to ensure that the history features for change plans work properly.

By default, when you select a change plan, baseline, or comparison in Change Manager, any operations you perform are carried out on the latest version of that object. In some cases, however, you may want to view or remove an earlier version of the object. To do so, after you select the object in Change Manager, on the **Object** menu, click **Show Versions**. This displays the Versions dialog box. In the Versions dialog box, select the version of the object that you are interested in, then click **View** to view the selected version of the object in the appropriate Oracle Change

Management Pack window or click **Remove** to remove the selected version of the object from the Oracle Enterprise Manager repository.

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

Exporting and Importing Change Plans, Baselines, and Comparisons

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

To export change plans, baselines, or comparisons:

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

To import change plans, baselines, or comparisons:

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

3

Using Plan Editor

The Plan Editor application allows you to modify or reproduce (or both) database object definitions at one or more databases.

With Plan Editor, you create or modify a single change plan and populate it with change requests. To deploy the plan, you specify one or more destination databases, generate a script to apply the plan's change requests at each database, then execute the scripts.

You can also create change plans with DB Diff's Synchronization wizard, DB Alter, DB Quick Change, and DB Propagate. However, these applications differ from Plan Editor because each of them is designed to create a change plan with specific types of change requests that make specific types of changes.

Plan Editor is a more flexible change plan tool. You can use Plan Editor to create and modify a change plan that includes any type of change request and to make a wider variety of changes.

This chapter explains in detail the steps for modifying and creating object definitions using Plan Editor.

Modifying and Creating Object Definitions with Plan Editor

This section describes how to start the Plan Editor application and use it to modify and create object definitions.

Note: Plan Editor provides right mouse button support for some operations.

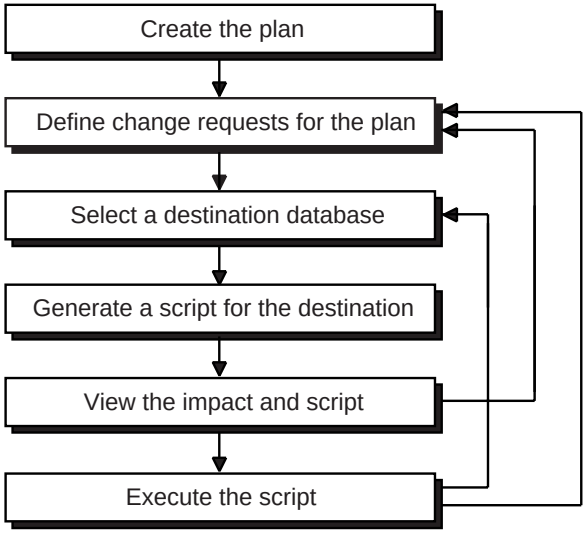
After you select an object in the Plan Editor navigator, click the right mouse button to display a menu of options. Any menu options that are not appropriate for the selected object are unavailable from the menu.

Creating a Plan with Plan Editor

To create a new plan using Plan Editor, follow these steps:

1. Start Change Manager from the Oracle Enterprise Manager console. On the **Tools** menu, point to **Change Management Pack**, then click **Change Manager**.
2. On the Change Manager **Object** menu, click **Create Change Plan**. In the Create Change Plan Options dialog box, click **Manual Creation**, which displays the Create Plan dialog box.
3. Create a plan by following these steps, which are also shown in Figure 3–1 on page 3-3:
   a. On the General page of the Create Plan dialog box:
      * Supply a unique name for the plan. Oracle Change Management Pack allows plan names and baseline names of up to 50 characters in length. Any character, including blank, is allowed. However, to avoid confusion, it is recommended that you do not use leading or trailing blanks in a plan name or baseline name.
      * Choose the plan's source database (the database used to create the plan's change requests) from the list of databases. The list of databases are the databases known to (discovered by) the Oracle Enterprise Manager console.
      * Provide a description of the plan (optional).
   b. Click **Create** to create the plan. This launches Plan Editor for the newly-created plan.

Figure 3–1 Creating and Modifying Object Definitions with Plan Editor



Defining Change Requests with Plan Editor

After Plan Editor creates the empty plan, you need to define one or more change requests to add to the plan. Depending on what you want the plan to accomplish, you will define directives, exemplars, or both for the plan.

Understanding Directives

A directive is a set of changes you specify for an existing, named object definition. A directive can be thought of as a "Super Alter" statement.

A directive for an object definition tells an Oracle Change Management Pack application, "Make these specific changes to the object definition." Suppose, for example, that you are defining a directive for a table named Table_1. Some of the change requests that you could specify in a directive for table Table_1 include:

- Adding column REGION_ID with data type of NUMBER(3).
- Renaming the column REGNAME to AREA_NAME.
- Changing the tablespace for the table to tablespace TABLESPACE_1.

You create a directive for an object definition by selecting an object definition to be modified, then specifying the changes to the object definition's attributes on property sheets similar to those in DBA Studio.

A directive has the scope of a single object definition (the changes made by the directive are applied to a single object definition).

It is also possible to extend the scope of a directive so that the changes specified in the directive are applied to multiple object definitions that you specify. A directive with an extended scope is called a scoped directive. Use a scoped directive to make the same set of changes to more than one object definition.

Change plans created with the following applications contain only directives:

- DB Alter (directives and scoped directives can be created)
- DB Quick Change (directives can be created, but scoped directives cannot be created)

Change plans created with Plan Editor can contain directives, scoped directives, and exemplars (or any combination of these types of change requests).

Understanding Exemplars

An exemplar is a complete object definition to be reproduced, either by creating a new object definition or by modifying an existing object definition of the same name and object type. An exemplar can be thought of as the example of what you want to reproduce.

An exemplar tells an Oracle Change Management Pack application, "Reproduce this object definition. If an object definition of the same name and type already exists, make whatever changes are necessary to that object definition so that it matches this object definition. If the object definition does not exist, create an object definition that matches this object definition." When you define an exemplar, you can also include grants information for the exemplar.

Change plans created with the following applications contain only exemplars:

- DB Propagate
- DB Diff's Synchronization wizard

Change plans created with Plan Editor can contain exemplars, directives, and scoped directives (or any combination of these types of change requests).

Table 3–1 on page 3-5 summarizes the types of change requests that can be created with Oracle Change Management Pack applications.

Table 3–1 Change Requests Created with Oracle Change Management Pack Applications

Application	Type of Change Requests Created
DB Alter	directives and scoped directives
DB Diff Synchronization wizard	exemplars
DB Propagate	exemplars
DB Quick Change	directives
Plan Editor	directives, scoped directives, and exemplars
DB Search	None

Some Oracle Change Management Pack applications (such as DB Alter and DB Propagate) make it evident when you are creating change requests because these applications prompt you to add directives or exemplars to the change plan. Other applications (such as DB Diff's Synchronization wizard and DB Quick Change) prompt you to select object definitions to copy or modify, but do not make it evident that the selected definitions are directives or exemplars that are being added to the change plan. DB Search does not create change requests.

Defining a Directive with Plan Editor

To specify the modifications to be made to an existing object definition at the destination database, follow these steps to define a directive for that object definition in the source database:

1. On the Plan Editor **Plan** menu, click **New Change Requests**.
2. Expand the **Source Database** tree in the New Change Requests dialog box, then select one or more object definitions for which you want to create directives. Definitions that are already in the plan are shown in gray and cannot be selected.
3. Click the **Directive** button. Each selected object definition in the **Source Database** tree turns gray when the directive for the object definition is created. This step also causes the selected directives to be displayed in the **Change Plan** tree.
4. Click **Close** or leave the New Change Requests dialog box displayed.

5. In the Plan Editor tree, expand the Change Requests folder under the new plan to display folders for each object type for which change requests have been defined.
6. Expand an object type folder to view the change requests that have been defined for that object type. Directives are marked with both the directive icon and an object type icon. The directive icon appears first, followed by the object type icon, then the name of the object. The directive icon is shown in Figure 3–2.
7. Click the name of a directive in the Plan Editor tree. This displays the General page for the directive in Plan Editor's detail view.
8. On the General page, click the **Edit Directive** button. This displays the Edit dialog box for the directive. Property sheets for the object are displayed in the Edit dialog box. You use the property pages for the directive to specify the changes that you want to make to the directive object definition.
9. On the property pages, specify the changes you want to make to the object definition. Click **OK** to accept the changes you have specified.

Figure 3–2 The Directive Icon

Note that a directive describes the changes you want to make to an object definition. Therefore, the meaningful part of a directive is the changes that you have specified. You can view these changes by clicking the directive in the Plan Editor tree and viewing the list of changes on the General page for the object. After you have created a directive for an object, you can make further edits to the directive if the object still exists in the change plan's source database. When you make further edits to a directive, the object's definition is loaded from the source database, and the edits already specified in the directive are applied to the object.

Defining a Scoped Directive with Plan Editor

By default, a directive contains the changes to be applied to a single object definition. However, it is possible to extend the scope of a directive so that the changes specified in the directive are applied to multiple object definitions that you specify. A directive with an extended scope is called a scoped directive.

Scoped directives can be very powerful. For example, suppose that you want to move several tables to a new tablespace without creating a separate directive for each table you want to move. Instead, you can create a directive for one of the

tables, and in that directive specify the name of the new tablespace for the table. Then you can edit the scope specification for that directive, making sure that the search criteria identifies the other tables that you want to move to the new tablespace. When the script is generated, the scoped directive's instructions are applied to each object that matches the search criteria. When the script executes, it carries out the scoped directive's instructions on each matched object. In this example, all the tables that match the scope directive's search criteria are moved to the new tablespace that is specified in the scoped directive.

To create a scoped directive, follow these steps:

1. In the Plan Editor tree, click the directive for which you want to edit the scope specification. If you have not already specified the set of changes that you want the directive to apply, click the **Edit Directive** button on the General page for the directive and specify those changes, as described in "Defining a Directive with Plan Editor" on page 3-5.
2. On the General page for the directive, click the **Edit Scope** button.
3. In the Edit Directive Scope dialog box, specify a set of search criteria to identify the database object definitions to which the changes specified in the scoped directive will be applied.

   The Edit Directive Scope dialog box contains the following fields:

   - **Object Type**

     Displays the object type of the directive object. This field is non-editable.

   - **Schemas**

     If the directive object is a non-schema object, you cannot modify this field.

     If the directive object is a schema object, you can modify this field. To include any schema name in the search criteria, click **Any Schema**. To include any schema name except the SYS and SYSTEM schemas, click **Exclude SYS, SYSTEM** after clicking **Any Schema**.

     To include specified schemas or wild card patterns in the search criteria, click **Add**. The Select Schemas dialog box is displayed. Use the Select Schemas dialog box to add specified schemas or wild card patterns to the search criteria. If you specify wild card patterns, any schema name that matches the pattern will be included in the search criteria.

     To remove specified schemas or wild card patterns from the search criteria, select the item in the **Schemas** list, then click **Remove**.

   - **Search For**

To include any object name in the search criteria, click **Any Object Name**.

To include specified object names or wild card patterns in the search criteria, click **Specified Object Names** and then click **Add**. The Select Names dialog box is displayed. Use the Select Names dialog box to add specified object names or wild card patterns to the search criteria. If you specify wild card patterns, any object name that matches the pattern will be included in the search criteria.

To remove specified schema names or wild card patterns from the search criteria, select the item in the **Search For** list, then click **Remove**.

4. Click **OK** to confirm the search criteria for the scoped directive. A Scope Specification box that includes the search criteria that you chose appears on the General page for the directive. Also, in the Plan Editor tree, the directive icon changes to the scoped directive icon.

Scoped directives are marked with both the scoped directive icon and an object type icon. The scoped directive icon appears first, followed by the object type icon, then the name of the object. The scoped directive icon is shown in Figure 3–3.

Figure 3–3 The Scoped Directive Icon

A change plan can have only one change request for an object in a destination database. For example, a plan cannot contain both a directive and a scoped directive for the same object in a destination database. If a change plan contains multiple change requests for the same object, this problem will be identified in the impact report.

Refer to the online help for more information on scoped directives.

Defining an Exemplar with Plan Editor

To reproduce an existing object definition at a destination database, you create an exemplar for that object definition in the source database. Later, when the script generated from the change plan is executed against the destination database, one of the following three actions is performed for each exemplar in the change plan:

- If an object definition of the same name and type as the exemplar does not exist at the destination database, the script creates the object at the destination database.

- If an object definition of the same name and type as the exemplar exists at the destination database but the object definition is different than the exemplar's definition, the script makes the necessary changes to the object definition so that it matches the exemplar's definition.
- If an object definition of the same name and type as the exemplar exists at the destination database and the object definition exactly matches the exemplar's definition, no changes are made to the object definition at the destination database.

To reproduce an existing object definition at a destination database, follow these steps to create an exemplar for that object definition in the source database:

1. On the Plan Editor **Plan** menu, click **New Change Requests**.
2. Expand the **Source Database** tree in the New Change Requests dialog box, then select one or more object definitions for which you want to create exemplars. Definitions that are already in the plan are shown in gray and cannot be selected.
3. Click the **Exemplar** button. Each selected object definition in the **Source Database** tree turns gray when the exemplar for the object definition is created. This step also causes the selected exemplars to be displayed in the **Change Plan** tree.
4. Click **Close** or leave the New Change Requests dialog box displayed.
5. In the Plan Editor tree, expand the Change Requests folder under the new plan, which displays folders for each object type for which change requests have been defined.
6. Expand an object type folder to view the change requests that have been defined for that object type. Exemplars are marked with both an object type icon and with the exemplar icon. The exemplar icon appears first, followed by the object type icon, then the name of the object. The exemplar icon is shown in Figure 3–4.

Figure 3–4 The Exemplar Icon

7. To view the attributes for an exemplar, expand the exemplar and click its Attributes subobject. This displays the object definition's property pages in Plan Editor's detail view. You cannot modify the exemplar's attributes.

8. To view the grants associated with an exemplar, expand the exemplar and click its Grants subobject (note that the Grants subobject is not displayed for object types that do not participate in grants). This displays the object definition's Grants property page in Plan Editor's detail view. By default, when you include an exemplar in a plan, all the grants associated with the exemplar object are included in the plan, which means when the object definition is reproduced at a destination database, the object's grants are reproduced, if possible. A grant will be applied if the objects that reference the grant already exist or will be created at the destination database when the change plan's script is executed at the destination database.

   Select one or more of an exemplar's grants and click the **Exclude** button to exclude those grants from the plan. If you decide later that you want to include one or more excluded grants for an exemplar in the plan, select those grants, then click the **Include** button to include them in the plan.

   After you include a specific grant for an exemplar in a plan, it is possible for the same grant to be modified in the database. In this case, the Refresh button becomes available when you select that grant on the Grants page. If you want to update the grant in the plan to match the grant in the database, select the grant, then click the **Refresh** button.

   If no grants are associated with the exemplar, the Grants page does not display any grants.

9. To view the dependencies and dependents of an exemplar, expand the exemplar and click its Dependencies subobject. This displays the Dependencies and Dependents property pages for the exemplar.

   The Dependencies page displays the objects that the exemplar depends on. Each dependency object definition on the Dependencies page should be added to the plan, except for those object definitions that already exist at the destination database. For example, suppose you add an exemplar for a trigger to a plan, and the trigger refers to a table that is not in the plan and which does not exist at the destination database. In this case, you should manually add an exemplar for the referenced table to the plan, otherwise the trigger cannot be created at the destination database. To manually add a dependent object to the plan, select the object definition and click **Add to Plan**. Objects that are already in the plan are unavailable.

The Dependents page displays the objects that depend on the exemplar. You can use this page to locate other object definitions that are related to the exemplar, and, if you wish, manually add them to the plan. To manually add a dependency object definition to the plan, select the object definition and click **Add to Plan**. Objects that are already in the plan are unavailable.

10. You can view and, if desired, change the value of one or more of the plan's propagate options. To do so, click on the plan name in the Plan Editor tree. In the detail view, click the Propagate Options tab to view and, if desired, modify one or more values for the plan's propagate options. The values of the propagate options for a change plan determine how exemplars in the plan are applied when a script generated from the plan is run at a destination database.

    If your plan contains table exemplars, you can reproduce both the table definitions for the exemplars and the data associated with the table definitions at a destination database. To do so, select the **Copy Table Data** option. If you want to reproduce only the definitions for the table exemplars, do not select the **Copy Table Data** option.

    See the online help for a complete list of the propagate options and a description of how their values affect the application of a change plan's exemplars at a destination database.

Selecting a Destination Database with Plan Editor

To select the destination database where you want the plan to be executed:

1. On the Plan Editor **Plan** menu, click **New Destination**.
2. On the General page of the Create Destination dialog box, select a destination database from the list of available destinations, and, optionally, supply a description for the database.
3. Click **Create**.

Understanding Script Generation

After a destination database has been selected, a script can be generated from the change plan. The script generated from the change plan (not the plan itself) will be run against the destination database. During the initial stage of script generation, Oracle Change Management Pack examines the structure and definitions in the destination database so that it can generate a script designed exclusively for execution against the destination database.

When you use a single plan to generate scripts for several databases that have different structures and definitions, Oracle Change Management Pack generates a different script for each database. This is because Oracle Change Management Pack takes each destination database's structure and definitions into account when generating the script.

For example, suppose your plan contains an exemplar for table Table_2, and you use Oracle Change Management Pack application to generate two scripts, one to run against destination database DB_1 and the other to run against destination database DB_2. If table Table_2 does not exist in database DB_1, the script generated for DB_1 will include statements that define table Table_2. If a different version of table Table_2 already exists in database DB_2, the script generated for DB_2 will include statements to make the definition of table Table_2 in database DB_2 match the exemplar for table Table_2.

After Oracle Change Management Pack generates a script for a destination database, you can view and, optionally, edit the script. Oracle Change Management Pack also creates an impact report when it generates the script. You should view the impact report to determine the impact of executing the script at the destination database. The impact report provides a summary of the number and types of objects that will be modified when the script executes at the destination database. The impact report also shows warnings and errors, including a description of the requested operations that cannot be performed at the destination database, for example, a request to drop a column that no longer exists at the destination database.

If you modify a plan's change requests after you have generated one or more scripts for the plan, Oracle Change Management Pack considers the scripts that have been generated to be obsolete scripts. When you try to execute an obsolete script, Oracle Change Management Pack displays a message that advises you that the plan was modified after the script was generated and confirms whether you want to execute the script anyway. It is prudent to generate a new script from the modified plan instead of executing an obsolete script.

Generating a Script with Plan Editor

To generate a script for the destination database:

1. Under the Destinations folder, expand the destination database.
2. Click the Script subobject. This displays the script property pages in the detail view.

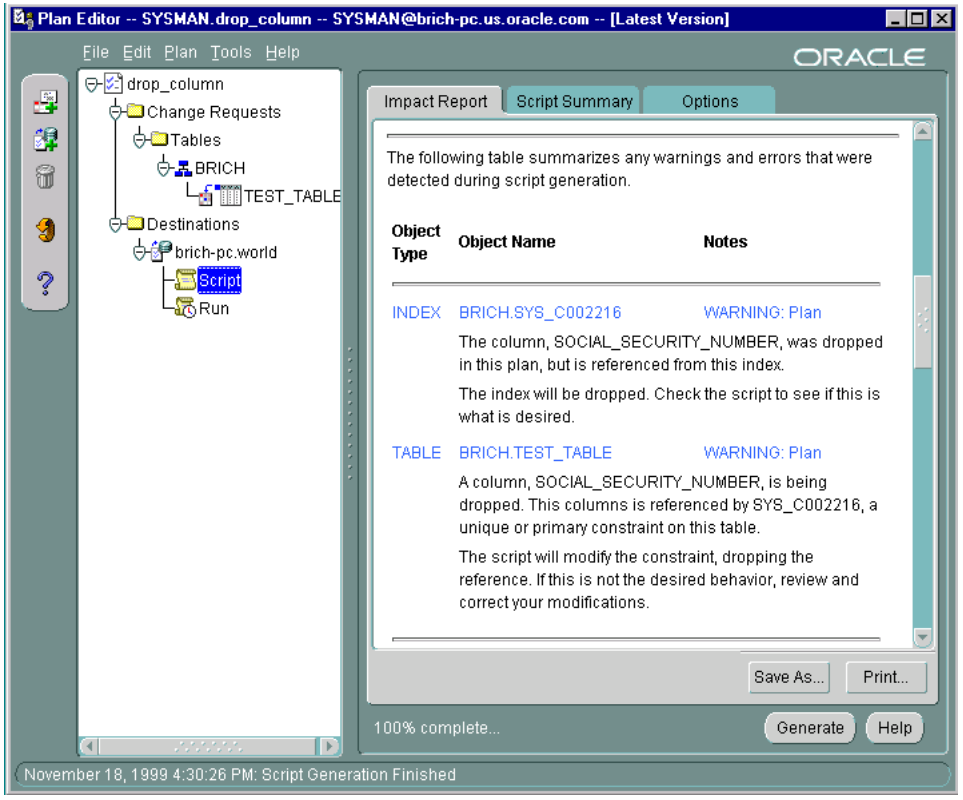
3. On the Options page, you can map schemas in the source database to their corresponding schemas in the destination database. By default, change requests specified for database objects in a source schema are applied to a destination schema with the same name. You only need to map schemas when you want change requests for the object definitions in a schema in the source database to be applied to a destination schema with a different name. For example, if your plan includes change requests created for the SALES table in the FINANCE schema and you want to apply those changes to the SALES table in the FINANCE_V2 schema, then you need to map the FINANCE schema to the FINANCE_V2 schema. To map two schemas, select the source schema from the source database list and select the destination schema from the destination database list, then click the Down arrow.

   You can also specify a scratch tablespace that Oracle Change Management Pack can use for script operations that require temporary storage of data. For example, renaming a tablespace requires a scratch tablespace because all the data in the tablespace must be stored temporarily while the first tablespace is dropped and recreated. Other operations, such as operations on a table, require either enough storage space in the table's tablespace for two copies of the original table or a scratch tablespace to contain the table copy.

4. Click the **Generate** button to generate the script for the destination database. Work-in-progress messages display while the script is being generated.

Figure 3–5 shows a fully expanded change plan in Plan Editor with the Script subobject selected.

Figure 3–5 A Fully Expanded Change Plan



Viewing the Impact Report and Script Summary with Plan Editor

Oracle Change Management Pack creates an impact report when it generates the script. You should view the impact report to determine the impact of executing the script at the destination database. The impact report provides a summary of the number and types of objects that will be modified when the script executes at the destination database. The impact report also shows warnings and errors, including a description of the requested operations that cannot be performed at the destination database, for example, a request to drop a column that no longer exists at the destination database.

After generating the script, you should view the impact report and script summary. You can also edit the script.

- To determine the impact of executing the generated script at the destination database, examine the impact report on the Impact Report page. The impact report provides errors and warnings, including a description of the requested operations that cannot be performed at the destination database, for example, a request to rename a table that no longer exists at the destination database. The impact report also provides a summary of the number and types of objects that will be modified when the script executes at the destination database.

  Script errors must be fixed. Evaluate the errors, take corrective action, then regenerate the script.

  Script warnings should be read and the appropriate action taken before you attempt to execute the script. Some warnings are informational, for example, a message that dropping a column will cause an index to be dropped, as shown in Figure 3–5. To save the impact report to a file, click the **Save As** button.

- Examine a summary of the script on the Script Summary page. The script summary contains the SQL statements and non-SQL operations that will be executed at the destination database to implement the plan's change requests. The actual script includes both the SQL statements from the script and OraTCL statements. To save the script summary to a file, click the **Save As** button.

- To edit the actual script (not the script summary), click the **Edit script** button on the Script Summary page. Note that the actual script can be very difficult to understand, and editing it may result in undesired changes that you cannot undo after the script is executed. To save the script to a file, click the **Save A**s button.

  Note that scripts produced by Oracle Change Management Pack applications can only be run using Oracle Change Management Pack applications, the Oracle Change Management Pack command line interface, or the Oracle Enterprise Manager job system. See "execute command" on page A-5 for more information about executing a script using the command line interface. See the online help for more information about executing a script using the job system.

A script that has been edited can be executed even if it has script generation errors.

If the impact report or the script summary is unacceptable, you can take one or more of the following actions:

- Modify the plan by modifying the directives, exemplars, propagate options, (or all of these), then save the plan, and generate a new script.
- Modify the destination database (add, modify, or delete object definitions, for example), then generate a new script.

- Change the schema mappings on the Options page, then generate a new script.
- Edit the script, then execute the script. To edit a script, click **Edit script** on the Script page. Note that the actual script can be very difficult to understand, and editing it may result in undesired changes that you cannot undo after the script is executed.

Understanding Script Execution

To ensure that you can undo the execution of a script, Oracle Change Management Pack makes a copy of the old data when needed for recovery purposes. The recovery data is stored in temporary tables that look like the original tables but have different names.

Oracle Change Management Pack allows you to keep or undo the changes made when a script is executed.

If you keep the changes, the temporary tables used by the recovery script are deleted, making the changes permanent.

If you undo the changes, the recovery script uses the recovery data to return the user tables and data to their original state.

Executing the Script with Plan Editor

To execute the script against the destination database:

1. Expand the destination database and select the Run subobject in the Plan Editor tree.
2. On the Execution Log page, click **Execute** to run the script immediately.
3. You can examine the execution log on the Execution Log page during or after script execution. The execution log displays messages, including the status of the script execution ("Script execution succeeded" or "Script execution failed"). To save the execution log to a file, click the **Save As** button.
4. You can keep or undo the changes made by the script to object definitions at the destination database:
   - When you click **Keep**, Plan Editor deletes temporary tables used by the recovery script, making the changes at the destination database permanent.
   - When you click **Undo**, Plan Editor uses the recovery script to undo the changes made at the destination database.

Note: There are a small number of attribute changes for which undo operations are not present in the recovery script. The common characteristics of these cases is that the original change can be done in a single ALTER statement and the undo operation requires multiple steps. In all cases where an undo operation is not included in the recovery script:

- You are clearly warned, both in the impact report and if you execute the recovery script.
- You can still use Oracle Change Management Pack to perform the undo operation, but you must do this as a separate step.

Suppose, for example, that a change plan makes several changes, including adding a column to a table. The impact report warns you that the recovery script will not drop the added column. (Note that the other changes can be undone.) If you execute the recovery script, you are warned again that the added column was not dropped. You can then use another Oracle Change Management Pack application (such as DB Quick Change) to drop the column as a separate step.

The attribute changes for which undo operations are not present in the recovery script are:

- adding a column to a table
- modifying a column's datatype to specify a larger size for the column
- adding a datafile to a tablespace
- specifying a date for the Start Date or Next Date fields for a snapshot

If you want to execute the plan's change requests against a different destination database, select a new destination database, then generate, view, and execute a new script against the database.

You can also execute an Oracle Change Management Pack script using:

- The Oracle Enterprise Manager job system. See the online help for more information.

- The Oracle Change Management Pack command line interface. See "execute command" on page A-5 for more information.

Dealing with Script Execution Errors

The two main causes of script execution errors are:

1. Stale scripts

   When the Oracle Change Management Pack translator generates a script for a destination database, it takes the current structure of the database into account. If objects at the destination database are deleted or modified after the script is generated, the script is considered to be a stale script. Errors can occur during the execution of a stale script or recovery script. For example, if a particular user is removed from a destination database before you run a script, the execution log may display an error message such as this after the statement that generated the error message:

   ```
   ORA-01918: user 'GEORGE' does not exist
   ```

2. Errors that the Oracle Change Management Pack translator does not anticipate when it generates a script, for example, insufficient space in a tablespace to carry out the requested changes. If you suspect that a script execution error is caused by a problem with the Oracle Change Management Pack translator, please contact Oracle Worldwide Customer Support.

To have Oracle Change Management Pack predict script execution failures (the default), enable the OCM_FAILURE_PREDICTION property in the ocm.properties file. The property is enabled when its value is set to "true" (case insensitive) or when the property does not exist in your ocm.properties file. When failure prediction is enabled, Oracle Change Management Pack performs resource checking (for example, it checks for sufficient space and quota to make copies of tables or to move items from one tablespace to another) during script generation. Resource warnings are reported in the impact report. Script generation takes longer when failure prediction is enabled.

If the property is present and has a value other than "true," then resource checking and script failure prediction does not occur.

When error messages occur during script execution, the best ways to fix the problem are:

- Click the **Undo** button to undo the changes. Then, regenerate the script.
- Correct the error at the destination database (for example, by creating a user again or by increasing the size of a tablespace), then click **Continue** to continue

executing the script. If you specify a scratch tablespace, you must generate a new script and execute the new script.

- Edit the script and click **Continue** to continue executing the script. This is the least preferable option, because editing the script may result in undesired changes that are not reversed when you press **Undo**.

When error messages occur during recovery script execution, the best ways to fix the problem (in order of preference) are:

1. Correct the error at the destination database (for example, by creating the user again), then click **Undo** to continue executing the recovery script.
2. Edit the recovery script, then click **Undo** to continue executing the recovery script.

A

Command Line Interface Appendix

Oracle Change Management Pack provides a command line interface that is available on Windows NT. This appendix provides the following sections that provide more information about the command line interface:

Possible Uses for the Command Line Interface

You can use the Oracle Change Management Pack command line interface to perform various Change Management Pack tasks without accessing the Change Management Pack graphical user interface. Some of the tasks that you can perform using the command line interface include:

- Capturing the definitions of a set of database objects each night, using the same baseline specification
- Comparing the definitions of a set of database objects to those of a different schema or database, or a baseline, each night
- Generating scripts during off hours by applying a single plan to each of a set of destination databases, and then executing the script at each destination if the generation completes without error

Understanding the Notation Used for the Command Syntax

The reference sections that describe each command in the Oracle Change Management Pack's command line interface use the following notation to describe command syntax:

Square brackets **[...]** denote optional elements.

Braces **{...}** denote a required element which can be one of two or more options separated by vertical bars **|**.

Square brackets enclosing options separated by vertical bars indicate an optional element consisting of one of the options.

Italics denote elements to be substituted by the user, or elements that are further defined elsewhere.

All other characters are keywords and punctuation that should be typed as shown in the command descriptions.

The commands and keywords are not case-sensitive.

Requirements for Using the Command Line Interface

When you enter the command line interface commands interactively at the MS-DOS prompt, preface each command with the ocm keyword, for example:

```
ocm command-name
```

When you use the command line interface, replace *command-name* with the name of a command line interface command.

You can enter the command line interface commands in a .BAT file. You can then parameterize the .BAT file and run it at specified times and/or intervals using operating system facilities. The commands return a status code, which allows flow-of-control within the containing .BAT file. If you are entering the commands in a .BAT file, use the MS-DOS call command to preface calls to the command line interface commands, for example:

```
call ocm command-name
```

The commands and keywords are not case-sensitive. The names of change plans, baselines, and comparisons are case- sensitive.

The Oracle Management Server (OMS) must be running when you use the command line interface.

Using the Command Line Interface Commands

Table A–1 lists each command line interface command and provides a brief description of the command's function:

Table A–1 Overview of Command Line Interface Commands

Command	Use of the Command	For More Information
login	Establishes the administrator credentials to use during a command line interface session.	See "login command" on page A-3
logout	De-establishes the administrator credentials established with the previous login command.	See "logout command" on page A-4
capture	Captures a new baseline for an existing baseline specification.	See "capture command" on page A-4
compare	Compares databases, baselines, or a baseline and a database using an existing comparison specification.	See "compare command" on page A-4
generate	Generates a script from a change plan.	See "generate command" on page A-5
execute	Executes a script, undoes changes made by a previously-executed script, or cleans up after the successful execution of a script.	See "execute command" on page A-5

login command

The login command establishes administrator credentials to use during a command line interface session. You can use the login command to establish or change credentials during the session. If you have not established credentials and identity, subsequent commands will fail.

The syntax for the command is:

`ocm login` *`OMS-connect-string`*

The *OMS-connect-string* identifies an Oracle Enterprise Manager administrator. It consists of an Oracle Enterprise Manager administrator's name, the password for the administrator, and the name of the node on which the Oracle Management Server is running. For example:

```
ocm login sysman/manager@oemadmin-pc
```

This command sets the Oracle Management Server (OMS) credentials in the user's environment that are used until one of the following occurs:

- The user terminates the operating system session
- The user issues another ocm login command
- The user issues an ocm logout command

logout command

The logout command de-establishes the administrator credentials established with the previous login command. Commands issued following logout will fail.

The syntax for the command is:

```
ocm logout
```

capture command

The capture command captures a new baseline for an existing baseline specification.

The syntax for this command is:

ocm capture *baseline-specification-name*

The *baseline-specification-name* must be the name of an existing baseline specification that was previously created using the Oracle Change Management Pack graphical user interface. The baseline specification name is case-sensitive. Enclose the *baseline-specification-name* within double quotation marks if it contains special characters, for example:

```
ocm capture "Baseline Specification Name With Spaces"
```

compare command

The compare command compares databases and / or baselines using an existing comparison specification.

The syntax for this command is:

ocm compare *comparison-specification-name*

Each comparison specification has a series of comparisons associated with it; the compare command creates another comparison in the series. The *comparison-specification-name* must be the name of an existing comparison specification that was previously previously created using the Oracle Change Management Pack graphical user interface. The *comparison-specification-name* is case-sensitive. Enclose the *comparison-specification-name* within double quotation marks if it contains special characters, for example:

```
ocm compare "Comparison Specification Name With Spaces"
```

generate command

The generate command generates a script. Generation is the process of applying the change requests in a plan to a destination database, producing a script that will carry out the change requests. Another possible output of the process is a non-success status code indicating some level of problem with the generation process.

The syntax for this command is:

```
ocm generate plan destination-database
```

The *plan* and *destination-database* pair identifies the deployment. This deployment (plan and destination database) must have been already created using the Change Management Pack graphical user interface. The *plan* is case-sensitive. The *destination-database* is not case-sensitive, but it must match the name of the destination database as it appears in the Oracle Change Management Pack graphical user interface.

Enclose the plan name within double quotation marks if it contains special characters, for example:

```
ocm generate "Plan Name With Spaces" personnel_db
```

execute command

The execute command executes a script, undoes a previously-executed script, or cleans up after the successful execution of a script. The script must be in an appropriate state for the requested operation or the command will fail.

The syntax for this command is:

```
ocm execute plan destination-database
       [ [ -d  {forward|backward|cleanup} ]
```

```
[ -s {cleanup|exit} ]
[ -e {undo|exit} ] ]
```

The *plan* and *destination-database* pair identifies the deployment. This deployment (plan and destination database) must have been already created using the Change Management Pack graphical user interface. The plan is case-sensitive. If the plan name contains special characters, enclose it within double quotation marks. The destination-database is not case-sensitive, but it must match the name of the destination database as it appears in the Oracle Change Management Pack graphical user interface.

Specifying the Direction in Which to Execute the Script

Use the -d option to specify the direction in which the script should be executed or to specify that you want to clean up after the successful execution of the script. The -d options are:

- forward

  The forward option executes the script.

- backward

  The backward option executes the recovery script that undoes the changes made by the script. Use this option if the script failed or you do not like the changes made by the script. Using this option is equivalent to selecting the Undo option in the Change Management Pack graphical user interface after executing a script.

- cleanup

  The cleanup option keeps the changes made by the script and removes the temporary data that the recovery script uses to undo changes made by the script. Use this option only after the script has successfully executed in the forward direction. Using this option is equivalent to selecting the Keep option in the Change Management Pack graphical user interface after executing a script. After using this option, you cannot use the backward option.

By default, the script is executed in the forward direction (from the start or from the last successfully completed step, as applicable).

Specifying Completion Actions for a Script Execution

The -s and -e options are used to specify completion actions.

Use the -s option to specify the action to be taken if the script executes successfully. The cleanup option only makes sense when the script is executed in the forward direction.

Use the -e option to specify the action to be taken if errors occur when the script executes. The undo option only makes sense when the script is executed in the forward direction. The default action is to exit on success or error.

Examples of Using the Execute Command

For example, to execute a script in the forward direction, keeping the changes if the execution completes successfully and undoing the changes if the execution fails, you would use a command like the following:

```
ocm execute plan15 corporate.world
       -d forward
       -s cleanup
       -e undo
```

To execute a script in the forward direction, undoing the changes if there is an error and simply exiting otherwise, you would use a command like the following:

```
ocm execute plan15 corporate.world
       -e undo
```

To keep the changes made by a script that has already executed successfully in the forward direction, use a command like the following:

```
ocm execute plan15 corporate.world
       -d cleanup
```

You can also execute a script in the backward direction, which undoes the changes made a script that has been executed in the forward direction. The backward option works only if the script was previously executed in the forward direction, either to completion or to a point of failure. To do this, use a command like the following:

```
ocm execute update_plan my_database.world
       -d backward
```

Enclose the plan name within double quotation marks if it contains special characters, for example:

```
ocm execute "Plan Name With Spaces" personnel_db
       -d forward
       -s cleanup
       -e undo
```

Status Codes Returned by the Command Line Interface

After you execute each command line interface command, the command line interface returns an exit status code for the command that you entered.

Table A–2 shows the meaning of each exit status value that can be returned.

Table A–2 Exit Status Codes Returned by the Command Line Interface

Exit Status	Description
0	Operation completed successfully.
1	Syntax error in command line.
2	The Oracle Management Server specified in the login command does not exist or the Oracle Management Server is not running.
3	There was an error when trying to login to the Oracle Management Server. Make sure that you specify correct credentials for the Oracle Management Server in the login command.
4	General, catchall error.
5	The baseline specified does not exist.
6	The comparison specified does not exist.
7	The change plan specified does not exist.
8	The script for that plan and database is already executing.
9	An error occurred during execution of the script.
10	Generation completed. Impact log contains warnings.
11	Generation completed. Impact log contains errors.
12	Generation failed. No script generated.
13	A problem occurred with the target database. For example, it does not exist.
14	Preferred credentials are not defined for the target database. Use the Oracle Enterprise Manager console to set preferred credentials for the database, then retry the operation.

Table A–2 Exit Status Codes Returned by the Command Line Interface

Exit Status	Description
15	You must use the login command to specify credentials for the Oracle Management Server before you can issue other command line interface commands.

To obtain more information about an error or warning status code returned after a generate or execute command, use the Change Management Pack graphical user interface to view the impact log or execution log.

B

Troubleshooting Appendix

This appendix describes different ways of troubleshooting problems that may occur when you are using Oracle Change Management Pack applications.

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

Using Environment Variables When Running Change Manager from the Command Line

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

- set ORACLE_OEM_JAVAMX=-mx<number>m

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

- set ORACLE_OEM_CLIENTTRACE=<any text>

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

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

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

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

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

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

   ```
   oemapp ocm
   ```

5. After Change Manager starts, you can start any of the other Oracle Change Management Pack applications from Change Manager in the usual manner.

Enabling Tracing and Debugging for Oracle Change Management Pack

You can turn on tracing and debugging facilities for the Oracle Change Management Pack applications to help troubleshoot problems.

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

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

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

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

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

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

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

Index

A

B

C

D

E

F

G

H

I

J

L

M

O

P

Q

R

S

T

U

V