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Administrator's Guide for Oracle Identity Manager

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Oracle Fusion Middleware Administrator's Guide for Oracle Identity Manager, 11*g* Release 1 (11.1.1)

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Preface

The *Oracle Fusion Middleware System Administrator's Guide for Oracle Identity Manager* describes how to perform system administration tasks in Oracle Identity Manager.

Audience

This guide is intended for system administrators who can perform system configuration tasks such as horizontal migration of system configuration, performance tuning across database, application servers, JMS, and connectors, scheduled task management, connector installation and deployment, and archival utility management.

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Related Documents

For more information, refer to the following documents:

- *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager*
- *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*
- *Oracle Fusion Middleware Installation Guide for Oracle Identity Management*
- *Oracle Fusion Middleware Quick Installation Guide for Oracle Identity Management*
- *Oracle Fusion Middleware Enterprise Deployment Guide for Oracle Identity Management*
- *Oracle Fusion Middleware Suite Integration Overview*
- *Oracle Fusion Middleware User Reference for Oracle Identity Management*
- *Oracle Fusion Middleware High Availability Guide*

- *Oracle Fusion Middleware Administrator's Guide for Oracle Access Manager*
- *Oracle Fusion Middleware Administrator's Guide for Oracle Adaptive Access Manager*
- *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*
- *Oracle Fusion Middleware Administrator's Guide for Oracle Identity Navigator*
- *Oracle Fusion Middleware Administrator's Guide for Authorization Policy Manager*

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Part I

Application Management

This part describes the application management tasks in Oracle Identity Manager.

It contains the following chapters:

1

Managing Reconciliation Events

The reconciliation process involves generation of events to be applied to Oracle Identity Manager. These events reflect atomic changes in the target system, and contain the data that has changed, the type of change, along with other information. The reconciliation events that are generated as a result of changes occurring in the target system must be managed in such a way that they meet various business requirements. The Event Management section in the Oracle Identity Manager Advanced Administration addresses these event management requirements.

> **See Also:** "Reconciliation Configuration" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for detailed information about reconciliation

You can manage reconciliation events by using the Event Management section, which lets you query the events stored in various ways and display all event data. The events are always displayed in the same form, which is on the Event Details page. You can run custom queries for the events through the Advanced Search feature. It also allows you to perform any necessary action to resolve event issues.

Events are generated by reconciliation runs. These reconciliation runs are scheduled to run by using the Oracle Identity Manager Scheduler.

> **See Also:** ""Managing Scheduled Tasks" on page 2-1" for detailed information about the scheduler

This chapter describes the following topics:

- Reconciliation Features in Oracle Identity Manager
- Event Management Tasks
- Updating Reconciliation Profiles Manually
- Populating Data in the RECON_EXCEPTIONS Table

1.1 Reconciliation Features in Oracle Identity Manager

Reconciliation features can be divided into the following categories:

- Performance Enhancements
- Web-Based Event Management Interface
- Other Enhancements

1.1.1 Performance Enhancements

In 11*g* Release 1 (11.1.1), the following enhancements help increase performance during reconciliation:

- New Metadata Model - Profiles
- Parameters to Control Flow and Processing of Events
- Grouping of Events by Reconciliation Runs
- Grouping of Events by Batches
- Implementing Reconciliation Engine Logic in the Database
- Improved Java Engine
- Improved Database Schema

1.1.1.1 New Metadata Model - Profiles

Oracle Identity Manager has a new model to store the metadata associated with various targets.

In earlier releases, the metadata is associated with a reconciliation target. This limits the ability to run multiple jobs performing different types of reconciliation against the same target.

In Oracle Identity Manager 11*g* Release 1 (11.1.1), all configurations in various components of Oracle Identity Manager are stored centrally in an XML store called MDS.

For backward compatibility, current deployments continue managing their configurations through Oracle Identity Manager Design Console and the configuration continues to be stored in the Oracle Identity Manager database. The configuration APIs automatically read the configurations from the tables in Oracle Identity Manager 11*g* Release 1 (11.1.1) and convert them into XML profiles, called default profiles, and associate those profiles with the existing reconciliation runs. The default profiles are marked with a DEFAULT tag.

You manage all the metadata by using Oracle Identity Manager Design Console. Using Oracle Identity Manager Design Console, you can generate the default reconciliation profile. This can be used to regenerate the profile when reconciliation configurations are changed from Oracle Identity Manager Design Console. When configurations are imported from the Deployment Manager, the profile is generated by default.

All nondefault profiles can be completely managed by using any XML editor.

> **See Also:** "Reconciliation Profile" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for information about reconciliation profiles

1.1.1.2 Parameters to Control Flow and Processing of Events

This section consists of the following topics:

- Parameters to Control Event Processing
- Parameter to Control AutoRetry

Parameters to Control Event Processing

BatchSize is the parameter to control event processing. This dictates the size of the batch. A batch size of 1 is equivalent to processing of events one at a time. Batch size is

available as a system property and can be managed from Oracle Identity Manager Design Console. The property name is OIM.ReconBatchSize. The default value of the system BatchSize parameter is 500. For information about system properties, see Chapter 4, "Administering System Properties".

Parameter to Control AutoRetry

The MaxRetryCount profile parameter controls auto retry by indicating how many times an item needs to be retried before the reconciliation engine marks it as an error or sends it to manual queue. MaxRetryCount = 0 means auto retry option is not configured.

> **See Also:** "Handling of Race Conditions" on page 1-5 for more information about auto retry

1.1.1.3 Grouping of Events by Reconciliation Runs

All the events created in the reconciliation database are grouped by reconciliation runs. All events in a reconciliation run are grouped with a common reconciliation run ID. Because each reconciliation run is associated with a profile, all events in a reconciliation run are processed by using the same profile. This helps in optimizing the performance because the configurations have to be retrieved only once per reconciliation run.

Each profile can use a different batch size. This enhances system performance for each target reconciliation by tuning the appropriate batch for it.

1.1.1.4 Grouping of Events by Batches

Batches are introduced to increase system performance during reconciliation. A batch consists of a number of events. It is a unit of processing in the reconciliation engine. The size of the batch is configurable. Reconciliation runs are broken into fixed size batches. For example, if a reconciliation run consists of 9900 events and batch size is 1000, then that reconciliation run is divided into 10 batches each with size 1000, and last batch with size 900.

Processing a batch as a unit optimizes system performance by eliminating the overhead of processing one event at a time. This also allows performing bulk operations wherever possible. Batches can also run in parallel to balance the use of hardware resources.

1.1.1.5 Implementing Reconciliation Engine Logic in the Database

In earlier releases, all engine logic was implemented in Java and the processing happened one event at a time. In 11*g* Release 1 (11.1.1), most of the logic to process the events is implemented as stored procedures. A combination for processing at batch level and the logic being implemented in PLSQL makes it possible to perform bulk operations at the SQL layer. The following steps are performed in bulk (one batch at a time):

- Required data check
- Applying matching rules
- Applying action rules

1.1.1.6 Improved Java Engine

Processing that cannot be performed in stored procedures and must be performed in Java layer also provides better performance than earlier releases of the engine for the following reasons:

- Java engine performs bulk operations by default:

  Submits events in batches to the database

  Submits bulk postprocess orchestration depending on the action

- Performs bulk operations wherever possible.

1.1.1.7 Improved Database Schema

A notable performance enhancement from the new database schema in 11*g* Release 1 (11.1.1) is by using horizontal tables for storing event details for various targets instead of using a single vertical table for storing the event details from various targets. A horizontal table is used for each profile.

> **See Also:** "Horizontal Tables" on page 1-4 for more information about horizontal tables

1.1.2 Web-Based Event Management Interface

Oracle Identity Manager provides a Web-based event management interface that allows you to manage the events from the Web. Authorized users are able to search for events, users, and handle exceptions by linking events with users and accounts. You can also close events, force failed events to be re-evaluated, and perform ad-hoc linking.

Ad-hoc linking refers to the ability provided to authorized users of the Event Management section to link an event to any user in Oracle Identity Manager. Although the reconciliation engine finds user matches for events, the user through this ad-hoc link feature can ignore those matches and select a different user. This allows you to handle exceptions resulting from error matches.

> **See Also:** "Event Management Tasks" on page 1-7 for information about the tasks performed in Event Management

1.1.3 Other Enhancements

Other reconciliation enhancements are described in the following sections:

- Horizontal Tables
- Handling of Race Conditions
- OES Integration
- Ad Hoc Linking

1.1.3.1 Horizontal Tables

In earlier releases of Oracle Identity Manager, the reconciliation schema has one table to store all the event details from various targets. The list of attributes and their names and types that the various reconciliation events contain can vary from target to target. This means that events from one target can contain a different set of data compared to events from another target. The only way to store data from such events in a single table is by storing one attribute per row. Therefore, in earlier releases, each row in the event detail table represents a single attribute of reconciliation event data. For each

attribute, it stores the event to which it belongs, the attribute name, type, and value. This is also referred to as vertical table in this document. Although vertical tables are beneficial from the point of view of flexibility and extensibility, it is not an efficient way to store event records from the performance prospective.

In 11*g* Release 1 (11.1.1), storage in vertical tables is replaced by separate tables for each target, called horizontal tables. They are called horizontal tables because instead of storing attributes of an event vertically in the table as rows (as many rows as there are number of attributes), the attributes of an event are stored horizontally as columns. This means that there are as many columns as there are number of attributes for a target. Each event is stored as a row. Because different targets can have different sets of attributes, each target has a separate table in the reconciliation schema to store event details. There can be multiple tables per target because of requirements to handle multi-valued attributes that are stored as rows in child tables.

Each row of the event detail table for a specific profile stores the list of reconciliation fields for a single event. For example, for trusted user reconciliation in which firstname, lastname, email attributes are being reconciled, there is the RA_XELLERATE_USER horizontal table with the following columns:

RE_KEY, RECON_FIRSTNAME, RECON_LASTNAME, RECON_EMAI

Creating and Maintaining Horizontal Tables

Horizontal tables can be created only when a target is being deployed against Oracle Identity Manager. This is because, at the time of target deployment, the reconciliation system knows the list of attributes and their types for the target, which needs to be reconciled.

Horizontal tables are updated when configurations are imported from the Deployment Manager or changes are made by using Oracle Identity Manager Design Console. To generate a horizontal table from Oracle Identity Manager Design Console, in the Object Reconciliation form, click **Generate Reconciliation Profile**.

1.1.3.2 Handling of Race Conditions

In earlier releases of Oracle Identity Manager, when an event is being reconciled, the reconciliation engine may not be able to process it successfully because before this event can be reconciled, another event needs to be reconciled. For example, before the reconciliation engine can reconcile an event that is supposed to create an account, the engine needs to reconcile an event that is supposed to create a user. This is called a race condition.

In Oracle Identity Manager 11*g* Release 1 (11.1.1), the race conditions are handled by using an auto retry option that you can select for each reconciliation run. To configure auto retry, specify a value greater than 0 for the MaxRetryCount parameter. If you do not want to configure auto retry, then specify 0 as the value of the MaxRetryCount parameter.

Note: MaxRetryCount is a parameter in the reconciliation profile. The default value of this parameter is 5. You can change this by exporting the profile from MDS, updating the retry count, and importing it back to MDS. For information about manually updating reconciliation profiles, see "Updating Reconciliation Profiles" on page 1-15.

When auto retry is configured, the reconciliation engine checks for the race conditions. If a race condition is found, then the reconciliation engine puts the reconciliation event in a re-evaluate queue until the retry count is exhausted.

A Reconciliation Retry Scheduled Task periodically checks if there is any event waiting for retry and is ready to be re-evaluated and if yes, it queues them up for reconciliation engine processing. This scheduled task is configured by default.

Note:

- If the auto retry count is exhausted, the reconciliation engine does not further process the event and sets the status per the matching rules. However, you can manually retry by requesting for re-evaluate from Event Management. For information about re-evaluating events, see "Re-evaluating Events" on page 1-11.
- During the retry, if the event is successfully processed, then the value of the CurrentRetryCount parameter is reset to 0.

Auto retry can handle the following race conditions:

- An account event for creating an account in Oracle Identity Manager is processed before the user is created for this event because the event for creating user is not processed yet.
- A user event for creating a Xellerate user in Oracle Identity Manager is processed before the organization is created to which this user belongs.

> **See Also:** "Parameter to Control AutoRetry" on page 1-3 for information about auto retry parameters

Except for the CurrentRetryCount parameter, all other auto retry parameters are stored as part of the reconciliation profiles. This means that while the events belonging to one reconciliation run may have auto retry configured, the events belonging to another reconciliation run may not have auto retry configured.

In Oracle Identity Manager 11*g* Release 1 (11.1.1), there is no UI to manage these parameters within a profile and you must use an XML editor to manage them by directly editing the XML profile. For information about editing an XML profile, see "Updating Reconciliation Profiles" on page 1-15.

1.1.3.3 OES Integration

The event management APIs, the reconciliation APIs, and the UI to manage reconciliation events are protected by using authorization policies. Oracle Entitlements Server (OES) is the Oracle product that is used to control authorization policies.

Note: More information about OES is available in the following URL:

`http://www.oracle.com/technetwork/middleware/oes/overview/index.html`

The default authorization policy for reconciliation specifies that only users with the RECONCILIATION ADMINISTRATORS or SYSTEM ADMINISTRATORS role are able to access and use reconciliation.

See Also:

- "Managing Authorization Policies" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for detailed information about authorization policies
- "Managing Roles" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for information about how to assign roles to a user

1.1.3.4 Ad Hoc Linking

If the reconciliation engine is not able to determine the owner based on the matching rules, then you can manually link an account to a user by using Oracle Identity Manager Advanced Administration. Subsequent modifications to the account is automatically linked to that account.

Ad hoc linking is supported for user and account events. If the reconciliation engine is not able to determine the owner based on the matching rules, then you can manually link a user or account event to a user.

See Also: "Ad Hoc Linking" on page 1-13 for information about how to perform ad hoc linking

1.2 Event Management Tasks

You can perform the following event management tasks by using the Event Management section of Oracle Identity Manager Advanced Administration:

- Searching Events
- Displaying Event Details
- Determining Event Actions
- Re-evaluating Events
- Closing Events
- Linking Reconciliation Events

1.2.1 Searching Events

You can display a summary of reconciliation events by performing the following types of search:

- Performing a Simple Search for Events
- Performing an Advanced Search for Events

1.2.1.1 Performing a Simple Search for Events

To perform a simple search for events:

1. Login to Oracle Identity Manager Advanced Administration.
2. In the Welcome page, under Event Management, click **Search Reconciliation Events**. Alternatively, you can click the **Event Management** tab, and then click **Reconciliation**.
3. In the left pane, enter a search criterion in the Search field. You can include wildcard characters (*) in your search criterion.

The simple search takes one argument. The text arguments are searched in the following event fields:

- Event ID
- Profile Name
- Key Fields

Note: In simple search, you cannot perform the search by event dates.

4. Click the icon next to the Search field. The events that match your search criterion is displayed in the search results table.

   The search fetches all rows for which the aforementioned attributes contains the string specified in the Search field. The search result displays the Event ID, Profile Name, and Key Fields columns. The Event ID column displays the event ID. The IDs are sorted as integers, not strings. The Profile Name column displays the name of the reconciliation profile. Key field is an attribute that uniquely identifies a row of data. In reconciliation, some attributes are flagged as Key in the profile. These fields are displayed in the Key Fields column.

   Note: Simple Search is paginated, meaning it only displays search results 64 rows at a time. This is to improve performance. Scrolling down past the 64th row in the UI triggers another page fetched from the database and so on for every 64 rows beyond that.

1.2.1.2 Performing an Advanced Search for Events

The advanced search takes multiple arguments and lets you fine-tune the list of events. To perform an advanced search for events:

1. In the left pane of the Reconciliation section, click **Advanced Search**. The Search: Events page is displayed.
2. Select any one of the following options:
   - **All:** On selecting this option, the search is performed with the AND condition. This means that the search operation is successful only when all the search criteria specified are matched.
   - **Any:** On selecting this option, the search is performed with the OR condition. This means that the search operation is successful when any search criterion specified is matched.
3. In the Event ID field, enter the event ID that you want to search. You can use wildcard characters (*) in your search criteria. Select a search condition in the list adjacent to the Event ID field.
4. Specify search arguments in the other fields displayed in the Search: Events page. Table 1 1 lists the fields in the Search: events page.

Table 1 1 Advanced Search Fields

Field	Description
Event Id	The event ID. The IDs are sorted as integers, not strings.

Table 1 1 (Cont.) Advanced Search Fields

Field	Description
Resource Name	The name of the resource object representing the target system the event originates from.
Current Status	A string representing the current state of the event.
Type	The type of operation performed by the event: regular (add or modify) or delete.
Profile Name	The name of the reconciliation profile this event pertains to. **See Also:** "Reconciliation Profile" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for information about reconciliation profile
Entity	The type of Oracle Identity Manager entity this event pertains to. Can be either user, account, role, role grant, or role hierarchy.
Start Date	Oldest event creation date to search for.
End Date	Most recent event creation date to search for.
Linked User Login	A string representing the login ID of the user linked to the event.
Key Fields	The fields flagged as key fields in the reconciliation profile that uniquely identifies rows of data.

5. Click **Search**. The search results are displayed, which consists of the Event ID, Resource Name, Entity, Event Status, Type, Profile Name, Job ID, Key Fields, and Date columns.

From the search results, you can perform event bulk actions, such as close and re-evaluate, and also display the details of any specific event.

If you want to search for events with LDAP profile, use the following LDAP profiles in your search:

Object	Profile
User	LDAPUser
Role	LDAPRole
Role Membership	LDAPRoleMembership
Role Hierarchy	LDAPRoleHierarchy

1.2.2 Displaying Event Details

To display the details pertaining to an event:

- In the left pane of the Oracle Identity Manager Advanced Administration, from the list of events, select an event whose details you want to display.
- From the advanced search result table, click an event in the Event ID column.
- From the Actions list, select **Lookup**. The Event Details page is displayed. The fields in the Event Details page change dynamically based on the event type and event status. Alternatively, you can select an event from the Event Summary on the right pane, and click the magnifying glass icon for lookup to open the Event Details page.

The data in the Event Details page is displayed in the following sections:

- **Event:** This section displays the information about the event, such as event ID, whether the event type is User or Account, the time when the event was created, the reconciliation run ID, resource name, the profile name, and the key field values. Reconciliation can use several key fields, and the key field values are shown separated by commas.
- **Linked To:** This section shows that the event is linked to a user or account. It displays the user or account ID to which the event is linked, the account description (if any), and the type of linking, such as rule-based linking or manual linking. Rule-based linking means that the reconciliation engine has performed the linking. Manual linking means that the administrator performs the linking manually.
- **Notes:** The reconciliation engine adds notes where appropriate. For example, when there is a 'Data Validation Fail', the engine adds a note explaining the reason. This is a read-only field and is blank if no notes are attached to the event.
- **Reconciliation Data:** This table displays the reconciliation event data. This shows the attribute name, attribute value, and Oracle Identity Manager mapped field. It also shows the child data of the event, if any. The reconciliation data displays the last name, first name, hiring date, user ID, and the IT resource name.

  If there are attributes with multi-language support, then these attribute values are also displayed in a separate table similar to child data.
- **Matched Accounts:** This table displays the accounts that are matched. The columns in the Matched Accounts table are listed in Table 1 2:

Table 1 2 Columns in the Matched Accounts Table

Column	Description
Account ID	The account ID of the matched account
Orc Key	An internal key that is stored in the ORC table. This key indicated if the event is matched to a user or an account.
Descriptor Field	A description that is associated to the account
Login ID	The user login ID corresponding to the user ID displayed for user events.
Account Owner Name	A string comprising of the first name and last name and the login ID of the user who owns the account. The event pertains to this account.
Account Owner Type	The type of account owner, such as user.

- **Matched Users:** This table shows the user matches found by the reconciliation engine. For a multiple match, the linked user is not shown in this table.
- **History:** This table shows the operations that took place for this event from event creation and data validation to account matching and whether the update was successful. The columns in the History table are listed in Table 1 3:

Table 1 3 Columns in the History Table

Column	Description
Status	Event status at the given date and time.
Action	Action performed on the event at the given date and time.
Action Performed by User	The ID and login ID of the user who performed the cited action. The engine uses the Default IAM Admin id: xelsysadm, ID = 1.

Table 1 3 (Cont.) Columns in the History Table

Column	Description
Date and Time	Date and time of the cited action.
Notes	Any notes attached to the event at the specified date and time.

Note: Oracle Identity Manager does not support translation of the reconciliation field names.

1.2.3 Determining Event Actions

The list of actions allowed for an event depends on the status, type, and operation of the event. Table 1 4 lists the possible actions for each type and status of events.

Table 1 4 Actions for Event Status and Types

Event Status	Event Type	Possible Actions
No matches found	User	Close event
		Re-apply reconciliation rules
		Create entity
		Ad-hoc linking
	Account	Close event
		Re-evaluate event
		Ad-hoc linking
Users matched	User	Close event
		Re-apply reconciliation rules
		Linking
	Account	Close event
		Re-apply reconciliation rules
		Linking
Accounts matched	Account	Close event
		Re-apply reconciliation rules
		Linking
Event Received	Any	Close event

The possible actions are described in the subsequent sections.

1.2.4 Re-evaluating Events

Re-evaluating an event means reapplying the reconciliation rules on the event. Reconciliation rule refers to the matching rule used to identify the owner of an event. For instance, if you change the reconciliation rules by using Oracle Identity Manager Design Console, then you can re-evaluate the rules in the Event Management section of the Oracle Identity Manager Advanced Administration.

To re-evaluate an event:

1. From the list of events, select an event. You can select multiple event rows by pressing the Ctrl key if you want to re-evaluate multiple events at a time.

2. From the Actions list, select **Re-Evaluate Event**. The Re-Evaluate Event dialog box is displayed with the event IDs that you have selected.
3. Click **Perform**. A confirmation message is displayed stating that the reconciliation rules are successfully reapplied for the event. If the selected action fails for any event, a generic message is displayed that shows the event IDs for which bulk processing has failed. The events can then be processed one at a time.

Note:

- The preprocess validation lists the events that are valid and those that are invalid for re-evaluation. If you click Perform, then only the valid events are re-evaluated.
- All event actions are tracked in the Event History table.

1.2.5 Closing Events

This action closes or discards the selected events, and the events are removed from any further processing queues. To close an event:

1. From the list of events, select an event.
2. From the Actions list, select **Close Event**. You can select multiple event rows by pressing the Ctrl key if you want to close multiple events at a time. The Close Event dialog box is displayed.

Note: If closing an event is not a valid option, then en error message is displayed in the Close Event dialog box.

3. In the Justification box, enter a reason to close the event.
4. Click **Perform**. A confirmation message is displayed stating that the event is closed. If the selected action fails for any event, a generic message is displayed that shows the event IDs for which bulk processing has failed. The events can then be processed one at a time.

Note:

- All event actions are tracked in the Event History table.
- The close event operation needs a justification to be entered. Therefore, when multiple events are closed at a time by performing bulk action, all the closed events will have the same justification.

1.2.6 Linking Reconciliation Events

Oracle Identity Manager allows you to perform the following operations for linking reconciliation events:

- Ad Hoc Linking
- Manual Linking
- Linking Orphan Accounts

1.2.6.1 Ad Hoc Linking

Ad hoc linking allows you to link an event to any user or role in Oracle Identity Manager. Even if the reconciliation engine finds user matches for the events, you can use ad hoc linking to ignore those matches and select a different user. This allows you to handle exceptions resulting from error matches because the reconciliation matching rules may not work correctly all the time.

This action lets you link an event to any entity other than the already matched entities. In other words, instead of selecting a row from the Matched Users table, you can select another user to link with the event.

To create an ad hoc link for an event:

1. In the Event Details page, from the Actions list, select **Ad Hoc Link**. The Ad Hoc Link dialog box is displayed.
2. Perform a user search by specifying a search criterion.
3. Select a user from the search result, and click **Perform**. A confirmation message is displayed that states that the ad hoc linking with the event is successful.

1.2.6.2 Manual Linking

When a reconciliation event has multiple matches, each match is displayed on the Matched Accounts (for account entity) or Matched Users (for user entity) tab of the Event Details page. You can manually select any match out of all the matches found by the reconciliation engine. To perform manual linking:

> **Note:** In manual linking, you select a match from a list of matches found by the reconciliation engine instead of selecting from a list of all Oracle Identity Manager users.

1. In the Event Details page, select a row from the table that lists all the matches found by the reconciliation engine.
2. Click **Link**. A message is displayed asking for confirmation.
3. Click OK to confirm.

1.2.6.3 Linking Orphan Accounts

Orphan accounts refer to accounts in the target system for which there is no corresponding user that exists in Oracle Identity Manager.

You can resolve events for orphan accounts for which the events either have no user match in Oracle Identity Manager, or several users are found for the match. You can therefore perform any one of the following:

- Re-create the user in Oracle Identity Manager
- Trigger a provisioning process to delete the user or account from the target system
- Perform ad hoc or manual linking

The Event Management section allows you to resolve orphan accounts by selecting the correct user for the match in the following scenarios:

- For an Event With Multiple Matches
- For an Event With No Matches

1.2.6.3.1 For an Event With Multiple Matches When several users are matched to the event data by the reconciliation engine, you must select the right user by using ad hoc or manual linking.

For information about ad hoc linking, see "Ad Hoc Linking" on page 1-13.

For information about manual linking, see "Manual Linking" on page 1-13.

1.2.6.3.2 For an Event With No Matches When no matches are found for an event, you can either trigger an entity creation, or select an Oracle Identity Manager entity to link to the event. For information about how to select and Oracle Identity Manager entity to link to an event, see "Ad Hoc Linking" on page 1-13.

1.3 Updating Reconciliation Profiles Manually

This section describes creating and updating reconciliation profiles manually in the following sections:

- Creating New Reconciliation Profiles
- Updating Reconciliation Profiles
- Changing the Profile Mode

1.3.1 Creating New Reconciliation Profiles

You might want to create reconciliation profiles in the following scenarios:

- Creating Additional Nondefault Profiles for Reconciliation Based on Resource Objects
- Creating New Profiles for Trusted Source Reconciliation

1.3.1.1 Creating Additional Nondefault Profiles for Reconciliation Based on Resource Objects

For reconciliation based on resource objects, the default profile name is the same as that of the resource object. For example, if resource object name is testresource, then the default profile name is also testresource. The corresponding reconciliation horizontal table name is RA_TESTRESOURCE<obj_key>. If the resource has Multi-Language Support (MLS) data, then the MLS table name is RA_MLS_TESTRESOURCE<obj_key>.

If the resource object has child tables, then for each child form name, which is UD_xxx, there is a corresponding RA_UD_xx. Each of the tables has a corresponding entity definition XML file, which is stored as per platform documentation on MDS storage. Therefore, RA_MLS_TESTRESOURCE<obj_key> has an entity definition MDS document called /db/RA_TESTRESOURCE<obj_key>.xml, which is stored as per platform documentation on MDS storage.

Note: If you change the name of a resource object, the reconciliation profile needs to be regenerated by clicking the "Create Reconciliation Profile" button in the Object Reconciliation tab in Oracle Identity Manager Design Console.

To create nondefault profiles for reconciliation based on resource objects:

Note: You can export or import files to MDS by using the MDS export/import utility, which is run by running the weblogicExportMetadata.sh and weblogicImportMetadata.sh scripts. For information about running these scripts, see "MDS Utilities and User Modifiable Metadata Files" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager*.

1. Create a copy of the exported profile XML file with a different name.
2. Make changes to the file to reflect the new profile name, horizontal table names, and new reconciliation field names and mappings.
3. Import the new profile to MDS by using the MDS import tool.
4. Copy the entity definition XML files with new names based on the new profile name. If the reconciliation field names also change, then change the XML files to refer to the new reconciliation field names.
5. Import the entity definition XML files to MDS by using the MDS import tool.
6. Create new horizontal tables in the database based on the new profile name.

1.3.1.2 Creating New Profiles for Trusted Source Reconciliation

The procedure for creating new profiles for trusted source reconciliation is similar to the procedure in "Creating Additional Nondefault Profiles for Reconciliation Based on Resource Objects" on page 1-14. The only difference is that trusted source reconciliation may or may not be associated with a resource object, and therefore, you can use the XML files corresponding to the LDAPUser profile as samples.

1.3.2 Updating Reconciliation Profiles

To change a property in a reconciliation profile, for instance batch size:

1. Export the /db/PROFILE_NAME profile document from MDS.
2. Make changes in the XML file, for example, change the batch size value.
3. Import the updated profile into MDS by using the MDS import tool.

1.3.3 Changing the Profile Mode

You can use one of the following methods to change the profile mode property from CHANGELOG to REGULAR:

See Also: "Mode of Reconciliation" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for information about changelog and regular reconciliation modes

- Change the value of the mode attribute in the profile, for example:

```
<generalconfig mode="REGULAR"
       createEntityUsingSPFlag="true"
       dateFormat="yyyy/MM/dd hh:mm:ss z"
       ownerMatchingRuleWhereClause="
       (UGP.ugp_ldap_guid=RA_SAMPLE_HIERARCHY.RECON_ROLE_GUID)"
       entitytype="RoleRole"
       version="1.0"
       trustedSrcFlag="false"
```

```
accountPostProcessingRequiredFlag="NOT_SET"
sequentialProcessingFlag="false"
batchSize="-1"
retryInterval="30"
maxRetryCount="5"
defaultProfileFlag="true"
name="sample-hierarchy"/>
```

- Change the attribute during event creation:

  The event creation API, introduced in Oracle Identity Manager 11*g* Release 1 (11.1.1), contains three parameters. The first two parameters are same as those used in previous create event APIs. The third parameter can have attributes such as dateFormat, changeType, eventFinished, and actionDate.

  You can use this API to set the changeType as follows:

```
public long createReconciliationEvent(String objName, Map<String, Object>
inputData, EventAttributes eventAttribs);
```

> **Note:** Using the API to set the changeType attribute overrides the value of the changeType attribute set in the profile.

1.4 Populating Data in the RECON_EXCEPTIONS Table

The RECON_EXCEPTIONS table in Oracle Identity Manager database is used to capture error messages generated during account reconciliation. This data is collected for the purpose of generating reports.

> **See Also:** "Account Reconciliation" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for information about account reconciliation

If a reconciliation match is found to a deleted user, then you must insert USER_DELETED in the REX_EXCEPTION column and the key of the deleted user in the USR_KEY column of the RECON_EXCEPTIONS table.

If no match is found, then insert USER_NOT_FOUND in the REX_EXCEPTION column.

If account match is found, then check if the account is already deprovisioned. Then insert into RECON_EXCEPTIONS table with the value `RESOURCE_DEPROVISIONED` in the REX_EXCEPTION column for the user who is to be provisioned.

To populate the RECON_EXEPTIONS table with exception data:

1. Fetch all the events with the change type != ('Modify' , 'Delete') and event status as ('Single User Match Found', 'Single Org Match Found').
2. Provision the resource object for the entities by performing the following:
   a. Collect the exception data from RECON_EXCEPTION DB table. To do so, perform any one of the following:

      Check if the value of the XL.EnableExceptionReports property is TRUE. If it is set to TRUE, then continue to the next step. Otherwise, do not collect the exception data.

      Select the obj_initial_recon_date in the obj table for the resource object being provisioned, and check if it is earlier than today's date. If an earlier

date is displayed, then continue to the next step. Otherwise, do not collect the exception data.

b. While provisioning the resource object to the user, check if the resource object has already been deprovisioned in Oracle Identity Manager:

If the resource object is already deprovisioned, then insert into RECON_EXCEPTIONS table the value `RESOURCE_DEPROVISIONED` in the REX_EXCEPTION column for the user who is to be provisioned.

If the resource object is not deprovisioned, then insert into RECON_EXCEPTIONS table the value `RESOURCE_NEVER_PROVISIONED` in the REX_EXCEPTION column for the user who is to be provisioned.

2

Managing Scheduled Tasks

In Oracle Identity Manager, it is often required to run jobs at specified times on a regular basis to manage various activities. Scheduler enables you to schedule jobs that automatically run predefined scheduled tasks at the specified time. This is illustrated by the following example:

To meet the security policies of an organization, employees may be required to change their product application password every 60 days. For this purpose, the system administrator has to ensure that an email is sent to all employees whose passwords for the respective product applications have expired. One approach would be to identify the set of users whose passwords have expired and send email to each employee manually. Alternatively, the system administrator can use a service, such as scheduler. In Oracle Identity Manager, there is a predefined scheduled task called Password Warning Task. The system administrator can use this scheduled task to create a scheduled job with the intended schedule.

> **See Also:** Table 2–2, " Predefined Scheduled Tasks" for information about the Password Warning Task scheduled task

Scheduler also enables you to create your own scheduled tasks that can be run by a job at a set time.

A **scheduled task** configure the metadata for a job, which is to be run, and the parameters required for execution of that task. This metadata is predefined for the predefined tasks. A new task can be added by the user, which will have the new metadata or the existing tasks can be updated to add/update the parameters for other configuration details. A **job** can be scheduled to run at the specified interval. You can create multiple jobs scheduled to run at different time intervals. A **job run** is a specific execution of a job. Each job run includes information such as the start time, stop time, exceptions and status of the execution.

This chapter discusses the following topics:

2.1 Configuring the oim-config.xml File

After you install Oracle Identity Manager, you can configure the scheduler settings by editing the child elements of the Scheduler element in the oim-config.xml file located in the following location in Meta Data Store (MDS):

db/oim-config.xml

> **See Also:** "MDS Utilities and User Modifiable Metadata Files" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about importing and exporting data to and from MDS

Table 2–1 lists the default elements that you can configure within the Scheduler element in the oim-config.xml file.

> **Note:** You can add new configurable child elements. For the information about new child elements, refer to the following URL:
>
> `http://www.quartz-scheduler.org/`

Table 2–1 Child Elements of the Scheduler Element

Element Within Scheduler Element	Description
DSJndiURL	This element is used for configuring transactional data source in the application server, which is used by Quartz to establish the connection. Default value: jdbc/operationsDB
nonTxnDSJndiURL	This element is used for configuring non-transactional data source in the application server, which is used by Quartz to establish the connection. Default value: jdbc/oimJMSStoreDS
Clustered	Enter `true` if Oracle Identity Manager has been installed in a clustered environment. Otherwise, enter `false`. Default value: `true` **NOTE:** In a clustered environment, the clocks on all nodes of the cluster must be synchronized.
implementationClass	Enter the name of the Java class that implements scheduler. Default value: oracle.iam.scheduler.impl.quartz.QuartzSchedulerImpl
instanceID	Enter a unique string value in this element. This value represents a string that uniquely identifies an Oracle Identity Manager scheduler instance. **NOTE:** In a clustered environment, each node of the cluster must have a unique InstanceId. This can be achieved by entering a value of `AUTO` in the instanceId element.
startOnDeploy	Enter `false` if you do not want scheduler service to start automatically when Oracle Identity Manager is started. Otherwise, enter true. Default value: true
threadPoolSize	Enter an integer value in this element. This value represents the number of threads that must be used for running jobs. Default Value: 10

2.2 Starting and Stopping the Scheduler

The Scheduler Status page is an authenticated UI page that displays the current status of the scheduler. At any given instance, the scheduler can be in one of the following statuses:

- Started

  If the scheduler is in the started status, then jobs can be scheduled and jobs that have already been scheduled will continue to run at the scheduled time.

- Stopped

  If the scheduler is in the stopped status, then all jobs are stopped. When the scheduler gets the stopped status while jobs are running, the currently running jobs are stopped. In addition, the jobs that are scheduled to run does not run, but are submitted for run according to the schedule. When the Scheduler Service is up in the future, all submitted jobs are run.

The Scheduler Status page also displays a detailed error message in the Last Error field, if any.

You can use the Scheduler Status page to either start, stop, or reinitialize the scheduler.

By default, the scheduler is in the started status after you install Oracle Identity Manager. However, if you want to stop scheduler for any reason and then restart it, then you must follow the procedure discussed in this section.

To start or stop the scheduler:

Note:

- You need to have Scheduler Admin role to start or stop the scheduler.
- In a clustered environment, you must perform this procedure on each node of the cluster.

---

1. Browse to the following URL by using a Web browser:

   http://*OIM_HOST*:*OIM_PORT*/SchedulerService-web/status

   In this URL, *OIM_HOST* represents the name of the computer hosting the Oracle WebLogic Application Server and *OIM_PORT* refers to the port on which the server is listening. The default port number for Oracle WebLogic Application Server is 7001.

2. Enter the User ID and password, and then click **OK.**

   The Scheduler Status page is displayed.

   Note: You may be automatically logged in to the scheduler service if you are working in a single sign-on environment.

   ---

3. Depending on the type of action that you want to perform, click one of the following:

   - **START:** Click this button to start the scheduler.
   - **STOP:** Click this button to stop the scheduler. This stops the scheduler and further execution of triggers, but it does not stop or abort any jobs that are

already executing. When the Scheduler Service is started again, jobs will then be executed at their appropriate times based on when they are scheduled.

- **REINIT**: Click this button to reinitialize the scheduler. Reinitializing the scheduler will restart the scheduler.

2.3 Scheduled Tasks

In Oracle Identity Manager, metadata is predefined for the default scheduled tasks. New tasks can be added by the user with new metadata, or the existing tasks can be updated to add or update the parameters or other configuration details.

For example, you can configure a reconciliation run using a scheduled task that checks for new information on target systems periodically and replicates the same in Oracle Identity Manager. Each scheduled task contains the following metadata information:

- Name of the scheduled task
- Name of the Java class that runs the scheduled task
- Description
- Retry
- (Optional) Parameters that the scheduled task accepts. Each parameter contains the following additional information:
  - Name
  - Data Type
  - Required/ Optional
  - Help Text
  - Encryption

This section discusses the following topics:

- Predefined Scheduled Tasks
- LDAP Scheduled Tasks
- Creating Custom Scheduled Tasks

2.3.1 Predefined Scheduled Tasks

This release of Oracle Identity Manager provides a set of predefined scheduled tasks that you can use while creating or working with jobs. Table 2–2 lists the predefined scheduled tasks.

Table 2–2 Predefined Scheduled Tasks

Job Name	Description	User-Configurable Attributes	Enabled By Default
Password Expiration Task	This scheduled task sends e-mail to users whose password expiration date had passed at the time when the task was run and then updates the USR_PWD_EXPIRED flag on the user profile.	Email Definition Name: Name of the email definition created in the Design Console for sending password expired notification to the user. The default value is "Password Expired".	Yes
Password Warning Task	This scheduled task sends e-mail to users whose password warning date had passed at the time when the task was run and then updates the USR_PWD_WARNED flag on the user profile.	Email Definition Name: Name of the email definition created in the Design Console for sending password expiration warning notification to the user. The default value is "Password Expiration Warning".	No
User Operations	This scheduled task performs the operation specified by the UserOperation attribute on the user account specified by the UserLogin attribute.	■ UserLogin: User ID of the user account ■ UserOperation: Operation that you want to perform on the user account. The value of this attribute can be ENABLE, DISABLE, or DELETE.	No
Attestation Grace Period Expiry Checker	This scheduled task delegates the attestation process after the grace period expires.	None	Yes
Task Escalation	This scheduled task escalates pending tasks whose escalation time had elapsed at the time when the scheduled task was run.	None	Yes
Task Timed Retry	This scheduled task creates a retry task for rejected tasks whose retry time has elapsed and whose retry count was greater than zero.	None	Yes
Set User Deprovisioned Date	A deprovisioning date is defined when a user account is created. For users whose deprovisioning date had passed at the time when this scheduled task was run, the task sets the deprovisioned date as the current date.	None	Yes
Disable/Delete User After End Date	An end date is defined when a user account is created. This scheduled task disables user accounts for which the end date had passed the current date at the time when the task is run. **Note:** Oracle recommendation is to run this scheduled task every 30 minutes or 1 hour.	None	Yes
Set User Provisioned Date	This scheduled task sets the provisioned date to the current date for users for whom all of the following conditions are true: ■ The provisioning date is in the past. ■ The deprovisioned date has not been set. ■ The deprovisioning date has not been reached or is NULL.	None	Yes

Table 2–2 (Cont.) Predefined Scheduled Tasks

Job Name	Description	User-Configurable Attributes	Enabled By Default
Enable User After Start Date	A start date is set when a user account is created. This scheduled task enables user accounts for which the start date has passed, and the user status is Disabled Until Start Date. These users are enabled thorough this scheduled task, thereby making the users ACTIVE.	None	Yes
Remove Open Tasks	This scheduled task removes information about open tasks from the table that serves as the source for the list displayed in Oracle Identity Manager Administrative and User Console.	Day Limit Number of days for which information about an open task should be retained in the table before the information is deleted By default, this attribute is not specified and disabled. You must enable and configure the time.	No
Issue Audit Messages Task	This scheduled task fetches audit message details from the aud_jms table and sends a single JMS message for a particular identifier and auditor entry in the aud_jms table. An MDB processes the corresponding audit message.	Max Records: Use this attribute to specify the maximum number of audit messages to be processed for a specified scheduled task run. The default value of this attribute is 400.	Yes
Initiate Attestation Processes	This scheduled task initiates a call to the Attestation Engine to run attestation processes that are scheduled to run at a time that has passed.	None	Yes
Request Execution Scheduled Task	This is a periodic scheduled task searches for requests with status "Request Awaiting Completion" and moves requests forward to the next stage "Operation Initiated" if the effective date set during the request submission is prior or equal to the current date.	Job Periodic Settings: Use this attribute to specify the time interval for the scheduled task to be run. The default value is 6 hours.	Yes
Automated Retry of Failed Async Task	This scheduled task retries Async Tasks (JMS Messages) that have failed. If the execution of the task succeeds, it is removed from the list of failed tasks. If it fails, the retry count is incremented. The maximum number of times a Failed Task is retried is determined by the 'maxRetries' defined for that task in async-messaging.xml.	None	Yes

Table 2–2 (Cont.) Predefined Scheduled Tasks

Job Name	Description	User-Configurable Attributes	Enabled By Default
Evaluate User Policies	This scheduled task re-evaluates the access policies.	Number of Threads: Use this attribute to specify the total number of threads that will process re-evaluation. The default value is 20. Batch Size: Use this attribute to fetch number of records from the database to be processed in one iteration. The default value is 500. Time Limit in mins: Use this attribute to specify time in minutes, after which the schedule task will stop. By default, this attribute is not specified and disabled. You must enable and configure the time.	No
Automatically Unlock User	This scheduled task automatically unlocks an user after the specified number of days.	None	Yes
Delayed Delete User	This scheduled task automatically deletes the user whose delete date is set as today. The scheduled task reads the XL.UserDeleteDelayPeriod system property, which indicates the number of days for which user will be in a Disable state when the user is deleted. This scheduled task finds all such users for whom this period has been reached and marks those users as deleted. Note: See "System Properties in Oracle Identity Manager" on page 4-1 for information about the XL.UserDeleteDelayPeriod system property. In Oracle Identity Manager 11*g* Release 1 (11.1.1.5), this scheduled task is not active by default. In Oracle Identity Manager 11*g* Release 1 (11.1.1.3), this scheduled task is active by default. However, the state of this scheduled task does not change if Oracle Identity Manager is upgraded from Release 1 (11.1.1.3) to Release 1 (11.1.1.5). **Note:** Oracle recommendation is to run this scheduled task frequently, such as every 1 hour.	None	No
Entitlement Assignments	This scheduled task populates Entitlement Assignment schema from child process form table whose field, Entitlement is marked as true.	RECORDS_TO_PROCESS_IN_BATCH: Number of records to process in a batch.	No
Entitlement List	This scheduled task populates Entitlement schema from lookup table whose child process form field, Entitlement is marked as true.	None	No

Table 2–2 (Cont.) Predefined Scheduled Tasks

Job Name	Description	User-Configurable Attributes	Enabled By Default
Entitlement Updates	This scheduled task populates Entitlement assignment table for a given user Entitlement Assignment Delta Table as & when Entitlements are add/update/delete for a User.	None	No
Get SOD Check Results Approval	This scheduled task gets back the result of SoD Evaluation from the SoD Server, for example, OAACG, SAP, and GRC for all requests waiting for SoD Check results. It reflects the SoDCheckResult and violation in appropriate dataset attributes. It will pick up all requests that are in "SoD check result pending" state and mark them as "SoD check completed".	None	No
Get SOD Check Results Provisioning	This scheduled task gets back the result of SoD Evaluation from the SoD Server, for example, OAACG, SAP, and GRC for all pending SoDCheck provisioning tasks. It reflects the SoDCheckResult and violation in appropriate process form attributes.	None	No
Non Scheduled Batch Recon	This scheduled task tries to process all the events created by non scheduled task based connectors such as PeopleSoft. Such connector created events are in either Event Received State or Data Received State, they only get processed if the batch size specified by the set of events is reached or via this scheduled task. This task executes as per settings to pick up all the unprocessed non scheduled task based events and submits them to the reconciliation engine for processing.	None	No
Orchestration Process Cleanup Task	This scheduled task deletes all completed parent orchestration processes.	Batch Size: Use this attribute to specify the number of completed orchestration processes to be deleted in each iteration. Delete Just One Batch: Use this attribute to specify the value *true* or *false*. Only a single batch is deleted if the value is true. All the completed events are deleted batch at a time in a loop if the value is false.	Yes
Refresh Materialized View	The materialized view is used to generate reports related to reconciliation. This view needs to be updated periodically (at a specified interval, for instance, once a day). Therefore, this scheduled task was created to update the view on a periodic basis.	None	No
Resubmit Uninitiated Approval SODChecks	This scheduled task tries to initiate SoD Check for pending requests, which have SoDCheckStatus as "SoD check not initiated" or "SoD check completed with error". The pending requests are the ones for which SoD initiation failed in first try and are pending for some level of approval.	None	No

Table 2–2 (Cont.) Predefined Scheduled Tasks

Job Name	Description	User-Configurable Attributes	Enabled By Default
Resubmit Uninitiated Provisioning SODChecks	This scheduled task tries to initiate SoD Check by submitting a JMS message for all pending SoDCheck provisioning tasks. The SoD Check initiation may have failed because of SoD server being down at the time of entitlement add/update via direct provisioning.	None	No
Reconciliation Retry Scheduled Task	This scheduled task processes the failed reconciliation event for the users whose status is set as Failed.	None	Yes
Run Future Dated Reconciliation Events	This scheduled task processes the current dated reconciliation event for the users whose status is set as Deferred.	None	No
Job History Archival	This scheduled task is designed to archive/purge entries for Job History.	Archival Date: Use this attribute to specify date till which the records need to be archived/purged. Batch Size: Use this attribute to specify the size of a batch in which the records must be processed. Operation Type: Use this attribute to specify the operation type. This attribute can have two possible values, Archive and Purge. The default value is Archive.	No

Table 2–2 (Cont.) Predefined Scheduled Tasks

Job Name	Description	User-Configurable Attributes	Enabled By Default
Bulk Load Post Process	This scheduled task starts post processing jobs for the Bulk Load Utility.	■ Batch Size for Processing Records: User records are processed in batches. This attribute specifies the size of the batch and must have a value. The default is 500. ■ Generate Password: This attribute specifies whether a password will be automatically generated when users are created with the Bulk Load Utility. It must have a value of Yes or No; the default is Yes. ■ Ldap Sync: This attribute specifies whether users created in Oracle Identity Manager using the Bulk Load Utility will also be created in the LDAP repository in an LDAP enabled environment. This attribute must have a value of Yes or No; the default is No. ■ Notification: This attribute specifies whether users created using the Bulk Load Utility will be notified with an email. It must have a value of Yes or No; the default is Yes. ■ Process User Ids: This attribute specifies the range of user keys (in the Oracle Identity Manager Database) that need to be processed. The keys are associated with the users created using the Bulk Load Utility. It defines a range from start (From:) to finish (To:).	No
Bulk Load Archival Job	This scheduled task cleans up the processed entries in the Oracle Identity Manager Database staging tables used during bulk load post processing.	■ Archival Date: This attribute specifies the date up to which the records will be purged. It must have a value. The format is **ddMMyyyy** or **MMM dd, yyyy**. ■ Batch Size: Database records are cleaned up in batches. This attribute specifies the size of the batch and must have a value. The default is 1000.	No

Table 2–2 (Cont.) Predefined Scheduled Tasks

Job Name	Description	User-Configurable Attributes	Enabled By Default
Retry Failed Orchestrations	This scheduled task retries all failed orchestrations based on the attribute values provided. If there is no parameter value defined, no orchestration will be retried.	▪ Orchestration ID: This attribute takes a comma separated list of Orchestration Ids to be retried. ▪ Entity Type: Orchestrations submitted for the given Entity will be retried. ▪ Operation: Orchestrations submitted for given Operation will be retried. ▪ Stage: Orchestrations on the given stage will be retried. ▪ From Date: Orchestrations submitted after the given date will be retried. The format is **ddMMyyyy** or **MMM dd, yyyy**. ▪ To Date: Orchestrations submitted before given date will be retried. The format is **ddMMyyyy** or **MMM dd, yyyy**.	No
Remove Failed Off-line Messages	This scheduled task is used for deleting the failed offline provisioning messages from the OPS table.	Remove Failed Messages Older Than (days)	No
DataCollection Scheduled Task	This scheduled task is used to populate data from Oracle Identity Manager operational tables to the staging tables in an offline manner. The scheduled task is set to run manually, and is triggered when Oracle Identity Analytics (OIA) invokes the DataCollectionOperationsIntf->startDataCollection API. See "Oracle Identity Analytics" on page 11-2 for information about integration between Oracle Identity Manager and OIA.	None	Yes

2.3.2 LDAP Scheduled Tasks

This release of Oracle Identity Manager provides a set of LDAP scheduled tasks that you can use while creating or working with jobs. These schedule tasks are created only when Oracle Identity Manager is configured with LDAP synchronization. Table 2–3 lists the LDAP scheduled jobs.

See Also: "Configuring the Integration with LDAP" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for detailed information about configuring the integration between Oracle Identity Manager and LDAP

Table 2–3 LDAP Scheduled Jobs

Scheduled Jobs	Description	User-Configurable Attributes	Enabled By Default
LDAP User Create and Update Reconciliation	This scheduled job reconciles user updates based on the change log from LDAP. The LDAP User Create and Update Reconciliation scheduled job cannot reconcile the User Defined Fields (UDFs). To enable this scheduled job to reconcile UDFs, export the /db/LDAPUser and /db/RA_LDAPUSER.xml files from MDS, make required configuration changes in the files, and import them back to MDS. See "MDS Utilities and User Modifiable Metadata Files" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about importing and exporting MDS files. **Note:** While modifying the files, you must not specify any spaces when providing attribute names in the profile.	Last Change Number: Use this attribute to update the last change number of scheduled jobs with last changelog number value of Oracle Internet Directory. Batch Size: Use this attribute to fetch number of entries from the directory in each query. OIM User Type: Use this attribute to specify the user type, for example, End-User or End-User Administrator. OIM User Organization Name: Use this attribute to specify Oracle Identity Manager organization in which reconciled users will be created. OIM Employee Type: Use this attribute to specify the value of employee type for users that are created through reconciliation.	No
LDAP User Delete Reconciliation	This scheduled job reconciles user deletes based on the change log from LDAP.	Last Change Number: Use this attribute to specify the last changelog identifier processed by this job. Batch Size: Use this attribute to fetch number of entries from the directory in each query.	No
LDAP Role Create and Update Reconciliation	This schedule job reconciles role creates or updates based on the change log from LDAP.	Last Change Number: Use this attribute to specify the last changelog identifier processed by this job. Batch Size: Use this attribute to fetch number of entries from the directory in each query.	No
LDAP Role Delete Reconciliation	This schedule job reconciles role deletes based on the change log from LDAP.	Last Change Number: Use this attribute to specify the last changelog identifier processed by this job. Batch Size: Use this attribute to fetch number of entries from the directory in each query.	No
LDAP Role Membership Reconciliation	This schedule job reconciles role membership based on the change log from LDAP.	Last Change Number: Use this attribute to specify the last changelog identifier processed by this job. Batch Size: Use this attribute to fetch number of entries from the directory in each query.	No

Table 2–3 (Cont.) LDAP Scheduled Jobs

Scheduled Jobs	Description	User-Configurable Attributes	Enabled By Default
LDAP Role Hierarchy Reconciliation	This schedule job reconciles role hierarchy based on the change log from LDAP.	Batch Size: Use this attribute to fetch number of entries from the directory in each query. Last Change Number: Use this attribute to specify the last changelog identifier processed by this job.	No
LDAP User Create and Update Full Reconciliation	This schedule job reconciles user creates or updates from LDAP, which includes all users under the search base that is defined in the Directory Server IT resource.	Batch Size: Use this attribute to fetch number of entries from the directory in each query. OIM Use Type: User this attribute to specify the user type, for example, End-User or End-User Administrator. OIM User Organization Name: Use this attribute to specify Oracle Identity Manager organization in which reconciled users will be created. OIM Employee Type: Use this attribute to specify the value of employee type for users that are created through reconciliation.	Yes
LDAP User Delete Full Reconciliation	This schedule job reconciles user deletes from LDAP. It detects the deleted users by comparing the users that exist in Oracle Identity Manager and LDAP.	Batch Size: Use this attribute to fetch number of entries from the directory in each query.	Yes
LDAP Role Create and Update Full Reconciliation	This schedule job reconciles role creates or updates from LDAP, which includes all roles under the search base that is defined in the Directory Server IT resource.	Batch Size: Use this attribute to fetch number of entries from the directory in each query.	Yes
LDAP Role Delete Full Reconciliation	This schedule job reconciles role deletes from LDAP. It detects the deleted roles by comparing the roles that exist in Oracle Identity Manager and LDAP.	Batch Size: Use this attribute to fetch number of entries from the directory in each query.	Yes
LDAP Role Membership Full Reconciliation	This schedule job reconciles role membership from LDAP. It detects the addition or deletion of role membership by comparing the entries existing in Oracle Identity Manager and LDAP.	Batch Size: Use this attribute to fetch number of entries from the directory in each query.	Yes
LDAP Role Hierarchy Full Reconciliation	This schedule job reconciles role hierarchy from LDAP. It detects the addition or deletion of role hierarchy by comparing the entries existing in Oracle Identity Manager and LDAP.	Batch Size: Use this attribute to fetch number of entries from the directory in each query.	Yes
Fusion Applications Role Category Seeding	This schedule job will query the LDAP system for all roles and find out their Role Category. If there are new role category in LDAP that are not in Oracle Identity Manager, it creates a new role category in Oracle Identity Manager.	Start Change Log Number: Use this attribute to specify last changelog identifier processed by this job or starting identifier for next run.	Yes

2.3.3 Creating Custom Scheduled Tasks

Oracle Identity Manager provides you with the capability of creating your own scheduled tasks. You can create scheduled tasks according to your requirements if you choose not to use any of the predefined scheduled tasks listed in Table 2–2.

> **See Also:** "Developing Scheduled Tasks" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for detailed information about creating a scheduled task

To create a custom scheduled task:

1. Create the scheduled task XML file and seed it in MetaData Store (MDS).
2. Develop the schedule task class and package it in a Jar.
3. Upload the Jar by:
   - Using Plug-ins
   - Using Database

Using Plug-ins

You can upload the jar using the Plug-in Framework provided by Oracle Identity Manager.

To upload the jar using plug-ins:

1. Create the plugin.xml file.
2. Create the directory structure (plugin.zip) for the scheduled task.
3. Upload the created plugin.zip in the Oracle Identity Manager database.

Using Database

You can upload the jar in the database (DB) of Oracle Identity Manager.

To upload the jar using DB:

Upload the jar in DB using UploadJar utility. You can run this utility from the following location:

```
$OIM_HOME/bin/
```

> **See Also:** "Upload Jar Utility" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about running the UploadJar utility

2.4 Jobs

As discussed in one of the earlier chapters, a job is a task that can be scheduled to run at the specified interval. A job run is a specific execution of a job. Each job run includes information such as the start time, stop time, job status, exceptions and status of the execution.

This section discusses the following topics:

- Creating Jobs
- Searching Jobs
- Viewing Jobs

- Modifying Jobs
- Disabling and Enabling Jobs
- Deleting Jobs

2.4.1 Creating Jobs

Note: The procedure described in this section assumes that the XML file for the scheduled task, which contains the job description is available in the *OIM_HOME*/metadata/file directory.

To create a job:

1. Log in to Oracle Identity Administration with the appropriate credentials.
2. Click the **System Management** tab and then click **Scheduler**. Alternatively, you can click the "Search Scheduled Jobs" link on Welcome Screen.
3. On the left pane, from the **Actions** list, select **Create.** Alternatively, you can click the icon with the plus (+) sign beside the View list.
4. On the Create Job page, enter values in the following fields under the Job Information section:
   - **Job Name:** Enter a name for the job.
   - **Task:** Specify the name of the scheduled task that runs the job. Alternatively you can search and specify a scheduled task.

     To search and specify a scheduled task:

     a. Click the magnifying glass icon next to this field.

     b. In the Search and Select : Scheduled Task dialog box, specify a search criterion for the scheduled task and click the icon next to Search field.

        A list of all scheduled tasks that meet the search criterion is displayed.

     c. From this list, select the scheduled task that runs the job being created, and then click **Confirm.**
   - **Start Date:** Specify the date and time on which you want the job to run. To do this, select the date and time along with timezone from the date editor and click **Ok**. By default, the timezone is "(UTC-08:00) US Pacific Time".
   - **Retries:** Enter an integer value in this field. This number represents the number of times the scheduler tries to start the job before assigning the **Stopped** status to the job.
   - **Schedule Type:** Depending on the frequency at which you want the job to run, select one of the following schedule types:
     - **Periodic:** Select this option if you want the job to be run at a time that you specify, on a repeating basis. If you select this option, then you must enter an integer value in the Run every field under the Job Periodic Settings section and select one of the following values:

       - mins

       - hrs

       - days

– **Cron:** Select this option if you want the job to be run at a particular interval on a recurring basis. For example, you can create a job that must run at 8:00 A.M. every Monday through Friday or at 1:30 A.M. every last Friday of the month.

  The recurrence of the job must be specified in the Cron Settings section. In the Recurring Interval field, you can select any of the following values:

  - Daily

  - Weekly

  - Monthly on given dates

  - Monthly on given weekdays

  - Yearly

  After selecting a value, you can enter an integer value in the Days between runs field.

– **Single:** Select this option if the job is to be run only once at the specified start date and time.

– **No pre-defined schedule:** This option specifies that no schedule is attached to the job you are creating, and therefore, it is not triggered automatically. As a result, the only option to trigger the job is by clicking **Save and Run Now**.

Note: For all the schedule types, if you want the job to be saved run immediately, then click **Save and Run Now.**

A message confirming that the job has been successfully created and triggered is displayed.

2.4.2 Searching Jobs

You can perform the following search operations to search for jobs in the Oracle Identity Administration:

- Performing a Simple Search for Jobs
- Performing an Advanced Search for Jobs

2.4.2.1 Performing a Simple Search for Jobs

To perform a simple search for jobs:

1. In the Welcome page of the Oracle Identity Administration, under System Management, click **Search Scheduled Jobs**. Alternatively, you can click the **System Management** tab, and then click **Scheduler.**
2. On the left pane, in the **Search** field, specify the search criterion for the job that you want to locate. You can also include wildcard characters in the search criteria.
3. Click the icon next to the Search field. A list of all jobs that meet the search criterion is displayed.

   The search results are displayed in a tabular format with the following columns:

   - Job Name: This column displays the name of the job. If you want to view the details of the job, then click its name in the column.

- Status: This column displays the status of the Job. A job can be in any one of the following statuses:
  - RUNNING: The job is currently running.
  - STOPPED: The job is currently not running. However, the job will run again at the date and time specified in the Next Scheduled Run field.
  - INTERRUPT: The job is interrupted while running. This status may appear if admin server go down in between while job is running.
  - FAILED: The Job was failed to execute due to some reasons.

2.4.2.2 Performing an Advanced Search for Jobs

To perform an advanced search for scheduler:

1. On the left pane of the Scheduler section, click **Advanced Search**. The Advanced Search: Scheduled Jobs page is displayed.
2. Select any one of the following options:
   - **All:** On selecting this option, the search is performed with the AND condition. This means that the search operation is successful only when all the search criteria specified are matched.
   - **Any:** On selecting this option, the search is performed with the OR condition. This means that the search operation is successful when any search criterion specified is matched.
3. In the Job Name field, enter the job name that you want to search. You can use wildcard characters in your search criteria. Select a search condition in the list adjacent to the Job Name field. The search conditions include Not Contains, Not Begins With, Not Equals, Equals, Ends With, Not Ends With, Contains, and Begins With.
4. For the Status field, select a search condition. Then select a status: **All**, **Running**, or **Stopped**.
5. In the Task Name field, enter the task name. You can use wildcard characters in your search criteria. Select a search condition in the list adjacent to the Task Name field.
6. Click **Search**. The list of jobs that match your search criteria are displayed in the search results table.

   Table 2–4 lists the columns of the search results table:

Table 2–4 Fields in the Search Results Table

Field	Description
Job Name	The name of the scheduled job
Task	The task associated with the job
Status	The status of the job, RUNNING, STOPPED, FAILED, or INTERRUPT
Schedule	The schedule or the time for the job to run
Last Run	The time when the job ran for the last time
Enable	The job is enabled or disabled

2.4.3 Viewing Jobs

To view the details of a job:

1. Search for the job whose details you want to view. See "Searching Jobs" on page 2-16 for information about how to search a job.
2. Click the job whose details you want to view in the Job Name column of the search results table.

The Job Details page is divided into the following sections:

- Job Information: This section displays the fields that provide information about the job. For example, Job Name, Task, Retries, and Start Date fields. If you want to modify the details of the job, then make the relevant change and click **Apply**. See "Modifying Jobs" on page 2-19 for more information about modifying jobs.
- Job Status: This section displays details of the status of the job in the following fields:
  - Current Status: This field displays the status of the job.
  - Last Run Start: This field displays the date and time of when the job started to run last.
  - Last Run End: This field displays the most recent date and time of when the job stopped running
  - Next Scheduled Run: This field specifies that no schedule is attached to the job you are creating and therefore the job is not triggered automatically. The only option to trigger the job in this case is performing "Run Now" .

    Note: No value is displayed in this field if the Schedule Type is No pre-defined schedule.

- Parameters: The parameter values specified are used at run-time while the job is being executed. The values need not be provided at the runtime, they can be there for each job and are used when the job is executed.
- Job History: This section displays a list of all job runs for the job in a table.

  Each row of the table displays the following information about the job:
  - Start Time: This column displays the date and time at which the job run started its run.
  - End Time: This column displays the time at which the job run ended its run.
  - Job Status: This column displays the status of the job.
  - Execution Status: This column displays the job execution status.

  You can reorder the display of columns in the table under the History section:

  a. From the View list, select **Reorder Columns.**
  b. In the Reorder Columns dialog box, select the column name that you want to move.
  c. Depending on the order in which you want to columns to appears, click the up or down arrows.

  To add or remove the columns displayed in the table under the History section:

  a. From the View list, select **Columns.**

b. Depending on your requirement, select one of the following:

- Show All
- Start Time
- End Time
- Job Status
- Execution Status

c. Repeat Steps a and b for each column that you want to add or remove.

After viewing the details of the job, you can either modify, run, or stop the job. In addition, you can also enable or disable the job. Job Detail screen can be refreshed.

After you view the details of the job on the Job Details page, you can perform one of the following:

- If you want to modify the details of the job, then make the relevant change and click **Apply.** See "Modifying Jobs" on page 2-19 for more information about modifying jobs.
- If you want to run the job, then click **Run Now.**
- If the Disable button is enable, then it means that the job is currently enabled and you can disable the job by clicking **Disable.**
- If the Enable button is enable, then it means that the job is currently disabled and you and enable the job by clicking **Enable.**
- If you want to refresh a job detail screen, then click **Refresh**.
- If the Stop button is displayed, then it means that the job is currently running and you can stop the job by clicking **Stop**.

2.4.4 Modifying Jobs

To modify a job:

1. Search and view the details of the job that you want to modify. See "Viewing Jobs" on page 2-18 for information about viewing job details.

> **Note:** If you want to run the job, then click the job name in the first column of the search results table and then click **Run Now.** After you click **Run Now,** you need not perform the rest of the steps in this procedure. However, if you want to modify the job and then run it, then perform the next step and click **Run Now.**

2. On the Job Details page, you can modify all the details of the job, except for the Job Name and Task fields under the Job information section and the fields under the Job Status section. See Step 4 of "Creating Jobs" on page 2-15 for details about the fields that you want to modify.
3. Click **Apply** to commit the changes made on the Job Details page to the database.

   A message confirming that the job has been successfully modified is displayed.

2.4.5 Disabling and Enabling Jobs

In addition to creating and modifying jobs, you can disable a job that is currently enabled, and enable a job that has been disabled earlier. On the Job Details page:

- If the Enabled button is enable, then it means that the job is currently disabled and you can enable it by clicking **Enable.** A job that has been enabled will run only when one of the following is true on the Job Details page:
  - The date and time displayed in the **Start Date** field matches the current date and time.
  - The date and time displayed in the **Next Scheduled Run** field matches the current date and time.
- If the Disabled button is enable, then it means that the job is currently enabled and you can disable the job by clicking **Disable.** A job that has been disabled will not run even when the date and time on which the job has been scheduled to run matches the current date and time.

To enable or disable a job:

1. Search for the job that you want to enable or disable by performing the procedure described in "Searching Jobs" on page 2-16.
2. On the left pane, in the search results table, right click on the job name and select **Enable** or **Disable**. Depending on whether you click **Enable** or **Disable**, a message indicating that the job has either been successfully enabled or disabled is displayed.
3. Click **OK** to close the dialog box.

2.4.6 Starting and Stopping Jobs

In addition to scheduling jobs to run automatically at the specified time, you can manually start or stop a job at any given time. For example, you create and schedule a job that runs every Friday. However, if you want to run the job on any day other than Friday, then you must run the job manually.

To start or stop a job:

1. Search for the job that you want to start or stop by performing the procedure described in "Searching Jobs" on page 2-16.
2. On the left pane, in the search results table, click the job name of the job that you want to start or stop.

> **Note:** By default, the status of all jobs is STOPPED unless a job is running.

3. If you want to start a job, then from the Actions list, click **Run Now.**

   A dialog box prompting you to confirm if you want to run the job is displayed.
4. If you want to stop a job, then from the Action list, click **Stop.**

   A dialog box prompting you to confirm if you want to stop the job is displayed.
5. Click **OK.**

2.4.7 Deleting Jobs

To delete a job:

1. Search for the job that you want to delete by performing the procedure described in "Searching Jobs" on page 2-16.

2. On the left pane, in the search results table, click the job name of the job that you want to delete.
3. From the Actions list, click **Delete.** Alternatively, you can click the Delete icon next to the icon with the plus (+) sign.

   A dialog box prompting you to confirm if you want to delete the job is displayed.
4. Click **OK.** A message indicating that the job has been deleted successfully is displayed.

3

Managing Notification Templates

Information about events occurring in Oracle Identity Manager are required to be sent to various users, such as requesters, beneficiaries, or administrators. This information about events is sent by using the notification service in the form of notification e-mail messages. The notification service allows you to perform all notification-related operations in Oracle Identity Manager.

An event is an operation that occurs in Oracle Identity Manager, such as user creation, request initiation, or any custom event created by the user. The events are generated as part of business operations or via generation of errors. Event definition is the metadata that describes the event. To define metadata for events, it is important to identify all event types supported by a functional component. For example, as a part of the scheduler component, metadata can be defined for scheduled job execution failed and shutting down of the scheduler. Every time a job fails or the scheduler is shut down, the events are raised and notifications associated with that event are sent.

The data available in the event is used to create the content of the notification. The different parameters defined for an event help the system to select the appropriate notification template. The different parameters that are defined for an event help the system decide which event variables can be made available at template design time.

A notification template is used to send notifications. These templates contain variables that refer to available data to provide more context to the notifications. The channel through which a notification is sent is known as the notification provider. For this release, the only notification provider available is an e-mail notification provider. At the backend, the notification engine is responsible for generating the notification, and utilizing the notification provider to send the notification.

> **Note:** For sending notifications, the XL.MailServer system property must be configured. See "System Properties in Oracle Identity Manager" on page 4-1 for information about this system property.

Oracle Identity Manager provides a set of default notification templates, as shown in Table 3–1.

Table 3–1 Default Notification Templates

Notification Template	Description
Bulk Request Creation	Template to provide notification during a bulk request creation
Create User Self Service Notification	Template to provide notification after a new user is created

Table 3–1 (Cont.) Default Notification Templates

Notification Template	Description
End Date	Template to provide notification to the manager when end date of the reportee expires
Generated Password Notification	Template to provide notification after a password is generated by Oracle Identity Manager
Request Creation	Template to provide notification during a request creation
Request Identity Creation	Template to provide notification during a Create User request
Request Status Change	Template to provide notification during a request status change
Reset Password	Template to provide notification after password has been reset
User Deleted	Template to provide notification to the manager when the user account of the reportee is deleted as a result of expired end date
Add Proxy Notification	Template to provide notification after a proxy has been added for a user

Notification templates are described in the following sections:

- Defining Event Metadata
- Creating a Notification Template
- Searching for a Notification Template
- Modifying a Notification Template
- Deleting a Notification Template
- Adding and Removing Locales from a Notification Template
- Configuring Notification for a Proxy

3.1 Defining Event Metadata

Corresponding to each event, you must create an XML file that has the specific schema defined by the notification engine. Compliant to that schema (.xsd file), an XML file is created that defines how an event looks like. When the event is defined, you can configure a notification template for that event.

An event file must be compliant with the schema defined by the notification engine, which is NotificationEvent.xsd. The event file contains basic information about the event.

> **Note:** The NotificationEvent.xsd file is in the iam\iam-product\features\notification\metadata directory in the MDS.

The following is a sample event XML file:

```
<?xml version="1.0" encoding="UTF-8"?>
<Events xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="../../../metadata/NotificationEvent.xsd">
  <EventType name="User Created">
    <StaticData>
      <Attribute DataType="X2-Entity" EntityName="User" Name="Granted User"/>
      <Attribute DataType="X2-Entity" EntityName="User" Name="Grantee User"/>
```

```
      <Attribute DataType="91-Entity" EntityName="User Group" Name="User Grp"/>
    </StaticData>
      <Resolver class="oracle.iam.notification.DemoResolver">
      <Param DataType="91-Entity" EntityName="Resource" Name="ResourceInfo"/>
    </Resolver>
  </EventType>
</Events>
```

The event XML file has the following elements:

- **EventType name:** The name of the event that will be available while creating notification templates for the event.
- **StaticData:** The list of static parameters. This set of parameters specifically let the user add parameters that are not data dependent. In other words, this element defines the static data to be displayed when notification template is to be configured. For instance, the user entity is not data dependent, and when resolved, has the same set of attributes for all the event instances and notification templates.
- **Param DataType:** The list of dynamic parameters. This set of parameters specifically let the user add parameters that are data dependent. For instance, the Resource entity is data dependent. Corresponding to this field, a lookup is displayed on the UI. When the user selects the resource object, the call goes to the Resolver class provided to get the fields that are shown in the tree from which user can select the attribute to be used on the template.

  Note: Available data is the list of attributes that can be embedded as a token in the template. These tokens are replaced by the value passed by the resolver class at run time. See step 7 of "Creating a Notification Template" on page 3-5 for an example of a token.

  Available data is displayed in a drop-down list while creating a notification template, as described in "Creating a Notification Template" on page 3-5.

  Selected data is a single attribute that helps user to copy and paste the attribute name in a notification template. Selected data is the same attribute name as selected in the Available Data list.

  The dynamic entities supported for lookup are user, resource, and organization. These entity names must be specified in the Param DataType element.

  Note: The <Param DataType> element is not a mandatory element. However, when it is used, the entity names must be specified as User, Resource, or Organization.

- **Resolver class:** The Resolver class must be defined for each notification. It defines what parameters are available in the notification creation screen and how those parameters are replaced when the notification is to be sent. In other words, the resolver class resolves the data dynamically at run time and displays the attributes in the UI. See "Creating the Resolver Class" on page 3-4 for information about implementing the resolver class.

Notification service reads the XML files from MDS. The event XML file is uploaded into MDS by using the MDS import and export utility. See "Deploying the Notification Event" on page 3-5 for details.

3.1.1 Creating the Resolver Class

All classes have to implement the NotificationEventResolver interface. This interface provides the following methods:

The getAvailableData Method

public List<NotificationAttribute> getAvailableData(String eventType, Map<String, Object> params);

This API returns the list of available data variables. These variables are available on the UI while creating or modifying the templates and allows the user to select the variables so that they can be the part of the messages on the template.

The eventType parameter specifies the event name for which the template is to be read.

The params parameter is the map that has the entity name and the corresponding value for which available data is to be fetched. For instance:

map.put("Resource", "laptop");

This helps you fetch the fields associated with the laptop resource or other data according to the code that you have provided in the resolver class.

Sample code:

```
/**
* this is a dummy implementation and uses hardcoded values
* Implementors need to iterate the XML as found through the event type
* params : will have all the specific values that your resolver needs
* for instance resource name = "laptop" that you may want here to be resolved
through your custon implementation
*/

List<NotificationAttribute> list = new ArrayList<NotificationAttribute>();
NotificationAttribute subatr = new NotificationAttribute();
subatr.setName("Dynamic1"); subatr.setType("91-Entity");
subatr.setEntityName("Resource"); subatr.setRequired(false);
subatr.setSearchable(true); subatr.setSubtree(lookup91EntityMetaData("resource"),
params.get(0)); list.add(subatr);
```

The main tree contains the entity information and the subtree contains all the nodes that are available on the UI. The name field from each node in the subtree is available on the UI for selection.

The getReplacedData Method

HashMap<String, String> getReplacedData(String eventType, Map<String, Object> params);

This API returns the resolved value of the variables present on the template at run time when notification is being sent.

The eventType parameter specifies the event name for which the template is to be read.

The params parameter is the map that has the base values, such as usr_key and obj_key, required by the resolver implementation to resolve the rest of the variables in the template.

Sample code:

```
HashMap<String, Object> resolvedData = new HashMap<String, Object>();
resolvedData.put("shortDate", new Date()); resolvedData.put("longDate", new
Date());
String firstName = getUserFirstname(params.get("usr_key"));
resolvedData.put("fname", firstName); resolvedData.put("lname", "lastname");
resolvedData.put("count", "1 million");
return resolvedData;
```

3.1.2 Deploying the Notification Event

To deploy the notification event:

1. Upload the event metadata XML file to the Meta Data Store (MDS). Oracle Identity Manager provides utilities to export/import data to and from MDS repository.

   See "MDS Utilities and User Modifiable Metadata Files" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about the MDS utilities.

2. Upload the JAR file containing the resolver class to Oracle Identity Manager database. Utilities are available in the *OIM_HOME*/bin/ directory for uploading resource bundles and JAR files to Oracle Identity Manager database.

   See "Upload JAR and Resource Bundle Utilities" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about the upload resource bundles and JAR utilities.

3.2 Creating a Notification Template

Note: Corresponding to each event that happens, you have to configure an XML file. The XML file defines the behavior of each event. You must first configure the XML for an event. After this is done, you can create a notification template for that event.

For information about creating the event XML file, see "Defining Event Metadata" on page 3-2.

To create a notification template:

1. Log in to the Administrative and User Console. Navigate to Advanced Administration.
2. Click the **System Management** tab, and then click the **Notification** tab.
3. From the Actions menu on the left pane, select **Create.**
4. On the Create page, enter values for the following fields under the Template Information section:
   - **Template Name:** Enter the template name in this field.
   - **Description Text:** Enter a brief description of the template in this field.

Note: The Description Text field cannot be translated and is available only in English.

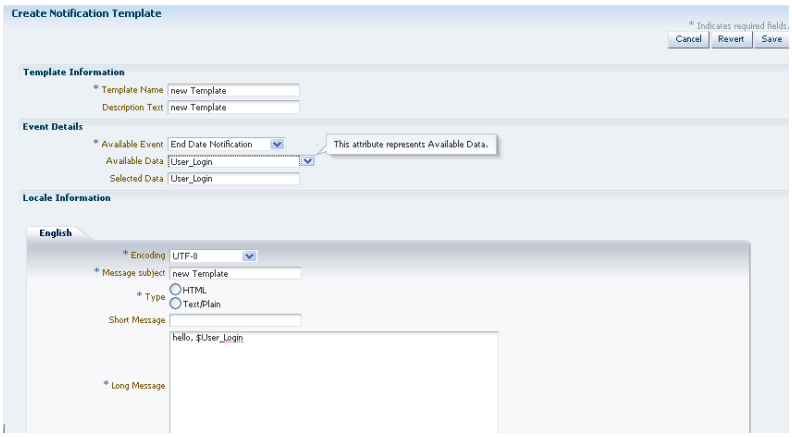
5. Under the Event Details section, perform the following:
   - From the Available Event list, select the event for which the notification template is to be created from a list of available events. Depending on your selection, other fields are displayed in the Event Details section.
   - In the Resource field, select a resource from the lookup. This is the dynamic data defined by the Param DataType element in the XML definition. For more information about this element, see "Defining Event Metadata" on page 3-2.
6. Under the Locale Information section, enter values in the following fields:

Note: The Default Locale information is stored in the PTY table and is fetched from there.

   - To specify a form of encoding, select either UTF-8 or ASCII.
   - In the **Message Subject** field, enter a subject for the notification.
   - From the **Type** options, select the data type in which you want to send the message. You can choose between HTML and Text/Plain.
   - In the **Short Message** field, enter a short version of the message.
   - In the **Long Message** field, enter the message that will be sent as the notification. See step 7.
7. To use the token for available data in the messages that will be sent as notification:
   a. Select the attribute from the list. This attribute will be displayed in the Selected Data field.
   b. Copy the attribute and add it in the message text by placing it inside ${}. For example, if selected data is FA_Territory, then include it in the text as ${FA_Territory}.

Figure 3–1 shows the Create Notification Template page with sample values:

Figure 3–1 The Create Notification Template Page



8. After you have entered the required values in all the fields, click **Save.**
9. A message is displayed confirming the creation of the notification template. Click **OK.**

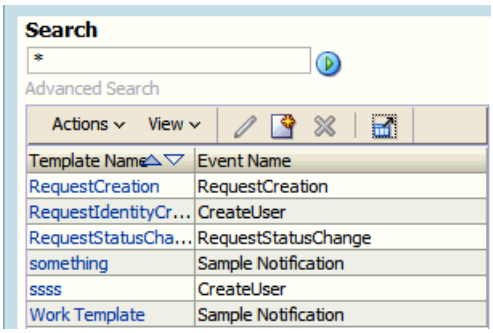
3.3 Searching for a Notification Template

You can perform a simple search or an advanced search for a notification template by using Advanced Administration.

To perform a simple search for a notification template:

1. Log in to the Oracle Identity Administration.
2. Click the **System Management** tab and then click the **Notification** tab.
3. Click the icon next to the **Search** field. All the existing notification templates are displayed on the left pane, as shown in Figure 3–2:

Figure 3–2 Notification Search Result

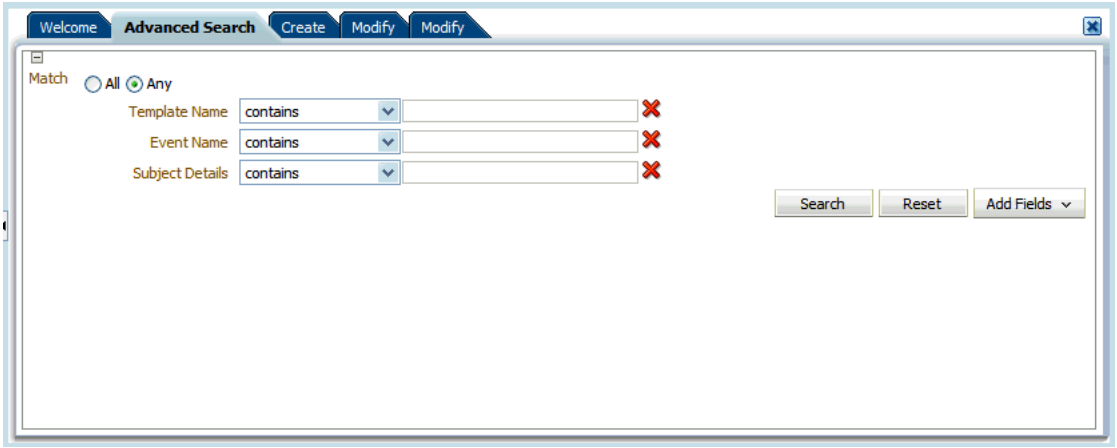


4. Select the template that you want to view. The details of the selected notification template are displayed on the right pane.

To perform an advanced search for a notification template:

1. In the left pane of the Oracle Identity Administration, click **Advanced Search**. The Advanced Search page is displayed, as shown in Figure 3–3:

Figure 3–3 The Advanced Search Page

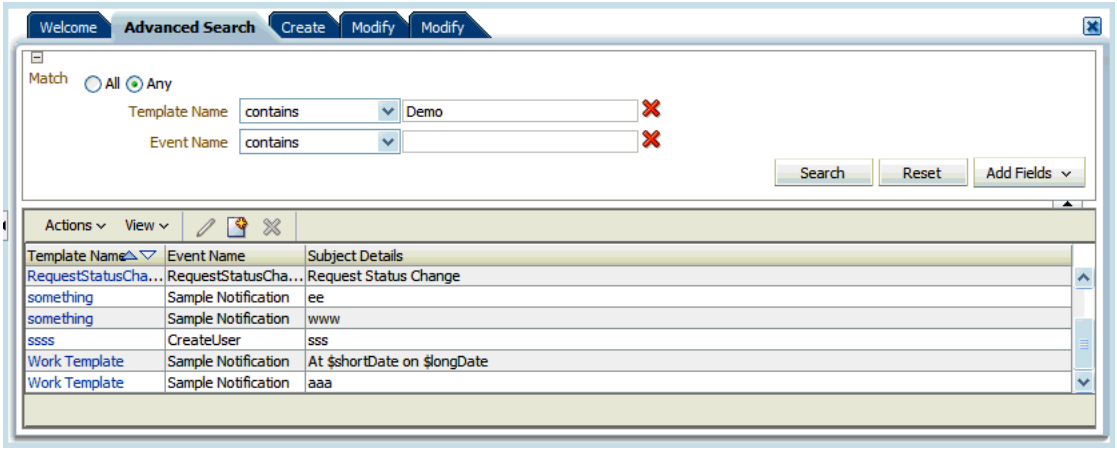


2. Select one of the following matching options:

- **All:** On selecting this option, the search is performed with the AND condition. This means that the search operation is successful based on Search field with any input from the user. Search field with no input from the user is not considered.
- **Any:** On selecting this option, the search is performed with the OR condition. This means that the search operation is successful when any search criterion specified is matched.

3. Specify the search criteria in the Template Name, Event Name, and Subject Details fields. You can remove any of these fields that you do not want to include in the search by clicking the icon next to it. You can add a field that you want to include in the search by clicking **Add Fields**, and then selecting the field name from the list.
4. Click **Search**. The search results table is displayed with details about template names, event names, and subject details, as shown in Figure 3–4:

Figure 3–4 Advanced Search Results

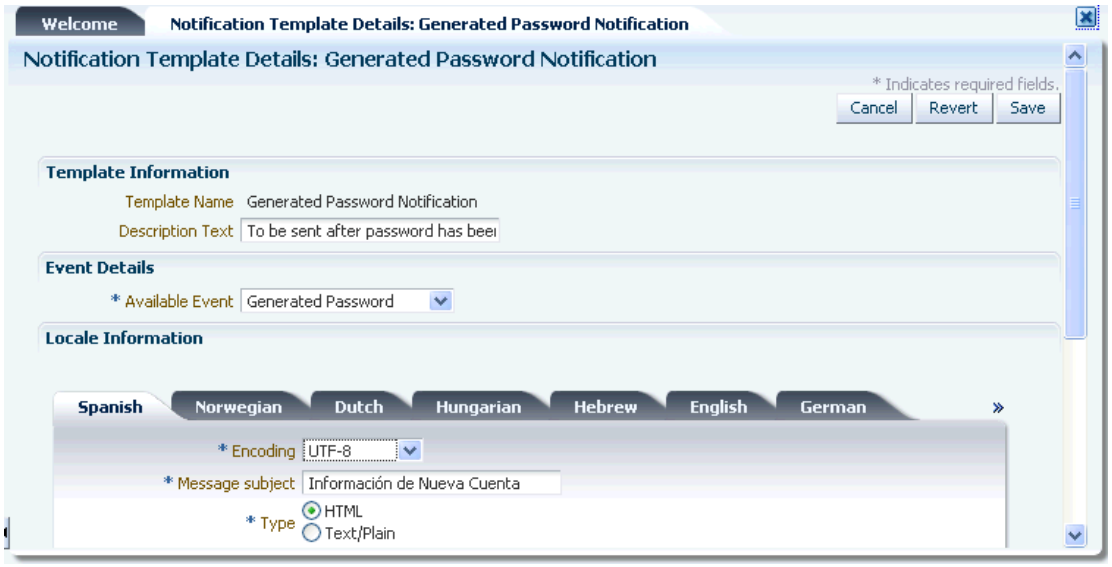


3.4 Modifying a Notification Template

To modify a notification template:

1. Log in to the Oracle Identity Administration.
2. Click the **System Management** tab and then click the **Notification** tab.
3. Click the icon next to the **Search** field. All the existing notification templates are displayed on the left pane. Select the template that you want to modify. Figure 3–5 shows the details of a notification template.

Figure 3–5 Notification Template Modification



4. Change the values that you want to and click **Save.**
5. A message is displayed confirming the modification of the notification template. Click **OK.**

3.5 Deleting a Notification Template

To delete a notification template:

1. Log in to the Oracle Identity Administration.
2. Click the **System Management** tab and then click the **Notification** tab.
3. Click the icon next to the **Search** field. All the existing notification templates are displayed on the left pane. Select the template that you want to delete.
4. From the Actions list, click **Delete.** A message is displayed prompting you to confirm the delete the operation. Click **OK.** A message is displayed confirming the delete operation.

3.6 Adding and Removing Locales from a Notification Template

To add locales to a notification template:

1. Log in to the Oracle Identity Administration.
2. Click the **System Management** tab and then click the **Notification** tab.
3. Click the icon next to the **Search** field. All the existing notification templates are displayed on the left pane. Select the template that you want to add a locale to.
4. From the Actions list, select **Add Locale.** The Add Locale page is displayed. In the Locale Name field, click the icon next to the Locale Name field to select a locale from a list. After selecting the locale, click **Confirm.** Click **Next.** The Locale Information page is displayed and the locale that you added is displayed as a tab in the page.

5. In the Locale Information section, specify values for all the fields as mentioned in step 6 of "Creating a Notification Template" on page 3-5 and then click **Save**. The locale is added to the template.

> **Note:** Notification can be sent in all the locales that are added to the notification template. A user receives notification in the same locale specified in the user preferences. If a locale is not specified in the user preferences, then the notification is sent in the default locale. The default locale is to be specified in the PTY table in Oracle Identity Manager database at the time of installation.

To remove locales from a notification template:

1. In the left pane of the Oracle Identity Administration, select the template from the search results table, and click **Remove Locale** from the Actions list. Alternatively, you can right-click the template, and select Remove Locale.
2. On the Remove Locale page, click the icon next to the Locale Name field to select a locale from a list . Remember, you can remove a locale from a template only if that template contains multiple locales. You cannot remove a locale if it's the only one associated with the template. Click **Save.**
3. A message is displayed confirming the removal of the locale. Click **OK.**

> **Note:** You must not remove default locale to ensure that a notification is sent every time when there is no user preferred locale is set or when notification template does not contain a locale template matching to user preferred locale.

3.7 Configuring Notification for a Proxy

Use the following steps to configure notification for a proxy:

1. Configure a new Email IT resource.
2. Create a new end user. (For example, create a user Jane Doe.)
3. Create a second end user. (For example, create a user John Doe.)
4. Assign the Jane Doe user as a manager for John Doe.
5. Specify your email ID for John Doe, which enables you to receive notifications in your inbox.
6. Log in as Jane Doe and navigate to the Oracle Identity Manager Self Service.
7. Select **Profile**, **Proxies**. When the Proxies screen is displayed, add John Doe as a proxy for Jane Doe.

> **Note:** If you successfully added the proxy, you (John Doe in this case) will receive an email notification message similar to the following:
>
> "You have been made the proxy for Jane Doe [JANED] from April 7, 2010 12:00:00 AM to April 30, 2010 12:00:00 AM".

4

Administering System Properties

The system configuration service enables you to manage system properties used by Oracle Identity Manager. This service allows you to create, modify, delete, or search existing system properties depending on their roles.

System properties define the characteristics that control the behavior of Oracle Identity Manager. You can define the functionality of consoles such as the Oracle Identity Administration and Oracle Identity Manager Self Service by using system properties. For example, you can define the number of consecutive attempts the user can make to login to Oracle Identity Manager unsuccessfully before Oracle Identity Manager locks the user account. In other words, a system property is an entity by which you can control the configuration of Oracle Identity Manager.

This chapter discusses the following topics:

4.1 System Properties in Oracle Identity Manager

Table 4–1 lists and describes the default system properties in Oracle Identity Manager.

Table 4–1 Default System Properties in Oracle Identity Manager

Property Name	Description	Keyword	Default Value
Access Policy Revoke If No Longer Applies Enhancement	Determines if the Revoke if no longer applies flag in access policy is applicable. If the value is true, then this flag is applicable to child table data (entitlements) along with parent data. The user can determine if child data must be removed or retained when access policy no longer applies to user based on this flag. If the value if false, then child table data (entitlements) are always removed after access policy is no longer applied.	XL.AccessPolicyRevokeIfNoLonger AppliesEnhancement	FALSE
Allows access policy based provisioning of multiple instances of a resource	Determines if multiple instances of a resource can be provisioned to multiple target resources. When the value is false, provisioning multiple instances of resource object via access policy is not allowed. When the value is true, provisioning multiple instances of resource object via access policy is allowed.	XL.AllowAPBasedMultipleAccount Provisioning	false
Are challenge questions disabled in OIM	Determines if challenge questions are enabled or disabled when a user logs in to Oracle Identity Manager for the first time. When value is False, challenge questions are enabled. When value is True, challenge questions are disabled. This property is primarily used in the context of Oracle Adaptive Access Manager (OAAM) configuration. When the value is TRUE, the challenge questions are handled by OAAM.	OIM.DisableChallengeQuestions	FALSE
Compiler Path for Connectors	Specifies the Java home depending on the application server. **Note:** If the path of the JDK directory is not included in the System Path variable, then you must set the path of the JDK directory in the XL.CompilerPath system property. If this is not done, then an error is encountered during the adapter compilation stage of the process performed when you import an XML file by using the Deployment Manager.	XL.CompilerPath	

Table 4–1 (Cont.) Default System Properties in Oracle Identity Manager

Property Name	Description	Keyword	Default Value
Default Date Format	When creating reconciliation events by calling the APIs and date format is not passed as one of the arguments to the API, Oracle Identity Manager assumes that all the date field values are specified in Default Date Format.	XL.DefaultDateFormat	yyyy/mm/dd hh:mm:ss z
Default Policy for common name generation	Determines the common name generation policy to be picked while generation of common name.	XL.DefaultCommonNamePolicyImpl	oracle.iam.identity.usermgmt.impl.plugins.FirstNameLastNamePolicy
Default policy for username generation	Determines the username policy to use when generating a username.	XL.DefaultUserNamePolicyImpl	oracle.iam.identity.usermgmt.impl.plugins.DefaultComboPolicy
Default user name domain	This property is used by the DefaultComboPolicy to generate a user name in e-mail format.	XL.UserNameDomain	oracle.com
Direct Provisioning vs. Request for Access Policy Conflicts	By default, the value of this property is TRUE. If a user has multiple access policies and these policies provision a particular resource multiple times, and at least one policy specifies that the resource can be provisioned directly, then the resource is provisioned without creating a request. Setting this property to FALSE specifies that conflicts are resolved by creating a request for the resource, which are not provisioned directly. If there are no conflicts, then resources are provisioned based on what is defined in the access policy.	XL.DirectProvision	TRUE
Does user have to provide challenge information during registration	If the value is TRUE, then users will have to provide challenge information during registration.	PCQ.PROVIDE_DURING_SELFREG	TRUE
Duplicate challenge responses allowed	This property is used to indicate whether or not duplicate challenge responses are allowed.	XL.IsDupResponsesAllowed	FALSE
Email Server	Name of the e-mail server. **Note**: After modifying the Email Server system property value, you must restart the server for the change to take effect.	XL.MailServer	Email Server
Enable exception reports	This property is used to enable the exception reporting feature. Exception reporting is enabled only if the value is set to TRUE.	XL.EnableExceptionReports	FALSE

Table 4–1 (Cont.) Default System Properties in Oracle Identity Manager

Property Name	Description	Keyword	Default Value
Enable disabled resource instances when a user is enabled	If the value is TRUE, then the disabled resource instances are enabled when a user is enabled.	XL.EnableDisabledResources	TRUE
Force Password Change at First Login	This system property is not used in Oracle Identity Manager 11*g* Release 1 (11.1.1). Setting this property has no effect.	XL.ForcePasswordChangeAtFirstLogin	TRUE or FALSE The default value for this property is FALSE if the user is created by self registration and TRUE if the user is created by any other method.
Force to set questions at startup	When the user logs into the Administrative and User Console for the first time, the user must set the default questions for resetting the password.	PCQ.FORCE_SET_QUES	False
Indicates if referential integrity is enabled in target LDAP directory	The value of this property is TRUE if referential integrity in target LDAP directory is turned on. The value of this property is FALSE if referential integrity in target LDAP directory is turned off.	XL.IsReferentialIntegrityEnabledInLDAP	FALSE
Is Self-Registration Allowed	If the value is TRUE, then the users are allowed to self-register.	XL.SelfRegistrationAllowed	TRUE
LDAP Reservation Plugin	This property determines the LDAP reservation plugin implementation to be picked up for reservation of user attributes.	XL.LDAPReservationPluginImpl	oracle.iam.identity.usermgmt.impl.plugins.reservation.ReservationInOID
Maximum Number of Login Attempts	Determines how many consecutive times the user can attempt to login to Oracle Identity Manager unsuccessfully before Oracle Identity Manager locks the user account. **Note**: If the user account is locked, then it can be unlocked by any one of the following ways: ■ Resetting the password by using Forgot Password ■ Unlocking the user by the delegated administrator ■ Automatic unlocking after the expiry of the lock period, which is done using the Automatically Unlock User scheduled task that runs daily	XL.MaxLoginAttempts	10

Table 4–1 (Cont.) Default System Properties in Oracle Identity Manager

Property Name	Description	Keyword	Default Value
Maximum Number of Password Reset Attempts	Determines how many consecutive times the user can attempt to reset the password unsuccessfully before Oracle Identity Manager locks the user account. **Important**: When the user account is locked, the user cannot unlock it. If this occurs, then contact the system administrator.	XL.MaxPasswordResetAttempts	3
Minimum length of challenge response	This property is used to set the minimum length of answers to challenge questions.	XL.ResponseMinLength	0
Number of Correct Answers	This value represents how many questions the user must answer correctly to reset user password.	PCQ.NO_OF_CORRECT_ANSWERS	3
Number of Questions	Sets the number of questions that must be completed by a user who is using the Web Application to reset the user's password.	PCQ.NO_OF_QUES	3 **Note:** The value set for PCQ.NO_OF_QUES must not be less than the value set for PCQ.NO_OF_CORRECT_ANSWERS.
Organization Delete/Disable Action	If this property is set to TRUE, then users can disable/delete the organization even if the organization contains users and suborganizations. If this property is FALSE, then users cannot disable/delete the organization if the organization contains users and suborganizations. The default value is FALSE.	ORG.DisableDeleteActionEnabled	FALSE
Organization Process Inheritance	If a resource is added to an organization as permitted resource, then by setting this property to TRUE, the same resource is automatically added as the permitted resource for suborganizations.	XL.OrganizationProcessInherit	TRUE
Organization Process Restriction	This property is for internal use by Oracle Identity Manager. You must not use this property.	XL.OrganizationProcessRestrict	FALSE

Table 4–1 (Cont.) Default System Properties in Oracle Identity Manager

Property Name	Description	Keyword	Default Value
Organization Self-Serviceable	Determines whether the default value for a process is self-serviceable and if it is set or not. This is used to determine which resources can be self requested. This is same as selecting the option from Oracle Identity Manager Design Console. The only difference is that by using this system property, it is allowed for a particular organization.	ORG.SELF_SERVICEABLE_DEFAULT	FALSE
Pending Cancelled Tasks	If this property is set to TRUE and tasks are configured to allow cancellation while they are pending, then these tasks are moved to Pending Cancelled (PX) status if the corresponding process instance is cancelled. If the property is set to FALSE, then tasks are moved to Cancelled (X) status when corresponding process instance is cancelled. Note that process instances are called by Oracle Identity Manager when the corresponding resource instances are revoked.	XL.PendingCancelled	true
Period to Delay User Delete	This property is used to specify the time period before deleting a user. When this property is set and a user is deleted, the user's state is changed to disabled and "automatically delete on date" is set to current date plus the delay period.	XL.UserDeleteDelayPeriod	0
Property dictates whether database name will be displayed	If the value is TRUE, then the database name is displayed on the Design Console.	XL.TOOLBAR_DBNAME_DISPLAY	TRUE
Property to indicate day limit set for pending approvals	Used prior to implementation of the Separation of active/non-active task feature to specify the duration for which the pending approval tasks would be fetched. Used at the API level to get the Pending approval related counters. **Note:** Do not use this property. It is retained in this release for internal use only. It will be removed in a future release of Oracle Identity Manager.	XL.OpenTask.DayLimit	30

Table 4–1 (Cont.) Default System Properties in Oracle Identity Manager

Property Name	Description	Keyword	Default Value
Property to indicate the duration in months of open tasks and pending approvals	**Note:** Do not use this property. It is retained in this release for internal use only. It will be removed in a future release of Oracle Identity Manager.	XL.OpenTasksPendingApprovalsDuration	3
Property to indicate whether the auditing engine should send a JMS message	When the value of this property is set to True and the XL.UserProfileAuditDataCollection property is set to an audit data collection level, then the account reconciliation performs the matching in the database layer at a batch-level and performs the event action by using the provisioning APIs. This in turn triggers the audit event handlers for account reconciliation. For information about account reconciliation, see "Account Reconciliation" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager.* **Note:** This property is for internal use by Oracle Identity Manager. You must not use this property.	XL.SendAuditJMSMessage	false
Proxy User Email Notification	The corresponding PTY_VALUE is the e-mail definition name that is sent when a proxy user is created. User gets a notification e-mail when the user is made the proxy for some other user.	XL.ProxyNotificationTemplate	Notify Proxy User
Recon Batch Size	This property is used to specify the batch size for reconciliation. You can specify 0 as the value for this to indicate that the reconciliation will not be performed in batches. **Note:** You must restart Oracle Identity Manager after setting this property.	OIM.ReconBatchSize	500
Record Read Limit	Sets the maximum number of records that can be displayed in a query result set in the Administrative and User Console.	XL.READ_LIMIT	500
Request Notification Level	This property indicates whether or not notification is sent to the requester and beneficiary when a request is created or the request status is changed. When the value of this property is 0, then the notification feature is disabled. When the value is 1, then the notification feature is enabled.	RequestNotificationLevel	0

Table 4–1 (Cont.) Default System Properties in Oracle Identity Manager

Property Name	Description	Keyword	Default Value
Reset with generated password	If a user's password is to be reset, then this property determines how the password is to be reset by the delegated administrator. If this property is set to true, then the password is always automatically generated. If set to false, then an additional option of setting the password manually is provided.	XL.ResetWithGeneratedPwd	TRUE
Search Stop Count	This property determines the maximum number of records that are displayed in the advanced search result. If the search criteria specified returns more number of records than that value of this property, then the number of records displayed is limited to this value. In addition, a warning is displayed stating that the results exceed maximum counts and you must refine your search with additional attributes.	XL.IDADMIN_STOP_COUNT	300
Shows tasks assigned to group users with least load only	If the value is TRUE, then the tasks are assigned to group users with least load only when the assignment type is Group User With Least Load.	XL.ShowTaskAssignedToGroupUserOnly	FALSE
Specifies the LDAP container mapper plug-in to be used	When Oracle Identity Manager is installed with LDAP synchronization enabled, this plug-in determines in which container users and roles are to be created. Value of this system property indicates the default Oracle Identity Manager plug-in name used for computing the container values. If the default plug-in does not meet the requirement, then you can define your own plug-in to determine the container and specify the name of the plug-in in this system property. **Note:** For information about this plug-in, see "Developing LDAP Container Rules" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager*.	LDAPContainerMapperPlugin	oracle.iam.ldapsync.impl.DefaultLDAPContainerMapper

Table 4–1 (Cont.) Default System Properties in Oracle Identity Manager

Property Name	Description	Keyword	Default Value
URL for challenge questions modification	When a user is locked, an automatic unlock occurs after a prescribed time period. This property defines that time period in seconds. Therefore, for example, if a user account is locked and the value of this property is 86400 seconds (one day), then the account is automatically unlocked after one day. The value of this property is the URL within OAAM that handles the challenge questions. For example: http://*OAAM_HOST*:*OAAM_PORT*/*OAAM_SERVER*/userPreferences.do?showView=registerQuestions	OIM.ChallengeQuestionsModificationURL	NONE
URL for change password	This property is used in combination with the property OIM.DisableChallengeQuestions. The value of this property is the URL within OAAM that handles the change password functionality. For example: http://*OAAM_HOST*:*OAAM_PORT*/*OAAM_SERVER*/userPreferences.do?showView=changePassword	OIM.ChangePasswordURL	NONE
URL for forgot password	This property is used in combination with the property OIM.DisableChallengeQuestions. The value of this property is the URL within OAAM that handles the forgot password functionality. For example: http://*OAAM_HOST*:*OAAM_PORT*/*OAAM_SERVER*/forgotPassword.do	OIM.ForgtoPasswordURL	NONE
Unlock Account Automatically After Time Period	This property is used to automatically unlock user accounts after the specified time period.	XL.UnlockAfter	86400 seconds, which is 1 day
Use Row Restriction	**Note:** This property is for internal use by Oracle Identity Manager. You must not use this property.	XL.UseRowRestriction	FALSE

Table 4–1 (Cont.) Default System Properties in Oracle Identity Manager

Property Name	Description	Keyword	Default Value
Use of Default Questions	For customers who have customized their UI to allow end-users to set their own challenge questions, this property determines whether the user must select challenge questions from a predefined list in the Web Application, or if users are required to provide their own questions. **Note**: Functionality that allows end-users to set their own challenge questions is not supported in the standard out-of-the-box user interface.	PCQ.USE_DEF_QUES	TRUE
Use semicolon as delimiter in API parameters	This property is used to specify whether or not semicolon should be used as a delimiter to the API input parameter values. Some APIs accepted string input values that are separated by semicolon. This has been changed to use a vertical bar "|" instead. To keep backward compatibility, this new property can be used to go back to using semicolons. The default value is FALSE signifying the usage of "|". When set to TRUE, the input for those APIs are accepted with semicolon as separator.	XL.UseSemiColonAsDelimiter	FALSE
User Attribute Reservation Enabled	This property is used to enable user attribute reservation.	XL.IsUsrAttribReservEnabled	TRUE
User Id reuse property	Determines whether a deleted user account can be reused. To reuse a deleted user account, assign this property a value of TRUE and drop the unique index for the USR_LOGIN column in the USR table and create a nonunique index. To prevent a user account from being reused, assign this property a value of FALSE.	XL.UserIDReuse	FALSE
User Language	The user.language value is configured during installation for Locale handling at server side.	user.language	en
User Region	The user.region value is configured during installation for Locale handling at server side.	user.region	US
User Variant	The user.variant value is configured during installation for locale handling at server side.	user.variant	

Table 4–1 (Cont.) Default System Properties in Oracle Identity Manager

Property Name	Description	Keyword	Default Value
User profile audit data collection level	This property controls the user profile data that is collected for audit purpose when an operation is performed on the user, such as creation, modification, or deletion of a user, role grants or revokes, and resource provisioning or deprovisioning. Depending upon the property value, such as Resource Form or None, the data is populated in the UPA table. The audit levels are specified as values of this property. The supported levels are: ■ **Process Task:** Audits the entire user profile snapshot together with the resource lifecycle process. ■ **Resource Form:** Audits user record, role membership, resource provisioned, and any form data associated to the resource. ■ **Resource:** Audits the user record, role membership, and resource provisioning. ■ **Membership:** Only audits the user record and role membership. ■ **Core:** Only audits the user record. ■ **None:** No audit is stored.	XL.UserProfileAuditDataCollection	Resource Form
XL.SoDCheckRequired	This property indicates whether or not Segregation of Duties (SoD) check is required.	XL.SoDCheckRequired	FALSE

Table 4–1 (Cont.) Default System Properties in Oracle Identity Manager

Property Name	Description	Keyword	Default Value
Xellerate User resource provision mode	This property determines whether provisioning of the Xellerate User resource to the user's organization occurs in the database layer through stored procedure, or in the Java layer via Event Handlers. **Note:** See *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about Event Handlers. This property has the following allowed values: ■ **DB:** Provisioning of the Xellerate User resource to the user's organization occurs in the database layer through stored procedure. This in turn does not trigger any further process. Therefore, custom tasks associated with the Xellerate User provisioning process that is associated with the Xellerate User resource does take place. ■ **Java:** Provisioning of the Xellerate User resource to the user's organization occurs in the database layer via Event Handlers. Custom tasks associated with the Xellerate User provisioning process that is associated with the Xellerate User resource takes place. This is applicable to the upgrade scenario, where you have your own tasks associated with provisioning processes in earlier releases of Oracle Identity Manager, and you want them to run even after 11*g* upgrade. In such scenario, set the value of this property value to JAVA.	XL.UserResource.ProvisionMode	DB

Table 4–1 (Cont.) Default System Properties in Oracle Identity Manager

Property Name	Description	Keyword	Default Value
Role Grants Trigger Requests	If this property is present and the value is true, then it means that role grants go through requests, which are subject to approval. It does not enable or disable SOD checks. If the value of this property is false, then role grants are performed without going through requests. **Note:** After modifying the Role Grants Trigger Requests system property value, you must restart Oracle Identity Manager for the change to take effect.	XL.RM_REQUEST_ENABLED	false
Role Assignment Template Name	If the RM_REQUEST_ENABLED property is not present or its value is false, then RM_ROLE_ASSIGN_TEMPLATE has no effect. If the value of RM_REQUEST_ENABLED is true and RM_ROLE_ASSIGN_TEMPLATE is not present, or has no legal template name as a value, then an error message is displayed and no role grant takes place. There is no default request template. If the value of RM_REQUEST_ENABLED is true and a legal request template name is specified as the value of RM_ROLE_ASSIGN_TEMPLATE, then that request template is used for the role grant.	XL.RM_ROLE_ASSIGN_TEMPLATE	

Table 4–1 (Cont.) Default System Properties in Oracle Identity Manager

Property Name	Description	Keyword	Default Value
Evaluate LDAP Container Rules for Entity Modification	If the property value is TRUE, then the LDAP container rules defined in LDAPContainerRules.xml are evaluated for entity modification. However, if none of the rules match, then the default container is not returned. The original parent container of the entity is returned, which means that there is no change in the entity DN. For more information, see "Configuring LDAP Container Rules" in *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager*. If the property value is FALSE, then the LDAP container rules defined in LDAPContainerRules.xml are not evaluated. The entity DN does not change. **Note:** This property only applies to a modification scenario and not to the entity creation scenario.	LDAPEvaluateContainerRulesForModify	FALSE

Table 4–1 (Cont.) Default System Properties in Oracle Identity Manager

Property Name	Description	Keyword	Default Value
Send Notification for Reconciliation	Determines if notification is sent to the user when the user login and password are generated in postprocess event handler for user creation via trusted source reconciliation. If the value is set to true, then notification is sent when user login and password are generated in postprocess event handler for user creation via trusted source reconciliation. If the value is set to false, then notification is not sent when user login and password are generated in postprocess event handler for user creation via trusted source reconciliation.	Recon.SEND_NOTIFICATION	true
Whether or not email should be validated for uniqueness	This property is available in an Oracle Identity Manager 11*g* Release 1 (11.1.1) deployment that has been upgraded from an earlier release of Oracle Identity Manager. If the value of this property is FALSE, then Email Uniqueness check is not performed by Oracle Identity Manager. If the value if TRUE, then Email Uniqueness check is performed by Oracle Identity Manager. **Note:** If this property is not present, then Email Uniqueness check is performed by Oracle Identity Manager.	OIM.EmailUniqueCheck	TRUE
Enable 9.x permission checking when searching organizations	This property controls the display of organizations in the organization search performed by the user. When XL.EnableOrgPermissionCheck = false, all the organizations are displayed when the user searches for organizations. When XL.EnableOrgPermissionCheck = true or the property is removed, only the organizations assigned to the user performing the search are displayed.	XL.EnableOrgPermissionCheck	TRUE

Oracle Identity Manager provides a set of system properties that are not present in the PTY table by default. You can add these system properties to the PTY table by using the Administrative and User Console, and then use the properties to change some of the default settings in Oracle Identity Manager. For example, if you want to save the Deployment Manager XML file that is generated at the time of Generic Technology Connector (GTC) creation, then you can configure the GTC Auto Import system property to do so.

See Also: *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for more information about GTC

Table 4–2 lists the system properties you can add to the PTY table:

Table 4–2 Nondefault System Properties

Property Name	Description	Keyword	Sample Value
OIM Database Query Retry Attempts	Number of times SQL queries to be retried for handling Oracle RAC failures. In the absence of this property in the PTY table, SQL queries for handling Oracle RAC failures are retried three times by default.	OIM.DBQueryRetryAttempts	5
OIM Database Query Retry Interval	Time in seconds after which each SQL retry takes place for Oracle RAC failures. In the absence of the property in the PTY table, SQL query occurs after every 7 seconds by default.	OIM.DBQueryRetryInterval	10 seconds
JDBC Connection Retry Attempts	Number of times Oracle Identity Manager retries to get a connection when the JDBC connection fails. In the absence of this property in the PTY table, the JDBC connection is retried three times by default.	OIM.JDBCConnectionRetryAttempts	5 When the value is 0, it means no retry.

Table 4–2 (Cont.) Nondefault System Properties

Property Name	Description	Keyword	Sample Value
JDBC Connection Retry Interval	Time in seconds between each JDBC connection retry. In the absence of this property in the PTY table, each JDBC connection retry occurs at an interval of 7 seconds.	OIM.JDBCConnectionRetryInterval	10 seconds
GTC Auto Import	Based on the value of this property, the DM xml that is generated while GTC creation can be saved to a directory. The default value of this property is true. When the value of this property is set to "False", then while creating GTC, the DM xml (the xml that GTC creates and imports using Deployment Manager internally while GTC creation) created by the GTC framework is stored in the following directory: O*IM_HOME*/GTC/XMLOutput The naming convention followed for the DM xml is: *GTCNAME_CURRENTDATE_TIMESTAMP* created using date format "yyyy-MM-dd-HH-mm-ss".xml For example: TRUSTEDCSV_2009-02-05-22-41-11.xml	XL.GTCAutoImport	False
FA cookie-http-only flag turned on	This property is seeded using the RoleCategorySeedMXBeanImpl MBean by FA provisioning system. By default, the value of this property is true. If you want to run Oracle Identity Manager in non-HTTP cookie-only environment, then set the value of this property to false.	FA.CookieHTTPOnly	true

4.2 Creating and Managing System Properties

This section discusses the following topics:

- Creating System Properties
- Purging Cache
- Searching for System Properties
- Modifying System Properties
- Deleting System Properties

4.2.1 Creating System Properties

Oracle Identity Manager provides you with the capability of creating your own system properties. You can create system properties according to your requirements if you choose not to use any of the predefined system properties listed in "System Properties in Oracle Identity Manager" on page 4-1.

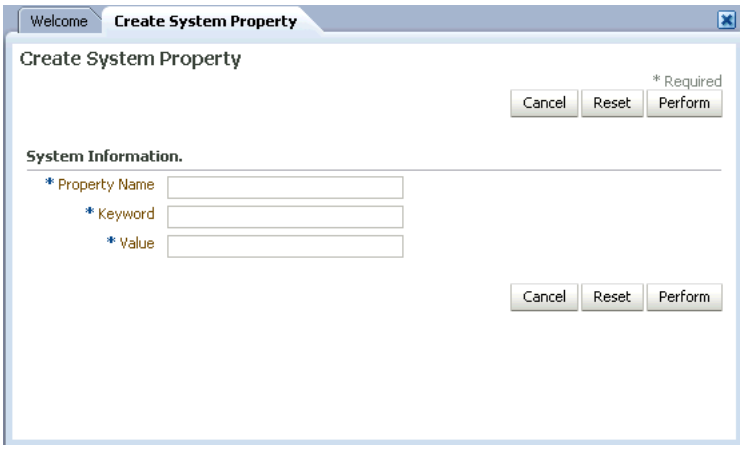
You can create a system property by using the Create System Property page in Oracle Identity Manager Administration. You can open this page only if you are authorized to create system properties.

While creating a system property, you specify values for the Property Name, Keyword, and Value fields. These values are saved in the PTY table of the Oracle Identity Manager database.

To create a system property:

1. Click the **System Management** tab, and then click **System Configuration.**
2. On the left pane, from the Actions menu, select **Create.** Alternatively, you can click the create icon on the toolbar. The Create System Property page is displayed, as shown in Figure 4–1:

Figure 4–1 Create System Property Page



3. On the Create System Property form, enter details of the system property. Table 4–3 describes the fields of this form.

Table 4–3 Fields of the Create System Property Form

Field	Description
Property Name	Enter a name of the system property.
Keyword	Enter a unique ID for the system property. You can enter the keyword in any format. **Note:** The property name can be translated to various locales, but the keyword cannot be translated.
Value	Enter a value for the system property, for example, 4.

Note: Any special character (.) is not allowed in the beginning or end of Keyword fields while creating or updating a system property. In case of Value fields, special characters are allowed in the beginning or in the end.

4. Click **Perform** to create the system property. A message confirming that the system property has been created is displayed. For the new system property that is created, by default, the data level is set to 2 and login_required is set to true.

   After the system property is created, you can use SQL to set the values for the following system property fields that are automatically added to the system property recorded in the PTY table of the database:

   - **Data Level:** Every system property has a data level associated with it. The data level field determines the kind of operations that can be performed on a system property. Data levels are a means of specifying the operations that can be performed on a system property. For example, a data level value of 1 for a system property indicates that the system property can neither be modified nor deleted. The default value of this field is 2.

     The data level field cannot be modified by using the UI. It can only be modified by using a SQL script. Table 4–3 lists and describes the various data levels associated with a system property.

Table 4–4 Data Levels Associated with a System Property

Data Level	Description
0	Indicates that the system property can be modified or deleted
1	Indicates that the system property cannot be modified or deleted
2	Indicates that the system property can only be modified
3	Indicates that a system property can only be deleted

   - **Log In Required:** This field specifies whether or not a login is required to access the system property. The default value of this field is 1, which means that a login is required to access the system property. You can change the value of this field to 0 by using a SQL script.
   - **LKU_KEY:** This field determines the set of values that can be specified in the Value field of a system property. The default value of this field for a newly created system property is null.

     Oracle Identity Manager represents sets using two tables, the LKU and LKV tables. The LKU table holds keys that identify each set. The LKV table defines the members of each set, in which each row in the LKV table uses one column to identify the set (a LKU_KEY column in the LKU table), and another column to declare a value that will be a member of that set.

     LKU_KEY is a column in the LKU table of the Oracle Identity Manager database. For a system property with non-null value in the LKU_KEY column, you can insert the values in this column from a predefined set of values that are in the LKV table. This is done by using a SQL script to include any valid LKU_KEY column value from the LKU table to associate multiple values with the system property. See step 7 for more details.

5. If you want to modify the data level of the system property, then run the following SQL statement:

UPDATE PTY SET PTY_DATA_LEVEL=DATA_LEVEL_VALUE WHERE PTY_KEYWORD = SYSTEM_PROPERTY_KEYWORD;

In this SQL statement:

- *DATA_LEVEL_VALUE* is any value listed in the Data level column of Table 4–4.
- *SYSTEM_PROPERTY_KEYWORD* is the unique ID for the system property that you entered in the Keyword field in Step 3.

Note: Any special character (.) is not allowed in the beginning or end of Keyword fields while creating or updating a system property. In case of Value fields, special characters are allowed in the beginning or in the end.

6. If you want to modify the value of the Log In Required field, then run the following command:

   UPDATE PTY SET PTY_LOGINREQUIRED=LOGIN_REQUIRED_VALUE WHERE PTY_KEYWORD = SYSTEM_PROPERTY_KEYWORD;

   In this command:

   - *LOGIN_REQUIRED_VALUE* can take a value of either 0 or 1.

     If a login is required for accessing the system property, then enter `1`. Otherwise, enter `0`.

   - *SYSTEM_PROPERTY_KEYWORD* is the unique ID for the system property that you entered in the Keyword field in Step 3.

7. If you want to define the set of values that can be specified in the Value field of a system property, then run the following commands:

   a. Run the following command to insert a row into the LKU table:

   ```
   INSERT INTO LKU (LKU_KEY, LKU_LOOKUP_KEY, LKU_TYPE, LKU_GROUP,
   LKU_REQUIRED, LKU_TYPE_STRING_KEY, LKU_FIELD, LKU_DATA_LEVEL, LKU_CREATE,
   LKU_CREATEBY, LKU_UPDATE, LKU_UPDATEBY, LKU_NOTE, LKU_ROWVER) VALUEs
   (LKU_KEY_VALUE, LKU_LOOKUP_KEY_VALUE,...);
   ```

   For example, if you want to update a set of values for the Title field, then run the following INSERT statement:

   ```
   INSERT INTO LKU (LKU_KEY, LKU_LOOKUP_KEY, LKU_TYPE, LKU_GROUP,
   LKU_REQUIRED, LKU_TYPE_STRING_KEY, LKU_FIELD, LKU_DATA_LEVEL, LKU_CREATE,
   LKU_CREATEBY, LKU_UPDATE, LKU_UPDATEBY, LKU_NOTE, LKU_ROWVER) VALUES (201,
   Title, ...);
   ```

   Here, *LKU_KEY_VALUE* is 201 that uniquely identifies the record in the LKU table, and *LKU_LOOKUP_KEY_VALUE* is Title.

   Note: You must insert a record in the LKU table before inserting any record in the LKV table because the value of LKU_KEY is used in the LKV insert statement.

   b. Run the following command to insert a row into the LKV table:

   ```
   INSERT INTO LKV (LKV_KEY, LKU_KEY, LKV_ENCODED, LKV_DECODED, LKV_LANGUAGE,
   ```

```
LKV_COUNTRY, LKV_VARIANT, LKV_DISABLED, LKV_DATA_LEVEL, LKV_CREATE,
LKV_CREATEBY, LKV_UPDATE, LKV_UPDATEBY, LKV_NOTE, LKV_ROWVER) VALUES
(LKV_KEY_VALUE, LKU_KEY_VALUE, LKV_ENCODED_VALUE, LKV_DECODED_VALUE, ...);
```

For example, to define the set of values for the Title field as Mr, Ms, and Dr, run the following INSERT statements:

```
INSERT INTO LKV (LKV_KEY, LKU_KEY, LKV_ENCODED, LKV_DECODED, LKV_LANGUAGE,
LKV_COUNTRY, LKV_VARIANT, LKV_DISABLED, LKV_DATA_LEVEL, LKV_CREATE,
LKV_CREATEBY, LKV_UPDATE, LKV_UPDATEBY, LKV_NOTE, LKV_ROWVER) VALUES (1001,
201, 'Ms', 'Miss', ...);

INSERT INTO LKV (LKV_KEY, LKU_KEY, LKV_ENCODED, LKV_DECODED, LKV_LANGUAGE,
LKV_COUNTRY, LKV_VARIANT, LKV_DISABLED, LKV_DATA_LEVEL, LKV_CREATE,
LKV_CREATEBY, LKV_UPDATE, LKV_UPDATEBY, LKV_NOTE, LKV_ROWVER) VALUES (1002,
201, 'Mr', 'Mister', ...);

INSERT INTO LKV (LKV_KEY, LKU_KEY, LKV_ENCODED, LKV_DECODED, LKV_LANGUAGE,
LKV_COUNTRY, LKV_VARIANT, LKV_DISABLED, LKV_DATA_LEVEL, LKV_CREATE,
LKV_CREATEBY, LKV_UPDATE, LKV_UPDATEBY, LKV_NOTE, LKV_ROWVER) VALUES (1003,
201, 'Dr', 'Doctor', ...);
```

In this example:

- *LKV_KEY_VALUE* is 1001, 1002, and 1003 respectively that uniquely identifies the records in the LKV table
- *LKV_ENCODED_VALUE* is Ms, Mr, and Dr respectively
- *LKV_DECODED_VALUE* is Miss, Mister, and Doctor respectively

See Also: Chapter 13, "Configuring User Attributes" for more information about the LKU and LKV tables

c. Run the following command to update the value of the LKU_KEY column in the PTY table:

UPDATE PTY SET LKU_KEY=LKU_KEY_COLUMN_IN_THE_LKV_TABLE WHERE PTY_KEYWORD = SYSTEM_PROPERTY_KEYWORD;

In this command:

- *LKU_KEY_COLUMN_IN_THE_LKV_TABLE* is the value of the LKU_KEY column in the LKV table.
- *SYSTEM_PROPERTY_KEYWORD* is the unique ID for the system property that you entered in the Keyword field in Step 3.

Note: If you want to view the changes in Oracle Identity Manager Advanced Administration, then you must run purge cache immediately after modifying a system property by using Microsoft SQL.

4.2.2 Purging Cache

Whenever you make any change to a system property by using any method other than from the Advanced Administration, you must run purge cache to get the changes reflected in Oracle Identity Manager:

To clear the server cache:

Note: Before running the PurgeCache utility, you must run the *DOMAIN_HOME*/bin/setDomainEnv.sh script.

1. Depending on the operating system being used, navigate to the following directory:
   - For Microsoft Windows:

     OIM_HOME\server\bin\
   - For UNIX:

     OIM_HOME/server/bin/
2. Run one of the following commands:
   - For Microsoft Windows:

     PurgeCache.bat *CATEGORY_NAME*
   - For UNIX:

     PurgeCache.sh *CATEGORY_NAME*

   The *CATEGORY_NAME* name argument represents the Oracle Identity Manager category name that is to be purged, for example, FormDefinition. To purge all the categories, pass a value of "All" to the PurgeCache utility. It is recommended to clear all the categories.

4.2.3 Searching for System Properties

Oracle Identity Manager Advanced Administration allows you to perform the following types of search operations for system properties:

- Performing a Simple Search
- Performing an Advanced Search

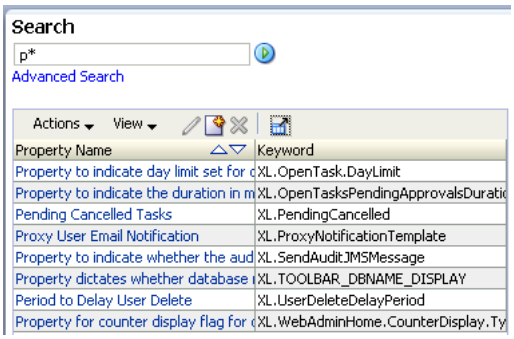
4.2.3.1 Performing a Simple Search

To perform a simple search for system properties:

1. In the Welcome page of Oracle Identity Manager Administration, under System Management, click **System Configuration**. Alternatively, you can click the **System Management** tab, and then click **System Configuration**.
2. In the left pane, enter a search criterion in the Search field for the system property that you want to search. You can include wildcard characters (*) in your search criterion.

   If you enter * in the Search field, then all the system properties are displayed. You can filter your search by combining characters with the wildcard characters. For example, to search all system properties starting with p, you can enter p* in the Search field.
3. Click the icon next to the Search field. A list of all system properties that meet the search criterion is displayed, as shown in Figure 4–2.

Figure 4–2 List of System Properties



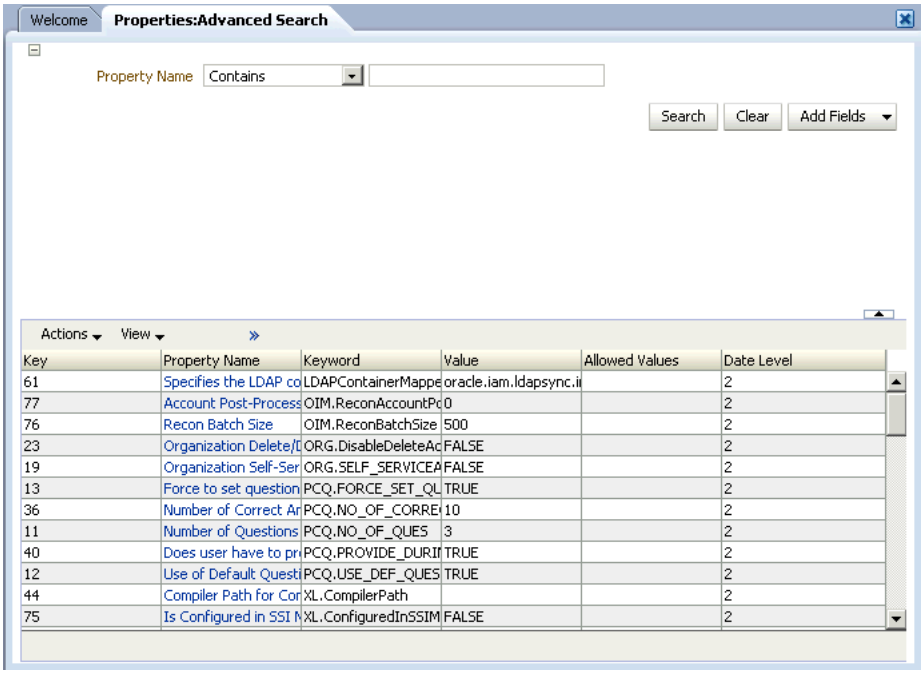
The search results table displays the system property names and keywords. You can click a property name to open the details for the system property.

4.2.3.2 Performing an Advanced Search

To perform an advanced search for system properties:

1. In the left pane of the System Configuration section, click **Advanced Search**. The Properties: Advanced Search page is displayed.
2. In the list adjacent to the Property Name field, select a search condition.
3. In the Property Name field, enter a search criterion for the system property that you want to search. You can include wildcard characters (*) in your search criterion. Select the search conditions in the list adjacent to the fields. The search conditions include Not Contains, Not Begins With, Not Equals, Equals, Ends With, Not Ends With, Contains, and Begins With.
4. Click **Search**. The system properties that match the search criterion are displayed in the search results table, as shown in Figure 4–3:

Figure 4–3 Advanced Search Result



The search result displays key, property name, keyword, value, allowed value, and date level for each system property.

4.2.4 Modifying System Properties

A modify operation lets you modify an existing system property by using the System Property Detail page. If any system property is tagged with a set of allowed values, then you must specify a value from that set only.

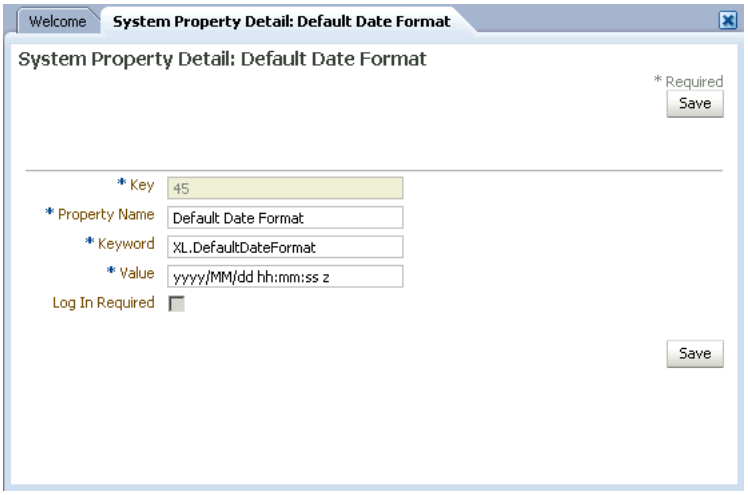
> **Note:** While modifying a system property that has multiple values attached to it, a message is displayed if the modified value is not part of the values defined in the LKU and LKV tables. For information about associating multiple values to a system property, see step 7 of "Creating System Properties" on page 4-18.

To modify a system property:

1. Search for the system property that you want to modify.
2. In the Property Name column of the search results table, click the system property that you want to modify.

   The System Property Details page is displayed, as shown in Table 4–4.

Figure 4–4 System Property Detail Page



3. If you want to modify the Property Name, keyword, and the Value fields, then perform Step 3 of "Creating System Properties" on page 4-18.
4. If you want to modify the Log In Required field, then perform Step 6 of "Creating System Properties" on page 4-18.
5. If you want to modify the Allowed Values column, then perform Step 7 of "Creating System Properties" on page 4-18.
6. If you want to modify the data level associated with a system property, then perform Step 5 of "Creating System Properties" on page 4-18.
7. Click **Save** to save the changes made.

   A message confirming that the system property has been modified is displayed.

4.2.5 Deleting System Properties

To delete a system property:

> **Note:** You can delete a system property only if the data level of that system property is set to either 0 or 3. While deleting a system property, a message is displayed if the data level associated with the system property is not appropriate. For a description of the data levels, see Table 4–4, " Data Levels Associated with a System Property".

1. Click the **System Management** tab and then click **System Configuration.**
2. On the left pane, search for the system property that you want to delete.
3. In the Property Name column of the search results table, select the system property that you want to delete.
4. From the Actions menu, select **Delete**. A message is displayed asking for confirmation. Click **OK**.
5. A message is displayed confirming that the system property has been deleted. Click **OK**.

5

Importing and Exporting Data Using the Deployment Manager

The Deployment Manager is a tool for exporting and importing Oracle Identity Manager configurations. The Deployment Manager lets you export the objects that constitute the Oracle Identity Manager configuration. Usually, you use the Deployment Manager to migrate a configuration from one deployment to another, for example, from a test to a production deployment, or to create a backup of your system.

> **Important:** To use Deployment Manager, JRE 1.4.2 or a higher version must be installed on any computer that is running the Oracle Identity Manager Administrative and User Console.

You can save some or all of the objects in your configuration. This lets you develop and test your configurations in a test environment, and then import the tested objects into your production environment. You can export and import an object and all of its dependent and related objects at the same time. Alternatively, you can export and import each object individually.

The Deployment Manager allows you to retrieve configuration information from the source system, store the information in an XML file, and then import the information from the XML file to the target system. In Oracle Identity Manager 11*g* Release 1 (11.1.1), the Deployment Manager allows you to import data from the Oracle Identity Manager database, Meta Data Store (MDS) repository, or API repository. As a result, you can import all types of objects from these repositories, such as system properties, jobs, and scheduled tasks, which are not in the same repository. For example, you can import the scheduled tasks that are in the MDS repository instead of the database.

An object exported from one type of repository is imported to the same type of repository. For example, if a scheduled task is exported from the MDS repository, then the scheduled task is imported to the same repository, which is MDS, in the target system.

This chapter includes the following topics:

- Troubleshooting

5.1 Features of the Deployment Manager

The Deployment Manager helps you to migrate Oracle Identity Manager deployments from one server environment to another, such as from a testing environment to a staging environment, or from a staging environment to a production environment.

The Deployment Manager enables you to:

- Update individual components of a deployment in different test environments
- Identify objects associated with components to be exported, so that those resources can be included
- Provide information about exported files
- Add comments

The Deployment Manager handles the following types of information:

- Roles
- Organizations
- Access policies
- Attestation processes
- Authorization policies
- User metadata
- Roles and organization metadata
- Scheduled tasks
- Scheduled jobs
- IT resources
- Resource objects
- Lookup definitions
- Process forms
- Provisioning workflows and process task adapters
- Data object definitions
- Rules
- Notification templates
- Generic Technology Connector (GTC) providers
- Error codes
- System properties
- E-mail definitions
- Event Handlers
- Password policies
- Generic Technology Connectors
- IT resource definition

- Request templates
- Request datasets
- Approval policies
- Event handlers
- Password policies
- Prepopulation adapters
- Process definitions

The following are limitations of the Deployment Manager:

- **Merge Utility**: The Deployment Manager is not a merge utility.

  It cannot handle modifications done in both production and test environments. It replaces the object in the target system with that in the XML file.

- **Version Control Utility**: The Deployment Manager does not track versions of imported files, and does not provide rollback functionality.

  You can only use it as a means to move data between environments.

- **Code Moving**: The Deployment Manager does not move JAR files in the JavaTasks directory or other locations.

- **Custom Labels Move**: The Deployment Manager does not move labels defined in the customResources.properties file or the property files in the connectorResources directory. You must do this manually.

5.2 Exporting Deployments

You can export objects from your Oracle Identity Manager system and save them in an XML file. The Deployment Manager has an Export Wizard that lets you create your export file. Add objects by type, one type at a time, for example, roles, then forms, then processes, and so on.

If you select an object that has child objects or dependencies, you have the option to add them or not. After adding objects of one type, you can go back and add other objects to your XML files. When you have all the objects you want, the Deployment Manager saves them all at once in a single XML file.

Note: When user-defined fields are associated with a specific resource object, during the export process one of the following events can occur:

- If the user-defined fields contain values (entered information), then the Deployment Manager will consider them to be dependencies.
- If the user-defined fields contain no values (the fields are blank), then the Deployment Manager will not consider them to be dependencies.

To export a deployment:

1. Login to Oracle Identity Manager Administration.

2. On the Welcome Page, click **Export Deployment Manager File** under System Management. Alternatively, you can click the **System Management** tab, click **Deployment Manager**, and then click **Export**.

   The Deployment Manager opens and the Search Objects page of the Export Wizard is displayed.

   Note: To open the Deployment Manager by using Mozilla Firefox Web browser, an additional authentication dialog box might be displayed. Providing authentication in this dialog box allows access to the Deployment Manager. To avoid this additional authentication:

   1. In Mozilla Firefox Web browser, from the Tools menu, select **Options**. The Options dialog box is displayed.
   2. Click **Privacy**.
   3. Select the **Accept third-party cookies** option.
   4. Click **OK**.

   The additional authentication is not required when the Deployment Manager is opened by using Microsoft Internet Explorer, Google Chrome, and Apple Safari Web browsers.

   ---

3. On the Search Objects page, select an object type from the menu, and enter search criteria. If you leave the criteria field blank, an asterisk (*) is displayed automatically to find all the objects of the selected type.

   All the objects supported by Deployment Manager for migration are available for exporting. See "Features of the Deployment Manager" on page 5-2 for the list of objects supported by Deployment Manager for migration.

4. Click **Search** to find objects of the selected type.

   To select an object, select the option of the object.

5. Click **Select Children**.

   The Select Children page is displayed with the selected objects and all of their child objects.

6. Select the child objects that you want to export.

   To select or remove an item, select the appropriate option.

   Click **Back** to go to the Search Objects page.

7. Click **Select Dependencies**.

   The Select Dependencies page is displayed with any objects required by the selected objects.

8. Select the dependent objects that you want to export.

   To select or remove an item, select the option of the item.

   Click **Back** to go to the Select Children page.

9. Click **Confirmation**.

   The Confirmation page is displayed.

10. Ensure that all the required items are selected, then click **Add for Export**.

    After you click **Add for Export**, you can still add more items to this export file.

Select **Add More** and click **OK** to go to Search Objects Page to add more objects for export.

11. Use the wizard to add more items, or finish and exit the wizard. Select the appropriate option and click **OK**.

    If you select **Add more**, repeat Steps 2 through 7. Otherwise, the Export page is displayed.

    The Export page displays your current selections for export. Your selections have icons next to them that indicate what types of objects are selected. The Summary information pane shows the objects you are exporting. The Unselected Dependencies pane displays the list of dependent or child objects that you did not select for export.

12. Make any adjustments to your export file as follows:

    - Click **Reset** to clear the form.
    - Click **Legend** to see icon definitions.
    - Click **Add Objects** to restart the wizard and add more items to your export file.

    To remove an object from the Current Selections list:

    - Right-click the object to remove and select **Remove** from the shortcut menu. If the object has child objects, then select **Remove including children** from the shortcut menu to remove the child objects all at the same time.
    - Click **Remove** to confirm. If the object is a child or dependency of a selected item, then it is added to the Unselected Children or Unselected Dependencies list.

    To add an object back to the Current Selections list from the Unselected Children or Unselected Dependencies list,

    a. Right-click the object, and select **Add**.

    b. Click **Confirmation**.

       The Confirmation page is displayed.

    c. Click **Add for Export**.

13. Click **Export**.

    The Add Description dialog box is displayed.

14. Enter a description for the file.

    This description is displayed when the file is imported.

15. Click **Export**.

    The Save As dialog box is displayed.

16. Enter a file name.

    You can browse to find a location.

17. Click **Save**.

    The Export Success dialog box is displayed.

18. Click **Close**.

5.3 Importing Deployments

Objects that were exported into an XML file by using the Deployment Manager can be imported into Oracle Identity Manager by using the Deployment Manager. You can import all or part of the XML file, and you can import multiple XML files at once. The Deployment Manager ensures that the dependencies for any objects you are importing are available, either in the import or in your system. During an import, you can substitute an object you are importing for one in your system. For example, you can substitute a group specified in the XML file for a group in your system.

Note:

- If a user belongs to a group to which the Import menu item has been assigned, then that user must also have the necessary permissions for the objects that the user wants to import. Without these object-specific permissions, the Import operation fails. The user must be a Deployment Manager Administrator to be able to see Deployment Manager menu items on the UI based on menu permissioning model.
- When more than 1000 resources, process definitions, parent forms, child forms, access policies, roles, and rules are imported by using the Deployment Manager, the size of the EIF table increases. The data can be truncated from this table by running a simple SQL query such as Delete from EIF.

This section discusses the following topics:

- Deployment Manager Actions on Reimported Scheduled Tasks
- Importing an XML File

Note: Before importing data that contains references to menu items, you must first create the menu items in the target system.

5.3.1 Deployment Manager Actions on Reimported Scheduled Tasks

A scheduled task is one of the objects that you can import by using the Deployment Manager. Typically, you import a scheduled task into your Oracle Identity Manager environment and later change the values of the scheduled attributes to meet your production requirements. However, if you import the same scheduled task a second time into the same Oracle Identity Manager server, the Deployment Manager does not overwrite the attribute values in the database. Instead, the Deployment Manager compares the attribute value of the reimported XML file to any corresponding attribute values in the database.

The following table summarizes the actions performed by the Deployment Manager during a scheduled task reimport:

Does the Scheduled Task have attribute values in the XML file being imported?	Are there any corresponding attribute values in the database?	Deployment Manager Action
Yes	No	Store attribute values in the database

Does the Scheduled Task have attribute values in the XML file being imported?	Are there any corresponding attribute values in the database?	Deployment Manager Action
No	Yes	Delete existing attribute values in the database
Yes	Yes (Newer attribute values indicated by time stamp)	No change in the database
Yes (New attribute values indicated by time stamp)	Yes	Update the database with the new attribute values

5.3.2 Importing an XML File

To import an XML file:

1. Login to Oracle Identity Manager Administration.
2. In the Welcome page, under System Management, under Deployment Manager, click **Import**. Alternatively, you can click the **System Management** tab, click **Deployment Manager**, and then click **Import**.

   The Deployment Manager opens and the Search Objects page of the Export Wizard is displayed.

   Note: To open the Deployment Manager by using Mozilla Firefox Web browser, an additional authentication dialog box might be displayed. Providing authentication in this dialog box allows access to the Deployment Manager. To avoid this additional authentication:

   1. In Mozilla Firefox, from the Tools menu, select **Options**. The Options dialog box is displayed.
   2. Click **Privacy**.
   3. Select the **Accept third-party cookies** option.
   4. Click **OK**.

   The additional authentication is not required when the Deployment Manager is opened by using Microsoft Internet Explorer, Google Chrome, and Apple Safari Web browsers.
3. Select a file.

   The Import dialog box is displayed.
4. Click **Open**.

   The File Preview page is displayed.
5. Click **Add File**.

   The Substitutions page is displayed
6. To substitute a name, click the **New Name** field adjacent to the item you want to replace, and enter the name.

   You can substitute only items that exist in the target system.
7. Click **Next**. If you are exporting an IT resource instance, then the Provide IT Resource Instance Data page is displayed. Otherwise, you are redirected to the Confirmation page.

8. Modify the values in the current resource instance and click **Next**, or click **Skip** to skip the current resource instance, or click **New Instance** to create a new resource instance.

   The Confirmation page is displayed.

9. Confirm that the information displayed on the Confirmation page is correct.

   To go back and make changes, click **Back**, or click **View Selections**.

   The Deployment Manager Import page displays your current selections.

   The Import page also displays icons next to your current selections. The icons indicate what types of objects are selected. The icons on the right indicate the status of your selections. The file names of any selected files, summary information about the objects you are importing, and substitution information are displayed on the left side of the page. On the right, the **Objects Removed from Import** list displays any objects in the XML file that will not be imported.

10. Make any of the following adjustments:

    - Click **Reset** to clear the form.
    - Click **Legend** to see icon definitions.
    - To remove an object from the Current Selections list, right-click the object, select **Remove** from the shortcut menu, and then click **Remove** to confirm that you want to remove the object.

      If the object has child objects, then select **Remove including children** from the shortcut menu to remove all the child objects at the same time. The item is added to the Objects Removed From Import list.
    - To add an item back to the Current Selections list, right-click the list, and click **Add**.

      If the object has child objects, then select **Add including children** from the shortcut menu to add all the child objects at the same time.
    - To make substitutions, click **Add Substitutions**.
    - To add objects from another XML file, click **Add File** and repeat Steps 2 through 7.
    - Click **Show Information** to see information about your imported information.

      The Information page is displayed.

      To see more information, select the **Show Info Level Messages** option, and then click **Show Messages**. Click **Close** to close the Information page.

11. To import the current selections, click **Import**.

    A confirmation dialog box is displayed.

12. Click **Import**.

    The Import Success dialog box is displayed.

13. Click **OK**.

    The objects are imported into Oracle Identity Manager.

5.4 Horizontal Migration of Entities

The Deployment Manager is used for performing migration of metadata entities from an Oracle Identity Manager deployment to another. However, for Oracle Identity Manager 11*g* Release 1 (11.1.1), there are other non-metadata entitles that are not supported by the Deployment Manager. These entities include custom resource bundles and plug-ins. Therefore, a complete migration of entities is performed by using a command-line utility, which is the horizontal migration utility, along with the Deployment Manager.

The horizontal migration command-line utility supports the migration of the following metadata entities that are not supported by the Deployment Manager:

- Custom resource bundle
- Plug-ins

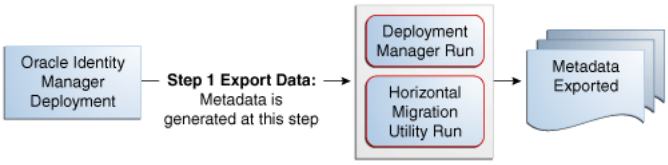
The migration of metadata entities take place in the following steps:

1. **Export data:** When data from an Oracle Identity Manager deployment is exported by running the Deployment Manager and the horizontal migration command-line utility, a set of artifacts are generated. The Deployment Manager generates XML files, and the horizontal migration utility generates binaries and XML files.

   Note: Deployment Manager supports the migration of all the entities in the form of XML. The command-line utility supports the migration of binaries, which are entities that are not exportable and importable in the form of XML.

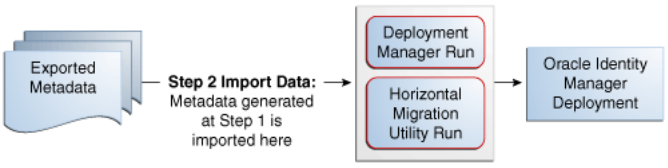
   Figure 5–1 shows the exporting of data:

Figure 5–1 Exporting Migration Data



2. **Import data:** The Deployment Manager and the horizontal migration utility are run to import the metadata on the second Oracle Identity Manager deployment, as shown in Figure 5–2:

Figure 5–2 Importing Migration Data



The horizontal migration utility is used to migrate the entities that are not supported by the Deployment Manager. This section describes the export and import of entities by using the horizontal migration utility in the following sections:

- Creating a Backup of the Existing Entities

- Running the Horizontal Migration Utility
- Data Migration for Supported Entities
- Horizontal Migration Report

5.4.1 Creating a Backup of the Existing Entities

Before performing the migration, create a backup of the existing entities in the Oracle Identity Manager deployment. If you are importing any entity, then create a backup of the existing ones so that you can roll back if required.

To create the backup, use the horizontal migration utility in the export mode to extract the existing entities. See "Running the Horizontal Migration Utility" on page 5-10 for information about running the utility in export mode.

5.4.2 Running the Horizontal Migration Utility

When you run the horizontal migration utility in EXPORT mode, a ZIP file is created that contains all the artifacts of the entities to be migrated. You must migrate the ZIP file into the second deployment where the data is to be imported back. When you run the utility in IMPORT mode, the contents of the ZIP file is extracted in a temporary location and all the artifacts are imported in the Oracle Identity Manager deployment. The configuration in the properties file controls the export and import. All the configurations in the file are defined at runtime.

In the EXPORT mode, you run the exportMetaData.sh or exportMetaData.bat script, which is in the *OIM_HOME*/bin directory.

To run the horizontal migration utility in EXPORT mode:

1. Check the location of the Config.xml file. The Config.xml file contains the filter criterion for filtering the entities for export. You can modify this file to provide custom filters.

   Save the Config.xml file before running the utility.

2. In a text editor, edit the exportMetaData.sh or exportMetaData.bat script to specify the following parameters:

   - CONTEXT_FACTORY: Context to connect to Oracle Identity Manager
   - PACKAGE_LOCATION: Destination path for the package to be exported
   - CONFIGURATION_FILE: Configuration file that you must create with the definition of the parameters and filtering criteria for the Export of the metadata

     The following is a sample configuration XML file:

```
<?xml version="1.0" encoding="UTF-8"?>
<MigrationDetails operation ="Export">
        <entityDetails>
              <EntityType>Jars</EntityType>
              <FilteringCriteria>
                     <Attribute>
                           <Name>OJ_NAME</Name>
                           <Filter>*</Filter>
                     </Attribute>
              </FilteringCriteria>
        </entityDetails>

        <entityDetails>
```

```
                <EntityType>Plugins</EntityType>
                <FilteringCriteria>
                        <Attribute>
                                <Name>PLUGIN_NAME</Name>
                                <Filter>*</Filter>
                        </Attribute>
                </FilteringCriteria>
        </entityDetails>

        <entityDetails>
                <EntityType>CustomResourceBundles</EntityType>
                <FilteringCriteria>
                        <Attribute>
                                <Name>RES_NAME</Name>
                                <Filter>*</Filter>
                        </Attribute>
                </FilteringCriteria>
        </entityDetails>
</MigrationDetails>
```

The configuration file supports three entity types: Jars, Plug-ins, and CustomResourceBundles. For each entity type, the following filters are supported:

- **Jars:** Jar_Type or OJ_TYPE, Jar_Name or OJ_NAME
- **Plugins:** PLUGIN_NAME or plugins.ID
- **CustomResourceBundles:** Resource_Type or RES_TYPE, Resource_Name or RES_NAME

- TEMP_LOCATION_TO_EXTRACT: Temporary location to keep the files temporarily before packaging for export

3. Run the exportMetaData.sh or exportMetaData.bat script.
4. Specify the following when prompted:
   - Oracle Identity Manager administrator user name to connect to Oracle Identity Manager
   - Oracle Identity Manager administrator password to connect to Oracle Identity Manager
   - JNDI URL to connect to Oracle Identity Manager: t3://localhost:*PORT_NUMBER*
   - LogFileLocation path where log file is to be generated
5. Verify the export list that is displayed.
6. When prompted for confirmation, enter YES.
7. Verify the export. All the listed items are exported to the destination provided as input. Check the contents of the ZIP package that is created at the destination.

In the IMPORT mode, you run the importMetaData.sh or importMetaData.bat script, which is in the *OIM_HOME*/bin directory.

To run the horizontal migration utility in IMPORT mode:

1. Before running the utility, run the client targets by using the following commands:

```
ant fullbuild XellerateClient.view-install
ant assemble-ear client-archive
```

2. Run the importMetaData.sh or importMetaData.bat script after specifying the following input parameters in the utility script:
   - Username to connect to Oracle Identity Manager.
   - Password to connect to Oracle Identity Manager.
   - JNDI URL to connect to Oracle Identity Manager.
   - Context to connect to Oracle Identity Manager.
   - Path of the package to be imported.
   - Configuration file updated with the information about items to be imported. If this configuration is not used in import, then the entire content of the package is imported.
   - Temporary location where the package is to be extracted before importing.
3. Specify the following when prompted:
   - Oracle Identity Manager administrator username
   - Oracle Identity Manager administrator password
   - Server URL: t3://localhost:*PORT_NUMBER*
4. Verify the import list that is displayed.
5. When prompted for confirmation, enter `YES`.
6. Verify the import. All the items in the package are imported to the application. Check if the import utility creates the entries corresponding to all the package contents in the database tables if you have access to the schema. Otherwise, check the utility output log in the application to verify if all contents have been successfully imported.

5.4.3 Data Migration for Supported Entities

This section describes the migration of the following entities:

- Custom Resource Bundle
- Plug-ins

5.4.3.1 Custom Resource Bundle

Oracle Identity Manager stores localized versions of text strings that appear in the user interface in resource bundles. In addition to the default resource bundles, the custom resource bundles, which are stored in Oracle Identity Manager database, can be imported and exported by using the horizontal migration utility.

The default packaged resource bundles are available in the following property files:

- oim.ear/xlWebApp.war/WEB-INF/classes/xlRichClient_*.properties
- Agent_*.properties for each feature in the deployment

You can customize the default packaged resource bundles to create custom resource bundles.

5.4.3.2 Plug-ins

Plug-ins are stored in Oracle Identity Manager database. The horizontal migration utility migrates the binaries from plug-in database store of one deployment to another.

See Also: "Working with the Plug-in Framework" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about defining and using plug-ins

5.4.4 Horizontal Migration Report

After the horizontal migration utility is run, a report is generated that contains the following information:

- All the entities migrated by using this utility
- Status of overall export and import of metadata
- Errors that occurred during the import of metadata

The following is a sample report:

```
Plugins :
Failed to process element Plugin1".
Exception details are java.io.FileNotFoundException: C:\Plugin1.zip (The system
cannot find the path specified) at java.io.FileInputStream.open(Native Method)at
java.io.FileInputStream.<init>(Unknown Source)at java.io.FileReader.<init>(Unknown
Source)at file.main(file.java:13)
```

5.5 Best Practices Related to Using the Deployment Manager

The following are some of the suggested practices and pitfalls to avoid while by using Deployment Manager:

- Export System Objects Only When Necessary
- Export Related Groups of Objects
- Group Definition Data and Operational Data Separately
- Use Logical Naming Conventions for Versions of a Form
- Export Root to Preserve a Complete Organizational Hierarchy
- Provide Clear Export Descriptions
- Check All Warnings Before Importing
- Check Dependencies Before Exporting Data
- Match Scheduled Task Parameters
- Compile Adapters and Enable Scheduled Tasks
- Export Entity Adapters Separately
- Check Permissions for Roles
- Back Up the Database
- Import Data When the System Is Quiet
- Update the SDK Table
- Remove Data Object Fields Before Importing Event Handlers as Dependencies

5.5.1 Export System Objects Only When Necessary

You should export or import system objects, for example, Request, Xellerate User, and System Administrator, only when it is absolutely necessary. Exporting system objects

from the testing and staging environments into production can cause problems. If possible, exclude system objects when exporting or importing data.

You may want to export or import system objects when, for example, you define trusted source reconciliation on Xellerate User resource objects.

Caution: The Deployment Manager keeps track of imported components and structures, but not of completed imports. After an import is completed, you cannot roll it back to a previous version. A new import is required.

5.5.2 Export Related Groups of Objects

Oracle recommends that you use the Deployment Manager to export sets of related objects. A unit of export should be a collection of logical items that you want to group together.

Avoid exporting everything in the database in one operation, or exporting items one at a time. For example, suppose that you manage an integration between Oracle Identity Manager and a target system that includes processes, resource objects, adapters, IT resource type definitions, IT resource definitions, scheduled tasks, and so on. For this environment, you should create groups of related objects before exporting.

For example, if you use the same e-mail definitions in multiple integrations, you should export the e-mail definitions as one unit, and the integrations as a different unit. This enables you to import changes to e-mail definitions independently of target system integration changes. Or, if multiple resources use the same IT resource type definition, you can export and import the type definition separately from other data.

You can import one or more sets of exported data at a time. For example, you can import a resource object definition, an e-mail definition, and an IT resource type definition in a single operation.

5.5.3 Group Definition Data and Operational Data Separately

You must group and export definition data and operational data separately.

You configure definition data in the testing and staging environment. Definition data includes resource objects, processes, and rules.

You typically configure operational data in the production environment. Operational data includes groups and group permissions. The testing and staging servers usually do not include this data.

By grouping data according to where it is changed, you know what data goes to testing and staging, and what goes to production. For example, if approval processes are changed in production, you should group approval processes and export them with other operational data.

5.5.4 Use Logical Naming Conventions for Versions of a Form

You often revise forms multiple times before exporting them. Avoid generic names, for example, "v23," to differentiate among versions of a form. Create meaningful names, for example, "Before Production" or "After Production Verification." Do not use special characters, including double quotation marks, in version names.

5.5.5 Export Root to Preserve a Complete Organizational Hierarchy

When you export a leaf or an organization in an organizational hierarchy, only one dependency level is exported. To export a complete organizational hierarchy, you must export the root of the hierarchy.

5.5.6 Provide Clear Export Descriptions

The Deployment Manager records some information automatically, for example, the date of the export, who performed the export, and the source database. You must also provide a meaningful description of the content of the export, for example, "resource definition after xxx attributes added in reconciliation." This informs the importer of the file of the contents of the data being imported.

5.5.7 Check All Warnings Before Importing

When importing information to the production environment, check all the warnings before completing the import operation. Treat each warning seriously.

5.5.8 Check Dependencies Before Exporting Data

The wizard in the top right pane shows resources that must be available in the target system.

Consider the following types of dependencies:

- If the resources are already available in the target system, they do not need to be exported.
- If the resources are new (not in the target system), they must be exported.
- If the target system does not include the resources, such as lookups, IT resource definitions, or others that are reused, then record the data and export it in a separate file so it can be imported if necessary.

Note: When you export a resource, groups with Data Object permissions on that form are not exported with the resource.

5.5.9 Match Scheduled Task Parameters

Scheduled tasks depend on certain parameters to run properly. You can import scheduled task parameters to the production server. Table 5–1 shows the rules for determining how to import scheduled tasks. Note that parameters may be available for tasks that no longer reside on the target system.

Table 5–1 Parameter Import Rules

Parameter Exists in Target System	Parameter Exists in the XML File	Action Taken
Yes	No	Remove the parameter from the target system.
No	Yes	Add the parameter and current value from the XML file.
Yes	Yes	Use the more recent value of the parameter.

5.5.10 Compile Adapters and Enable Scheduled Tasks

After an import operation, the adapters are set to recompile and the scheduled tasks are disabled. After importing the classes and adjusting the task attributes, manually recompile the adapters and enable the scheduled tasks.

5.5.11 Export Entity Adapters Separately

Entity adapters are modified to bring just the entity adapter, not its usage. If you want to export the usage of an entity adapter, you must separately export each use with a data object by exporting the data object. If you export a data object, all the adapters and event handlers attached to the object along with the permissions on the object are exported. You must pay special attention when exporting data objects. For example, to export a form, you should also add the data object corresponding to the form. This ensures that the associated entity adapters can use the form.

5.5.12 Check Permissions for Roles

When you export roles, the role permissions on different data objects are also exported. However, when you import data, any permissions for missing data objects are ignored. If the role is exported as a way of exporting role permission setup, then check the warnings carefully to ensure that permission requirements are met. For example, if a role has permissions for objects A, B, and C, but the target system only has objects A and B, the permissions for object C are ignored. If object C is added later, the role permissions for C must be added manually, or the role must be imported again.

When you export role that have permissions for viewing certain reports, ensure that the reports exist in the target environment. If the reports are missing, then consider removing the permissions before exporting the role.

5.5.13 Back Up the Database

Before you import data into a production environment, back up the database. This enables you to restore the data if anything goes wrong with the import. Backing up the database is always a good precaution before making significant changes.

Note: When you import forms and user-defined fields, you add entries to the database. These database entries cannot be rolled back or deleted. Before each import operation, ensure that the correct form version is active.

5.5.14 Import Data When the System Is Quiet

You cannot complete an import operation in a single transaction because it includes schema changes. These changes affect currently running transactions on the system. To limit the effect of an import operation, temporarily disable the Web application for general use and perform the operation when the system has the least activity, for example, overnight.

5.5.15 Update the SDK Table

The SDK table contains metadata definitions for user-defined data objects. When you import data from an XML file into the SDK table, the values in the SDK_SCHEMA column might be modified with the schema name of the source system where the XML file was created. For this reason, after you import data from an XML file into the SDK

table, you must check the schema name in the SDK_SCHEMA column, and if necessary, manually change it to the schema name on the target system where the Oracle Identity Manager database is running. To update the schema name in the SDK_SCHEMA column, run a SQL query similar to the following with SQL*Plus on Oracle Database installations or with SQL Query Analyzer on Microsoft SQL Server installations:

```
UPDATE SDK SET SDK_SCHEMA='target system schema name'
```

If you do not update the schema name in the SDK_SCHEMA column, an error similar to the following might be generated when you import other XML files that modify user-defined field (UDF) definitions:

```
CREATE SEQUENCE UGP_SEQ
java.sql.SQLException: ORA-00955: name is already used by an existing object
```

5.5.16 Remove Data Object Fields Before Importing Event Handlers as Dependencies

The Deployment Manager does not import event handlers that include data object fields if the event handlers are imported as dependencies. For this reason, you must remove the data object fields from any event handlers that you want to import as dependencies with the Deployment Manager.

5.6 Best Practices for Using the Horizontal Migration Utility

The following are some of the suggested practices and pitfalls to avoid while by using the horizontal migration utility:

- Export system objects only when necessary. See "Export System Objects Only When Necessary" on page 5-13.
- Export related groups of objects. See "Export Related Groups of Objects" on page 5-14.
- Check all listing before importing or exporting. See "Check All Warnings Before Importing" on page 5-15.
- Create a backup of the database. "Back Up the Database" on page 5-16.
- Provide filter criteria as specific as possible in the Config.xml file. See step 3 in "Running the Horizontal Migration Utility" on page 5-10.

  For example, consider the following filter criteria:

```
<entityDetails>
      <EntityType>CustomResourceBundles</EntityType>
      <FilteringCriteria>
            <Attribute>
                  <Name>FileName</Name>
                  <Filter>*</Filter>
            </Attribute>
      </FilteringCriteria>
</entityDetails>
```

  Instead of using the asterisk (*) wildcard character as the filter criteria, specify a file name or combine a file name with wildcard characters, such as `<Filter>*.properties</Filter>`.

5.7 Troubleshooting

Table 5–2 lists the troubleshooting steps that you can perform if you encounter a failure:

Table 5–2 Troubleshooting Deployment Manager

Problem	Solution
In Oracle Identity Manager 11*g* Release 1 (11.1.1), scheduled job has a dependency on scheduled task. Therefore, scheduled task must be imported prior to scheduled job. As a result, if a XML file has scheduled job entries prior to scheduled task entries, then importing the XML file using Deployment Manager fails with the following error message: `[exec] Caused By: oracle.iam.scheduler.exception.SchedulerExceptio n: Invalid ScheduleTask definition [exec] com.thortech.xl.ddm.exception.DDMException`	Open the XML file and move all scheduled task entries above the scheduled job entries.
Deployment Manager export fails for any object. User is prompted with Export Failed dialog box, and no exception is found in the server log. When you look at the JRE console, you can see the following: java.security.AccessControlException: access denied (java.io.FilePermission *PATH_AND_NAME_OF_THE_FILE*)	Perform the following steps: 1. Modify your java.policy in the *JRE_HOME*/lib/security/ directory. 2. Replace the existing policy file content with the following: `grant{ permission java.security.AllPermission; };` 3. Restart the browser to laod the policy again. You can now export the data.
The following error occurs while importing an XML file: `Caused by: oracle.iam.reconciliation.exception.ConfigExcept ion: Profile :Xellerate User InvalidAttributes :`	Perform any one of the following: ■ Remove the attribute on which the error is generated from the XML, and then try importing. ■ Create the missing UDF or other attributes by using configuration service, and then retry the import. ■ Export the UDF shown as missing dependency. Import this UDF first before importing the current XML.
Importing approval policy might result in the following error: `weblogic.kernel.Default (self-tuning)'] [userId: xelsysadm] [ecid: f9e72ab2a292a346:-188377b2:12f96ae9676:-8000-000 0000000000047,0] [APP: oim#11.1.1.3.0] Exception thrown {0}[[ oracle.iam.platform.entitymgr.ProviderException: USER_NOT_FOUND`	An approval policy rule is invalid if it points to an entity (user or organization) that does not exist in Oracle Identity Manager. These invalid approval rules must be corrected to point to a valid entity (user or organization) before the import.

6

Managing Connector Lifecycle

Oracle Identity Manager offers various solutions for integration with different kinds of IT-based resources in an organization. Oracle Identity Manager connectors are the recommended solution for integration between Oracle Identity Manager and resources that store and use user data. A connector enables exchange of user data between Oracle Identity Manager and a specific resource or target system.

Oracle Identity Manager server uses connectors to perform operations on target systems. Oracle provides connectors for common enterprise resources. You can develop custom connectors for your own resources.

A connector consists of the following artifacts:

- Binaries (JAR and DLL files) that contain the connector code
- Objects defined in Oracle Identity Manager, such as an IT resource, resource object, provisioning process and process tasks, process form and child forms, adapters and adapter tasks, lookup definitions, reconciliation rules, and scheduled tasks
- Integration libraries that enable adapters to perform actions on the target system

  For some target systems, third-party integration libraries might be required to enable communication or specific functionality with the target systems.

  See Also: *Oracle Identity Manager Connector Concepts* for detailed conceptual information about connectors and connector objects

This chapter provides information about connector lifecycle management features. It is divided into the following sections:

6.1 Lifecycle of a Connector

The following are stages in the lifecycle of a connector:

Deployment

A connector can be installed by clicking the **Manage Connector** menu on the Advanced Administration section of the Oracle Identity Manager Administrative and User Console. To complete the deployment procedure, you might also need to copy connector files and external code files to destination directories on Oracle Identity Manager and target system host computers. Some connectors require a Remote Manager, which is usually installed on the target system host computer. Some other connectors, specifically the identity connectors, require the local and remote connector server.

See Also:

- Oracle Identity Manager Connector documentation for information about copying connector files and external code files to destination directories on Oracle Identity Manager and target system host computers. Connector documentation is available on the Oracle Web site at the following URL:

  `http://download.oracle.com/docs/cd/E22999_01/index.htm`

- "Identity Connector Framework" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about the Identity Connector Framework and how to use it to create an identity connector.

The Deployment Manager offers an alternative approach to import definitions of the objects that constitute a connector. However, as explained later in this chapter, the Install Connectors feature is the recommended approach.

Customization

After deployment, you might customize a connector to meet business requirements that are not addressed by the default configuration of the connector. For example, you might add new attributes for reconciliation and provisioning with the target system. An enhancement of this type requires changes to be made in multiple connector objects, such as Resource Object, Process Definition, and Process Form. See Connector Documentation for detailed information about changes required in connector objects.

Cloning

You might have more than one installation of a target system. If you have a target system with multiple instances, and data is either same or shared or replicated, such as in Microsoft Exchange or Active Directory connectors, then you do not need to clone the connector. You need to create multiple IT resources for the instances. The target works as a single resource object.

If you have a target system with different installations or schema or data, such as a LDAP server for internal users and another LDAP server for external, contractors, and consumers, then you need to clone the connector. The connectors will work as two separate targets.

There might be a scenario where the connector attributes are different. Then instead of creating a new connector, the existing connector can be cloned by using the XML of

the original connector. The **Clone Connectors feature** of the Advanced Administration enables you to automatically generate copies of a set of connector objects.

Upgrade

To make use of new features introduced in later releases of a connector, you might upgrade a connector by applying patch sets released by Oracle. Typically, upgrading to a new release of a connector involves processes that range from simple changes (such as a JAR file upgrade) to changes that affect most of the adapter tasks that were shipped as part of the connector. You can use the **Upgrade Connectors feature** to upgrade a connector.

> **Note:** Upgrading connectors preserve the existing customizations in a connector.

Uninstalling

> **Note:** Uninstalling a connector is performed in the development environment and not in production environment.

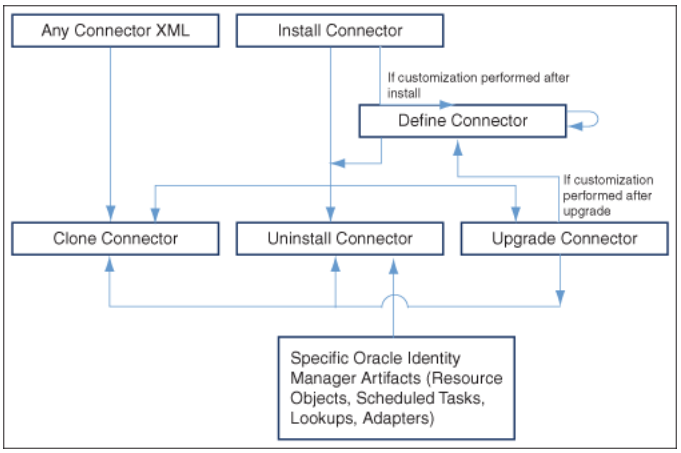
If you stop using a connector, then this action is also provided to additional environments, such as System Integration Testing, User Acceptance Testing, and Staging, where that connector is also stopped.

The need to keep a clean development environment that does not have any unnecessary Oracle Identity Manager objects, you would like to uninstall a particular connector version that you no longer need to use. The **Uninstall Connectors utility** enables you to uninstall connectors as well as individual connector objects.

> **Note:** You must have the System Administrator role to perform connector lifecycle management tasks, such as installing connectors including importing connector XML files by using the Deployment Manager, and cloning, defining, upgrading, and uninstalling connectors.

Figure 6–1 depicts the connector lifecycle:

Figure 6–1 Connector Lifecycle



6.2 Connector Lifecycle and Change Management Terminology

The following terms have been introduced in this chapter:

- **Oracle-released connector** refers to a connector released by Oracle.
- **Custom release** or **custom connector** refers to connectors that you develop as well as Oracle-released connectors that you customize or reconfigure in any way.
- **Source release** or **source connector** refers to the existing release of the connector that you want to upgrade to a different (that is, new) release. For example, if you want to upgrade the SAP User Management connector from release 9.1.2 to release 9.1.2.1, then release 9.1.2 is the source release.
- **Target release** or **target connector** is the release to which you want to upgrade the source release. In the preceding example, SAP User Management release 9.1.2.1 is the target release.

> **Note:** Some of the preceding terms can be combined to provide a shortened description of the type of connector that is under discussion. For example, a **custom source release** is a connector that you had created, customized, or reconfigured and now want to upgrade to a target release.

- A **configuration XML file** contains information that is used during connector installation by the Install Connectors feature. For a connector released by Oracle, the configuration XML file is included in the deployment package. For a custom-developed connector, you might want to develop the individual connector objects on the staging (test) server and then deploy the connector on the production server. In this case, you can create a configuration XML file for the connector if you want to install the connector on the production server by using the Install Connectors feature.

  > **See Also:** "Installing Connectors" on page 6-6 for information about the Install Connectors feature.

- A **connector XML file** contains definitions of the individual objects that constitute a connector. When the XML file is imported into Oracle Identity Manager through the Deployment Manager, these objects definitions are used to create the

connector objects in the Oracle Identity Manager database. The manner in which the XML file is imported into Oracle Identity Manager depends on the type of connector:

- For an Oracle-released connector that is compatible with the Install Connectors feature, the connector XML file is automatically imported when you use the Install Connectors feature. This feature implicitly calls the Deployment Manager to import the connector XML file.
- For an Oracle-released connector that is not compatible with the Install Connectors feature, you use the Deployment Manager to import the XML file.
- For a custom connector, you can use the Deployment Manager to first export definitions of objects that you had created on the staging server. The output of this process is the connector XML file. You can then import the file into the production server. Alternatively, if you create a complete deployment package (including the configuration XML file) for the connector, then you can use the Install Connectors feature to install the connector. This feature implicitly calls the Deployment Manager to import the file.

  See Also: "Exporting Connector Object Definitions in Connector XML Format" on page 6-33 for information about exporting connector object definitions by using the Deployment Manager

6.3 Viewing Connector Details

To view the details of a connector:

Note: In this release of Oracle Identity Manager, the connector lifecycle management functionality have been introduced such as defining, cloning, upgrading, and uninstalling connectors. For all these features, complete connector DM-XML is required in the database, and this is the source for all the connector lifecycle management activities.

When Oracle Identity Manager is upgraded from Release 9.1.x or from 11*g* Release 1 (11.1.1.3) to 11*g* Release 1 (11.1.1.5), you must define the connector so that all the lifecycle management operations on the connector are possible to perform. Without defining the connector, it is not possible to search for the installed connector, upgrade the installed connector, clone the connector, and uninstall the connector. See "Defining Connectors" on page 6-11 for information about defining connectors.

---

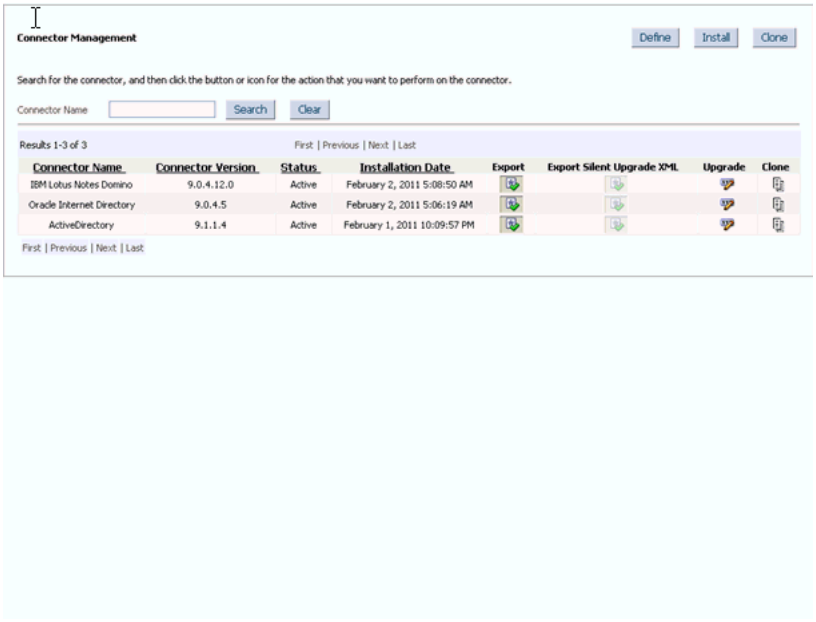
1. Login to the Administrative and User Console.
2. Go to Advanced Administration, expand **System Management, Deployment Manager,** and then click **Manage Connector**.
3. In the **Connector Name** field, enter the name of the connector and then click **Search**.
4. The search results show the details of the connector.

   If you do not know the full name of the connector, then you can perform a wildcard search for a connector. For example, if you want to display details of the Microsoft Active Directory connector installed in your operating environment, then you can use "Direct" as the search string.

If you want to display details of all installed connectors, then leave the Connector Name field blank and click Search.

Figure 6–2 shows the search results table.

Figure 6–2 Search Results Table Showing Details of Connectors



The search results table displays the connector name, release number, status, and the date and time at which the connector was installed. The remaining columns of the table provide icons that you can use to begin any of the lifecycle management operations on a connector.

6.4 Installing Connectors

In the Advanced Administration section, you can click **System Management, Deployment Manager, Manage Connector**, and then click **Install** to install a connector. The following sections describe this feature and the procedure to use it:

> **Note:** To determine whether you can install an Oracle-released connector by using the Install Connectors feature, see the connector guide.

- Overview of the Connector Deployment Process
- Creating the User Account for Installing Connectors
- Installing a Connector

6.4.1 Overview of the Connector Deployment Process

To install a connector, you perform some or all of the following tasks:

1. Verify the installation requirements.
2. Configure the target system.

3. Copy the connector files and external code files to directories on the Oracle Identity Manager server.
4. Configure Oracle Identity Manager.
5. Import the connector XML files.
6. Configure reconciliation.
7. Configure provisioning.
8. Configure Secure Sockets Layer (SSL).

Of these tasks, the Install Connectors feature automatically performs the following:

Note: You manually perform the remaining tasks. Connector documentation provides instructions.

- Copying the connector files and external code files to directories on the Oracle Identity Manager server
- Importing the connector XML files
- Compiling adapters (which is part of the procedure to configure provisioning)

At the end of a successful installation, an entry is created in a table in the Oracle Identity Manager database that stores data about installed connectors. "Defining Connectors" on page 6-11 describes the data that is stored in the database.

6.4.2 Creating the User Account for Installing Connectors

Users belonging to the SYSTEM ADMINISTRATORS group of Oracle Identity Manager can install connectors. Alternatively, members of a group to which you assign the required menu items and permissions can install connectors.

See Also: The "Creating and Managing User Groups" section in the connector guide for information about creating groups and assigning menu items and permissions to them.

The required permissions are the following:

- Form Designer (Allow Insert, Write Access, Delete Access)
- Structure Utility.Additional Column (Allow Insert, Write Access, Delete Access)
- Meta-Table Hierarchy (Allow Insert, Write Access, Delete Access)
- User Should belong to SYSTEM ADMINISTRATORS group.

The required menu item is Deployment Management Install Connector.

To install a connector, if you want to use a user account that does not belong to the SYSTEM ADMINISTRATORS group, then you must apply these permissions and menu item to one of the groups to which the user account belongs.

6.4.3 Installing a Connector

> **Note:** From this release onward, re-installing a connector is not supported. You cannot install a connector version which had already been installed in Oracle Identity Manager. However, if the installation process is not successful, Oracle Identity Manager allows you to reinstall the connector.

To install a connector:

1. Log in to Oracle Identity Manager Administrative and User Console by using the user account described in "Creating the User Account for Installing Connectors" on page 6-7.
2. Click **Advanced Administration, System Management, Deployment Management**, and then click **Manage Connector**.
3. Click **Install** in the top-right corner of the page.
4. From the **Connector List** list, select the connector that you want to install. This list displays the names and release numbers of connectors whose installation files you copy into the default connector installation directory:

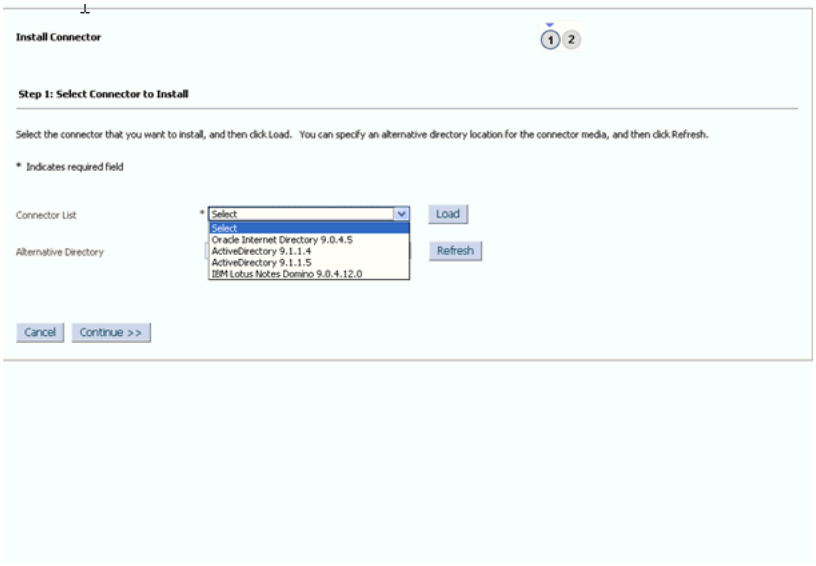
   `OIM_HOME/server/ConnectorDefaultDirectory`

   If you have copied the installation files into a different directory, then:

   a. In the **Alternative Directory** field, enter the full path and name of that directory.
   b. To repopulate the list of connectors in the Connector List list, click **Refresh**.
   c. From the **Connector List** list, select the connector that you want to install.

      Figure 6–3 shows the Select Connector to Install page of the Install Connector wizard:

Figure 6–3 The Select Connector to Install Page



5. Click **Load**.

The following information is displayed:

- Connector installation history

  The connector installation history is information about previously installed releases of the same connector.

- Connector dependency details

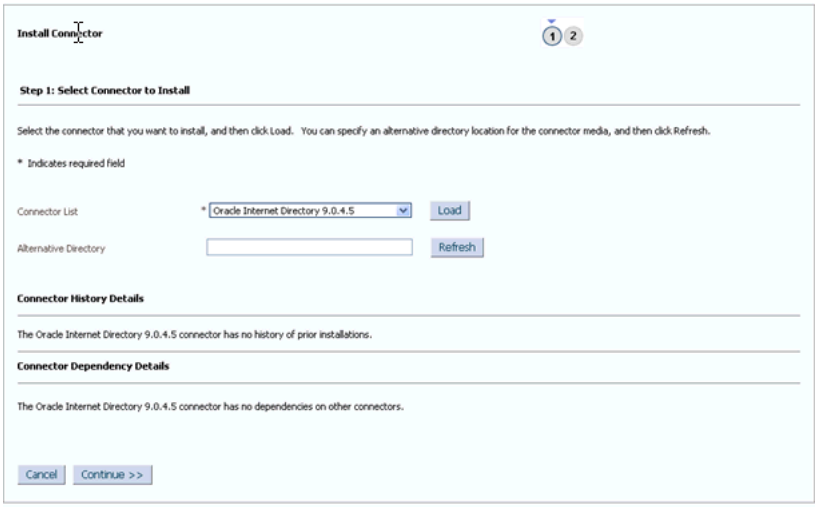
  There are some connectors that require the installation of some other connectors before you can start using them. For example, before you use the Novell GroupWise connector, you must install the Novell eDirectory connector. Novell eDirectory is called the **dependency connector** for Novell GroupWise.

  The connector dependency details include the list of connectors that must be installed before you can install and use the selected connector. These details also include information about any dependency connectors that are already installed, and whether or not any of the installed dependency connectors must be upgraded. However, after showing the dependency information, the Install Connector wizard allows you to install the connector.

  You must ensure that the correct versions of dependency connectors are installed after you complete the current installation.

  Figure 6–4 shows the page with connector history details and connector dependency details:

Figure 6–4 Connector History and Dependency



6. To start the installation process, click **Continue**.

   The following tasks are performed in sequence:

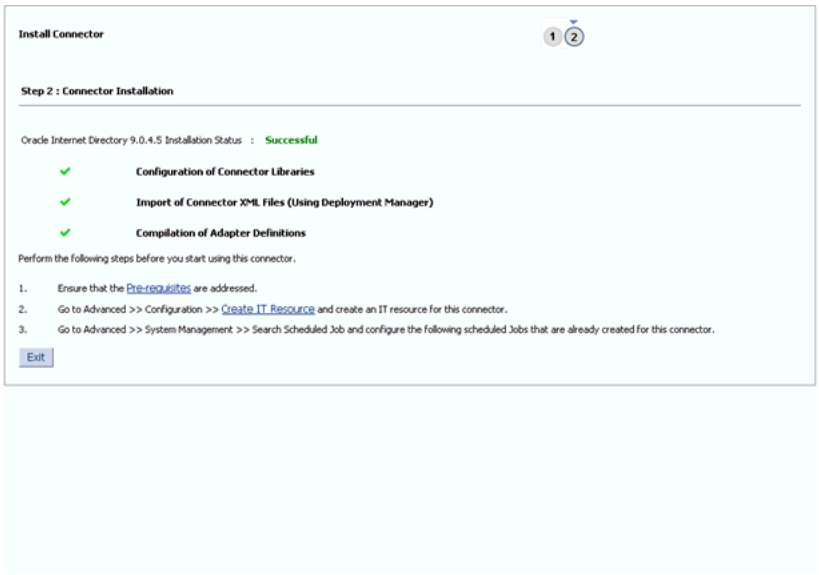
   a. Configuration of connector libraries

   b. Import of the connector XML files (by using the Deployment Manager)

   c. Compilation of adapters

      Figure 6–5 shows the Connector Installation page of the Install Connector wizard:

Figure 6–5 The Connector Installation Page



On successful completion of a task, a check mark is displayed for the task. If a task fails, then an X mark and a message stating the reason for failure are displayed. Depending on the reason for the failure, make the required correction and then perform one of the following steps:

- Fix the cause of the error, and then retry installation by clicking **Retry.**
- Cancel the installation and begin again from step 1 of the installation procedure.

One of the reasons for installation failure could be a mismatch between information about files and directory paths in the configuration XML file and the actual files and directory paths. If this happens, then an error message is displayed.

For example, suppose the actual name of the JAR file for reconciliation is `recon.jar`. If the name is provided as `recon1.jar` in the configuration XML file, then an error message is displayed.

If such an error message is displayed, then perform *one* of the following steps:

- Make the change in the configuration XML file, and then retry installation from the Step 1: Select Connector to Install page onward.

  In the example described earlier, change the name of the JAR file to `recon.jar` in the configuration XML file, and then retry installation from the Step 1: Select Connector to Install page onward.

- Make the change in the actual name or path of the file or directory, and then use the Retry option.

  In the example described earlier, change the name of the JAR file to `recon1.jar` and then click the **Retry** button.

7. If all three tasks of the connector installation process are successful, then a message indicating successful installation is displayed. In addition, a list of the steps that you must perform after the installation is displayed. These steps are as follows:

   a. Ensuring that the prerequisites for using the connector are addressed

Note: There are no prerequisites for some connectors.

b. Creating an IT resource for the connector

The IT resource type is displayed. You must create an IT resource of the specified type. To do this, go to **Advanced Administration, Configuration, Resource Management, Create IT Resource**. See the "Creating IT Resources" section in the connector guide for more information.

c. Configuring the scheduled tasks that are created when you installed the connector.

The names of the scheduled tasks that are created during the XML file import process are displayed. You must configure these scheduled tasks. To do this, go to Advanced Administration, System Management, Scheduler. Alternatively, in the System Management page, you can search Scheduled Jobs. See the "Managing Scheduled Tasks" section in the connector guide for more information.

6.5 Defining Connectors

Connector LCM operations such as Upgrade, Clone, and Uninstall needs a source for each connector where all the connector objects reside. The Connector Install stores the Deployment Manager (DM) XML in Oracle Identity Manager database.

Typically, you will install the shipped connector and then perform one or both of the following operations:

- Customize the connector by, for example, add/ modify existing object definitions, add additional adapters
- (Re) Configure the connector by, for example, changing attribute names and key fields

The DM XML in Oracle Identity Manager database, which will be the reference for all Connector LCM operations need to be updated for customization changes. Oracle Identity Manager provides **Define** feature to update the DM XML stored in Oracle Identity Manager database with customization changes. Define feature is similar to Export where user need to add all the connector objects related to a specific connector. The end result of defining a connector is an XML file, which will be updated in Oracle Identity Manager database.

At this point, the customized or re-configured connector is not the same as the Oracle-released connector. The connector XML file for the Oracle-released connector might not be valid for the customized or re-configured connector.

In the Advanced Administration page of the Oracle Identity Manager Administrative and User Console, you can **define** a customized or re-configured connector. Defining a connector is equivalent to registering the connector with Oracle Identity Manager.

Note: You must add only those Oracle Identity Manager artifacts that are specific to the connector and do not add default objects or any other connector objects that are shared across connectors. The defined XML is the source for life cycle operations such as upgrade, clone, and uninstall. If an object is used in define and is shared across connectors or a default Oracle Identity Manager object, then there will be un-intended behavior. For example, a Lookup Definition which is there by default in Oracle Identity Manager is added as a part of define, then clone operation will create another copy of the object, which is not required. The uninstall will delete this default object from Oracle Identity Manager as it is defined specific to a connector. Such incorrect definition will have impact on Oracle Identity Manager functionality. Therefore, you must be careful while adding an object while defining a connector.

When you define a connector, a record representing the connector is created in the Oracle Identity Manager database. If this record already exists, then it updates:

- The name of the connector. For example, `Microsoft Active Directory`.
- The release number of the connector. For example, `9.1.1`.
- The connector XML definitions.

Note:

- You can define the connector XML definitions in the form of an XML file. See the "Exporting Connector Object Definitions in Connector XML Format" section of the connector guide for more information. You can then use this connector XML file to build the installation package for installing the connector on a different Oracle Identity Manager installation.
- Oracle recommends defining a connector immediately after customizing the connector or updating the DM XML file with the customization changes.

A connector is automatically defined when you install it using the Install Connectors feature or when you upgrade it using the Upgrade Connectors feature. Therefore, if you install a connector and want to clone it without customizing the connector, then there is no need to define the connector.

You must manually define a connector if:

- You import the connector by using the Deployment Manager.
- You customize or reconfigure the connector.

Note: You can continue to use a connector without defining it after you customize or reconfigure a connector or after you upgrade Oracle Identity Manager. However, if you want to upgrade, clone, or uninstall the connector, then you must first define it.

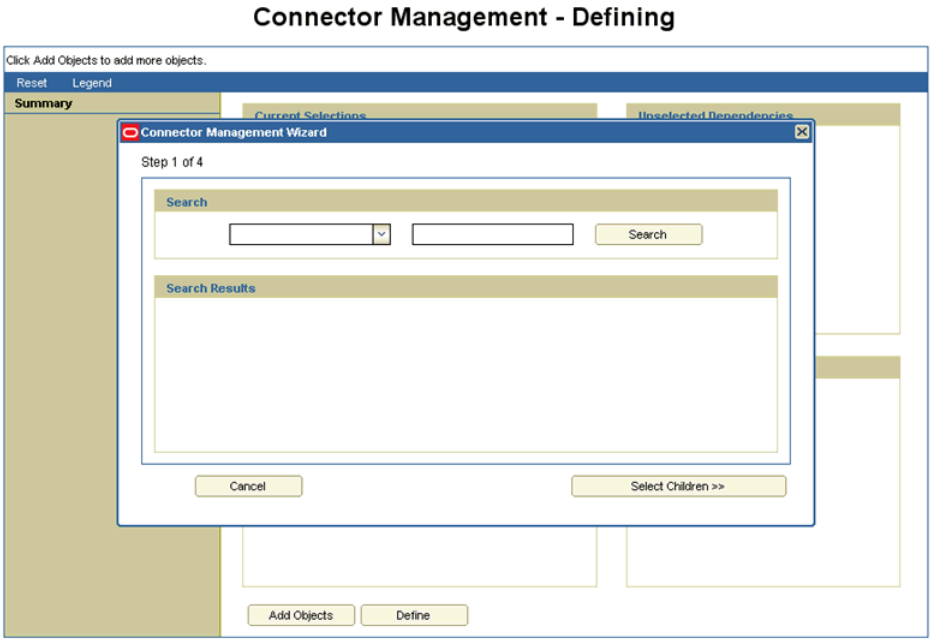
- You upgrade Oracle Identity Manager.
- It is a custom connector that you develop.

To define a connector:

> **Note:** To determine whether you can define a particular release of a connector by using the Oracle Identity Manager Administrative and User Console, see the documentation for that release of the connector.

1. Log in to Oracle Identity Manager Administrative and User Console and click **Advanced Administration**.
2. On the left pane, expand **System Management, Deployment Management** and then click **Manage Connector**.
3. On the Connector Management window, click **Define**. The Connector Management Wizard is displayed, as shown in Figure 6–6:

Figure 6–6 Connector Management Wizard for Defining Connectors



4. On the first page of the wizard, select either **Resource** or **Process** from the Search list. In the adjoining field, you can enter a search string and the asterisk (*) as a wildcard character to refine your search for resource objects or process definitions belonging to the connector. Then, click **Search**.

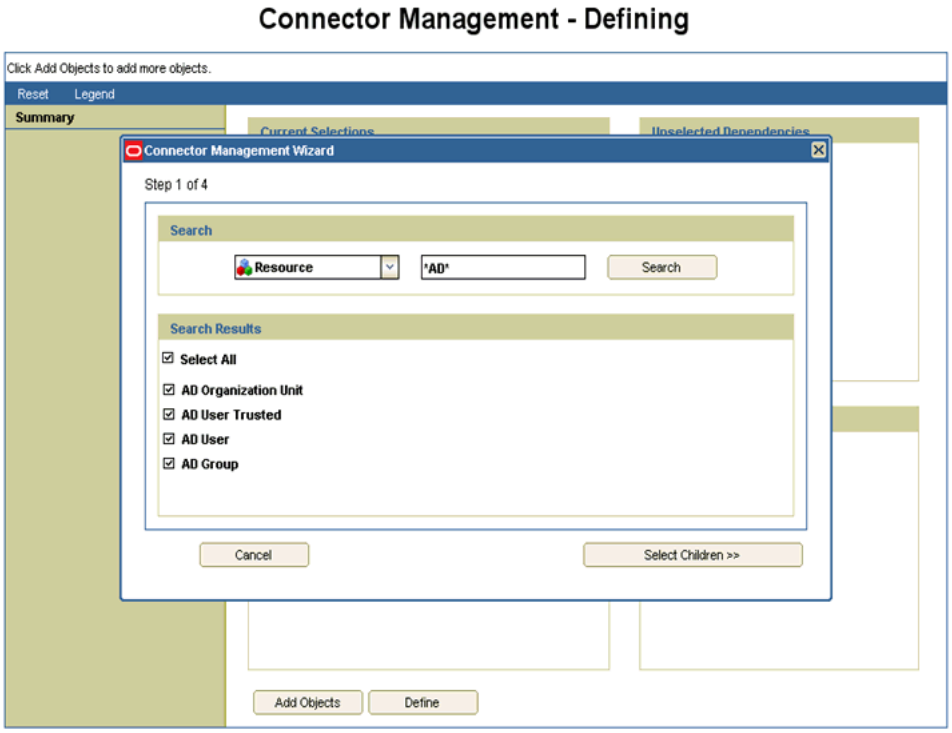
   Most of the objects that constitute a connector are linked to the resource objects and process definition of the connector. By selecting the resource objects or process definition, you automatically select the objects linked with them. Some of the connector objects, for example, scheduled task, do not have dependency with the resource object. Ensure that you search all the attributes and add them while defining.

   When you click Search, the list of resource objects or process definitions that meet the specified search criteria are displayed.

5. Select the check boxes for the resource objects or process definitions that are part of the connector.

Figure 6–7 shows step 1 of the Connector Management Wizard with search results for connector objects:

Figure 6–7 Step 1 of the Connector Management Wizard

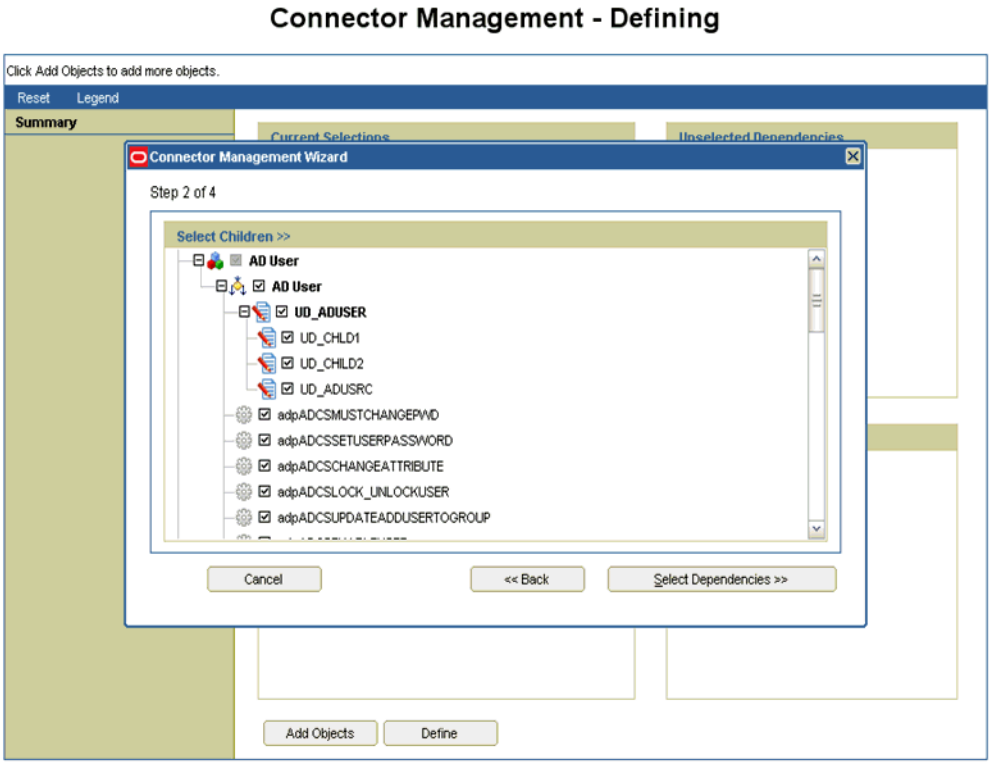


6. Click **Select Children**.
7. From the list of connector objects displayed, ensure that all the objects belonging to the connector are selected. Then, click **Select Dependencies**.

Note: For an Oracle-released connector, the adapters that are part of the connector are listed in the connector guide. Select the check boxes for those adapters.

Figure 6–8 shows step 2 of the Connector Management Wizard:

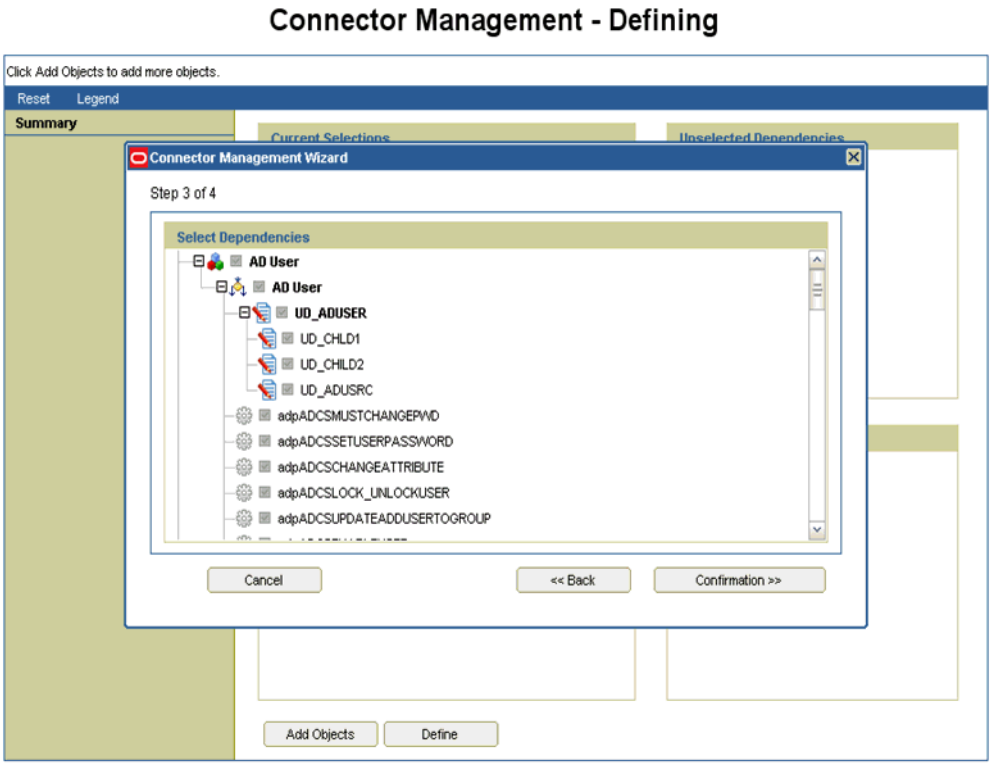
Figure 6–8 Step 2 of the Connector Management Wizard



8. After you review the list of objects that you have selected, click **Confirmation**.

   Figure 6–9 shows step 3 of the Connector Management Wizard with the list of selected connector objects:

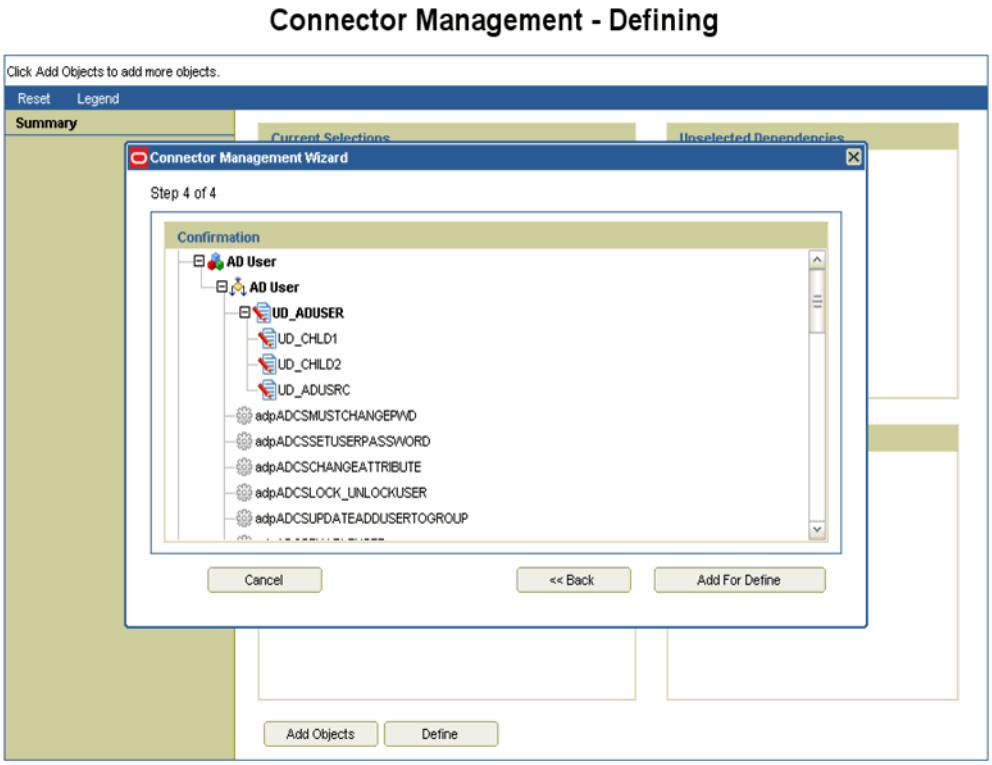
Figure 6–9 Step 3 of the Connector Management Wizard



9. Click **Add For Define**.

   Figure 6–10 shows step 4 of the Connector Management Wizard:

Figure 6–10 Step 4 of the Connector Management Wizard

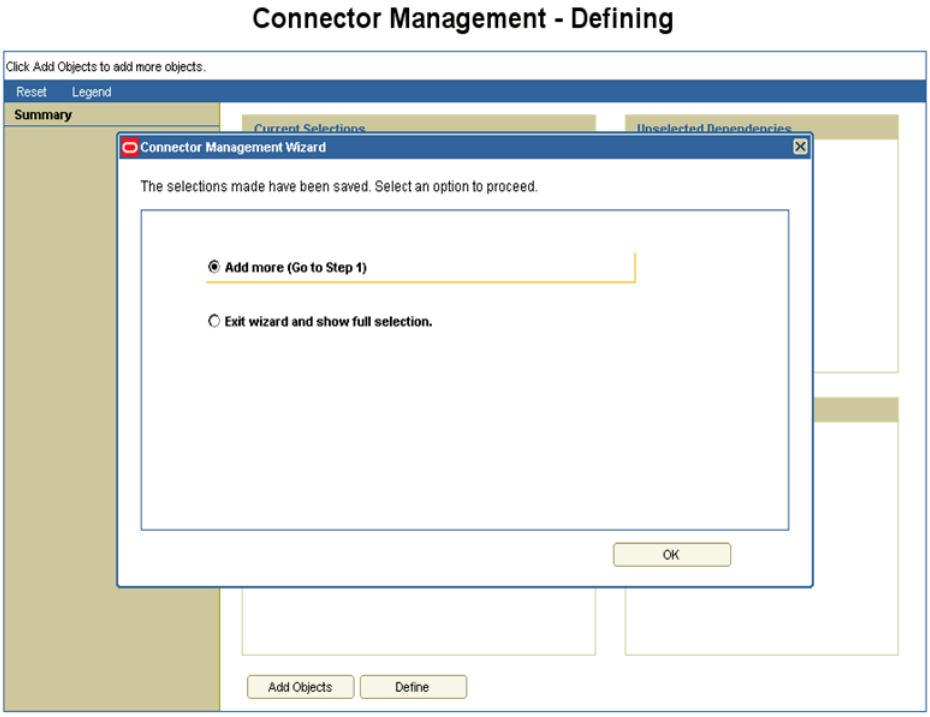


10. To proceed, select any one of the following options, and click OK:

- **Add more (Go to Step 1):** Select this option if you want to go to step 1 of the Connector Management Wizard and select more connector objects.
- **Exit wizard and show full selection:** Select this option if you want to exit the Connector Management Wizard and display the complete list of selected connector objects.

Figure 6–11 shows the page with the options to add more connector objects or to exit the wizard:

Figure 6–11 Options to Select More Objects or Exit



11. On the page that is displayed, only objects shown in the Current Selections list are included in the connector definition. You can drag objects across lists. For example, you can drag an adapter from the Current Selections list to the Unselected Children list. After you make the required changes, click **Define**.

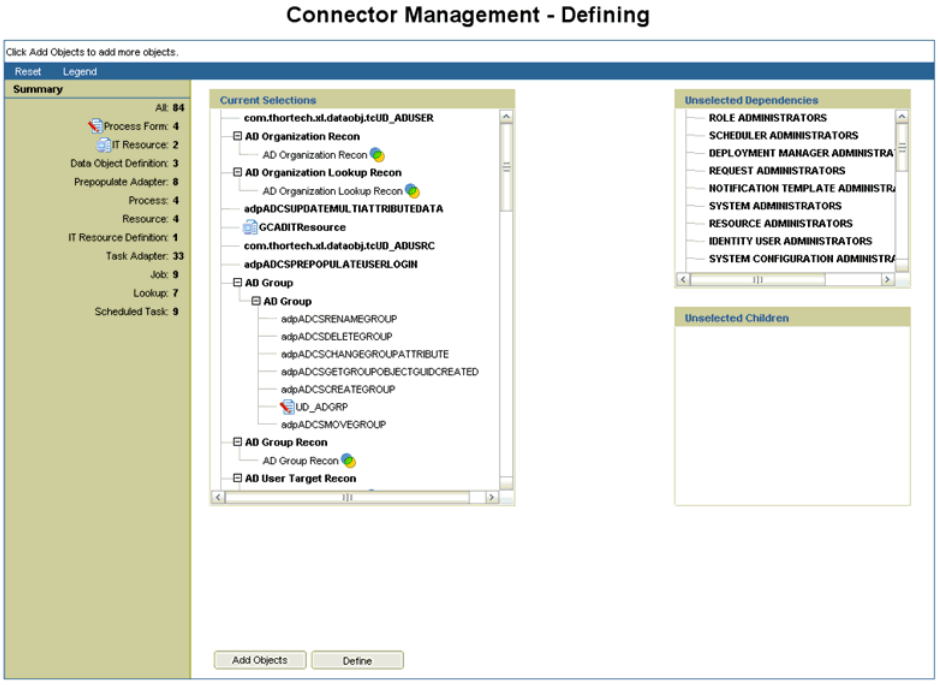
Note: Make sure that you have added all the Oracle Identity Manager connector objects specific to defining connector. If you do not have a specific connector object while defining the connector, then upgrade, clone, or uninstall may not handle the undefined object.

The following are Oracle Identity Manager artifacts that are generally associated with almost all the connectors:

- Resource objects
- Event handlers
- Process forms
- IT resources
- Data object definitions
- Prepopulate adapters
- Processes
- IT resource type definitions
- Task adapters
- Lookups
- Scheduled tasks

Figure 6–12 shows the page with the complete list of selected connector objects that are to be included in the connector definition and the unselected connector dependencies:

Figure 6–12 Selected Connector Objects

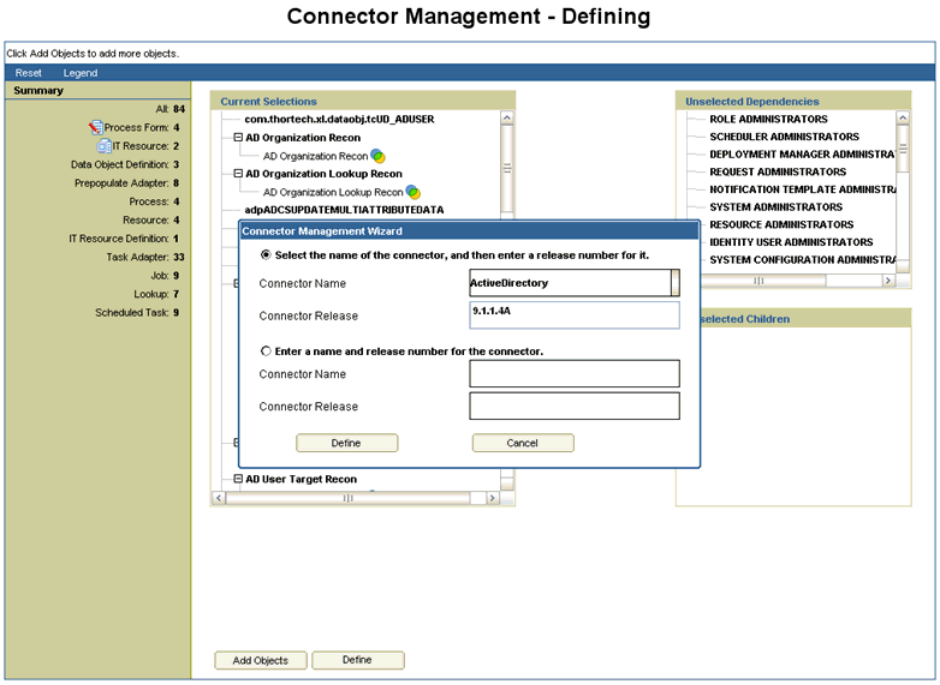


12. In the dialog box that is displayed, select one of the following options:

    - **Select the name of the connector, and then enter a release number for it:** Select this option if an earlier release of this connector already exists on this Oracle Identity Manager installation. In addition, select a connector name and enter a release number.
    - **Enter a name and release number of the connector:** Select this option if an earlier release of this connector does not exist on this Oracle Identity Manager installation. In addition, enter a connector name and release number.

    Figure 6–13 shows the dialog box to specify the connector name and release number:

Figure 6–13 Connector Name and Release Number



13. Click **Define**.
14. At the end of the process, a message stating that the operation was successful is displayed. Click **Close**.

6.6 Cloning Connectors

Note: In this guide, the term **Clone Connectors feature** refers to the set of Oracle Identity Manager Administrative and User Console pages that you can use to clone connectors.

This section describes the procedure to create a copy of a connector by setting new names for some of the objects that comprise the connector. The outcome of the process is a new connector XML file. Most of the connector objects, such as Resource Object, Process Definition, Process Form, IT Resource Type Definition, IT Resource Instances, Lookup Definitions, Adapters, Reconciliation Rules and so on in the new connector XML file have new names.

Note: Oracle Identity Manager offers a different feature for using a single connector to integrate:

- Multiple installations of a particular target system with Oracle Identity Manager
- A target system that stores data about multiple user types (for example, employee and contractor) and requires Oracle Identity Manager to provide a different resource object for each user type

See the connector guide for information about how to use access policies to create resource objects for different user types on a particular target system.

This section contains the following topics:

6.6.1 Guidelines for Cloning a Connector

Apply the following guidelines while using the Clone Connectors feature:

- The Clone Connectors feature does not support request dataset cloning. This is because request dataset definitions are not usually included in the connector XML file. Cloned copy of the connector is needed when there is a change in attributes of the same target but for different instances. If attributes are different, then the same request dataset cannot be used.
- A connector must be compatible with the Clone Connectors feature before you can use the utility to create a clone of the connector. For an Oracle-released connector, see the connector guide for information about whether or not the connector is supported by the Clone Connectors feature.
- Validation performed on the names of connector objects does not cover the names of objects that belong to other connectors. However, when you import the connector XML file that is created by the Clone Connectors feature, the Deployment Manager throws an error when it encounters duplicate object names. This is illustrated by the following example:

  AD USER is the name of a resource object belonging to the Microsoft Active Directory connector. Suppose My_RO is the name of an existing resource object defined in the Oracle Identity Manager database. If the new name that you specify for the AD_USER resource object is My_RO, then the Clone Connectors feature does not display an error message stating that a resource object with the specified name already exists.

6.6.2 Cloning a Connector

Cloning a connector involves performing a two-step procedure:

Step 1: Create the connector XML file for the cloned connector

To create the connector XML file for the cloned connector:

1. Log in to Oracle Identity Manager Administrative and User Console
2. Go to Advanced Administration and on the left pane expand **System Management**, **Deployment Manager**, and then click **Manage Connector**.
3. The next step depends on the source XML that you want to use to create the clone:
   - If you want to use a connector XML file as the source, then:
     a. Click **Clone** in the upper-right corner.
     b. On the Step 1: XML Selection from File System page, use the Browse option to navigate to and select the connector XML file.

        Figure 6–14 shows the XML Selection from File System page of the Connector Management - Cloning wizard:

Figure 6–14 The XML Selection from File System Page

     c. Click **Continue**.
   - If you want to use the connector XML that was stored in the database when the connector was defined, then:
     a. Use the Search feature to search for the connector. Figure 6–15 shows the page to search for the connector:

Figure 6–15 Searching the Connector

b. In the search results that are displayed, click the Clone icon in the row for the connector that you want to clone.

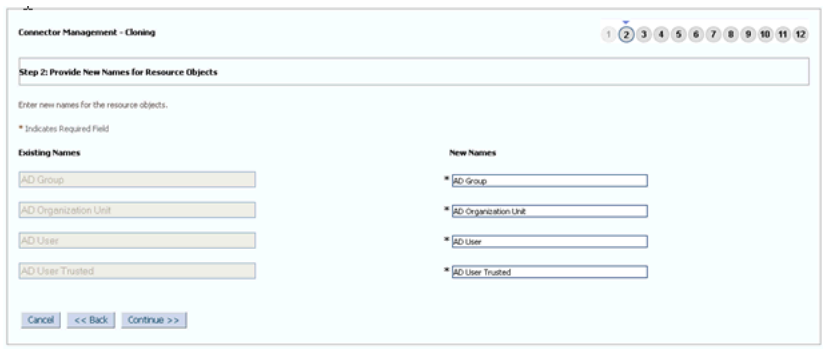
4. On the Step 2: Provide New Names for ROs page, enter new names for the resource objects of the clone.

If the connector has multiple resource objects, then the new name that you specify for each resource object must be different from the names of all the existing resource objects of that connector.

Click **Continue** after you specify new names for all the resource objects.

Figure 6–16 shows the Provide New Names for Resource Objects page of the Connector Management - Cloning wizard:

Figure 6–16 The Provide New Names for Resource Objects Page



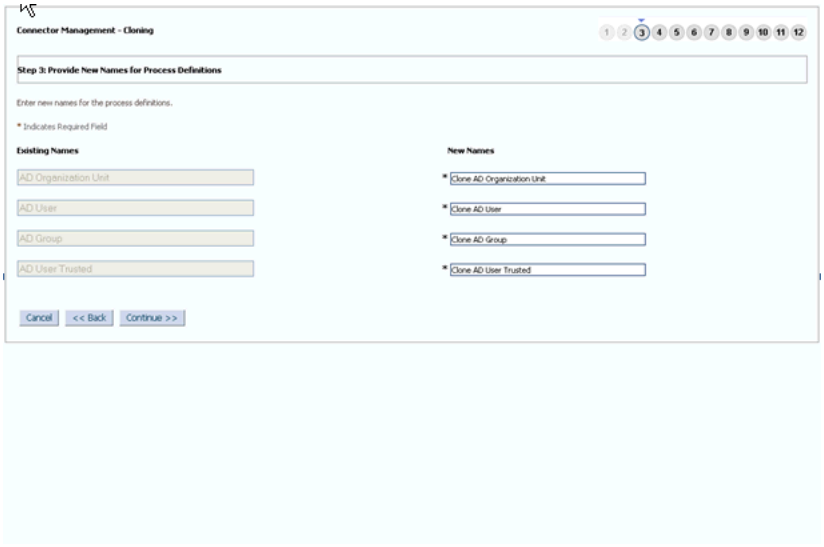
5. On the Step 3: Provide New Names for Process Definitions page, enter new names for the process definitions of the clone.

If the connector has multiple process definitions, then the new name that you specify for each process definition must be different from the names of all the existing process definitions of that connector.

Click **Continue** after you specify new names for all the process definitions.

Figure 6–17 shows the Provide New Names for Process Definitions page of the Connector Management - Cloning wizard:

Figure 6–17 The Provide New Names for Process Definitions Page



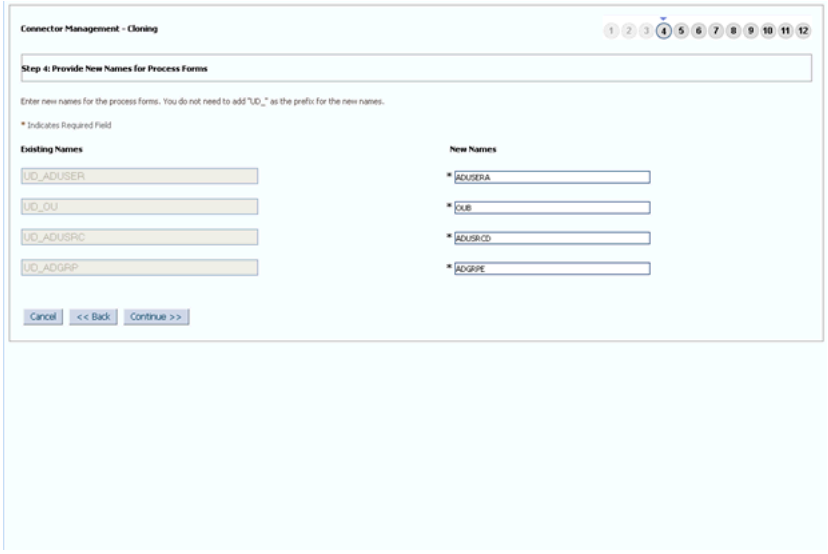
6. On the Step 4: Provide New Names for Process Forms page, enter new names for the process forms of the clone.

   If the connector has multiple process forms, then the new name that you specify for each process form must be different from the names of all the existing process forms of that connector.

   Click **Continue** after you specify new names for all the process forms.

   Figure 6–18 shows the Provide New Names for Process Forms page of the Connector Management - Cloning wizard:

Figure 6–18 The Provide New Names for Process Forms Page



7. On the Step 5: Provide New Names for IT Resource Type Definitions page, enter new names for the IT resource type definitions of the clone.

If the connector has multiple IT resource type definitions, then the new name that you specify for each IT resource type definition must be different from the names of all the existing IT resource type definitions of that connector.

Click **Continue** after you specify new names for all the IT resource type definitions.

Figure 6–19 shows the Provide New Names for IT Resource Type Definitions page of the Connector Management - Cloning wizard:

Figure 6–19 The Provide New Names for IT Resource Type Definitions Page

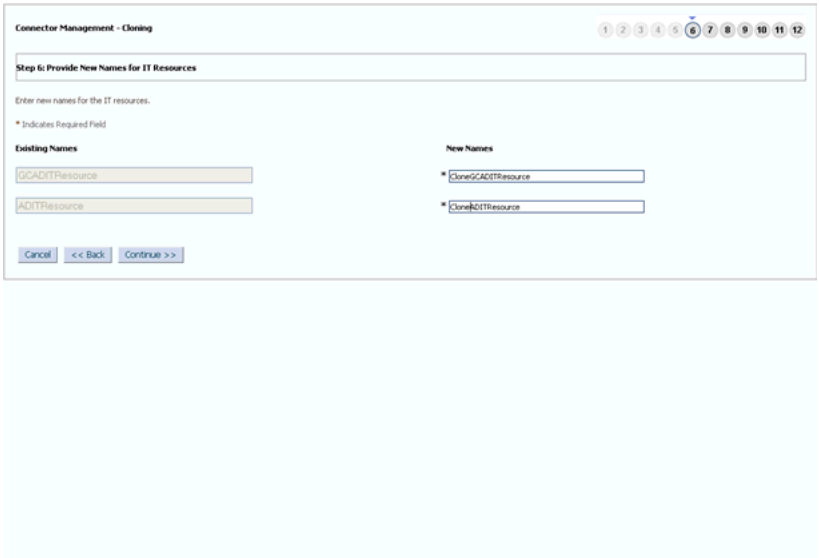
8. On the Step 6: Provide New Names for IT Resources page, enter new names for the IT resources of the clone.

   If the connector has multiple IT resources, then the new name that you specify for each IT resource must be different from the names of all the existing IT resources of that connector.

   Click **Continue** after you specify new names for all the IT resources.

   Figure 6–20 shows the Provide New Names for IT Resource Type Definitions page of the Connector Management - Cloning wizard:

Figure 6–20 The Provide New Names for IT Resources Page



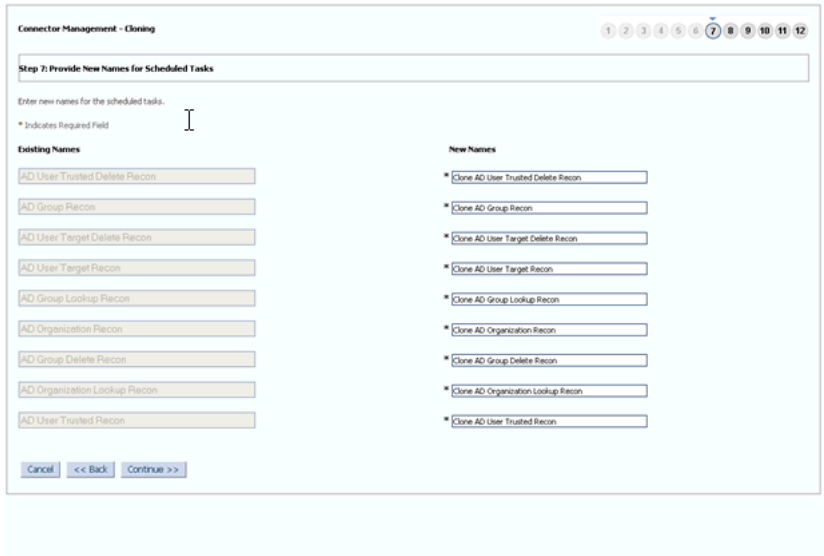
9. On the Step 7: Provide New Names for Scheduled Tasks page, enter new names for the scheduled tasks of the clone.

   Enter new names for the scheduled tasks. However, you cannot use the same set of scheduled tasks for the clone and the original connector.

   Click **Continue**.

   Figure 6–21 shows the Provide New Names for Scheduled Tasks page of the Connector Management - Cloning wizard:

Figure 6–21 The Provide New Names for Scheduled Tasks Page



10. On the Step 8: Provide New Names for Lookup Type Definitions page, enter new names for the lookup definitions of the clone.

    Click **Continue**.

Figure 6–22 shows the Provide New Names for Lookup Type Definitions page of the Connector Management - Cloning wizard:

Figure 6–22 The Provide New Names for Lookup Type Definitions Page

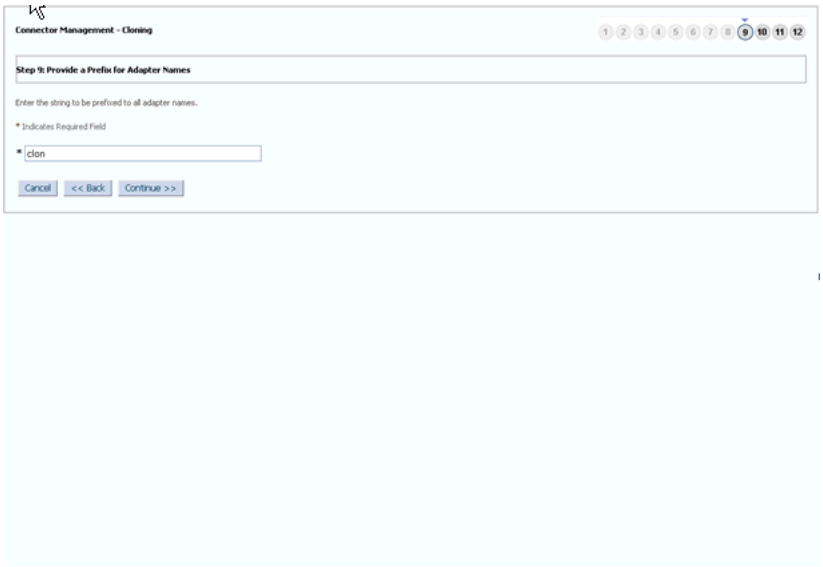
11. On the Step 9: Provide a Prefix for Adapters page, enter the string that will be set as the prefix for the copies of the adapters. Then, click **Continue**.

You must ensure that the prefix that you specify does not cause the full name of any adapter to exceed 80 characters. The Clone Connectors feature cannot check if this limit is exceeded. However, when you import the connector XML file created for the clone, the Deployment Manager throws an error. Remember that the Deployment Manager is called even when you build a deployment package for the clone and use the Install Connectors feature to install the clone.

You can use the Design Console to determine the character length of the longest adapter name.

Figure 6–23 shows the Provide a Prefix for Adapters page of the Connector Management - Cloning wizard:

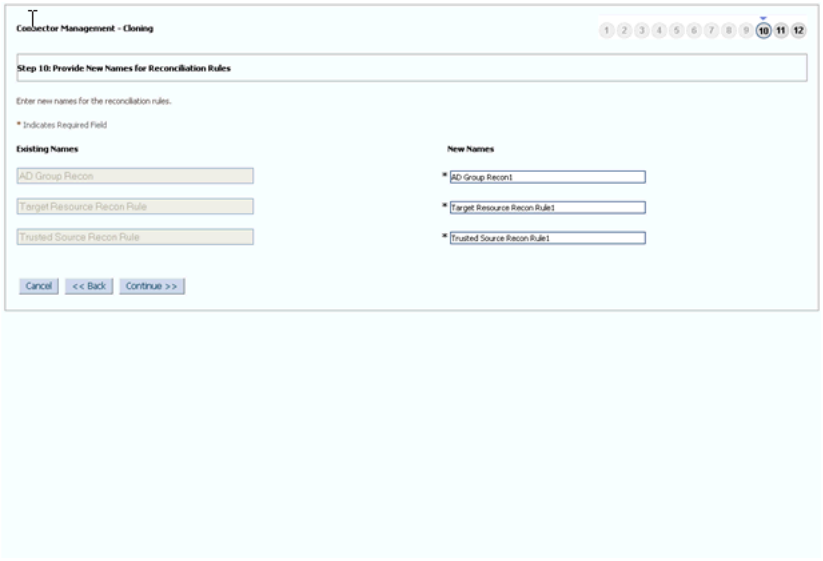
Figure 6–23 The Provide a Prefix for Adapters Page



12. On the Step 10: Provide New Names for Reconciliation Rules page, enter new names for the reconciliation rules of the clone.

    Figure 6–24 shows the Provide New Names for Reconciliation Rules page of the Connector Management - Cloning wizard:

Figure 6–24 The Provide New Names for Reconciliation Rules Page



13. On the Step 11: Object Names Summary page, review the names that you have set for the connector objects of the clone and then click **Continue**.

Figure 6–25 shows the Object Names Summary page of the Connector Management - Cloning wizard:

Figure 6–25 The Object Names Summary Page

Connector Management - Cloning

1 2 3 4 5 6 7 8 9 10 **11** **12**

Step 11: Object Names Summary

Review the new object names, and then click Confirm to proceed with the cloning operation.

Resource Objects mapping summary.

Existing Object Names	New Object Names
AD Group	Clone AD Group
AD Organization Unit	Clone AD Organization Unit
AD User	Clone AD User
AD User Trusted	Clone AD User Trusted

Process Definition mapping summary.

Existing Object Names	New Object Names
AD Organization Unit	Clone AD Organization Unit
AD User	Clone AD User
AD Group	Clone AD Group
AD User Trusted	Clone AD User Trusted

Process Form mapping summary.

Existing Object Names	New Object Names
UD_ADUSER	UD_ADUSERA
UD_OU	UD_OUB
UD_ADUSRC	UD_ADUSRCD
UD_ADGRP	UD_ADGRPE

IT Resource type definition mapping summary.

Existing Object Names	New Object Names
AD Server	Clone AD Server

IT Resource mapping summary.

Existing Object Names	New Object Names
GCADITResource	CloneGCADITResource
ADITResource	CloneADITResource

Scheduled tasks mapping summary.

Existing Object Names	New Object Names
AD User Trusted Delete Recon	Clone AD User Trusted Delete Recon
AD Group Recon	Clone AD Group Recon
AD User Target Delete Recon	Clone AD User Target Delete Recon
AD User Target Recon	Clone AD User Target Recon
AD Group Lookup Recon	Clone AD Group Lookup Recon
AD Organization Recon	Clone AD Organization Recon
AD Group Delete Recon	Clone AD Group Delete Recon
AD Organization Lookup Recon	Clone AD Organization Lookup Recon
AD User Trusted Recon	Clone AD User Trusted Recon

Lookup definitions mapping summary.

Existing Object Names	New Object Names
Lookup.AD Group Type	Lookup.CloneAD Group Type
Lookup.AD.FieldsForValidation	Lookup.CloneAD.FieldsForValidation
AtMap.ADAMGroup	AtMap.CloneADAMGroup
Lookup.ADReconciliation.TransformationMap	Lookup.CloneADReconciliation.TransformationMap
AtMap.AD.RemoteScriptlookUp	AtMap.CloneAD.RemoteScriptlookUp
Lookup.AD.BLOBAttribute.Values	Lookup.CloneAD.BLOBAttribute.Values
Lookup.ADAMReconciliation.FieldMap	LookupClone.ADAMReconciliation.FieldMap
AtMap.ADAM	AtMap.CloneADAM
Atmap.RM	Atmap.CloneRM
Lookup.AD.Constants	Lookup.CloneAD.Constants
Lookup.ADReconciliation.Organization	Lookup.CloneADReconciliation.Organization
Lookup.AD.Country	Lookup.CloneAD.Country
AtMap.ADGroup	AtMap.CloneADGroup
Lookup.ADReconciliation.FieldMap	Lookup.CloneADReconciliation.FieldMap
lookup.AD.GroupChildData	lookup.CloneAD.GroupChildData
Lookup.ADReconciliation.GroupLookup	Lookup.CloneADReconciliation.GroupLookup
AtMap.AD	AtMap.CloneAD
Lookup.AD.Domains	Lookup.CloneAD.Domains
Lookup.ADGroupReconciliation.FieldMap	Lookup.CloneADGroupReconciliation.FieldMap
Lookup.ADAMGroupReconciliation.FieldMap	Lookup.CloneADAMGroupReconciliation.FieldMap
Lookup.AD.Configuration	Lookup.CloneAD.Configuration

Adapter names mapping summary.

Existing Object Names	New Object Names
ADCS Update Multi Attribute Data	ClonADCS Update Multi Attribute Data
ADCS Prepopulate User Last Name	ClonADCS Prepopulate User Last Name
ADCS Execute Remote Script	ClonADCS Execute Remote Script
ADCS Change Org Name	ClonADCS Change Org Name
ADCS Prepopulate User Password	ClonADCS Prepopulate User Password
ADCS Prepopulate User Middle Name	ClonADCS Prepopulate User Middle Name
ADCS Rename Group	ClonADCS Rename Group
ADCS Must Change PWD	ClonADCS Must Change PWD
ADCS Lock_Unlock User	ClonADCS Lock_Unlock User
ADCS Remove User From Group	ClonADCS Remove User From Group
ADCS Add User To Group	ClonADCS Add User To Group
ADCS Prepopulate UserPrincipalName	ClonADCS Prepopulate UserPrincipalName
ADCS Rename User Account	ClonADCS Rename User Account
ADCS Get Group ObjectGUID Created	ClonADCS Get Group ObjectGUID Created
ADCS Prepopulate AD Group Name	ClonADCS Prepopulate AD Group Name
ADCS Remove Multi Attribute Data	ClonADCS Remove Multi Attribute Data
ADCS Get USNChanged	ClonADCS Get USNChanged
ADCS Pwd Never Expires	ClonADCS Pwd Never Expires
ADCS Set User Password	ClonADCS Set User Password
ADCS Get USNCreated	ClonADCS Get USNCreated
ADCS Update Redirect Mail ID	ClonADCS Update Redirect Mail ID
ADCS Check Process Parent Org	ClonADCS Check Process Parent Org
ADCS Add Multi Attribute Data	ClonADCS Add Multi Attribute Data
ADCS Create Group	ClonADCS Create Group
ADCS Set Account Exp Date	ClonADCS Set Account Exp Date
ADCS Disable User	ClonADCS Disable User
ADCS Move User	ClonADCS Move User
ADCS Create OU	ClonADCS Create OU
ADCS Change Attribute	ClonADCS Change Attribute
ADCS Delete OU	ClonADCS Delete OU
ADCS Create User	ClonADCS Create User
ADCS Prepopulate User Full Name	ClonADCS Prepopulate User Full Name
ADCS Prepopulate User First Name	ClonADCS Prepopulate User First Name
ADCS Delete User	ClonADCS Delete User
ADCS Update Add User to Group	ClonADCS Update Add User to Group
ADCS Move Group	ClonADCS Move Group
ADCS Move OU	ClonADCS Move OU
ADCS Prepopulate User Login	ClonADCS Prepopulate User Login
ADCS Delete Group	ClonADCS Delete Group
ADCS Change Group Attribute	ClonADCS Change Group Attribute
ADCS Enable User	ClonADCS Enable User

Reconciliation rules mapping summary.

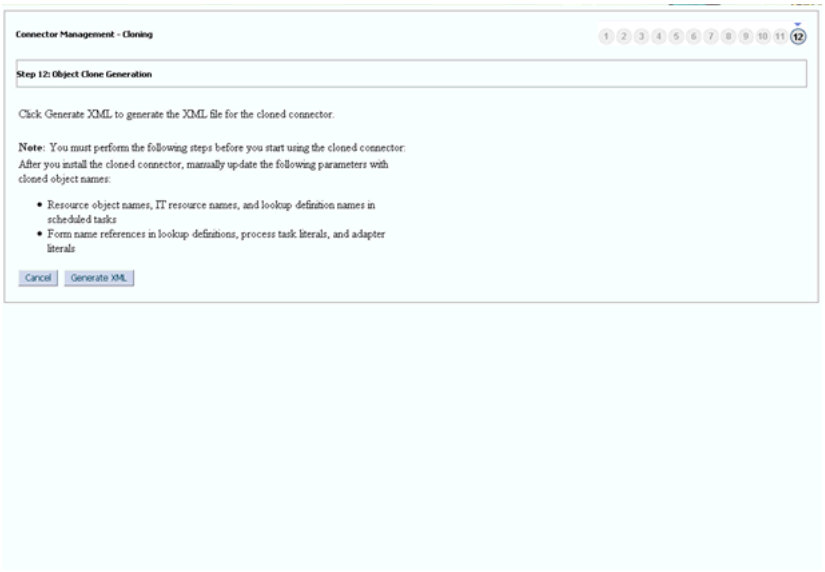
Existing Object Names	New Object Names
AD Group Recon	AD Group Recon1
Target Resource Recon Rule	Target Resource Recon Rule1
Trusted Source Recon Rule	Trusted Source Recon Rule1

Cancel << Back Confirm

14. On the Step 12: Object Clone Generation page, click **Generate XML**.

    Figure 6–26 shows the Object Clone Generation page of the Connector Management - Cloning wizard:

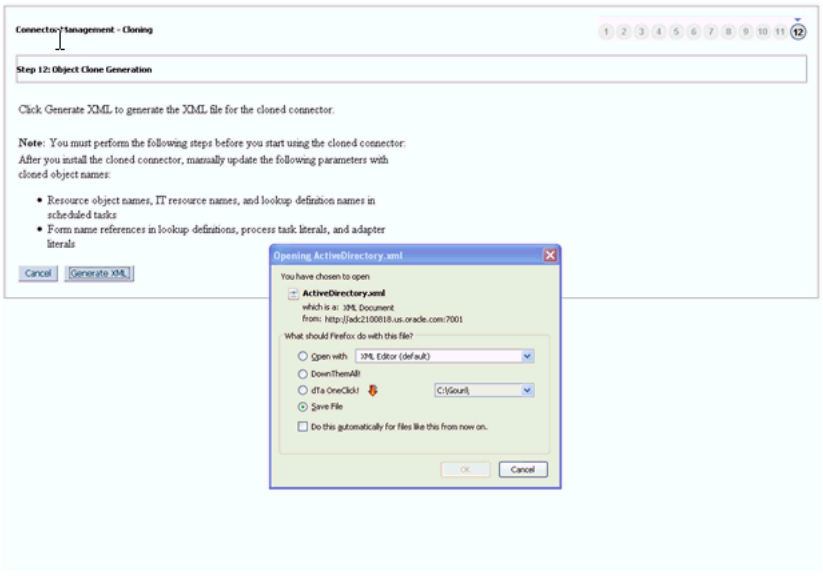
Figure 6–26 The Object Clone Generation Page



15. In the File Download dialog box, use the Save option to save the connector XML file of the clone to a location of your choice.

    Figure 6–27 shows the File Download dialog box:

Figure 6–27 The File Download Dialog Box



Step 2: Install the clone connector

You can install the clone connector by using one of the following approaches:

Note: You can install the clone connector on either the same or a different Oracle Identity Manager installation.

- Use the Deployment Manager to import the connector XML file. If you use Deployment Manager import to install the connector, then you need to define the cloned connector. This will enlist the cloned connector in the list of connectors in Connector Management Search. If the connector is imported in different Oracle Identity Manager environment where the original connector does not exist, then you need to upload the related Jar files of the connector using JarUpload utility.
- Create a deployment package for the cloned connector, and then install it using the Install Connectors feature. For a sample, see the contents of the deployment package for any Oracle-released connector.

6.6.3 Postcloning Steps

After a copy of the connector is created by setting new names for connector objects, some objects might contain the details of the old connector objects. Therefore, you must modify the following Oracle Identity Manager objects to replace the base connector artifacts or attribute references with the corresponding cloned artifacts or attributes:

- **Lookup Definition:** If the lookup definition contains the old lookup definition details, then it must be modified to provide the new cloned lookup definition names. If the encode and decode values are referring the base connector attribute references, then these must be replaced with new cloned attributes.
- **Scheduled Task:** The base connector resource object name in the scheduled task must be replaced with the cloned resource object name. If the scheduled task parameter has any data referring to the base connector artifacts or attributes, then these must be replaced with the new cloned connector artifacts or attributes.

6.7 Exporting Connector Object Definitions in Connector XML Format

As mentioned earlier, the Oracle Identity Manager database stores the definitions of all connector objects. You can export these definitions to create a connector XML file for a particular connector. By using the Deployment Manager, you can import the connector XML file to create the connector object definitions in another Oracle Identity Manager installation.

Alternatively, you can use the connector XML file as one of the components of a deployment package that you create for the connector. This deployment package can then be installed using the Install Connectors feature. For a sample, see the contents of the deployment package for any Oracle-released connector. Another important component of a deployment package is the configuration XML file, which is used by the Install Connectors feature. You must manually create the configuration XML file.

See Also : Connector guide for information about the contents of the configuration XML file

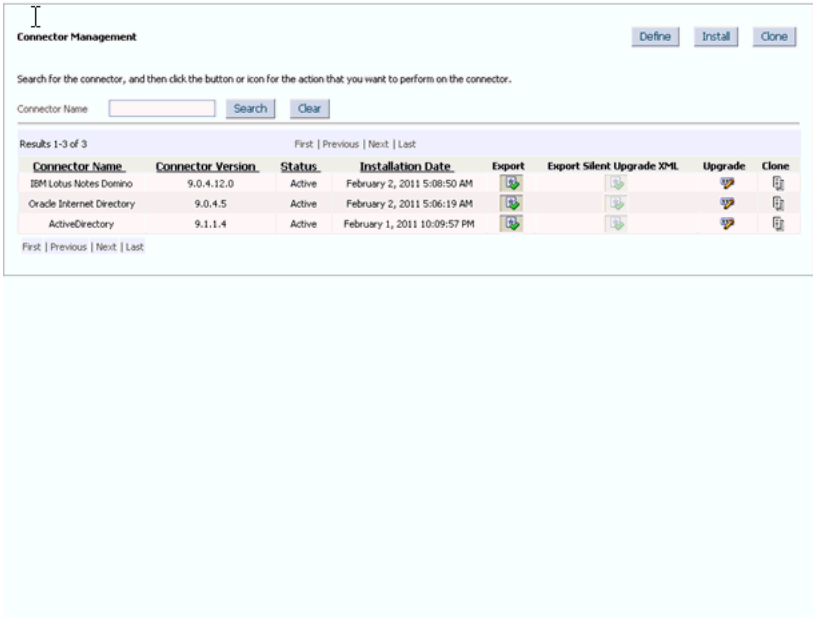
To export connector object definitions in connector XML format:

1. Log in to Oracle Identity Manager Administrative and User Console.
2. On the left pane, expand **System Management**, **Deployment Manager**, and then click **Manage Connector**.

3. You can use one of the following options to export the connector XML file:
   - If you want the XML file to include definitions of only specific connector objects, then use the Export button to open the Deployment Manager. See the "Using the Deployment Manager" chapter in the connector guide for detailed information about using this feature to select connector objects whose definitions you want to include in the connector XML file.
   - If you want to create the connector XML file out of the connector XML stored in the database when the connector was defined, then:
     a. In the Connector Management page, use the Search feature to display the connector for which you want to create the connector XML file.
     b. Use the Export icon displayed in the connector row to export the connector XML file from the entry created in the database when defining the connector.

        Figure 6–28 shows the Connector Management page:

Figure 6–28 The Connector Management Page



6.8 Upgrading Connectors

The following are sample scenarios that describe a need for upgrading a connector:

- Reconfiguring or customizing an existing connector

  After you install a connector, you might customize or reconfigure it according to your requirements. For example, you might add new attributes for reconciliation and provisioning and modify the scheduled tasks for reconciliation or lookup field synchronization. Ideally, you would make these changes to the connector on a staging server. You would then want to upgrade the connector deployed on your production server to the version that you create by making changes on the staging server.

- Upgrading a customer-developed connector

You might have developed your own connector. When an Oracle-released upgrade is available for your connector, you might want to upgrade from your connector to the Oracle-released connector. For example, suppose you have developed and are using a connector for IBM Lotus Notes and Domino. When Oracle ships a new release of Oracle Identity Manager Connector for IBM Lotus Notes and Domino, you might want to use some of the features included in the new release. You can use the Upgrade Connectors feature to upgrade from your connector to the Oracle-released connector.

- Upgrading an Oracle-released connector

  Oracle ships connector upgrades. An upgrade includes enhancements and fixes that you might need. For example, if you are currently using SAP User Management release 9.1.2, then you might want to upgrade to release 9.1.2.3 of the same connector when that release is available.

In scenarios such as these, you can use the Upgrade Connectors feature to upgrade the connector.

Upgrading connectors can be done by two ways:

- Silent mode upgrade: Used in staging and production environments
- Wizard mode upgrade: Used in development environment

In this guide, Wizard upgrade, which is performed using Oracle Identity Manager Administrative and User Console pages is described.

This section is divided into the following topics:

- Upgrade Use Cases Supported by the Connector Upgrade Feature
- Summary of the Upgrade Procedure
- Procedure to Upgrade a Connector

6.8.1 Upgrade Use Cases Supported by the Connector Upgrade Feature

The following types of source connectors are supported by the Upgrade Connectors feature:

- Customer-developed connectors
- Oracle-released connectors that are not supported by the Install Connectors feature
- Oracle-released connectors that are supported by the Install Connectors feature
- Oracle-released connectors that are supported by the Install Connectors feature and have been customized
- Cloned connectors

The upgrade process does not cover the following objects:

- E-mail definitions
- Password policies
- Error message definitions
- Business rule definitions
- Object forms
- Access policies

Note:

- Connector lifecycle management does not support the upgrade of a trusted connector if the source connector uses the Xellerate User resource object for trusted source configuration. Therefore, you must manually upgrade the connector. Contact Oracle Support for more information.
- Connector lifecycle management does not support the upgrade of a connector from the target mode (source version) to the trusted mode (target version). Similarly, upgrading from trusted mode to the target mode is also not supported.

Use Case 1: Custom-Developed Source Connector

A custom-developed source connector must meet the following requirements so that it is compatible with the Upgrade Connectors feature:

- The connector must be defined in Oracle Identity Manager. See "Defining Connectors" on page 6-11 if you want to manually define the connector.
- The connector must have a configuration XML file. See the connector guide for information about configuration XML files.

The following are sample events that can take place before you upgrade a custom-developed source connector:

- You develop the connector and its configuration XML file.
- Create a deployment package that is compatible with the Connector Installation feature. When you use this feature to deploy the connector on the production server, the connector is automatically defined at the end of the installation process.
- You use the connector for reconciliation and provisioning. Target system resources are allocated (through reconciliation and provisioning) for OIM Users.
- You modify the connector on the staging server, redefine it, and then regenerate the connector XML file.

Use Case 2: Oracle-released connector that is not supported by the Install Connectors feature

A connector that is not supported by the Install Connectors feature connector must meet the following requirements so that it is compatible with the Upgrade Connectors feature:

- The connector must be defined in Oracle Identity Manager. See "Defining Connectors" on page 6-11 if you want to manually define the connector.
- The connector must have a configuration XML file. See the connector guide for information about configuration XML files.

Sample events and the upgrade procedure for this use case are the same as those for Use Case 1.

Use Case 3: Oracle-released connector that is installed using the Install Connectors feature

A connector that is installed using the Install Connectors feature meets the requirements specified for Use Cases 1 and 2.

Use Case 4: Oracle-released connector that has been installed and then customized

A connector that is supported by the Install Connectors feature meets the requirements specified for Use Cases 1 and 2. However, customizations are overwritten during the upgrade process. For example, if you have added an attribute in a scheduled task and also modified the JAR file for reconciliation, then this customization would be lost after the upgrade. To work around this issue:

1. Keep a record of customizations that you implement on a connector.
2. After you upgrade the connector, reapply the customizations.

Use Case 5: Cloned connector

A connector that is installed using the Clone Connectors feature meets the requirements specified for Use Cases 1 and 2.

After the upgrade operation, you can use each clone to manage resource data that was collected through the clone before the upgrade.

6.8.2 Connector Object Changes Supported by the Upgrade Connectors Feature

Before you upgrade a connector, you might have reconfigured or customized the connector by making changes in individual connector objects. The upgrade process itself changes individual connector objects. The following sections list connector object changes supported by the Upgrade Connectors feature. These changes may have been performed manually (that is, at any time before the Upgrade Connectors feature is used) or may be performed by the Upgrade Connectors feature itself.

- Resource Object Changes
- Process Definition Changes
- Connector Code Files Changes
- Process Form Changes
- Lookup Definition Changes
- Adapter Changes
- Rule Changes
- IT Resource Type Changes
- IT Resource Changes
- Scheduled Task Changes

6.8.2.1 Resource Object Changes

The Upgrade Connectors feature can run on a resource object on which any combination of the following changes have been made. In addition, an upgrade operation might involve any combination of the following changes to a resource object.

- Status definitions can be added or deleted.
- Administrators can be assigned or deleted.
- Password policies can be added or deleted.
- User-defined fields (UDFs) can be added or deleted.
- Dependencies with other resource objects can be assigned or deleted.

- Object authorizers can be assigned or deleted. In addition, the priority number assigned to the authorizers can be modified.
- Process determination rules can be assigned or deleted.
- Event-handler adapters can be assigned or deleted.
- Resource object fields that are not present in the connector XML of the target connector are marked as obsolete.
- Customizations performed on the resource object are not retained.

After the upgrade, the new name of the resource object is the one specified in the connector XML of the target connector.

6.8.2.2 Process Definition Changes

The Upgrade Connectors feature can run on a process definition on which any combination of the following changes have been made. In addition, an upgrade operation might involve any combination of the following changes to a process definition.

- The existing process definition can be replaced by a new process definition.
- The existing provisioning definition can be renamed.
- Existing reconciliation field mappings can be retained without change or modified.
- New process tasks can be added.
- Custom process tasks can be retained without a change.
- Default process tasks can be retained, but you need to confirm that there are no changes in the default process task in the new version. Refer to the connector guide for more information.
- Any combination of the following changes can be made to an existing process task:
  - The name and properties of the task can be modified.
  - An attached event handler-adapter can be modified.
  - Preceding and dependent tasks can be added, modified, or deleted.
  - New response codes can be added.
  - Existing response codes can be modified or deleted.
  - New tasks can be generated.
  - Undo tasks and recovery tasks can be modified.
  - Task-to-object status mapping can be modified.
  - Assignment rules can be modified.
- Existing process tasks can be deleted.

After the upgrade, the new name of the process definition is the one specified in the connector XML of the target connector.

6.8.2.3 Connector Code Files Changes

During an upgrade operation, you need copy connector code files, which include JAR files and scripts to the specified directories. To do so:

1. Manually upload all the connector specific jars (excluding common library files Common.jar, FAMILYCommon.jar, and icf-Common.jar) present in the "lib" folder of the connector distribution bundle using UpdateJars utility (available under *OIM_HOME*/server/bin) to Oracle Identity Manager database.
2. Download common library (Common.jar, FAMILYCommon.jar and icf-Common.jar) from Oracle Identity Manager database using DownloadJar utility (available under *OIM_HOME*/server/bin).
3. Extract MANIFEST.MF from the downloaded libraries. Compare this version of MANIFEST.MF with the version in MANIFEST.MF of the common libraries that is available as part of converged distribution bundle. If the distributed library version is higher than the one downloaded from Oracle Identity Manager database, then use the UploadJar utility (available under OIM_HOME/server/bin) to upload the common libraries to Oracle Identity Manager database.

6.8.2.4 Resource Object Changes

To update the resource bundles:

1. If there are any customization on the resource bundles such as adding new entries to the connector resource bundles, the changes need to be applied on the resource bundles present in the "resources" folder of the connector distribution bundle. The existing resource bundles present in Oracle Identity Manager database can be downloaded using the DownloadResourceBundles utility available under *OIM_HOME*/server/bin.
2. Use DownloadResourceBundles utility (available under *OIM_HOME*/server/bin) to delete all the resource bundles specific to the connector from Oracle Identity Manager database.
3. Use UploadResourceBundles utility (available under *OIM_HOME*/server/bin) to upload all the resource bundles specific to the connector to Oracle Identity Manager database.

6.8.2.5 Process Form Changes

The Upgrade Connectors feature can run on a process form on which any combination of the following changes have been performed. In addition, an upgrade operation might involve any combination of the following changes to a process form.

Note:

- An upgrade operation works on only the active version of the process form. No changes are made to earlier versions.
- The existing process form cannot be renamed.

- Columns can be added, modified, or deleted.
- Child forms can be added, modified, or deleted.
- Pre-populate adapters can be added.
- The name, mappings, order, and rule of existing pre-populate adapters can be modified.
- The user can manually add the customizations to the active version if they wish to add certain fields to the new version that were present in the existing form.

- If the form attribute is retained and the corresponding connector objects, for example Lookup Definition and IT Resource Type Definition are removed to which this attribute has references, then you need to modify the form attribute properties by pointing it to the correct connector object.

After the upgrade, the name of the process form is the version number of the upgraded connector.

6.8.2.6 Lookup Definition Changes

The Upgrade Connectors feature can run on a lookup definition on which any combination of the following changes have been made. In addition, an upgrade operation might involve any combination of the following changes to a lookup definition.

- Lookup definitions can be added.

> **Note:** Existing lookup definitions are not deleted during an upgrade operation.

- Existing lookup definitions can be retained or modified. During an upgrade operation, new entries in an existing lookup definition are appended after the existing entries.

6.8.2.7 Adapter Changes

The Upgrade Connectors feature can run on an adapter on which any combination of the following changes have been made. In addition, an upgrade operation might involve any combination of the following changes to an adapter.

> **Note:** Existing adapters are not deleted during an upgrade operation.

- New adapters can be added.
- The custom adapters are retained as part of upgrade. If there are any customization on the default adapters, these changes need to be applied after upgrade as all the default adapters will be overwritten.
- After applying the customization on the default adapters (if there are any), the corresponding mapping for these adapters in Process Task, form field, and data object manager need to be verified for mapping.

6.8.2.8 Rule Changes

The Upgrade Connectors feature can run on a rule on which any combination of the following changes have been made. In addition, an upgrade operation might involve any combination of the following changes to a rule.

- New rules can be added.
- If there are any customizations in default Rules, these customizations need to be applied after the upgrade as all default Rules will be overwritten.

6.8.2.9 IT Resource Type Changes

The Upgrade Connectors feature can run on an IT resource type on which any combination of the following changes have been made. In addition, an upgrade

operation might involve any combination of the following changes to an IT resource type.

- The existing IT resource type can be replaced by a new IT resource type.
- In an existing IT resource type, new parameters can be added and existing parameters can have their default values and types modified or deleted.
- All custom parameters are displayed while mapping IT Resource Type definitions. You can retain the custom parameters.

6.8.2.10 IT Resource Changes

The Upgrade Connectors feature can run on an IT resource on which any combination of the following changes have been made. In addition, an upgrade operation might involve any combination of the following changes to an IT resource.

- The parameter retained for IT Resource Type definition will be available for all the IT Resource instances of this type. If an existing parameter in IT Resource Type definition is not retained, then this parameter will not available in all the IT Resource instances of this type.
- In an existing IT resource, new parameters can be added and existing parameters can have their default values and types modified or deleted.

After the upgrade, the new name of the IT Resource Type definition is the one specified in the connector XML of the target connector.

6.8.2.11 Scheduled Task Changes

The Upgrade Connectors feature can run on a scheduled task that has been retained or existing scheduled tasks have been replaced by new scheduled tasks.

6.8.3 What Happens When You Upgrade a Connector

See Upgrade Use Cases Supported by the Connector Upgrade Feature for information about the changes that can be put into effect when you upgrade a connector.

In addition, the following events are part of the outcome of an upgrade operation:

- While performing the upgrade procedure, you are prompted to map new connector objects with existing objects. For example, you are prompted to map each resource object in the target connector with a resource object in the source connector. If the object names are same in both source and target, then for the new object, the corresponding old object need to be mapped. If there are changes in the object names in source and target, then you need to map the object properly by referring the source and target connector release documents. It is your responsibility map the source and target objects properly. If the objects are not mapped properly, then the source object will be corrupted by the upgrade process. Therefore, it is mandatory that you must know about all the source and the target connector objects.

6.8.4 Summary of the Upgrade Procedure

The following is a summary of the procedure to upgrade a connector:

Note: The procedure explained in this chapter is based on the best practice in which you first perform the upgrade in a test development environment. All functional use cases need to be tested before applying the upgrade in production server. Wizard mode upgrade should not be used in production, only silent mode need to be used in production server.

1. Read through the upgrade procedure.

   This will let you make an estimate of the time for which the connector and, therefore, the target system might be unavailable to Oracle Identity Manager users. You can also determine if you have the Oracle Identity Manager expertise required to complete all the upgrade and post-upgrade steps.

2. Make a note of associations between objects of the source connector and other Oracle Identity Manager objects. For example, make a note of associations between resource objects and access policies.

3. If required, create the connector XML file for a clone of the source connector.

   If the object names in the target connector are different from object names in the source connector, then it is recommended that you first create the connector XML file for the clone connector. "Step 1: Create the connector XML file for the cloned connector" on page 6-22 describes the procedure. While performing the procedure, specify object names that are the same as object names in the target connector. This will help avoid the need for renaming connector objects after you upgrade the connector.

4. Upgrading the source connector to target connector on staging server.

   The XML file contains details of changes to be made to the connector objects of the source connector so that they are converted into the connector objects of the target connector. These changes are applied automatically during the upgrade process.

   To upgrade the source connector:

   a. Back up the Oracle Identity Manager database on the production server.

   b. Perform the steps described in "Preupgrade Procedure" on page 6-43

   c. Perform the steps described in "Silent Mode Upgrade in Staging and Production Environment" on page 6-55 The resulting transformed XML can be generated and used in production server.

5. Use the silent delta XML for connector upgrade.

   To use the delta XML file:

   a. Restore the production database on the staging server.

   b. Perform the steps described in "Preupgrade Procedure" on page 6-43

   c. Perform the steps described in "Silent Mode Upgrade in Staging and Production Environment" on page 6-55

   d. Perform the steps described in "Postupgrade Procedure" on page 6-58

6. Verify that the source connector on the production server is the same as the source connector on the staging server. If there are differences in the source connector on the staging server and the production server, then the delta XML file is not correctly imported on the production server.

7. Import the delta XML file on the production server.

After you verify that the upgraded target connector is working as expected on the staging server, perform the following steps:

a. Perform the steps described in "Preupgrade Procedure" on page 6-43

b. Perform the steps described in "Silent Mode Upgrade in Staging and Production Environment" on page 6-55

c. Perform the steps described in "Postupgrade Procedure" on page 6-58

6.8.5 Procedure to Upgrade a Connector

The following sections discuss the procedure to upgrade a connector:

- "Preupgrade Procedure" on page 6-43
- "Upgrade Procedure" on page 6-43
- "Postupgrade Procedure" on page 6-58

6.8.5.1 Preupgrade Procedure

Before you begin the upgrade procedure, ensure that the following prerequisites are addressed:

- Read through the upgrade procedure documented in this chapter.
- Note down customizations made in the connector objects on source connector.
- Call a Java API to handle workflows that are in progress. You need to make sure that there are no requests in pending state for the resource objects that are part of this connector. You also need to complete all the requests before going for connector upgrade. Requests can be closed if they are in a closable state. All the requests associated with the connector resource objects should in one of the following states before starting the upgrade process.
  - Request Completed
  - Request Closed
  - Request Withdrawn
  - Request Failed
  - Template Approval Rejected
  - Request Approval Rejected
  - Operation Approval Rejected
- If required, create the connector XML file for a clone of the source connector.
- Disable all the scheduled tasks.

6.8.5.2 Upgrade Procedure

Upgrading connectors is a two-stage procedure:

- Wizard Mode Upgrade in Staging Environment
- Silent Mode Upgrade in Staging and Production Environment

Wizard Mode Upgrade in Staging Environment

Note: You need to perform preupgrade and post upgrade steps while performing wizard mode upgrade.

To perform the wizard mode upgrade on the staging server:

1. Create a backup of the Oracle Identity Manager database.
2. Create Oracle Identity Manager metadata (MDS) backup. See "MDS Utilities and User Modifiable Metadata Files" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about the utilities that you can use to modify Oracle Identity Manager metadata.
3. Run the connector preupgrade utility.

   A validation script is provided with Oracle Identity Manager. This script performs the following functions:

   - Determines whether the connector that you want to upgrade has been defined in Oracle Identity Manager

     In other words, the script checks whether the connector XML stored in the database when the connector was installed/defined is consistent with the connector object definitions in the database. Apart from checking the consistency of the connector XML, it also checks whether the Connector XML is present in Oracle Identity Manager Database or not. If it is not present, then it displays the corresponding message to define the connector before proceeding with upgrade. Refer the "Defining Connectors" on page 6-11 to perform the procedure to define a connector.
   - Identifies the Oracle Identity Manager scheduled tasks that are currently running.

     You must disable all scheduled tasks that belong to the source connector before you proceed with the upgrade procedure. In addition, it is recommended to disable all other scheduled tasks before proceeding with the upgrade procedure.
   - Identifies the Attestation tasks associated with the resource object of the connector.

     You must complete all the attestation tasks that belong to the source connector before you proceed with the upgrade procedure.
   - Identifies all the pending requests associated with the resource objects of the connectors.

     You must either close or complete all the pending requests that belong to the source connector before you proceed with the upgrade procedure.

   To run the validation script:

   a. Ensure that Oracle Identity Manager is running.
   b. In a command window, change to the *OIM_HOME*/server/bin directory.
   c. Run the script as follows:

      For Unix:

      ```
      sh ConnectorPreUpgradeUtil.sh
      ```

For Windows:

```
ConnectorPreUpgradeUtil.bat
```

You will be prompted to provide the following details:

- Enter Oracle Identity Manager administrator's username: Enter the Oracle Identity Manger administrator's username.
- Enter Oracle Identity Manager administrator's password: Enter the Oracle Identity Manger administrator's password.
- Enter t3 Oracle Identity Manager Server URL: Enter the Oracle Identity Manger server URL. For example, t3://hostname:hostport.
- Enter OIM Database username: Enter the Oracle Identity Manager Database's username.
- Enter OIM Database Password: Enter the password of the Oracle Identity Manager Database.
- Enter the JDBC URL for the OIM Database: Enter the JDBC URL of the Oracle Identity Manager Database. For Example:

  jdbc:oracle:thin:@*HOST_NAME*:*DB_PORT*:iam/*ORACLE_SID*

  After the successful login, you will be prompted to provide the following details:
- Enter the connector name: Enter the connector name to be validated before upgrade.
- Enter the connector version: Enter the connector version to be validated before upgrade.

On successfully connecting to the Oracle Identity Manager database, a message is displayed.

The output generated by the script is displayed in the command window and is also recorded in the *OIM_HOME*/server/bin/validateUtil.log file.

The action that you must take depends on the message generated by the script:

- If the message states that the connector XML in the database is not consistent with the connector objects defined in the database, then perform the procedure described in the "Defining Connectors" on page 6-11 of the connector guide.
- If the message states that the "connector XML does not exists in Oracle Identity Manager database. Define a connector before upgrade.", then perform the procedure described in the "Defining Connectors" on page 6-11 section of the connector guide before proceeding with upgrade
- If the message contains the names of the scheduled tasks that are currently running, then you must disable all scheduled tasks. To disable a scheduled task, in the Advanced Administration, click **System Management**, search for scheduled jobs, and click the specific scheduled job, and then click **Stop**.
- If the message contains the names of the Attestation Processes of which some attestation tasks associated with the resource object of the connector is pending, then you must complete all the attestation tasks belonging to the connector that you are upgrading before proceeding with the upgrade process.

- If the message contains the names of the pending requests associated with the resource object of the connector, then you must either close or complete all the pending requests belonging to the connector that you are upgrading before proceeding with the upgrade process.

4. Copy the JARs and the resource bundles to the specified directories.

   If the target release also contains new or updated JARs and resource bundles, then download the version of the jar to Oracle Identity Manager, check the version of the jar which is shipped with Oracle Identity Manager, compare these files and copy the JARs manually to their destination directories. For an Oracle-shipped connector, details of the destination directories are given in the connector guide. See the "Connector Code Files Changes" on page 6-38 for more information.

5. Use the Upgrade Connectors feature.

   a. Log in to the Oracle Identity Manager Advanced Administrative Console.

   b. On the left pane, expand **System Management**, **Deployment Manager**, **Manage Connector**.

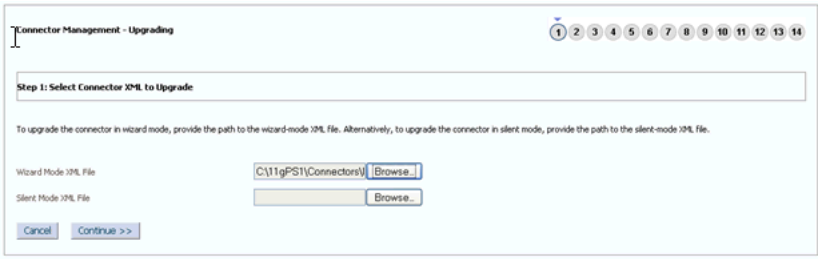
   c. Use the Search feature to search for the source connector that you want to upgrade. In the table of search results, click the Upgrade icon for the source connector.

   d. On the Step 1: Select Connector XML to Upgrade page of the utility, enter the full path and name of the connector XML file for the source release in the Wizard mode upgrade XML field. You can use the Browse option to navigate to the XML file. Make sure that you select the correct target connector XML. Upgrade feature does not validate the XML for target version or for any other connector object details.

   Note: There will be only one XML file for both trusted source reconciliation and target resource reconciliation for all the converged connectors. If you have more than one XML file, that is one for trusted source reconciliation and another for target resource reconciliation, you need to select the XML file for target resource reconciliation. Refer the connector guide (CI-XML) for the XML file name.

   Figure 6–29 shows the Select Connector XML to Upgrade page of the Connector Management - Upgrading wizard:

Figure 6–29 The Select Connector XML to Upgrade Page



e. Click **Continue**.

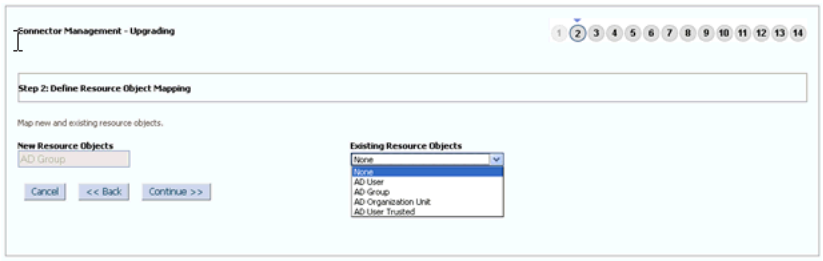
f. On the Step 2: Resource Object Mapping page, apply the following guidelines to map each new resource object with an existing resource object. Click Continue after you create each mapping.

- The New Resource Object field shows the name of a resource object in the target release. From the Existing Resource Object list, select the resource object in the source release to which you want to map the resource object in the target release. There might be a change in resource object names. It is your responsibility to map the resource object properly.
- If there are new resource objects that do not have a corresponding resource object in the source release, then select None from the Existing Resource Object list. This will happen only when the target connector versions add new resource objects that are not there in the source version.

Note: If you are upgrading from an Oracle-released source connector to an Oracle-released target connector, then see the connector guide for information about the mappings that you must create.

Figure 6–30 shows the Resource Object Mapping page of the Connector Management - Upgrading wizard:

Figure 6–30 The Resource Object Mapping Page



g. On the Step 3: Define Resource Scope page, a summary of the resource object mappings that you create is displayed. If there are resource objects in the source release that do not have corresponding resource objects in the target release, then they are displayed in the second table on this page. If you want to delete these resource objects, then select their check boxes. If a resource object is selected for deletion, then the resource will not be deleted from Oracle Identity Manager database. It just updates the OBJ_IS_SOFT_DELETE flag for the corresponding Resource Object to "1". The resource will be still available for all provisioning and reconciliation. This flag will be used in future.

Figure 6–31 shows the Define Resource Scope page of the Connector Management - Upgrading wizard:

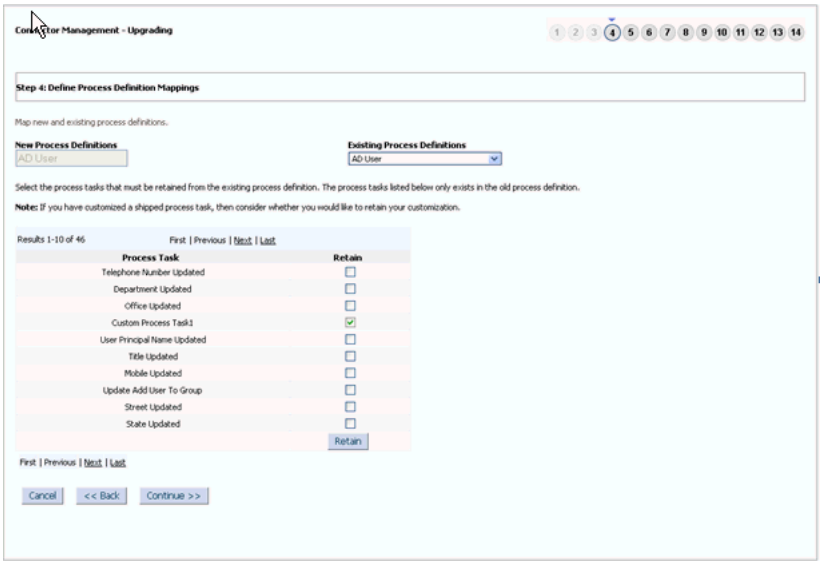
Figure 6–31 The Define Resource Scope Page

h. Click **Continue**.

i. On the Step 4: Define Process Definition Mapping page, map each new process definition with an existing process definition. Follow the guidelines given in Step f for mapping resource objects. Click Continue after you create each process definition mapping. If there are changes in the process definition names in source and target, it is your responsibility to map them properly. After selecting the corresponding source process definition for a specified target process definition, the page displays the list of process tasks available in the source process definition. You can retain the process tasks from the Source process definition. If there are any custom process tasks added to the source process definition, they can be retained. If there are any customization on the default process task, then before retaining such tasks you need to make sure there are no changes for this process task in the new connector release version by refereeing the connector guide. If a specific default process task is selected to retain, you might lose the changes (if there are any) for this process task in the new connector release. If the process tasks are part of the source connector and are not required in the target connector, then such process tasks must not be retained. It is recommended only to retain tasks that are added by user as part of customization of the source connector.

Figure 6–32 shows the Define Process Definition Mapping page of the Connector Management - Upgrading wizard:

Figure 6–32 The Define Process Definition Mapping Page



j. On the Step 5: Process Definition Mapping Summary page, a summary of the process definition mappings that you create is displayed. Click Continue to proceed.

Figure 6–33 shows the Process Definition Mapping Summary page of the Connector Management - Upgrading wizard:

Figure 6–33 The Process Definition Mapping Summary Page

k. On the Step 6: Define Form Mappings page, map each new form with an existing form. Follow the guidelines given in Step f for mappings resource objects. In addition, apply the following guideline and then click Continue after you create a mapping for each form. When a source process form is selected for each target, the page displays list of process form fields from the source process form attributes, which are not available in the target process form. These attributes either added to the source process as a part of customization or these were default attributes part of the source process form which may not be required for the target. You can select the attributes which are added as a part of customization, but need to verify if a default attribute is required in the target before retaining it.

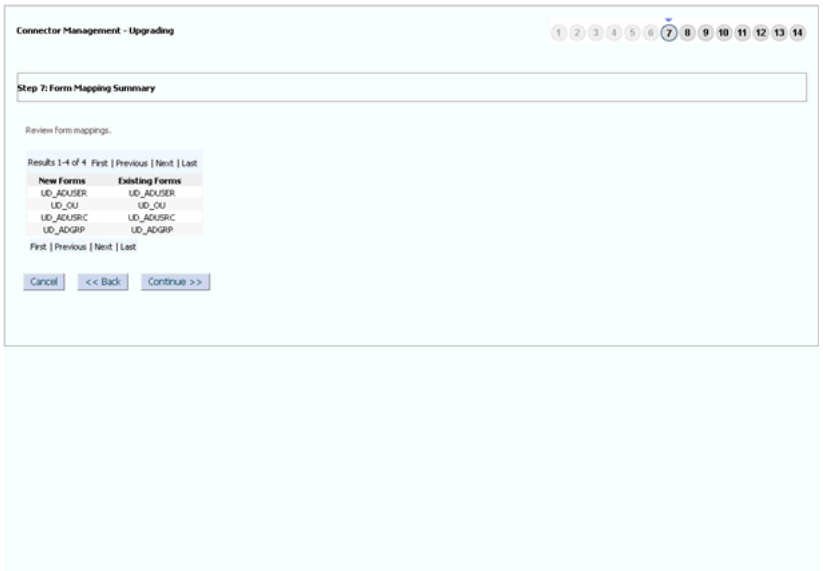
Figure 6–34 shows the Define Form Mappings page of the Connector Management - Upgrading wizard:

Figure 6–34 The Define Form Mappings Page

l. On the Step 7: Form Mapping Summary page, a summary of the form mappings that you create is displayed. Click Continue to proceed.

Figure 6–35 shows the Form Mapping Summary page of the Connector Management - Upgrading wizard:

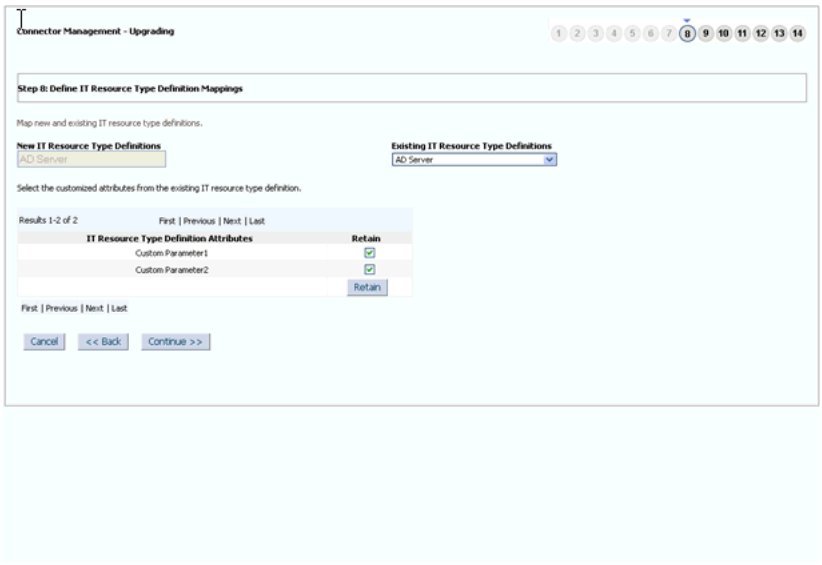
Figure 6–35 The Form Mapping Summary Page



m. On the Step 8: Define IT Resource Type Definition Mappings page, map each new IT resource definition with an existing IT resource definition. Follow the guidelines given in Step f for mappings resource objects. Click Continue after you create a mapping for each IT resource definition. If there are changes in the names of the IT resource type definition, then it is your responsibility to map them properly. Refer the connector guide to check the change in default IT resource type definition names. When a target IT resource type definition is mapped with corresponding source IT resource type definition, the page displays list of IT resource type definition parameters, which are part of source definition but not available in target definition. These are either added as a part of customization or they were part of source definition. If these parameters are added as part of customization, then you need to retain them.

Figure 6–36 shows the Define IT Resource Type Definition Mappings page of the Connector Management - Upgrading wizard:

Figure 6–36 The Define IT Resource Type Definition Mappings Page



n. On the Step 9: IT Resource Type Definition Mapping Summary page, a summary of the IT resource type definition mappings that you create is displayed. Click Continue to proceed.

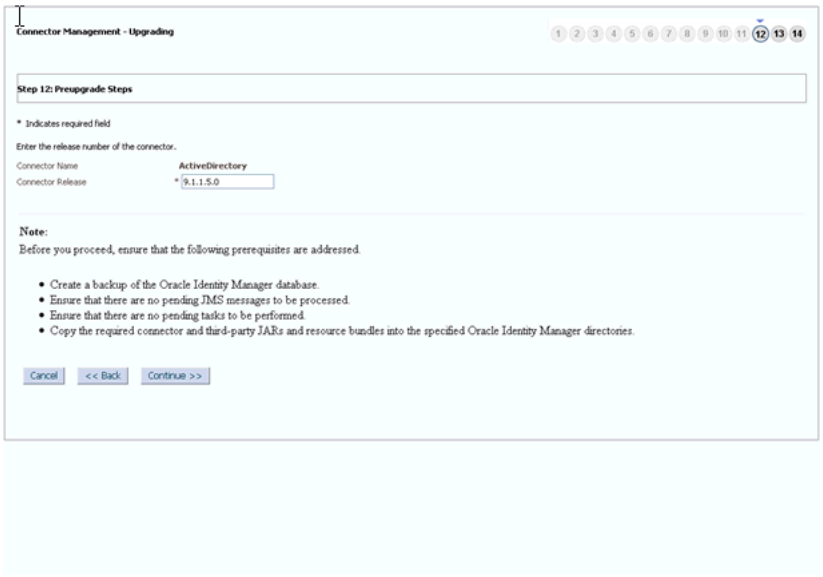
Figure 6–37 shows the IT Resource Type Definition Mapping Summary page of the Connector Management - Upgrading wizard:

Figure 6–37 The IT Resource Type Definition Mapping Summary Page

o. On the Step 12: Preupgrade Steps page, enter a new release number for the connector in the Connector Version field. Click Continue to proceed. The upgrade process does not validate the version provided with the connector release version. You need to provide correct version here by referring the connector guide.

Figure 6–38 shows the Preupgrade Steps page of the Connector Management - Upgrading wizard:

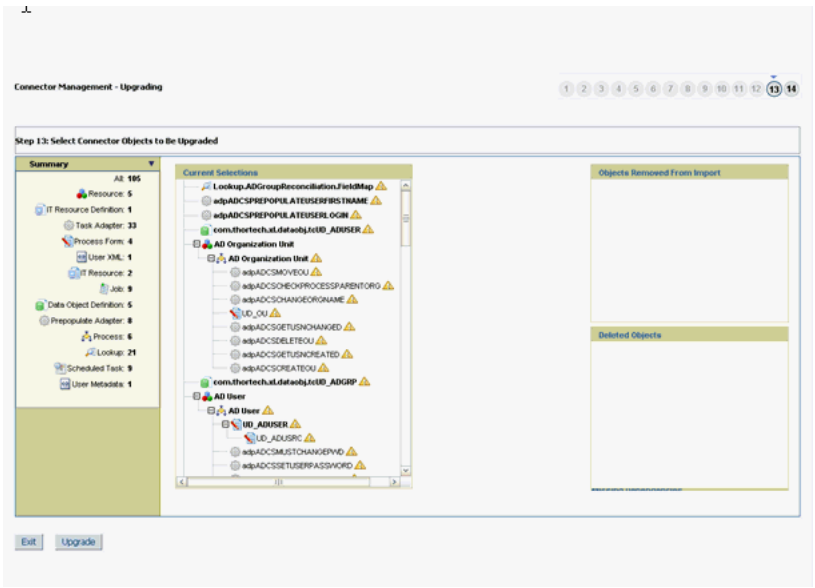
Figure 6–38 The Preupgrade Steps Page



p. On the Step 13: Select Connector Objects to Be Upgraded page.

Figure 6–39 shows the Select Connector Objects to Be Upgraded page of the Connector Management - Upgrading wizard:

Figure 6–39 The Select Connector Objects to Be Upgraded Page

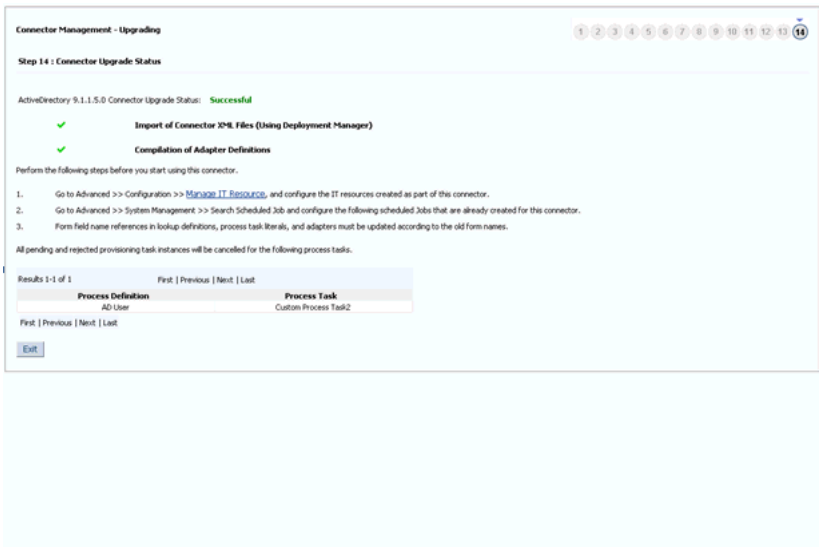


Note: If the Connector Management - Upgrading wizard is opened by using Microsoft Internet Explorer, then all the fields and buttons on the Step 13: Select Connector Objects to Be Upgraded page might not be visible. There is no scroll bar available in the page. Therefore, maximize the window to display all the controls in the page.

q. After you review the information on the Connector Upgrade Status page, click **Upgrade** to start the upgrade process.

Figure 6–40 shows the Connector Upgrade Status page of the Connector Management - Upgrading wizard:

Figure 6–40 The Connector Upgrade Status Page



Note down the process definition names and the corresponding process task names. These process tasks are not going to be used by Oracle Identity Manager anymore. Therefore, all their pending and rejected instances need to be canceled.

Use cancelProcessTask utility available in *OIM_HOME*/server/bin. The utility takes the process definition name and the process task name as input. You need to run the utility for each process task.

The Upgrade Connectors feature processes connector object mappings in the following manner:

- If a new connector object is mapped to None, then the new connector object is inserted in the database.
- A new resource object, process definition, or form replaces the old resource object, process definition, or form to which it is mapped.
- The new names of the process form are converted into the old process form names.
- If an old and a new lookup definition have the same name, then their contents are merged.
- When the Upgrade Connectors feature tries to delete an object, which is not going to be used by upgraded version of connector, an exception is thrown if the instances of the object exists in Oracle Identity Manager database. Such an object is renamed and soft deleted so that it will not be used anymore by Oracle Identity Manager.

6. Perform the following steps:

a. Change form names and form field column name references in the following objects:

Note: For an Oracle-released connector, see the connector guide for information about the changes to be made.

- Lookup definitions
- Process task literals
- Adapter literals

b. All the default adapters are overwritten. Therefore, if customer has done any customization, the changes need to be applied after connector upgrade.

c. After the upgrade, contents of existing and new lookup definitions are merged. In these lookup definitions, you must manually delete entries that are not required.

7. Use the FVC Utility to update existing user data created through the connector.

See "Using the Form Version Control Utility" in the *Oracle Fusion Middleware Administrator's Guide for Oracle Identity Manager* for information about using the FVC Utility.

8. Verify that all use cases specific to the target are working fine including provisioning and reconciliation.

9. Generate the XML file. This XML file contains details of the object definition changes from the source release to the target release.

To generate this file:

a. Log in to the Oracle Identity Manager Advance Administrative Console.

b. On the left pane, expand **System Management, Deployment Manager** and then click **Manage Connector**.

c. Use the Search feature to search for the connector.

d. In the search results table, click the Export Silent Upgrade XML icon for the connector.

e. Specify the location where you want the file to be saved.

Note: If the upgrade fails, then perform the following steps:

1. Look at the exception and take suitable action.
2. Restore the Oracle Identity Manager database and MDS.
3. Proceed for the upgrade.

Silent Mode Upgrade in Staging and Production Environment

Note: You need to perform preupgrade and post upgrade steps while performing wizard mode upgrade.

Caution: Before you import the XML file, verify that the source connector on the production server is the same as the source connector on the staging server. If there are differences in the source connector on the staging server and the production server, then the XML file is not correctly imported on the production server.

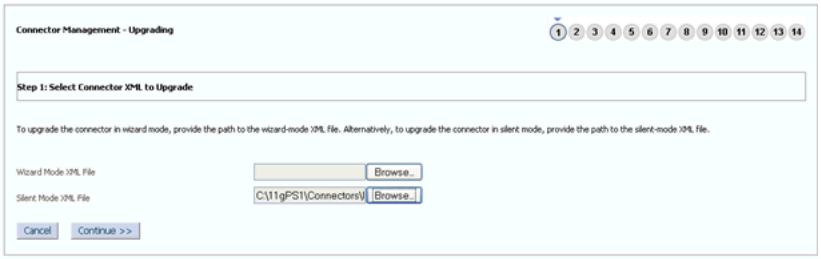
To perform the silent mode upgrade on the production server:

1. Copy the XML file to the host computer of the Oracle Identity Manager installation on which you want to import the file. Alternatively, copy the XML file to a shared folder on another computer that can be accessed from the Oracle Identity Manager host computer.
2. Log in to the Oracle Identity Manager Advanced Administrative Console.
3. On the left pane, expand **System Management** , **Deployment Manger**, and then click **Manage Connector**.
4. Use the Search feature to search for the source connector that you want to upgrade.
5. In the table of search results, click the Upgrade icon for the source connector.
6. On the Step 1: Select Connector XML to Upgrade page of the utility, enter the full path and name of the connector XML file for the source release in the Silent mode upgrade XML field. You can use the Browse option to navigate to the XML file.

Note: There will be only one XML file for both trusted source reconciliation and target resource reconciliation for all the converged connectors. If you have more than one XML file, that is one for trusted source reconciliation and another for target resource reconciliation, you need to select the XML file for target resource reconciliation. Refer the connector guide (CI-XML) for the XML file name.

Figure 6–41 shows the Select Connector XML to Upgrade page of the Connector Management - Upgrading wizard:

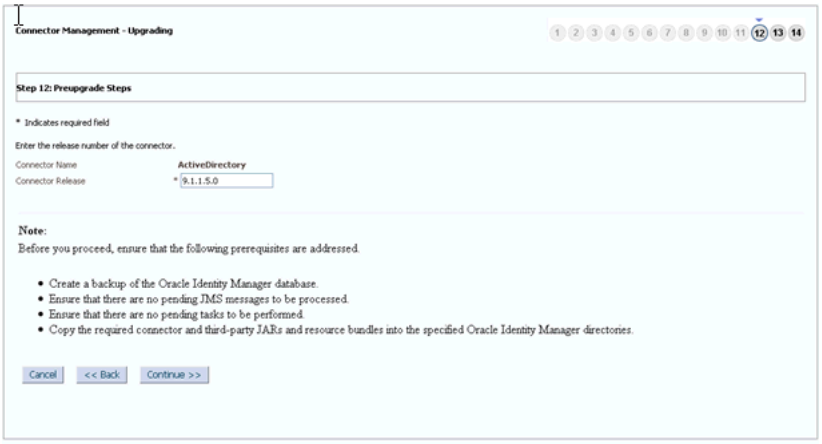
Figure 6–41 The Select Connector XML to Upgrade Page



7. Click **Continue**.
8. On the Step 12: Preupgrade Steps page, click **Continue** to proceed.

   Figure 6–42 shows the Preupgrade Steps page of the Connector Management - Upgrading wizard:

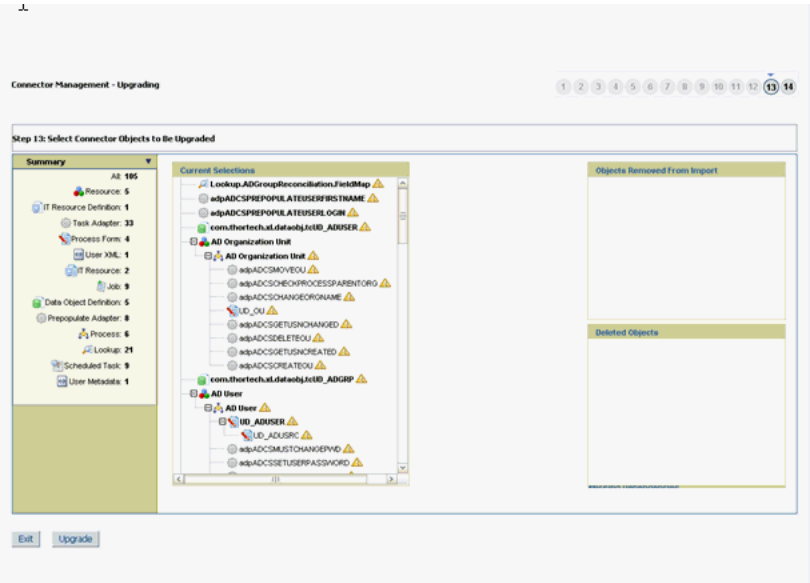
Figure 6–42 The Preupgrade Steps Page



9. On the Step 13: Select the Connector Objects to be Upgraded page, review the summary of the connector objects that you selected for upgrade.

   Figure 6–43 shows the Select the Connector Objects to be Upgraded page of the Connector Management - Upgrading wizard:

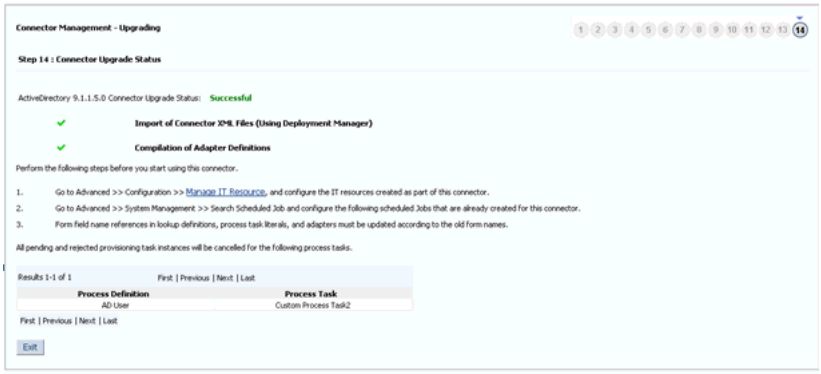
Figure 6–43 The Select the Connector Objects to be Upgraded Page



10. After you review the information on the page, click **Upgrade** to start the upgrade process.

    The Connector Upgrade Status page shows the status at the end of a successful upgrade, as shown in Figure 6–44:

Figure 6–44 The Connector Upgrade Status Page



6.8.5.3 Postupgrade Procedure

The following sections describe procedures that you must perform after the upgrade operation:

- Running the PurgeCache Utility
- Running cancelProcessTask Utility
- Running the FVC Utility

- Updating Access Policies
- Updating Approval Policies
- Configuring the IT Resource
- Configuring the Scheduled Tasks
- Other Postupgrade Steps

Running the PurgeCache Utility

When the upgrade is performed, there might be stale data in the cache, which is required to be purged. The PurgeCache utility purges the cache. See "Purging the Cache" on page 26-3 for information about purging the cache.

Running cancelProcessTask Utility

This utility is used for canceling the pending and rejected instances of a process task. If a process task of a process definition, which is there in the source connector and is not required in the target, then the process task will be soft deleted in the upgrade process. Oracle Identity Manager will not use such soft deleted task as part of provisioning work flow after upgrade. All the instances of such deleted process task, which are in pending and rejected status need to be canceled.

The utility is available in *OIM_HOME*/server/bin. This utility will take the process task name and the corresponding process definition name as input.

Running the FVC Utility

Connector upgrade process creates the new process form versions. The account data created using the source connector will have an association with the source connector process form version. Therefore, after the upgrade, you need to run the FVC utility to update the new process form version which is created in upgrade process. Apart from this, FVC provides the feature to copy the old form field data to the new form fields. You can use the FVC Utility to copy process form data from the source release to the process form of the target release. You can also specify changes to be made to the resource data so that it is consistent with changes made in the process form of the target release. See *Oracle Identity Manager Tools Reference* for information about using this utility.

Updating Access Policies

In Oracle Identity Manager, an access policy is associated with a resource object. While creating an access policy, user would have provided the data for the process form attributes. As the part of connector upgrade, if there are changes in the form attributes, then you need to edit the access policy to check the data for the existing and the new fields. For example, if the connector upgrade adds a new process form attribute, you can provide the data for the new attribute by editing the access policy.

Updating Approval Policies

In Oracle Identity Manager, an approval policy is associated with a resource object. While creating a policy, user would have provided the data for the process form attributes. As the part of connector upgrade, If there are any change in the resource object names, then the user need to verify all the Approval Policies associated with the resources to modify the resource name to the new resource name.

Configuring the IT Resource

Verify that the IT resource instances have proper values after upgrade.

Configuring the Scheduled Tasks

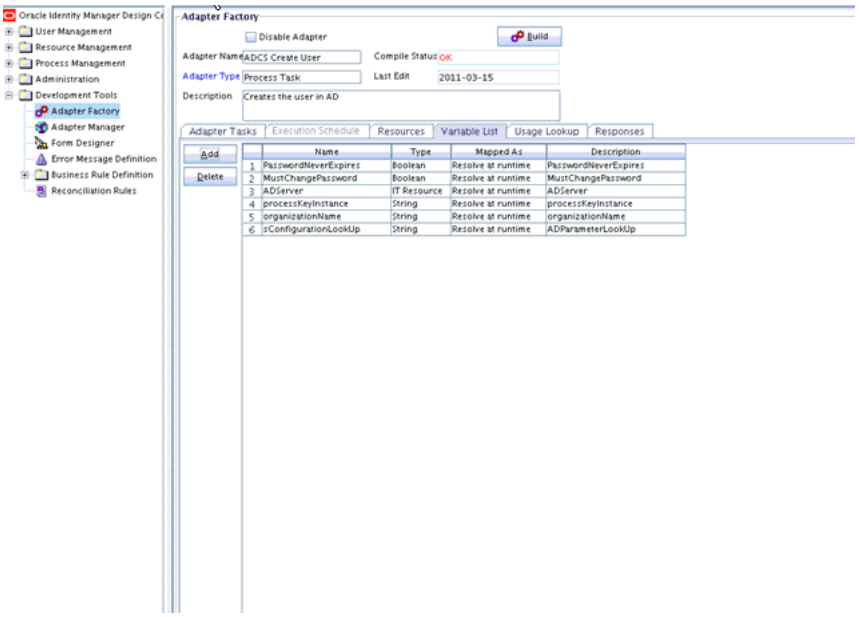
Set values for attributes of the scheduled tasks of the target release. For an Oracle-released target connector, see the connector guide for information about the scheduled task attributes.

Update Adapters for Changes in IT Resource Type Definition Parameter

If there are changes in the IT Resource Type Definition Parameter names, you need to update the custom adapters for the parameter changes. To do so:

1. Log in to Design Console.
2. Open the custom adapter using the adapter factory.
3. Go to the variable list and check if there are any variables of type IT Resource, as shown in Figure 6–45:

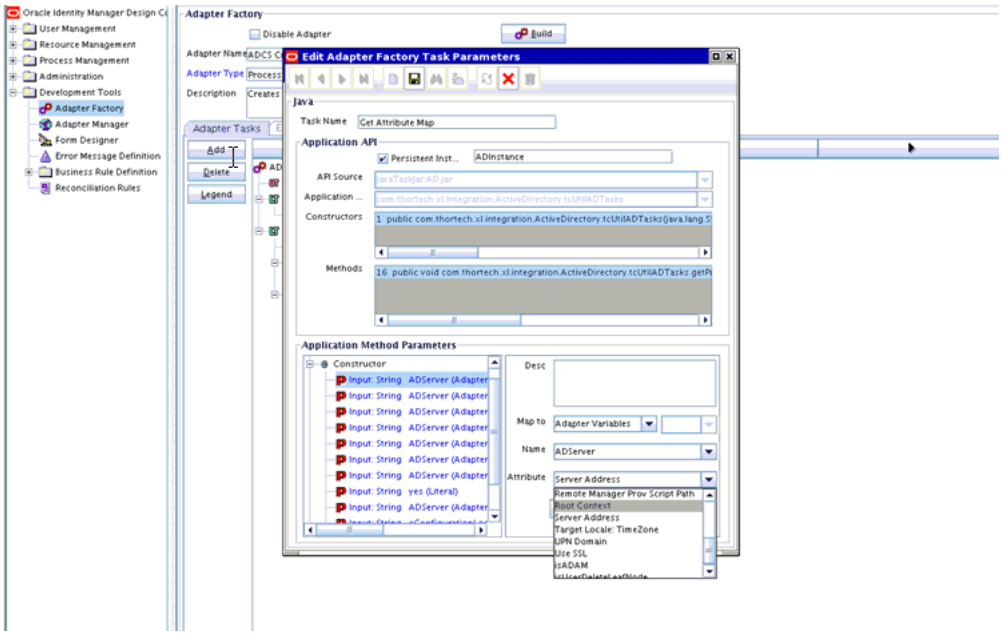
Figure 6–45 The Variable List Tab of the Adapter Factory Form



4. If there is a variable of IT Resource, then go to the task details and change the mapping of the IT Resource parameter mapping to the new target field (if the parameter is changed/deleted).

   Figure 6–46 shows the Edit Adapter Factory Task Parameters dialog box that enables you to change the mapping of the IT Resource parameter mapping to the new target field:

Figure 6–46 The Edit Adapter Factory Task Parameters Dialog Box



5. If the adapter is mapped to the IT Resource Type Definition parameter, then you need to verify if the mapped parameter is not deleted. If the parameter is deleted, then you need to remap it to the correct parameter.

   To verify the adapter mappings:

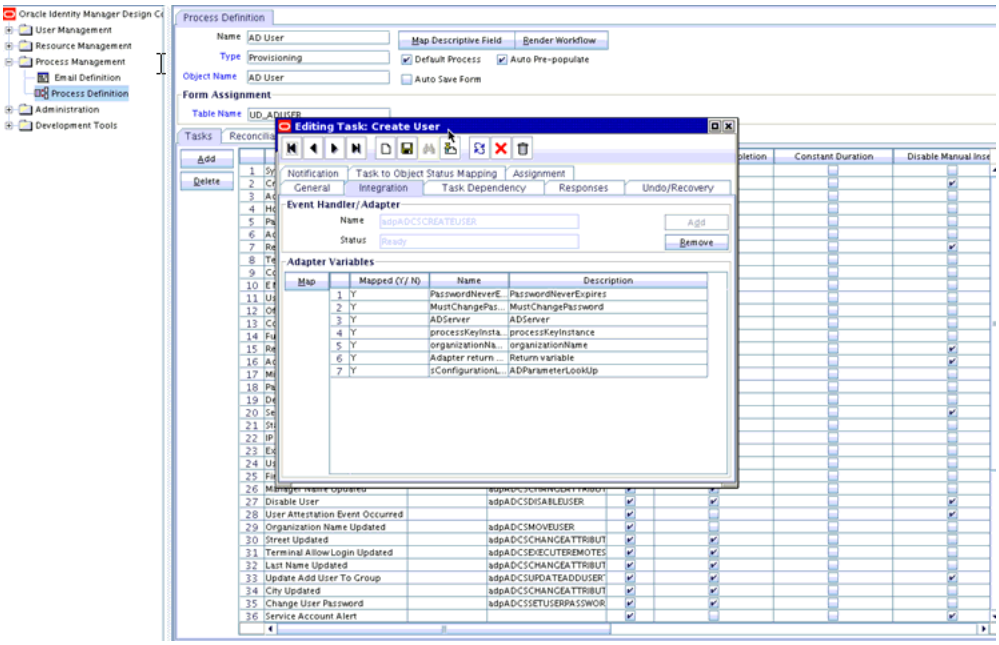
   a. Verify the mapping for process task adapter as follows:

      i) Log in to Design Console.

      ii) Go to Process Definition.

      iii) Click the task, and then click the **Integration** tab, as shown in Figure 6–47:

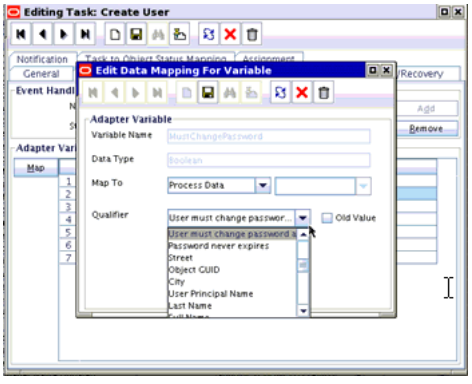
Figure 6–47 The Integration Tab of the Editing Task Dialog Box



iv) Check if the adapter variable is mapped to the deleted/modified form attribute. If yes, remap such attributes to adapter variables. Repeat this step for all process tasks of all process definitions of the connector.

Figure 6–48 shows the Editing Data Mapping for Variable dialog box that enables you to view and edit the adapter variable mapping to the form attribute:

Figure 6–48 The Editing Data Mapping for Variable Dialog Box

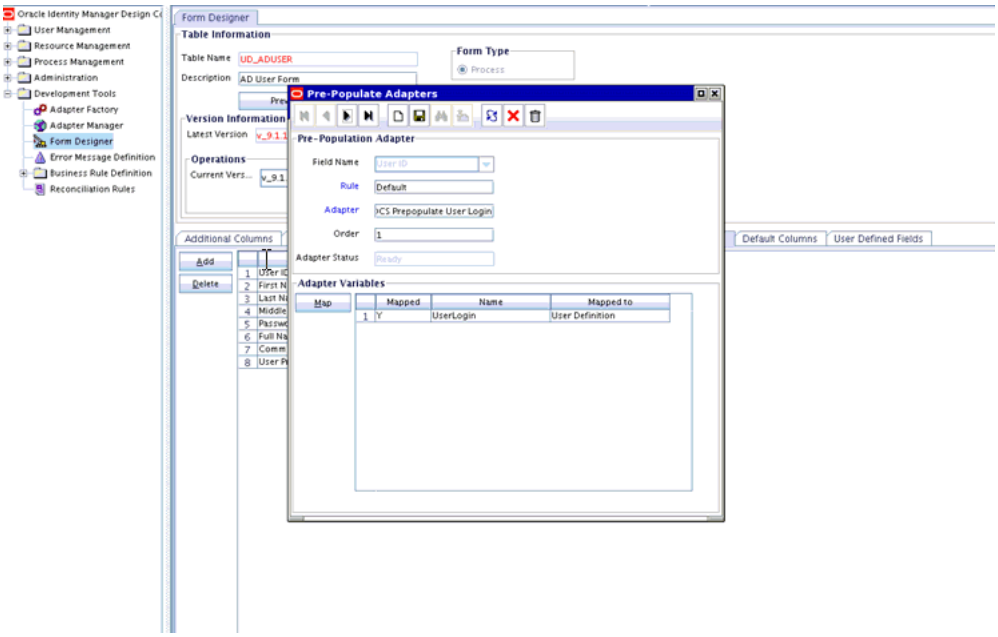


b. Prepopulate adapter mappings as follows:

i) Log in to Design Console.

ii) Go to Form Designer, Pre-Populate Adapters, as shown in Figure 6–49:

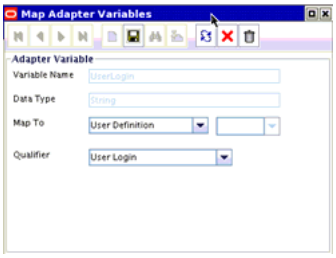
Figure 6–49 The Pre-Populate Adapters Dialog Box



iii) Click **Map** to map adapter variable and check if any of the fields are mapped to the process data attributes. If it is mapped, then verify the process form attribute is not deleted as part of upgrade. If the process form attributes are deleted, then remap them to the correct form attribute data.

Figure 6–50 shows the Map Adapter Variable dialog box:

Figure 6–50 The Map Adapter Variable Dialog Box



Note: Repeat the procedure for all the prepopulated fields of all the process forms of the connector. If there are any entity adapter, then check the adapter variables mapping for these adapters in Data Object Manager.

Other Postupgrade Steps

Perform the following postupgrade steps:

1. Change form names and form field column name references in the following objects:

Note: For an Oracle-released connector, see the connector guide for information about the changes to be made.

- Lookup definitions
- Process task literals
- Adapter literals

2. Verify all the reconciliation fields on the resource object and corresponding reconciliation form field mapping on the process definition. Delete old default reconciliation fields, if there are any, which have mapping to the process form fields that are not retained as part of upgrade.
3. Verify that upgrade process has retained all customizations, for example, customizations on Resource Object, Process definition, and Process Form.
4. After the upgrade, contents of existing and new lookup definitions are merged. In these lookup definitions, you must manually delete entries that are not required.
5. Run the Lookup reconciliation again. The old lookup reconciliation data will be available in the Lookups after upgrade. Re-running the Lookups is required if there is a change in the format for the lookup values. Refer the specific connector guide for more details about lookup reconciliation.
6. Recalculate statistics and re-create indexes and other database objects that are removed or made invalid by the upgrade process. For more information, see Oracle Identity Manager Database guide.
7. Check adapters status related to the connectors. If the adapters are not compiled, then you must compile them.
8. Verify that the custom parameters are available after upgrade. Custom Scheduled Task parameters are retained as part of upgrade process. Modify the scheduled task to add the parameter if it is not available after upgrade.
9. If there are any change in Resource object names the user need to verify all the Approval Policies associated with the Resources to modify the Resource name to the new Resource name.
10. Verify if there are any changes in the new request dataset shipped with the connector. If yes, then delete the existing request dataset for the resource from MDS. Modify the new request dataset for any customization and import the new dataset to MDS. See "MDS Utilities and User Modifiable Metadata Files" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about importing and exporting data to and from MDS.

6.8.6 Procedure to Upgrade a Non-Converged Connector to a Converged Connector

To upgrade a non-converged connector to a converged connector:

1. Delete all the existing jar files such as Javatasks, ScheduleTask, and ThirdParty jars related to the non-converged connector except for the Common.jar file.
2. Download Common.jar and extract its MANIFEST.MF. Compare this version of MANIFEST.MF with the version in MANIFEST.MF of the Common.jar that is available as part of converged connectors distribution bundle. Retain/Upload (using UploadJars utility) Common.jar in Oracle Identity Manager database that has higher version.
3. Manually upload all the jars present in the "lib" folder of the converged connector distribution bundle using the UploadJars utility in Oracle Identity Manager database (available under *OIM_HOME*/server/bin).

4. Explode the connector bundle (with naming convention "org.identityconnectors.*") in some temporary folder. Make a folder named "lib" in the same temporary folder and copy all the third party libraries to that folder.
5. Retain MANIFEST.MF from the above exploded bundle.
6. Repackage the connector with the same name and with the same MANIFEST.MF that was being retained. Now, the repackaged connector bundle will also be having third party libraries.
7. Upload the repackaged connector in Oracle Identity Manager database with jar type as "ICFBundle".
8. Delete the temporary folder created in Step 4.
9. Upgrade the connector by following the upgrade process
10. Purge cache or restart the server.

6.9 Uninstalling Connectors

WARNING: Do not use this utility in production. This utility deletes data from the Oracle Identity Manager database directly and is meant to be used in development/staging environments.

Connector uninstall utility deletes the data related to the connector chosen for uninstall from Oracle Identity Manager Database. It deletes all the account related data associated with resource objects of the connector.

This utility does not delete:

- The actual user account from the target system
- Identities from Oracle Identity Manager although the users are brought from trusted source to Oracle Identity Manager through trusted reconciliation
- Audit data
- Archival data

Connector uninstall utility does not validate and notify the user if there is any object dependency present. For example, while uninstalling a Microsoft Active Directory (AD) connector, it does not validate if a dependent connector, such as Microsoft Exchange connector, already exists or not. Before uninstalling a connector, you must check if there are any other connectors dependent on the connector. If there are any, then the connector must not be uninstalled because this will affect the functionality of the dependent connectors. You must uninstall all the dependent connectors before uninstalling the base connector.

This section discusses the following topics:

6.9.1 Use Cases Supported by the Uninstall Connectors Utility

The following use cases are supported by the Uninstall Connectors utility:

- A target system that has been decommissioned, and you want to uninstall the connector that was used to link that target system with Oracle Identity Manager.
- Instead of directly upgrading to the latest release of a connector, you want to uninstall the earlier release and then perform a fresh installation of the latest release.
- You want to remove an individual connector object from the Oracle Identity Manager database. For example, you had created a resource object in Oracle Identity Manager to represent the Intern user type defined in your target system. This user type has been removed from the target system, and you now want to remove the resource object from Oracle Identity Manager.

  The Uninstall Connectors utility supports independent deletion of following connector artifacts:

  – Adapters
  – Lookup definitions
  – Resource objects
  – Scheduled tasks

6.9.2 Overview of the Connector Uninstall Process

When you run the Uninstall Connectors utility, the utility performs the following steps before deleting the resource objects of the connector:

1. Checks if there are any access policies associated with the resource objects of the connector. If there are any access policies present, then the utility displays the list of access policies associated with the resource object and prompts you to modify the access policy and terminates with no data deletion. The access policy should be modified to remove the resource object from it. If the access policy is associated with only one resource object, then you need to create a dummy resource object, assign it to the access policy and then proceed with the removal of resource object from the access policy.
2. Closes all requests associated with the resource objects.
3. Displays list of request templates that are used while creating requests that are associated with the resource objects. The request templates are generic in nature, therefore the utility does not delete request templates. It prompts a message recommending you to delete/modify these templates as the resource objects would be deleted from Oracle Identity Manager. If the request template is associated with the resource object, then the request template needs to be modified to remove the resource name. If the request template is created for this resource object only, then you can delete the request template.
4. Displays the list of attestation processes which are associated with the resource objects. Attestation processes are generic in nature, therefore the utility does not delete attestation processes from Oracle Identity Manager. It prompts you to modify these processes as the resource objects would be deleted from Oracle Identity Manager.
5. Deletes only the operational level approval policies, which are associated with the resource object. The utility does not delete or modify request level approval

policies and other operational level approval policies that are not associated with the resource object.

The following objects that constitute the connector are dropped from the Oracle Identity Manager database.

1. Resource object and objects related to the resource object.
    a. Entitlement assignment, entitlement assignment history, and entitlement data
    b. Tasks and task history associated with any provisioning process linked to the resource object
    c. Process forms associated with the resource object
    d. Process instance and object instances associated with the resource object
    e. Reconciliation events and data associated with the resource object
    f. Attestation event data for the resource object
    g. Requests and request data associated with the resource object
    h. E-mail definitions for the resource object
    i. Entitlements associated with the resource object
    j. Regular rules associated with the resource object
    k. Reconciliation owner matching rules for the resource object
    l. Reconciliation action rules for the resource object
    m. Status codes corresponding to this resource object
    n. Reconciliation process mappings for the resource object
    o. Reconciliation object fields for the resource object
    p. Request dataset to process form mappings for the resource object.
    q. Object dependency tables for parent and child forms for the resource object
    r. Resource object for organization
    s. Process determination rules associated with the resource object
    t. Password policy rules associated with the resource object
    u. IT resource instances that are associated with IT resource types defined on forms that are linked to provisioning processes. If there is any default IT resource instance, they will not be deleted, for example, IT resource instance of Remote Manager
    v. Process instances and resource object instances
    w. Tasks associated with the provisioning processes
    x. The actual object and process, parent and child tables associated with the resource object.
2. Scheduled tasks and scheduled jobs
3. Adapters/Event Handlers
4. Lookup definitions

6.9.3 Setting Up the Uninstall Connector Utility

To set up the Uninstall Connector utility:

- Files that constitute the Uninstall Connector utility are viable in `OIM_HOME`/server/bin directory. These files are as follows:
  - ConnectorUninstall.properties
  - uninstallConnector.bat
  - uninstallConnector.sh

6.9.4 Uninstalling Connectors and Removing Connector Objects

Depending on your requirements, you can use the Uninstall Connectors utility to perform any of the following tasks:

- Uninstalling a Connector
- Removing Adapters, Lookup Definitions, Resource Objects, and Scheduled Tasks

The following section provides detailed instructions on using the ConnectorUninstall script to delete connector objects from the Oracle Identity Manager database. Each of the earlier sections provides a link to this section.

- Running the Script to Uninstall Connectors and Connector Objects

6.9.4.1 Uninstalling a Connector

Caution: It is strongly recommended that Oracle Identity Manager is idle and it is not available for any operations. You must ensure that:

- There are no operations on Oracle Identity Manager while using uninstalling connector or connector objects
- All scheduled tasks are disabled and there are no asynchronous messages pending for processing such as audit messages, offline provisioning messages, offline task messages, requests scheduled for future and so on.

You can use the ConnectorUninstall script to uninstall a connector. When you run the script, all objects that form part of the connector and all the resource data that was collected through the connector are deleted from the database.

Note: Before running the uninstall utility:

- You cannot use uninstall utility on production database.
- You cannot delete data that are already archived.
- You must ensure that you have the latest Oracle Identity Manager schema and MDS backup , which will help to restore if uninstall utility does not complete successfully.
- You must ensure that your UNDO tablespace is sized properly. This is required if your development/test environment has significant amount of data to be deleted.

As mentioned earlier in this guide, when a connector is defined, an entry is created for the connector in the Oracle Identity Manager database. This entry also includes the contents of the connector XML. When you choose to uninstall a connector, the utility identifies the connectors objects to be dropped by parsing the connector XML contents.

Warning:

- Connector uninstall collects all the objects information from the connector XML, which is created while installing or defining a connector. If an additional object, which is not related to this connector is added while defining the connector, uninstall would delete that too. For example, while defining AD connector, if user adds a system lookup or lookup related to other connector, uninstall would delete that lookup.
- Ensure that only the connector specific objects are added while defining a connector.

See "Running the Script to Uninstall Connectors and Connector Objects" on page 6-69 for the procedure.

6.9.4.2 Removing Adapters, Lookup Definitions, Resource Objects, and Scheduled Tasks

Caution: It is strongly recommended that Oracle Identity Manager is idle and it is not available for any operations. You must ensure that:

- there are no operations on Oracle Identity Manager while using uninstalling connector or connector objects
- all scheduled tasks are disabled and there are no asynchronous messages pending for processing such as audit messages, offline provisioning messages, offline task messages, requests scheduled for future and so on.

You can use the ConnectorUninstall script to remove an adapter, lookup definition, resource object, or scheduled task. Only the object that you specify is removed from Oracle Identity Manager.

6.9.4.3 Running the Script to Uninstall Connectors and Connector Objects

Running the script to uninstall connectors and connector objects includes the following procedures:

- Preuninstall
- Uninstall
- Postuninstall

6.9.4.3.1 Preuninstall

Note: Before executing the uninstall, you must ensure that all scheduled tasks are disabled.

Before Uninstalling the connector, you must:

1. Take Oracle Identity Manager Database backup so that if something goes wrong during uninstalling, then the data can be restored. See Oracle Identity Manager Database documentation for details about taking backup.

2. Create Oracle Identity Manager metadata (MDS) backup. See "MDS Utilities and User Modifiable Metadata Files" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about the utilities that you can use to modify Oracle Identity Manager metadata.
3. Ensure that there are no operations on Oracle Identity Manager until the Uninstall utility is completed. Oracle Identity Manager and SOA servers should be up and running.
4. Ensure that all the JMS messages are processed.

6.9.4.3.2 Uninstall To run the ConnectorUninstall script for uninstalling the connector:

1. Set values in the properties file used by the script.

   Note: If you provide ConnectorName and Release along with ObjectType and ObjectValues, then deletion of ObjectValues will be performed by the utility and the Connector information will be skipped.

   The ConnectorUninstall.properties file is a viable in *OIM_HOME*/server/bin. This file contains information that is used by the script for deleting connector objects.

   Open the properties file in a text editor, and then set values for the following properties:

   - DatabaseURL: Enter the JDBC URL for the Oracle Identity Manager database in the following format:

     ```
     jdbc:oracle:thin:@HOST_NAME:DATABASE_PORT:DATABASE_NAME/ORACLE_SID

     For example: jdbc:oracle:thin:@localhost:1521:orcl
     ```

   - DBUserName: Enter the user name of an Oracle Identity Manager database.
   - DBType: Specifies the type of database.
   - LogLevel: Enter one of the following as the log level: DEBUG, WARN, INFO, or ERROR.
   - Location: Enter the directory location where you want to have all the log files generated by the Uninstall utility.

     If the Uninstall utility completes successfully, then the ConnectorUninstall.log file, along with <ResourceObject>.log files are generated.

     If the Uninstall utility fails, then the ConnectorUninstall.log file along with the ConnectorUninstall_Error.log file are generated.

     Note: If the uninstall utility fails with errors, then check the ConnectorUninstall.log and ConnectorUninstall_Error.log and take suitable action. Then, run the uninstall utility again.

     For example, if the Uninstall utility of ActiveDirectory Connector succeeds, then the following logs will be generated:

     – ConnectorUninstall.log

     – AD User.log

- AD Group.log
- AD Oraganization Unit.log
- AD User Trusted.log

If the Uninstall utility of ActiveDirectory Connector Fails, then the following logs will be generated:

- ConnectorUninstall.log
- ConnectorUninstall_Error.log

- ConnectorName: The value that you set for this property depends on your requirement. If you want to delete a specific connector, then enter the name of the connector. The name that you enter must be the same as the name shown in the search results displayed through the Manage Connector feature. For example, enter `Active Directory` if you want to delete the Microsoft Active Directory connector.
- Release: The value that you set for this property depends on your requirement. If you want to delete a specific connector, then enter the release number of the connector. The release number that you enter must be the same as the release number shown in the search results displayed through the Manage Connector feature. For example, enter `9.1.0.1` if you want to delete the Microsoft Active Directory 9.1.0.1 connector.
- ObjectType: The value that you set for this property depends on your requirement:
  - If you want to uninstall a connector, then ensure that the ObjectType property is not assigned a value.
  - If you want to delete adapters, lookup definitions, resource objects, or scheduled task, then enter `Adapter, Lookup, ResourceObject,or ScheduledTask` respectively.

    Example: ResourceObject
- ObjectValues: Enter a semicolon-separated list of object values.

  Example: AD User; AD Group

2. In a command window, change to the *OIM_HOME*/server/bin directory and then run the script, sh uninstallConnector.sh (or bat file).

   While the script runs, logs will be generated at the location provided.

   After you run the utility, you will be prompted to enter following information:

   a. Oracle Identity Manager Database Password
   b. Oracle Identity Manager Administrator Name
   c. Oracle Identity Manager Administrator Password
   d. Oracle Identity Manager Server t3 URL
   e. Confirmation for the deletion of the connector/object(s)

6.9.4.3.3 Postuninstall After uninstalling the connector, you must perform the following steps:

1. Use DeleteJars utility for deleting the jars associated with the connector from Oracle Identity Manager database.

2. Use DeleteResourceBundles utility for deleting all resources that are associated with the connector from Oracle Identity Manager database.
3. Revisit the log, look for the following information and perform the steps mentioned for each of it:
   a. The list of request templates: Delete/modify these templates as the resource objects, which used these templates are now deleted.
   b. The list of attestation processes: Delete/modify these attestation process as the resource objects, which used these attestation processes are now deleted.
   c. Modify request and approval policies manually to delete the resource object names that are cleaned by the uninstall utility.
   d. As the part of connector uninstall, the approval processes (Approval workflow/SOA composites) are not deleted. If the approval processes are generic, then you need to modify them if they have association with the deleted resource objects.
4. Recalculate statistics and re-create indexes and other database objects that are removed by the connector uninstall utility. For more information, see "Performance Tuning and Best Practices".
5. Restart Oracle Identity Manager, or use PurgeCache utility to purge the Cache.

   See "Purging the Cache" on page 26-3 for information about purging the cache.

Part II

System Management

This part describes the system management tasks in Oracle Identity Manager.

This part contains the following chapters:

7

Starting and Stopping Servers

Most Oracle Identity Manager feature configurations, such as password policy create and update, need the restart of the server for the changes to take effect. This chapter provide procedures to start/stop Oracle WebLogic Servers.

You can perform all start and stop operations for managed WebLogic Servers either from command prompt or from Oracle WebLogic Server Administration Console or Oracle Enterprise Manager Fusion Middleware Control.

The following sections are given only for reference purpose. See Oracle *WebLogic Server Administrator Guide* for detailed information.

> **Note:** Node Manager must be running in order to use the Oracle WebLogic Server Administration Console or Oracle Enterprise Manager Fusion Middleware Control for controlling (start/stop) Oracle Identity Manager WebLogic managed servers and SOA WebLogic managed servers.

- Configuring the Node Manager
- Starting the Node Manager
- Starting or Stopping WebLogic Administration Server
- Starting or Stopping WebLogic Managed Servers

You can perform all start and stop operations either from command prompt or from Oracle WebLogic Server Administration Console.

> **Note:** Node Manager must be running before you can start and stop administration server, managed server, and SOA server through Oracle WebLogic Server Administration Console.

7.1 Configuring the Node Manager

After installing and configuring Oracle Identity Manager and SOA servers, you must configure node manager for using it with WebLogic Administration Console or Oracle Enterprise Manager Fusion Middleware Control. This configuration is to be done only once.

To configure node manager, you must set `StartScriptEnabled=true` in the nodemanager.properties file. To do so, run following script:

For UNIX:

MIDDLEWARE_HOME/oracle_common/common/bin/setNMProps.sh

For Microsoft Windows:

MIDDLEWARE_HOME\oracle_common\common\bin\setNMProps.cmd

7.2 Starting the Node Manager

To start the Node Manager:

1. Navigate to *WL_HOME*/server/bin.
2. At the command prompt, enter:

   ```
   ./startNodeManager
   ```

7.3 Starting or Stopping WebLogic Administration Server

To start or stop the WebLogic Administration Server:

1. Navigate to *DOMAIN_HOME*/bin.

   Note:

   - For Linux Install you have only "./startWebLogic.sh" and you do not have "startWebLogic.cmd" in the bin folder.
   - For Microsoft Windows Install we have both "./startWebLogic.sh" and "startWebLogic.cmd" in the bin folder.

2. To start the server, enter the following:

   For UNIX:

   ```
   ./startWebLogic.sh
   ```

   For Microsoft Windows:

   ```
   startWebLogic.cmd
   ```

   To stop the server, enter the following:

   For UNIX:

   ```
   ./stopWebLogic.sh
   ```

   For Microsoft Windows:

   ```
   stopWebLogic.cmd
   ```

7.4 Starting or Stopping WebLogic Managed Servers

This section contains the following topics:

- Starting or Stopping the Managed Servers By Using Command Prompt
- Starting or Stopping the Managed Server By Using Oracle Enterprise Manager Fusion Middleware Control
- Starting or Stopping Servers By Using Oracle WebLogic Server Administration Console

7.4.1 Starting or Stopping the Managed Servers By Using Command Prompt

To start or stop the managed servers using command prompt:

1. Navigate to the *DOMAIN_HOME*/bin/ directory.
2. To start the server, enter the following at the command prompt:

   For UNIX:

   `./startManagedWebLogic.sh` *`MANAGED_SERVER_NAME ADMIN_SERVER_URL`*

   For example:

   ```
   startManagedWebLogic.sh oim_server1
   http://mywlsadminhost.mycompany.com:7001
   ```

   ```
   startManagedWebLogic.sh soa_server1
   http://mywlsadminhost.mycompany.com:7001
   ```

   For Microsoft Windows:

   `startManagedWebLogic.cmd` *`MANAGED_SERVER_NAME ADMIN_SERVER_URL`*

   To stop the server, enter the following at the command prompt:

   For UNIX:

   `./stopManagedWebLogic.sh` *`MANAGED_SERVER_NAME ADMIN_SERVER_URL`*

   For Microsoft Windows:

   `stopManagedWebLogic.cmd` *`MANAGED_SERVER_NAME ADMIN_SERVER_URL`*

   For example:

   stopManagedWebLogic.cmd oim_server1
   http://mywlsadminhost.mycompany.com:7001

   stopManagedWebLogic.cmd soa_server1
   http://mywlsadminhost.mycompany.com:7001

7.4.2 Starting or Stopping the Managed Server By Using Oracle Enterprise Manager Fusion Middleware Control

In order to use the Oracle Enterprise Manager Fusion Middleware Control to control managed servers, Node Manager must be running on the computer.

To start or stop the managed server using Oracle Enterprise Manager Fusion Middleware Control:

1. Log in to the Oracle Enterprise Manager Fusion Middleware Control.
2. Navigate to **Weblogic Domain**, **Domain Name**, ***SERVER_NAME***.
3. Right click, and navigate to **Control**.
4. Click **Start Up** to start the server.

   Click **Shutdown** to stop the server.

7.4.3 Starting or Stopping Servers By Using Oracle WebLogic Server Administration Console

To start or stop servers by using Oracle WebLogic Administration Console:

1. Log in to the Oracle WebLogic Server Administration Console.
2. On the left pane, under Domain Structure, select **Environment**, **Servers**.
3. On the right pane, under Summary of Servers, click the **Control** tab.
4. Select the server name.
5. Click **Start** to start the server.

   Click **Shutdown** to shutdown the server.

8

Enabling System Logging

Oracle Identity Manager uses two logging services: Oracle Diagnostic Logging (ODL), which is the logging service used by most Oracle Fusion Middleware applications, and Apache log4j.

Oracle Identity Manager logging is primarily done with ODL. Apache log4j is only used with third-party applications, such as Nexaweb for Deployment Manager and Workflow Designer, and OSCache for caching.

This chapter contains the following sections:

8.1 Logging in Oracle Identity Manager By Using ODL

Oracle Diagnostic Logging (ODL) is the principal logging service used by Oracle Identity Manager. For ODL logging to work, both loggers and log handlers need to be configured. Loggers send messages to handlers, and handlers accept messages and output them to log files.

Logging configuration is controlled by the logging.xml file described in "Log Handler and Logger Configuration" on page 8-3. This file can either be edited directly or edited through the Enterprise Manager. On the Enterprise Manager, the logging configuration can be accessed by clicking the OIM server link and by selecting the Weblogic Server drop down from the top, and then clicking on Logs - Log Configuration.

To access the logging configuration on the Enterprise Manager:

1. Click the OIM server link.
2. From the Weblogic Server list, select Logs - Log Configuration. All the packages available for logging are displayed on the log configuration screen.

For any additional packages to be logged that are not available in the Enterprise Manager (such as, for connector packages), follow the instructions to manually edit the logging.xml file. The packages specific to Oracle Identity Manager can be accessed under oracle.iam. The different log levels are available for selection under the Oracle Diagnostic Logging Level column. Select a particular log level, and then click **Apply** for the changes to take effect. In addition, new log handlers can be created and configured by clicking the **Log Files** tab.

Each Oracle Identity Manager module has its own logger that can be configured independently to send different amounts of information to one or more log handlers. Table 8–2, " Oracle Identity Manager Loggers" lists the more than twenty different

Oracle Identity Manager loggers that can be configured to send messages to log handlers.

You can output more or less information to a log by adjusting the level attribute for each logger. To select a logging level, choose from one of five message types (INCIDENT_ERROR, ERROR, WARNING, NOTIFICATION, and TRACE). Each message type can also take a numeric value between 1 (highest severity) and 32 (lowest severity) that you can use to further restrict the volume of messages that a logger will output. Table 1 on page 2 lists the message type and level combinations that are used most often.

Log handlers specify the target where log messages should appear. For example, log handlers can write messages to the console, to various log files, and to additional outputs.

This section contains the following topics:

8.1.1 Message Types and Levels

ODL recognizes five message types: INCIDENT_ERROR, ERROR, WARNING, NOTIFICATION, and TRACE. Each message type can also take a numeric value between 1 (highest severity) and 32 (lowest severity) that you can use to further restrict message output.

When you specify a message type, ODL returns all messages of that type, as well as the messages that have a higher severity. For example, if you set the message type to WARNING, ODL also returns messages of type INCIDENT_ERROR and ERROR.

Message types and levels are described in greater detail in "Setting the Level of Information Written to Log Files" of the *Oracle Fusion Middleware Administrator's Guide*. Table 8–1 lists the diagnostic message types that you can use most often with Oracle Identity Manager.

Table 8–1 Oracle Identity Manager Diagnostic Message Types

Message Type and Numeric Value	Description
INCIDENT_ERROR:1	A serious problem that may be caused by a bug in the product and that should be reported to Oracle Support. Examples are errors from which you cannot recover.
ERROR:1	A serious problem that requires immediate attention from the administrator and is not caused by a bug in the product. An example is if Oracle Fusion Middleware cannot process a log file, then you can correct the problem by fixing the permissions on the document.
WARNING:1	A potential problem that should be reviewed by the administrator. Examples are invalid parameter values or a specified file does not exist.

Table 8–1 (Cont.) Oracle Identity Manager Diagnostic Message Types

Message Type and Numeric Value	Description
NOTIFICATION:1	A major lifecycle event such as the activation or deactivation of a primary sub-component or feature. This is the default level for NOTIFICATION.
NOTIFICATION:16	A finer level of granularity for reporting normal events.
TRACE:1	Trace or debug information for events that are meaningful to administrators, such as public API entry or exit points.
TRACE:16	Detailed trace or debug information that can help Oracle Support diagnose problems with a particular subsystem.
TRACE:32	Very detailed trace or debug information that can help Oracle Support diagnose problems with a particular subsystem.

8.1.2 Log Handler and Logger Configuration

Both log handlers and loggers can be configured by editing logging.xml, which is located in:

DOMAIN_NAME/config/fmwconfig/servers/*SERVER_NAME*/logging.xml

Here, *DOMAIN_NAME* and *SERVER_NAME* are the domain name and server name respectively specified during the installation of Oracle Identity Manager.

The logging.xml file has a <log_handlers> configuration section, followed by a <loggers> configuration section. Each log handler is defined within the <log_handlers> section, and each logger is defined within the <loggers> section.

The file has the following basic structure:

```
<logging configuration>
  <log_handlers>
    <log_handler name='console-handler' level="NOTIFICATION:16"></log_handler>
    <log_handler name='odl-handler'></log_handler>
    <!--Additional log_handler elements defined here....-->
  </log_handlers>
  <loggers>
    <logger name="example.logger.one" level="NOTIFICATION:16">
      <handler name="console-handler"/>
    </logger>
    <logger name="example.logger.two" />
    <logger name="example.logger.three" />
    <!--Additional logger elements defined here....-->
  </loggers>
</logging_configuration>
```

When configuring a logger to write messages to either the console or a file, make configuration changes to both the logger and the handler. Setting the level attribute for the logger configures the amount of detail (and therefore, the volume of messages) that the logger sends to the handler. Similarly, setting the level attribute for the handler configures the amount of detail that the handler accepts from the logger.

Note: If you are not getting the volume of output that you expect in a log, then verify that the level attribute for both the logger and the log handler are set appropriately. For example, if the logger is set to TRACE and the log handler is set to WARN, then the handler does not generate messages more detailed than WARN.

8.1.3 Configuring Log Handlers

Individual log handlers are configured in the <log_handlers> section of the logging.xml file. Configure the level attribute for the handler to set the amount of detail that the handler will accept from loggers.

To configure the log handler-level attribute:

Note: You must have a basic understanding of XML syntax before you attempt to modify the logging.xml file.

1. Open the *DOMAIN_NAME*/config/fmwconfig/servers/*SERVER_NAME*/logging.xml file.
2. Change the level attribute as shown in the following examples.

   In this example XML code, the level attribute for the console-handler is set to WARNING:32.

   ```
   <log_handler name='console-handler'
   class='oracle.core.ojdl.logging.ConsoleHandler'
   formatter='oracle.core.ojdl.weblogic.ConsoleFormatter' level='WARNING:32'/>
   ```

   For the console-handler to be able to write TRACE level messages to the console, change the level attribute as shown:

   ```
   <log_handler name='console-handler'
   class='oracle.core.ojdl.logging.ConsoleHandler'
   formatter='oracle.core.ojdl.weblogic.ConsoleFormatter' level='TRACE:1'/>
   ```

3. Save your changes and restart the application server.

8.1.3.1 Log Handler Configuration Tools

Log handlers that write to a file have additional properties that can be configured. For example, this excerpt from logging.xml configures the odl-handler:

```
<log_handler name='odl-handler' class='oracle.core.ojdl.logging.ODLHandlerFactory'
    filter='oracle.dfw.incident.IncidentDetectionLogFilter'>
    <property name='path'
value='${domain.home}/servers/${weblogic.Name}/logs/${weblogic.Name}-diagnostic.lo
g'/>
    <property name='maxFileSize' value='10485760'/>
    <property name='maxLogSize' value='104857600'/>
    <property name='encoding' value='UTF-8'/>
    <property name='useThreadName' value='true'/>
    <property name='supplementalAttributes' value='J2EE_APP.name,J2EE_MODULE.name,

WEBSERVICE.name,WEBSERVICE_PORT.name,composite_instance_id,component_instance_id,
     composite_name,component_name'/>
</log_handler>
```

To make changes to log handler properties, you can use either the Fusion Middleware Control tool or the WLST command-line tool.

See Also:

- "Configuring Settings for Log Files" in the *Oracle Fusion Middleware Administrator's Guide* for information about both the Fusion Middleware Control tool and the WLST command-line tool
- "Logging Custom WLST Commands" in the *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference* for information about the WLST command-line tool

8.1.4 Configuring Loggers

Individual loggers are configured in the <loggers> section of the logging.xml file. More than twenty different Oracle Identity Manager loggers that can be configured to send messages to log handlers. Oracle Identity Manager loggers are described in Table 2 on page 7.

Setting the level attribute for the logger configures the amount of detail (and, hence, the volume of messages) that the logger sends to its handlers. Nesting one or more <handler> elements inside of <logger> elements assigns handlers to loggers.

The following excerpt shows a logger called OIMCP.PSFTCOMMON. The level attribute is set to WARNING:32 and the logger sends messages to three handlers:

```
<logger name="OIMCP.PSFTCOMMON" level="WARNING:32" useParentHandlers="false">
<handler name="odl-handler"/>
<handler name="wls-domain"/>
<handler name="console-handler"/>
</logger>
```

A logger can inherit a parent logger's settings, including the parent's level setting and other attributes, as well as the parent logger's handlers. To disable inheritance, set the useParentHandlers attribute to false, as shown in the previous excerpt.

At the top of the logger inheritance tree is the root logger. The root logger is the logger with an empty name attribute, as shown in the following example.

```
<loggers>
    <logger name="" level="WARNING:1">
      <handler name="odl-handler"/>
      <handler name="wls-domain"/>
      <handler name="console-handler"/>
    </logger>

    <!-- Additional loggers listed here -->
</loggers>
```

If a logger is configured with only its name attribute, the logger will inherit the rest of its attributes from the root logger, as shown in the following example:

```
<loggers>
    <logger name="oracle.iam.identity.rolemgmt"/>
    <!-- Additional loggers listed here -->
</loggers>
```

To configure loggers:

1. Open the *DOMAIN_NAME*/config/fmwconfig/servers/*SERVER_NAME*/logging.xml file.
2. Locate the logger you want to configure. Table 8–2 lists the Oracle Identity Manager loggers.

Table 8–2 Oracle Identity Manager Loggers

Logger	Description

`oracle.iam.request`
`oracle.iam.requestdatasetgeneration`
`oracle.iam.requestactions`
`oracle.iam.platform.workflowservice`
	Logs events related to request and request dataset management.

`oracle.iam.requesttemplate`	Logs events related to request template management.
`oracle.iam.selfservice`	Logs events related to authenticated and unauthenticated self-service operations.
`oracle.iam.ChangePasswordtaskflow`	Logs events for the password change functionality UI.
`oracle.iam.forgotpasswordtaskflow`	Logs events for the "forgot password" functionality UI.
`oracle.iam.identitytaskflow`	Logs events for the administrative UI identity operations.
`oracle.iam.identity.orgmgmt`	Logs events related to the organization manager service operations.
`oracle.iam.identity.rolemgmt`	Logs events related to the role manager service operations.
`oracle.iam.identity.usermgmt`	Logs events related to the user manager service operations.
`oracle.iam.identity.scheduledtasks`	Logs events related to scheduled tasks in the identity feature.
`oracle.iam.platform.utils`	Logs events related to utilities provided by the platform (mainly used by other features). Includes utilities for message resources handling, logging handling, internationalization, caching, and so on.
`oracle.iam.platformservice`	Logs events related to utilities that are mainly executed from the client side. For example, the plug-in registration utility, the purge cache utility, and so on. Some server-side utilities, such as the date-time utility and the exception handling utility, also use this logger.
`oracle.iam.platform.canonic`	Logs events related to the platform UI framework.
`oracle.iam.consoles.faces` `oracle.iam.consoles.common`	Logs messages generated from the UI framework.
`oracle.iam.platform.kernel`	Logs events related to the kernel. This includes the logging generated during the handling of orchestrations by the platform. The event handlers executed in the orchestrations within each feature use that feature's respective logger.
`oracle.iam.platform.context`	Logs events related to the context management feature.

Table 8–2 (Cont.) Oracle Identity Manager Loggers

Logger	Description
`oracle.iam.platform.entitymgr`	Logs events related to the entity manager feature. This feature provides generic handling of different types of entities, such as users, roles, and so on, and appropriate routing to the respective operations on them.

`oracle.iam.scheduler`
`oracle.iam.platform.scheduler`
`Xellerate.Scheduler`
`Xellerate.Scheduler.Task`
	Logs events related to the scheduler. Note that certain scheduled tasks may also use other loggers.

`oracle.iam.reconciliation`	Logs events related to the reconciliation feature.
`oracle.iam.accesspolicy`	Logs events related to the access policy feature.
`oracle.iam.autoroles`	Logs events related to the auto role membership assignment feature.
`oracle.iam.callbacks`	Logs events related to the callbacks feature.
`oracle.iam.configservice`	Logs events related to the Configuration service APIs that are used for configuration of entity attributes.
`oracle.iam.ldap-sync`	Logs events related to the Oracle Identity Manager and LDAP synchronization feature.
`oracle.iam.notification`	Logs events related to e-mail templates and the notifications handling feature.
`oracle.iam.passwdmgnt`	Logs events related to the password management feature.
`oracle.iam.platform.pluginframework`	Logs events from the plug-in framework feature that handles the management of plug-ins.
`oracle.iam.platform.async`	Logs events from platform that handles asynchronous operations.
`oracle.iam.spmlws` `oracle.iam.wsschema`	Logs events related to web services used for Fusion applications that generate requests for different operations.
`oracle.iam.diagnostic`	Logs messages from the diagnostic service APIs used to run diagnostic checks.
`oracle.iam.oimdataproviders`	Logs events related to the Oracle Identity Manager data providers. The Oracle Identity Manager data providers provide code to update and fetch data from the Oracle Identity Manager database.
`Xellerate.Database`	Logs database operations.
`Xellerate.PreparedStatement`	Same as Xellerate.Database, but logs only PreparedStatement details.
`Xellerate.Performance`	Logs database performance, such as time to execute a statement (query), or time to iterate through a result set to get data/metadata.

Table 8–2 (Cont.) Oracle Identity Manager Loggers

Logger	Description
`oracle.iam.platform.auth`	Logs events for the authentication handling feature.
`oracle.iam.platform.authz` `oracle.iam.authzpolicydefn`	Logs events for the feature that handles authorization policies.
`oracle.iam.sod` `Xellerate.SoD`	Logs events related to SoD (Segregation of Duties).
`oracle.jps`	Logger for the embedded Oracle Entitlements Server MicroSM engine. Note that the log file is created in the *OIM_ORACLE_HOME* folder named as Managed Server name-microsm.log (for example, OIMServer1-microsm.log).
`Xellerate.Entitlement`	Provides logging for entitlement operations used for provisioning entitlements.
`oracle.iam.conf`	Logs events related to the system configuration services feature that includes handling system properties.
`oracle.iam.transUI`	Logs events related to the transitional UI feature that handles initiation of legacy APIs from the 11g code. This includes operations such as initiation of provisioning during user creation, and so on.
`Xellerate.AccountManagement`	Provides logging in legacy user operations APIs.
`Xellerate.Server`	Provides logging in data objects.
`Xellerate.ResourceManagement` `Xellerate.ObjectManagement`	Provides logging for resource object operations.
`Xellerate.Workflow`	Provides logging for provisioning process operations.
`Xellerate.WebApp`	Provides logging for the transitional UI operations.
`Xellerate.Adapters`	Provides logging for the adapter factory.
`Xellerate.JavaClient`	Provides logging for client-side data objects.
`Xellerate.Policies`	Provides logging for data objects related to access policies.
`Xellerate.Rules`	Provides logging for data objects related to rules.
`Xellerate.APIs`	Provides logging for legacy public APIs.
`Xellerate.JMS`	Provides logging for JMS operations where messages are produced.
`Xellerate.RemoteManager`	Provides logging in remote manager.

Table 8–2 (Cont.) Oracle Identity Manager Loggers

Logger	Description
Xellerate.Auditor	Provides logging in audit framework.
Xellerate.Attestation	Provides logging in the attestation UI and operations.
Xellerate.GC.StartUp Xellerate.GC.ProviderRegistration Xellerate.GC.ImageGeneration Xellerate.GC.FrameworkProvisioning Xellerate.GC.Provider.ProvisioningFormat Xellerate.GC.Provider.ProvisioningTransport Xellerate.GC.FrameworkReconciliation Xellerate.GC.Provider.ReconciliationFormat Xellerate.GC.Provider.Validation Xellerate.GC.Provider.Transformation Xellerate.GC.Model Xellerate.GC.Server	Provides logging for the Generic Technology Connector (GTC).
oracle.iam.connectors.icfcommon	Provides logging for connector framework.

3. Define the level attribute for the <logger> element. See the example at the beginning of this section.
4. Add one or more <handler> elements to the <logger> element.
5. When you are finished editing both the <loggers> and <log_handlers> sections of logging.xml, save the file.
6. Restart the application server for the changes to take effect.

8.1.5 Sample ODL Log Output

The following ODL log excerpt illustrates the kind of output you can expect.

```
<Jun 15, 2010 2:01:20 AM IST> <Error> <oracle.iam.platform.authz.impl>
<IAM-1010032>
<No OES Policy found for the given Action.>
<Jun 15, 2010 2:02:02 AM IST> <Warning> <oracle.iam.platform.canonic.agentry>
<IAM-0091108> <readme.txt is not a valid connector resource file.>
<Jun 15, 2010 2:02:52 AM IST> <Error> <oracle.iam.configservice.impl>
<IAM-3020003> <The attribute User Type does not exist!>
```

For information about managing and interpreting log output, see "Managing Log Files and Diagnostic Data" in the *Oracle Fusion Middleware Administrator's Guide*.

8.2 Logging in Oracle Identity Manager By Using log4j

Apache log4j is used with third-party applications, such as Nexaweb for Deployment Manager and Workflow Designer, and OSCache for caching.

The location of the log4j configuration file is:

OIM_HOME/config/log.properties

Logging in Oracle Identity Manager by using log4j is described in the following sections:

- Log Levels
- Loggers
- Configuring and Enabling Logging

8.2.1 Log Levels

Table 8–3 lists the log levels for log4j:

Table 8–3 Log Levels for log4j

Log Level	Description
DEBUG	The DEBUG level designates fine-grained informational events that are useful to debug an application.
INFO	The INFO level designates informational messages that highlight the progress of the application at coarse-grained level.
WARN	The WARN level designates potentially harmful situations.
ERROR	The ERROR level designates error events that might allow the application to continue running.
ALL	The ALL level has the lowest possible rank and is intended to turn on all logging.
OFF	The OFF level has the highest possible rank and is intended to turn off logging.

8.2.2 Loggers

The loggers for the third-party applications used are:

- com.nexaweb.server for Nexaweb
- com.opensymphony.oscache for OSCache

8.2.3 Configuring and Enabling Logging

Any of the log levels can be used for the third-party applications as follows:

```
log4j.logger.com.nexaweb.server=WARN
log4j.logger.com.opensymphony.oscache=ERROR
```

9

Enabling Secure Cookies

By default, Oracle Identity Manager can be accessed over HTTP but does not work over Secure Socket Layer (SSL). This is because the cookie-secure flag is disabled by default. The cookie-secure flag tells the Web browser to only send the cookie back over an HTTPS connection. This ensures that the cookie is transmitted only on a secure channel. HTTPS must be enabled for the URL exposed by the application.

To enable Oracle Identity Manager to work over SSL, you must enable the cookie-secure flag. To do so:

1. Add the <cookie-secure>true</cookie-secure> tag inside the <session-descriptor> element to the following files in the Oracle Identity Manager deployment:
   - *OIM_HOME*/apps/oim.ear/admin.war/WEB-INF/weblogic.xml
   - *OIM_HOME*/apps/oim.ear/iam-consoles-faces.war/WEB-INF/weblogic.xml
   - *OIM_HOME*/apps/oim.ear/xlWebApp.war/WEB-INF/weblogic.xml
2. Create a new weblogic.xml file for Nexaweb application if it does not exist in its WEB-INF/ directory.
3. Add the following session descriptor in it:

```
<?xml version='1.0' encoding='UTF-8'?>
<weblogic-web-app
  xmlns="http://xmlns.oracle.com/weblogic/weblogic-web-app/1.0"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://xmlns.oracle.com/weblogic/weblogic-web-app/1.0
http://xmlns.oracle.com/weblogic/weblogic-web-app/1.0/weblogic-web-app.xsd">

  <session-descriptor>
    <persistent-store-type>replicated_if_clustered</persistent-store-type>
    <cookie-http-only>false</cookie-http-only>
    <cookie-name>oimjsessionid</cookie-name>
    <cookie-secure>true</cookie-secure>
    <url-rewriting-enabled>false</url-rewriting-enabled>
  </session-descriptor>

</weblogic-web-app>
```

4. Save weblogic.xml.
5. Restart the Oracle Identity Manager Managed Servers.

10

Enabling LDAP Synchronization

In earlier release of Oracle Identity Manager, LDAP synchronization can be enabled only at the time of installing Oracle Identity Manager, and postinstallation enablement of LDAP synchronization is not allowed. Oracle Identity Manager 11*g* Release 1 (11.1.1) supports postinstallation enablement of LDAP synchronization.

> **See Also:** "Integration Between LDAP Identity Store and Oracle Identity Manager" in *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for more information about LDAP synchronization

When Oracle identity Manager with Oracle Internet Directory (OID) or iplanet (ODSEE) or Active Directory (AD) is selected during installation, the virtualization functionality of Oracle Virtual Directory (OVD) is utilized. Oracle Identity Manager includes the Identity Virtualization Library (libOVD) instead of the stand-alone OVD server. Oracle Identity Manager deployment can be with or without Identity Virtualization Library (libOVD). With Identity Virtualization Library (libOVD) included in Oracle Identity Manager, the common library is used by Oracle Identity Manager without running its own instance of OVD. Without Identity Virtualization Library (libOVD), Oracle Identity Manager must use an instance of OVD separately.

When you select LDAP synchronization in the Oracle Identity Manager installer, you can select any one of the AD, iPlanet (ODSEE), OID, and OVD options. If you select any of AD, iPlanet (ODSEE), or OID, then Oracle Identity Manager is installed with Identity Virtualization Library (libOVD). If you select OVD, then LDAP synchronization is enabled, and no manual configuration steps for enabling LDAP synchronization is required. However, postinstall manual configuration to enable LDAP synchronization is required when LDAP synchronization has not been enabled at the time of installing Oracle Identity Manager.

This chapter describes the following configurations for postinstallation enablement of LDAP synchronization:

- Enabling Postinstallation LDAP Synchronization
- Enabling SSL Between Identity Virtualization Library (libOVD) and the Directory Server

In addition, this chapter contains the following sections:

- Provisioning Users and Roles Created Before Enabling LDAP Synchronization to LDAP
- Disabling LDAP Synchronization
- Managing Identity Virtualization Library (libOVD) Adapters
- Configuring LDAP Authentication When LDAP Synchronization is Enabled

10.1 Enabling Postinstallation LDAP Synchronization

To enable LDAP synchronization after Oracle Identity Manager has been deployed:

> **Note:** In Oracle Identity Manager 11*g* Release 1 (11.1.1), the idmConfigTool must be run to preconfigure LDAP synchronization. Running the LDAPConfigPreSetup script to preconfigure LDAP synchronization generates errors. See "Preparing Third-Party Directories" in the *Oracle Fusion Middleware Installation Guide for Oracle Identity Management* for information about using the idmConfigTool.

1. Set the *OIM_HOME* environment variable to the directory on which Oracle Identity Manager is deployed.
2. Copy the following files from the MDS to a temporary staging directory, such as /tmp:

> **Note:** It is mandatory to create a separate staging directory. The $OIM_ORACLE_HOME/server/metadata directory cannot be used as the staging directory because it contains some other files. If these files are imported inadvertently, then it might corrupt the Oracle Idenitity Manager instance.

   - The following metadata files used for configuring reconciliation profile and reconciliation horizontal table entity definition for LDAP user, role, role hierarchy, and role membership reconciliation:

     /db/LDAPUser

     /db/LDAPRole

     /db/LDAPRoleHierarchy

     /db/LDAPRoleMembership

     /db/RA_LDAPROLE.xml

     /db/RA_LDAPROLEHIERARCHY.xml

     /db/RA_LDAPROLEMEMBERSHIP.xml

     /db/RA_LDAPUSER.xml

     /db/RA_MLS_LDAPROLE.xml

     /db/RA_MLS_LDAPUSER.xml

     These files must be copied to a temporary location before importing, or you might corrupt your instance because oim-config.xml is also present in the same location.

   - The LDAP event handlers. The predefined event handlers are in the /db/ldapMetadata/EventHandlers.xml file.
   - The LDAPContainerRules.xml consisting of the container information for users and roles to be created.

Note: The LdapContainerRules.xml file can contain rules by using only those attributes that are mapped to the directory. A rule cannot be written by using attributes from foreign objects or attributes that are not part of the entity. This is true for both user and role entities. For example, Role Email cannot be used for rules for roles, and user's Organization Name cannot be used for user entity.

3. Edit the LDAPContainerRules.xml. To do so, open LDAPContainerRules.xml, and replace $DefaultUserContainer$ and $DefaultRoleContainer$ with appropriate user and role container values. For example, replace:
   - $DefaultUserContainer$ with a value, such as cn=ADRUsers,cn=Users,dc=us,dc=oracle,dc=com
   - $DefaultRoleContainer$ with a value, such as cn=ADRGroups,cn=Groups,dc=us,dc=oracle,dc=com
4. Perform the import. To do so:
   a. Using the MDS utilities, such as weblogicImportMetadata.sh, available in the *OIM_HOME*/bin/ directory, import all the files listed in step 2.

      Note:
      - See "MDS Utilities and User Modifiable Metadata Files" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about the MDS utilities.
      - Make sure that EventHandlers.xml is in the /db/ldapMetadata/ directory when imported into MDS.
      - MDS import utility imports everything in the staging directory, and therefore, only the files that are to be imported must be kept there. Otherwise, the Oracle Identity Manager instance can get corrupted.

   b. Navigate to the OIM_HOME/bin/ directory.
   c. In a text editor, open the weblogic.properties file. Provide values for the following properties:
      – wls_servername=`oim_server1`

        wls_servername is the name of the Oracle WebLogic Server on which Oracle Identity Manager is deployed.

      – application_name=`oim`

        If you are importing or exporting any default event handlers, the value is `oim`. For rest of the predefined metadata, value is `OIMMetadata`. If you are importing or exporting any custom data, then use application name as `OIMMetadata`.

      – metadata_from_loc=/tmp

        This is the directory location from which XML file is to be imported. For example, if you want to import User.xml and it is in the location /scratc/*USER*/temp/oim/file/User.xml, then you can specify location value as /scratc/*USER*/temp/oim. Make sure that no other files exist in

this directory or in its subdirectories. Import utility tries to recursively import all the files from location directory. This property is only used by weblogicImportMetadata.sh.

Note: Similarly, to export the files, such as EventHandlers.xml, the path /db/ldapMetadata/EventHandlers.xml must be used. The value of metadata_files in weblogic.properties must be:

metadata_files=/db/ldapMetadata/EventHandlers.xml

OIM_HOME/metadata contains two directories, db and ldapReconJobs. The metadata_from_loc location pointing to this directory results in import of both the directories into MDS.

---

d. Run the following command to import the configuration files into MDS:

sh ./weblogicImportMetadata.sh

You are prompted for WebLogic login information. Provide the following information:

```
Please enter your username [weblogic] :weblogic
Please enter your password [weblogic] :PASSWORD
Please enter your server URL [t3://localhost:7001] :t3://localhost:8003
```

This imports the configuration files.

5. Edit IT Resource configuration in Oracle Identity Manager. To do so:

a. Login to the Oracle Identity Manager Administrative and User Console by using administrator credentials, and navigate to Advanced Administration.

b. In the Welcome page of the Advanced Administration, under Configuration, click Manage IT Resource. Alternatively, click the Configuration tab, click Resource Management, and then select Manage IT Resource.

c. Search for the `Directory Server` IT resource.

d. Update the IT resource with Search base and Reservation container values.

The suggested value for Search base is the root suffix or the BaseDN, for example, dc=us,dc=oracle,dc=com.

e. If you want to configure Oracle Identity Manager with OVD server, then enter the values for ServerURL with the OVD server host and port details.

If you want to configure Oracle Identity Manager with Identity Virtualization Library (libOVD), then do not enter the values for ServerURL. It must be empty.

f. Enter the values for the bind credentials, as shown:

bind dn: `cn=oimadmin`

bind password: `1111111111`

Note: The Oracle Identity Manager proxy user DN is in the following format:

PROXY_USER,cn=system,*ROOT_SUFFIX*

For example: cn=oimadmin,cn=system, dc=us,dc=oracle,dc=com

---

g. Make sure that the value for the Reservation Container is cn=reserve,*VALUE_OF_THE_ROOT_SUFFIX*. For example:

   Reservation Container: cn=reserve,dc=us,dc=oracle,dc=com

6. For reconciliation jobs, seed the LDAP Reconciliation jobs or Load LDAP Recon jobs into Quartz tables, which are part of Oracle Identity Manager schema. to do so:

   a. Seed the LDAP Recon jobs by using the patch_weblogic.sh MDS utility available in *OIM_HOME*/bin/.

   Note: In a text editor, open the $OIM_ORACLE_HOME/server/bin/weblogic.profile file, and enter values for the properties before executing the patch_weblogic.sh script.

   b. Set ANT_HOME and JAVA_HOME accordingly.

   c. Create a backup of a $*OIM_ORACLE_HOME*/server/setup/deploy-files/setup.xml.

   d. In a text editor, open the $*OIM_ORACLE_HOME*/server/setup/deploy-files/setup.xml file.

   e. If the target for seeding Recon jobs is commented by default, then uncomment the following and have only that target in that file to seed the reconciliation jobs:

```
<target name="patch" description="This contains the list of targets to be
invoked post-patching">
               <antcall target="explode-archived-apps"/>
               <antcall target="seed-ootb-jobs"/>
               <!--antcall target="seed-ldap-recon-jobs"/--> == Uncomment
this line.
               <antcall target="update-oes-ootb-policies"/>
               <antcall target="seed-ootb-templates"/>
               <antcall target="unzip-db-deliverables-archive"/>
              <!--ant antfile="${appserver.type}/setup.xml" target="patch"
inheritrefs="true" /-->
</target>
```

   The required target to seed the Recon jobs is seed-ldap-recon-jobs.

   f. Run the patch_weblogic.sh script.

10.2 Enabling SSL Between Identity Virtualization Library (libOVD) and the Directory Server

For SSL, you must export the server side certificates from the directory server and import into Identity Virtualization Library (libOVD), as described in the following sections:

- Enabling SSL Between Identity Virtualization Library (libOVD) and Microsoft Active Directory
- Enabling SSL Between Identity Virtualization Library (libOVD) and iPlanet
- Enabling SSL Between Identity Virtualization Library (libOVD) and OID

10.2.1 Enabling SSL Between Identity Virtualization Library (libOVD) and Microsoft Active Directory

To export the server side certificates from Active Directory and import into Identity Virtualization Library (libOVD):

1. Export the certificate from the Active Directory server by referring to the instructions in the following Microsoft TechNet Website URLs:

   http://technet.microsoft.com/en-us/library/cc732443%28WS.10%29.aspx

   http://technet.microsoft.com/en-us/library/cc772898%28WS.10%29.aspx

2. Retrieve the CA signing certificate and save it to a file. To do so:

   a. Login to the Active Directory domain server as a domain administrator.

   b. Click **Start**, **Control Panel**, **Administrative Tools**, **Certificate Authority** to open the CA Microsoft Management Console (MMC).

   c. Right-click the CA computer, and select **CA Properties**.

   d. From the General menu, select **View Certificate**.

   e. Select the Details view, and click **Copy to File** on the lower-right corner of the window.

   f. Use the Certificate Export wizard to save the CA certificate in a file by running the following command:

   ```
   certutil -ca.cert OutCACertFile
   ```

   Note: You can save the CA certificate in either DER Encoded Binary X-509 format or Based-64 Encoded X-509 format.

3. Import the Active Directory server certificate created in step 3f to the Identity Virtualization Library (libOVD) keystore as a trusted entry by running the following command:

   ```
   $ORACLE_HOME/jdk/jre/bin/keytool -importcert -keystore
   $DOMAIN_HOME/config/fmwconfig/ovd/CONTEXT/keystores/adapters.jks -storepass
   password -alias alias -file OutCACertFile -noprompt
   ```

10.2.2 Enabling SSL Between Identity Virtualization Library (libOVD) and iPlanet

To export certificates from iPlanet (ODSEE) and import into Identity Virtualization Library (libOVD) for enabling SSL between Identity Virtualization Library (libOVD) and iPlanet (ODSEE):

1. To export certificate from iPlanet (ODSEE), run the following command:

   ```
   dsadm export-cert -o OUTPUT_FILE INSTANCE_PATH CERT_ALIAS
   ```

   For example:

   ```
   ./dsadm export-cert -o /tmp/server-cert /scratch/aime1/iPlanet/dsInst/
   defaultCert
   Choose the PKCS#12 file password:
   Confirm the PKCS#12 file password:
   ```

```
ls -lrt /tmp
-rw------- 1 aime1 svrtech 1684 Jan 20 00:39 server-cert
```

2. To import the iPlanet (ODSEE) certificate created in step 1 to the Identity Virtualization Library (libOVD) keystore as a trusted entry, run the following command:

```
ORACLE_HOME/jdk/jre/bin/keytool -importcert -keystore
$DOMAIN_HOME/config/fmwconfig/ovd/CONTEXT/keystores/adapters.jks -storepass
password -alias alias -file server-cert -noprompt
```

10.2.3 Enabling SSL Between Identity Virtualization Library (libOVD) and OID

To export the server side certificates from OID and import into Identity Virtualization Library (libOVD):

1. Export the Oracle Internet Directory server certificate in Base64 format using the following command:

```
orapki wallet export -wallet LOCATION_OF_OID_WALLET -dn
DN_FOR_OID_SERVER_CERTIFICATE -cert ./b64certificate.txt
```

> **Note:** If you use a certificate alias in the orapki command, then an error is generated if the alias is not in all lower case letters.

2. Import the Oracle Internet Directory server certificate created in step 2 to the Identity Virtualization Library (libOVD) keystore as a trusted entry using the following command:

```
$ORACLE_HOME/jdk/jre/bin/keytool -importcert -keystore
$DOMAIN_HOME/config/fmwconfig/ovd/CONTEXT/keystores/adapters.jks -storepass
password -alias alias -file OutCACertFile -noprompt
```

10.3 Provisioning Users and Roles Created Before Enabling LDAP Synchronization to LDAP

If you create users and roles in Oracle Identity Manager deployment without LDAP synchronization, and later decide to enable LDAP synchronization, then the users and roles created before LDAP synchronization enablement must be synced with LDAP after enablement. The provisioning of users, roles, role memberships, and role hierarchy to LDAP is achieved by the following predefined scheduled jobs for LDAP:

- LDAPSync Post Enable Provision Users to LDAP
- LDAPSync Post Enable Provision Roles to LDAP
- LDAPSync Post Enable Provision Role Memberships to LDAP
- LDAPSync Post Enable Provision Role Hierarchy to LDAP

For details about these scheduled jobs, see "Predefined Scheduled Tasks" on page 2-4.

10.4 Disabling LDAP Synchronization

To disable LDAP synchronization in Oracle Identity Manager deployment:

1. Remove the /db/ldapMetadata/EventHandlers.xml file from MDS by using MDS utilities. To delete the XML file, modify the following values in the weblogic.properties file and run the weblogicDeleteMetadata.sh or weblogicDeleteMetadata.bat script:
   - wls_servername=*OIM_SERVER_NAME*, for example oim_server1
   - application_name=oim

     If you are importing or exporting any predefined event handlers, then value is `oim`. For the rest of the default metadata, value is `OIMMetadata`. If you are importing or exporting any custom data, then always use `application`.
   - metadata_files=/metadata/user/custom/EventHandlers.xml
2. Login to Oracle Identity Manager Administrative and User Console with administrator credentials.
3. Disable all scheduled jobs mentioned in "Provisioning Users and Roles Created Before Enabling LDAP Synchronization to LDAP" on page 10-7.

10.5 Managing Identity Virtualization Library (libOVD) Adapters

In an Oracle Identity Manager deployment with LDAP synchronization enabled and AD, iPlanet (ODSEE), or OID as a the directory server, you can manage the Identity Virtualization Library (libOVD) adapters by using the WLST command.

To manage the Identity Virtualization Library (libOVD):

1. Start the WLST console. To do so, run oracle_common/common/bin/wlst.sh.
2. In the WLST console, run the following command:

   ```
   connect()
   ```

   When prompted, provide the WLST username, password, and t3 URL.
3. Run the following command to display a list of Identity Virtualization Library (libOVD) WLST commands:

   ```
   help('OracleLibOVDConfig')
   ```

   This lists the commands for creating, deleting, and modifying Identity Virtualization Library (libOVD), LDAP, and join adapters. The following commands act on the Identity Virtualization Library (libOVD) configuration assosicated with a particular OPSS context, which is passed in as a parameter:
   - **addJoinRule:** Adds a join rule to an existing Join adapter for the Identity Virtualization Library (libOVD) associated with the given OPSS context
   - **addLDAPHost:** Adds a new remote host to an existing LDAP adapter

     ---

     Note: The following is an example of adding multiple remote hosts for High Availability (HA) scenario:

     ```
     addLDAPHost(adapterName='ldap1', host='myhost.example.domain.com',
     port=389, contextName='myContext')
     ```

     See *Oracle Fusion Middleware High Availability Guide* for detailed information about HA.

- **addPlugin:** Adds a plug-in to an existing adapter or at the global level

  See Also: "Developing Plug-ins" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about developing plug-ins in Oracle Identity Manager

- **addPluginParam:** Add new parameter values to the existing adapter level plug-in or global plug-in
- **createJoinAdapter:** Creates a new Join adapter for the Identity Virtualization Library (libOVD) associated with the given OPSS context
- **createLDAPAdapter:** Creates a new LDAP adapter for the Identity Virtualization Library (libOVD) associated with the given OPSS context
- **deleteAdapter:** Deletes an existing adapter for the Identity Virtualization Library (libOVD) associated with the given OPSS context
- **getAdapterDetails:** Displays the details of an existing adapter that is configured for the Identity Virtualization Library (libOVD) associated with the given OPSS context
- **listAdapters:** Lists the name and type of all adapters that are configured for this Identity Virtualization Library (libOVD) associated with the given OPSS Context
- **modifyLDAPAdapter:** Modifies the existing LDAP adapter configuration
- **removeJoinRule:** Removes a join rule from a Join adapter configured for this Identity Virtualization Library (libOVD) associated with the given OPSS Context
- **removeLDAPHost:** Removes a remote host from an existing LDAP adapter configuration
- **removePlugin:** Removes a plug-in from an existing adapter or at global level
- **removePluginParam:** Removes an existing parameter from a configured adapter level plug-in or global plug-in

4. Run help on the individual commands to get usage, such as:

```
help('addPluginParam')
```

The following are examples for updating the AD User Management adapter for the oimLanguages attribute for Multi Language Support (MLS):

- **addPluginParam:**

  You can use this command to add oimLanguage param to UserManagement plug-in in AD user adapter, as shown:

```
add PluginParam(adapterName='ldap1', pluginName='UserManagement',
paramKeys='oimLanguages', paramValues='fr,zh-CN', contextName='oim')
```

- **removePluginParam:**

  You can use this command to remove oimLanguage param from UserManagement plug-in in AD user adapter, as shown:

```
removePluginParam(adapterName='ldap1', pluginName='UserManagement',
paramKey='oimLanguages', contextName='oim')
```

- **removePluginParam:**

You can use this command to remove modifierDNFilter param from Changelog plug-in, as shown:

```
removePluginParam(adapterName='CHANGELOG_ldap1', pluginName='Changelog',
paramKey='modifierDNFilter', contextName='oim')
```

See Also: "Creating Adapters in Oracle Virtual Directory" in the *Oracle Fusion Middleware Installation Guide for Oracle Identity Management* for detailed information about creating the OVD adapters for Oracle Identity Manager change log and user management

10.6 Configuring LDAP Authentication When LDAP Synchronization is Enabled

Use the following procedure to be able to use LDAP for authentication when LDAP synchronization is enabled.

Note: This procedure does not enable the following functionality:

- Forced password changes, including first login, administrator password reset, and expired passwords
- Forced setting of challenge responses

1. Add a dynamic group in Oracle Internet Directory (OID).
   a. Create an oimusers.ldif file that defines a dynamic group. The format of the LDIF file should be similar to the following:

      ```
      dn: cn=oimusers, <group search base>
      objectclass: orclDynamicGroup
      objectclass: groupOfUniqueNames
      labeleduri:ldap://LDAP_HOST:LDAP_PORT/<UserSearchBase>??sub?(objectclass=in
      etOrgPerson)
      ```

      For example:

      ```
      dn: cn=oimusers,cn=Groups,dc=us,dc=oracle,dc=com
      objectclass: orclDynamicGroup
      objectclass: groupOfUniqueNames
      labeleduri:
      ldap://LDAP_HOST:3060/cn=Users,dc=us,dc=oracle,dc=com??sub?(objectclass=ine
      tOrgPerson)
      ```

   b. Use the ldapadd command to upload the oimusers.ldif file to OID. The command should have the following format:

      ```
      ldapadd -h LDAP_HOST -p LDAP_PORT -D <root dn> -w <password> -f
      oimusers.ldif
      ```

      For example:

      ```
      ldapadd -h LDAP_HOST -p 3060 -D cn=orcladmin -w welcome1 -f oimusers.ldif
      ```

   c. Use the ldapsearch command to validate group members. The command should have the following format:

      ```
      ldapsearch -h LDAP_HOST -p LDAP_PORT -D <root dn> -w <password> -b
      "cn=oimusers,<groupsearchbase>" -s base "objectclass=*"
      ```

For example:

```
ldapsearch  -h LDAP_HOST -p 3060 -Dcn=orcladmin -wwelcome1 -b
"cn=oimusers,cn=Groups,dc=us,dc=oracle,dc=com" -s base "objectclass=*"
```

2. Configure the LDAP Authenticator in WLS.
   a. Log in to WebLogic Administrative Console.
   b. Go to Security Realms, myrealm, Providers.
   c. Click **New**. Give a name and choose OracleInternetDirectoryAuthenticator as type.
   d. Set the Control Flag to SUFFICIENT.
   e. Click the Provider Specific settings and configure the OID connection details.
   f. In Dynamic groups section, enter the following values:

      Dynamic Group Name Attribute: cn

      Dynamic Group Object Class: orcldynamicgroup

      Dynamic Member URL Attribute: labeleduri

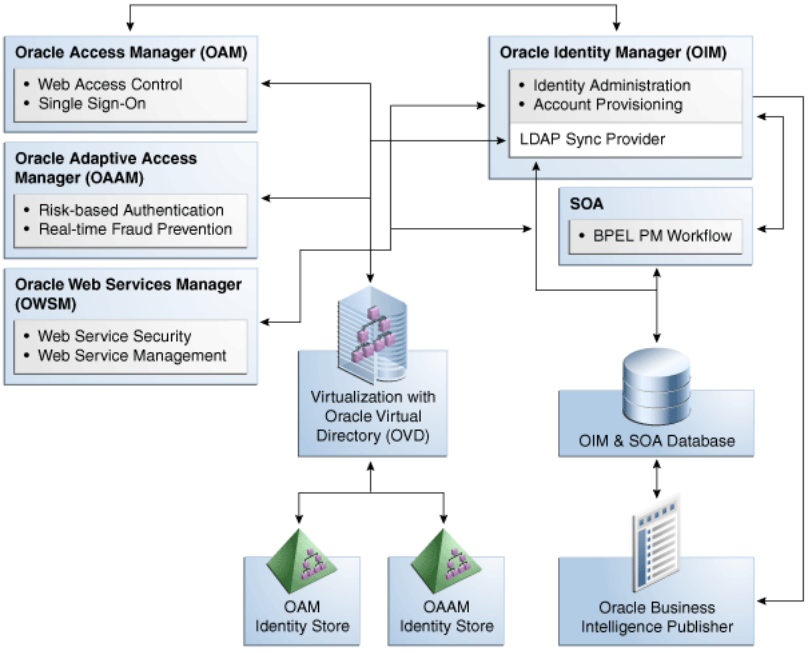
      User Dynamic Group DN Attribute: GroupOfUniqueNames
   g. Click the Providers tab and then click **Reorder**. Reorder the LDAP authenticator so this is placed before the OIM Authenticator.
3. Restart all servers.
4. Validate role memberships.
   a. Login to WebLogic Admin Console.
   b. Go to Security Realms, myrealm, User and Groups.
   c. Click **users** to display all the users in the LDAP user search base. If the LDAP users are not displayed, it means that there is an error with the LDAP connection, and the details are specified in OID Authenticator (provider specific settings).
   d. Click on any user and then to the corresponding group entry. "Oimusers" should be one of the listed entries. If this validation fails, please go through the LDAP authenticator's provider-specific details.

11

Integrating with Other Oracle Components

Oracle offers several technologies that compliment and extend the functionality available in Oracle Identity Manager, some of which are described in this chapter. Refer to the "Oracle Fusion Middleware Integration Overview" for complete information about the technologies you can integrate with Oracle Identity Manager. Figure 11–1 shows the integration of Oracle Identity Manager with other Oracle components.

Figure 11–1 Integration with Other Components



This chapter discusses the integration of Oracle Identity Manager with the following Oracle components:

- Oracle Access Manager
- Oracle Adaptive Access Manager
- Oracle Identity Analytics
- Oracle Identity Navigator
- Oracle Virtual Directory
- Oracle Service-Oriented Architecture

- Oracle Business Intelligence Publisher

11.1 Oracle Access Manager

Oracle Access Manager (OAM) protects applications, data, and cloud-based services through a combination of flexible authentication and single sign-on (SSO), identity federation, risk-based authentication, proactive enterprise fraud prevention, and fine-grained authorization.

Web-based SSO provides secure access to multiple applications with one authentication step. When OAM is combined with Oracle Identity Manager, OAM can SSO-enable the Oracle Identity Administration, along with the other Oracle Identity Management components.

Oracle Identity Manager, OAM, and Oracle Adaptive Access Manager (OAAM) share a common set of LDAP attributes, improving efficiency by making it easier to manage workflows and other processes. Integrated password management makes it easy for users to log in to OAM, OAAM, and Oracle Identity Manager, and to manage expired and forgotten passwords.

For integration details, see "Integration Between OIM and OAM" in the *Oracle Fusion Middleware Installation Guide for Oracle Identity Management*.

11.2 Oracle Adaptive Access Manager

OAAM provides sophisticated multifactor authentication and proactive, real-time fraud prevention functionality for Web-based connections.

Risk-based authentication is one such capability OAAM provides. The OAAM risk-scoring engine combats identity fraud in real-time by evaluating whether a user should be allowed to authenticate based on the type of transaction being attempted and the probability of fraud occurring. Next, the OAAM risk-scoring engine evaluates how a user answers a series of dynamically generated questions that are created based on a combination of public and private data sources. OAAM then generates a fraud score and the user is either allowed to continue with the transaction or is denied access.

When integrated with Oracle Identity Manager, the robust challenge question feature set found in OAAM replaces the more limited set found in Oracle Identity Manager, which handles password validation, storage, and propagation duties.

For information about how password management is achieved when Oracle Identity Manager is integrated with OAM and OAAM, see "Deployment Options for Password Management" in the *Oracle Fusion Middleware Integration Guide for Oracle Access Manager.*

For integration details, see "Integrating Oracle Access Manager, Oracle Adaptive Access Manager, and Oracle Identity Manager" in the *Oracle Fusion Middleware Integration Guide for Oracle Access Manager.*

11.3 Oracle Identity Analytics

Oracle Identity Analytics (OIA), formerly Sun Role Manager, provides rich identity analytics and dashboards that allow you to monitor, analyze, review, and govern user access in order to mitigate risk, build transparency, and satisfy compliance mandates.

When integrated with Oracle Identity Manager, Oracle Identity Analytics defines the Role-based Access Control (RBAC) framework, the attestation process, and the

approach to Segregation of Duties (SoD) policy enforcement, while Oracle Identity Manager serves as the automated provisioning and identity synchronization solution. Rather than assigning individual access entitlements, the RBAC framework allows organizations to assign and unassign roles as a means of controlling user access on various applications.

11.3.1 Integration Configuration in Oracle Identity Analytics

For integration details in Oracle Identity Analytics, see "Integrating With Oracle Identity Manager, Preferred Method" in the *Oracle Identity Analytics 11gR1 System Integrator's Guide* at the following URL:

`http://wikis.sun.com/x/iIUpDg`

11.3.2 Integration Configuration in Oracle Identity Manager

Oracle Identity Manager is an authoritative source of data for users, accounts, and entitlements. Therefore, in an integrated deployment, OIA needs the following data from Oracle Identity Manager:

- User attributes
- Account attributes, including assigned entitlements
- Entitlements

The requirements for the data synchronization are:

- OIA needs incremental changelog updates for users, accounts, and entitlements from Oracle Identity Manager
- OIA needs, on an ad-hoc basis full set of entities, such as users, accounts, and entitlements, from Oracle Identity Manager on an ad hoc basis

Oracle Identity Manager 11*g* Release 1 (11.1.1) allows the data synchronization with the help of:

- APIs to allow OIA to start data collection for a configurable number of entities. In addition, APIs allow OIA to get the status of the data collection.

  For information about using Oracle Identity Manager APIs, see *Oracle Fusion Middleware Java API Reference for Oracle Identity Manager* and "Using APIs" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager*.

- Stored procedures that perform the data collection from Oracle Identity Manager transactional tables to the staging tables.

This section describes the data collection process with the help of the following topics:

- The DataCollectionOperationsIntf API Interface
- Staging Tables
- Data Collection Process

11.3.2.1 The DataCollectionOperationsIntf API Interface

The DataCollectionOperationsIntf API interface provides the following APIs:

- **void startDataCollection(String sessionID, Map entities):** This API starts the data collection process for a single session. The parameters are:

  - **sessionID:** A unique string identifying the particular session. This string must be the same in repeated invocations of APIs that form the part of a single data collection session.
  - **entities:** A Map that contains all the entities and the since dates for which data collection is to be performed. There are two static entities, user and entitlement. The rest can be resource object names in Oracle Identity Manager. If the entity or resource object name cannot be found, it is ignored and no data collection is performed for the same. The values in the Map are java.util.Date objects that represent a timestamp. If this value is NULL, then complete data for that entity is populated. If the data is non-NULL, then data is populated in the staging tables for entities modified after that date.

- **String checkStatus(String sessionID):** This API checks for the status of the specified data collection session. The API returns the following statuses:
  - INITIATED
  - IN PROGRESS
  - COMPLETED
  - FAILED
  - FINALIZED
- **void finalizeSession(String sessionID):** This API finalizes the data collection session by truncating the staging tables and other cleanup activities.

11.3.2.2 Staging Tables

Oracle Identity Manager makes user, account, and entitlement data through certain tables to OIA. These are called staging tables, which can be populated on demand by using the APIs in the DataCollectionOperationsIntf interface. The following staging tables can be populated:

- staging_users_table: Staging table for user profile attributes
- staging_user_extended_props: Staging table for custom user defined fields
- staging_entitlements: Staging table for entitlement information
- staging_accounts: Staging table for account information
- staging_account_attributes: Staging table for account attributes including parent and child form data

11.3.2.3 Data Collection Process

The following is the sequence of steps for the data collection:

1. Invoke startDataCollection() API with the appropriate session ID and entities with since dates. If the since date is NULL, then indicates to Oracle Identity Manager that full data must be populated in the staging tables.
2. Poll Oracle Identity Manager by running the getDataCollectionStatus() API with the same session ID.
3. After the getDataCollectionStatus() API returns COMPLETED status, OIA processes can directly read the data from the staging tables.
4. After data synchronization is complete, run the finalizeDataCollectionSession() API with the same session ID to finalize the data collection session.

5. If there are any errors in the data collection, then Oracle Identity Manager indicates it with a FAILED status. If this happens, then the data collection session must be restarted. You can restart the data collection session by finalizing the current session using finalizeDataCollectionSession() API and then running startDataCollection() with a new session ID.

11.4 Oracle Identity Navigator

Oracle Identity Navigator (OIN) is a browser-based administrative portal designed to act as a launch pad for Oracle Identity Management components. It does not replace the individual component consoles. Rather, it allows you to access the Oracle Identity Management consoles from one site.

When integrated with Oracle Identity Manager, OIN replaces the Oracle Identity Administration as the primary Oracle Identity Manager user interface.

OIN has a product discovery feature that can be used to discover all active J2EE components in a domain, including the Oracle Identity Administration.

For integration details, see "Adding a Component Link to the Product Launcher by Using Product Discovery" in the *Oracle Fusion Middleware Administrator's Guide for Oracle Identity Navigator*.

11.5 Oracle Virtual Directory

If you install Oracle Identity Manager with LDAP, you must install Oracle Virtual Directory (OVD). OVD connects to multiple enterprise directories and consolidates the contents of those directories into a unified view. For example, if your enterprise uses Oracle Internet Directory (OID), iPlanet, and Active Directory, OVD can interface with all three directories and create a consolidated view. Oracle Identity Manager can then use a single connector to access the consolidated LDAP data on OVD. The LDAP Sync Provider (also called the LDAP Provider) connects Oracle Identity Manager and OVD.

When integrated with Oracle Identity Manager, OVD provides the following benefits:

- Oracle Identity Manager connector management is simplified - Only a single LDAP connector is needed for multiple directory providers (although, multiple instances may be needed)
- LDAP connector reliability is improved - The same connector is used regardless of the underlying LDAP server. OVD handles the data translation that, in the past, required multiple LDAP connectors for multiple LDAP providers
- The same identity virtualization capability is provided to all Fusion Middleware applications, reducing the overall footprint of components in the Enterprise

For integration details, see the *Oracle Fusion Middleware Installation Guide for Oracle Identity Management*, which contains multiple procedures for integrating Oracle Identity Manager and Oracle Virtual Directory in various environments.

Earlier releases of OVD are installed in Blocking IO (BIO) mode. The current release of OVD is installed in Non Blocking IO (NIO) mode by default. However, Oracle Identity Manager is not certified with NIO mode. Therefore, the OVD connection management in Oracle Identity Manager must be modified for working with OVD in NIO mode.

The current release of OVD is also enhanced to include multiple change log support. These enhancements require changes to the OVD Changlog adapter parameters.

See "Creating Adapters in Oracle Virtual Directory" in the *Oracle Fusion Middleware Installation Guide for Oracle Identity Management* for detailed information about creating the OVD adapters for Oracle Identity Manager change log and user management.

11.6 Oracle Service-Oriented Architecture

The Oracle Identity Manager workflow feature utilizes Oracle Service-Oriented Architecture (SOA) back-end services and management capabilities to provide an interactive environment to request, approve, and manage user access. In order to install Oracle Identity Manager, you also must install Oracle SOA.

Oracle Identity Manager makes use of the following SOA Suite components:

- BPEL Process Manager, which provides the end-to-end solution for creating and managing business processes
- Human Workflow, which manages the lifecycle of human tasks, including creation, assignment, deadlines, expiration, and notifications
- Oracle Business Rules, which allows you to define complex business rules to support request assignment, process selection, and approver resolution
- Oracle Web Services Manager, which secures the web service and BPEL processes consumed and invoked by Oracle Identity Manager

For integration details, see "Integration with Oracle SOA Suite" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager*.

11.7 Oracle Business Intelligence Publisher

The Oracle Identity Manager reporting feature utilizes Oracle Business Intelligence Publisher (BI Publisher) to provide high-fidelity reporting capabilities, allowing you to create, deploy, and use complex reports in a multi-channel environment.

For BI Publisher details, see "Using Reporting Features" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager.*

12

Handling Lifecycle Management Changes

Because of integrated deployment of Oracle Identity Manager with other applications, such as Oracle Access Manager (OAM), and configuration changes in those applications, various configuration changes might be required in Oracle Identity Manager and Oracle WebLogic Server. These configuration changes are described in the following sections:

- URL Changes Related to Oracle Identity Manager
- Password Changes Related to Oracle Identity Manager
- Configuring SSL for Oracle Identity Manager

12.1 URL Changes Related to Oracle Identity Manager

Oracle Identity Manger uses various hostname and port in its configuration because of the architectural and middleware requirements. This section describes ways to make the corresponding changes in Oracle Identity Manager and Oracle WebLogic configuration for any change in the integrated and dependent applications.

This section contains the following topics:

- Oracle Identity Manager Database Host and Port Changes
- Oracle Virtual Directory Host and Port Changes
- Oracle Identity Manager Host and Port Changes
- BI Publisher Host and Port Changes
- SOA Host and Port Changes
- OAM Host and Port Changes

12.1.1 Oracle Identity Manager Database Host and Port Changes

This section describes the configuration areas where database hostname and port number are used.

After installing Oracle Identity Manager, if there are any changes in the database hostname or port number, then the following changes are required:

> **Note:** Before making changes to the database host and port, shutdown the managed servers hosting Oracle Identity Manager. But you can keep the Oracle WebLogic Administrative Server running.

- **To change datasource oimJMSStoreDS configuration:**

1. Navigate to **Services**, **JDBC**, **Data Sources**, and then **oimJMSStoreDS**.
2. Click the **Connection Pool** tab.
3. Modify the values of the **URL** and **Properties** fields to reflect the changes to database host and port.

- **To change datasource oimOperationsDB configuration:**
  1. Navigate to **Services**, **JDBC**, **Data Sources**, and then **oimOperationsDB**.
  2. Click the **Connection Pool** tab.
  3. Modify the values of the URL and Properties fields to reflect the changes to database host and port.
- **To change the datasource related to Oracle Identity Manager Meta Data Store (MDS) configuration:**
  1. Navigate to **Services**, **JDBC**, **Data Sources**, and then **mds-oim**.
  2. Click the **Connection Pool** tab.
  3. Modify the values of the URL and Properties fields to reflect the changes in the database host and port.
- **To change OIMAuthenticationProvider configuration:**
  1. In the WebLogic Administrative console, navigate to **Security Realms**, **myrealm**, and then **Providers**.
  2. Click **OIMAuthenticationProvider**.
  3. Click **Provider Specific**.
  4. Modify the value of the DBUrl field to reflect the change in hostname and port.

     Note: If Service Oriented Architecture (SOA) and Oracle Web Services Manager (OWSM) undergo configuration changes, then you must make similar changes for datasources related to SOA or OWSM.

After making changes in the datasources, restart the Oracle WebLogic Administrative Server, and start the Oracle Identity Manager managed WebLogic servers.

Note: Whenever Oracle Identity Manager application configuration information is to be changed by using OIM App Config MBeans from the Enterorise Management (EM) console, at least one of the Oracle Identity Manager Managed Servers must be running. Otherwise, you cannot figure out any of the OIM App Config MBeans from the EM console.

- **To change DirectDB configuration:**
  1. Login to Enterprise Manager by using the following URL:

     http://*ADMIN_SERVER*/em
  2. Navigate to **Identity and Access**, and then **oim**.

3. Right-click **oim**, and navigate to **System MBean Browser** under Application Defined MBeans.
4. Navigate to **oracle.iam**, **Application:oim**, **XMLConfig**, **Config**, **XMLConfig.DirectDBConfig**, and then **DirectDB**.
5. Enter the new value for the URL attribute to reflect the changes to host and port, and then apply the changes.

Note: When Oracle Identity Manager single instance deployment is changed to Oracle Real Application Clusters (Oracle RAC) or Oracle RAC is changed to single instance deployment, change the oimJMSStoreDS, oimOperationsDB, and mds-oim datasources. In addition to the generic changes to make these datasources to multidatasource configuration, change the OIMAuthenticationProvider and domain credential store configurations to reflect the Oracle RAC URL. For information about these generic changes, see *Oracle Fusion Middleware High Availability Guide*.

12.1.2 Oracle Virtual Directory Host and Port Changes

When LDAP synchronization is enabled, Oracle Identity Manager connects with directory servers through Oracle Virtual Directory (OVD). This connection takes place by using LDAP/LDAPS protocol.

To change OVD host and port:

1. Login to Oracle Identity Manager Administration.
2. Click **Advanced**.
3. Under Configuration, click **Manage IT Resource**.
4. From the IT Resource Type list, select **Directory Server** , and click **Search**.
5. Edit the Directory Server IT resource. To do so:
   a. If the value of the Use SSL field is set to `False`, then edit the Server URL field. If the value of the Use SSL field is set to `True`, then edit the Server SSL URL field.
   b. Click **Update**.

12.1.3 Oracle Identity Manager Host and Port Changes

This section consists of the following topics:

- Changing OimFrontEndURL in Oracle Identity Manager Configuration
- Changing backOfficeURL in Oracle Identity Manager Configuration

---

Note: When additional Oracle Identity Manager nodes are added or removed, perform the procedures described in these sections to configure Oracle Identity Manager host and port changes.

12.1.3.1 Changing OimFrontEndURL in Oracle Identity Manager Configuration

The OimFrontEndURL is the URL used to access the Oracle Identity Manager UI. This can be a load balancer URL or Web server URL depending on the application server is

fronted with loan balancer or Web server, or single application server URL. This is used by Oracle Identity Manager in the notification e-mails as well as the callback URL for SOA calls.

The change may be necessary because of change in Web server hostname or port for Oracle Identity Manager deployment in a clustered environment, or WebLogic managed server hostname or port changes for Oracle Identity Manager deployment in a nonclustered environment.

To change the OimFronEndURL in Oracle Identity Manager configuration:

1. Login to Enterprise Manager by using the following URL when the WebLogic Administrative Server and Oracle Identity Manager managed servers, at least one of the servers in case of a clustered deployment, are running:

   http://*ADMIN_SERVER*/em

2. Navigate to **Identity and Access**, **oim**.
3. Right-click **oim**, and navigate to **System MBean Browser**.
4. Under Application Defined MBeans, navigate to **oracle.iam**, **Application:oim**, **XMLConfig**, **Config**, **XMLConfig.DiscoveryConfig**, and then **Discovery**.
5. Enter new value for the OimFrontEndURL attribute, and click **Apply** to save the changes. Example values can be:

   http://myoim.oracle.com

   https://myoim.oracle.com

   http://myserver.oracle.com:7001

   Note: SPML clients store Oracle Identity Manager URL for invoking SPML and sending callback response. Therefore, changes are required corresponding to this. In addition, if Oracle Identity Manager is integrated with OAM, OAAM, or Oracle Identity Navigator (OIN), there may be corresponding changes necessary. For more information, refer to OAM, OAAM, and OIN documentation in the Oracle Technology Network (OTN) Web site.

12.1.3.2 Changing backOfficeURL in Oracle Identity Manager Configuration

Changing backOfficeURL is required only for Oracle Identity Manager deployed in front-office and back-office configuration. This change does not apply for simple clustered or nonclustered deployments. This URL is used internally by Oracle Identity Manager for accessing back-office components from the front-office components. You might change the value of this attribute during the implementation of back-office and front-office configuration, for adding additional servers to back office, and for removing servers from back-office.

To change the value of the backOfficeURL attribute:

1. Login to Enterprise Manager by using the following URL when the WebLogic Administrative Server and Oracle Identity Manager managed servers, at least one of the servers in case of a clustered deployment, are running:

   http://*ADMIN_SERVER*/em

2. Navigate to **Identity and Access**, and then **oim**.
3. Right-click **oim**, and navigate to **System MBean Browser**.

4. Under Application Defined MBeans, navigate to **oracle.iam**, **Application:oim**, **XMLConfig**, **Config**, **XMLConfig.DiscoveryConfig**, **Discovery**.
5. Enter a new value for the BackOfficeURL attribute, and click **Apply** to save the changes. Example values can be:

   t3://mywls1.oracle.com:8001

   t3://mywls1.oracle.com:8001,mywls2.oracle.com:9001

   Note: The value of the BackOfficeURL attribute must be empty for Oracle Identity Manager nonclustered and clustered deployments.

12.1.4 BI Publisher Host and Port Changes

BI Publisher can be accessed by clicking a simple link from Oracle Identity Manager Administrative and User console for reporting purposes. This URL is based on the configuration value on Oracle Identity Manager side. If there is host and port changes for BI Publisher, then the following change must be made in Oracle Identity Manager:

1. Login to Enterprise Manager by using the following URL when the WebLogic Administrative Server and Oracle Identity Manager managed servers, at least one of the servers in case of a clustered deployment, are running:

   http://*ADMIN_SERVER*/em
2. Navigate to **Identity and Access**, **oim**.
3. Right-click **oim**, and navigate to **System MBean Browser**.
4. Under Application Defined MBeans, navigate to **oracle.iam**, **Application:oim**, **XMLConfig**, **Config**, **XMLConfig.DiscoveryConfig**, **Discovery**.
5. Enter a new value for the BIPublisherURL attribute, and click **Apply** to save the changes.

12.1.5 SOA Host and Port Changes

To change the SOA host and port:

Note: When additional SOA nodes are added or removed, perform this procedure to change the SOA host and port.

1. Login to Enterprise Manager by using the following URL when the WebLogic Administrative Server and Oracle Identity Manager managed servers, at least one of the servers in case of a clustered deployment, are running:

   http://*ADMIN_SERVER*/em
2. Navigate to **Identity and Access**, **oim**.
3. Right-click **oim**, and navigate to **System MBean Browser**.
4. Under Application Defined MBeans, navigate to **oracle.iam**, **Application:oim**, **XMLConfig**, **Config**, **XMLConfig.SOAConfig**, **SOAConfig**.
5. Change the values of the Rmiurl and Soapurl attributes, and click **Apply** to save the changes.

   The Rmiurl attribute is used for accessing SOA EJBs deployed on SOA managed servers. This is the application server URL. For a clustered deployment of Oracle

Identity Manager, it is a comma-separated list of all the SOA managed server URLs. Example values for this attribute can be:

t3://mysoa1.oracle.com:8001

t3s://mysoa1.oracle.com:8001,mysoa2.oracle.com:8002

t3://mysoa1.oracle.com:8001,mysoa2.oracle.com:8002,mysoa3.oracle.com:8003

The Soapurl attribute is used for accessing SOA Web services deployed on SOA managed servers. This is the Web server and load balancer URL for a SOA cluster front-ended with Web server and load balancer. It can be application server URL for a single SOA server.

The example values for this attribute can be:

http://myoimsoa.oracle.com

http://mysoa.oracle.com:8001

12.1.6 OAM Host and Port Changes

To change the OAM host and port:

1. Login to Enterprise Manager by using the following URL when the WebLogic Administrative Server and Oracle Identity Manager managed servers, at least one of the servers for a clustered deployment, are running:

   http://*ADMIN_SERVER*/em

2. Navigate to **Identity and Access**, and then to **oim**.
3. Right-click **oim**, and navigate to **System MBean Browser**.
4. Under Application Defined MBeans, navigate to **oracle.iam**, **Application:oim**, **XMLConfig**, **Config**, **XMLConfig.SSOConfig**, and then **SSOConfig**.
5. Change the values of the AccessServerHost and AccessServerPort attributes and other attributes as required, and click **Apply** to save the changes.

12.2 Password Changes Related to Oracle Identity Manager

Various passwords are used for Oracle Identity Manger configuration because of the architectural and middleware requirements. This section describes the default passwords and ways to make the changes to the password in Oracle Identity Manger and Oracle WebLogic configuration for any change in the dependent or integrated products.

This section consists of the following topics:

- Changing Oracle WebLogic Administrator Password
- Changing Oracle Identity Manager Administrator Password
- Changing Oracle Identity Manager Database Password
- Changing Oracle Identity Manager Passwords in the Credential Store Framework
- Changing OVD Password

12.2.1 Changing Oracle WebLogic Administrator Password

To change Oracle WebLogic administrator password:

1. Login to WebLogic Administrative console.

2. Navigate to **Security Realms**, **myrealm**, **Users and Groups**, **weblogic**, **Password**.
3. In the New Password field, enter the new password.
4. In the Confirm New Password field, re-enter the new password.
5. Click **Apply**.

12.2.2 Changing Oracle Identity Manager Administrator Password

During Oracle Identity Manager installation, the installer prompts for the Oracle Identity Manager administrator password. If required, you can change the administrator password after the installation is complete. To do so, you must login to Oracle Identity Manager Self Service as Oracle Identity Manager administrator. For information about how to change the administrator password, see "Authenticated User Self Service" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*.

Note: If OAM or OAAM is integrated with Oracle Identity Manager, then you might have to make corresponding changes in those applications. For more information, refer to OAM and OAAM documentation in the Oracle Technology Network (OTN) Web site by using the following URL:

`http://www.oracle.com/technetwork/indexes/documentation/index.html`

12.2.3 Changing Oracle Identity Manager Database Password

Oracle Identity Manager uses two database schemas for storing Oracle Identity Manager operational and configuration data. It uses Oracle Identity Manager MDS schema for storing configuration-related information and Oracle Identity Manager schema for storing other information. Any change in the schema password requires changes on Oracle Identity Manager configuration.

Changing Oracle Identity Manager database password involves the following:

Note: Before changing the database password, shutdown the managed servers that host Oracle Identity Manager. However, you can keep the Oracle WebLogic Administrative Server running.

- **To change datasource oimJMSStoreDS configuration:**
  1. Navigate to **Services**, **JDBC**, **Data Sources**, **oimJMSStoreDS**.
  2. Click the **Connection Pool** tab.
  3. In the Password and Confirm password fields, enter the new Oracle Identity Manager database schema password.
  4. Click **Save** to save the changes.
- **To change datasource oimOperationsDB configuration:**
  1. Navigate to **Services**, **JDBC**, **Data Sources**, **oimJMSStoreDS**.
  2. Click the **Connection Pool** tab.
  3. In the Password and Confirm password fields, enter the new Oracle Identity Manager database schema password.

4. Click **Save** to save the changes.

- **To change datasource related to Oracle Identity Manager MDS configuration:**
  1. Navigate to **Services**, **JDBC**, **Data Sources**, **mds-oim**.
  2. Click the **Connection Pool** tab.
  3. In the Password and Confirm password fields, enter the new Oracle Identity Manager MDS database schema password.
  4. Click **Save** to save the changes.

  Note:

  - For Oracle Identity Manager deployments with Oracle Real Application Clusters (Oracle RAC) configuration, you might have to make changes in all the datasources under the respective multi-datasource configurations.
  - You might have to make similar changes for datasources related to SOA or OWSM, if required.

- **To change OIMAuthenticationProvider configuration:**
  1. In the WebLogic Administrative console, navigate to **Security Realms**, **myrealm**, and then **Providers**.
  2. Click **OIMAuthenticationProvider**.
  3. Click **Provider Specific**.
  4. In the DBPassword field, enter the new Oracle Identity Manager database schema password.
  5. Click **Save** to save the changes.
- **To change domain credential store configuration:**
  1. Login to Enterprise Manager by using the following URL:

     http://*ADMIN_SERVER*/em
  2. Navigate to **Weblogic Domain**, and then ***DOMAIN_NAME***.
  3. Right click **oim**, and navigate to **Security**, **Credentials**, and then **oim**.
  4. Select **OIMSchemaPassword**, and click **Edit**.
  5. In the Password field, enter the new password, and click **OK**.

After changing the Oracle Identity Manager database password, restart the WebLogic Administrative Server. Start the Oracle Identity manager managed WebLogic Servers as well.

12.2.4 Changing Oracle Identity Manager Passwords in the Credential Store Framework

Oracle Identity Manager installer stores several passwords during the install process. Various values are stored in Credential Store Framework (CSF) as key and value. Table 12–1 lists the keys and the corresponding values:

Table 12–1 CSF Keys

Key	Description
DataBaseKey	The password for the key used to encrypt database. The password is the user input value in the installer for the Oracle Identity Manager keystore.
.xldatabasekey	The password for keystore that stores the database encryption key. The password is the user input value in the installer for the Oracle Identity Manager keystore.
xell	The password for key 'xell', which is used for securing communication between Oracle Identity Manager components. Default password generated by Oracle Identity Manager installer is xellerate.
default_keystore.jks	The password for the default_keystore.jks JKS keystore in the *DOMAIN_HOME*/config/fmwconfig/ directory. The password is the user input value in the installer for the Oracle Identity Manager keystore.
SOAAdminPassword	The password is user input value in the installer for SOA Administrator Password field.
OIMSchemaPassword	The password for connecting to Oracle Identity Manager database schema. Password is user input value in the installer for OIM Database Schema Password field.
JMSKey	The password is the user input value in the installer for the Oracle Identity Manager keystore.

To change the values of the CSF keys:

1. Login to Enterprise Manager.
2. Right-click the domain.
3. Navigate to **Security**, and then **Credential**.
4. Expand **oim**. The list of all the key and value pairs for Oracle Identity Manager are displayed. You can edit and change the values.

12.2.5 Changing OVD Password

To change the OVD password:

1. Login to Oracle Identity Manager Administration.
2. Click **Advanced**.
3. Under Configuration, click **Manage IT Resource**.
4. From the IT Resource Type list, select **Directory Server**.
5. Click **Search**.
6. Edit the Directory Server IT resource. To do so, in the Admin Password field, enter the new OVD password, and click **Update**.

12.3 Configuring SSL for Oracle Identity Manager

This section describes the procedure for generating keys, signing and exporting certificates, setting up SSL Configuration for Oracle Identity Manager and for the components with which Oracle Identity Manager interacts, and establish secure communication between them. It includes the following topics:

- Generating Keys
- Signing the Certificates
- Exporting the Certificate
- Importing the Certificate
- Enabling SSL for Oracle Identity Manager and SOA Servers
- Enabling SSL for Oracle Identity Manager DB
- Enabling SSL for LDAP Synchronization

12.3.1 Generating Keys

You can generate private and public certificate pairs by using the keytool command.

The following command creates an identity keystore (support.jks):

Note: Change the parameter values passed to the keytool command according to your requirements. Ensure that there is no line break in the keytool argument.

```
keytool -genkey
-alias support
-keyalg RSA
-keysize 1024
-dname "CN=localhost, OU=Identity, O=Oracle Corporation,C=US"
-keypass weblogic1
-keystore support.jks
-storepass weblogic1
```

12.3.2 Signing the Certificates

Use the following keytool command to sign the certificates that you created:

Note: Change the parameter values passed to the keytool command according to your requirements. Ensure that there is no line break in the keytool argument.

```
./keytool -selfcert -alias support
  -sigalg MD5withRSA -validity 2000 -keypass weblogic1
  -keystore support.jks
  -storepass weblogic1
```

12.3.3 Exporting the Certificate

Use the following keytool command to export the certificate from the identity keystore to a file, for example, supportcert.pem:

```
./keytool -export -alias support
  -file supportcert.pem
  -keypass weblogic1
  -keystore support.jks
  -storepass weblogic1
```

12.3.4 Importing the Certificate

Use the following keytool command to import the certificate from a file, such as wlservercert.pem, to the identity keystore:

```
keytool -import -alias serverwl -trustcacerts -file
D:\bea\user_projects\domains\mydomain\wlservercert.pem
-keystore CLIENT_TRUST_STORE -storepass CLIENT_TRUST_STORE_PASSWORD
```

12.3.5 Enabling SSL for Oracle Identity Manager and SOA Servers

You need to perform the following configurations in Oracle Identity Manager and SOA servers to enable SSL:

- Enabling SSL for Oracle Identity Manager By Using Default Setting
- Enabling SSL for Oracle Identity Manager By Using Custom Keystore
- Changing OimFrontEndURL to Use SSL Port
- Changing backOfficeURL to Use SSL Port
- Changing SOA Server URL to Use SSL Port
- Configuring SSL for Design Console
- Configuring SSL for Oracle Identity Manager Utilities
- Configuring SSL for MDS Utilities
- Configuring SSL for SPML/Callback Domain

12.3.5.1 Enabling SSL for Oracle Identity Manager

Enabling SSL for Oracle Identity Manager is described in the following sections:

- Enabling SSL for Oracle Identity Manager By Using Default Setting
- Enabling SSL for Oracle Identity Manager By Using Custom Keystore

12.3.5.1.1 Enabling SSL for Oracle Identity Manager By Using Default Setting

To enable SSL for Oracle Identity Manager and SOA servers by using default setting:

1. Log in to WebLogic Server Administrative console and go to Servers, OIM_SERVER1, General. Under the general section, you can enable ssl port to any value and activate it.
2. The server will start listening and you can access the URL with HTTPS protocol.
3. Perform the same steps for Admin/SOA Servers as Oracle Identity Manager might need to interact with SSL-enabled SOA Server.

12.3.5.1.2 Enabling SSL for Oracle Identity Manager By Using Custom Keystore

To enable SSL for Oracle Identity Manager by using custom keystore:

Note:

- Change the parameter values passed to the keytool command according to your requirements. Ensure that there is no line break in the keytool argument.
- See "Generating Keys" on page 12-10 for information about generating custom keys.

1. In the WebLogic Server Administration Console, click **Environment**, **Servers**, **Server_Name (OIM_Server1)**, **Configuration**, and then **General**.
2. Click **Lock & Edit**.
3. Select SSL listen port enabled. The default port is 14001.
4. Select the Keystores tab.
5. From the Keystore list, select Custom Identity, Java Standard Trust.
6. In the Custom Identity Keystore field, enter the absolute path of custom identity keystore filename. For example:

   DOMAIN_HOME/config/fmwconfig/support.jks
7. Specify JKS as the custom identity keystore type.
8. Type the password (weblogic1) into the Custom Identity Keystore Passphrase and the Confirm Custom Identity Keystore Passphrase fields.
9. Click **Save**.
10. Click the **SSL** tab.
11. Type `support` as the private key alias.
12. Type the password (weblogic1) into the Private Key Passphrase and the Confirm Private Key Passphrase fields.
13. Click **Save**.
14. Click **Activate changes**.
15. Restart all servers for these changes to take effect.
16. Import the certificate that you exported in "Exporting the Certificate" on page 12-10 into the SPML client truststore.

    See "Importing the Certificate" on page 12-11 for information about importing the certificate.

After enabling SSL on Oracle Identity Manager and SOA Servers, perform the following changes for establishing secured communication between them:

- Changing OimFrontEndURL to Use SSL Port
- Changing backOfficeURL to Use SSL Port
- Changing SOA Server URL to Use SSL Port

12.3.5.2 Changing OimFrontEndURL to Use SSL Port

OimFrontEndURL is used to access the oim application UI. This can be a load balancer URL or web server URL (in case application server is fronted with load balancer or web server) or single application server URL. This is generally used by Oracle Identity

Manager in the notification emails or to send a call back web service from SOA to Oracle Identity Manager.

To change the OimFrontEndURL to use SSL port:

1. When the WebLogic admin and Oracle Identity Manager managed servers (at least one of the servers in case of cluster) are running, log in to Enterprise Manager (EM).

   For example:

   http://<AdminServer>/em

2. Navigate to Identity and Access, Oracle Identity Manager.
3. Right click and select System MBean Browser.
4. Under Application Defined MBeans, navigate to oracle.iam, Application:oim, XMLConfig, Config, XMLConfig.DiscoveryConfig, Discovery.
5. Enter a new value for the "OimFrontEndURL" attribute and click **Apply** to save the changes.

   For example:

   http://myoim.oracle.com

   https://myoim.oracle.com

   http://myserver.oracle.com:7001

> **Note:** Fusion Apps or SPML clients store Oracle Identity Manager URL for invoking SPML and also send callback response. Therefore, there will be changes needed corresponding to this. Also, if Oracle Identity Manager is integrated with OAM/OAAM/OIN, there may be corresponding changes necessary. Refer to Chapter 11, "Integrating with Other Oracle Components" for detailed information about the integration with other components.

12.3.5.3 Changing backOfficeURL to Use SSL Port

backOfficeURL change is required only for Oracle Identity Manager deployed in front-office/back-office configuration. For simple cluster or non-cluster installations the following does not apply. This URL is used internally by Oracle Identity Manager for accessing back-office components from the front-office components. This value needs to be changed initially during the implementation of back-office/front-office configuration, for adding additional servers to back office, and for removing servers from back-office.

To change the backOfficeURL to use SSL port:

1. When the WebLogic admin and Oracle Identity Manager managed servers (at least one of the servers in case of cluster) are running, log in to Enterprise Manager (EM).

   For example:

   http://<AdminServer>/em

2. Navigate to Identity and Access, Oracle Identity Manager.
3. Right click and select System MBean Browser.

4. Under Application Defined MBeans, navigate to oracle.iam, Application:oim, XMLConfig, Config, XMLConfig.DiscoveryConfig, Discovery.
5. Enter a new value for the "backOfficeURL" attribute and click **Apply** to save the changes.

   For example:

   t3://mywls1.oracle.com:8001

   t3://mywls1.oracle.com:8001,mywls2.oracle.com:9001

   Note: For simple cluster and non-cluster installations the value must be empty.

12.3.5.4 Changing SOA Server URL to Use SSL Port

To change SOA server URL to use SSL port:

1. When the admin server and Oracle Identity Manager managed servers are running, log in to Enterprise Manager (EM).

   For example:

   http://*ADMINISTRATIVE_SERVER*/em
2. Navigate to Identity and Access, Oracle Identity Manager.
3. Right click and select System MBean Browser.
4. Under Application Defined MBeans, navigate to oracle.iam, Application:oim, XMLConfig, Config, XMLConfig.SOAConfig, SOAConfig.
5. Change the values for attributes "Rmiurl", "Soapurl", and click **Apply** to save the changes.

   Note: Rmiurl is used for accessing SOA EJBs deployed on SOA managed servers.

   This is the application server URL. (For clustered installation, it is a comma separated list of all the SOA managed server URLs)

   For example:

   t3://mysoa1.oracle.com:8001

   t3s://mysoa1.oracle.com:8001,mysoa2.oracle.com:8002

   t3://mysoa1.oracle.com:8001,mysoa2.oracle.com:8002,mysoa3.com:8003

   Note: Soapurl is used to access SOA web services deployed on SOA managed servers. This is the web server/load balancer URL, in case of a SOA cluster front ended with web server/load balancer. In case of single SOA server, it can be application server URL.

   For example,

   http://myoimsoa.oracle.com

   https://mysoa.oracle.com: 8001

12.3.5.5 Configuring SSL for Design Console

To change the Design console to establish secure connection between Oracle Identity Manager and Design console:

1. Add WebLogic server jars required to support SSL.
2. Copy webserviceclient+ssl.jar from:

   $WL_HOME/server/lib

   to

   $*OIM_HOME*/designconsole/ext directory.
3. Use the Server trust store in the Design console. To access this:
   a. Go to WebLogic Server Administrative console, Environment, Servers.
   b. Click on <OIM_SERVER_NAME> to view details of the Oracle Identity Manger server.
   c. Click the KeyStores tab and note down the "Trust keystore" location in the "Trust" section.

If Design Console is Deployed on the Oracle Identity Manager Host

Set the TRUSTSTORE_LOCATION environment variable to the location of the "Trust keystore" location noted above.

For example:

setenv TRUSTSTORELOCATION/scratch/user1/dogwoodsh100520/beahome/wlserver_10.3/server/lib/DemoTrust.jks

If Design Console is Deployed on a Different Computer than Oracle Identity Manager

Copy the "Trust keystore" to the box in which Design console is present and set the TRUSTSTORE_LOCATION env variable to the location where "Trust keystore" is copied on the local box.

12.3.5.6 Configuring SSL for Oracle Identity Manager Utilities

Oracle Identity Manager client utilities include PurgeCache, GenerateSnapshot, UploadJars, and UploadResources.

Set the TRUSTSTORE_LOCATION environment variable to the location of the "Trust keystore" location.

> **Note:** Refer "Configuring SSL for Design Console" on page 12-15 for details about setting the TRUSTSTORE_LOCATION environment variable to the location of the 'Trust keystore' location.

For example:

setenv TRUSTSTORELOCATION/scratch/user1/dogwoodsh100520/beahome/wlserver_10.3/server/lib/DemoTrust.jks

12.3.5.7 Configuring SSL for MDS Utilities

All Oracle Identity Manager MDS Utilities which contains WLST scripts must be set to the following environment variable in the shell in which you are running the script:

WLST_PROPERTIES=-Dweblogic.security.SSL.ignoreHostnameVerification=true-Dweblogic.security.TrustKeyStore=DemoTrust

---

Note: Once this property is set, WLST works fine. You will see INFO/NOTICE messages, which you can ignore.

12.3.5.8 Configuring SSL for SPML/Callback Domain

To configure SSL for SPML/callback domain:

1. Ensure that Oracle Identity Manager port is SSL enabled with HostName verification set to false.
2. Enable SSL on Fusion Applications including callback domain.

   See Also: "Enabling SSL for Oracle Identity Manager By Using Custom Keystore" on page 12-11 for information about enabling SSL for Oracle Identity Manager by using custom keystore

3. If you are using WebLogic default trust store, you must not change anything other than enabling the SSL mode.
4. If you have certificates other than default, then the trusted certificates should be exchanged between them to establish two-way trust. See "Signing the Certificates" on page 12-10 and "Exporting the Certificate" on page 12-10 for information about signing and exporting certificates.

   See Also: "Configuring SSL" in the *Oracle Fusion Middleware Securing Oracle WebLogic Server* for detailed information about configuring SSL for Oracle WebLogic Server

5. If you are using a stand-alone client for sending SPML requests for testing purpose, then you must:
   a. Add the following system properties to SPML client command to send the request to SSL enabled OIM port.
      – Djavax.net.ssl.trustStore=D:\Oracle\Middleware1\wlserver_10.3\server\lib\DemoTrust.jks

      ---

      Note: Change the value of the Djavax.net.ssl.trustStore parameter to point to the truststore used to configure SSL.

      See "Configuring SSL for Design Console" on page 12-15 for information about the location of the trust store used in WebLogic to configure SSL.

      – -Djava.protocol.handler.pkgs=weblogic.net
      – -Dweblogic.security.TrustKeyStore=DemoTrust
   b. Add webserviceclient+ssl.jar to your client classpath.

12.3.6 Enabling SSL for Oracle Identity Manager DB

You need to perform the following configurations to enable SSL for Oracle Identity Manager DB:

- Setting Up DB in Server-Authentication SSL Mode
- Creating KeyStores and Certificates
- Updating Oracle Identity Manager
- Updating WebLogic Server

12.3.6.1 Setting Up DB in Server-Authentication SSL Mode

To set up DB in Server-Authentication SSL mode:

1. Stop the DB server and the listener.
2. Configuring the listener.ora file as follows:
   a. Navigate to the path:

      $DB_ORACLE_HOME/network/admin directory

      For example:

      /scratch/user1/production-database/product/11.1.0/db_1/network/admin
   b. Edit the listener.ora file to include SSL listening port and Server Wallet Location.

      The following is the sample listener.ora file:

```
# listener.ora Network Configuration File:
/scratch/rbijja/production-database/product/11.1.0/db_1/network/admin/liste
ner.ora
# Generated by Oracle configuration tools.

SSL_CLIENT_AUTHENTICATION = FALSE

WALLET_LOCATION =
  (SOURCE =
    (METHOD = FILE)
    (METHOD_DATA =
      (DIRECTORY =
/scratch/rbijja/production-database/product/11.1.0/db_1/bin/server_keystore
_ssl.p12)
    )
  )

LISTENER =
  (DESCRIPTION_LIST =
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = TCPS)(HOST = dadvmh0175.us.oracle.com)(PORT =
2484))
    )
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = TCP)(HOST = dadvmh0175.us.oracle.com)(PORT =
1521))
    )
  )

TRACE_LEVEL_LISTENER = SUPPORT
```

3. Configure the sqlnet.ora file as follows:
   a. Navigate to the path:

      $DB_ORACLE_HOME/network/admin directory

      For example:

      /scratch/user1/production-database/product/11.1.0/db_1/network/admin
   b. Edit sqlnet.ora file to include:
      - TCPS Authentication Services
      - SSL_VERSION
      - Server Wallet Location
      - SSL_CLIENT_AUTHENTICATION type (either true or false)
      - SSL_CIPHER_SUITES that can be allowed in the communication (optional)

      The following is the sample sqlnet.ora file:

```
# sqlnet.ora Network Configuration File:
/scratch/rbijja/production-database/product/11.1.0/db_1/network/admin/sqlne
t.ora
# Generated by Oracle configuration tools.

SQLNET.AUTHENTICATION_SERVICES= (BEQ, TCPS)

SSL_VERSION = 3.0

SSL_CLIENT_AUTHENTICATION = FALSE

WALLET_LOCATION =
  (SOURCE =
    (METHOD = FILE)
    (METHOD_DATA =
      (DIRECTORY =
/scratch/rbijja/production-database/product/11.1.0/db_1/bin/server_keystore
_ssl.p12)
    )
  )
```

4. Configure the tnsnames.ora file as follows:
   a. Navigate to the path:

      $DB_ORACLE_HOME/network/admin directory

      For example:

      /scratch/user1/production-database/product/11.1.0/db_1/network/admin
   b. Edit the tnsnames.ora file to include SSL listening port in the description list of the service.

      The following is the sample tnsnames.ora file:

```
# tnsnames.ora Network Configuration File:
/scratch/user1/production-database/product/11.1.0/db_1/network/admin/tnsnam
es.ora
# Generated by Oracle configuration tools.

PRODDB =
```

```
 (DESCRIPTION_LIST =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCPS)(HOST = dadvmh0175.us.oracle.com)(PORT =
2484))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = proddb)
    )
  )
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = dadvmh0175.us.oracle.com)(PORT =
1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = proddb)
    )
  )
 )
```

5. Start/Stop utilities for DB server.
6. Start the DB server.

12.3.6.2 Creating KeyStores and Certificates

You can create server side and client side KeyStores using the orapki utility. This utility will be shipped as a part of Oracle DB installation.

KeyStores could be of any format such as JKS and PKCS12. The format of keystore changes based on the provider implementation. For example, JKS is the implementation provided by Sun Oracle where as PKCS12 is implemented by OraclePKIProvider.

Only JKS client KeyStore is used in Oracle Identity Manager for DB server. This is because using non-JKS KeyStores format such as PKCS12 requires significant changes on the installer side at the critical release time. However, Oracle Identity Manager already has a KeyStore named default-KeyStore.jks, which is in JKS format.

The following are the KeyStores that you can create using orapki utility:

- Creating a Root CA Wallet
- Creating DB Server Side Wallet
- Creating Client Side Wallet

> **Note:** Wallets and KeyStores are interchangeably used and they both mean the same. These refer to a repository of public/private keys and self-signed/trusted certificates.

Creating a Root CA Wallet

To create a root certification authority (CA) wallet:

1. Navigate to the following path:

   $DB_ORACLE_HOME/bin directory

2. Create a wallet by using the command:

```
./orapki wallet create -wallet CA_keystore.p12 -pwd welcome1
```

3. Add a self signed certificate to the CA wallet by using the command:

```
./orapki wallet add -wallet CA_keystore.p12 -dn 'CN=root_test,C=US' -keysize
2048 -self_signed -validity 3650 -pwd welcome1
```

4. View the wallet using the command:

```
./orapki wallet display -wallet CA_keystore.p12 -pwd welcome1
```

5. Export the self signed certificate from the CA wallet using the command:

```
./orapki wallet export -wallet CA_keystore.p12 -dn 'CN=root_test,C=US' -cert
self_signed_CA.cert -pwd welcome1
```

Creating DB Server Side Wallet

To create a DB server side wallet:

1. Create a server wallet using the command:

```
./orapki wallet create -wallet server_keystore_ssl.p12 -auto_login -pwd
welcome1
```

2. Add a certificate request to the server wallet using the command:

```
./orapki wallet add -wallet server_keystore_ssl.p12/ -dn
'CN=Customer,OU=Customer,O=Customer,L=City,ST=NY,C=US' -keysize 2048 -pwd
welcome1
```

3. Export the certificate request to a file, which will be used later for getting it signed using the root CA signature:

```
./orapki wallet export -wallet server_keystore_ssl.p12/ -dn
'CN=Customer,OU=Customer,O=Customer,L=City,ST=NY,C=US' -request server_creq.csr
-pwd welcome1
```

4. Get the server wallet's certificate request signed using the CA signature:

```
./orapki cert create -wallet CA_keystore.p12 -request server_creq.csr -cert
server_creq_signed.cert -validity 3650 -pwd welcome1
```

5. View the signed certificate using the command:

```
/orapki cert display -cert server_creq_signed.cert -complete
```

6. Import the trusted certificate in to the server wallet using the command:

```
./orapki wallet add -wallet server_keystore_ssl.p12 -trusted_cert -cert
self_signed_CA.cert -pwd welcome1
```

7. Import this newly created signed certificate (user certificate) to the server wallet using the command:

```
./orapki wallet add -wallet server_keystore_ssl.p12 -user_cert -cert
server_creq_signed.cert -pwd welcome1
```

Creating Client Side Wallet

To create a client side (Oracle Identity Manager server) wallet:

1. Create a client keystore using default-keystore.jks keystore which is populated in the following path:

   DOMAIN_HOME/config/fmwconfig

Note: You can also use Oracle PKCS12 wallet as the client keystore.

2. Import the self-signed CA trusted certificate that you have already exported using the server side commands, to the client keystore (default-keystore.jks) by using the command:

```
keytool -import -trustcacerts -alias dbtrusted -noprompt -keystore
default-keystore.jks -file self_signed_CA.cert -storepass xellerate
```

12.3.6.3 Updating Oracle Identity Manager

You need to perform the following steps in Oracle Identity Manager to enable Oracle Identity Manager and Oracle Identity Manager DB in SSL mode for a secure communication:

1. Import the trusted certificate into the default-keystore.jks keystore of Oracle Identity Manager.
2. Log in to Enterprise Manager.
3. Navigate to Identity and Access, OIM.
4. Right click and navigate to System MBean Browser.
5. Under Application Defined MBeans, navigate to oracle.iam, Application:oim, XMLConfig, Config, XMLConfig.DirectDBConfig, and DirectDB.
6. Change the values for attributes "Sslenabled", "Url" and click **Apply**. If SSL mode is enabled for DB, then "Url" should contain TCPS enables and SSL port in it.

   For example:

   url="jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS=(PROTOCOL=TCPS)(HOST=my.domain.com)(PORT=2484))(CONNECT_DATA=(SERVICE_NAME=proddb)))"
7. Restart the Oracle Identity Manager server.

12.3.6.4 Updating WebLogic Server

After enabling SSL for Oracle Identity Manager DB, you need to change the following Oracle Identity Manager datasources and authenticators to use DB SSL port:

- Configuring Datasource
- Updating Datasource oimJMSStoreDS Configuration
- Updating Datasource oimOperationsDB Configuration
- Updating Datasource Related to Oracle Identity Manager MDS Configuration
- Updating Oracle Identity Manager Authenticators

Configuring Datasource

To configure the datasource:

1. Log in to Enterprise Manager.
2. Perform the host/port changes.

Note: Before performing changes to database host/port, you must shutdown the managed servers hosting Oracle Identity Manager application. However, you can keep the WebLogic Admin Server up and running.

Updating Datasource oimJMSStoreDS Configuration

To update the datasource oimJMSStoreDS configuration:

1. Log in to WebLogic Server.
2. Navigate to Services, JDBC, Data Sources, oimJMSStoreDS.
3. Click the **Connection Pool** tab and change the value of the URL and Properties to reflect the changes to DB host/port.

Updating Datasource oimOperationsDB Configuration

To update the Change Datasource oimOperationsDB Configuration:

1. Log in to Enterprise Manager.
2. Navigate to Services, JDBC, Data Sources, oimJMSStoreDS.
3. Click the **Connection Pool** tab and change the value of the URL and Properties to reflect the changes to DB host/port.

Updating Datasource Related to Oracle Identity Manager MDS Configuration

To update datasource related to Oracle Identity Manager MDS configuration:

1. Log in to Enterprise Manager.
2. Navigate to Services, JDBC, Data Sources, mds-oim.
3. Click the **Connection Pool** tab and change the value of the URL and Properties to reflect the changes to DB host/port.

Note: You might have to perform similar updates for SOA/OWSM related datasources if required.

Updating Oracle Identity Manager Authenticators

The existing Oracle Identity Manager authenticators in the WebLogic server are configured against Non-SSL DB details and they do not use datasources for communicating with Oracle Identity Manager DB. In order to use SSL DB details in the authenticators, you must perform the following:

1. Ensure that Datasources are configured to SSL.
2. In WebLogic Administrative console, navigate to Security Realms, myrealm, Providers.
3. Remove OIMAuthenticationProvider.
4. Create an authentication provider of type "OIMAuthenticator" and mark the control flag as SUFFICIENT.
5. Create an authentication provider of type "OIMSignatureAuthenticator" and mark the control flag as SUFFICIENT.
6. Reorder the authenticators as:

a. DefaultAuthenticator

b. OIMAuthenticator

c. OIMSignatureAuthenticator

d. Other providers if any

7. Restart all servers.

12.3.7 Enabling SSL for LDAP Synchronization

You need to perform the following configurations to enable Oracle Identity Manager to use SSL enabled Oracle Virtual Directory (OVD):

- Enabling OVD-OID with SSL
- Updating Oracle Identity Manager for OVD Host/Port

12.3.7.1 Enabling OVD-OID with SSL

To enable OVD-OID with SSL:

1. Log in to the OVD EM console.
2. Expand **Identity and Access** and navigate to ovd1, Administration, Listeners.
3. Click **Create** and enter all the required fields.

> **Note:** You must select the Listener Type as LDAP.

4. Click **OK**.
5. Select the newly created LDAP listener and click **Edit**.
6. In the Edit Listener - OIM SSL ENDPOINT page, edit the newly created LDAP listener.
7. Click **OK**. The SSL Configuration page opens.
8. Select the **Enable SSL** checkbox.
9. In the Advanced SSL Settings section, for SSL Authentication, select **No Authentication**.
10. Click **OK**.
11. Stop and start the OVD server for the changes to take effect.

> **Note:** You must not use the restart option.

12.3.7.2 Updating Oracle Identity Manager for OVD Host/Port

When LDAPSync is enabled on Oracle Identity Manager, Oracle Identity Manager connects with directory servers through OVD. It connects using ldap/ldaps protocol.

To change OVD host/port:

1. Log in to Oracle Identity Manager Administrative and User console.
2. Navigate to Advanced and click **Manage IT Resource**.
3. Select IT Resource Type as **Directory Server** and click **Search**.

4. In the IT Resource Directory Server, edit "server URL" to include SSL protocol and SSL port details.
5. Ensure that Use SSL is set to true and click **Update**.

Part III

Configuration

This part describes the configuration tasks in Oracle Identity Manager.

It contains the following chapters:

- Chapter 13, "Configuring User Attributes"
- Chapter 14, "Managing Password Policies"
- Chapter 16, "Managing Asynchronous Execution"
- Chapter 17, "Enabling Offline Provisioning"
- Chapter 18, "Using Enterprise Manager for Managing Oracle Identity Manager Configuration"
- Chapter 19, "Setting the Language for Users"

13

Configuring User Attributes

User attributes are properties of the user entity. The information about the user entity is stored in the form of attributes, such as first name, last name, user login, and password. There are default user attributes in Oracle Identity Manager. However, you can create custom user attributes by using the user configuration UI in the Administrative and User Console.

In Oracle Identity Manager, there are certain operations involved in the life-cycle management of each entity. Some of the basic operations for the user entity are:

- Create
- View/Modify
- Browse
- Delete
- Disable
- Enable
- Bulk Operations

> **See Also:** "Managing Users" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for information about the operations related to the user entity and a list of default user entity attributes

A complete list of attributes managed via configuration management feature can be obtained by the operations performed on an entity. For example, for searching users through advanced search, a set of searchable user attributes is displayed for performing the search. After the search operation is completed, search results involving a set of attributes are displayed. These attribute sets are managed by using the configuration management feature.

The configuration management UI in the Oracle Identity Administration is used to define user entity data structure and attributes. The availability of configuring attributes in the UI is subject to permissions that are controlled by authorization policies. See "User Management" and "Authenticated User Self Service" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for information about authorization policies for managing users and self service operations.

This chapter describes user configuration management in the following sections:

- Enabling the Usage of UDFs in Requests
- Synchronizing User-Defined Fields Between Oracle Identity Manager and LDAP
- Configuration Management Architecture

13.1 Entity Configuration Operations

Entity configuration operations allow you to define the set of attributes for the user entity. You can add new and custom attribute definitions and modify the existing ones. In addition to the attributes defined by default, you can define your own attributes for the user entity.

Note: To access the Configuration Management section in the Advanced Administration, the user must have authorization to configure the user attributes. For more details, see "User Management Configuration" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*.

Entity configuration operations include:

- Listing Entity Attributes
- Creating Entity Attributes
- Modifying Entity Attributes
- Deleting Entity Attributes
- Performing Category Configuration

13.1.1 Listing Entity Attributes

To list the entity attributes in the user configuration management UI:

1. Login to the Oracle Identity Manager Advanced Administration.
2. In the Welcome page, under Configuration, click **User Configuration**. Alternatively, you can click the **Configuration** tab, and then click the **User Configuration** tab.
3. On the left pane of the console, from the Actions menu, select **User Attributes**. The User Attributes page is displayed with a table containing all user attributes that are defined in the User.xml configuration file.

   Table 13 1 describes the columns in the User Attributes table:

Table 13 1 Columns in the User Attributes Table

Column	Description
Category Name	The category to which the attribute belongs. The categorization is used to organize data in the User Management console. **Note:** For information about each category, see "Performing Category Configuration" on page 13-12.
Attribute Names	The unique name for the attribute. It is also used as the caption when this attribute is displayed on the user profile page.
Order in Category	The order of the attributes within the category. The attributes are displayed on the User Management console based on this order.

Table 13 1 (Cont.) Columns in the User Attributes Table

Column	Description
Attribute Type	Whether the type of the attribute is System or user-defined field (UDF). System attributes cannot be deleted and have restrictions on their modifications.
Backend Data Type	The data type of the attribute in the backend datastore.
Display Type	The display type of the attribute in the User Management console.

You can select a row in the User Attributes table and perform operations, such as creating or modifying attributes, which are described in the subsequent sections.

Note: Any administrator user cannot access the Configuration Management section in Oracle Identity Manager Administration. The user must have authorization to configure the user attributes.

4. In the Category Name column, expand a category name by clicking the icon to the left of the category name. The attributes under the category are listed in the Attribute Name column.

13.1.2 Creating Entity Attributes

To create new attributes for an entity:

1. In the User Attributes page, from the Actions menu, select **Create Attribute**. The Create Attribute wizard is displayed.
2. In the Set Attribute Details page of the wizard, enter values in the fields. Table 13 2 lists the fields in the Set Attribute Details page:

Table 13 2 Fields in the Set Attribute Details Page

Field	LOV Types	Description
Attribute Name		This is the unique name for the attribute. It is also used as the caption when this attribute is displayed on the User profile page.
Backend Attribute Name		This is the name of the field that will be created in the user backend schema to store the value specified for this attribute while creating or modifying users . Oracle Identity Manager automatically prefixes the Backend Attribute Name with "USR_UDF.".
Category Name		This is the category name to which the attribute belongs. The categorization is used to organize the data in the UI. **Note:** For information about category configuration, see "Performing Category Configuration" on page 13-12.

Table 13 2 (Cont.) Fields in the Set Attribute Details Page

Field	LOV Types	Description
Display Type		This indicates the display type of the attribute in the UI. This is an attribute property and is stored in the User.xml file as metadata attachment. The available display types are: ■ String ■ Integer ■ Text Area ■ Check Box ■ Double ■ Date ■ Secret ■ List of Values Selecting Display Type sets the appropriate backend and frontend data types. Backend data type is the data type of the attribute in the backend datastore. This is stored in the User.xml file along with the attribute definition. Frontend data type indicates the data type of the attribute as interpreted by Oracle Identity Manager. This is stored in the User.xml file along with the attribute definition. This is not displayed in the UI. See Also: The "Attribute Properties" on page 13-9 section for information about properties to be configured for each attribute
LOV Type		This field is hidden by default. If the display type is selected as List Of Values, then the LOV-related fields are displayed. The LOV Type can be System Generated, Admin Configured, and By Query.
	System Generated	The user can specify existing LOVs. For example: 1. Select **System Generated** as the LOV Type. 2. The LOV Search Options points to the Contains operator by default. In the LOV Code field, enter `users`, and click **Search**. The list of available LOV codes matching the search criteria is displayed in the Available LOV Codes list. 3. Select **Lookup.Users.Role** and move to the Selected LOV codes list by clicking the right arrow. Only one LOV code should be moved to this list. Then, click **Next**, and complete the rest of the steps in the wizard as described in this section. After saving the attribute, a drop-down list with employee type codes is displayed in the user details page.

Table 13 2 (Cont.) Fields in the Set Attribute Details Page

Field	LOV Types	Description
	Admin Configured	The user can add this LOV. For example: 1. Select **Admin Configured** as the LOV Type. 2. In the LOV Code field, enter `level`. For a LOV code, you can add multiple LOV options and corresponding LOV descriptions. 3. In the LOV Options field, enter `L1`, and in the LOV Options Description field, enter `Executive`. Then, click **Add**. The LOV option and description is added and are displayed on the page. 4. To add another value, in the LOV Options field, enter `L2`. and in the LOV Options Description field, enter `Senior Executive`. Then click **Add**. 5. After adding multiple values, click **Next**, and complete the rest of the steps in the wizard as described in this section. After saving the attribute, a drop-down list with the values specified in the LOV Options Description field are displayed in the user details page.

Table 13 2 (Cont.) Fields in the Set Attribute Details Page

Field	LOV Types	Description
	By Query	The LOV Code and LOV Options fields are not displayed. Instead, the following fields are displayed: - LOV Query: In this field, you can specify any SQL query that is valid in the Oracle Identity Manager database schema. - LOV Column to Display: This is a list showing all the columns from the select query. The selected column values are available on clicking a search icon on the pages for creating or modifying the user entity. For example, you might want to display Manager Name instead of Manager Key. - LOV Column to Save: This is a list showing all columns from the select query. The selected column value is the one that is saved in the backend store when the user makes a selection in the dropdown available on the pages for creating or modifying the user entity. For example, you can display Manager Name, but want to save Manager Key value. **Note:** Oracle Identity Manager represents sets by using two tables, the LKU and LKV tables. The LKU table holds keys that identify each set. The LKV table defines the members of each set, in which each row in the LKV table uses one column to identify the set (a LKU_KEY column in the LKU table), and another column to declare a value that will be a member of that set. A list of values is already defined in the LKU and LKV tables in the database. For administrator specified, the user must specify an LOV code. This is stored in the LKU table. Associated with each code are the list of values. The user must add new values here. These values are stored in the LKV table and are used as this attribute's LOV values. For system generated, the user can search for LOV codes, and then select a code. Values already exist for this code in the LKV table and are used as this attribute's LOV values. See "LKU and LKV Table Definitions" on page 13-10 for the list of columns in the LKU and LKV tables. The following is an example of setting the By Query LOV type: 1. Select **By Query** as the LOV Type. 2. In the LOV Query field, enter `SELECT USR_FIRST_NAME as FirstName , USR_LOGIN as UserLogin FROM USR WHERE USR_STATUS = 'Active'.` 3. In the LOV Column to Display list, select **FIRSTNAME**. 4. In the LOV Column to Save list, select **USERLOGIN** and click **Next**, and complete the rest of the steps in the wizard as described in this section. After saving the attribute, a search icon against this attribute is displayed in the user details page. The user can search and select value for the attribute. FIRSTNAME is displayed in the user details page and USERLOGIN is saved in the backend store.
LOV Code		This is the code to identify the LOV. For system-generated LOV, this value must be of an existing LOV code. **Note:** The LoV Code, LOV Options, and LOV Options Description fields are displayed only when Display Type is selected as List Of Values. For other display types, these fields are not displayed.
LOV Options		This is displayed only if the LOV Type is administrator specified. The user must specify the LOV values here.
LOV Options Description		These are the descriptive LOV options.

Note: You cannot remove a value from the list of values.

3. If you are creating a custom LOV type attribute, then perform the following steps:

Note: Perform step 3 only if you want to create a custom LOV type attribute. Otherwise, skip this step.

In this example, the LOV Type is Admin Configured.

a. In the Set Attribute Details page of the Create Attribute wizard, select the Display Type as **List of Values**.

b. Select **Admin Configured** as the LOV Type. The LOV Type, LOV Code, LOV Options, and LOV Options Description fields are displayed. For information about these fields, see Table 13 2, " Fields in the Set Attribute Details Page".

c. In the LOV Code field, enter the `department`.

d. In the LOV Options field, enter `L1`.

e. In the LOV Options Description field, enter `Engineering`.

f. Click **Add**. The LOV option with description is added in a table at the bottom of the page.

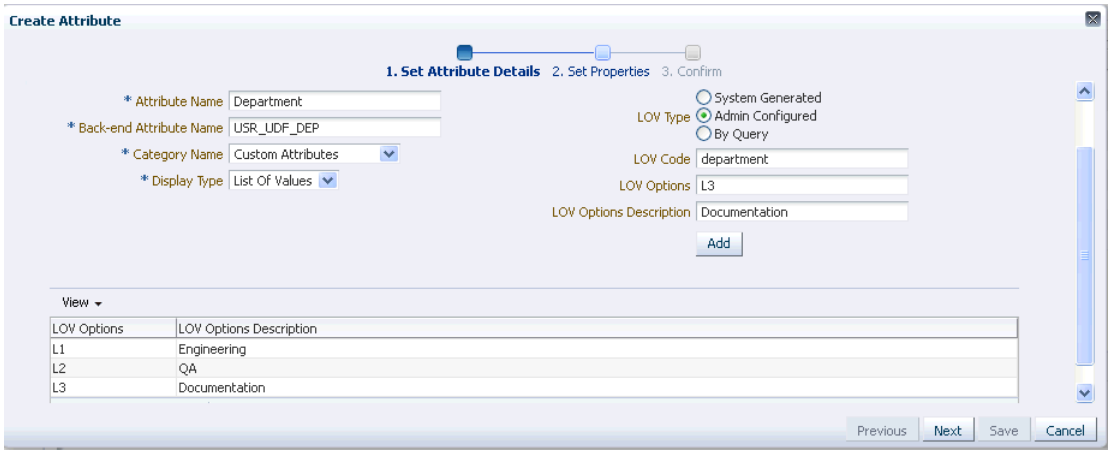
g. Add the other LOV options, such as:

LOV Options: `L1`, `L2`

LOV Options Description: `QA`, `Documentation`

Figure 13 1 shows the Set Attribute Details page with the added LOV options:

Figure 13 1 LOV Options



4. Click **Next**. The Set the attribute properties page is displayed.

5. Specify values for the attribute properties. Table 13 3 lists the fields in the Set Properties page:

Table 13 3 Fields in the Set Properties Page

Field	Description
Read Only Value	Determines if the attribute is a read only attribute
Encryption	Determines if the attribute value is stored in encrypted or clear formats
Visible	Determines if the attribute is displayed on the UI
Attribute Size	The maximum size the attribute value can take
Searchable	Determines if the attribute is searchable
Bulk Updatable	Determines if the attribute can be modified while modifying multiple users at the same time.
Default Value	The default value of the attribute to be displayed on the user details.

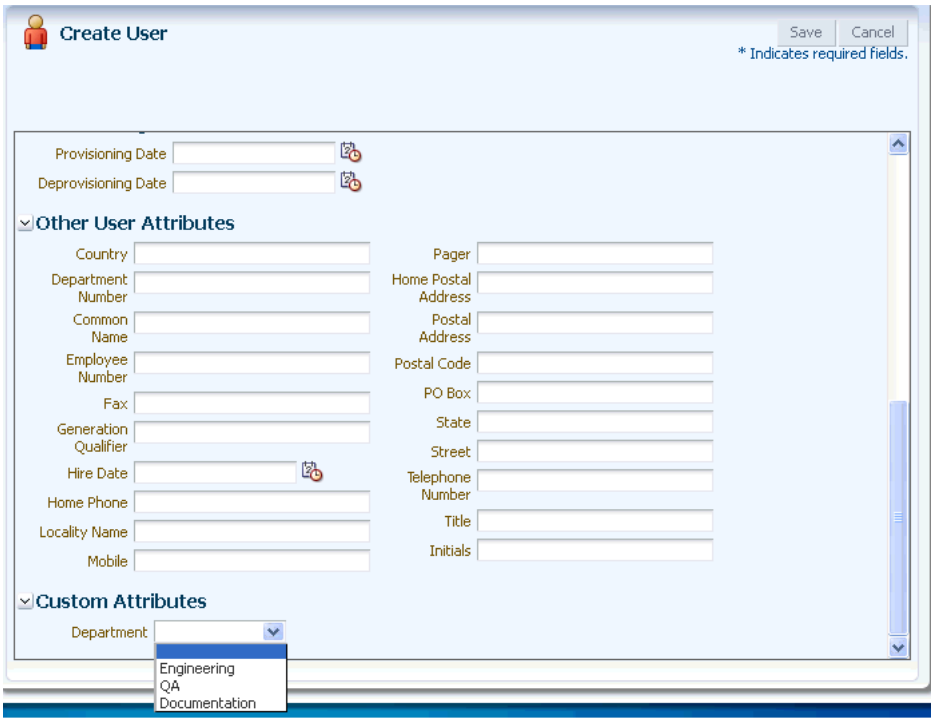
6. Click **Next**. The Confirm page of the Create Attribute wizard is displayed with information that you entered for creating the attribute.
7. Review the attribute information, and then click **Save**. The MDS schema, which is the User.xml file, and the DB schema are updated with the new attribute. The new attribute added is displayed in the User Management section based on the properties set. See "User Management" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for information about authorization policies for the user management.

Note:

- To make the newly created attribute that can be viewed or modified in the User Profile, you must create appropriate authorization policies. See "Managing Authorization Policies" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for information about authorization policies.
- For information about using these fields with LDAP, see "Synchronizing User-Defined Fields Between Oracle Identity Manager and LDAP" on page 13-18.
- For information about configuring request datasets, see "Step 1: Creating a Request Dataset for the Resources" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager*.

The LOV type attribute that you created in step 3 is available in the Create User page, as shown in Figure 13 2:

Figure 13 2 Custom LOV Attribute in the Create User Page



13.1.2.1 Attribute Properties

For each attribute, you must configure the following properties:

- **Required:** Determines if every user in the repository must have a non-null value for this attribute. For predefined users, the required attributes have values. If you create a user, you must provide a value for the required attribute. An existing attribute cannot be modified to required unless the attribute has values for all the existing users.
- **Read-Only:** Makes an attribute read-only, which means that the attribute cannot be modified irrespective of the authorization policy. Some attributes in the UI must always be read-only. These include the system-controlled attributes and may include custom attributes.
- **System Controlled:** Determines if the value can only be set and edited by Oracle Identity Manager.
- **Encrypted:** Determines if the value is stored in the repository in reversible encrypted or clear formats.
- **Searchable:** Determines if the values can be used in simple as well as advanced searches. An attribute must be configured for use in simple search or advanced search by modifying the search configuration. See "Search Operation Configuration" on page 13-13 for information about configuring search operations.
- **Bulk Updatable:** Determines if the attribute can be updated during a bulk modify operation.
- **Size:** Indicates the max size that the value for this attribute can take.
- **Default Value:** The default value of the attribute, which is the value that will be populated in the backend store if no value is provided while creating the user entity.

Note: When you create a new UDF, you must add a corresponding entry in the following custom resource bundle:

OIM_ORACLE_HOME/server/customResourses/customResources_*LANGUAGE*.properties

Here, replace *LANGUAGE* with the appropriate locale, such as en for English.

The naming convention for the entry is:

global.udf.*BACKEND_UDF_NAME=DESCRIPTION_DISPLAYED_ON_THE_UI*

For example: global.udf.USR_UDF_ATT=Attestation

After adding the entry, upload the resource bundle to MDS by using the Upload JAR utility. See "Upload JAR Utility" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about this utility.

13.1.2.2 LKU and LKV Table Definitions

Table 13 4 lists the columns in the LKU table:

Table 13 4 Columns in the LKU Table

Column Name	Data Type	NULL
LKU_KEY	NUMBER(19, 0)	No
LKU_LOOKUP_KEY	NUMBER(19, 0)	Yes
LKU_TYPE	VARCHAR2(1)	Yes
LKU_GROUP	VARCHAR2(255)	Yes
LKU_REQUIRED	VARCHAR2(1)	Yes
LKU_TYPE_STRING_KEY	VARCHAR2(255)	No
LKU_FIELD	VARCHAR2(50)	Yes
LKU_DATA_LEVEL	NUMBER(1, 0)	Yes
LKU_CREATE	DATE	Yes
LKU_CREATEBY	NUMBER(19, 0)	Yes
LKU_UPDATE	DATE	Yes
LKU_UPDATEBY	NUMBER(19, 0)	Yes
LKU_NOTE	CLOB	Yes
LKU_ROWVER	RAW(8)	Yes

Table 13 5 lists the columns in the LKV table:

Table 13 5 Columns in the LKV Table

Column Name	Data Type	NULL
LKV_KEY	NUMBER(19, 0)	No
LKU_KEY	NUMBER(19, 0)	Yes
LKV_ENCODED	VARCHAR2(3000)	No

Table 13 5 (Cont.) Columns in the LKV Table

Column Name	Data Type	NULL
LKV_DECODED	VARCHAR2(4000)	No
LKV_LANGUAGE	VARCHAR2(2)	No
LKV_COUNTRY	VARCHAR2(2)	No
LKV_VARIANT	VARCHAR2(10)	Yes
LKV_DISABLED	VARCHAR2(1)	Yes
LKV_DATA_LEVEL	NUMBER(1, 0)	Yes
LKV_CREATE	DATE	Yes
LKV_CREATEBY	NUMBER(19, 0)	Yes
LKV_UPDATE	DATE	Yes
LKV_UPDATEBY	NUMBER(19, 0)	Yes
LKV_NOTE	CLOB	Yes
LKV_ROWVER	RAW(8)	Yes

13.1.3 Modifying Entity Attributes

The Modify Attribute operation allows you to edit the attributes specific to user entity. To do so:

1. In the User Attributes table, select an attribute.
2. From the Actions menu, select **Modify Attribute**. The Modify Attribute page is displayed.
3. On the Modify Attribute page, edit the attribute details and attribute properties. You cannot edit the Attribute Name and Display Type fields.
4. (Optional) Click Preview User Profile to display a preview of the user profile.

   The Preview User Profile feature renders a hypothetical page that contains all available categories and attributes. This feature helps you review the Profile before saving it to the database. Note that a user may not be able to view all of the categories and attributes shown due to user permissions and other constraints.
5. Click **Save** to save the changes.

For attributes with default values, only the following modifications can be done:

- Modifying the default value of the attribute.
- Modifying the visible property of the attribute.
- If an attribute has a default value and is nonrequired, then that attribute can be changed to be required. If an attribute is nonrequired and it does not have a default value, then the attribute cannot be changed to required.

13.1.4 Deleting Entity Attributes

The Delete operation allows you to delete an attribute. To delete an attribute:

1. In the User Attributes table, select a row.
2. From the Actions menu, select **Delete Attribute**. A message box is displayed asking for confirmation.

3. Click **OK**. A message is displayed confirming that the attribute is deleted.

On performing the delete operation, the actual attribute in the backend is not deleted. The existing data is not affected and audit logs continue to display the data. The deletion happens only in the MDS schema (User.xml).

Note: Default attributes cannot be deleted. Only user-defined attributes can be deleted.

13.1.5 Performing Category Configuration

A category is a logical entity to display the related information or attributes together. Category configuration allows you to organize the data in the UI. The following categories are available by default:

- **Basic User Information:** This contains the user's personal information such as first name, last name, e-mail, and organizational information, for example manager or department.
- **Account Settings:** This contains the user login and password information.
- **Account Effective Dates:** The dates on which the user account is activated or deactivated.
- **Provisioning Dates:** The dates on which the user account is provisioned and deprovisioned.
- **Lifecycle:** This is for attributes for user account locked, manually locked, or the date when the account will be automatically deleted. These are not displayed on the UI.
- **System:** These include attributes that are used internally by the application, such as login attempts by the user, the date when the user is created, and user password cannot be changed. These are not displayed on the UI.
- **Other User Attributes:** This contains the remaining attributes of the user.
- **Custom Attributes:** This is an empty category. Attributes are added here by the Deployment Manager while importing from Oracle Identity Manager release 9.1.0 UDFs.
- **Preferences:** This contains the attributes that control the user preferences. For example, Locale and Timezone.

You can perform the following category configuration operations:

- Creating Category
- Renaming Category
- Deleting Category
- Ordering Attributes Within a Category

13.1.5.1 Creating Category

Create category operation allows you to add new categories. To create a new category:

1. In the User Attributes page, from the Actions menu, select **Add Category**. The Create Category dialog box is displayed.
2. In the Category Name field, enter the name of the category.

3. Click **Save** to create the category. A message is displayed stating that the category is successfully created.
4. Click **OK**.

13.1.5.2 Renaming Category

The category names that are displayed in the UI are taken from the resource bundles. To change the display name of a category, you must change the value in the resource bundle, for example, *OIM_ORACLE_HOME*/server/customResourses/customResources_*LANGUAGE*.properties.

Here, replace *LANGUAGE* with the appropriate locale, such as en for English.

You can also modify the default category names by editing the resource bundle.

13.1.5.3 Deleting Category

You can delete only empty categories. To delete a category:

1. In the User Attributes page, select an empty category that you want to delete.
2. From the Actions menu, select **Delete Category**. A message box is displayed asking for confirmation.
3. Click **OK**. A message is displayed that confirms the deletion.
4. Click **OK**.

13.1.5.4 Ordering Attributes Within a Category

You can specify the order of the attributes within the category. The attributes are displayed on the User Management section based on this order.

To order the attributes within a category:

1. In the User Attributes page, select a category whose attributes you want to order.
2. From the Actions menu, select **Order Category Attribtues**. The Order Category Attributes dialog box is displayed with all the attribute names within the selected category.
3. Edit the numbers corresponding to each attribute to specify the attribute's order in the category.
4. Click **Save**.

13.2 Search Operation Configuration

The search operation allows searching of user entities based on a query provided by the user. You can configure the attributes for the search operation, the search results table, and the full table for simple/advanced search.

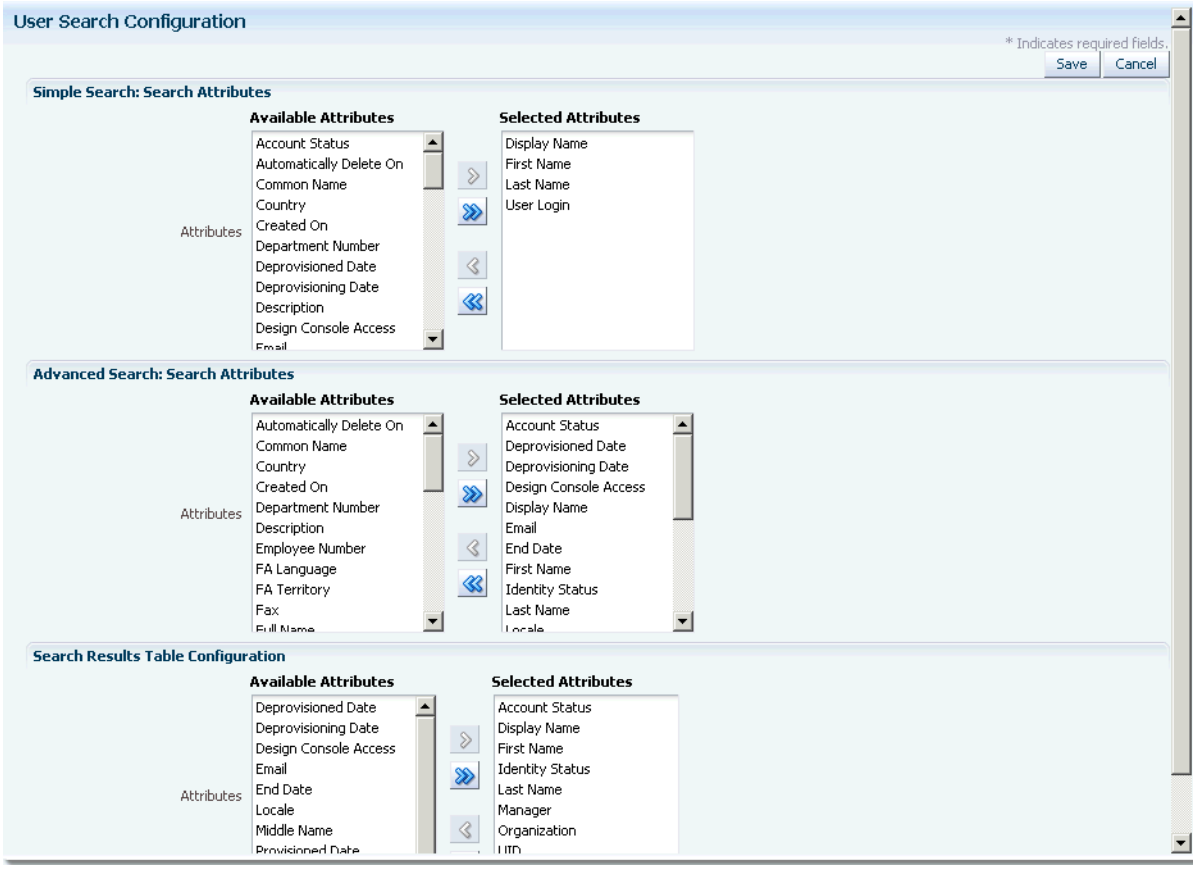
Searchable attributes define the set of attributes to which the search string is applied when performing the simple search. By default, the display name, user name, first name, and last name searchable attributes are configured for simple search. The same are configured by default for advanced search.

Result attributes define the set of attributes that is returned by the search operation. You can define the columns to display in the search results, and the subset to display in the limited search result table for simple search.

You can configure the available attributes for use in simple search and advanced search queries. In addition, you can configure the attributes that you want to be displayed in the search results table. To do so:

1. On the left pane in the User Configuration section, from the Actions menu, select **Search Configuration**. The User Search Configuration page is displayed, as shown in Figure 13 3:

Figure 13 3 The Search Configuration Form



2. In the Simple Search: Search Attributes section, select the attributes that you want to make available for simple search. Click the move and move all icons to add the attributes for simple search. You can also click the remove and remove all icons to remove attributes from the search.
3. In the Advanced Search: Search Attributes section, select the attributes that you want to make available for advanced search. Click the move and move all icons to add the attributes for advanced search.
4. In the Search Results Table Configuration section, select the attributes that you want to display in the search results table. Click the move and move all icons to add the attributes for the search results table.
5. Click **Save**.

Note:

- The Modify and Create operations are not configurable to this level. All the attributes are displayed as editable on the User Management UI, with the following exceptions:

  ```
  Attributes with property Visible=No
  Attributes with property System Controlled=Yes"
  ```

- The attributes that are visible, but have the property `System Controlled=Yes`, are displayed as read only. See Table 13 6, " Noneditable Attributes".
- The final list of attributes displayed on the UI depends on the authorization policies configured.
- Any user-defined field (UDF) is not displayed in the Available Attributes list for simple search.

Table 13 6 lists the attributes with the Visible property set to No or the System Controlled property set to Yes:

Table 13 6 Noneditable Attributes

Attribute	Visible	System Controlled
Full Name	No	No
UID	No	Yes
Manually Locked	No	Yes
Locked On	No	Yes
Automatically Delete On	No	No
Provisioned Date	No	No
Deprovisioned Date	No	No
Login Attempts	No	Yes
Created On	No	Yes
Updated On	No	Yes
Password Cannot Change	No	Yes
Password Must Change	No	Yes
Password Never Expires	No	Yes
Password Expiration Date	No	Yes
Password Warn Date	No	Yes
Password Expired	No	No
Password Warned	No	No
Password Reset Attempts	No	Yes
Change Password At Next Login	No	No
Password Minimum Age Date	No	Yes
Created By	No	Yes

Table 13 6 (Cont.) Noneditable Attributes

Attribute	Visible	System Controlled
Updated By	No	Yes
User Created On	No	Yes
Policy Updated	No	No
Password Generated	No	Yes
Data Level	No	Yes
LDAP Organization	No	No
LDAP Organization Unit	No	No
LDAP GUID	No	Yes
LDAP DN	No	No
Number Format	No	No
Currency	No	No
Date Format	No	No
Time Format	No	No
Accessibility Mode	No	No
Color Contrast	No	No
Font Size	No	No
Embedded Help	No	No
FA Language	No	No
FA Territory	No	No
User Name Preferred Language	No	No

13.3 User Configuration Management Authorization

Authorization of the user configuration management is governed by a default authorization policy. Custom authorization policies cannot be created for this feature.

> **See Also:** "User Management Configuration" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for information about the default authorization policy for user configuration management

The users that are members of the System Administrators role are authorized to perform all user configuration operations. The operations are defined by the permissions set for the default authorization policy for this feature. Table 13 7 lists the permissions:

Table 13 7 Authorization Permissions

Permission	Description
Create Attribute	Decides if adding attributes is enabled in the UI for the user. This permission is also used at the API level to decide if the user can add an attribute.

Table 13 7 (Cont.) Authorization Permissions

Permission	Description
Update Attribute	Decides if updating all attributes is enabled in the UI for the user. This permission is also used at the API level to decide if the user can update attributes.
Delete Attribute	Decides if deleting an attribute is enabled in the UI for the user. This permission is also used at the API level to decide if user can delete an attribute.
Add Category	Decides if adding categories is enabled in the UI for the user. This permission is also used at the API level to decide if the user can add a category.
Order Category Attribute	Decides if updating attributes is enabled in the UI for the user. This permission is also used at the API level to decide if the user can update a category.
Delete Category	Decides if deleting categories is enabled in the UI for the user. This permission is also used at the API level to decide if the user can delete a category.
Add Derived Attributes	Decides if adding derived attributes is enabled for the user. The option to add derived attributes is available at the API level only.
Set Search Attributes	Decides if searching configuration is enabled in the UI for the user. This permission is also used at the API level to decide if the user can update simple search and advanced search, and search table attributes.

13.4 Enabling the Usage of UDFs in Requests

You can create UDFs and use them in various requests, such as self registration, self profile modification, and creating and modifying users. To enable the usage of UDFs in requests:

1. Create the UDF by using the user configuration management UI. See "Creating Entity Attributes" on page 13-3 for details.
2. For modify operations, assign the modify permission by using authorization policies to the roles or users that can create modify requests. See "Managing Authorization Policies" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager* for details.
3. Update the corresponding request dataset for the request that you want to create. For example:
   - For user self registration, use SelfCreateUserDataset.xml
   - For user self profile modification, use ModifyUserDataset.xml
   - For user creation by administrator through request, use CreateUserDataSet.xml
   - For user modification by administrator through request, use ModifyUserDataset.xml

   See "Configuring Requests" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about request datasets.
4. Upload the request datasets to the Meta Data Store (MDS). See "Step 2: Uploading Request Datasets into MDS" and "MDS Utilities and User Modifiable Metadata Files" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager*

for information about uploading request datasets to the MDS by using the MDS import/export utility tools.

13.5 Synchronizing User-Defined Fields Between Oracle Identity Manager and LDAP

This section describes how to synchronize user-defined fields (UDFs) between Oracle Identity Manager and LDAP. After creating a user-defined field using the Oracle Identity Manager Advanced Administration Configuration Service, you must extend the OVD and OID schema by adding the new attribute before you can synchronize that attribute. For example, assume you created an Oracle Identity Manager attribute named Employee ID and that the corresponding column name in the USR table is USR_EMPLOYEE_ID. You must add the Employee ID attribute to the orclIDXPerson objectclass in both OVD and OID.

> **See Also:** OVD and OID documentation for information about adding new attributes to the schema.

Synchronization between Oracle Identity Manager UDFs and LDAP can be achieved in following ways:

- Synchronizing the Attribute Manually
- Synchronizing UDFs Between Oracle Identity Manager and LDAP By Using the ldapsyncudf Utility

13.5.1 Synchronizing the Attribute Manually

Use the following steps to synchronize the attribute:

> **Note:** You cannot directly map a multi-valued attribute in a directory to a similarly multi-valued attribute in Oracle Identity Manager. Therefore, you can propagate only single-valued attributes from LDAP to Oracle Identity Manager.

1. Extend the OVD and OID schemas by adding the emplyeeid attribute to the orclIDXPerson objectclass in both OVD and OID.
2. To propagate the attribute value from Oracle Identity Manager to LDAP, perform the following steps:
   a. Export the following file from MDS:

      /metadata/iam-features-ldap-sync/LDAPUser.xml

   b. Add the following entry to the end of the <entity-attributes> tag:

```
<attribute name="Employee ID">
                    <type>string</type>
                    <required>false</required>
                    <attribute-group>Basic</attribute-group>
                    <searchable>true</searchable>
      </attribute>
```

Note: Oracle Identity Manager does not support provisioning or reconciling Boolean-type attributes to LDAP.

c. Add the following entry to the end of the <target-fields> tag:

```
<field name="employeeid">
              <type>string</type>
              <required>false</required>
       </field>
```

d. Add the following entry to the end of the <attribute-maps> tag:

```
<attribute-map>
              <entity-attribute>Employee ID</entity-attribute>
              <target-field>employeeid</target-field>
       </attribute-map>
```

e. Import the LDAPUser.xml file in the /metadata/iam-features-ldap-sync/ directory in MDS.

3. To propagate the attribute value from LDAP to Oracle Identity Manager, perform these steps:

a. Extend the RA_LDAPUSER table by adding a new column. For example, add the RECON_EMPLOYEE_ID column.

b. Export the reconciliation profile, /db/LDAPUser from MDS.

c. Add the following entry to the end of the <reconFields> tag:

```
<reconAttr>
              <oimFormDescriptiveName>Employee ID</oimFormDescriptiveName>
              <reconFieldName
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                  xmlns:xs="http://www.w3.org/2001/XMLSchema"
                  xsi:type="xs:string">employeeid</reconFieldName>
              <reconColName>RECON_EMPLOYEE_ID</reconColName>
              <emDataType>string</emDataType>
              <formFieldType/>
                   <targetattr keyfield="false" encrypted="false"
 required="false"
                   type="String" name="usr_employee_id"/>
       </reconAttr>
```

d. Add the following entry to the end of the <reconToOIMMappings> tag:

```
<reconAttr>
              <oimFormDescriptiveName>Employee ID</oimFormDescriptiveName>
              <reconFieldName
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

     xmlns:xs="http://www.w3.org/2001/XMLSchema"
                  xsi:type="xs:string">employeeid</reconFieldName>
              <reconColName> RECON_EMPLOYEE_ID </reconColName>
              <emDataType>string</emDataType>
              <formFieldType/>
              <targetattr keyfield="false" encrypted="false"
required="false"
 type="String" name="

         usr_employee_id">
```

```
                <Transformation name="OneToOne">
                <Parameter name=" employeeid " fieldname=" employeeid "/>
                </Transformation>
                </targetattr>
    </reconAttr>
```

e. Import the xml file back into MDS. After importing, verify that the full path in MDS is /db/LDAPUser.

f. Export the /db/RA_LDAPUSER.xml file from MDS.

g. Add the following entry to the end of the <entity-attributes> tag:

```
<attribute name="Employee ID">
                <type>string</type>
                <required>false</required>
                <attribute-group>Basic</attribute-group>
                <searchable>true</searchable>
     </attribute>
```

h. Add this entry to the end of the <target-fields> tag:

```
<field name=" RECON_EMPLOYEE_ID">
                <type>string</type>
                <required>false</required>
     </field>
```

i. Add the following entry to the end of the <attribute-maps> tag:

```
<attribute-map>
                <entity-attribute>Employee ID</entity-attribute>
                <target-field> RECON_EMPLOYEE_ID </target-field>
     </attribute-map>
```

j. Import the RA_LDAPUSER.xml file back into MDS. After importing, verify that the full path in MDS is /db/RA_LDAPUSER.xml.

13.5.2 Synchronizing UDFs Between Oracle Identity Manager and LDAP By Using the ldapsyncudf Utility

You can automate the synchronization of UDFs between Oracle Identity Manager and LDAP by using the ldapsyncudf.sh utility.

This utility takes care of both provisioning and reconciliation of UDFs, and it is recommended that you synchronize UDFs by using this utility. If you want to provision UDFs without reconciliation, or if you want to reconcile UDFs without provisioning, then you must run the process manually as described in "Synchronizing the Attribute Manually" on page 13-18.

Using the ldapsyncudf.sh script is described in the following sections:

- Configuring the Properties File
- Configuring the Input File
- Running the Utility

13.5.2.1 Configuring the Properties File

You can configure properties in the ldapconfig.props file before running the ldapsyncudf.sh script to achieve UDF synchronization. These properties are used by the client to connect to the service provided by Oracle Identity Manager. These

properties can also be specified through console if properties file does not exist or does not contain property values.

You can configure the following properties:

- **OIMServer type:** The application server type, such as Oracle WebLogic Server. If no value is specified, then Oracle WebLogic Server is the default value.
- **OIMProviderURL:** Oracle Identity Manager provider URL. This is in the format t3://*HOST_NAME*:*PORT*.

  If the value is not specified in the properties file, then you are prompted to enter the value when running the ldapsyncudf.sh script.
- **OIMAdminUser:** Oracle Identity Manager administrator user login.

  If the value is not specified in the properties file, then you are prompted to enter the value when you run the ldapsyncudf.sh script.
- **SkipOVDValidation:** Whether or not LDAP attribute validation in OVD schema is skipped.

  By default the value is false. If the value of this property is true, then the LDAP attribute is not validated in OVD schema and it can be configured after running the utility. The utility makes the changes in MDS and horizontal tables.

The following is a sample properties file:

```
# OIMServer Type, Valid values can be WLS, JBOSS, WAS
OIMServerType=WLS

# OIMAdmin User Login
OIMAdminUser=OIM_ADMINISTRATOR_LOGIN

# OIM Provider URL, such as OIMProviderURL=t3://HOST_NAME:PORT
OIMProviderURL=t3://localhost:7001

# Skip Validation of OVD Schema, such as SkipOVDValidation=true or false
SkipOVDValidation=false
```

13.5.2.2 Configuring the Input File

The input to the utility can either be provided through an input file or at runtime in interactive mode as prompted through the console. If the input is provided though an input file, then it must be in the following format:

ENTITY_TYPE, *OPER_TYPE*, *UDF_NAME*, *LDAP_ATTR*

> **Note:** The parameters must be separated by comma (,). Any line beginning with the hash character (#) is treated as comment and is not processed by the utility.

The input parameters are:

- ***ENTITY_TYPE***: The valid values can be either USER or ROLE. The values are not case-sensitive.
- ***OPER_TYPE***: The valid values can be either ADD or DELETE. The values are not case-sensitive.

Tip: Update is not supported. To perform an update, first perform delete followed by add. A new definition is picked from Oracle Identity Manager entity definition file present in the MDS.

- ***UDF_NAME***: The valid values can be any Oracle Identity Manager entity attribute, which has been created successfully. If the *UDF_NAME* does not exist, then an error message is displayed. The value is case-sensitive.
- ***LDAP_ATTR***: The valid values can be any LDAP attribute present in the LDAP directory server as well as in the OVD schema. The *LDAP_ATTR* parameter is optional for the DELETE operation. If this parameter value is specified for the DELETE operation, then this attribute value is ignored. The value is case-sensitive.

The following is a sample input file:

```
USER, ADD, udf1, ldapAttr1
ROLE, ADD, udf2, ldapAttr2
ROLE, DELETE, udf3
#This is comment
USER, DELETE, udf4
USER, ADD, UDF Number 5, ldapAttr5
```

13.5.2.3 Running the Utility

The ldapsyncudf.sh script is in the *ORACLE_HOME*/server/ldap_config_util/ directory. To run the ldapsyncudf.sh script:

Note: Before running the utility, create the LDAP attribute and include that in the orclIDXPerson or orclIDXGroup objectclass as depending on the entity type.

1. Extend the OVD and OID schemas by adding the LDAP attribute, such as employeeid, to the orclIDXPerson objectclass in both OVD and OID.
2. Before running the utility, set the WL_HOME and JAVA_HOME environment variables.
3. Run the following command:

   ldapsyncudf.sh [-Dconfig.properties=*PATH_TO_PROPERTIES_FILE*] [-DinputFile=*PATH_TO_INPUT_FILE*]

   Tip: Run the ldapsyncudf.sh script with help, –help, or --help command-line parameter to display usage details and general help.

   You can run the utility in any one of the following ways:

   - Both the command-line parameters are optional. If the command-line parameters are not specified, then you are prompted to enter the parameters at runtime through the console, as shown:

     ```
     Enter Entity Type (User / Role):
     ```

     Specify the Oracle Identity Manager entity type, which is USER or ROLE.

     ```
     Enter Operation Type (Add / Delete):
     ```

     Specify the operation type, which is ADD or DELETE.

```
Enter OIM UDF Name to be Synchronized:
```

Specify the Oracle Identity Manager entity attribute which has been created successfully.

```
Enter the LDAP attribute name in LDAP schema:
```

Specify the LDAP attribute present in the LDAP directory server as well as in the OVD schema. This is an optional parameter for the DELETE operation.

One set of operation is completed. If the operation is successful, then you are prompted, as shown:

```
Want to continue adding / deleting more attributes (y/n)?
```

Enter `y` if you want to start the input process for another operation. Otherwise, enter `n` to end the program.

- Run the utility with values for the -Dinputfile and -Dconfig.properties command-line parameters. The input is read from the input file. The input file can contain multiple inputs, one per line. Each input contains four parameters for ADD operation or three parameters for DELETE operation. If you provide the fourth parameter for a DELETE operation, then it is ignored.

13.6 Configuration Management Architecture

For all attribute definitions and the Configuration Management pages in the UI, the configuration file for maintaining the user entity attributes is User.xml. This configuration file defines all attributes of user entity and their properties. The mapping of the attribute to the backend attributes or columns is also specified in the file. The attributes to be displayed on the UI are determined based on the attribute properties. For example, if an attribute is system-controlled, then the attribute is not displayed in the UI.

Example 13 1 shows the code for a sample User.xml configuration file:

Example 13 1 The User.xml Configuration File

```
<?xml version="1.0" encoding="UTF-8"?>
<tns:entity-definition xmlns:tns="http://www.oracle.com/schema/oim/entity"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.oracle.com/schema/oim/entity ../entity.xsd ">
  <entity-type child-entity="false">User</entity-type>
  <!-- Defines the repository and data provider to use for this entity -->
  <provider-instance>
    <repository-instance>OperationalDB</repository-instance>
    <provider-type>UserDataProvider</provider-type>
    <parameters>
        <parameter name="table">
            <value>usr</value>
        </parameter>
        <parameter name="id_column">
            <value>usr_key</value>
        </parameter>
        <parameter name="usr_foreign_key_column">
            <value>usr_manager_key</value>
        </parameter>
        <parameter name="org_table">
            <value>act</value>
        </parameter>
```

```
        <parameter name="org_id_column">
            <value>act_key</value>
        </parameter>
        <parameter name="org_foreign_key_column">
            <value>parent_key</value>
        </parameter>
<parameter name="foreign_search_table">
    <value>act:usr</value>
</parameter>
<parameter name="foreign_search_table_alias">
    <value>actorg:usrmgr</value>
</parameter>
<parameter name="foreign_search_table_to_join_key">
    <value>actorg.act_key:usrmgr.usr_key</value>
</parameter>
<parameter name="foreign_search_table_from_join_key">
    <value>usr.act_key:usr.usr_manager_key</value>
</parameter>
<parameter name="foreign_search_column">
    <value>actorg.act_name:usrmgr.usr_display_name</value>
</parameter>
<parameter name="foreign_search_column_label">
    <value>Organization Name:Manager Login</value>
</parameter>
<parameter name="foreign_search_column_alias">
    <value>actorg_act_name:usrmgr_usr_login</value>
</parameter>
<parameter name="foreign_search_column_outer_join">
    <value>false:true</value>
</parameter>
    </parameters>
  </provider-instance>
  <container-capability>
    <enabled>false</enabled>
  </container-capability>
  <!-- entity-attributes define the attributes at the API level. These are the
attribute names that the API will return and expects -->
  <entity-attributes>
    <attribute name="usr_key">
        <type>number</type>
        <searchable>true</searchable>
        <required>false</required>
        <MLS>false</MLS>
    <multi-represented>false</multi-represented>


        <attribute-group>Basic</attribute-group>
        <!-- The metadata attachment defines the enttiy attribute properties.
These properties will be common across all entities -->
        <metadata-attachment>
            <!-- Whether the attribute is searchable by the user -->
            <metadata>
                <name>user-searchable</name>
                <value>true</value>
                <category>properties</category>
            </metadata>
            <!-- Whether the attribute can be updated in bulk -->
            <metadata>
                <name>bulk-updatable</name>
                <value>false</value>
```

```
                    <category>properties</category>
                </metadata>
                <!-- The category in the UI to which this attribute belongs -->
                <metadata>
                    <name>category</name>
                    <value>Account Settings</value>
                    <category>properties</category>
                </metadata>
                <!-- The display type of the attribute on the UI -->
                <metadata>
                    <name>display-type</name>
                    <value>ENTITY</value>
                    <category>properties</category>
                </metadata>
                <!-- Whether the attribute value needs to be encrypted or not -->
                <metadata>
                    <name>encryption</name>
                    <value>CLEAR</value>
                    <category>properties</category>
                </metadata>
                <metadata>
                    <name>visible</name>
                    <value>false</value>
                    <category>properties</category>
                </metadata>
                <!-- The maximum size that an attribute value can take -->
                <metadata>
                    <name>max-size</name>
                    <value>19</value>
                    <category>properties</category>
                </metadata>
                <!-- Whether the attribtue is single valued or multivalued -->
                <metadata>
                    <name>multi-valued</name>
                    <value>false</value>
                    <category>properties</category>
                </metadata>
                <!-- Whether an attribute's value can be modified or not -->
                <metadata>
                    <name>read-only</name>
                    <value>true</value>
                    <category>properties</category>
                </metadata>
                <!-- Whether the value is controlled only by the system -->
                <metadata>
                    <name>system-controlled</name>
                    <value>true</value>
                    <category>properties</category>
                </metadata>            <!-- Whether the attribute is custom or user
defined attribute -->
                <metadata>
                    <name>custom</name>
                    <value>false</value>
                    <category>properties</category>
                </metadata>

            </metadata-attachment>
        </attribute>
        <attribute name="act_key">
            <type>number</type>
```

```
        <searchable>true</searchable>
        <required>true</required>
        <MLS>false</MLS>
<multi-represented>false</multi-represented>
        <attribute-group>Basic</attribute-group>
        <metadata-attachment>
            <metadata>
                <name>user-searchable</name>
                <value>true</value>
                <category>properties</category>
            </metadata>
            <metadata>
                <name>bulk-updatable</name>
                <value>true</value>
                <category>properties</category>
            </metadata>
            <metadata>
                <name>category</name>
                <value>Basic User Information</value>
                <category>properties</category>
            </metadata>
            <metadata>
                <name>display-type</name>
                <value>ENTITY</value>
                <category>properties</category>
            </metadata>
            <metadata>
                <name>encryption</name>
                <value>CLEAR</value>
                <category>properties</category>
            </metadata>
            <metadata>
                <name>visible</name>
                <value>true</value>
                <category>properties</category>
            </metadata>
            <metadata>
                <name>max-size</name>
                <value>256</value>
                <category>properties</category>
            </metadata>
            <metadata>
                <name>multi-valued</name>
                <value>false</value>
                <category>properties</category>
            </metadata>
            <metadata>
                <name>read-only</name>
                <value>false</value>
                <category>properties</category>
            </metadata>
            <metadata>
                <name>system-controlled</name>
                <value>false</value>
                <category>properties</category>
            </metadata>            <metadata>
                <name>custom</name>
                <value>false</value>
                <category>properties</category>
            </metadata>
```

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```

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```
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```

```
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            </metadata>
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```

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```

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  </entity-attributes>

  <!-- The target fields define the attribute columns in the DB. These are not
exposed via the User Management APIs. -->
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    </field>
    <field name="act_key">
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        <required>true</required>
    </field>
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        <required>true</required>
    </field>
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    </field>
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    <field name="usr_full_name">
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    </field>
    <field name="usr_display_name">
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    </field>
    <field name="usr_disabled">
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```

```
</field>
<field name="usr_pwd_cant_change">
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    <required>false</required>
</field>
<field name="usr_pwd_must_change">
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    <required>false</required>
</field>
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<field name="usr_deprovisioning_date">
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```

```
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    <field name="usr_update">
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```

```
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</field>
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```

```
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<field name="usr_postal_code">
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</field>
<field name="usr_po_box">
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</field>
<field name="usr_state">
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    <required>false</required>
</field>
<field name="usr_street">
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    <required>false</required>
</field>
<field name="usr_telephone_number">
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    <required>false</required>
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    <required>false</required>
</field>
<field name="usr_initials">
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    <required>false</required>
</field>
<field name="usr_pwd_generated">
    <type>string</type>
    <required>false</required>
</field>
<field name="usr_ldap_organization">
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    <required>false</required>
</field>
<field name="usr_ldap_organization_unit">
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</field>
<field name="usr_ldap_guid">
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    <required>false</required>
```

```
    </field>
    <field name="usr_ldap_dn">
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    </field>
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    </field>
<field name="usr_time_format">
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    <field name="usr_date_format">
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    </field>
    <field name="usr_currency">
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    </field>
    <field name="usr_number_format">
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    <field name="usr_font_size">
        <type>string</type>
        <required>false</required>
    </field>
    <field name="usr_embedded_help">
        <type>string</type>
        <required>false</required>
    </field>
    <field name="usr_territory">
        <type>string</type>
        <required>false</required>
    </field>
    <field name="usr_name_preferred_lang">
        <type>string</type>
        <required>false</required>
    </field>
  </target-fields>
  <!-- The attribute mapping defines which backend DB columns are mapped to the
frontend attributes exposed at the API level -->
  <attribute-maps>
    <attribute-map>
      <entity-attribute>usr_key</entity-attribute>
      <target-field>usr_key</target-field>
    </attribute-map>
    <attribute-map>
      <entity-attribute>act_key</entity-attribute>
      <target-field>act_key</target-field>
    </attribute-map>
```

```
<attribute-map>
  <entity-attribute>Last Name</entity-attribute>
  <target-field>usr_last_name</target-field>
</attribute-map>
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  <entity-attribute>First Name</entity-attribute>
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  <entity-attribute>Full Name</entity-attribute>
  <target-field>usr_full_name</target-field>
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  <entity-attribute>Display Name</entity-attribute>
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</attribute-map>
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  <entity-attribute>Xellerate Type</entity-attribute>
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</attribute-map>
<attribute-map>
  <entity-attribute>usr_password</entity-attribute>
  <target-field>usr_password</target-field>
</attribute-map>
<attribute-map>
  <entity-attribute>usr_disabled</entity-attribute>
  <target-field>usr_disabled</target-field>
</attribute-map>
<attribute-map>
  <entity-attribute>usr_pwd_cant_change</entity-attribute>
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</attribute-map>
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  <entity-attribute>usr_pwd_must_change</entity-attribute>
  <target-field>usr_pwd_must_change</target-field>
</attribute-map>
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  <entity-attribute>usr_pwd_never_expires</entity-attribute>
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</attribute-map>
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  <entity-attribute>Status</entity-attribute>
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</attribute-map>
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  <entity-attribute>Role</entity-attribute>
  <target-field>usr_emp_type</target-field>
</attribute-map>
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</attribute-map>
<attribute-map>
  <entity-attribute>usr_pwd_expire_date</entity-attribute>
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</attribute-map>
```

```
<attribute-map>
  <entity-attribute>usr_pwd_warn_date</entity-attribute>
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</attribute-map>
<attribute-map>
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  <entity-attribute>End Date</entity-attribute>
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</attribute-map>
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<attribute-map>
  <entity-attribute>usr_deprovisioned_date</entity-attribute>
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</attribute-map>
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  <target-field>usr_locked</target-field>
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  <target-field>usr_locked_on</target-field>
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<attribute-map>
  <entity-attribute>Automatically Delete On</entity-attribute>
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</attribute-map>
<attribute-map>
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</attribute-map>
```

```
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   <target-field>usr_automatically_delete_on</target-field>
 </attribute-map>
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 </attribute-map>
 <attribute-map>
   <entity-attribute>usr_pwd_reset_attempts_ctr</entity-attribute>
   <target-field>usr_pwd_reset_attempts_ctr</target-field>
 </attribute-map>
 <attribute-map>
   <entity-attribute>usr_data_level</entity-attribute>
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 </attribute-map>
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 <attribute-map>
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  <target-field>usr_description</target-field>
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<attribute-map>
  <entity-attribute>Employee Number</entity-attribute>
  <target-field>usr_emp_no</target-field>
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<attribute-map>
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</attribute-map>
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  <target-field>usr_gen_qualifier</target-field>
</attribute-map>
<attribute-map>
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  <target-field>usr_hire_date</target-field>
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<attribute-map>
  <entity-attribute>Home Phone</entity-attribute>
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  <target-field>usr_locality_name</target-field>
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  <entity-attribute>PO Box</entity-attribute>
  <target-field>usr_po_box</target-field>
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```

```
<attribute-map>
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  <target-field>usr_state</target-field>
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  <entity-attribute>Title</entity-attribute>
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</attribute-map>
<attribute-map>
  <entity-attribute>Password Generated</entity-attribute>
  <target-field>usr_pwd_generated</target-field>
</attribute-map>
<attribute-map>
  <entity-attribute>LDAP Organization</entity-attribute>
  <target-field>usr_ldap_organization</target-field>
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  <entity-attribute>LDAP Organization Unit</entity-attribute>
  <target-field>usr_ldap_organization_unit</target-field>
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</attribute-map>
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  <entity-attribute>LDAP DN</entity-attribute>
  <target-field>usr_ldap_dn</target-field>
</attribute-map>
<attribute-map>
  <entity-attribute>FA Language</entity-attribute>
  <target-field>usr_language</target-field>
</attribute-map>
<attribute-map>
  <entity-attribute>Embedded Help</entity-attribute>
  <target-field>usr_embedded_help</target-field>
</attribute-map>
<attribute-map>
  <entity-attribute>Font Size</entity-attribute>
  <target-field>usr_font_size</target-field>
</attribute-map>
<attribute-map>
  <entity-attribute>Color Contrast</entity-attribute>
  <target-field>usr_color_contrast</target-field>
</attribute-map>
<attribute-map>
  <entity-attribute>Accessibility Mode</entity-attribute>
  <target-field>usr_accessibility_mode</target-field>
</attribute-map>
```

```
    <attribute-map>
      <entity-attribute>Number Format</entity-attribute>
      <target-field>usr_number_format</target-field>
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      <entity-attribute>Date Format</entity-attribute>
      <target-field>usr_date_format</target-field>
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      <entity-attribute>Time Format</entity-attribute>
      <target-field>usr_time_format</target-field>
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    <attribute-map>
      <entity-attribute>Currency</entity-attribute>
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    </attribute-map>
    <attribute-map>
      <entity-attribute>FA Territory</entity-attribute>
      <target-field>usr_territory</target-field>
    </attribute-map>
    <attribute-map>
      <entity-attribute>User Name Preferred Language</entity-attribute>
      <target-field>usr_name_preferred_lang</target-field>
    </attribute-map>
   </attribute-maps>
   <!-- The following section defines various User configurations for the UI -->
   <metadata-attachment xmlns="">
        <!-- 1 -->
        <!--
            This section defines the categories that will be available in the UI.
Each attribute must belong to one of these categories
        -->
        <metadata>
            <!-- The unique ID of the category -->
            <name>Basic User Information</name>
            <!-- The display name of the category. This will be a key in a bundle
which will be fetched by the config API -->
            <value>Basic User Information</value>
            <category>categories</category>
        </metadata>
        <metadata>
            <name>Account Settings</name>
            <value>Account Settings</value>
            <category>categories</category>
        </metadata>
        <metadata>
            <name>Account Effective Dates</name>
            <value>Account Effective Dates</value>
            <category>categories</category>
        </metadata>
        <metadata>
            <name>Provisioning Dates</name>
            <value>Provisioning Dates</value>
            <category>categories</category>
        </metadata>
        <metadata>
            <name>Lifecycle</name>
            <value>Lifecycle</value>
            <category>categories</category>
        </metadata>
```

```
        <metadata>
            <name>System</name>
            <value>System</value>
            <category>categories</category>
        </metadata>
        <metadata>
            <name>Other User Attributes</name>
            <value>Other User Attributes</value>
            <category>categories</category>
        </metadata>
        <metadata>
            <!-- The unique ID of the category -->
            <name>CustomAttributes</name>
            <!-- The display name of the category. This will be a key in a bundle
which will be fetched by the config API -->
            <value>Custom Attributes</value>
            <category>categories</category>
        </metadata>
        <metadata>
            <name>Preferences</name>
            <value>Preferences</value>
            <category>categories</category>
        </metadata>

        <!-- 2 -->
        <!--
            This section defines the ordering amongst the categories
        -->

        <metadata>
            <name>1</name>
            <value>Basic User Information</value>
            <category>categories.order</category>
        </metadata>
        <metadata>
            <name>2</name>
            <value>Account Settings</value>
            <category>categories.order</category>
        </metadata>
        <metadata>
            <name>3</name>
            <value>Account Effective Dates</value>
            <category>categories.order</category>
        </metadata>
        <metadata>
            <name>4</name>
            <value>Provisioning Dates</value>
            <category>categories.order</category>
        </metadata>
        <metadata>
            <name>5</name>
            <value>Lifecycle</value>
            <category>categories.order</category>
        </metadata>
        <metadata>
            <name>6</name>
            <value>System</value>
            <category>categories.order</category>
        </metadata>
        <metadata>
```

```
            <name>7</name>
            <value>Other User Attributes</value>
            <category>categories.order</category>
        </metadata>
        <metadata>
            <name>8</name>
            <value>CustomAttributes</value>
            <category>categories.order</category>
        </metadata>
        <metadata>
            <name>9</name>
            <value>Preferences</value>
            <category>categories.order</category>
        </metadata>


        <!-- 3 -->
        <!--
            This section defines the ordering of the attributes within each
category. The attributes will be displayed on the UI in the order defined here.
        -->
        <metadata>
            <name>1</name>
            <value>User Login</value>
            <category>categories.Account Settings</category>
        </metadata>
        <metadata>
            <name>2</name>
            <value>usr_password</value>
            <category>categories.Account Settings</category>
        </metadata>
        <metadata>
            <name>3</name>
            <value>Status</value>
            <category>categories.Account Settings</category>
        </metadata>
        <metadata>
            <name>4</name>
            <value>usr_locked</value>
            <category>categories.Account Settings</category>
        </metadata>
        <metadata>
            <name>5</name>
            <value>usr_key</value>
            <category>categories.Account Settings</category>
        </metadata>

        <metadata>
            <name>1</name>
            <value>First Name</value>
            <category>categories.Basic User Information</category>
        </metadata>
        <metadata>
            <name>2</name>
            <value>Middle Name</value>
            <category>categories.Basic User Information</category>
        </metadata>
        <metadata>
            <name>3</name>
            <value>Last Name</value>
```

```
    <category>categories.Basic User Information</category>
</metadata>
<metadata>
    <name>4</name>
    <value>Xellerate Type</value>
    <category>categories.Basic User Information</category>
</metadata>
<metadata>
    <name>5</name>
    <value>Email</value>
    <category>categories.Basic User Information</category>
</metadata>
<metadata>
    <name>6</name>
    <value>usr_manager_key</value>
    <category>categories.Basic User Information</category>
</metadata>
<metadata>
    <name>7</name>
    <value>act_key</value>
    <category>categories.Basic User Information</category>
</metadata>
<metadata>
    <name>8</name>
    <value>Role</value>
    <category>categories.Basic User Information</category>
</metadata>
<metadata>
    <name>9</name>
    <value>Full Name</value>
    <category>categories.Basic User Information</category>
</metadata>

<metadata>
    <name>10</name>
    <value>Display Name</value>
    <category>categories.Basic User Information</category>
</metadata>
<metadata>
    <name>1</name>
    <value>Start Date</value>
    <category>categories.Account Effective Dates</category>
</metadata>

<metadata>
    <name>2</name>
    <value>End Date</value>
    <category>categories.Account Effective Dates</category>
</metadata>
<metadata>
    <name>1</name>
    <value>usr_provisioning_date</value>
    <category>categories.Provisioning Dates</category>
</metadata>

<metadata>
    <name>2</name>
    <value>usr_deprovisioning_date</value>
    <category>categories.Provisioning Dates</category>
</metadata>
```

```
<metadata>
    <name>1</name>
    <value>Manually Locked</value>
    <category>categories.Lifecycle</category>
</metadata>
<metadata>
    <name>2</name>
    <value>Locked On</value>
    <category>categories.Lifecycle</category>
</metadata>

<metadata>
    <name>3</name>
    <value>Automatically Delete On</value>
    <category>categories.Lifecycle</category>
</metadata>
<metadata>
    <name>1</name>
    <value>usr_provisioned_date</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>2</name>
    <value>usr_deprovisioned_date</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>3</name>
    <value>usr_login_attempts_ctr</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>4</name>
    <value>usr_create</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>5</name>
    <value>usr_update</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>6</name>
    <value>usr_pwd_cant_change</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>7</name>
    <value>usr_pwd_must_change</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>8</name>
    <value>usr_pwd_never_expires</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>9</name>
    <value>usr_pwd_expire_date</value>
    <category>categories.System</category>
```

```
</metadata>
<metadata>
    <name>10</name>
    <value>usr_pwd_warn_date</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>11</name>
    <value>usr_pwd_expired</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>12</name>
    <value>usr_pwd_warned</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>13</name>
    <value>usr_pwd_reset_attempts_ctr</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>14</name>
    <value>usr_change_pwd_at_next_logon</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>15</name>
    <value>usr_pwd_min_age_date</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>16</name>
    <value>usr_createby</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>17</name>
    <value>usr_updateby</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>18</name>
    <value>usr_created</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>19</name>
    <value>usr_policy_update</value>
    <category>categories.System</category>
</metadata>

<metadata>
    <name>20</name>
    <value>Password Generated</value>
    <category>categories.System</category>
</metadata>
<metadata>
    <name>21</name>
    <value>usr_data_level</value>
```

```
    <category>categories.System</category>
</metadata>
<metadata>
    <name>1</name>
    <value>Country</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>2</name>
    <value>Department Number</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>3</name>
    <value>Description</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>4</name>
    <value>Common Name</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>5</name>
    <value>Employee Number</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>6</name>
    <value>Fax</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>7</name>
    <value>Generation Qualifier</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>8</name>
    <value>Hire Date</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>9</name>
    <value>Home Phone</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>10</name>
    <value>Locality Name</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>11</name>
    <value>Mobile</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>12</name>
    <value>Pager</value>
```

```
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>13</name>
    <value>Home Postal Address</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>14</name>
    <value>Postal Address</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>15</name>
    <value>Postal Code</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>16</name>
    <value>PO Box</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>17</name>
    <value>State</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>18</name>
    <value>Street</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>19</name>
    <value>Telephone Number</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>20</name>
    <value>Title</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>21</name>
    <value>Initials</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>22</name>
    <value>LDAP Organization</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>23</name>
    <value>LDAP Organization Unit</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>24</name>
    <value>LDAP GUID</value>
```

```
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>25</name>
    <value>LDAP DN</value>
    <category>categories.Other User Attributes</category>
</metadata>
<metadata>
    <name>1</name>
    <value>usr_locale</value>
    <category>categories.Preferences</category>
</metadata>
<metadata>
    <name>2</name>
    <value>usr_timezone</value>
    <category>categories.Preferences</category>
</metadata>
<metadata>
    <name>3</name>
    <value>Number Format</value>
    <category>categories.Preferences</category>
</metadata>
<metadata>
    <name>4</name>
    <value>Currency</value>
    <category>categories.Preferences</category>
</metadata>
<metadata>
    <name>5</name>
    <value>Date Format</value>
    <category>categories.Preferences</category>
</metadata>
<metadata>
    <name>6</name>
    <value>Time Format</value>
    <category>categories.Preferences</category>
</metadata>
<metadata>
    <name>7</name>
    <value>Accessibility Mode</value>
    <category>categories.Preferences</category>
</metadata>
<metadata>
    <name>8</name>
    <value>Color Contrast</value>
    <category>categories.Preferences</category>
</metadata>
<metadata>
    <name>9</name>
    <value>Font Size</value>
    <category>categories.Preferences</category>
</metadata>
<metadata>
    <name>10</name>
    <value>Embedded Help</value>
    <category>categories.Preferences</category>
</metadata>
<metadata>
    <name>11</name>
    <value>FA Language</value>
```

```
                <category>categories.Preferences</category>
            </metadata>
            <metadata>
                <name>12</name>
                <value>FA Territory</value>
                <category>categories.Preferences</category>
            </metadata>
            <metadata>
                <name>13</name>
                <value>User Name Preferred Language</value>
                <category>categories.Preferences</category>
            </metadata>
            <!-- 4 -->
            <!--
                This section defines the attributes that will be available in advanced
search
            -->
            <metadata>
                <name>User Login</name>
                <value></value>
                <category>Advanced Search.Attributes</category>
            </metadata>
            <metadata>
                <name>First Name</name>
                <value></value>
                <category>Advanced Search.Attributes</category>
            </metadata>
            <metadata>
                <name>Middle Name</name>
                <value></value>
                <category>Advanced Search.Attributes</category>
            </metadata>
            <metadata>
                <name>Last Name</name>
                <value></value>
                <category>Advanced Search.Attributes</category>
            </metadata>
            <metadata>
                <name>Display Name</name>
                <value></value>
                <category>Advanced Search.Attributes</category>
            </metadata>
            <metadata>
                <name>Role</name>
                <value></value>
                <category>Advanced Search.Attributes</category>
            </metadata>
            <metadata>
                <name>act_key</name>
                <value></value>
                <category>Advanced Search.Attributes</category>
            </metadata>
            <metadata>
                <name>usr_manager_key</name>
                <value></value>
                <category>Advanced Search.Attributes</category>
            </metadata>
            <metadata>
                <name>Start Date</name>
                <value></value>
```

```
    <category>Advanced Search.Attributes</category>
</metadata>
<metadata>
    <name>End Date</name>
    <value></value>
    <category>Advanced Search.Attributes</category>
</metadata>
<metadata>
    <name>Status</name>
    <value></value>
    <category>Advanced Search.Attributes</category>
</metadata>
<metadata>
    <name>Xellerate Type</name>
    <value></value>
    <category>Advanced Search.Attributes</category>
</metadata>
<metadata>
    <name>usr_locked</name>
    <value></value>
    <category>Advanced Search.Attributes</category>
</metadata>
<metadata>
    <name>Email</name>
    <value></value>
    <category>Advanced Search.Attributes</category>
</metadata>
<!--<metadata>
    <name>Phone</name>
    <value></value>
    <category>Advanced Search.Attributes</category>
</metadata>-->
<metadata>
    <name>usr_locale</name>
    <value></value>
    <category>Advanced Search.Attributes</category>
</metadata>
<metadata>
    <name>usr_timezone</name>
    <value></value>
    <category>Advanced Search.Attributes</category>
</metadata>
<metadata>
    <name>usr_provisioning_date</name>
    <value></value>
    <category>Advanced Search.Attributes</category>
</metadata>
<metadata>
    <name>usr_deprovisioning_date</name>
    <value></value>
    <category>Advanced Search.Attributes</category>
</metadata>
<metadata>
    <name>usr_provisioned_date</name>
    <value></value>
    <category>Advanced Search.Attributes</category>
</metadata>
<metadata>
    <name>usr_deprovisioned_date</name>
    <value></value>
```

```
            <category>Advanced Search.Attributes</category>
        </metadata>

        <!-- 5 -->
        <!--
            This section defines attributes that will be used for simple search
        -->
        <metadata>
            <name>Display Name</name>
            <value></value>
            <category>Simple Search.Attributes</category>
        </metadata>
        <metadata>
            <name>User Login</name>
            <value></value>
            <category>Simple Search.Attributes</category>
        </metadata>
        <metadata>
            <name>First Name</name>
            <value></value>
            <category>Simple Search.Attributes</category>
        </metadata>
        <metadata>
            <name>Last Name</name>
            <value></value>
            <category>Simple Search.Attributes</category>
        </metadata>

        <!-- 6 -->
        <!--
            This section defines attributes and their ordering in the advanced
search results table. The simple search results table will use the first two
defined here.
        -->
        <metadata>
            <name>1</name>
            <value>Display Name</value>
            <category>Search Results.Attributes</category>
        </metadata>
        <metadata>
            <name>2</name>
            <value>User Login</value>
            <category>Search Results.Attributes</category>
        </metadata>
        <metadata>
            <name>3</name>
            <value>First Name</value>
            <category>Search Results.Attributes</category>
        </metadata>
        <metadata>
            <name>4</name>
            <value>Last Name</value>
            <category>Search Results.Attributes</category>
        </metadata>
        <metadata>
            <name>5</name>
            <value>act_key</value>
            <category>Search Results.Attributes</category>
        </metadata>
        <metadata>
```

```
            <name>6</name>
            <value>usr_manager_key</value>
            <category>Search Results.Attributes</category>
        </metadata>
        <metadata>
            <name>7</name>
            <value>Status</value>
            <category>Search Results.Attributes</category>
        </metadata>
        <metadata>
            <name>8</name>
            <value>usr_locked</value>
            <category>Search Results.Attributes</category>
        </metadata>

        <!-- 7 -->
        <!--
            This section defines derived attributes. That is, attributes whose
value is based on other attribute values.
        -->
        <!--
        <metadata>
           <name>Full Name</name>
           <value></value>
           <category>Derived Attributes</category>
       </metadata>
        -->
        <!--<metadata>
            <name>1</name>
            <value>Last Name</value>
            <category>Derived Attributes.Full Name</category>
        </metadata>
        <metadata>
            <name>2</name>
            <value>, </value>
            <category>Derived Attributes.Full Name</category>
        </metadata>
        <metadata>
            <name>3</name>
            <value>First Name</value>
            <category>Derived Attributes.Full Name</category>
        </metadata>-->

    </metadata-attachment>
</tns:entity-definition>
```

The User.xml file must be compliant to the entity schema file (Entity.xsd).

Example 13 2 shows the code for a sample Entity.xsd file:

Example 13 2 Entity XML Definition

```
<?xml version="1.0" encoding="UTF-8"?>
<schema targetNamespace="http://www.oracle.com/schema/oim/entity"
xmlns="http://www.w3.org/2001/XMLSchema"
xmlns:tns="http://www.oracle.com/schema/oim/entity">
<element name="entity-definition"
type="tns:entity-definition-type">
</element>

<complexType name="entity-definition-type">
```

```
<all>
<element name="entity-type" minOccurs="1" maxOccurs="1">
<complexType>
<simpleContent>
<extension base="string">
<attribute name="child-entity"
type="boolean">
</attribute>
</extension>
</simpleContent>
</complexType>
</element>
<element name="description" type="string" maxOccurs="1"
minOccurs="0">
</element>
<element name="provider-instance"
type="tns:provider-instance-type" minOccurs="1"
maxOccurs="1">
</element>
<element name="container-capability"
type="tns:container-definition-type" maxOccurs="1"
minOccurs="1">
</element>
<element name="entity-attributes" maxOccurs="1"
minOccurs="1">
<complexType>
<sequence>
<element name="attribute"
type="tns:attribute-definition-type" maxOccurs="unbounded"
minOccurs="1">
</element>
</sequence>
</complexType>
</element>
<element name="target-fields" maxOccurs="1" minOccurs="1">
<complexType>
<sequence>
<element name="field"
type="tns:field-definition-type" maxOccurs="unbounded"
minOccurs="1">
</element>
</sequence>
</complexType>
</element>
<element name="attribute-maps" maxOccurs="1"
minOccurs="0">
<complexType>
<sequence>
<element name="attribute-map"
type="tns:attribute-map-definition-type"
maxOccurs="unbounded" minOccurs="1">
</element>
</sequence>
</complexType>
</element>
<element name="child-entities" maxOccurs="1"
minOccurs="0">
<complexType>
<sequence>
<element name="entity"
```

```
        type="tns:attribute-definition-type" maxOccurs="unbounded"
        minOccurs="1">
        </element>
        </sequence>
        </complexType>
        </element>
        <element name="metadata-attachment" maxOccurs="1"
        minOccurs="0">
        <complexType>
        <sequence>
        <element name="metadata"
        type="tns:metadata-attachment-type" maxOccurs="unbounded"
        minOccurs="0">
        </element>
        </sequence>
        </complexType>
        </element>
        <element name="control-attributes" minOccurs="0" maxOccurs="1">
        <complexType>
        <sequence>
        <element name="attribute" minOccurs="1" maxOccurs="unbounded">
        <complexType>
        <sequence>
        <element name="type" type="string"
        minOccurs="1" maxOccurs="1">
        </element>
        <element name="description"
        type="string" minOccurs="0" maxOccurs="1">
        </element>
        <element name="required"
        type="boolean" minOccurs="1" maxOccurs="1">
        </element>
        </sequence>
        <attribute name="name"
        type="string" use="required">
        </attribute>
        </complexType></element>
        </sequence>
        </complexType></element>
        </all>
</complexType>

<complexType name="provider-instance-type">
        <all>
<element name="repository-instance" type="string" maxOccurs="1"
minOccurs="0"></element>
<element name="provider-type" type="string" maxOccurs="1" minOccurs="1"></element>
<element name="parameters" minOccurs="0" maxOccurs="1">
<complexType>
<sequence>
<element name="parameter" maxOccurs="unbounded" minOccurs="1">
<complexType>
<sequence>
<element name="value" type="string" maxOccurs="unbounded" minOccurs="1">
</element>
</sequence>
<attribute name="name" type="string">
</attribute>
</complexType>
</element>
```

```
</sequence>
</complexType>
</element>
</all>
</complexType>

<complexType name="parameter-definition-type">
        <all>
<element name="type" type="string" maxOccurs="1" minOccurs="1">
</element>
<element name="description" type="string" maxOccurs="1" minOccurs="0">
</element>
<element name="required" type="boolean" maxOccurs="1" minOccurs="1">
</element>
<element name="multi-valued" type="boolean" maxOccurs="1" minOccurs="0">
</element>
</all>
<attribute name="name" type="string"></attribute>
</complexType>

<complexType name="attribute-definition-type">
        <all>
        <element name="type" type="string" maxOccurs="1"
        minOccurs="1">
        </element>
        <element name="description" type="string" maxOccurs="1"
        minOccurs="0">
        </element>
        <element name="required" type="boolean" maxOccurs="1"
        minOccurs="1">
        </element>
        <element name="searchable" type="boolean" maxOccurs="1"
        minOccurs="1">
        </element>
        <element name="MLS" type="boolean" minOccurs="0" maxOccurs="1"></element>
        <element name="default-value" type="string" maxOccurs="1"
        minOccurs="0">
        </element>
        <element name="attribute-group" type="string" maxOccurs="1"
        minOccurs="1">
        </element>
        <element name="metadata-attachment" maxOccurs="1"
        minOccurs="0">
        <complexType>
        <sequence>
        <element name="metadata"
        type="tns:metadata-attachment-type" maxOccurs="unbounded"
        minOccurs="0">
        </element>
        </sequence>
        </complexType>
        </element>
        </all>
        <attribute name="name" type="string"></attribute>
</complexType>

<complexType name="field-definition-type">
        <all>
<element name="type" type="string" maxOccurs="1" minOccurs="1">
</element>
```

```
<element name="description" type="string" maxOccurs="1" minOccurs="0">
</element>
<element name="required" type="boolean" maxOccurs="1" minOccurs="1">
</element>
</all>
<attribute name="name" type="string"></attribute>
</complexType>

<complexType name="attribute-map-definition-type">
        <all>
<element name="entity-attribute" type="string" maxOccurs="1" minOccurs="1">
</element>
<element name="target-field" type="string" maxOccurs="1" minOccurs="1">
</element>
</all>
</complexType>

<element name="repository-definition"
type="tns:repository-definition-type">
</element>

<complexType name="repository-definition-type">
        <all>
<element name="name" type="string" maxOccurs="1" minOccurs="1">
</element>
<element name="class" type="string" maxOccurs="1" minOccurs="1">
</element>
<element name="parameters" maxOccurs="1" minOccurs="0">
<complexType>
<sequence>
<element name="parameter-def" type="tns:parameter-definition-type"
maxOccurs="unbounded" minOccurs="1">
</element>
</sequence>
</complexType>
</element>
<element name="description" type="string" maxOccurs="1" minOccurs="0"></element>
</all>
</complexType>

<element name="provider-definition"
type="tns:provider-definition-type">
</element>

<complexType name="provider-definition-type">
        <all>
<element name="name" type="string" maxOccurs="1" minOccurs="1"></element>
<element name="type" maxOccurs="1" minOccurs="1">
<complexType>
<choice>
<element name="DataProvider" type="string"></element>
<element name="RelationProvider" type="string">
</element>
</choice>
</complexType>
</element>
<element name="class" type="string" maxOccurs="1" minOccurs="1"></element>
<element name="description" type="string" maxOccurs="1" minOccurs="0"></element>
<element name="parameters" maxOccurs="1" minOccurs="0">
<complexType>
```

```
                    <sequence>
<element name="parameter-def" type="tns:parameter-definition-type"
maxOccurs="unbounded" minOccurs="1">
</element>
</sequence>
</complexType>
</element>
</all>
</complexType>

<element name="repository-instance">
<complexType>
           <all>
<element name="name" type="string"></element>
<element name="type" type="string"></element>
<element name="parameters" maxOccurs="1" minOccurs="0">
<complexType>
<sequence>
<element name="parameter" maxOccurs="unbounded" minOccurs="1">
<complexType>
<sequence>
<element name="value" type="string" maxOccurs="1" minOccurs="1">
</element>
</sequence>
<attribute name="name" type="string">
</attribute>
</complexType>
</element>
</sequence>
</complexType>
</element>
</all>
</complexType>
</element>

<complexType name="container-definition-type">
        <sequence>
<element name="enabled" type="boolean" maxOccurs="1" minOccurs="1"></element>
<element name="contained-entity" type="string" maxOccurs="unbounded"
minOccurs="0">
</element>
</sequence>
</complexType>

<complexType name="relation-definition-type">
        <all>
<element name="relation-type" type="string" maxOccurs="1" minOccurs="1"></element>
<element name="description" type="string" maxOccurs="1" minOccurs="0"></element>
<element name="provider-instance" type="tns:provider-instance-type" maxOccurs="1"
minOccurs="1">
</element>
<element name="entity1" type="tns:relation-entity-type" maxOccurs="1"
minOccurs="1">
</element>
<element name="entity2" type="tns:relation-entity-type" maxOccurs="1"
minOccurs="1"></element>
<element name="relation-attributes" maxOccurs="1" minOccurs="1">
<complexType>
<sequence>
<element name="attribute" type="tns:attribute-definition-type"
```

```
maxOccurs="unbounded" minOccurs="0">
</element>
</sequence>
</complexType>
</element>
<element name="target-fields" maxOccurs="1" minOccurs="1">
<complexType>
<sequence>
<element name="field" type="tns:field-definition-type" maxOccurs="unbounded"
minOccurs="0">
</element>
</sequence>
</complexType>
</element>
<element name="attribute-maps" maxOccurs="1" minOccurs="0">
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maxOccurs="unbounded" minOccurs="1">
</element>
</sequence>
</complexType>
</element>
</all>
</complexType>

<element name="relation-definition"
type="tns:relation-definition-type">
</element>

<complexType name="relation-entity-type">
        <all>
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<element name="attribute" type="string"></element>
<element name="attribute-in-entity" type="string"></element>
<element name="attribute-group" type="string" maxOccurs="1"
minOccurs="1"></element>
</all>
</complexType>


<element name="datatype-definition"
type="tns:datatype-definition-type">
</element>

<complexType name="datatype-definition-type">
        <all>
<element name="name" type="string" maxOccurs="1" minOccurs="1"></element>
<element name="class" type="string" maxOccurs="1" minOccurs="1"></element>
<element name="base-type" type="string" maxOccurs="1" minOccurs="1"></element>
</all>
</complexType>

<complexType name="metadata-attachment-type">
        <all>
<element name="name" type="string"></element>
<element name="value" type="string"></element>
<element name="category" type="string"></element>
</all>
</complexType>
```

```
<element name="derived-datatype-definition"
type="tns:derived-datatype-definition-type">
</element>

<complexType name="derived-datatype-definition-type">
        <all>
<element name="name" type="string" maxOccurs="1" minOccurs="1">
</element>
<element name="class" type="string" maxOccurs="1" minOccurs="1">
</element>
<element name="parameters" minOccurs="0" maxOccurs="1">
<complexType>
<sequence>
<element name="parameter" maxOccurs="unbounded" minOccurs="1">
<complexType>
<sequence>
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</element>
</sequence>
<attribute name="name" type="string">
</attribute>
</complexType>
</element>
</sequence>
</complexType>
</element>
</all>
</complexType>
</schema>
```

The entity XML files are stored in MDS. When a new attribute is added, the database schema is updated along with the entity XML in MDS. The configuration service APIs can be used to fetch the attribute information and can be leveraged while building custom UI.

14

Managing Password Policies

The Administration folder of Oracle Identity Manager Design Console enables you to administer Oracle Identity Manager.

> **See Also:** *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for detailed information about Oracle Identity Manager Design Console and all the forms available in Oracle Identity Manager Design Console

You can perform the following tasks by using the Administration folder of Oracle Identity Manager Design Console:

- Creating a Password Policy
- Setting the Criteria for a Password Policy

14.1 Creating a Password Policy

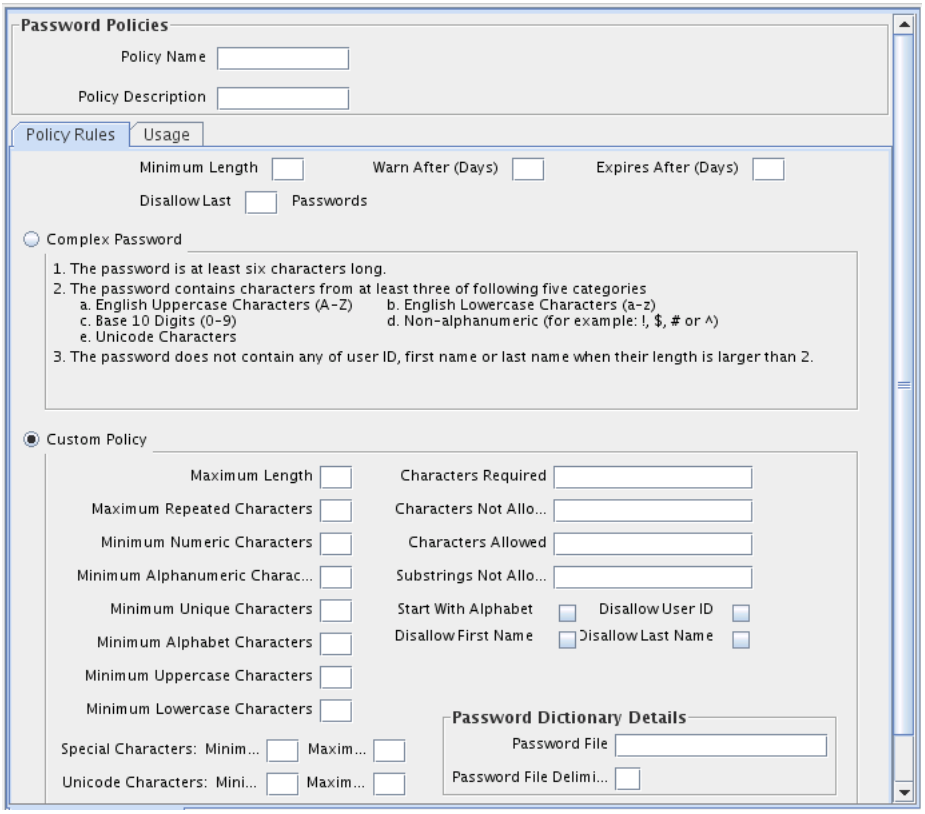
You can use the Password Policies form in Oracle Identity Manager Design Console to create password policies, and thereby:

- Set password restrictions, for example, define the minimum and maximum length of passwords
- See rules and resource objects that are associated with a password policy

To create a password policy:

1. Open the Password Policies form. Figure 14–1 shows the Password Policies form.

Figure 14–1 The Password Policies Form



2. In the Policy Name field, enter the name of the password policy.
3. In the Policy Description field, enter a short description of the password policy.
4. Click **Save**.

Note:

- A password policy is not applied during the creation of an Oracle Identity Manager user through trusted reconciliation.
- After you create a password policy, it must be supplied with criteria and associated with a resource. To supply your password policy with criteria, use the Policy Rules tab of this form. To associate your password policy with a resource, use the Password Policies Rule tab of the Resource Object form to create a password policy and rule combination that will be evaluated when accounts are created or updated on the resource. The password policy will be applied when the criteria for the rule are met. Each password policy can be used by multiple resources.

  The same resource might be accepted by the rules of two different password policies. However, the password policy attached to the rule with the highest priority is applied.

  See "Adding a Password Policy Rule to a Resource Object" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about associating a resource with a password policy.

The tabs in this form become functional after you create a password policy. These tabs are used to set the criteria for the password policy and to view the rules and resource objects that are associated with the current password policy. The following sections discuss these tabs:

- The Policy Rules Tab
- The Usage Tab

14.1.1 The Policy Rules Tab

You use the Policy Rules tab to specify criteria for your password policy, for example, the minimum and maximum length of passwords.

You can use either or both of the following methods to set password restrictions:

- Enter information in the appropriate fields, or select the required check boxes. For example, to indicate that a password must have a minimum length of four characters, enter **4** in the **Minimum Length** field.
- In the **Password File** field, enter the directory path and name of the password policy file (for example, `c:\xellerate\userlimits.txt`). This file contains predefined words that you do not want to be used as passwords. The delimiter specified in the **Password File Delimiter** field separates these words. the predefined words in the file cannot be used as passwords. For example, if the file contains the word welcome, then welcome, Welcome, and welcome123 are invalid passwords

Figure 14–1 shows the **Policy Rules** tab of the Password Policies form.

Table 14–1 describes the data fields on the **Policy Rules** tab. You specify the password policy criteria in these fields.

> **Note:** If a data field of the policy is empty, a password conforming to this policy does not have to meet the criteria of that field for the password to be valid. For example, when the **Minimum Numeric Characters** data field is blank, Oracle Identity Manager will accept a password, regardless of the number of characters included in it.

Table 14–1 Fields of the Policy Rules Tab of the Password Policies Form

Field Name	Description
Minimum Length	The minimum number of characters that a password must contain for the password to be valid. For example, if you enter **4** in the **Minimum Length** field, the password must contain at least four characters. This field accepts values from 0 to 999.
Expires After Days	The duration in days for which users can use a password. For example, if you enter **30** in the **Expires After Days** field, users must change their passwords by the thirtieth day from when it was created or last modified. **Note:** After the number of days specified in the **Expires After Days** field passes, a message is displayed asking the user to change the password. This field accepts values from 0 to 999.

Table 14–1 (Cont.) Fields of the Policy Rules Tab of the Password Policies Form

Field Name	Description
Disallow Last Passwords	The frequency at which old passwords can be reused. This policy ensures that users do not change back and forth among a set of common passwords. For example, if you enter **10** in the **Disallow Last Passwords** field, users are allowed to reuse a password only after using 10 unique passwords. This field accepts values from 0 to 24.
Warn After (Days)	The number of days that must pass before a user is notified that the user's password will expire on a designated date. For example, suppose you enter **30** in the **Expires After Days** field, and **20** in the **Warn After (Days)** field, and the password is created on November 1. On November 21, the user will be informed that the password will expire on December 1. This field accepts values from 0 to 999.

On the Policy Rules tab of the Password Policies form, you can configure either a complex password or custom password policy. If you select the **Complex Password** option, you cannot use the Custom Password option setup and passwords will be evaluated against the complex password criteria that you enter on the Policy Rules tab.

The remaining fields in the Policy Rules tab are discussed in the following sections:

- Complex Password
- Custom Policy

Complex Password

The following are the complex password criteria:

- The password is at least six characters long. This password length overrides the **Minimum Length** field if the value entered in the **Minimum Length** field is less than 6. For example, if you enter 2 in the **Minimum Length** field, at least six characters will be required for the password because it must have at least six characters according to the complex password criteria.
- The password must contain characters from at least three of the following five categories:
  - English uppercase characters (A - Z)
  - English lowercase characters (a - z)
  - Base 10 digits (0 - 9)
  - Non-alphanumeric characters (for example: !, $, #, or %)
  - Unicode characters
- The password must not contain the user's first name, last name, or user ID when their length is greater than 2.

  The names are parsed for delimiters: commas, periods, dashes or hyphens, underscores, spaces, pound signs, and tabs. If any of these delimiters are found, then the names are split and all sections are verified not to be included in the password. For example, if the user name is john-d, then d will not be checked in

the password because its length is less than 2. Similarly, if the name is John Richard Doe, then the password cannot contain john, richard, or doe.

When checking against the user's full name, characters such as commas, periods, dashes or hyphens, underscores, spaces, pound signs, and tabs are treated as delimiters that separate the name into individual character sets. Each character set that has three or more characters is searched in the password. If the character set is present in the password, the password change is rejected. For example, the name `John Richard-Doe` is split into three character sets: `John`, `Richard`, and `Doe`. This user cannot have a password that consists of three continuous characters from either `John` or `Richard` or `Doe` anywhere in the password. However, the password can contain the substring `d-D` because the hyphen (-) is treated as the delimiter between the substrings `Richard` and `Doe`. In addition, the search for character sets in the password is not case-sensitive.

Note: If the user's full name is less than three characters in length, the password is not checked against it because the rate at which passwords will be rejected is too high.

Custom Policy

If you select the **Custom Policy** option, you can set a custom password policy by using the fields listed in Table 14–2.

Table 14–2 Fields of the Policy Rules Tab for Setting Custom Password Policy

Field Name	Description
Maximum Length	The maximum number of characters that a password can contain. For example, if you enter **8** in the **Maximum Length** field, a password is not accepted if it has more than eight characters. This field accepts values from 1 to 999.
Maximum Repeated Characters	The maximum number of times a character can be repeated in a password. For example, if you enter **2** in the **Maximum Repeated Characters** field, a password is not accepted if any character is repeated more than two times. For example, `RL112211` would not be a valid password because the character `1` is repeated three times. **Note:** In this example, there are four occurrences of the character `1`, which means that it is repeated three times. This field accepts values from 1 to 999.
Minimum Numeric Characters	The minimum number of digits that a password must contain. For example, if you enter **1** in the **Minimum Numeric Characters** field, a password must contain at least one digit. This field accepts values from 0 to 999.
Minimum Alphanumeric Characters	The minimum number of letters or digits that a password must contain. For example, if you enter **6** in the **Minimum Alphanumeric Characters** field, a password must contain at least six letters or numbers. This field accepts values from 0 to 999.

Table 14–2 (Cont.) Fields of the Policy Rules Tab for Setting Custom Password Policy

Field Name	Description
Minimum Unique Characters	The minimum number of nonrepeating characters that a password must contain. For example, if you enter **1** in the **Minimum Unique Characters** field, a password is accepted if at least one character in the password is not repeated. For example, `1a23321` would be a valid password because the character `a` in the password is not repeated although the remaining characters are repeated. This field accepts values from 0 to 999.
Minimum Alphabet Characters	The minimum number of letters that a password must contain. For example, if you enter **2** in the **Minimum Alphabet Characters** field, the password is not accepted if it has less than two letters. This field accepts values from 0 to 999.
Special Characters: Minimum	The minimum number of non-alphanumeric characters (for example, #, %, or &) that a password must contain. For example, if you enter **1** in the **Special Characters: Minimum** field, a password must have at least one non-alphanumeric character. This field accepts values from 0 to 999.
Special Characters: Maximum	The maximum number of non-alphanumeric characters that a password can contain. For example, if you enter **3** in the **Special Characters: Maximum** field, a password is not accepted if it contains more than three non-alphanumeric characters. This field accepts values from 1 to 999.
Minimum Uppercase Characters	The minimum number of uppercase letters that a password must contain. For example, if you enter **8** in the **Uppercase Characters: Minimum** field, a password is not accepted if it contains less than eight uppercase letters. This field accepts values from 0 to 999.
Minimum Lowercase Characters	The minimum number of lowercase letters that a password must contain. For example, if you enter **8** in the **Minimum Lowercase Characters** field, a password is not accepted if it has less than eight lowercase letters. This field accepts values from 0 to 999.
Unicode Characters: Minimum	The minimum number of Unicode characters that a password must contain. For example, if you enter **3** in the **Unicode Characters: Minimum** field, the password is not accepted if it has less than three Unicode characters. This field accepts values from 0 to 999.
Unicode Characters: Maximum	The maximum number of Unicode characters that a password can contain. For example, if you enter **8** in the **Unicode Characters: Maximum** field, a password is not accepted if it has more than eight Unicode characters. This field accepts values from 1 to 999.

Table 14–2 (Cont.) Fields of the Policy Rules Tab for Setting Custom Password Policy

Field Name	Description
Characters Required	The characters that a password must contain. For example, if you enter **x** in the **Characters Required** field, a password is accepted only if it contains the character x. The character you specify in the **Characters Required** field, must be mentioned in the **Characters Allowed** field. If you enter a character in the Characters Required field that is not mentioned in the Characters Allowed field, then an error is displayed stating that the required characters must be in the list of allowed characters, and required characters must not be in the list of not allowed characters. In addition, if you specify more than one character, then do not provide delimiters. Commas and white spaces are also considered as characters in this field. For example, if you specify characters such as a,x,c, then the password is not accepted unless it contains comma.
Characters Not Allowed	The characters that a password must not contain. For example, if you enter an exclamation point (**!**) in the **Characters Not Allowed** field, a password is not accepted if it contains an exclamation point.
Characters Allowed	The characters that a password can contain. For example, if you enter the percent sign (*%)* in the **Characters Allowed** field, a password is accepted if it contains a percent sign, given that all other criteria are met. **Note:** If any character is used in the password and that character is not in the Characters Allowed field, then the password will be rejected. For example, if the Characters Allowed field has "abc" and the password is "dad", then the password is rejected because "d" is not in the Characters Allowed field. If you specify the same character in the **Characters Allowed** and **Characters Not Allowed** fields, an error message is returned when you create the password policy.
Substrings Not Allowed	A series of consecutive alphanumeric characters that a password must not contain. For example, if you enter **IBM** in the **Substrings Not Allowed** field, a password is not accepted if it contains the letters I, B, and M, in successive order.
Start With Alphabet	Whether or not the password must begin with a letter. For example, if you select this option, then the password 123welcome is not accepted because the password does not begin with a letter. However, if you do not select this option, then the password can begin with a letter, numeric digit, or special character.
Disallow User ID	This check box specifies if the user ID will be accepted as the whole password or as part of the password. When this check box is selected, a password will not be valid if the user ID is entered in the **Password** field. In addition, the password is not valid if the user ID occurs as a part of the password specified in the Password field. If you deselect this check box, the password will be accepted, even if it contains the user ID.

Table 14–2 (Cont.) Fields of the Policy Rules Tab for Setting Custom Password Policy

Field Name	Description
Disallow First Name	This check box specifies if the user's first name will be accepted as the whole password or as part of the password. When this check box is selected, a password will not be valid if the user's first name is entered in the **Password** field. In addition, the password is not valid is the first name is entered as a part of the password. If you deselect this check box, the password will be accepted, even if it contains the user's first name.
Disallow Last Name	This check box specifies if the user's last name will be accepted as the whole password or as part of the password. When this check box is selected, a password will not be valid if the user's last name is entered in the **Password** field. In addition, the password is not valid is the last name is entered as a part of the password. If you deselect this check box, the password is accepted, even if it contains the user's last name.
Password File	The path and name of a file that contains predefined terms, which are not allowed as passwords. The file must be stored on the same host on which Oracle Identity Manager is deployed. **Note:** The settings on the Policy Rules tab get precedence over the specifications in the password file. For example, a disallowed term of the password file is used in the policy when no disallowed term is specified in the Policy Rules tab.
Password File Delimiter	The delimiter character used to separate terms in the password file. For example, if a comma (,) is entered in the Password File Delimiter field, the terms in the password file will be separated by commas. **Note:** There are no escape characters defined to be used in password policies.

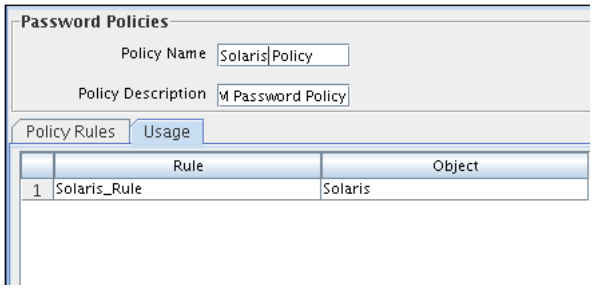
You can attach a process form with one of the Password fields to a resource. A password entered for a resource is validated against the password policy associated with that resource.

14.1.2 The Usage Tab

You use this tab to view the rules and resource objects that are associated with the current password policy.

Figure 14–2 shows the **Usage** tab of the Password Policies form. In this example rules are being defined for the **Solaris** password policy.

Figure 14–2 Usage Tab of the Password Policies Form



See Also: "Password Policies Rule Tab" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for more information about the relationship between password policies and resource objects

14.2 Setting the Criteria for a Password Policy

You can attach a process form with one of the Password fields to a resource. A password entered for a resource is validated against the password policy associated with that resource.

To set the criteria for a password policy:

1. Open the required password policy definition.
2. Click the **Policy Rules** tab.
3. Either enter information into the appropriate fields, or select the required check boxes.
4. Click **Save**.

15

Managing Identity and Resource Information

This chapter describes managing users in Oracle Identity Manager Design Console. It contains the following sections:

15.1 Overview of User Management

The User Management folder provides tools to create and manage information about a company's organizations, users, roles, and resources.

This folder contains the following forms:

- **Organizational Defaults**: Use this form to view records that reflect the internal structure of your organization and to designate information related to these entities.
- **Policy History**: Use this form to view user records that your employees require.
- **Roles**: Use this form to view records for roles, called user groups in earlier releases of Oracle Identity Manager, to whom you can assign some common functionality.

15.2 Managing Organization Information

The Organizational Defaults form is in the User Management folder. You use this form to view records that reflect the structure of your organization and to enter and modify information related to organizational entities. An organization record contains information about an organizational unit, for example, a company, department, or branch.

A suborganization is an organization that is a member of another organization, for example, a department in a company. The organization that the suborganization belongs to is referred to as a parent organization.

You use the Organizational Defaults tab to specify default values for parameters on the custom process form for resources that can be provisioned for the current organization. Each process form is associated with a resource object that is allowed for the organization, or with a resource that has the Allow All option on the associated Resource Objects form selected.

The values that you provide on the Organizational Defaults tab become the default values for all users in the organization. Oracle recommends that you do not specify default values for passwords and encrypted parameters.

Figure 15–1 shows the Organizational Defaults form.

Figure 15–1 Organizational Default Form

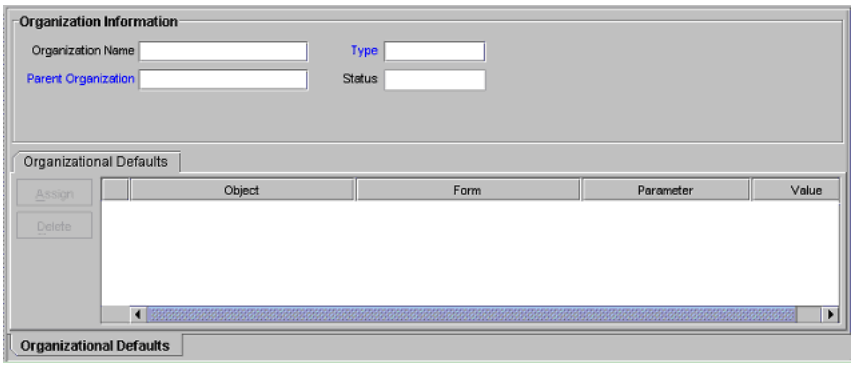


Table 15–1 describes the fields of the Organizational Default form.

Table 15–1 Fields of the Organizational Defaults Form

Field Name	Description
Organization Name	Name of the organization.
Type	The classification type of the organization, for example, Company, Department, Branch.
Status	The current status of the organization (Active, Disabled, or Deleted).
Parent Organization	The organization to which this organization belongs. If a parent organization is displayed in this field, this organization is displayed on the Sub Organizations tab for the parent organization. If this field is empty, this organization is a top-level organization.

15.3 Viewing Resources Allowed or Disallowed for Users

You use the Policy History form to view information about the resources that are allowed or disallowed for a user.

There are two types of users in Oracle Identity Manager:

- **End-user administrators**: This user can access Oracle Identity Manager Design Console and the Oracle Identity Manager Administrative and User Console. The system administrator sets permissions to enable end-user administrators to access a subset of the forms in Oracle Identity Manager Design Console.
- **End-users**: This user can access only the Oracle Identity Manager Administrative and User Console and generally has fewer permissions than end-user administrators. Only resource objects that are defined as self-service on the Objects Allowed tab of the user's organization are available for provisioning requests by using the Oracle Identity Manager Administrative and User Console.

Table 15–2 shows this form.

Figure 15–2 Policy History Form

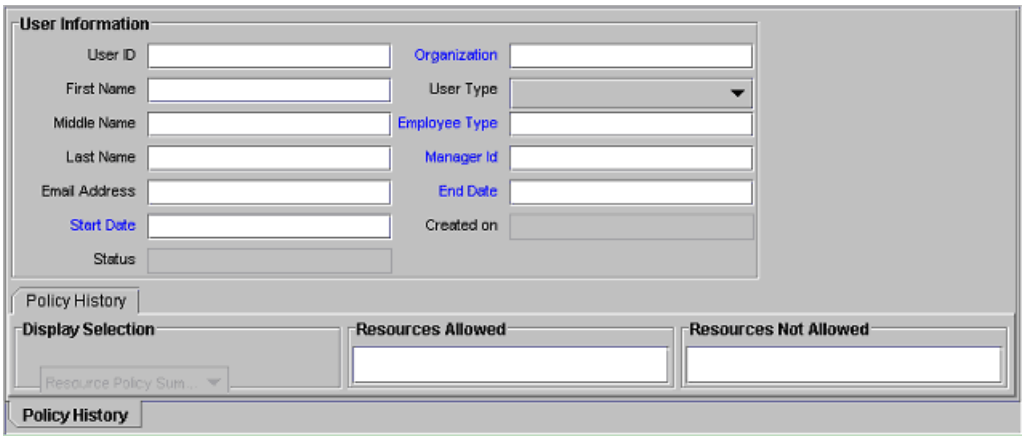


Table 15–2 describes the fields of the Policy History form.

Table 15–2 Fields of the Policy History Form

Field Name	Description
User ID	The user's Oracle Identity Manager login ID.
First Name	The user's first name.
Middle Name	The user's middle name.
Last Name	The user's last name.
Email Address	The user's e-mail address.
Start Date	The date on which the user's account will be activated.
Status	The current status of the user (Active, Disabled, or Deleted).
Organization	The organization to which the user belongs.
User Type	The user's classification status. Valid options are End-User and End-User Administrator. Only end-user administrators have access to Oracle Identity Manager Design Console.
Employee Type	The employment status of the user at the parent organization (for example, full-time, part-time, intern, and so on).
Manager ID	The user's manager.
End Date	The date on which the user's account will be deactivated.
Created on	The date and time when the user record was created.

15.3.1 Policy History Tab

Use this tab to view resource objects that are allowed or disallowed for a user, based on the following:

- Access policies for the user group to which the user belongs
- Resource objects that are allowed by the organization to which the user belongs

The Policy History tab contains a Display Selection region. To organize the contents of this tab, go to the uppermost box in this region and select an item from one of its menus, as follows:

- **Resource Policy Summary**: Displays resource objects that are allowed or disallowed based on the user's organization and applicable access policies.

- **Not Allowed by Org**: Displays only resource objects that are disallowed, based on the user's organization.
- **Resources by Policy**: Displays a second box that contains the access policies for the user groups to which the user is a member.

  Select an access policy from this box to display the resource objects that are allowed or disallowed for the user, based on this access policy.

A tracking system enables you to view resources that are allowed or disallowed for a user, based on the organizations the user is a member of and the access policies that apply to the user.

The resource objects that are allowed for the user are displayed in the Resources Allowed list. This list represents resource objects that can be provisioned for the user. It does not represent the resource objects that are provisioned for the user.

The resource objects that are disallowed for the user are displayed in the Resources Not Allowed list.

To view the tracking system:

1. Go to the Policy History tab.
2. Find the Display Selection region on this tab.
3. Click **Policy History**.

From the User Policy Profile History window, you can view resources that are allowed or disallowed for a user for the date and time you selected, as follows:

- From the **History Date** box, you can select a date.
- From the **Display Type** box, you can display resources that are allowed or disallowed based on the organizations the user is a member of, the access policies that apply to the user, or both.
- From the **Policy** box, you can display the access policy that determines what resource objects are allowed or disallowed for the user.

15.4 Assigning Role Entitlements

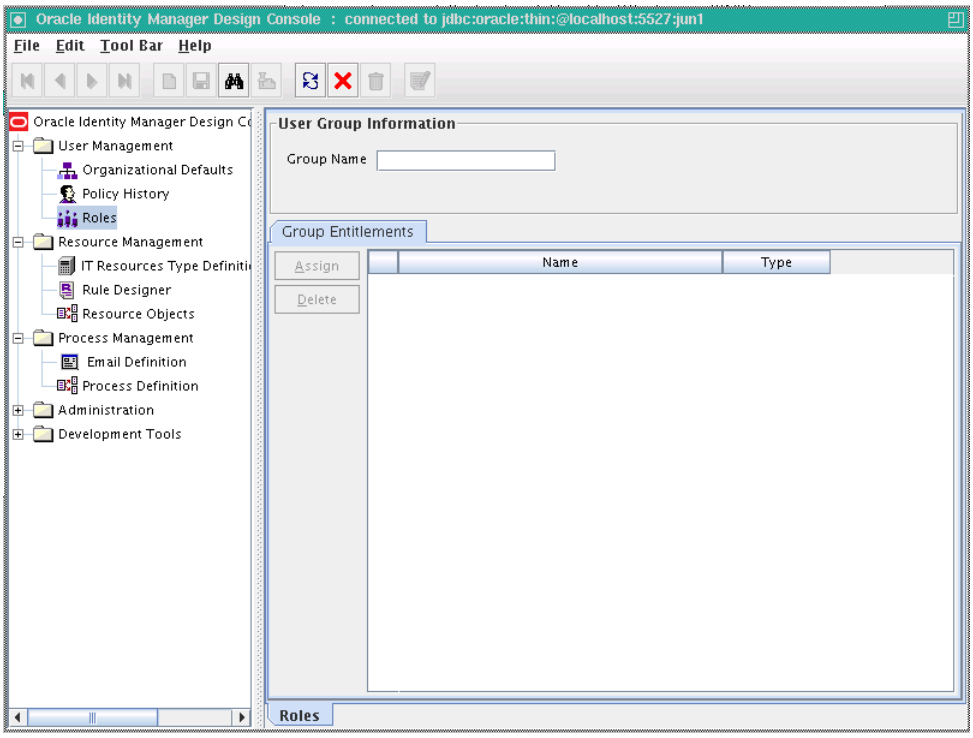
The Group Entitlements form is displayed in the User Management folder. You use it to create and move forms, and to designate the forms and folders that members of a role can access through the Explorer.

To designate forms and folders to roles by using the Group Entitlements form:

1. In the Explorer, double-click **Group Entitlements**.

   The User Group Information page is displayed, as shown in Figure 15–3:

Figure 15–3 Roles Form



2. In the **Group Name** field, enter the name of the role.
3. Click **Assign**.

   The User Form Assignment lookup table is displayed.
4. From the lookup table, select the user form for this role.

   Use the arrow buttons to either add or delete from the **Assigned Forms** list.
5. Click **OK**.

   The newly added user forms are listed in a Group Entitlements table. The Group Entitlements Table displays all available roles. This table shows the name of the user form and the type. In the Group Entitlements table, there are two types, javaform and folder. A **javaform** is a Java-based, graphical interface. A **folder** is a container of one or many javaforms.

> **See Also:** "Default Roles" for information about pre-existing roles in Oracle Identity Manager

16

Managing Asynchronous Execution

This chapter describes the AsyncService provided by the Oracle Identity and Access Management (IAM) platform and contains the following topics:

- Section 16.1, "Overview of AsyncService"
- Section 16.2, "Async Routing and Configuration"
- Section 16.3, "Troubleshooting Failed Async Tasks"
- Section 16.4, "Working with the Diagnostic Dashboard UI"

16.1 Overview of AsyncService

The AsyncService is one of the services provided by the IAM platform to run tasks asynchronously. Tasks are executed asynchronously to improve performance and throughput.

Some Identity Management operations take a long time to complete. So, it makes sense to split these operations into two parts, a short synchronous interaction followed by a long asynchronous process. The user is provided a response at the end of the synchronous interaction, and the remaining operation is performed asynchronously.

The AsyncService allows the Oracle Identity Manager component to submit tasks for asynchronous execution. The caller then performs other tasks. It is the responsibility of the AsyncService to execute this task whenever the computing resources are available.

16.2 Async Routing and Configuration

The AsyncService uses a configuration file, *async-messaging.xml*, to route and configure Async tasks. This configuration file is stored in the MetaData Store (MDS) schema in Oracle Identity Manager database. The MDS path of the file is /file/async-messaging.xml.

Example 16–1 shows a snippet of the configuration file.

Example 16–1 Sample Configuration File

```
<tns:async-config>
<task-config>
<class>oracle.iam.reconciliation.impl.ActionTask</class>
<destination>queue/oimReconQueue</destination>
</task-config>
<task-config>
<class>com.thortech.xl.schedule.jms.messagetype.AttestationTaskMessage</class>
<destination>queue/oimAttestationQueue</destination>
<priority>NORMAL</priority>
```

```
<maxRetries>2</maxRetries>
</task-config>
<task-config>
<class>com.thortech.xl.schedule.jms.messagetype.AttestationRequestMessage</class>
<destination>queue/oimAttestationQueue</destination>
<priority>HIGH</priority>
</task-config>
<default-config>
<destination>queue/oimDefaultQueue</destination>
<maxRetries>3</maxRetries>
</default-config>
</tns:async-config>
```

To modify the configuration file, import it by using the MDS import utility, make changes in the file, and then export the modified file by using the MDS export utility. For more information about the MDS utilities, see "MDS Utilities and User Modifiable Metadata Files" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager*.

16.2.1 Configuration Parameters

The System Administrators can configure the following parameters in the configuration file for Async tasks:

- **Destination:** You can assign high-volume tasks to their own dedicated queues. For instance, in Example 16–1, all the Async tasks are assigned to the same destination queue `attestationQueue`. You can decide where to send each massage by creating separate destination queues for each Async task.

  Note: You must ensure that the queue exists in the Application Server before assigning a task to it. For information about creating queues, see *Oracle Fusion Middleware Configuring and Managing JMS for Oracle WebLogic Server*.

- **Priority:** You can set a priority when multiple types of Async tasks are assigned to the same destination queue. Its value can be one of the following:
  - NORMAL
  - HIGH
  - LOW
- **Max Retries:** Async task execution error recovery is handled in two ways, automated and manual. The automated retry mechanism uses a scheduled task to retry all failed tasks at specific intervals. Max Retries parameter allows the System Administrator to specify the maximum number of times a task can be retried in the event of an execution failure. See "Troubleshooting Failed Async Tasks" on page 16-2 for detailed information about error handling and recovery mechanisms.

16.3 Troubleshooting Failed Async Tasks

Errors may occur during execution of tasks or messages. The Async task execution error recovery is a combination of automated retries and manual intervention. If a task encounters an error during task execution, then it is added to a `FailedTasks` table and the System Administrator is notified. See "Automated Retry Error Handling

Mechanism" on page 16-3 and "Manual Retry Error Handling Mechanism" on page 16-3 for detailed information about error handling mechanisms.

16.3.1 Automated Retry Error Handling Mechanism

A scheduled task is provided to automate retries of failed tasks at periodic intervals. The maximum number of times a task is retried by the scheduled task can be configured by using the max-retries property of the async task, as shown in Example 16–2.

Example 16–2 Configuring Max Retries

```
<async-task>
    <class>oracle.iam.reconciliation.impl.ActionTask</class>
    <destination>reconQueue</destination>
    <max-retries>2</max-retries>
</async-task>
```

16.3.2 Manual Retry Error Handling Mechanism

The System Administrator can use the Oracle Identity Manager Diagnostic Dashboard User Interface (UI) to view the failed tasks and retry a task after taking the appropriate remedial action. See "Working with the Diagnostic Dashboard UI" on page 16-3 for more information on Oracle Identity Manager Diagnostic Dashboard UI.

16.4 Working with the Diagnostic Dashboard UI

The Diagnostic Dashboard provides a UI for the System Administrator to view and retry failed Async tasks. This section contains the following topics:

- Starting the Diagnostic Dashboard UI
- Viewing Failed Async Tasks
- Retrying Failed Async Tasks
- Resubmitting Failed Async Tasks
- Purging Failed Async Tasks

> **See Also:** Chapter 20, "Working with the Diagnostic Dashboard" for information about installing and enabling the Diagnostic Dashboard

16.4.1 Starting the Diagnostic Dashboard UI

To start the Diagnostic Dashboard UI:

1. Access the Diagnostic Dashboard home page by using the following URL:

   `http://host:port/XIMDD`

2. Click the **Manage Failed Tasks** link on the left menu pane.
3. Enter the user name and password. The Manage Failed Tasks page is displayed.

> **Note:** You need System Administrator privileges to access the Diagnostic Dashboard UI.

16.4.2 Viewing Failed Async Tasks

The System Administrator can view the details of each failed task, for instance the cause for the task to fail and the remedial action to be undertaken.

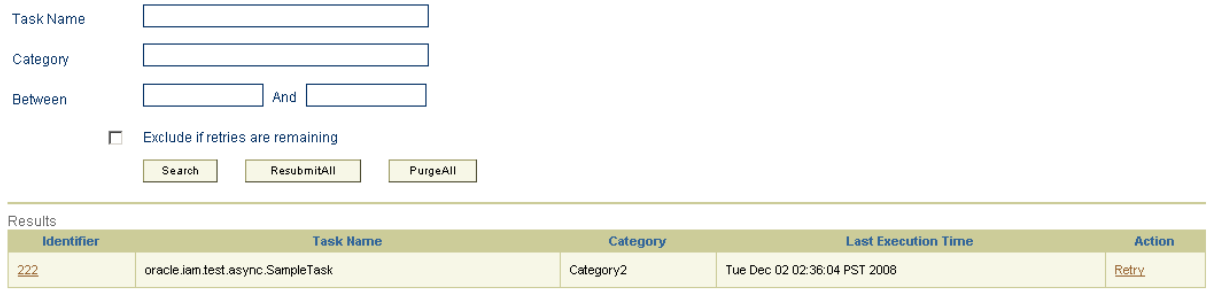
The user can view the details of the failed tasks by either providing the filter criteria or by clicking the **Search** button.

16.4.2.1 To view failed async tasks

1. Log in to the Diagnostic Dashboard main page. See "Starting the Diagnostic Dashboard UI" on page 16-3 for more information.
2. Perform one of the following to view a list of failed tasks.
   - Click **Search** to view a list of all the failed tasks.
   - Search for the failed task based on the following filter criteria.
     - **Task Name:** Type the name of the failed task.
     - **Category:** Type the category of the failed task.
     - **Between:** Specify the date range.
     - Select the **Exclude if retries are remaining** option if you do not want to view the tasks for which automated retries are still pending.

     Click **Search** after providing the filter criteria. The list of failed async tasks are displayed, as shown in Figure 16–1:

Figure 16–1 Failed Async Tasks



3. Click the Identifier link to view detailed information about the failed task. In this scenario, click `222`. The following information is displayed:
   - Task Name
   - Instance ID
   - Category
   - Last Execution Time
   - Cause
   - Action
   - Stack Trace

16.4.3 Retrying Failed Async Tasks

The System Administrator can retry a specific failed task directly from the Diagnostic Dashboard UI and then view the results of the retry.

16.4.3.1 To retry failed Async task

1. Search for the failed task that you want to retry. See "To view failed async tasks" on page 16-4 for more information.
2. Click the **Retry** link. The retry status for the task is displayed. The following details are provided.
   - Retry Status
   - Task Summary
   - Stack Trace
   - Cause
   - Resolution

16.4.4 Resubmitting Failed Async Tasks

All the failed tasks are resubmitted to the Async queue. These are later executed asynchronously.

To resubmit failed tasks, click **ResubmitAll**.

16.4.5 Purging Failed Async Tasks

There are situations when there are numerous failed Async tasks. The System Administrator might feel that there is no use retrying these tasks. In such a scenario, the failed tasks can be purged. The action purge removes all the failed Async tasks from the database. In other words, there no more tasks to retry.

16.4.5.1 To purge failed Async tasks

1. Search for the failed task that you want to retry. See "To view failed async tasks" on page 16-4 for more information.
2. Click **PurgeAll**.

17

Enabling Offline Provisioning

In online provisioning, multiple provisioning operations are performed in sequence. For example, if you create a request to allocate (provision) five resources to five OIM User, then the system:

- Treats the provisioning of one resource to one user as a provisioning operation
- Processes provisioning operations in sequence, one after the other

This chapter contains the following sections:

Note: You might not need to enable offlining in Oracle Identity Manager 11*g* architecture, depending on your work flow. This feature may be obsolete in future.

17.1 Features of Offline Processing

The following are features of offline provisioning:

- The offline provisioning approach is applied only during Provision (Create Target System Account) Resource, Enable Resource, Disable Resource, and Revoke Resource operations. The offline provisioning approach is not applied in a provisioning operation that involves modification of an allocated (provisioned) resource.
- Offline provisioning is not applied during organization provisioning.
- You enable offline provisioning at the resource object level. The procedure is described later in this chapter.
- JMS messages generated during offline provisioning are processed in parallel. Processing of each JMS message is treated as a single transaction, and it is asynchronous and independent of other JMS messages. This approach provides better performance over the online provisioning approach in which provisioning operations are processed in sequence.
- When you view the resource details for a resource instance of an OIM User, you can view the "Provisioning in Queue", "Enable in Queue", "Disable in Queue" and "Revoke in Queue" statuses for Provision, Enable, Disable, and Revoke operations respectively if provisioning for a particular resource has not yet been processed.

- The final status of the resource instance is the same as the status for online provisioning. For example, if a message for a resource is processed successfully, then the Provisioned status is displayed. The same status is displayed for online provisioning.
- In offline provisioning, details of failed messages are stored in the Off-line Persistent Store (OPS) table. You can view these details by running the Off-line Resource Provisioning Messages report. See "Reports Related to Offline Provisioning" for information about this report.

17.2 Enabling and Disabling Offline Provisioning

As mentioned earlier, you enable offline provisioning at the resource object level. Off-line provisioning is applicable only when the Auto Save Form option is already selected in the Process Definition form.

To enable offline provisioning:

1. Log in to Oracle Identity Manager Design Console.
2. Expand **Resource Management**, and double-click **Resource Objects**.
3. Search for and open the resource object for which you want to enable offline provisioning.
4. On the Resource Object form, select **Off-line Provisioning**. This enables off-line provisioning for enable, disable, and revoke resource operations.

   When the Off-line Provisioning option is not selected, the specific resource provisioning, enable, disable, and revoke operations occur online.
5. Click the Save icon.

To disable offline provisioning:

1. Log in to Oracle Identity Manager Design Console.
2. Expand **Resource Management**, and double-click **Resource Objects**.
3. Search for and open the resource object for which you want to enable offline provisioning.
4. On the Resource Object form, deselect the **Off-line Provisioning** check box.
5. Click the Save icon.

17.3 Reports Related to Offline Provisioning

When an online provision, enable, disable, or revoke operation fails, the error messages and other information about the operation are displayed on the UI. The Offline Resource Provisioning Messages report in Oracle BI Publisher stores all the error messages.

17.4 Configuring the Remove Failed Off-line Messages Scheduled Task

Configure the Remove Failed Off-line Messages scheduled task to schedule deletion of failed provisioning operations from the OPS table. While configuring this scheduled task, set a value for the Remove Failed Messages Older Than (days) attribute.

See Chapter 2, "Managing Scheduled Tasks" for information about working with scheduled tasks.

18

Using Enterprise Manager for Managing Oracle Identity Manager Configuration

Oracle Identity Manager stores the configuration files in MDS. Most of the configurations are exposed as MBeans. Therefore, you can control the configuration values by using Enterprise Manager. In some instances, might have to export the complete files to file system, make the necessary changes, and then import the files back into the repository, as described in the following sections:

18.1 Using MBeans for Configuration Changes

To change configuration settings by using Mbeans:

1. When the administrative server and at least one Oracle Identity Manager managed server is running, login to Oracle Enterprise Manager Fusion Middleware Control by using the URL in the following format:

   http://*ADMINSTRATION_SERVER*:*PORT*/em

2. Navigate to Identity and **Access**, **oim**. Right-click and navigate to **System MBean Browser**.

3. Under Application Defined MBeans, navigate to **oracle.iam**, **Application:oim**, **XMLConfig**, **Config**.

   All the configuration files are in this location.

18.2 Exporting and Importing Configuration Files

To export or import configuration files:

> **See Also:** "MDS Utilities and User Modifiable Metadata Files" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about the list of configuration files that can be exported and imported

1. When the administrative server and at least one Oracle Identity Manager managed server is running, login to Oracle Enterprise Manager Fusion Middleware Control by using the URL in the following format:

   http://*ADMINSTRATION_SERVER*:*PORT*/em

2. Navigate to Identity and **Access**, **oim**. Right-click and navigate to **System MBean Browser**.
3. Under Application Defined MBeans, navigate to **oracle.mds.lcm**, **Server:oim_server1**, **Application:oim**, **MDSAppRuntime**.
4. To export the configuration files:
   a. Click the **Operations** tab, and then click **exportMetaData**.
   b. In the toLocation field, enter `/tmp` or the name of another directory.
   c. Select createSubDir as **false**.
   d. In the docs field, enter the complete file location as the Element.
   e. Also select **false** for excludeAllCust, excludeBaseDocs, and excludeExtendedMetadata. Then, click **Invoke**.

      This exports the file specified in the docs field to the directory specified in the toLocation field.
5. To import the configuration files:
   a. Click **importMetaData**.
   b. In the fromLocation field, enter `/tmp` or the name of the directory in which you have the configuration files.
   c. Select createSubDir as **false**.
   d. In the docs field, enter the complete file location as the Element. For example, /db/oim-config.xml.
   e. Also select **false** for excludeAllCust, excludeBaseDocs, and excludeExtendedMetadata. Then, click **Invoke**.

      This imports the file specified in the docs field to MDS in the toLocation field.

19

Setting the Language for Users

In Oracle Identity Manager 11*g* Release 1 (11.1.1), the language preference of the user for the UI is not set according to the locale specified by the user in the Preferences section of the Self Service. However, this locale preference is used to determine the language of notification messages.

The logic to determine the UI locale gives precedence to other ways a locale can be specified, such as through Fusion Apps or Oracle Access Manager (OAM) login page, before using the browser locale.

The oracle.fusion.appsMode system property is used internally and is automatically set when the environment is with fusion Apps. Based on this property's value, the appropriate attribute within a cookie called ORA_FUSION_PREFS (set and used internally), is used to determine the locale.

To determine the UI locale for a user, the following logic is used internally:

1. Check if the oracle.fusion.appsMode system property is available.
2. If the oracle.fusion.appsMode system property is not available or the value is set to false, then preferredLanguage attribute is checked. The value of this attribute is the UI locale for the user. The preferredLanguage attribute is checked inside the ORA_FUSION_PREFS cookie.
3. If the oracle.fusion.appsMode system property is available and the value is set to true, then the locale attribute is checked inside the ORA_FUSION_PREFS cookie. The value of this attribute is the UI locale for the user.

   Note: The ORA_FUSION_PREFS cookie is internal to Oracle Identity Manager.

4. If the ORA_FUSION_PREFS cookie is not present, then check the browser language setting. The UI locale for the user is same as the browser language setting.

   Note: If none of the above can provide a locale value, then check the server setting.

Part IV

Administrative Utilities

This part describes a number of additional features for Oracle Identity Manager administrators.

It contains the following chapters:

20

Working with the Diagnostic Dashboard

This chapter describes the Diagnostic Dashboard utility shipped with Oracle Identity Manager and contains the following topics:

20.1 Overview of the Diagnostic Dashboard

Diagnostic Dashboard is a stand-alone application that helps you validate some of the Oracle Identity Manager prerequisites and installation.

You must have the appropriate system administrator permissions for your Application Server and Oracle Identity Manager environments to use this tool. You need DBA-level permissions to execute some database-related tests.

Note: The Diagnostic Dashboard and Oracle Identity Manager must be installed on the same application server.

20.2 Installing the Diagnostic Dashboard

The Diagnostic Dashboard utility is distributed on the installation CD-ROM with the Oracle Identity Manager Installer. It is available as a EAR file in the `Diagnostic Dashboard` directory on the CD-ROM.

20.2.1 Installing the Diagnostic Dashboard on Oracle WebLogic Server

This section discusses the steps you need to perform to install the Diagnostic Dashboard on Oracle WebLogic Server.

To install the Diagnostic Dashboard on Oracle WebLogic Server:

1. Log in to Oracle WebLogic Administration Console.
2. In the left navigation pane, click **Deployments**. It lists all the applications deployed on the server.
3. Click **Install**.

4. Navigate to the location for deploying the EAR file. Typically, the EAR file is located in the following directory:

   OIM_ORACLE_HOME/server/webapp/optional/

5. Select **XIMDD.ear** from the **Current Location** panel.
6. Click **Next** on the **Choose targeting style** page.
7. Select **OimServer** (Oracle Identity Manager Server) from the **Available targets for XIMDD** panel, and click **Next**.
8. Click **Finish**. The following message appears:

   ```
   All changes have been activated. No restarts are necessary.
   The deployment has been successfully installed.
   ```

   You can access the Diagnostic Dashboard from the following location:

   ```
   http://OIM_server_host_ip:port/XIMDD
   ```

20.3 Starting the Diagnostic Dashboard

After the Diagnostic Dashboard is deployed, you can access it by using a URL of the following format:

http://*OIM_HOST:OIM_PORT*/XIMDD

Log into Diagnostic Dashboard with administrator privileges. Click the **Diagnostic Dashboard** link on the left menu pane to display the Diagnostic Dashboard main page.

The Diagnostic Dashboard utility indicates on which application server the tool is deployed.

20.4 Using the Diagnostic Dashboard

The Diagnostic Dashboard main page includes the sections listed in the following table:

Section	Description
Application Server	Displays the name of the application server
Oracle Identity Manager Installation	Displays installation details such as product version, build number, host, and location of the product
Test Details	Displays the test name and its description
Test Parameters	Displays the parameters required for testing

To run a test:

1. Select the test by selecting the option on the Diagnostic Dashboard main page.
2. Enter the required parameters.
3. Click **Verify** to see the result.

   The Diagnostic Dashboard Test Result page is displayed with the status information listed in the following table.

Test Result	Description
Result Summary	Shows all the selected tests with icons (pass or fail) indicating the result. The test name is a Web link that allows the user to jump to the result details directly.
Test Name	Displays the name of the test
Description	Displays the description of the test
Input Parameters	Displays the parameters of the test
Result	Displays the outcome of the test
Details	Displays details about the outcome of the test

4. Click **Diagnostic Dashboard** on the left menu pane or **Return to Diagnostic Dashboard** to return to the previous test page.

20.5 Running Tests By Using the Diagnostic Dashboard

The following tests are available for different application servers.

- Oracle Database Prerequisites Check
- Database Connectivity Check
- Account Lock Status
- Data Encryption Key Verification
- Scheduler Service Status
- Remote Manager Status
- JMS Messaging Verification
- Target System SSL Trust Verification
- Java VM System Properties Report
- Oracle Identity Manager Libraries and Extensions Version Report
- Oracle Identity Manager Libraries and Extensions Manifest Report
- Test Basic Connectivity
- Test Provisioning
- Test Reconciliation
- SOA-Oracle Identity Manager Configuration Check
- Request Diagnostic Information
- Orchestration Status
- Retry Failed Orchestration
- SPML Web Service
- Test OWSM Setup
- Test SPML to Oracle Identity Manager Request Invocation
- SPML Attributes to Oracle Identity Manager Attributes
- Username Test
- Diagnose Creation of User and Role in Oracle Identity Manager and LDAP

- Diagnose OVD Connection
- Diagnose LDAP Reserve Container

20.5.1 Oracle Database Prerequisites Check

Prerequisite: The following are the prerequisites for running this test:

Prerequisite	Description
Database Server	Enter the location of the database server.
Port	Enter the port number.
Database Name	Enter the database name (SID).
Oracle Identity Manager Database User Name	Enter the Oracle Identity Manager database user name.
System User Name	Enter the system user name.
System User Password	Enter system user password.

Description: Checks if the specified Oracle Database instance meets the prerequisites for Oracle Identity Manager installation. This test requires SYSTEM permissions.

Result: It displays the following information:

- Necessary permissions for user
- XA support enabled
- JVM enabled
- Oracle version Information

20.5.2 Database Connectivity Check

Prerequisite: None

Description: Run this test to verify whether or not Oracle Identity Manager is able to connect to the database. This test verifies the direct database connection and the J2EE data sources (XA).

Result: It displays the following information:

- Direct database connectivity
- XA execution

20.5.3 Account Lock Status

Prerequisite: The following is the prerequisite for verifying this test:

Prerequisite	Description
User Login	Enter the user name.

Description: Oracle Identity Manager locks an account when there are successive multiple invalid login attempts. This test checks whether or not a specified account is locked.

Result: Checks for locked or unlocked accounts in the database.

20.5.4 Data Encryption Key Verification

Prerequisite: None

Description: The data encryption key in an Oracle Identity Manager installation should be the same as the one used to encrypt the data in the Oracle Identity Manager database. This may not be the case when an Oracle Identity Manager installation is pointed to a database schema created for a different Oracle Identity Manager installation. This can also happen when a database dump from one Oracle Identity Manager installation is imported for a different Oracle Identity Manager installation without copying the corresponding key.

Result: Checks if the database key is present in the Oracle Identity Manager configuration directory.

20.5.5 Scheduler Service Status

Prerequisite: None

Description: Checks the status of the Oracle Identity Manager Scheduler Service running on the server.

Result: Displays the status of the scheduler service.

20.5.6 Remote Manager Status

Prerequisite: None

Description: Reports the status of the Remote Managers that this Oracle Identity Manager installation is set to work with.

Result: Displays the status of the Remote Manager.

20.5.7 JMS Messaging Verification

Prerequisite: None

Description: The purpose of this test is to verify that Oracle Identity Manager will be able to submit a JMS message and process it.

Result: Displays if Oracle Identity Manager is able to submit and process a JMS message.

20.5.8 Target System SSL Trust Verification

Prerequisite: The following are the prerequisites for running this test:

Prerequisite	Description
Target System	Enter the host name.
Port	Enter the port number.
Certificate Store Location	Enter the location for storage.
Certificate Store Password	Enter the password for storage.

Description: Oracle Identity Manager must be set up to trust the target system certificates if the connectivity is over Secure Sockets Layer (SSL). Enter the host name and the port where a target system is listening for SSL connections.

Result: It displays the following information:

- Valid and invalid host and port address
- Trusted certificates

20.5.9 Java VM System Properties Report

Prerequisite: None

Description: Displays all the Java VM system properties.

Result: Displays all the Java VM system properties.

20.5.10 Oracle Identity Manager Libraries and Extensions Version Report

Prerequisite: None

Description: Reports all the versions of the Oracle Identity Manager libraries and extensions.

Result: Displays the versions of the Oracle Identity Manager libraries and extensions.

20.5.11 Oracle Identity Manager Libraries and Extensions Manifest Report

Prerequisite: None

Description: Reports the manifest information of the Oracle Identity Manager libraries and extensions.

Result: Displays the manifest information of the Oracle Identity Manager libraries and extensions.

20.5.12 Test Basic Connectivity

Prerequisite: The following are the prerequisites for running this test:

Prerequisite	Description
IT Resource Type Name	Enter the IT resource type.
IT Resource Instance Name	Enter the IT resource name.

Description: Tests the connection to the target system by using the IT resource for the target system.

> **Note:** If the specified IT resource type was created when you deployed a predefined connector, then see the Oracle Identity Manager Connector Pack release notes and documentation to determine whether or not this test can be applied for the release of the connector that you deployed.

Result: Displays the results of the connectivity test. If the test fails, then the cause of the error is also displayed.

20.5.13 Test Provisioning

Prerequisite: The following are the prerequisites for running this test:

Prerequisite	Description
IT Resource Type Name	Enter the IT resource type.
IT Resource Instance Name	Enter the IT resource name.

Description: Performs a basic Create User operation on the target system.

> **Note:** If the specified IT resource type was created when you deployed a predefined connector, then see the Oracle Identity Manager Connector Pack release notes and documentation to determine whether or not this test can be applied for the release of the connector that you deployed.

Result: Displays the results of the provisioning test. Test data created on the target system during the test is deleted at the end of the test.

20.5.14 Test Reconciliation

Prerequisite: The following are the prerequisites for running this test:

Prerequisite	Description
IT Resource Type Name	Enter the IT resource type.
IT Resource Instance Name	Enter the IT resource name.

Description: Performs a basic reconciliation operation on the target system.

> **Note:** If the specified IT resource type was created when you deployed a predefined connector, then see the Oracle Identity Manager Connector Pack release notes and documentation to determine whether or not this test can be applied for the release of the connector that you deployed.

Result: Displays the results of the reconciliation test. Test data reconciled into Oracle Identity Manager during the test is deleted at the end of the test.

20.5.15 SOA-Oracle Identity Manager Configuration Check

Prerequisite: None

Description: Checks whether the details provided for SOA-wiring are valid or not.

Result: Displays the status for the following tests:

1. Validation for SOA connection with Oracle Identity Manager and authentication of user in SOA
2. Authentication and search of Oracle Identity Manager DB user

20.5.16 Request Diagnostic Information

Prerequisite: The following is the prerequisite for running this test:

Prerequisite	Description
Request ID	Enter the ID of the request for which diagnostic information is required

Description: Provides the orchestration ID and the composite details for the given request ID.

Result: Displays the following information:

1. Orchestration process ID associated with the given request ID.
2. Composite details of the request along with details of approval and process task.

20.5.17 Orchestration Status

Prerequisite: The following are the prerequisites for running this test:

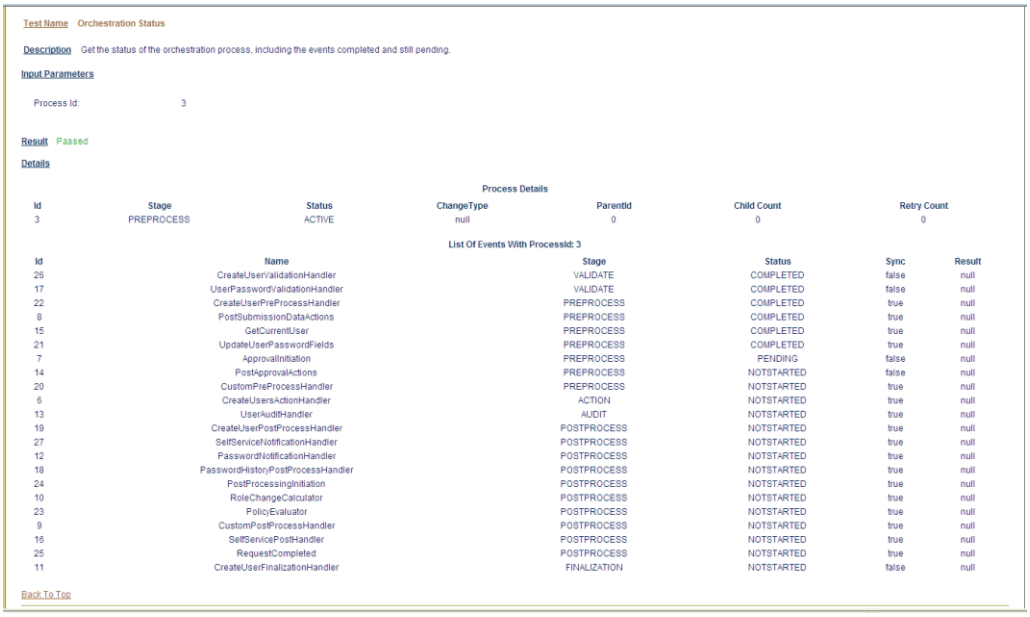
Prerequisite	Description
Process Id	Enter the Id of the orchestration process.

Description: Provides the status of the orchestration process in the Oracle Identity Manager Kernel. It also provides details and status about all the event handlers involved in that process.

Result: Displays the status of the orchestration process as Failed, Completed, or Active.

Figure 20–1 displays the status of the orchestration process, including the events completed and still pending.

Figure 20–1 Sample Output for Orchestration Status Test



Test Name Orchestration Status

Description Get the status of the orchestration process, including the events completed and still pending.

Input Parameters

Process Id: 3

Result Passed

Details

Process Details

Id	Stage	Status	ChangeType	ParentId	Child Count	Retry Count
3	PREPROCESS	ACTIVE	null	0	0	0

List Of Events With ProcessId: 3

Id	Name	Stage	Status	Sync	Result
26	CreateUserValidationHandler	VALIDATE	COMPLETED	false	null
17	UserPasswordValidationHandler	VALIDATE	COMPLETED	false	null
22	CreateUserPreProcessHandler	PREPROCESS	COMPLETED	true	null
8	PostSubmissionDataActions	PREPROCESS	COMPLETED	true	null
15	GetCurrentUser	PREPROCESS	COMPLETED	true	null
21	UpdateUserPasswordFields	PREPROCESS	COMPLETED	true	null
7	ApprovalInitiation	PREPROCESS	PENDING	false	null
14	PostApprovalActions	PREPROCESS	NOTSTARTED	false	null
20	CustomPreProcessHandler	PREPROCESS	NOTSTARTED	true	null
6	CreateUsersActionHandler	ACTION	NOTSTARTED	true	null
13	UserAuditHandler	AUDIT	NOTSTARTED	true	null
19	CreateUserPostProcessHandler	POSTPROCESS	NOTSTARTED	true	null
27	SelfServiceNotificationHandler	POSTPROCESS	NOTSTARTED	true	null
12	PasswordNotificationHandler	POSTPROCESS	NOTSTARTED	true	null
18	PasswordHistoryPostProcessHandler	POSTPROCESS	NOTSTARTED	true	null
24	PostProcessingInitiation	POSTPROCESS	NOTSTARTED	true	null
10	RoleChangeCalculator	POSTPROCESS	NOTSTARTED	true	null
23	PolicyEvaluator	POSTPROCESS	NOTSTARTED	true	null
9	CustomPostProcessHandler	POSTPROCESS	NOTSTARTED	true	null
16	SelfServicePostHandler	POSTPROCESS	NOTSTARTED	true	null
25	RequestCompleted	POSTPROCESS	NOTSTARTED	true	null
11	CreateUserFinalizationHandler	FINALIZATION	NOTSTARTED	false	null

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20.5.18 Retry Failed Orchestration

Prerequisite: The following are the prerequisites for running this test:

Prerequisite	Description
Process Id	Enter the Id of the orchestration process.

Description: Obtains the response that indicates how to handle the failure for the given orchestration process.

Result: Displays the orchestration process in failed state and continues to retry based on the response.

20.5.19 SPML Web Service

Prerequisite: None

Description: Verifies that SPML WSDL is accessible and the Web service is up and running.

Result: Displays the contents of SPML WSDL file.

20.5.20 Test OWSM Setup

Prerequisite: The following are the prerequisites for running this test:

Prerequisites	Description
SPML User Name	Enter user name to be used to run SPML request.
SPML User Password	Enter user password.

Description: Verifies OWSM setup by submitting a request with OWSM header information. This also ensures a valid response is returned by submitting a request with OWSM header set.

Result: Displays the targets supported by the SPML web-service.

20.5.21 Test SPML to Oracle Identity Manager Request Invocation

Prerequisite: The following are the prerequisites for running this test:

Prerequisites	Description
SPML User Name	Enter user name to be used to run SPML request.
SPML User Password	Enter user password.

Description: SPML WS to Oracle Identity Manager is a signature-based login, This test ensures if this is working, by simulating a Oracle Identity Manager request.

Result: Displays whether signature-based login is working fine.

20.5.22 SPML Attributes to Oracle Identity Manager Attributes

Prerequisite: None

Description: Lists all the mapping of SPML attributes to Oracle Identity Manager attributes which helps the administrator to check if the set up is correct.

Result: Displays a table showing the SPML to Oracle Identity Manager attributes mappings:

SPML Attribute Name	Oracle Identity Manager Attribute Name
Number Format	Number Format
localityName	Locality Name
countryName	Country
manager	User Manager
facsimileTelephoneNumber	Fax
generationQualifier	Generation Qualifier
street	Street
state	State
surname	Last Name
Embedded Help	Embedded Help
Territory	FA Territory
organizationUnit	LDAP Organization Unit
givenName	First Name

20.5.23 Username Test

Prerequisite: None

Description: Lists the existing username generation policy defined in Oracle Identity Manager

Result: Displays the policy name.

20.5.24 Diagnose Creation of User and Role in Oracle Identity Manager and LDAP

Prerequisite: The following are the prerequisites for running this test:

Prerequisites	Description
SPML User Name	Enter user name to be used to run SPML request.
SPML User Password	Enter user password.

Description: Verifies the user creation and role creation are working fine in LDAP and Oracle Identity Manager individually.

Result: Displays the status specifying whether user and role creation was successful in Oracle Identity Manager and LDAP.

20.5.25 Diagnose OVD Connection

Prerequisite: None

Description: Verifies if Oracle Identity Manager is able to connect to the OVD.

Result: Displays whether Oracle Identity Manager was successful to connect to the OVD.

20.5.26 Diagnose LDAP Reserve Container

Prerequisite: None

Description: Oracle Identity Manager configuration file has the tree structure of reserve container. This test validates that the reserve container was created during the setup.

Result: Displays whether reserve container is created properly.

21

Installing and Configuring a Remote Manager

This chapter describes how to configure the remote manager in the following topics:

21.1 Overview of the Remote Manager Configuration

While performing provisioning or reconciliation actions, Oracle Identity Manager must communicate with the target to perform the business operations. To do so, Oracle Identity Manager uses the target APIs to directly communicate with the target during provisioning and reconciliation. However, Oracle Identity Manager cannot directly communicate with the target in some instances, such as:

- The target is behind a firewall, and the target communication port is not exposed.
- The target does not provide APIs that can be invoked over the network.
- The target APIs cannot be invoked over a secure connection.

In these instances, instead of directly communicating with the target system, Oracle Identity Manager must use an Oracle Identity Manager component that acts like a proxy. This component is known as remote manager.

The remote manager is used for:

- Invoking non-remotable target APIs through Oracle Identity Manager
- Invoking target APIs that do not support SSL over secure channel

21.2 Configuring the Remote Manager

Remote manager configuration consists of the following steps:

1. Install the remote manager. See *Oracle Fusion Middleware Installation Guide for Oracle Identity Management* for information about installing the remote manager.
2. Establish trust relationship with remote manager and Oracle Identity Manager. See "Adding the Trust Relation" on page 21-2 and "Configuring the Remote Manager by Using Your Own Certificate" on page 21-3 for details.

3. Test the remote manager. See "Testing the Remote Manager Connection" on page 21-5 for details.

This section contains the following topics:

21.2.1 Adding the Trust Relation

The remote manager and Oracle Identity Manager communicate by using SSL. You must enable a trust relationship between Oracle Identity Manager and the remote manager.

Oracle Identity Manager must trust the remote manager certificate. To achieve this, you must import the remote manager certificate into the Oracle Identity Manager keystore and set it up as a trusted certificate.

If required, you can also enable client-side authentication in which the remote manager trusts the server certificate. For client-side authentication, import the certificate for Oracle Identity Manager into the remote manager keystore and set it up as a trusted certificate.

You might have to manually edit the configuration file (xlconfig.xml) associated with Oracle Identity Manager and the remote manager.

Perform the following steps to ensure that the trust relation between the application server and the remote manager is established through the certificate. The keytool utility is used to import/export the certificates.

1. Using a command prompt, navigate to the *XLREMOTE_HOME* directory and use the keytool utility to list the certificate fingerprints.
2. Enter the following command:

```
$JAVA_HOME/jre/bin/keytool -list -keystore ./config/default-keystore.jks
```

Note: The Oracle Identity Manager keystore is called default-keystore.jks. In Oracle Identity Manager, it is located in the $*DOMAIN_HOME*/config/fmwconfig/ directory.

For the remote manager, the keystore is located in the $*XLREMOTE_HOME*/config/ directory. The keystore name is default-keystore.jks.

On running the keytool command shown in this step, you will be prompted to enter the default password for the keystore. When you enter the keystore password, the entries in the keystore along with their certificate fingerprints (MD5 hashes) are displayed, as follows:

```
Enter the default password for xellerate keystore: KEYSTORE_PASSWORD
Your keystore contains 1 entry
xell, Jan 7, 2005, keyEntry,
Certificate fingerprint (MD5):
B0:F2:33:C8:69:E4:25:A3:CB:59:E8:51:27:EE:5C:52
```

The certificate fingerprint is marked in bold. This is used to uniquely identify the certificate in the keystore.

3. To establish a trust relationship between Oracle Identity Manager and the remote manager:

   a. Copy the remote manager certificate to the server computer. On the remote manager computer, locate the *XLREMOTE_HOME*/xlremote/config/xlserver.cert file, and copy it to the server computer.

   b. Open a command prompt on the server computer.

   c. To import the certificate by using the keytool utility, use the following command:

      ```
      $JAVA_HOME\jre\bin\keytool -import -alias rm_trusted_cert -file
      RM_CERT_LOCATION\xlserver.cert -trustcacerts -keystore
      $DOMAIN_HOME\config\fmwconfig\default-keystore.jks -storepass
      KEYSTORE_PASSWORD
      ```

      JAVA_HOME is the location of the Java directory for the application server, the value of alias is the name for the certificate in the store, and *RM_CERT_LOCATION* is the location in which you copied the certificate.

   d. Enter **Y** at the prompt to trust the certificate.

   e. On to the remote manager computer, in a text editor, open the $*XLREMOTE_HOME/xlremote*/config/xlconfig.xml file.

   f. Locate the <RMIOverSSL> property and ensure that the value is set to true, for example:

      ```
      <RMIOverSSL>true</RMIOverSSL>
      ```

   g. Locate the <KeyManagerFactory> property. If you are using the IBM JRE, then set the value to IBMX509. For example:

      ```
      <KeyManagerFactory>IBMX509</KeyManagerFactory>
      ```

      For all other JREs, set the value to SUNX509. For example:

      ```
      <KeyManagerFactory>SUNX509</KeyManagerFactory>
      ```

   h. Save the file.

      Note: The server certificate in *OIM_HOME* is also named xlserver.cert. Ensure that you do not overwrite that certificate.

   i. Restart Oracle Identity Manager.

21.2.2 Configuring the Remote Manager by Using Your Own Certificate

When the remote manager is installed, the installer generates a keypair and certificate with some default parameters, such as key password, certificate expiration time, and CN. However, you might need to change some of the parameters because of business security requirements. As a result, you need to generate and use a keypair and certificate, instead of the default certificates that are installed.

To configure the remote manager by using your own certificate on the remote manager server:

Note: Perform the procedure given in this section only if you want to use your own certificate instead of the default Oracle Identity Manager certificates. Otherwise, skip this section.

1. Generate a new custom keystore and certificate. To do so, use the keytool utility, as shown in the following example:

   ```
   keytool-genkeypair -keystore test.jks -alias rmcert -storepass welcome1 -keyalg
   DSA -keysize 1024 -dname "CN=TestUser, OU=fmw, O=Oracle, C=US" -keypass
   PASSWORD -validity 3650
   ```

   Note the password that you use for the new keystore.

2. Copy the new keystore to the $*XLREMOTE_HOME*/config/ directory.
3. In a text editor, open the $*REMOTE_MANAGER*/config/xlconfig.xml file.
4. Locate the <RMSecurity> tag and change the value in the <Location> and <Password> tags as follows:

   - If you are using the IBM JRE, then change the values to:

     ```
     <KeyStore>
     <Location>new_keystore_name</Location>
     <Password encrypted="false">new_keystore_pwd</Password>
     <Type>JKS</Type>
     <Provider>com.ibm.crypto.provider.IBMJCE</Provider>
     </KeyStore>
     ```

   - For all other JREs, change the values to:

     ```
     <KeyStore>
     <Location>new_keystore_name</Location>
     <Password encrypted="false">new_keystore_pwd</Password>
     <Type>JKS</Type>
     <Provider>sun.security.provider.Sun</Provider>
     </KeyStore>
     ```

5. Restart the remote manager server, and reopen the xlconfig.xml file to ensure that the password for the new keystore is encrypted.

To configure the remote manager by using your own certificate on Oracle Identity Manager:

1. Export the certificate from the newly created keystore on the remote manager computer, as shown in the following example:

   ```
   keytool-export -keystore test.jks -storepass welcome1 -alias rmcert -file
   test.cer
   ```

2. Copy the new certificate file to the *$DOMAIN_HOME*/config/fmwconfig/ directory.
3. Import certificate into default-keystore.jks, as shown in the following example:

   ```
   keytool-import -keystore test.jks -storepass welcome1 -alias test_alias -file
   test.cer -trustcacerts
   ```

4. Check if the connection between remote manager and Oracle Identity Manager is established, as described in "Testing the Remote Manager Connection" on page 21-5.

21.2.3 Testing the Remote Manager Connection

To test if the connection between remote manager and Oracle Identity Manager is established:

1. Login to the Design Console.
2. Open the Remote Manager form. This form displays the following:
   - The names and IP addresses of the remote managers that communicate with Oracle Identity Manager
   - Whether or not the remote managers are running
   - Whether or not the remote managers represent IT resources that Oracle Identity Manager can use

     See Also: "Remote Manager Form" in the *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about the Remote Manager form
3. Verify if the check boxes in the Running and IT Resource columns are selected for the remote manager service that you configured. This ensures that the remote manager is running and it represents an IT resource that Oracle Identity Manager can use.

21.2.4 Updating the xlconfig.xml File to Change the Port for Remote Manager

Changing the port for the remote manager is not required at the time of configuring the remote manager. This is required if you need to change ports while using the product.

To update the xlconfig.xml file and start the remote manager on a new port as opposed to what was set during installation:

1. In a text editor, open the $*XLREMOTE_HOME*/xlremote/config/xlconfig.xml file.
2. Edit the following tags and change the port number:
   - ListenPortunder RMSecurity for remote manager SSL Listen port
   - RMIRegistryPort under RMSecurity for RMI Registry
3. Restart the remote manager. See "Stopping and Starting the Remote Manager" on page 21-5 for details.

21.3 Stopping and Starting the Remote Manager

To stop remote manager, navigate to the console from which the remote manager was started, and press CTRL+C. The remote manager is a command-line application, which will stop on this signal.

To start the remote manager, run the following script:

For UNIX:

$XLREMOTE_HOME/xlremote/remotemanager.sh

For Microsoft Windows:

$XLREMOTE_HOME\xlremote\remotemanager.bat

21.4 Troubleshooting Remote Manager

Table 21–1 lists the troubleshooting steps that you can perform if you encounter problems with the remote manager:

Table 21–1 Troubleshooting Remote Manager

Problem	Solution
You encounter certificate trust issues.	Ensure that the remote manager certificate is trusted on the Oracle Identity Manager side.
	Ensure that the remote manager certificate has not expired.
	Ensure that the remote manager port is correctly configured on the Oracle Identity Manager host. In other words, ensure that the port configured on the Oracle Identity Manager host must be the same port in the remote manager configuration.
	Ensure that the remote manager configuration, such as keystore location, alias, password, and key password, in the xlconfig.xml file and Oracle Identity Manager host configuration in the oim-config.xml file are correct.
	Ensure that the correct server certificate is trusted on the remote manager if client-auth is set.
After ensuring all the conditions to resolve certificate trust issues, failure occurs while communicating between the remote manager and Oracle Identity Manager.	Restart Oracle Identity Manager and remote manager by passing the following flag: `-Djavax.net.debug={all|ssl}` This flag, when turned on stores all the information related to the SSL/TLS handshake in the logs. Here, all turns on all debugging, and ssl turns on SSL debugging. **Note:** Use this flag only for debugging purpose. When turned on, it dumps a huge amount of information in the logs.
The remote manager connection fails.	Ensure that there is no firewall between Oracle Identity Manager and remote manager that is blocking tcp traffic on the specific port. To do this, telnet from the Oracle Identity Manager host to the remote manager host on the remote manager port.
Provisioning through the remote manager fails.	Ensure that the adapter JAR files (which are usually located in the $*OIM_HOME*/JavaTasks/ directory or in the database) are copied on the remote manager host in the JavaTasks/ directory.
	Ensure that the remote manager-based adapters have a Remote Task to invoke target APIs, as opposed to regular adapters, which can just use Java Task to do the same.
	Ensure that the remote manager-based connectors: - Define a remote manager IT resource. - Set the remote manager IT resource on the remote manager field on the regular IT resource, which contains the connectivity information of the target

22

Using the Form Version Control Utility

Process forms and child forms are used to hold account data of OIM Users. You can upgrade a form by adding, modifying, or removing fields on the form. For example, as part of an upgrade operation, you might add the Hire Date field and remove the Country of Origin field from a form. In addition, fields might be moved from the parent form to the child form. The Oracle Identity Manager Form Version Control (FVC) Utility facilitates the management of form data changes after a form upgrade operation.

The FVC Utility is a command-line utility that works directly on the Oracle Identity Manager database. When you install the Oracle Identity Manager Design Console, the utility is present in the *OIM_DC_HOME* directory. You use a properties file to specify the form data updates that the utility must perform.

The utility supports field mapping and data updates on a provisioning process form and its associated child forms.

Note: The FVC Utility *cannot* perform the following functions:

- Manage data updates on object forms
- Move rows across forms

In addition, you *need not* run the FVC Utility if there are no form-related changes from one release to the next release.

This chapter contains the following sections:

22.1 Use Cases Supported by the FVC Utility

In a single run, the FVC Utility can be used to manage form data updates corresponding to the following form changes:

See Also: "Summary of the Form Version Control Process" on page 22-2 provides information about the validation performed by the utility before it starts processing form data.

- A field on the parent form is renamed.
- A field on the child form is renamed.
- A field is moved from the parent form to a child form.
- A field is moved from the parent form to a parent form.
- A field is moved from a child form to the parent form. This scenario is supported only if the child form contains a single record.
- A field is moved from a child form to another child form of the same parent form. This scenario is supported only if the source child form contains a single record.
- A field is moved from one child form to another child form of the same parent form. This scenario is supported only if the child form contains a single record.
- A field is moved from a child form to the parent form and also the data type of the moved field is changed from Lookup Field or Combo Box type to Check Box type in parent form.
- In any of the above use cases, the data type of the field in parent form is changed from Lookup Field or Combo Box type to Check Box type.
- In any of the above use cases, the case of a field name is changed. For example, the field name is changed from `MyField` to `myfield`.
- The data type of a field is changed from Lookup Field or Combo Box type to Check Box type, without any other change being made to the form.
- For a particular OIM User, the utility proceeds with updating account data only if the status of the user's record in the USR table is not `Deleted`.

  For an OIM User whose status in the USR table is not `Deleted`, the utility updates account data in a UD_ table only if the status of the account is not `Revoked`.

22.2 Use Cases That Are Not Supported by the FVC Utility

The FVC Utility cannot be used to update form data in the following scenarios:

- Fields are modified across multiple process (parent) forms.
- A field is mapped to multiple fields on the same form.
- A field is mapped to multiple fields on different child forms.
- The data type of a field is changed from any type *other than* the Lookup Field or Combo Box type.
- The data type of a field is changed from Lookup Field or Combo Box type to any type *other than* a Check Box type.
- Multiple fields are combined into a single field.

22.3 Summary of the Form Version Control Process

The following steps take place during each run of the FVC Utility:

1. The properties file holds information about the data conversion actions to be performed by the FVC Utility. The utility reads the contents of this properties file.

2. The utility checks the object status of the record in the USR table. The next step depends on the status of the record:
   - If the user's record is in the Deleted state, then the utility moves on to the next user's record.
   - If the user's record is *not* in the Deleted state, then the utility checks the status of the account records in the connector-specific (UD_) tables for that user. For each account record, the next step depends on the status of the account record:
     - If the account record is in the Revoked state, then the utility moves on to the next account record for that user.
     - If the account record is *not* in the Revoked state, then the utility performs the updates specified in the properties file.
3. For a particular account record, the utility first updates the version of the record and then updates the data as specified in the properties file.

Note: If an error is encountered, then an error message is displayed in the command window. After you fix the cause of the error and rerun the utility, records that have been updated before the error was encountered are not processed again.

22.4 Components of the FVC Utility

The following are components of the FVC Utility:

Note: When you install the Design Console, these files are copied into the *OIM_DC_HOME* directory.

- Properties file: You use a file with the `".properties"` extension to provide details of the process form, child forms, and resource object on which you want to run the utility. The fvc.properties file is provided as a sample. If a new properties file is used, then the name of the file must be changed in fvcutil.sh or fvcutil.cmd.
- xlFvcUtil.jar: This JAR file contains the utility classes required to run the FVC Utility.
- fvcutil.sh and fvcutil.cmd: You use this script to run the utility.

22.5 Using the FVC Utility

The following sections describe the procedure to use the FVC Utility:

- Preparing the Properties File
- Addressing Prerequisites for Using the FVC Utility
- Running the Utility

22.5.1 Preparing the Properties File

As mentioned earlier in this chapter, you use a properties file to define the data conversion actions that you want the FVC Utility to perform. Whether you must create or update the properties file depends on the upgrade scenario:

- If you are upgrading from a predefined release to a predefined release of a connector, then look for a properties file in the connector deployment package.
- If you are upgrading from a custom release *or* upgrading to a custom release, then you must add the required entries in the properties file.
- If you are upgrading from a custom release to a predefined release of a connector, then see if the connector guide provides information about changes to the process form and child forms of the connector. You can use this information to determine the entries that you must add in the properties file.

The following are sample entries for the properties file:

```
ResourceObject;OID User
FormName;UD_OID_USR
FromVersion;8
ToVersion;9
Parent;UD_OID_USR_DEFTVAL;ABC
Child;UD_OID_GRP_NORMALFIELD;XYZ;Update
ParentChild;UD_OID_USR_FNAME;UD_OID_GRP_NORMALFIELD
ChildChild;UD_OID_GRP_GROUP_NAME;UD_OID_GRP_NORMALFIELD
ChildParent;UD_OID_GRP_NORMALFIELD;UD_OID_USR_LNAME
ParentParent;UD_OID_USR_FNAME;UD_OID_USR_LOGIN;
ParentParentLookupOrComboToCheckBox;UD_OID_USR_PREF_LANG;UD_OID_USR_CHKBOXTEST
ChildParentLookupOrComboToCheckBox;UD_OID_GRP_GROUP_NAME;UD_OID_USR_CHKBOXTEST
ChildDiffChild;UD_OID_GRP_NORMALFIELD;UD_OID_ROLE_DIFFFIELD
```

Apply the following guidelines while adding or modifying entries in the properties file:

> **Note:** See the sample entries listed earlier to get a better understanding of the guidelines.

- In the properties file, each line consists of the use case name, followed by old field name and the new field name. Each of these are separated by semicolon.

  For Example consider following entry in properties file:

  ```
  ParentChild;UD_OID_USR_FNAME;UD_OID_GRP_NORMALFIELD
  ```

  ParentChild: represents that the fields of the parent have been renamed/moved to be in the new child form

  UD_OID_USR_FNAME: represents the old field name in parent form

  UD_OID_GRP_NORMALFIELD: represents the new name of the field to be upgraded in the new form.

  > **Note:** There can be spaces in the value as long as a space does not appear immediately after the semicolon.

- You must include the following lines in the properties file:

  > **Note:** The location and order of these 4 lines in the properties file does not matter.

  - `ResourceObject;`*`RESOURCE_OBJECT_NAME`*

In this line, replace *RESOURCE_OBJECT_NAME* with the name of the resource object.

Sample line:

```
ResourceObject;OID User
```

– `FormName;`*FORM_NAME*

In this line, replace *FORM_NAME* with the name of the process (parent) form.

Sample line:

```
FormName;UD_OID_USR
```

– `FromVersion;`*CURRENT_VERSION_OF_FORM*

In this line, replace *CURRENT_VERSION_OF_FORM* with the current version of the form.

Note: When you run the FVC Utility, only records whose version is the same as *CURRENT_VERSION_OF_FORM* are updated by the utility.

Sample line:

```
FromVersion;8
```

– `ToVersion;`*NEW_VERSION_OF_FORM*

In this line, replace *NEW_VERSION_OF_FORM* with the new version of the form.

Note: If you want to update form data on a form whose version has not changed, then set *NEW_VERSION_OF_FORM* to the same value as *CURRENT_VERSION_OF_FORM*.

Sample line:

```
ToVersion;9
```

- You can include any combination of the following lines in the properties file:

  – `Parent;`*FIELD_NAME;DEFAULT_FIELD_VALUE;*`Update`

  For all records on the parent form, the utility updates the value of the *FIELD_NAME* field with *DEFAULT_FIELD_VALUE*.

  Note: If a mandatory (required) field has been added on the parent form, then you must include this line in the properties file for the mandatory field.

  Sample line:

  Parent;UD_OID_USR_DEFTVAL;MyString;Update

  – `Child;`*FIELD_NAME;DEFAULT_FIELD_VALUE;*`Update`

  For all records on the child form, the utility updates the value of the *FIELD_NAME* field to *DEFAULT_FIELD_VALUE*.

Note: If a mandatory (required) field has been added on the child form, then you must include this line in the properties file.

Sample line:

```
Child;UD_OID_GRP_NORMALFIELD;XYZ;Update
```

- `ParentParent;`*`OLD_FIELD_NAME;NEW_FIELD_NAME`*

  On the parent form, the utility moves data from the *OLD_FIELD_NAME* field to the *NEW_FIELD_NAME* field.

  Sample line:

  ```
  ParentParent;UD_OID_USR_FNAME;UD_OID_USR_DEFTVAL;
  ```

- `ParentParentLookupOrComboToCheckBox;OLD_FIELD_NAME;NEW_FIELD_NAME;`

  On the parent form, for a Lookup Field or Combo Box type field that has been changed to a Check Box type field and also renamed, the utility sets the check box for each record to the selected state if the field value is True (case insensitive). For all other values, the utility sets the check box to the deselected state.

  Sample value:

  ```
  ParentParentLookupOrComboToCheckBox;UD_OID_USR_PREF_LANG;UD_OID_USR_CHKBOXTEST
  ```

- `ChildChild;`*`OLD_FIELD_NAME;NEW_FIELD_NAME`*

  On the child form, the utility copies data from the *OLD_FIELD_NAME* field of the earlier version to the *NEW_FIELD_NAME* field of the new version.

  Sample line:

  ```
  ChildChild;UD_OID_GRP_GROUP_NAME;UD_OID_GRP_NORMALFIELD
  ```

- `ParentChild;`*`OLD_FIELD_NAME;NEW_FIELD_NAME`*

  The *OLD_FIELD_NAME* field was moved from the parent form to the child form and renamed to *NEW_FIELD_NAME*. The utility moves data from the *OLD_FIELD_NAME* field to the *NEW_FIELD_NAME* field.

  Sample line:

  ```
  ParentChild;UD_OID_USR_FNAME;UD_OID_GRP_NORMALFIELD
  ```

- `ChildParent;`*`OLD_FIELD_NAME;NEW_FIELD_NAME`*

  The *OLD_FIELD_NAME* field was moved from the child form to the parent form and renamed to *NEW_FIELD_NAME*. The utility moves data from the *OLD_FIELD_NAME* field to the *NEW_FIELD_NAME* field.

  Sample line:

  ```
  ChildParent;UD_OID_GRP_NORMALFIELD;UD_OID_USR_DEFTVAL
  ```

- `ChildParentLookupOrComboToCheckBox;OLD_FIELD_NAME;NEW_FIELD_NAME`

  From a child form, a Lookup Field or Combo Box type field (*OLD_FIELD_NAME*) has been changed to a Check Box type field and moved to the parent form. On the parent form, the utility sets the check box for each

record to the selected state if the field value is True (case sensitive). For all other values, the utility sets the check box to the deselected state.

Sample line:

```
ChildParentLookupOrComboToCheckBox;UD_OID_GRP_GROUP_NAME;U
D_OID_USR_CHKBOXTEST
```

– `ChildDiffChild;`*`OLD_FIELD_NAME;NEW_FIELD_NAME`*

The utility moves data from the *`OLD_FIELD_NAME`* field on the source child form to the *`NEW_FIELD_NAME`* field on the target child form.

Note: This update is carried out only if the source child form contains a single row. A scenario in which the source child form contains more than one row is not supported.

Sample line:

```
ChildDiffChild;UD_OID_GRP_NORMALFIELD;UD_OID_ROLE_DIFFFIEL
D
```

22.5.2 Addressing Prerequisites for Using the FVC Utility

Before you run the utility:

1. Set the Java home directory path in the FVC Utility script as follows:
   a. Depending on the operating system and application server that you are using, open one of the following files in a text editor:

      fvcutil.sh

      fvcutil.cmd

   b. Search for `set JAVA_HOME`.
   c. Set the Java home directory path as shown in the following example:

      ```
      set JAVA_HOME=C:\Java\
      ```

   d. Save and close the file.
2. Verify that the version of the process (parent) form on which you want to run the utility is the Active version.

   To check if the version of a form is the Active version:

   a. Log in to the Design Console
   b. Expand the **Development Tools** folder, and then double-click **Form Designer**.
   c. Search for and open the form.
   d. Active Version field of the form displays the active version of the form.
3. The utility cannot update a form field if the field is associated with error-handling adapters. If any field is associated with error-handling adapters, then dissociate the adapters as follows:

Note: After you run the utility, you can again set up the association between the field and its error-handling adapters. The procedure is described later in this chapter.

---

a. Log in to the Design Console

b. Expand the **Process Management** folder, and then double-click **Process Definition**.

c. Search for and open the process definition of the connector.

d. Make a note of the name of the task that updates the field.

e. Double-click the task. For example, if the userID field has an error-handling adapter, then double-click the **updateUserID** task.

f. On the Integration tab of the Editing Task dialog box, make a note of the adapter variable names and their descriptions.

g. Click **Remove**.

h. To confirm that you want to remove the event-handler adapter, click **OK** in the message that is displayed.

i. Click **Save**.

22.5.3 Running the Utility

Note: You must execute the FVC utility every time the form version is changed.

Run the following script:

For Unix:

```
sh fvcutil.sh
```

For Windows:

```
fvcutil.bat
```

This will prompt you to enter the following details:

1. Enter Oracle Identity Manager admin username: Enter Oracle Identity Manager administrator username.
2. Enter Oracle Identity Manager admin password: Provide Oracle Identity Manager administrator password.
3. Enter logger level: Enter the logger level. It can be DEBUG, WARN, INFO, or ERROR.
4. Enter logger location: Provide the location and name of the log file that you want the utility to create at the end of each run. For example, <Path name>/FVC.log.

22.6 Troubleshooting

Table 22–1 lists the error messages that you might encounter in the log file and the corresponding actions that you can take to fix the issues:

Table 22–1 Error Messages and Solutions

Error Message	Solution
Could not find objects with name=*OBJECT_NAME*	Check the name of the resource object provided in the properties file. Ensure that it is spelled correctly.
Could not find form with name=*FORM_NAME*	Check the name of the form provided in the properties file. Ensure that it is spelled correctly.
Could not find active version of the form.	A newly created form might not have been committed and set to the Active state. Ensure that the form is in the Active state.
ToVersion value and active version of the form do not match.	Ensure that the ToVersion value is the same as the version of the form that is currently active.
Either ToVersion or FromVersion values are not valid versions.	Ensure that the ToVersion and FromVersion values are correct.
FIELD_NAME field does not exist in the Oracle Identity Manager database.	Ensure that the name of the field is spelled correctly.

23

Using the Archival Utilities

This chapter describes how to use the various archival utilities in the following sections:

- Using the Reconciliation Archival Utility
- Using the Task Archival Utility
- Using the Requests Archival Utility
- Using the Audit Archival and Purge Utility

23.1 Using the Reconciliation Archival Utility

This section describes how to use the Reconciliation Archival utility. It contains the following topics:

- Understanding the Reconciliation Archival Utility
- Prerequisite for Running the Reconciliation Archival Utility
- Archival Criteria
- Running the Reconciliation Archival Utility
- Log File Generated by the Reconciliation Archival Utility

23.1.1 Understanding the Reconciliation Archival Utility

Oracle Identity Manager stores reconciliation data from target systems in Oracle Identity Manager tables called **active reconciliation tables**:

During the reconciliation process, Reconciliation Manager reconciles data in the active reconciliation tables with the Oracle Identity Manager core tables. Because Reconciliation Manager does not remove reconciled data from the active reconciliation tables, they might eventually grow very large, resulting in decreased performance during the reconciliation process. You can use the Reconciliation Archival utility to archive data that has been reconciled with Oracle Identity Manager. The Reconciliation Archival utility stores archived data in the **archive reconciliation tables**, which have the same structure as the active reconciliation tables.

Table 23–1 lists the active reconciliation tables with the corresponding archive reconciliation tables in which data from the active reconciliation tables are archived.

Table 23–1 Active and Archive Reconciliation Tables

Active Reconciliation Tables (Oracle Identity Manager Tables)	Archive Reconciliation Tables
RECON_EVENTS	ARCH_RECON_EVENTS
RECON_JOBS	ARCH_RECON_JOBS
RECON_BATCHES	ARCH_RECON_BATCHES
RECON_EVENT_ASSIGNMENT	ARCH_RECON_EVENT_ASSIGNMENT
RECON_EXCEPTIONS	ARCH_RECON_EXCEPTIONS
RECON_HISTORY	ARCH_RECON_HISTORY
RECON_USER_MATCH	ARCH_RECON_USER_MATCH
RECON_ACCOUNT_MATCH	ARCH_RECON_ACCOUNT_MATCH
RECON_CHILD_MATCH	ARCH_RECON_CHILD_MATCH
RECON_ORG_MATCH	ARCH_RECON_ORG_MATCH
RECON_ROLE_MATCH	ARCH_RECON_ROLE_MATCH
RECON_ROLE_HIERARCHY_MATCH	ARCH_RECON_ROLE_HIER_MATCH
RECON_ROLE_MEMBER_MATCH	ARCH_RECON_ROLE_MEMBER_MATCH
RA_LDAPUSER	ARCH_RA_LDAPUSER
RA_MLS_LDAPUSER	ARCH_RA_MLS_LDAPUSER
RA_LDAPROLE	ARCH_RA_LDAPROLE
RA_MLS_LDAPROLE	ARCH_RA_MLS_LDAPROLE
RA_LDAPROLEMEMBERSHIP	ARCH_RA_LDAPROLEMEMBERSHIP
RA_LDAPROLEHIERARCHY	ARCH_RA_LDAPROLEHIERARCHY
All reconciliation horizontal tables	"ARCH_" + substr(HTnames,1,25)

You can use the Reconciliation Archival utility to perform the following tasks:

- Archive all or specific data from the active reconciliation tables to the archive reconciliation tables
- Delete all data from the active reconciliation tables

When you archive data by moving it from the active reconciliation tables to the archive reconciliation tables, you must specify the date in the YYYYMMDD format, such as all records on or before this date will be archived, and a reconciliation event status parameter value, which defines the data that you want to archive. For information about these archiving criteria, refer to "Archival Criteria" on page 3.

If you choose to archive selective data, then the utility archives reconciliation data based on selected event status that have been created on or before the specified date and event status.

When you archive all data from the active reconciliation tables to the archive reconciliation tables, the Reconciliation Archival utility archives all reconciliation data that have been created on or before the specified date.

The files that constitute the Oracle Database version of the Reconciliation Archival utility are located in the following directory:

OIM_HOME/db/oim/oracle/Utilities/Recon11gArchival

23.1.2 Prerequisite for Running the Reconciliation Archival Utility

Before running the Reconciliation Archival utility, the OIM_RECON_ARCH tablespace must be created in the database. To do so, you can run the following sample command:

```
CREATE TABLESPACE OIM_RECON_ARCH
        LOGGING DATAFILE 'OIM_RECON_ARCH'
        SIZE 500M REUSE AUTOEXTEND ON NEXT 10M;
```

Note:

- You must set *LD_LIBRARY_PATH* to start Oracle utilities such as SQL*Plus in the environment where you want to run Oracle Identity Manager utilities.
- Data that has been archived from the active reconciliation tables to the archive reconciliation tables will no longer be available through Oracle Identity Manager. To access this data, you must query the archive reconciliation tables in your Oracle Identity Manager database.

23.1.3 Archival Criteria

To select reconciliation data to archive, provide the following criteria. Data with matching values will be archived.

- Date must be in the format YYYYMMDD. All records on or before this date that match the specified reconciliation event parameter value will be archived.
- Select Closed, Linked, Closed or Linked, or All for the reconciliation event parameter.
  - Closed describes events that have been manually closed in Reconciliation Manager.
  - Linked describes events that were reconciled in Oracle Identity Manager, including the following states:
    * Creation Succeeded
    * Update Succeeded
    * Delete Succeeded
    * Creation Failed
    * Update Failed
    * Delete Failed
  - Closed or Linked
  - All archives all events regardless of status

23.1.4 Running the Reconciliation Archival Utility

To run the Reconciliation Archival utility:

1. Ensure that the Oracle Identity Manager database is available and that no reconciliation processes are running. In addition, ensure that the Oracle Identity Manager database is not open to transactions for other sessions.

Note: Oracle recommends that you run the Reconciliation Archival utility during off-peak hours.

2. Stop the Oracle Identity Manager by following the instructions in the "Starting and Stopping Servers" chapter.
3. On Microsoft Windows platforms, you must specify the short date format as M/d/yyyy. In addition, you must specify the time format as H:mm:ss. To customize the date and time formats, use the Regional and Language Options command in Control Panel.

   Note:

   - When you change the date and time format, the change is applied to all the applications running on the Microsoft Windows platform.
   - Minimal validation is done on date before calling the utility, and you can scan logs files for any ORA-18xx errors for invalid date-related errors.

4. On Linux or UNIX platforms, run the following commands to set execution permission for the oim_recon_archival.sh file and to ensure that the file is a valid Linux or UNIX text file:

   ```
   chmod 755 path/oim_recon_archival.sh
   dos2unix path/oim_recon_archival.sh
   ```

5. On Linux or UNIX platforms, run the *path*/oim_recon_archival.sh file to run the utility.

   On Microsoft Windows platforms, run the *path*\oim_recon_archival.bat file to run the utility.

6. For Oracle Database installations, enter values for the following parameters when prompted:
   - Oracle home directory
   - Oracle Database name for a remote database, a connection string is required as input, which is of the following format: //HOST_NAME:PORT/SERVICE_NAME
   - Oracle Identity Manager database user name and password
7. Enter the reconciliation creation date in the YYYYMMDD format. All records on or before this date with required status value will be archived.
8. When prompted, select a reconciliation event status for the data that you want to archive:
   - Enter 1 for Closed
   - Enter 2 for Linked
   - Enter 3 for Closed or Linked
   - Enter 4 for All
   - Enter 5 for Exit

9. Enter the batch size for processing.

   The default batch size is 5000.

   Note: Batch size is a value for the number of records to be processed in a single iteration of archival/purge, also as an internal commit at the database level. You must provide the batch size as an input parameter value while starting the operation of Archival Utilities at run time.

   This batch size by default is 5000. When purging greater than few hundred thousand recon_events, a higher batch size can be opted for. This may need more resources from RDBMS, such as more space from the TEMP and UNDO tablespaces.

   The utility archives the reconciliation data and provides an execution summary in a log file.

10. On Microsoft Windows platforms, reset the short date format to the date format for your region or locale after you run the utility. Use the Regional and Language Options command in Control Panel to reset the date format.

11. Because the data from active reconciliation tables are removed, your DBA must analyze the active reconciliation tables and their indexes in order to update the statistics. Perform this step only if you are using Oracle Database as the database for Oracle Identity Manager.

23.1.5 Log File Generated by the Reconciliation Archival Utility

After running the Reconciliation Archival utility, the following log file is generated:

./logs/oim_recon_archival_summary_*TIMESTAMP*.log

If running the utility fails, then the log file records the batch number at which the utility fails along with the error messages.

23.2 Using the Task Archival Utility

This section describes how to use the Task Archival utility. It contains the following topics:

- Understanding the Task Archival Utility
- Preparing Oracle Database for the Task Archival Utility
- Running the Task Archival Utility
- Reviewing the Output Files Generated by the Task Archival Utility

23.2.1 Understanding the Task Archival Utility

In Oracle Identity Manager, a **task** refers to one or more activities that comprise a process, which handles the provisioning of a resource. For example, a process for requesting access to a resource may include multiple provisioning tasks. Oracle Identity Manager stores task data in the following tables, which are called **active task tables**:

- OSI
- OSH

- SCH

By default, Oracle Identity Manager does not remove completed tasks from the active task tables. As the size of the active task tables increases, you might experience a reduction in performance, especially when managing provisioning tasks. After a task executes successfully, you can use the Task Archival utility to archive the task data and remove it from the active task tables. Archiving task data with the Task Archival utility improves performance and ensures that the data is safely stored.

The Task Archival utility stores archived task data in the following **archive task tables**, which have the same structure as the active task tables:

- ARCH_OSI
- ARCH_OSH
- ARCH_SCH

You can use the Task Archival utility to archive the following types of tasks:

- Provisioning tasks for resource instances that have been revoked for disabled or deleted users
- Provisioning tasks for resource instances that have been revoked

When you archive tasks with the Task Archival utility, you can specify the type of archive operation, the user status, the task execution date, and the number of records above which to drop the indexes before archiving. The archive operation represents the type of task data to archive and the user status determines whether to archive data for users who have been deleted, disabled, or both. The task execution date represents the date on which a task is executed and must be in the format YYYYMMDD.

All executed tasks, up to the task execution date you specify, will be archived. To reduce the time that the archiving process takes, the utility drops the indexes on all active task tables when the number of records to be archived is greater than 200000. The indexes are re-created after the archived data is deleted from the active task tables. You can change the value 200000 to your preferred value. You can change the value in the following lines of code in the OIM_TasksArch.bat file or in the OIM_TasksArch.sh file:

In the .bat file, set INDXRESP=200000

In the .sh file, indxopt=200000

The files that constitute the Oracle Database version of the Task Archival utility are located in the following directory:

OIM_HOME/db/oim/oracle/Utilities/TaskArchival

Note: Data that has been archived from the active task tables to the archive task tables will no longer be available through Oracle Identity Manager. To access this data, you must query the archive task tables in your Oracle Identity Manager database.

23.2.2 Preparing Oracle Database for the Task Archival Utility

Before you can use the Task Archival utility with Oracle Database, you must perform the following steps:

1. Start SQL*Plus and connect to Oracle Database as a SYS user.

2. Create a separate tablespace for the archival task tables by entering the following command. Replace *DATA_DIR* with the directory in which you want to store the data file and adjust the size and other parameters as necessary for your environment.

```
CREATE TABLESPACE TasksArch
    DATAFILE 'DATA_DIR\tasksarch_01.dbf' SIZE 1000M REUSE
    EXTENT MANAGEMENT LOCAL SEGMENT SPACE MANAGEMENT AUTO;
```

> **Note:** Oracle recommends that you allocate a large UNDO tablespace when archiving large amounts of data. In addition, turn on parallel execution by configuring the parallel_max_servers and parallel_min_servers initialization parameters. Parallel execution helps improve the performance of the archival process.

3. Connect to Oracle Database as the Oracle Identity Manager database user.
4. Enter the following command to run the cr_taskarchival_ddl_table.sql script, which creates a table named OIM_TASK_ARCH_DDL. This table is used by the Task Archival utility.

```
@ path/cr_taskarchival_ddl_table.sql
```

5. Enter the following command to run the Create_TasksArch_Tables.sql script, which creates the archive task tables:

```
@ path/Create_TasksArch_Tables.sql
```

6. Enter the following command to run the OIM_SP_TASKS_ARCHIVAL.sql script, which creates a stored procedure that the Task Archival utility uses to archive and delete task data:

```
@ path/OIM_SP_TASKS_ARCHIVAL.sql
```

> **Note:** You must set *LD_LIBRARY_PATH* to start Oracle utilities such as SQL*Plus in the environment where you want to run Oracle Identity Manager utilities.

23.2.3 Running the Task Archival Utility

Perform the following steps to run the Task Archival utility:

1. Ensure that the Oracle Identity Manager database is available but it is not open to other Oracle Identity Manager transactions.

> **Note:** Oracle recommends that you run the Task Archival utility during off-peak hours.

2. Ensure that you have created a backup of the OSI, SCH, and OSH tables.
3. Stop Oracle Identity Manager by following the instructions in the Oracle Identity Manager installation guide for your application server.
4. On Microsoft Windows platforms, you must specify the short date format as dddd M/d/yyyy. In addition, you must specify the time format as H:mm:ss. To

customize the date and time formats, select the Regional and Language Options command in the Control Panel.

Note:

- When you change the date and time format, the change is applied to all the applications running on the Microsoft Windows platform
- Minimal validation is done on date before calling the utility, and you can scan logs files for any ORA-18xx errors for invalid date-related errors

---

5. On Linux and UNIX platforms, run the path/OIM_TasksArch.sh file. On Microsoft Windows platforms, run the path`\OIM_TasksArch.bat` file.
6. For Oracle Database installations, enter values for the following parameters when prompted:
   - Oracle home directory
   - Oracle Identity Manager database name or TNS string if the Oracle Identity Manager database is running on a remote computer
   - For a remote database, a connection string is required as input, which is of the following format: //HOST_NAME:PORT/SERVICE_NAME
   - Oracle Identity Manager database user name and password
7. When prompted, select one of the following options:
   - Archive all provisioning tasks on resource instances that have been revoked for disabled or deleted users.
   - Archive all provisioning tasks on resource instances that have been revoked.
   - Exit.
8. If you chose to archive all provisioning tasks for resource instances that have been revoked for disabled or deleted users, select one of the following options:
   - Users at Deleted status
   - Users at Disabled status
   - Users at Deleted and Disabled status
   - Go back to Main Menu
9. Enter a task execution date in the format YYYYMMDD when prompted. All executed tasks, up to the task execution date you specify, will be archived. To archive all tasks that were executed on or before the current date, press **Enter** without entering a date.
10. Summary information is displayed before the utility starts the archival process. The summary information gives you the total number of tasks to be archived. Read the summary information carefully and make sure your database can support the delete volume listed in the summary.

    Enter a value of **y** or **Y** when prompted to archive the tasks. Otherwise, enter a value of **n** or **N** to exit the utility.

Note: You must enter the value of Y or N when prompted. If you press Enter without selecting a value, then the utility again counts the number of tasks to be archived and prompts you without beginning the archive.

11. On Microsoft Windows platforms, reset the short date format to the date format for your region or locale after the Task Archival utility finishes running. Use the Regional and Language Options command in the Control Panel to reset the date format.

Note: You must analyze the active task tables and their indexes for updated statistics, because the data from active task tables is removed. Perform this step only if you are using Oracle Database as the database for Oracle Identity Manager.

23.2.4 Reviewing the Output Files Generated by the Task Archival Utility

Table 23–2 describes the output files that are generated by the Task Archival utility.

Table 23–2 Output Files Generated by the Task Archival Utility

File	Description
`Err_DB_Conn_`*`timestamp`*`.log`	Generated when the utility is unable to connect to the database with the specified credentials
`Err_Arch_Tasks_`*`timestamp`*`.log`	Generated when the archival or deletion processes fail
`Arch_TaskData_`*`timestamp`*`.log`	Generated when the archival or deletion processes succeed

Note: These error log files are deleted when you run the utility again.

23.3 Using the Requests Archival Utility

This section describes how to use the Requests Archival utility. It contains the following topics:

- Understanding the Requests Archival Utility
- Prerequisites for Running the Requests Archival Utility
- Input Parameters
- Running the Requests Archival Utility
- Log Files Generated by the Utility

23.3.1 Understanding the Requests Archival Utility

By default, Oracle Identity Manager does not remove closed or withdrawn requests from the active request tables. To archive these requests and free up the disk space and thereby enhance database performance, the Requests Archival utility is used. You can archive request data based on request creation date and request status. Archiving

requests based on the request status is optional. By using request status, you can archive:

- Completed requests such as requests with status Withdrawn, Closed, and Completed. This is specified by selecting the **1 for Completed** option.
- Completed and failed requests such as requests with status Withdrawn, Closed, Completed, Failed, and Partially Failed. This is specified by selecting option **2 for Completed and Failed**.
- All requests based on request creation date. This is specified by selecting option **3 for All**.

Table 23–3 lists the names of the tables which are to be archived and the corresponding archival table names.

Table 23–3 Archival Tables

Main Table	Archival Table
REQUEST	ARCH_REQUEST
REQUEST_HISTORY	ARCH_REQUEST_HISTORY
REQUEST_APPROVALS	ARCH_REQUEST_APPROVALS
REQUEST_ENTITIES	ARCH_REQUEST_ENTITIES
REQUEST_ENTITY_DATA	ARCH_REQUEST_ENTITY_DATA
REQUEST_BENEFICIARY	ARCH_REQUEST_BENEFICIARY
REQUEST_BENEFICIARY_ENTITIES	ARCH_REQUEST_BE
REQUEST_BENEFICIARY_ENTITYDATA	ARCH_REQUEST_BED
REQUEST_TEMPLATE_ATTRIBUTES	ARCH_REQUEST_TA
WF_INSTANCE	ARCH_WF_INSTANCE
REQUEST_COMMENTS	ARCH_REQUEST_COMMENTS

The files that constitute the Oracle Database version of the Requests Archival utility are located in the following directory:

`OIM_HOME/db/oim/oracle/Utilities/RequestArchival`

You can run the Requests Archival utility in offline mode with Oracle Identity Manager stopped, or in online mode with Oracle Identity Manager running.

Before running the utility in offline mode, you must stop Oracle Identity Manager.

23.3.2 Prerequisites for Running the Requests Archival Utility

Before running the Requests Archival utility:

> **Note:** You must set *LD_LIBRARY_PATH* to start Oracle utilities such as SQL*Plus in the environment where you want to run Oracle Identity Manager utilities.

- Create the OIM_REQUEST_ARCH tablespace. When the Requests Archival utility is run for the first time, a corresponding archival table is created for all the tables that are to be archived. The archival tables are created in a separate tablespace

named OIM_REQUEST_ARCH. This tablespace must be created before running the utility.

- Create the required archival tables for the request tables by running the oim_create_request_arch_tables.sql script. This is the PL/SQL script to create archival tables against all tables that are to be archived.
- If you want to run the utility in offline mode, then you must stop Oracle Identity Manager before running the utility.

23.3.3 Input Parameters

Table 23–4 lists the input parameters used by the Requests Archival utility:

Table 23–4 Input Parameters

Parameter	Description
Oracle Home	The value of *ORACLE_HOME* environment variable on the system.
Oracle SID	The SID of the Oracle Identity Manager database. For a remote database, a connection string is required as input, which is in the following format: *//HOST_NAME:PORT/SERVICE_NAME* Here, *HOST_NAME* is the host name of the computer on which the database is deployed, *PORT* is the port number of the host, and *SERVICE_NAME* is the name of the database instance.
OIM DB User	The database login ID of the Oracle Identity Manager database user.
OIM DB Pwd	The password of the Oracle Identity Manager database user.
Request Status	The request status based on the user inputs 1, 2, or 3.
Request Creation Date	The utility archives all requests created on or before this request creation date with the required request status.
Batch Size	The utility processes a group of records or batch as a single transaction. The batch size can influence the performance of the utility. Default value of Batch Size is `2000`.
Utility Running Mode	The mode in which you want to run the utility, online or offline. You must enter 1 for online mode, or 2 for offline mode. The utility runs faster when you run it in offline mode than online mode. However, running the utility in offline mode requires downtime. The archival operation can be speeded up by running in offline mode, but Oracle Identity Manager is not usable until the utility completes the archival operation. Therefore, make sure that Oracle Identity Manager is not running before choosing this option.

23.3.4 Running the Requests Archival Utility

To run the Requests Archival utility:

1. Ensure that the Oracle Identity Manager database is available.

> **Note:** It is recommended that you run the Requests Archival utility during off-peak hours.

2. If you want to run the utility in offline mode, then stop Oracle Identity Manager by following the instructions in the "Starting and Stopping Servers" chapter.

   To run the utility in online mode, ignore this step and proceed to step 3.

3. On Microsoft Windows platform, you must specify the short date format as `dddd M/d/yyyy`. In addition, you must specify the time format as `H:mm:ss`. To customize the date and time formats, use the Regional and Language Options command in Control Panel.

   Note:

   - When you change the date and time format, the change is applied to all the applications running on the Microsoft Windows platform.
   - Minimal validation is done on date before calling the utility, and you can scan logs files for any ORA-18xx errors for invalid date-related errors.

4. On UNIX platform, run the following commands to set execution permission for the `OIM_request_archival.sh` file and to ensure that the file is a valid UNIX text file:

   ```
   chmod 755 path/OIM_request_archival.sh
   dos2unix path/OIM_request_archival.sh
   ```

5. On UNIX platform, run the *path*`/OIM_request_archival.sh` file. On Microsoft Windows platform, run the *path*`\OIM_request_archival.bat` file.

   The oim_request_archival script validates the database input and establishes a connection with the database. It then calls the oim_request_archival.sql script, the script is used to compile PL/SQL procedures related to the utility.

6. For Oracle Database installations, enter values for the following parameters when prompted:

   - Oracle home directory.
   - Oracle Identity Manager database name or TNS string if the Oracle Identity Manager database is running on a remote computer. Otherwise, enter ORACLE SID.
   - For a remote database, a connection string is required as input, which is of the following format: //HOST_NAME:PORT/SERVICE_NAME
   - Oracle Identity Manager database user name and password.

7. When prompted, enter one of the following options:

   - Enter 1 to archive the requests with status Request Withdrawn, Request Closed, or Request Completed, and requests with creation date on or before the request creation date specified by the user in the format YYYYMMDD.
   - Enter 2 to archive the requests with status Request Withdrawn, Request Closed, Request Completed, or Request Partially Failed, and requests with creation date on or before the request creation date specified by the user in the format YYYYMMDD.
   - Enter 3 to archive all the requests with request creation date on or before the request creation date specified by the user in the format YYYYMMDD.

8. When prompted to specify the mode of running the utility, enter 1 if you want to run the utility in online mode. Otherwise, enter 2 to run the utility in offline mode.
9. Specify the batch size, when prompted.

> **Note:** Batch size is a value for the number of records to be processed in a single iteration of archival/purge also an internal commit at the database level. You must provide the batch size as an input parameter value while starting the operation of Archival Utilities at run time.
>
> This batch size by default is 2000. A higher batch size can be opted for, but this might require more resources from the database, such as more space from the TEMP and UNDO tablespaces.

   The utility archives the request data and provides an execution summary in a log file.

10. On Microsoft Windows platforms, reset the short date format to the date format for your region or locale after you run the utility. Use the Regional and Language Options command in Control Panel to reset the date format.
11. Because the data from active request tables are removed, your DBA must analyze the active request tables and their indexes in order to update the statistics. Perform this step only if you are using Oracle Database as the database for Oracle Identity Manager.

23.3.5 Log Files Generated by the Utility

All the logs are written to the logs/ directory created in the current folder. Table 23–5 lists the log files generated by the utility.

Table 23–5 Logs Generated by the DB Archival Utility

Log File	Description
oim_create_request_arch_tables.log	Created when the utility fails to create the archival tables
oim_request_archival.log	Created when the utility fails to create the procedures required for archival
validate_date.log	Created when the input REQUEST_CREATION_DATE is invalid
oim_request_archival_summary_*TIMESTAMP*.log	Contains the summary of the run
Err_DB_Conn_*TIMESTAMP*_*ATTEMPTNUMBER*.log	Created when the utility is unable to connect to the database with the credentials provided

23.4 Using the Audit Archival and Purge Utility

This section describes how to use the Audit Archival and Purge utility. It contains the following topics:

- Overview
- Prerequisites for Using the Utility
- Preparing the UPA Table for Archival and Purge
- Archiving or Purging the UPA Table

23.4.1 Overview

Continuous data generation in the Oracle Identity Manager database schema and the audit data growth results in a gradual increase in the storage consumption of the database server. The audit data is populated in the UPA table. The growth of data in the UPA table can pose disk space and maintenance issues. Therefore, old audit data in the UPA table must be cleaned or archived.

To keep this disk space consumption in control, you can use the Audit Archival and Purge utility. This utility controls the growth of the audit data by purging the data in a logical and consistent manner.

Note:

- The audit archival and purge solution is only applicable to the UPA table. It is not applicable to audit reporting tables, which are tables with the UPA_ prefix.
- The utility is compatible with Oracle Identity Manager release 9.1.0 and later.

Oracle recommends partitioning of the UPA table on the basis of calendar year, which allows you to archive or drop partitions. The advantage of partitioning is that the old partitions can be archived or purged because Oracle Identity Manager does not use old audit data lying in those partitions. Oracle Identity Manager uses the latest audit data and the current calendar year data. Therefore, the UPA table is partitioned based on date range-partitioning approach by calender year using EFF_TO_DATE column. After partitioning, the latest audit data where EFF_TO_DATE is NULL, can be grouped in one partition, and there will be one partition for each calendar year. Oracle Identity Manager do not read or write into any other partitions except the latest and current year partitions.

For instance, if you are using Oracle Identity Manager audit feature since 2005 and implementing the audit archive and purge solution in calendar year 2011, then you will have seven partitions after this exercise, assuming that you create a partition for each calendar year. In those seven partitions, Oracle Identity Manager will only read or write the following partitions:

- The latest partition
- The partition for the current year, for example 2011

All the previous year partitions can be archived and then purged. If you do not want to archive, then you can purge those old partitions. You can reclaim the space by archiving and purging those old partitions. You must keep the latest and current year partitions untouched for Oracle Identity Manager to continue working.

23.4.2 Prerequisites for Using the Utility

The following prerequisites must be met before or when using the Audit Archival and Purge utility:

- Database partitioning is supported only on Enterprise Edition of Oracle Database. Therefore, to implement the audit archival and purge solution, you must run Enterprise Edition of Oracle Database.
- The UPA table must be range-partitioned on the basis of calendar year. Other modes of partition methods are not supported.

- Make sure that the latest backup of the UPA table is available. Creating a backup of the UPA table is a compulsory prerequiste before applying this solution. It is recommended to try out this solution in the development or staging environment before implementing it on the production database.
- Decide how many previous year's of audit data you require to keep online before implementing this solution. This helps in creating partitions beforehand.
- Each partition should be placed on its own tablespace. Do not share the tablespace between partitions of different year or with some other data.
- During partitioning, the audit data for each calendar year is copied into a table before it is moved into a final destination. You must have provision for disk space to hold the copied data.

23.4.3 Preparing the UPA Table for Archival and Purge

To prepare the UPA table for the audit and purge solution:

1. Make sure that Oracle Identity Manager is not running and is not available for off-line utilities.
2. Make sure that Oracle Identity Manager database has no transaction against it until the UPA table is partitioned.
3. Query the UPA table to get the minimum and maximum calendar year for the audit data. Following queries can help you get the minimum and maximum year. The maximum year should be the current calendar year.

   ```
   SELECT EXTRACT (YEAR FROM MIN (eff_to_date)) min_year,
   EXTRACT (YEAR FROM MAX (eff_to_date)) running_year FROM upa;
   ```

   This helps in deciding the partitions for each calendar year starting from minimum year.
4. Create a new partition table.

   Assuming 2005 as minimum year and 2011 as running or current calendar year, the following decisions are to be made before creating a newly partition table:

   - How many years of old audit data you want to keep? If it is important to keep only three years of audit data, then you have to create newly partitioned table starting from year 2008. The data older than 2008 will get cleaned up when the original UPA table gets dropped.
   - After deciding the years of old data to keep, the next question is how and where the old data should be kept? Do you want to keep all the old data partitions in the active UPA table, or create backup of the old partitions and then drop the old partitions? Oracle recommends moving the old partitions into tapes and then purging them from the UPA table. As stated earlier, you must keep the latest and running calendar year partition untouched.

   The following sample assumes that you want to keep three years of audit data in UPA table and current calendar year is 2011:

   ```
   SQL> SELECT 'Create Table UPA_PART
   (
   UPA_KEY NUMBER (19) Not Null,
   USR_KEY NUMBER (19) Not Null,
   EFF_FROM_DATE TIMESTAMP (6) Not Null,
   EFF_TO_DATE TIMESTAMP (6),
   SRC VARCHAR2 (4000),
   SNAPSHOT CLOB,
   ```

```
DELTAS CLOB,
SIGNATURE CLOB
)
PARTITION BY RANGE (EFF_TO_DATE)
(PARTITION UPA_2008 VALUES LESS THAN (TO_DATE(''01/01/2009'', ''DD/MM/YYYY''))
Tablespace upa_2008,
PARTITION UPA_2009 VALUES LESS THAN (TO_DATE(''01/01/2010'', ''DD/MM/YYYY''))
Tablespace upa_2009,
PARTITION UPA_2010 VALUES LESS THAN (TO_DATE(''01/01/2011'', ''DD/MM/YYYY''))
Tablespace upa_2010,
PARTITION UPA_2011_PART1 VALUES LESS THAN
(TO_DATE('''||TO_CHAR(SYSDATE,'DD/MM/YYYY HH24:MI:SS')||''','DD/MM/YYYY
HH24:MI:SS'')) TABLESPACE UPA_2011_PART1,
PARTITION UPA_2011_PART2 VALUES LESS THAN
(TO_DATE(''01/01/2012'',''DD/MM/YYYY'')) TABLESPACE UPA_2011_PART2,
PARTITION UPA_LATEST VALUES LESS THAN (MAXVALUE) TABLESPACE UPA_MAX
)
ENABLE ROW MOVEMENT;' FROM DUAL;
```

5. Create another non-partitioned table with similar structure as the UPA table, by running the following statement:

   ```
   SQL> Create table upa_non_part Tablespace TBS_NAME as select * from upa where
   1=2;
   ```

   Here, *TBS_NAME* is the name of the same tablespace as of partition, which is to be exchanged.

   This table is temporary in nature. The purpose of this table is to facilitate the loading of audit data to a newly partitioned UPA table.

   Note: UPA_NON_PART or temporary non-partitioned table must be created on same tablespace as the partition to be exchanged.

6. Load the latest audit data into the non-partitioned UPA table, as shown:

   ```
   SQL> Insert /*+ parallel */ into upa_non_part select /*+ parallel */   * from
   upa where eff_to_date is null;
   SQL> COMMIT;
   ```

   Note: Using hint /*+parallel*/ in the INSERT statement is optional and you can use other hints also to improve performance according to the available resources.

7. Swap the data into the partitioned table by using the ALTER TABLE command, as shown:

   ```
   SQL> ALTER TABLE upa_part EXCHANGE PARTITION UPA_LATEST WITH TABLE UPA_NON_PART
   WITH VALIDATION UPDATE GLOBAL INDEXES;
   ```

8. Drop the upa_non_part table, as shown:

   ```
   SQL> DROP TABLE upa_non_part;
   ```

   While exchanging partitions, the data dictionary is updated instead of writing data physically. Therefore, it is necessary to drop and re-create the temporary

non-partitioned UPA_NON_PART table in the same tablesapce associated to the partition to be exchanged.

9. Rename the original non-partitioned UPA table to UPA_OLD, as shown:

```
SQL> ALTER TABLE upa rename TO upa_old;
```

10. Rename the newly partitioned UPA_PART table to UPA:

```
SQL> RENAME UPA_PART to UPA;
```

11. Manage the constraints for the new UPA table. To do so:

    a. Rename the constraint from old UPA table to some other name, as shown:

```
ALTER TABLE UPA_old RENAME CONSTRAINT PK_UPA TO PK_UPA_old;
ALTER INDEX IDX_UPA_EFF_FROM_DT RENAME TO IDX_UPA_EFF_FROM_DT_old;
ALTER INDEX IDX_UPA_EFF_TO_DT RENAME TO IDX_UPA_EFF_TO_DT_old;
ALTER INDEX IDX_UPA_USR_KEY RENAME TO IDX_UPA_USR_KEY_old;
ALTER INDEX PK_UPA RENAME TO PK_UPA_OLD;
```

    b. Create the necessary indexes and primary key constraint on the newly partitioned UPA table. Make sure to add storage characteristics, such as tablespace and size. To do so, run the following SQL query:

```
SQL>create index IDX_UPA_EFF_FROM_DT on UPA (EFF_FROM_DATE) Local;
SQL>create index IDX_UPA_EFF_TO_DT on UPA (EFF_TO_DATE) Local;
SQL>create index IDX_UPA_USR_KEY on UPA (USR_KEY) Local;
SQL>ALTER TABLE UPA add constraint PK_UPA primary key (UPA_KEY) using
index;
```

> **Note:** The global non-partitioned index is created to support the primary key. Global index becomes unusable every time a partition is touched. You must rebuild the index when required.

12. Run the statistics collection for the UPA table, as shown:

```
SQL>Exec dbms_stats.gather_table_stats(ownname => 'SCHEMA_NAME',tabname =>
'UPA',cascade => TRUE,granularity => 'GLOBAL and PARTITION');
```

> **Note:** Global statistics must be gathered by default. Oracle 11*g* includes improvements to statistics collection for partitioned objects so untouched partitions are not rescanned. This significantly increases the speed of statistics collection on large tables where some of the partitions contain static data. When a new partition is added to the table, you need to collect statistics only for the new partition. The global statistics is automatically updated by aggregating the new partition synopsis with the existing partitions synopsis.

13. Start Oracle Identity Manager. The database is ready to be opened for transactions. Test and make sure that applications are running as expected.

14. Bring current year data in UPA_2011_PART1 to have all data and maintain consistency for current year. To do so, run the following SQL queries in sequence:

```
SQL> CREATE TABLE upa_non_part Tablespace TBS_NAME AS SELECT * FROM upa WHERE
1=2;
```

Here, *TBS_NAME* is the same tablespace name as of the partition, which is to be exchanged.

```
SQL> Alter Table UPA_NON_PART add constraint PK_UPA_NON_PART primary key
(UPA_KEY) using index;

.............
.............
SQL> Insert into upa_non_part select * from upa_old where eff_to_date >=
to_date('01/01/2011', 'mm/dd/yyyy');

.............
.............
SQL> COMMIT;

.............
.............

SQL> ALTER TABLE upa_part exchange partition UPA_2011_PART1 WITH table
upa_non_part WITH VALIDATION UPDATE GLOBAL INDEXES;

.............
.............
SQL> Drop table upa_non_part;
```

15. If required, bring previous year's data into the newly partitioned UPA table. To do so:

    a. Run the following SQL queries in sequence:

    ```
    SQL> CREATE TABLE upa_non_part Tablespace TBS_NAME AS SELECT * FROM upa
    WHERE 1=2;
    ```

    Here, TBS_NAME is the same tablespace as of the partition, which is to be exchanged.

    ```
    .............
    .............
    SQL> Alter Table UPA_NON_PART add constraint PK_UPA_NON_PART primary key
    (UPA_KEY) using index;
    .............
    .............
    SQL> Insert into upa_non_part select * from upa_old where eff_to_date >=
    to_date('01/01/YEAR', 'mm/dd/yyyy') and eff_to_date <
    to_date('01/01/<YEAR+1>', 'mm/dd/yyyy');
    ```

    Here, *YEAR* is the year for which you want to bring the data into newly parititoned UPA table.

    ```
    .............
    .............
    SQL>COMMIT;

    .............
    .............
    SQL> Alter table upa exchange partition UPA_<year> with table upa_non_part
    with validation Update global indexes;
    ```

    b. Rebuild indexes if they are unusable. The Following SQL query shows the indexes that are unusable:

```
SQL> Select index_name, partition_name, tablespace_name, status from
user_ind_partitions;
```

c. Drop the table upa_non_part, as shown:

```
SQL> Drop table upa_non_part;
```

Note: Repeat step 15 for each old year.

16. All partition operations against UPA table are done and all the data is brought into. Run the statistics collection for the UPA table, as shown:

```
SQL>Exec dbms_stats.gather_table_stats(ownname => '<Schem_name>',tabname =>
'UPA',cascade => TRUE,granularity => 'GLOBAL and PARTITION');
```

17. Drop the UPA_OLD table if it is not required. You can create a backup of this table before dropping.

23.4.4 Archiving or Purging the UPA Table

Archiving and purging the UPA table is described in the following sections:

- Partitions That Must Not Be Archived or Purged
- Ongoing Partition Maintenance
- Archiving or Purging Partitions in the UPA Table

23.4.4.1 Partitions That Must Not Be Archived or Purged

Oracle Identity Manager always requires the latest and the current calendar year audit data. The following are the names of latest and calendar year partitions:

- **UPA_LATEST:** The latest partition
- **UPA_2011_PART1** and **UPA_2011_PART2:** Partitions for the current year if current year is 2011

You must keep these two partitions untouched for Oracle Identity Manager to continue working. These two partitions should never be archived or purged.

23.4.4.2 Ongoing Partition Maintenance

A new partition must be added to the UPA table before the new calendar year arrives. To do so, use the following SQL template:

```
SQL> Alter table UPA split partition UPA_LATEST at
(TO_DATE('01/01/YEAR+1','DD/MM/YYYY')) into (partition UPA_YEAR tablespace
UPA_YEAR,partition UPA_LATEST tablespace UPA_MAX) update global indexes;
```

Here, *YEAR* in the TO_DATE function represents the new calendar year plus one. *YEAR* for partition name and tablespace name represents new upcoming calendar year.

An example of SQL statement for adding new partition for new calendar year 2012 is as follows:

```
SQL> Alter table UPA split partition UPA_LATEST at
(TO_DATE('01/01/2013','DD/MM/YYYY')) into (partition UPA_2012 tablespace
UPA_2012,partition UPA_LATEST tablespace UPA_MAX) update global indexes;
```

Oracle recommends adding new partition with the given SQL template before the new calendar year arrives. However, if you do not add the same before the arrival of the next calender year, then the same can be done after the next year has started by using the same SQL command.

23.4.4.3 Archiving or Purging Partitions in the UPA Table

To archive or purge partitions in the UPA table:

1. If you use the attestation feature of Oracle Identity Manager, then make sure that the partition to be archived or purged does not have any active attestation records. You can use the following SQL to verify that.

   ```
   SQL> SELECT COUNT(1) FROM UPA PARTITION(<PARTITION_TO_BE_DROPPED>)
   WHERE UPA_KEY IN (select distinct (upa_key) from apt apt, atr atr, atd atd
   where apt.atr_key=atr.atr_key and atr.atr_completion_time is NULL and
   apt.apt_key = atd.apt_key);
   ```

   This query should return zero records, which means there are no active attestation records. If this returns non-zero value, then it means that there are still active attestations pointing to the partition to be dropped. This is not common, but you must make sure that there are no active attestation records before dropping an old year partition.

2. Make sure that there are no custom reports or queries that needs the data from partition to be dropped.

3. Archive the partition to be dropped to tape or any other media. There are many ways to archive a partition. One of the ways is to use data pump or export utility to archive the partition to be dropped. Choose a way that works best in your environment.

4. Purge the partition. To do so:

   ```
   SQL> Alter table UPA drop partition PARTITION_NAME UPDATE GLOBAL INDEXES;
   SQL>Drop tablespace TBS_NAME including contents and datafiles;
   ```

   Here, TBS_NAME is the tablespace associated with the partition to be dropped, and it must not contain any other data.

   Note:

   - The current year contains two partitions named UPA_2011_PART1 and UPA_2011_PART2. When current year becomes an old year and the data for that is ready to be archived or purged, make sure to archive or purge these two partitions.
   - It is your responsibility to restore the archived data later, if required.

Part V

Performance Tuning and Best Practices

This part describes the performance tuning of various Oracle Identity Manager components.

It contains the following chapters:

- Chapter 24, "Tuning Oracle Database"
- Chapter 25, "Tuning Application Server Performance"
- Chapter 26, "Tuning and Managing Application Cache"

24

Tuning Oracle Database

As with any enterprise class business application, there is no simple procedure for tuning that works for all systems. This section describes one sample configuration and outlines the principles for tuning Oracle Database.

Oracle Identity Manager has many configuration options. The best way to identify bottlenecks and optimize performance is to monitor key database performance indicators in your production environment and adjust the configuration accordingly. This chapter serves as a guideline to help you choose the initial baseline database configuration.

This chapter discusses the following topics:

- Using Database Roles/Grants for Oracle Identity Manager Database
- Sample Instance Configuration Parameters
- Physical Data Placement
- Database Performance Monitoring

24.1 Using Database Roles/Grants for Oracle Identity Manager Database

As a database administrator, you can create roles to grant all privileges to a secure application role required to run a database application. You can then grant the secure application role to other roles or users. An application can have various roles, each granted a different set of privileges that allow the user access more or less data while using the application. For example, you can create a role with a password to prevent unauthorized use of the privileges granted to the role. An application can be designed in such a way so that when it starts, it enables the proper role. As a result, an application user does not need to know the password for an application's role.

Depending on what is granted or revoked, a grant or revoke takes effect at different times, such as:

- All grants and revokes for system and object privileges to users, roles, and PUBLIC grants take immediate effect.
- All grants and revokes of roles to users, other roles, and PUBLIC take effect only when a current user session issues a SET ROLE statement to re-enable the role after the grant and revoke, or when a new user session is created after the grant or revoke.

You can see which roles are currently enabled by examining the SESSION_ROLES data dictionary view.

In Oracle Identity Manager, there are prerequisite grants that are provided to Oracle Identity Manager schema to create necessary objects before installing Oracle Identity

Manager. Some of these grants can be revoked later on after installing the Oracle Identity Manager and can be granted to particular users in future as required by the application.

Table 24–1 describes the grants required for database applications:

Table 24–1 Role Grants for Database Applications

Role Name	Description	Usage Specific to Oracle Identity Manager	If Revoked
CREATE TABLE	Enables a user to create, modify, and delete tables in the user's schema.	Although this is part of grant resource, this is explicitly required because the grant resource does not allow to create a table through a procedure.	User will not be able to create any new tables programmatically. You can revoke this grant when the Oracle Identity Manager deployment is stable, which means all the components and connectors are imported and working as expected. This is because each connector creates its own schema object. This grant is needed for initial run of any archival utility because the archival utilities create tables programmatically.
CONNECT	Provides the create session privileges	To create sessions for users	This can be replaced with create session after installation. You can do this when the Oracle Identity Manager deployment is stable, which means all the components and connectors are imported and working as expected. This is because each connector creates its own schema object.

Table 24–1 (Cont.) Role Grants for Database Applications

Role Name	Description	Usage Specific to Oracle Identity Manager	If Revoked
RESOURCE	Enables a user to create, modify, and delete certain types of schema objects in the schema associated with that user. Grant this role only to developers and to other users that must create schema objects. This role grants a subset of the create object system privileges. For example, it grants the CREATE TABLE system privilege, but does not grant the CREATE VIEW system privilege. It grants the following privileges: ■ CREATE CLUSTER ■ CREATE INDEXTYPE ■ CREATE OPERATOR ■ CREATE PROCEDURE ■ CREATE SEQUENCE ■ CREATE TABLE ■ CREATE TRIGGER ■ CREATE TYPE In addition, this role grants the UNLIMITED TABLESPACE system privilege, which effectively assigns a space usage quota of UNLIMITED on all tablespaces in which the user creates schema objects.	To create sequences, indexes, procedures, triggers, and packages	User will not be able to create any database objects. Only SYS user will be able to do so. You can revoke this grant when the Oracle Identity Manager deployment is stable, which means all the components and connectors are imported and working as expected. This is because each connector creates its own schema object. Specify the quota for tablespaces correctly.
CREATE VIEW	Enables a user to create, modify, and delete views in the user's schema	To create SDP_VISIBLE_V, SDP_REQUIRED_V, SDP_LOOKUPCODE_V, and SDP_RECURSIVE_V views in Oracle Identity Manager	The user will not be able to create any views. Only SYS user will be able to do so.
DBMS_SHARED_POOL	Fits a database object in a shared pool memory	Used for pinning all the procedures and functions used in Oracle Identity Manager in shared memory	It can be revoked after installation but may impact performance because some of the procedures and functions may not be pinned explicitly. The pin_obj procedure is created only for Oracle Identity Manager. It is used to explicitly pin database objects into shared memory. Before revoking this role, make sure that the database-level trigger cache_seq is dropped, if already created.

Table 24–1 (Cont.) Role Grants for Database Applications

Role Name	Description	Usage Specific to Oracle Identity Manager	If Revoked
SYS.DBMS_SYSTEM	Enables an XA Resource Manager and sets privileges so that the XA Resource Manager can manage the interaction between the Oracle database and the applications. **Note:** Each database connection is enlisted with the transaction manager as a transactional resource. The transaction manager obtains an XA Resource for each connection participating in a global transaction. The transaction manager uses the start method to associate the global transaction with the resource, and it uses the end method to disassociate the transaction from the resource. The resource manager associates the global transaction to all work performed on its data between the start and end method invocations.	For XA resource and database transactions	On Oracle Database version 10.2.0.4 onwards, it can be removed safely. Oracle has redeemed themselves by moving the DIST_TXN_SYNC procedure to a new package called DBMS_XA that is available to the public. Therefore, XA clients do not require execute privilege on DBMS_SYSTEM for later oracle versions.
SYS.DBMS_FLASHBACK	Enables self-service repair. If you accidentally delete rows from a table, then you can recover the deleted rows.	For any failure during reconciliation, you can roll back the changes by using this.	This is required for new reconciliation engine in Oracle Identity Manager 11*g* Release 1 (11.1.1) for error handling.
CREATE_MATERIALIZED_VIEW	Creates a materialized view in the grantee's schema	To create the OIM_RECON_CHANGES_BY_RES_MV materialized view	User will not be able to create any materialized view. Only SYS user will be able to do so. This materialized view is required for reporting purpose only.
SELECT ON V$XATRANS SELECT ON PENDING_TRANS$ SELECT ON DBA_2PC_PENDING SELECT ON DBA_PENDING_TRANSACTIONS	Enables an XA Resource Manager and sets privileges so that the XA Resource Manager can manage the interaction between the Oracle database and the applications.	NA	Not recommended to remove. Required for XA support.
ADMINISTER DATABASE TRIGGER	Allows the creation of database-level triggers.	To create DDL trigger named ddl_trigger in Oracle Identity Manager	Users will not be able to create new DDL triggers. It can be removed after schema creation.

24.2 Sample Instance Configuration Parameters

Table 24–2 provides information on some important performance-related database initialization parameters for Oracle 11*g* database.

SGA,PGA size are limited by the underlying operating system restrictions on the maximum available memory in some platforms. See Support Note: Oracle Database Server and the Operating System Memory Limitations [ID 269495.1].

Note: For the Database Instance Parameters listed in Table 24–2, any one of the following memory management approaches can be used based on the Oracle Database versions:

- Using Automatic Memory Management feature available in Oracle Database 11*g*: Here, the MEMORY_TARGET and MEMORY_MAX_TARGET parameters can be used to manage the SGA and PGA together.
- Using Automatic Shared Memory Management (ASMM) available in Oracle Database 10*g* onward: Here, the SGA components can be managed by specifying the SGA_TARGET and SGA_MAX_SIZE parameters. PGA is managed separately through PGA_AGGREGATE_TARGET.

You should set the processes parameter to accommodate the following connection pool requirements and few extra connections for external programs:

- Connection pool size of XA data-source configured in Application Server
- Connection pool size for non-XA data-source configured in Application Server
- Direct database connection pool size configured in xlconfig.xml

Table 24–2 Sample Configuration Parameters

Parameter	Recommended Initial Settings for Oracle Database 11*g*
db_block_size	8192
memory_target	Using Automatic Memory Management feature in Oracle Database 11*g*, the MEMORY_TARGET and MEMORY_MAX_TARGET parameters can be used to manage the SGA and PGA together. Recommended value is 3 GB. When considering MEMORY_TARGET for managing the database memory components, SGA_TARGET and PGA_AGGREGATE_TARGET can be left unallocated, which is 0.
db_keep_cache_size	800M
log_buffer	15 MB
cursor_sharing	FORCE
open_cursors	500
session_cached_cursors	500
query_rewrite_integrity	TRUSTED
query_rewrite_enabled	TRUE
db_file_multiblock_read_count	16
db_writer_processes	2

Table 24–2 (Cont.) Sample Configuration Parameters

Parameter	Recommended Initial Settings for Oracle Database 11*g*
processes	Based on connection pool settings

24.3 Physical Data Placement

The basic installation of Oracle Identity Manager uses two physical tablespace to store database objects: tablespace *oim_lob* for orchestration-related LOB data and *oim* for everything else. Oracle Identity Manager database objects belong to one of the following categories:

- Physical tables
- Indexes
- Large objects (LOBs or CLOBs)

> **Tip:** To minimize disk space consumption, Oracle recommends the following:
>
> During the initial startup phase of the deployment, Oracle Identity Manager tablespace is expected to grow at the rate 20G for every hundred thousand users reconciled into Oracle Identity Manager. LOB tablespace grows at around 30% of the size of main Oracle Identity Manager tablespace for the same users. Depending on the usage of orchestration in Oracle Identity Manager, which affects the LOB tablespace growth, the LOB tablespace can grow at a rate of 60% to 100% of the main tablespace in scenarios where orchestration is widely used.
>
> Database administrators must monitor the exact growth rate in the real system for efficient disk space management.

For better performance, create multiple locally managed tablespaces and store each category of database object in a dedicated tablespace. This storage optimization helps efficient data access. The tables that are frequently accessed and have potential growth are highlighted in the following sections. Oracle recommends that you place these tables in their own dedicated tablespace(s).

Note that the tables highlighted in the following sections generally grow bigger and are accessed frequently in a typical Oracle Identity Manager deployment. In addition, you can use performance metrics to identify tables that are accessed frequently (hot tables). To reduce I/O contention, move hot tables to dedicated tablespaces. See "Database Performance Monitoring" on page 24-10 for more information about performance metrics.

> **Note:** Oracle Identity Manager offers archival and purge solution to contain the data growth in most of these tables. See Chapter 23, "Using the Archival Utilities" for more information.

24.3.1 Tasks Tables

Oracle Identity Manager stores provisioning and approval task details in the following tables. These tables have lot of potential to grow big overtime. It is recommended to group these in one or more dedicated tablespaces.

- OSI
- OSH
- SCH

24.3.2 Reconcliation Tables

The reconciliation schema of Oracle Identity Manager has both static and dynamic tables. The following is a list of static tables. The dynamic tables can be identified by querying the RECON_TABLE_NAME column in the RECON_TABLES table.

- RECON_ACCOUNT_OLDSTATE
- RECON_BATCHES
- RECON_CHILD_MATCH
- RECON_EVENTS
- RECON_EVENT_ASSIGNMENT
- RECON_EXCEPTIONS
- RECON_HISTORY
- RECON_JOBS
- RECON_TABLES
- RECON_UGP_OLDSTATE
- RECON_USER_OLDSTATE
- RECON_ACCOUNT_MATCH
- RECON_ORG_MATCH
- RECON_ROLE_HIERARCHY_MATCH
- RECON_ROLE_MATCH
- RECON_ROLE_MEMBER_MATCH
- RECON_USER_MATCH
- RA_LDAPUSER
- RA_MLS_LDAPUSER
- RA_LDAPROLE
- RA_MLS_LDAPROLE
- RA_LDAPROLEMEMBERSHIP
- RA_LDAPROLEHIERARCHY

If your environment generates a large amount of reconciliation data, then move these tables to one or more dedicated tablespace(s).

24.3.3 Audit Tables

Oracle Identity Manager audits the transactions based on the audit level setting. Most of the audit levels are likely to increase data growth significantly. Oracle recommends storing audit tables in their own tablespace. Oracle Identity Manager audit tables are of two categories. Following are the tables that store audit data in XML format. In this

list, UPA table is especially expected to grow big and it is important to place it in a dedicated tablespace.

- UPA
- GPA

The user profile audit data is stored in the following flat structured tables. These tables are used by Oracle Identity Manager historical reports for compliance reporting. It is recommended to store these tables and their indexes in a dedicated tablespace.

- UPA_FIELDS
- UPA_GRP_MEMBERSHIP
- UPA_RESOURCE
- UPA_USR
- UPA_UD_FORMS
- UPA_UD_FORMFIELDS

24.3.4 Redo-Log Files

Depending on the reconciliation processes configured in Oracle Identity Manager, the volume of database transactions and commits during a reconciliation run can be high. Oracle recommends that you use multiple redo-log files. The total allocated redo-log space should be 1 GB to 2 GB.

Oracle recommends use of at least three redo log groups with redo log members with minimum size of 500 MB for each. The multiplexing and the exact number of members and disk space for each member can be considered in accordance with the planning for failure.

24.3.5 Keep Pool Changes

By default, Oracle Identity Manager assigns frequently referenced small tables to be cached in the database by using a keep pool buffer. See db_keep_cache_size in Table 24–2. The USR table which stores user records is also cached by default. If your installation contains more than 50,000 users, then Oracle recommends that you use the default database buffer for USR table instead of the keep pool buffer. You can use the following command to put USR table in default buffer pool.

```
ALTER TABLE USR STORAGE(buffer_pool default);
```

24.4 Database Performance Monitoring

To identify performance bottlenecks, you can monitor real-time performance metrics for the Oracle Identity Manager database.

Perform the following at regular intervals:

- Monitor real-time performance by using a performance-monitoring tool such as Oracle Enterprise Manager Fusion Middleware Control or Automatic Workload Repository (AWR) in Oracle Database 11*g*.

Note: You can use Oracle Enterprise Manager Fusion Middleware Control to monitor Oracle Identity Manager. To do so:

1. Under Identity Management, select **Oracle Identity Manager** to go to the home page. On the Home page, you can monitor Oracle Identity Manager.
2. From the Oracle Identity Manager menu, select **Performance** to view performance metrics.

- Collect routine statistics and report by using Oracle Database Enterprise Manager (EM), which is available in Oracle Database 11g (as a standard offering).
  - Routine Statistics Gathering

    Routine statistics gathering can be taken care by the 'Automated Maintenance Tasks', which is available in the following navigation path in Oracle Database 11g:

    Oracle EM, the **Server** tab, **Query Optimizer**, **Manage Optimizer Statistics**, the **Automated Maintenance Tasks** link
  - Reporting requirements of statistics through Oracle Database 11g EM

    To report on the state of the currently gathered statistics, EM provides a reporting interface in the following navigation path:

    Oracle EM, the **Server** tab, **Query Optimizer**, **Manage Optimizer Statistics**, the **Object Statistics** link

    This interface can be used for the reporting purpose for All Objects (of the Schema or even the Object of choice), which have Stale, Missing, or Locked states or are already analyzed.
- Collect complete schema statistics upon implementation of Oracle Identity Manager.

  Update schema statistics regularly, so that the Cost-Based Optimizer (CBO) can access the latest statistics. You must consider complete schema or table statistics on mass data change events such as bulkload of users or accounts, import of a new connector, a huge reconciliation run from a new target system, or use of an archival utility.

  This helps the CBO determine an efficient query execution plan that is based on the current state of data. The following is a sample SQL command to collect database statistics on a regular basis:

  See Also: Gathering routine statistics and reporting can be done by performing the automated maintenance tasks available in Oracle Database 11g. See *Oracle Database Performance Tuning Guide 11g Release 1 (11.1)* for details.

```
DBMS_STATS.GATHER_SCHEMA_STATS(OWNNAME=> schema_owner,
  ESTIMATE_PERCENT=>DBMS_STATS.AUTO_SAMPLE_SIZE,
  DEGREE=>8,
  OPTIONS=>'GATHER AUTO',
  NO_INVALIDATE=>FALSE);
```

- Look for relevant recommendations provided in advisory sections in the Automatic Database Diagnostic Monitor (ADDM) or Automatic Workload

Repository (AWR) report, and adjust the instance configuration parameters according to the recommended settings. This is specially required after importing a new connector and completing a round of reconciliation from a new target system so that you can identify the need of any new indexes according to your matching rules.

25

Tuning Application Server Performance

This chapter describes how to tune Oracle WebLogic Server for Oracle Identity Manager to improve performance in the following sections:

Note:

- All tuning parameter suggestions and values in this section are for reference purposes only. Values should be modified based on your requirement, application usage patterns, loads, and hardware specifications.
- Changing any of the settings may require you to restart the server.

See Also: Oracle® WebLogic Server Performance and Tuning documentation for more information about tuning Oracle Application Server

25.1 JVM Memory Settings

To change the JVM memory setting:

1. Open the *DOMAIN_HOME*/bin/setSOADomainEnv.sh or setSOADomainEnv.cmd file.
2. Change the value of DEFAULT_MEM_ARGS and PORT_MEM_ARGS from the default value.
3. Save the setSOADomainEnv.sh or setSOADomainEnv.cmd file.

Note: Add the following option to prevent StringIndexOutOfBoundsException error:

```
-XX:-UseSSE42Intrinsics
```

This parameter is required only for Sun JDK.

25.2 JDBC Connection Pool

Oracle Identity Manager uses the oimOperationsDB and oimJMSStoreDS datasources deployed on Oracle WebLogic Server. By default, maximum connections is set at 50. You may have to increase this based on the requirement. To increase the capacity of the JDBC connection pools:

1. Open the WebLogic Server Administration Console.
2. For JDBC Datasource xlXADS:
   a. Click **Services**, **JDBC, Data Sources**, **oimOperationsDB**, and then click the **Connection Pool** tab.
   b. Adjust the Initial Capacity and Maximum Capacity based on requirement.

   For JDBC Datasource xlDS:
   a. Click **Services**, **JDBC**, **Data Sources**, **oimJMSStoreDS**, and then click the **Connection Pool** tab.
   b. Adjust the Initial Capacity and Maximum Capacity based on requirement.
3. Save and activate the changes.

Note: Ensure that any increase in number of connections on the application server connection pools are compensated by database configuration changes. You might have to increase the MAX SESSIONS settings on Oracle Database.

25.3 Number of Message Driven Beans

Oracle Identity Manager uses Message Driven Beans (MDBs) for processing all offline activities, such as reconciliation, auditing, requests, attestation, and for its internal kernel operations. By default, total of 80 MDB instances concurrently serve requests. However, based on the requirement, this can be increased by modifying the OIMMDBWorkManager configuration. To do so:

1. Login to WebLogic Administrative Console.
2. Navigate to **Environment**, **Work Managers**, and then to **MaxThreadsConstraint-1**.
3. Change the count from 80 to a higher number per your requirement.

25.4 User Interface Threads

By default, Oracle Identity Manager provides 20 front-end thread configurations. These threads are used for serving front-end requests. To change the number of front-end thread configurations:

1. Login to WebLogic Administrative Console.

2. Navigate to **Environment**, **Work Managers**, and then to **MaxThreadsConstraint-0**.
3. Change the value of the count from 20 to number per your requirement.

25.5 Disable Reloading of Adapters and Plug-in Configuration

By default, reloading of adapters and plug-in configuration are enabled for ease of development. These should be disabled in the production environment. To do so:

1. Export the /db/oim-config.xml file from MDS as described in "Exporting and Importing Configuration Files" on page 18-1.
2. In the oim-config.xml file, replace the following:

```
<ADPClassLoaderConfig adapterReloadingEnabled="true" loadingStyle="ParentFirst"
reloadInterval="15" reloadingEnabled="true">
```

With:

```
<ADPClassLoaderConfig adapterReloadingEnabled="false"
loadingStyle="ParentFirst" reloadInterval="15" reloadingEnabled="false">
```

3. Replace the following:

```
<storeConfig reloadingEnabled="true" reloadingInterval="20"/>
```

With:

```
<storeConfig reloadingEnabled="false" reloadingInterval="20"/>
```

4. Save the oim-config.xml file and import it back to MDS.

25.6 Changing the Number of Open File Descriptors for UNIX (Optional)

WebLogic limits the number of open file descriptors in the *WEBLOGIC_HOME*/common/bin/commEnv.sh script to 1024. In some cases, if there is a huge number of concurrent users, WebLogic may throw the "TOO MANY OPEN FILES" exception. If you face this error, then increase the limit beyond 1024 in the script. Ensure that the operating system is able to handle the increase in the number of open files.

25.7 Tuning the JVM Garbage Collection for Solaris Sparc T3 or T4

To tune the JVM garbage collection for Solaris Sparc T3 or T4:

1. In a text editor, open the setSOADomainEnv.sh or setSOADomainEnv.cmd file in the *DOMAIN_HOME*/bin/ directory.
2. Set the value of USER_MEM_ARGS similar to the following:

> **Note:** The values shown for USER_MEM_ARGS are examples. You can change the values based on your requirement.

```
USER_MEM_ARGS="-Xms3048m -Xmx3048m -Xmn1648m -Xss256k -XX:PermSize=384m
-XX:MaxPermSize=384m"
```

3. Set the value of JAVA_OPTIONS similar to the following:

Note: The values shown for JAVA_OPTIONS are examples. You can change the values based on your requirement.

```
JAVA_OPTIONS="-Xnoclassgc -XX:SurvivorRatio=8 -XX:TargetSurvivorRatio=90
 -XX:PermSize=350m -XX:MaxPermSize=350m -XX:+AggressiveOpts
 -XX:+UseParallelOldGC -XX:ParallelGCThreads=8 -XX:+PrintGCDetails
 -XX:+PrintGCTimeStamps -XX:+PrintGCDateStamps  -XX:ReservedCodeCacheSize=64m
 -XX:CICompilerCount=8 -XX:+AlwaysPreTouch -XX:+PrintReferenceGC
 -XX:+ParallelRefProcEnabled -XX:-UseAdaptiveSizePolicy
 -XX:+PrintAdaptiveSizePolicy -XX:+DisableExplicitGC"
```

4. Save and close the file.

26

Tuning and Managing Application Cache

This chapter explains about caching and how it can be managed. It contains the following sections:

26.1 Introduction to Caching

Oracle Identity Manager allows caching of metadata, which reduces DB activities. This results in reduced network load and improved performance.

By default, caching for most of the configurations are disabled (set to false) so that the configuration changes are reflected immediately without having to restart the application servers in the development environments.

26.2 Tuning Oracle Identity Manager Cache

Caching is configured in the /db/oim-config.xml configuration file, which is located in MDS. See Chapter 18, "Using Enterprise Manager for Managing Oracle Identity Manager Configuration" for information about how to make changes to this file.

Oracle recommends the following settings for the production environments for optimal and better performance.

- Set the caching to true for all the components except the following two sections:

  threadLocalCacheEnabled="false"

  "StoredProcAPI" enabled="false"

- Set clustered="false" for non-clustered installation and clustered="true" for clustered installation.

Example 26–1 shows a snippet from the /db/oim-config.xml file, with all the caching enabled for production systems.

Example 26–1 Recommended Cache Values for oim-config.xml in a Clustered Production Environment

```
<cacheConfig clustered="true" enabled="true" expirationTime="144000"
provider="oracle.iam.platform.utils.cache.OSCacheProvider"
threadLocalCacheEnabled="false">
<cacheCategoriesConfig>
<cacheCategoryConfig name="DataObjectEventHandlers" enabled="true"
```

```
expirationTime="14400"/>
<cacheCategoryConfig name="ProcessDefinition" enabled="true"
expirationTime="14400"/>
<cacheCategoryConfig name="EmailDefinition" enabled="true"
expirationTime="14400"/>
<cacheCategoryConfig name="RuleDefinition" enabled="true" expirationTime="14400"/>
<cacheCategoryConfig name="FormDefinition" enabled="true" expirationTime="14400"/>
<cacheCategoryConfig name="ColumnMap" enabled="true" expirationTime="14400"/>
<cacheCategoryConfig name="UserDefinedColumns" enabled="true"
expirationTime="14400"/>
<cacheCategoryConfig name="ObjectDefinition" enabled="true"
expirationTime="14400"/>
<cacheCategoryConfig name="StoredProcAPI" enabled="false" expirationTime="600"/>
<cacheCategoryConfig name="NoNeedToFlush" enabled="true" expirationTime="-1"/>
<cacheCategoryConfig name="MetaData" enabled="true" expirationTime="14400"/>
<cacheCategoryConfig name="User" enabled="true" expirationTime="14400"/>
<cacheCategoryConfig name="AdapterInformation" enabled="true"
expirationTime="14400"/>
<cacheCategoryConfig name="OrgnizationName" enabled="true"
expirationTime="14400"/>
<cacheCategoryConfig name="Reconciliation" enabled="true" expirationTime="14400"/>
<cacheCategoryConfig name="SystemProperties" enabled="true"
expirationTime="14400"/>
<cacheCategoryConfig name="LookupDefinition" enabled="true"
expirationTime="14400"/>
<cacheCategoryConfig name="UserGroups" enabled="true" expirationTime="14400"/>
<cacheCategoryConfig name="LookupValues" enabled="true" expirationTime="14400"/>
<cacheCategoryConfig name="ITResourceKey" enabled="true" expirationTime="14400"/>
<cacheCategoryConfig name="RecordExists" enabled="true" expirationTime="14400"/>
<cacheCategoryConfig name="ServerProperties" enabled="true"
expirationTime="14400"/>
<cacheCategoryConfig name="ColumnMetaData" enabled="true" expirationTime="14400"/>
<cacheCategoryConfig name="API" enabled="true" expirationTime="14400"/>
<cacheCategoryConfig name="CustomResourceBundle" enabled="true"
expirationTime="-1"/>
<cacheCategoryConfig name="CustomDefaultBundle" enabled="true"
expirationTime="-1"/>
<cacheCategoryConfig name="ConnectorResourceBundle" enabled="true"
expirationTime="-1"/>
<cacheCategoryConfig name="LinguisticSort" enabled="true" expirationTime="-1"/>
<cacheCategoryConfig name="GenericConnector" enabled="true"
expirationTime="14400"/>
<cacheCategoryConfig name="GenericConnectorProviders" enabled="true"
expirationTime="-1"/>
<cacheCategoryConfig name="AccessPolicyDefinition" enabled="true"
expirationTime="14400"/>
<cacheCategoryConfig name="UserConfig" enabled="true" expirationTime="-1"/>
<cacheCategoryConfig name="OESDefinition" enabled="true" expirationTime="14400"/>
<cacheCategoryConfig name="RoleContainerToDescrMap" enabled="true"
expirationTime="-1"/>
<cacheCategoryConfig name="PluginFramework" enabled="true"
expirationTime="14400"/>
<cacheCategoryConfig name="CallbackConfiguration" enabled="true"
expirationTime="14400"/>
<cacheCategoryConfig name="SchedulerTaskDefinition" enabled="true"
expirationTime="14400"/>
<cacheCategoryConfig name="UserStatus" enabled="true" expirationTime="14400"/>
<cacheCategoryConfig name="LocaleCodeLanguageMapping" enabled="true"
expirationTime="14400"/>
</cacheCategoriesConfig>
```

26.3 Purging the Cache

If you want to purge the cache, use the PurgeCache utility in the *OIM_HOME*/server/bin/ directory. This utility purges all elements in the cache.

Note:

- Purging is required when caching is enabled and if you make any system configuration changes. It is not required if caching is disabled.
- Before running the PurgeCache utility, navigate to the *OIM_HOME*/server/bin/ directory.

Before running the PurgeCache utility, you must run the *DOMAIN_HOME*/bin/setDomainEnv.sh script.

To use the PurgeCache utility, run PurgeCache.bat *CATEGORY_NAME* on Microsoft Windows or PurgeCache.sh *CATEGORY_NAME* on UNIX. The *CATEGORY_NAME* argument represents the name of the category that must be purged. For example, the following commands purge all FormDefinition entries from a system and its clusters:

```
PurgeCache.bat FormDefinition
PurgeCache.sh FormDefinition
```

To purge all Oracle Identity Manager categories, pass a value of "All" to the PurgeCache utility. It is recommended to clear all the categories.

Note: The wlfullclient.jar file must be in the classpath for the PurgeCache utility to run correctly.

27

Securing a Deployment

Securing an Oracle Identity Manager deployment is achieved through authorization and hardening. Authorization controls the access to various components. Hardening secures the components from potential security threats.

Table 27–1 lists the various topics that you can refer for information about securing an Oracle Identity Manager deployment:

Table 27–1 Securing a Deployment

Topic	Topic Type	Information Covered
"Managing Scheduled Tasks" on page 2-1	Hardening	Scheduled tasks and scheduled jobs. Ensure that only required scheduled tasks are enabled.
"System Properties in Oracle Identity Manager" on page 4-1	Hardening	System properties related to system behavior. Ensure that password policies and challenge questions and answers are defined.
"Creating the User Account for Installing Connectors" on page 6-7	Hardening	Specific permissions required to install connectors.
"Enabling Secure Cookies" on page 9-1	Hardening	Enabling Oracle Identity Manager to work over SSL.
"Enabling SSL Between Identity Virtualization Library (libOVD) and the Directory Server" on page 10-5	Hardening	Instructions specific to Microsoft Active Directory, iPanet Directory Server, and Oracle Internet Directory for Identity Virtualization Library (libOVD)
"Configuring LDAP Authentication When LDAP Synchronization is Enabled" on page 10-10	Hardening	Enabling LDAP authentication.
"URL Changes Related to Oracle Identity Manager" on page 12-1	Hardening	Steps to make the corresponding changes in Oracle Identity Manager and Oracle WebLogic configuration for any change in the integrated and dependent applications
"Password Changes Related to Oracle Identity Manager" on page 12-6	Hardening	Steps to make the changes to the password in Oracle Identity Manger and Oracle WebLogic configuration for any change in the dependent or integrated products.
"Configuring SSL for Oracle Identity Manager" on page 12-9	Hardening	Securing Oracle Identity Manager by configuring SSL.
"Managing Password Policies" on page 14-1	Hardening	Password policy configuration.
"Adding the Trust Relation" on page 21-2	Hardening	Remote Manager SSL configuration.

Table 27–1 (Cont.) Securing a Deployment

Topic	Topic Type	Information Covered
"Configuring the Remote Manager by Using Your Own Certificate" on page 21-3	Hardening	Remote Manager configuration by using your own certificate instead of the default Oracle Identity Manager certificate.
"OES Integration" on page 1-6	Authorization	Reconciliation event access.
"Check Permissions for Roles" on page 5-16	Authorization	Permissions for role while importing and exporting roles. Check for any errors in setting data object permissions if data object is missing.
"User Management Authorization" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*	Authorization	Authorization of user management operations.
"Role Membership Inheritance" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*	Authorization	Inheritance of role by membership.
"Role Permission Inheritance" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*	Authorization	Inheritance of role by permissions.
"Default Roles" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*	Authorization	Predefined roles in Oracle Identity Manager.
"Updating Data Object Permissions" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*	Authorization	Data object permissions at the role level.
"Managing Authorization for Roles" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*	Authorization	Authorization for role management operations.
"Managing Administrative Roles" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*	Authorization	Organization administration roles.
"Managing Permitted Resources" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*	Authorization	Steps to assign and update permitted resources to the users of selected organizations.
"Organization Management Authorization" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*	Authorization	Authorization of organization management operations.
"Managing Authorization Policies" in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*	Authorization	Using authorization policies to secure Oracle Identity Manager deployment.

See Also: *Oracle Fusion Middleware Installation Guide for Oracle Identity Management* and *Oracle Fusion Middleware Enterprise Deployment Guide for Oracle Identity Management* for information about Oracle Identity Management software integrations and related security aspects

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