

Oracle® Identity Manager

Connector Guide for Novell eDirectory

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Preface

Oracle Identity Manager Connector Guide for Novell eDirectory provides information about integrating Oracle Identity Manager with Novell eDirectory.

Note: Some parts of the product and documentation still refer to the original Thor company name and Xellerate product name and will be rebranded in future releases.

Audience

This guide is intended for users who want to deploy the Oracle Identity Manager connector for Novell eDirectory.

Documentation Accessibility

Our goal is to make Oracle products, services, and supporting documentation accessible, with good usability, to the disabled community. To that end, our documentation includes features that make information available to users of assistive technology. This documentation is available in HTML format, and contains markup to facilitate access by the disabled community. Accessibility standards will continue to evolve over time, and Oracle is actively engaged with other market-leading technology vendors to address technical obstacles so that our documentation can be accessible to all of our customers. For more information, visit the Oracle Accessibility Program Web site at

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Related Documents

For more information, refer to the following documents in the Oracle Identity Manager documentation library:

- *Oracle Identity Manager Release Notes*
- *Oracle Identity Manager Installation Guide for JBoss*
- *Oracle Identity Manager Installation Guide for Oracle Containers for J2EE*
- *Oracle Identity Manager Installation Guide for WebLogic*
- *Oracle Identity Manager Installation Guide for WebSphere*
- *Oracle Identity Manager Administrative and User Console Guide*
- *Oracle Identity Manager Administrative and User Console Customization Guide*
- *Oracle Identity Manager Design Console Guide*
- *Oracle Identity Manager Tools Reference Guide*
- *Oracle Identity Manager Audit Report Developer Guide*
- *Oracle Identity Manager Best Practices Guide*
- *Oracle Identity Manager Globalization Guide*
- *Oracle Identity Manager Glossary of Terms*

The following document is available in the Oracle Identity Manager Connector Pack documentation library:

- *Oracle Identity Manager Connector Framework Guide*

Documentation Updates

Oracle is committed to delivering the best and most recent information available. For information about updates to the Oracle Identity Manager 9.0.3 connector documentation set, visit Oracle Technology Network at

<http://www.oracle.com/technology/documentation/index.html>

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.
<i>italic</i>	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.

What's New in the Oracle Identity Manager Connector for Novell eDirectory?

This chapter provides an overview of the updates made to the connector and documentation for Novell eDirectory in release 9.0.3 of the Oracle Identity Manager connector pack.

See Also: The 9.0.2 release of this guide for information about updates that were new for the 9.0.2 release

The updates discussed in this chapter are divided into the following categories:

- [Software Updates](#)
These include updates made to the connector software.
- [Documentation-Specific Updates](#)
These include major changes made to the connector documentation. These changes are not related to software updates.

See Also: *Oracle Identity Manager Release Notes*

Software Updates

This section discusses the following software updates implemented in this release of the connector.

Enhancement in the Multilanguage Support Feature

In addition to the three languages supported by the earlier release, this release of the connector supports seven new languages. All the supported languages are listed in the "[Multilanguage Support](#)" section on page 1-2.

Support for OC4J

Earlier releases of the connector supported the following application servers:

- JBoss Application Server
- BEA WebLogic
- IBM WebSphere

This release of the connector also supports Oracle Containers for J2EE (OC4J).

Documentation-Specific Updates

The following documentation-specific updates have been made in this release of the guide:

- In the "[Supported Functionality](#)" section on page 1-1, the following functions have been added:
 - Reconciliation Insert Received
 - Reconciliation Update Received
- In the "[Enabling Logging](#)" section on page 2-4, instructions for each of the application servers that are supported by this release of the connector have been added. In "[Running Test Cases](#)" section on page 3-1, Step 3 describing how to enable logging has been removed.
- In the "[Defining IT Resources](#)" section on page 2-6, the default values of the `Admin ID` and `Root DN` parameters have been modified.
- In the "[Lookup Fields Reconciliation Scheduled Task](#)" section on page 2-9:
 - Corrections have been made in the sample values for the `LookupCodeName`, `ObjectClass`, `SearchContext`, and `CodeKeyRTrimStr` attributes.
 - The `AttrTask` attribute has been added.
- In the "[User Reconciliation Scheduled Task](#)" section on page 2-10, the default value of the `UserContainer` attribute has been modified.
- In the "[Step 6: Compiling Adapters](#)" section on page 2-11, the instruction about restarting the node has been removed from Step 4 of the procedure to compile adapters.
- In the "[Troubleshooting](#)" section on page 3-2, the table has been broken down into multiple tables on the basis of the type of error.

About the Connector

Oracle Identity Manager automates access rights management, security, and provisioning of IT resources. Oracle Identity Manager connectors are used to integrate Oracle Identity Manager with third-party applications. The connector for Novell eDirectory is used to integrate Oracle Identity Manager with Novell eDirectory.

Note: Oracle Identity Manager connectors were referred to as *resource adapters* prior to the acquisition of Thor Technologies by Oracle.

This chapter contains the following sections:

- [Supported Functionality](#)
- [Multilanguage Support](#)
- [Reconciliation Module](#)
- [Provisioning Module](#)
- [Files and Directories That Comprise the Connector](#)
- [Determining the Release Number of the Connector](#)

Supported Functionality

The following table lists the functions that are available with this connector.

Process Task	Type	Description
Create User	Provisioning	Creates a user in Novell eDirectory
Delete User	Provisioning	Deletes a user in Novell eDirectory
Enable User	Provisioning	Enables a user in Novell eDirectory
Disable User	Provisioning	Disables a user in Novell eDirectory
Move User	Provisioning	Moves a user from one container to another in Novell eDirectory
Update User Password	Provisioning	Updates the password of a user in Novell eDirectory
Add User to Group	Provisioning	Adds a user to a group in Novell eDirectory
Remove User from Group	Provisioning	Removes a user from a group in Novell eDirectory

Process Task	Type	Description
Assign Role to User	Provisioning	Assigns a role to a user in Novell eDirectory
Remove Assigned Role from User	Provisioning	Removes a role from a user in Novell eDirectory
Assign Trustee Right to User	Provisioning	Adds a trustee right to a user in Novell eDirectory
Remove Trustee Right from User	Provisioning	Removes a trustee right from a user in Novell eDirectory
Add Network Address Restriction to User	Provisioning	Adds a network address restriction to a user in Novell eDirectory
Remove Network Address Restriction from User	Provisioning	Removes a network address restriction from a user in Novell eDirectory
Create User	Reconciliation	Creates a user in Oracle Identity Manager
Delete User	Reconciliation	Deletes a user from Oracle Identity Manager
Enable User	Reconciliation	Enables a user in Oracle Identity Manager
Disable User	Reconciliation	Disables a user in Oracle Identity Manager
Move User	Reconciliation	Moves a user from one container to another in Oracle Identity Manager
Add User to Group	Reconciliation	Adds a user to a group in Oracle Identity Manager
Remove User from Group	Reconciliation	Removes a user from a group in Oracle Identity Manager
Assign Role to User	Reconciliation	Assigns a role to a user in Oracle Identity Manager
Remove Assigned Role from User	Reconciliation	Removes a role from a user in Oracle Identity Manager
Assign Trustee Right to User	Reconciliation	Adds a trustee right to a user in Oracle Identity Manager
Remove Trustee Right from User	Reconciliation	Removes a trustee right from a user in Oracle Identity Manager
Add Network Address Restriction to User	Reconciliation	Adds a network address restriction to a user in Oracle Identity Manager
Remove Network Address Restriction from User	Reconciliation	Removes a network address restriction from a user in Oracle Identity Manager
Reconciliation Insert Received	Reconciliation	Inserts a user in Oracle Identity Manager
Reconciliation Update Received	Reconciliation	Updates a user in Oracle Identity Manager

See Also: [Appendix A](#) for information about attribute mappings between Oracle Identity Manager and Novell eDirectory

Multilanguage Support

This release of the connector supports the following languages:

- English
- Brazilian Portuguese
- French
- German
- Italian
- Japanese
- Korean
- Simplified Chinese
- Spanish
- Traditional Chinese

See Also: *Oracle Identity Manager Globalization Guide* for information about supported special characters

Reconciliation Module

This section discusses the elements that the reconciliation class extracts from the target system to construct reconciliation event records.

Reconciliation can be divided into the following types:

- [Lookup Fields Reconciliation](#)
- [User Reconciliation](#)

Lookup Fields Reconciliation

Lookup fields reconciliation involves reconciling group, role, and profile master data.

User Reconciliation

User reconciliation involves reconciling the fields discussed in this section.

Reconciled Resource Object Fields

The following fields are reconciled:

Note: These fields do not have the `ldap` prefix.

- User ID
- First Name
- Last Name
- Middle Name
- Department
- Location
- Telephone
- Email

- Communication Language
- Timezone
- Logon Script
- Title
- Profile
- Organization Unit
- Server Name
- Security Group (multiple group names can be entered)
- Role
 - Role Name
 - Scope
 - Inheritance
- Trustee Rights
 - Property
 - Supervisor
 - Read
 - Write
 - Compare
 - Add Self
- Network Address

Reconciled Xellerate User Fields

The following fields are reconciled only if reconciliation is implemented in trusted mode:

- User ID
- Password
- Organization
- First Name
- Last Name
- Xellerate Type
- Role

Provisioning Module

The following fields are provisioned:

- User ID
- First Name
- Last Name
- Middle Name

- Department
- Location
- Telephone
- Email
- Communication Language
- Timezone
- Logon Script
- Title
- Profile
- Organization Unit
- Server Name
- Security Group
- Role
 - Role Name
 - Scope
 - Inheritance
- Trustee Rights
 - Property
 - Supervisor
 - Read
 - Write
 - Compare
 - Add Self
- Network Address

Files and Directories That Comprise the Connector

The files and directories that comprise this connector are compressed in the following directory on the installation media:

Directory Servers\Novell eDirectory

These files and directories are listed in the following table.

File in the Installation Media Directory	Description
lib\eDirProv.jar	This JAR file contains the class files required for provisioning and reconciliation.

File in the Installation Media Directory	Description
Files in the <code>resources</code> directory	Each of these resource bundle files contains language-specific information that is used by the connector. Note: A resource bundle is a file containing localized versions of the text strings that are displayed on the user interface of Oracle Identity Manager. These text strings include GUI element labels and messages displayed on the Administrative and User Console.
Files in the <code>troubleshoot</code> directory	These files are used to implement test cases that are run by using the troubleshooting utility.
<code>xml\edirResourceObject.xml</code>	This XML file contains definitions for the following components of the connector: <ul style="list-style-type: none"> ■ IT resource type ■ Custom process form ■ Process tasks and adapters (along with their mappings) ■ Resource object ■ Provisioning process ■ Pre-populate rules ■ Reconciliation process ■ Lookup definitions
<code>xml\edirXLResourceObject.xml</code>	This XML file contains the configuration for the Xellerate User. You must import this file only if you plan to use the connector in trusted source reconciliation mode.

Note: The files in the `troubleshoot` directory are used only to run tests on the connector.

The "[Step 2: Copying the Connector Files and External Code](#)" section on page 2-2 provides instructions to copy these files into the required directories.

Determining the Release Number of the Connector

To determine the release number of the connector that you have deployed:

1. Extract the contents of the `edirProv.jar` file. For a connector that has been deployed, this file is in the following directory:
`OIM_home\xellerate\JavaTasks`
2. Open the `manifest.mf` file in a text editor. The `manifest.mf` file is one of the files bundled inside the `edirProv.jar` file.

In the `manifest.mf` file, the release number of the connector is displayed as the value of the `Version` property.

See Also: *Oracle Identity Manager Design Console Guide*

Deploying the Connector

Deploying the connector involves the following steps:

- [Step 1: Verifying Deployment Requirements](#)
- [Step 2: Copying the Connector Files and External Code](#)
- [Step 3: Configuring the Oracle Identity Manager Server](#)
- [Step 4: Importing the Connector XML Files](#)
- [Step 5: Configuring Reconciliation](#)
- [Step 6: Compiling Adapters](#)
- [Step 7: Configuring SSL](#)

If you want to configure the connector for multiple installations of Novell eDirectory, then perform the following procedure:

- [Configuring the Connector for Multiple Installations of the Target System](#)

Step 1: Verifying Deployment Requirements

The following table lists the deployment requirements for the connector.

Item	Requirement
Oracle Identity Manager	Oracle Identity Manager release 8.5.3 or later
Target systems	Novell eDirectory 8.7.3
Target system host platforms	The target system host platform can be any one of the following: <ul style="list-style-type: none"> ■ Microsoft Windows 2000 ■ Microsoft Windows 2003 ■ Red Hat Advanced Server 2.1
External code	ldap.jar Refer to " Step 2: Copying the Connector Files and External Code " on page 2-2 for information about downloading this JAR file.
Target system user account	Novell eDirectory user account to which the Supervisor right has been assigned You provide the credentials of this user account while performing the procedure in the " Defining IT Resources " section on page 2-6.

Step 2: Copying the Connector Files and External Code

The connector files to be copied and the directories to which you must copy them are given in the following table.

Note: The directory paths given in the first column of this table correspond to the location of the connector files in the following directory on the installation media:

Directory Servers\Novell eDirectory

Refer to the "[Files and Directories That Comprise the Connector](#)" section on page 1-5 for more information about these files.

File in the Installation Media Directory	Destination Directory
lib\eDirProv.jar	<i>OIM_home</i> \xellerate\eDir\lib <i>OIM_home</i> \xellerate\JavaTasks
Files in the resources directory	<i>OIM_home</i> \xellerate\connectorResources
Files in the troubleshoot directory	<i>OIM_home</i> \xellerate\eDir\troubleshoot
Files in the xml directory	<i>OIM_home</i> \xellerate\eDir\xml

To copy the external code into the required directories:

1. Log on to the Novell Web site at
http://developer.novell.com/wiki/index.php/Special:Downloads/jldap/builds/netware_windows/
2. Download the following file from the Novell Web site:
novell-jldap-devel-2005.10.03-1netware_windows.zip

The size of the file is 11.1 MB.
3. Extract the contents of the file that you downloaded in Step 2.
4. Copy the ldap.jar file from the novell-jldap-devel-2005.10.03-1netware_windows\jldap_2005.10.03\lib directory to the *OIM_home*\xellerate\JavaTasks directory on the Oracle Identity Manager server.

Note: While installing Oracle Identity Manager in a clustered environment, you copy the contents of the installation directory to each node of the cluster. Similarly, you must copy the connectorResources directory and the JAR files to the corresponding directories on each node of the cluster.

Step 3: Configuring the Oracle Identity Manager Server

Configuring the Oracle Identity Manager server involves performing the following procedures:

Note: In a clustered environment, you must perform this step on each node of the cluster.

- [Changing to the Required Input Locale](#)
- [Clearing Content Related to Connector Resource Bundles from the Server Cache](#)
- [Enabling Logging](#)

Changing to the Required Input Locale

Changing to the required input locale (language and country setting) involves installing the required fonts and setting the required input locale.

To set the required input locale:

Note: Depending on the operating system used, you may need to perform this procedure differently.

1. Open Control Panel.
2. Double-click **Regional Options**.
3. On the Input Locales tab of the Regional Options dialog box, add the input locale that you want to use and then switch to the input locale.

Clearing Content Related to Connector Resource Bundles from the Server Cache

Whenever you add a new resource bundle file in the `OIM_home\xellerate\connectorResources` directory or make a change in an existing resource bundle file, you must clear content related to connector resource bundles from the server cache.

To clear content related to connector resource bundles from the server cache:

1. In a command window, change to the `OIM_home\xellerate\bin` directory.
2. Enter one of the following commands:

Note: You must perform Step 1 before you perform this step. If you run the command as follows, then an exception is thrown:

```
OIM_home\xellerate\bin\batch_file_name
```

- On Microsoft Windows:
`PurgeCache.bat ConnectorResourceBundle`
- On UNIX:
`PurgeCache.sh ConnectorResourceBundle`

In this command, `ConnectorResourceBundle` is one of the content categories that you can remove from the server cache. Refer to the following file for information about the other content categories:

```
OIM_home\xellerate\config\xlConfig.xml
```

Note: You can ignore the exception that is thrown when you perform Step 2.

Enabling Logging

When you enable logging, Oracle Identity Manager automatically stores in a log file information about events that occur during the course of provisioning and reconciliation operations. To specify the type of event for which you want logging to take place, you can set the log level to one of the following:

- ALL
This level enables logging for all events.
- DEBUG
This level enables logging of information about fine-grained events that are useful for debugging.
- INFO
This level enables logging of informational messages that highlight the progress of the application at coarse-grained level.
- WARN
This level enables logging of information about potentially harmful situations.
- ERROR
This level enables logging of information about error events that may still allow the application to continue running.
- FATAL
This level enables logging of information about very severe error events that could cause the application to stop functioning.
- OFF
This level disables logging for all events.

The file in which you set the log level and the log file path depend on the application server that you use:

- **For JBoss Application Server**

To enable logging:

1. In the *JBoss_home*\server\default\conf\log4j.xml file, locate the following lines:

```
<category name="XELLERATE">  
  <priority value="log_level"/>  
</category>
```

2. In the second XML code line, replace *log_level* with the log level that you want to set. For example:

```
<category name="XELLERATE">  
  <priority value="INFO"/>  
</category>
```

After you enable logging, log information is written to the following file:

JBoss_home\server\default\log\server.log

- **For IBM WebSphere:**

To enable logging:

1. Add the following line in the *OIM_home\xellerate\config\log.properties* file:

```
log4j.logger.XELLERATE=log_level
```

2. In this line, replace *log_level* with the log level that you want to set.

For example:

```
log4j.logger.XELLERATE=INFO
```

After you enable logging, log information is written to the following file:

WebSphere_home\AppServer\logs\server_name\startServer.log

- **For BEA WebLogic**

To enable logging:

1. Add the following line in the *OIM_home\xellerate\config\log.properties* file:

```
log4j.logger.XELLERATE=log_level
```

2. In this line, replace *log_level* with the log level that you want to set.

For example:

```
log4j.logger.XELLERATE=INFO
```

After you enable logging, log information is written to the following file:

WebLogic_home\user_projects\domains\domain_name\server_name\server_name.log

- **For OC4J**

To enable logging:

1. Add the following line in the *OIM_home\xellerate\config\log.properties* file:

```
log4j.logger.XELLERATE=log_level
```

2. In this line, replace *log_level* with the log level that you want to set.

For example:

```
log4j.logger.XELLERATE=INFO
```

After you enable logging, log information is written to the following file:

OC4J_home\opmn\logs\default_group-home~default_group~1.log

Step 4: Importing the Connector XML Files

To import the connector XML files into Oracle Identity Manager:

1. Open the Oracle Identity Manager Administrative and User Console.
2. Click the **Deployment Management** link on the left navigation bar.

3. Click the **Import** link under Deployment Management. A dialog box for locating files is displayed.
4. Locate and open the `eDirResourceObject.xml` file, which is in the `OIM_home\xellerate\eDir\xml` directory. Details of this XML file are shown on the File Preview page.
5. Click **Add File**. The Substitutions page is displayed.
6. Click **Next**. The Confirmation page is displayed.
7. Click **Next**. The Provide IT Resource Instance Data page for the `eDirectory IT Resource` IT resource is displayed.
8. Specify values for the parameters of the `eDirectory IT Resource` IT resource. Refer to the table in the "[Defining IT Resources](#)" section on page 2-6 for information about the values to be specified.
9. Click **Next**. The Provide IT Resource Instance Data page for a new instance of the `LDAP Server` IT resource type is displayed.
10. Click **Skip** to specify that you do not want to define another IT resource. The Confirmation page is displayed.

See Also: If you want to define another IT resource, then refer to *Oracle Identity Manager Tools Reference Guide* for instructions.

11. Click **View Selections**.

The contents of the XML file are displayed on the Import page. You may see a cross-shaped icon along with some nodes. Remove these nodes by right-clicking each node and then selecting **Remove**.

12. Click **Import**. The connector XML file is imported into Oracle Identity Manager.

After you import the connector XML files, proceed to the "[Step 5: Configuring Reconciliation](#)" section on page 2-7.

Defining IT Resources

You must specify values for the `eDirectory IT Resource` IT resource parameters listed in the following table.

Parameter	Description
Admin ID	DN value of the user who has admin rights on the Novell eDirectory server Default value: <code>cn=Admin,o=PXED-DEV</code>
Admin Password	Password of the administrator
Server Address	Server address of the Novell eDirectory server
Root DN	Base DN on which all user operations are to be carried out Default value: <code>o=PXED-DEV</code>
Port	Port number to connect to the target Novell eDirectory server Default value: 389

Parameter	Description
SSL	<p>Specifies whether or not SSL is used to secure communication between Oracle Identity Manager and Novell eDirectory.</p> <p>The value can be <code>true</code> or <code>false</code>.</p> <p>Default value: <code>false</code></p> <p>Note: It is recommended that you enable SSL to secure communication with the target system.</p>
Last Recon TimeStamp	<p>For the first reconciliation run, the time-stamp value is not set. For subsequent rounds of reconciliation, the time at which the previous round of reconciliation was completed is stored in this parameter.</p> <p>Default value: <code>20060519120000Z</code></p> <p>In this value:</p> <ul style="list-style-type: none"> ▪ 2006 is the year ▪ 05 is the month ▪ 19 is the day of the month ▪ 12 is the hour ▪ 00 is the minute ▪ 00 is the second ▪ The letter Z is required at the end
Prov Attribute Lookup Code	<p>Name of the lookup definition that has the target attribute mappings required for provisioning</p> <p>Default value: <code>AttrName.Prov.Map.EDIR</code></p> <p>Note: This value must not be changed.</p>
Recon Attribute Lookup Code	<p>Name of the lookup definition that has the target attribute mappings required for reconciliation</p> <p>Default value: <code>AttrName.Recon.Map.EDIR</code></p> <p>Note: This value must not be changed.</p>
Use XL Org Structure	<p>If set to <code>true</code>, then the Oracle Identity Manager Organization structure is used during provisioning and reconciliation. If set to <code>false</code>, then the value of the Organization field in the process form is used for provisioning and the organization or container in the target LDAP is used for reconciliation.</p> <p>Default value: <code>false</code></p>

After you specify values for these IT resource parameters, proceed to Step 9 of the procedure to import the connector XML file.

Step 5: Configuring Reconciliation

Configuring reconciliation involves the following steps:

- [Configuring Trusted Source Reconciliation](#)
- [Creating the Reconciliation Scheduled Tasks](#)

Configuring Trusted Source Reconciliation

Note: Perform this step of the procedure only if you want to configure trusted source reconciliation. Only one connector can be configured for trusted source reconciliation. If you import the `eDirXLResourceObject.xml` file while you have another trusted source configured, then both connector reconciliations would stop working.

Refer to *Oracle Identity Manager Connector Framework Guide* for conceptual information about reconciliation configurations.

To configure trusted source reconciliation, you must first import the XML file for trusted source reconciliation as follows:

1. Open the Oracle Identity Manager Administrative and User Console.
2. Click the **Deployment Management** link on the left navigation bar.
3. Click the **Import** link under Deployment Management. A dialog box for locating files is displayed.
4. Locate and open the `eDirXLResourceObject.xml` file, which is in the `OIM_home\xellerate\eDir\xml` directory. Details of this XML file are shown on the File Preview page.
5. Click **Add File**. The Substitutions page is displayed.
6. Click **Next**. The Confirmation page is displayed.
7. Click **Import**.
8. In the message that is displayed, click **Import** to confirm that you want to import the XML file and then click **OK**.

Then, set the value of the `TrustedSource` reconciliation scheduled task attribute to `True` while performing the procedure described in the following section.

Creating the Reconciliation Scheduled Tasks

To create the scheduled tasks for lookup fields and user reconciliations:

1. Open the Oracle Identity Manager Design Console.
2. Expand the **Xellerate Administration** folder.
3. Select **Task Scheduler**.
4. Click **Find**. The details of the predefined scheduled tasks are displayed on two different tabs.
5. For the first scheduled task, enter a number in the **Max Retries** field. This number represents the number of times Oracle Identity Manager must attempt to complete the task before assigning the `ERROR` status to the task.
6. Ensure that the **Disabled** and **Stop Execution** check boxes are not selected.
7. In the Start region, double-click the **Start Time** field. From the date-time editor that is displayed, select the date and time at which you want the task to run.
8. In the Interval region, set the following schedule parameters:

- To set the task to run on a recurring basis, select the **Daily**, **Weekly**, **Recurring Intervals**, **Monthly**, or **Yearly** option.

If you select the **Recurring Intervals** option, then you must also specify the time interval at which you want the task to run on a recurring basis.

- To set the task to run only once, select the **Once** option.
9. Provide values for the attributes of the scheduled task. Refer to the "[Specifying Values for the Scheduled Task Attributes](#)" section on page 2-9 for information about the values to be specified.

See Also: *Oracle Identity Manager Design Console Guide* for information about adding and removing task attributes

10. Click **Save**. The scheduled task is created. The `INACTIVE` status is displayed in the **Status** field, because the task is not currently running. The task is run at the date and time that you set in Step 7.
11. Repeat Steps 5 through 10 to define the second scheduled task.

After you create both scheduled tasks, proceed to the "[Step 6: Compiling Adapters](#)" section on page 2-11.

Specifying Values for the Scheduled Task Attributes

This section provides information about the attribute values to be specified for the following scheduled tasks:

- [Lookup Fields Reconciliation Scheduled Task](#)
- [User Reconciliation Scheduled Task](#)

Lookup Fields Reconciliation Scheduled Task You must specify values for the following attributes of the lookup fields reconciliation scheduled task.

Note: Attribute values are predefined in the connector XML file that you import. Specify values only for those attributes that you want to change.

You must create a scheduled task for each master lookup data reconciliation: organizational unit, group, role, and profile.

Attribute	Description	Sample/Default Value
<code>AttrTask</code>	Name of the attribute task	<ul style="list-style-type: none"> ■ For organizational units: ou ■ For groups, roles, and profiles: cn

Attribute	Description	Sample/Default Value
LookupCodeName	Name of the lookup definition to which the values are to be reconciled	<ul style="list-style-type: none"> ■ For Organizational units: Lookup.EDIR.Organization ■ For groups: Lookup.EDIR.Groups ■ For roles: Lookup.EDIR.AssignedRoles ■ For profiles: Lookup.EDIR.Profiles
ITResourceName	Name of the IT resource for setting up a connection with Novell eDirectory	eDirectory IT Resource
SearchContext	Search context to be used for searching for users	o=PXED-DEV
ObjectClass	Name of the object class	<ul style="list-style-type: none"> ■ For Organizational units: OrganizationalUnit ■ For groups: group ■ For roles: rBSRole ■ For profiles: profile
CodeKeyLTrimStr	String value for left-trimming the value obtained from the search If there is nothing to be trimmed, then specify the value [NONE] .	cn= or uid=
CodeKeyRTrimStr	String value for right-trimming the value obtained from the search If there is nothing to be trimmed, then specify the value [NONE] .	, o=PXED-DEV
ReconMode	Specify REFRESH to completely refresh the existing lookup. Specify UPDATE if you want to update the lookup with new values.	REFRESH or UPDATE

After you specify values for these scheduled task attributes, proceed to Step 10 of the procedure to create scheduled tasks.

User Reconciliation Scheduled Task You must specify values for the following attributes of the user reconciliation scheduled task.

Note: Attribute values are predefined in the connector XML file that you import. Specify values only for those attributes that you want to change.

Attribute	Description	Sample/Default Value
ITResourceName	Name of the IT resource for setting up a connection with Novell eDirectory	eDirectory IT Resource
ResourceObjectName	Name of the resource object into which users need to be reconciled	eDirectory User
XLDeleteUsersAllowed	If this attribute is set to <code>true</code> , then the Delete reconciliation event is started. Users who are deleted from the target system are removed from Oracle Identity Manager. This requires all the users on the target system to be compared with all the users in Oracle Identity Manager. Note: This process affects performance.	<code>true</code>
UserContainer	DN value from where users are reconciled into Oracle Identity Manager	<code>o=PXED-DEV</code>
Keystore	Directory path to the Novell eDirectory keystore This is required to make a secure SSL connection. If an SSL connection is not required, then specify the value <code>[NONE]</code> .	<code>E:\j2sdk1.4.2_05\jre\lib\security\cacerts</code> <code>or</code> <code>[NONE]</code>
TrustedSource	Specifies whether or not trusted source reconciliation is to be performed The value can be <code>True</code> or <code>False</code> .	<code>False</code>
Xellerate Type	Default Xellerate Type for the Xellerate User	End-User Administrator
Password	Default password for the Xellerate User	Dummy123
Organization	Default organization of the Xellerate User	Xellerate Users
Role	Default role for the Xellerate User	Consultant

After you specify values for these scheduled task attributes, proceed to Step 10 of the procedure to create scheduled tasks.

Step 6: Compiling Adapters

The following adapters are imported into Oracle Identity Manager when you import the connector XML file:

- eDir Create User
- eDir Delete User
- eDir Modify User
- eDir Move User
- eDir Add User to Group
- eDir Remove User from Group
- eDir Add Trustee Right to User
- eDir Remove Trustee Right from User
- eDir Add Assigned Role to User

- eDir Remove Assigned Role from User
- eDir Add Network Restriction
- eDir Remove Network Restriction
- eDir PP String

You must compile these adapters before you can use them to provision accounts on the target system.

To compile adapters by using the Adapter Manager form:

1. Open the Adapter Manager form.
2. To compile all the adapters that you import into the current database, select **Compile All**.

To compile multiple (but not all) adapters, select the adapters you want to compile. Then, select **Compile Selected**.

Note: Click **Compile Previously Failed** to recompile only those adapters that were not compiled successfully. Such adapters do not have an OK compilation status.

3. Click **Start**. Oracle Identity Manager compiles the selected adapters.
4. If Oracle Identity Manager is installed in a clustered environment, then copy the compiled adapters from the *OIM_home\xellerate\Adapter* directory to the same directory on each of the other nodes of the cluster. If required, overwrite the adapter files on the other nodes.

To view detailed information about an adapter:

1. Highlight the adapter in the Adapter Manager form.
2. Double-click the row header of the adapter, or right-click the adapter.
3. Select **Launch Adapter** from the shortcut menu that is displayed. Details of the adapter are displayed.

Note: To compile one adapter at a time, use the Adapter Factory form. Refer to *Oracle Identity Manager Tools Reference Guide* for information about using the Adapter Factory and Adapter Manager forms.

Step 7: Configuring SSL

Note: This is an optional step of the deployment procedure.

To enable SSL connectivity between Oracle Identity Manager and the target Novell eDirectory:

1. Import the certificate from the target system into the JSDK (the JSDK that is used during installation of Oracle Identity Manager Server) cacerts keystore as follows:

```
keytool -import -alias alias_name -file
certificate_file_name_with_complete_path -keystore
```

```
java_home\jre\lib\security\cacerts
```

2. Restart the Oracle Identity Manager server.
3. In the `eDirectory IT Resource IT` resource definition:
 - Set the `SSL` parameter value to `true`.
 - Set the `Port` parameter value to the SSL port number. Typically, this number is 636.

Configuring the Connector for Multiple Installations of the Target System

Note: Perform this procedure only if you want to configure the connector for multiple installations of Novell eDirectory. Refer to *Oracle Identity Manager Design Console Guide* for detailed instructions on performing each step of this procedure.

To configure the connector for multiple installations of the target system:

1. Create and configure one resource object for each target system installation.

The Resource Objects form is in the Resource Management folder. The `eDirectory User` resource object is created when you import the connector XML file. You can use this resource object as the template for creating the remaining resource objects.

2. Create and configure one IT resource for each resource object.

The IT Resources form is in the Resource Management folder. The `eDirectory IT Resource IT` resource is created when you import the connector XML file. You can use this IT resource as the template for creating the remaining IT resources, of the same resource type.

3. Design one process form for each resource object.

The Form Designer form is in the Development Tools folder. The following process forms are created when you import the connector XML file:

- `UD_EDIR_USR` (main form, eDirectory User)
- `UD_EDIR_GRP` (child form, eDirectory Security Group)
- `UD_EDIR_ROL` (child form, eDirectory Assigned Role)
- `UD_EDIR_NET` (child form, eDirectory Network Address Restriction)
- `UD_EDIR_RIG` (child form, eDirectory Trustee Rights)

You can use these process forms as templates for creating the remaining process forms.

4. Create and configure one process definition for each resource object.

The Process Definition form is in the Process Management folder. The `iPlanet User` process definition is created when you import the connector XML file. You can use this process definition as the template for creating the remaining process definitions.

While creating process definitions for each target system installation, the following steps that you must perform are specific to the creation of each process definition:

- From the **Object Name** lookup field, select the resource object that you create in Step 1.
 - From the **Table Name** lookup field, select the process form that you create in Step 3.
 - While mapping the adapter variables for the IT Resource data type, ensure that you select the IT resource that you create in Step 2 from the **Qualifier** list.
5. Configure reconciliation for each target system installation. Refer to the "[Step 5: Configuring Reconciliation](#)" section on page 2-7 for instructions. Note that only the values of the following attributes are to be changed for each reconciliation scheduled task:
- `ITResourceName`
 - `ResourceObjectName`
 - `TrustedSource`
- Set the `TrustedSource` attribute to `True` for the Novell eDirectory installation that you want to designate as a trusted source. You can designate either a single or multiple installations of Novell eDirectory as the trusted source. For the remaining Novell eDirectory installations, set this attribute to `False`.
6. If required, modify the fields to be reconciled for the Xellerate User resource object.

When you use the Administrative and User Console to perform provisioning, you can specify the IT resource corresponding to the Novell eDirectory installation to which you want to provision the user.

Testing and Troubleshooting

After you deploy the connector, you must test it to ensure that it functions as expected. This chapter discusses the following topics related to connector testing:

- [Running Test Cases](#)
- [Troubleshooting](#)

Running Test Cases

You can use the troubleshooting utility to identify the cause of problems associated with connecting to the target system and performing basic operations on the target system.

To use the troubleshooting utility:

1. Specify the required values in the `global.properties` file.

This file is in the `OIM_home\xellerate\edir\troubleshoot` directory. The following table describes the sections of this file in which you must provide information for running the tests.

Section	Information
Novell eDirectory Server Parameters	Parameters required to connect to Novell eDirectory Refer to the " Defining IT Resources " section on page 2-6 for information about the values that you must provide.
Create User Parameters	Values required to create a user on the target system
Modify User Parameters	Values required to modify a user
Delete User Parameters	DN of the user to be deleted

2. Add the following to the `CLASSPATH` environment variable:

```
OIM_home\xellerate\lib\xlLogger.jar
OIM_home\xellerate\lib\xlUtils.jar
OIM_home\xellerate\JavaTasks\edirProv.jar
OIM_home\xellerate\JavaTasks\ldap.jar
OIM_home\xellerate\ext\log4j-1.2.9.jar
```

3. Create an ASCII-format copy of the `global.properties` file as follows:

Note: You must perform this procedure every time you make a change in the contents of the `global.properties` file.

- a. In a command window, change to the following directory:

```
OIM_home\xellerate\edir\troubleshoot
```

- b. Enter the following command:

```
native2ascii global.properties troubleshoot.properties
```

The `troubleshoot.properties` file is created when you run the `native2ascii` command. The contents of this file are an ASCII-format copy of the contents of the `global.properties` file.

4. Run the following tests:

- Enter the following command to create a Novell eDirectory user:

```
java
-DpropertyFile=OIM_home\xellerate\edir\troubleshoot\troubleshoot.properties
-Dlog4j.configuration=file:\OIM_home\xellerate\edir\troubleshoot\log.properties
TroubleShootingUtilityLdap createUser
```

- Enter the following command to modify a Novell eDirectory user:

```
java
-DpropertyFile=OIM_home\xellerate\edir\troubleshoot\troubleshoot.properties
-Dlog4j.configuration=file:\OIM_home\xellerate\edir\troubleshoot\log.properties
TroubleShootingUtilityLdap modifyUser
```

- Enter the following command to delete a Novell eDirectory user:

```
java
-DpropertyFile=OIM_home\xellerate\edir\troubleshoot\troubleshoot.properties
-Dlog4j.configuration=file:\OIM_home\xellerate\edir\troubleshoot\log.properties
TroubleShootingUtilityLdap deleteUser
```

Troubleshooting

This section provides instructions for identifying and resolving some commonly encountered errors of the following types:

- [Connection Errors](#)
- [Create User Errors](#)
- [Modify User Errors](#)
- [Delete User Errors](#)

Connection Errors

The following table provides solutions to some commonly encountered connection errors.

Problem Description	Solution
<p>Oracle Identity Manager cannot establish a connection to Novell eDirectory.</p> <p>Returned Error Message: LDAP connection exception</p> <p>Returned Error Code: INVALID_CONNECTION_ERROR</p>	<ul style="list-style-type: none"> ■ Ensure that Novell eDirectory is running. ■ Ensure that Oracle Identity Manager is running. ■ Ensure that all the adapters have been compiled. ■ Use the IT Resources form to examine the Oracle Identity Manager record. Ensure that the IP address, admin ID, and admin password are correct.
<p>Target not available.</p> <p>Returned Error Message: Connection error - unable to create initial LDAP</p> <p>Returned Error Code: TARGET_UNAVAILABLE_ERROR</p>	<p>Ensure that the specified Novell eDirectory connection values are correct.</p>
<p>Returned Error Message: Connection error - unable to create initial LDAP.</p> <p>Returned Error Code: AUTHENTICATION_ERROR</p>	<p>Ensure that the specified Novell eDirectory connection values are correct.</p>

Create User Errors

The following table provides solutions to some commonly encountered Create User errors.

Problem Description	Solution
<p>Oracle Identity Manager cannot create a user.</p> <p>Returned Error Message: Required information missing</p> <p>Returned Error Code: INSUFFICIENT_INFORMATION_PROVIDED</p>	<ul style="list-style-type: none"> ■ Ensure that the specified IP address, admin ID, and administrator password are correct. ■ Ensure that the following information has been provided: <ul style="list-style-type: none"> User ID User password User container User first name User last name
<p>Oracle Identity Manager cannot create a user.</p> <p>Returned Error Message: User already exists</p> <p>Returned Error Code: USER_ALREADY_EXISTS</p>	<p>A user with the assigned ID already exists in Novell eDirectory.</p>

Problem Description	Solution
<p>Oracle Identity Manager cannot create a user.</p> <p>Returned Error Message: Connection error - unable to create initial LDAP context</p> <p>Returned Error Code: INVALID_NAMING_ERROR</p>	<ul style="list-style-type: none"> ■ Ensure that the specified Novell eDirectory connection values are correct. ■ Check if the value for an attribute violates the schema definition.
<p>Oracle Identity Manager cannot create a user.</p> <p>Returned Error Message: User creation failed</p> <p>Returned Error Code: USER_CREATION_FAILED</p>	<p>The user cannot be created because one or more attribute values violate the schema definition.</p>
<p>The Create User function failed because a value was being added to a nonexistent attribute.</p> <p>Returned Error Message: Attribute does not exist</p> <p>Returned Error Code: ATTRIBUTE_DOESNOT_EXIST</p>	<p>In the <code>AttrName.Prov.Map.EDIR</code> lookup definition, check if the decode values are valid attribute names in the target system.</p>
<p>The Create User function failed because an invalid value was specified.</p> <p>Returned Error Message: Invalid value specified for an attribute</p> <p>Returned Error Code: INVALID_ATTR_VALUE_ERROR</p>	<p>Check the values specified during user creation.</p>

Modify User Errors

The following table provides solutions to some commonly encountered Modify User errors.

Problem Description	Solution
<p>Oracle Identity Manager cannot modify the value of a user.</p> <p>Returned Error Message: Invalid attribute value or state</p> <p>Returned Error Code: INVALID_ATTR_MODIFY_ERROR</p>	<p>Check the attribute ID and value that were specified.</p>
<p>The Modify User function failed because a value was being added to a nonexistent attribute.</p> <p>Returned Error Message: Attribute does not exist</p> <p>Returned Error Code: ATTRIBUTE_DOESNOT_EXIST</p>	<ol style="list-style-type: none"> 1. From the corresponding process task, get the value specified for <code>AttrName</code> of the connector. 2. Using the name obtained in the previous step, check in the <code>AttrName.Prov.Map.EDIR</code> lookup definition if the decode value is a valid attribute name in the target.

Problem Description	Solution
<p>The Modify User function failed because an invalid value was specified.</p> <p>Returned Error Message: Invalid value specified for an attribute</p> <p>Returned Error Code: INVALID_ATTR_VALUE_ERROR</p>	<p>Check the value entered.</p>
<p>The Modify User function failed because a value was specified for an attribute that does not exist in the AttrName.Prov.Map.EDIR lookup definition.</p> <p>Returned Error Message: One or more attribute mappings are missing</p> <p>Returned Error Code: ATTR_MAPPING_NOT_FOUND</p>	<ol style="list-style-type: none"> 1. From the corresponding process task, get the value specified for AttrName of the connector. 2. Using the name obtained in the previous step, check if an entry has been made in the AttrName.Prov.Map.EDIR lookup definition.
<p>Error caused because a duplicate value was specified for an attribute.</p> <p>Returned Error Message: Duplicate value</p> <p>Returned Error Code: DUPLICATE_VALUE_ERROR</p>	<p>The attribute specified already exists for another user in the system.</p>
<p>Oracle Identity Manager cannot move a user from one container to another.</p> <p>Returned Error Message: Moving user to different container failed</p> <p>Returned Error Code: USER_MOVE_FAILED</p>	<p>Generic error. Review the log for more details.</p>
<p>Oracle Identity Manager cannot add a user to a security group.</p> <p>Returned Error Message: Group does not exist</p> <p>Returned Error Code: SEC_GROUP_DOESNOT_EXIST</p>	<p>The specified user security group does not exist in Novell eDirectory.</p>
<p>Oracle Identity Manager cannot add a user to a security group.</p> <p>Returned Error Message: User is already a member of this group</p> <p>Returned Error Code: DUPLICATE_VALUE</p>	<p>The user is already a member of the specified security group.</p>
<p>Oracle Identity Manager cannot add the trustee right to a user.</p> <p>Returned Error Message: Trustee tight already added</p> <p>Returned Error Code: DUPLICATE_VALUE</p>	<p>Check if the trustee right has already been assigned to the user in Novell eDirectory.</p>

Problem Description	Solution
<p>Oracle Identity Manager cannot add a role to a user.</p> <p>Returned Error Message: Role does not exist</p> <p>Returned Error Code: ROLE_DOESNOT_EXIST</p>	<p>The specified role for the user in Oracle Identity Manager does not exist in Novell eDirectory. Create the role in Novell eDirectory.</p>
<p>Oracle Identity Manager cannot add a role to a user.</p> <p>Returned Error Message: Error while updating user info</p> <p>Returned Error Code: USER_UPDATE_FAILED</p>	<p>Generic error. Review the log for more details.</p>
<p>Oracle Identity Manager cannot add a role to a user.</p> <p>Returned Error Message: User has already been assigned this role</p> <p>Returned Error Code: DUPLICATE_VALUE</p>	<p>The user has already been assigned this role.</p>
<p>Oracle Identity Manager cannot remove an assigned role from a user.</p> <p>Returned Error Message: Removing assigned role failed</p> <p>Returned Error Code: USER_DELETE_ASSIGNED_ROLE_FAILED</p>	<p>Generic error. Review the log for more details.</p>
<p>Oracle Identity Manager cannot add a network restriction.</p> <p>Returned Error Message: This network restriction already exists</p> <p>Returned Error Code: DUPLICATE_VALUE</p>	<p>The specified network restriction already exists for this user in Novell eDirectory.</p>

Delete User Errors

The following table provides solutions to a commonly encountered Delete User error.

Problem Description	Solution
<p>Oracle Identity Manager cannot delete a user.</p> <p>Returned Error Message: User does not exist in target</p> <p>Returned Error Code: USER_DOESNOT_EXIST</p>	<p>The specified user does not exist in Novell eDirectory.</p>

Known Issues

The following are known issues associated with this release of the connector:

- The user search operation is based only on the user ID.
- The user ID in the process form must be the same as that of the Oracle Identity Manager User login. Otherwise, reconciliation of the enable/disable status of the user and the organization update fails because these operations require direct API calls to update information.
- Some Asian languages use multibyte character sets. If the character limit for the fields in the target system is specified in bytes, then the number of Asian-language characters that you can enter in a particular field may be less than the number of English-language characters that you can enter in the same field. The following example illustrates this limitation:

Suppose you can enter 50 characters of English in the User Last Name field of the target system. If you were using the Japanese language and if the character limit for the target system fields were specified in bytes, then you would not be able to enter more than 25 characters in the same field.

Attribute Mappings Between Oracle Identity Manager and Novell eDirectory

The following table discusses attribute mappings between Oracle Identity Manager and Novell eDirectory.

Oracle Identity Manager Attribute	Novell eDirectory Attribute	Description
Logon Script	loginScript	Login script that is used to log in to Novell eDirectory
Communication Language	language	Language of communication
ldapOrgDNPrefix	ou	Organization unit for organization
ldapPassword	userPassword	Password
ldapOrgPersonObject	OrganizationalPerson	Object class
Timezone	timezone	Time zone of the Novell eDirectory system
ldapRoleObjectClass	rBSRole	Object class of role
ldapRoleDNPrefix	cn	Role object
Profile	profile	Profile
loginDisabled	loginDisabled	Disabled status login
ldapUserUniqueAttr	cn	User name attribute
ldapUserObjectClass	inetOrgPerson	Object class
ldapUserDNPrefix	cn	User object
ldapUserDisableAttr	loginDisabled	Login disable attribute
ldapObjectClass	objectclass	Object class of object class
ldapGroupObjectClass	group	Object class of group
ldapGroupMemberAttr	groupMembership	Group member attribute
ldapGroupDNPrefix	cn	Group object
ldapFirstName	givenName	First name
ldapLastName	sn	Last name
Title	title	Title
Location	l	Location
Telephone	telephoneNumber	Telephone number
Email	mail	Email address

Oracle Identity Manager		
Attribute	Novell eDirectory Attribute	Description
Department	departmentNumber	Department number
Middle Name	initials	Initials
User ID	cn	User ID
Organization Unit	o	Organization unit
ldapOrgObjectClass	organizationalUnit	Object class of organizational unit
ldapTargetResourceTimeStampField	modifyTimestamp	Time stamp of the Novell eDirectory system
ldapMultiValAttr	Security Group, Group Name Trustee Rights, Trustee Rights Role, Role Name Network Address, NetAdd	Multivalue attribute
Trustee Rights	ACL	Trustee rights
Role Name	rBSAssignedRoles	User role
NetAdd	networkAddressRestriction	Network address that is restricted for the user
First Name	givenname	First name
Last Name	sn	Last name

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