Oracle® Identity Manager

Connector Guide for Database Tables

Release 9.0.1

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Oracle Identity Manager Connector Guide for Database Tables, Release 9.0.1

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Preface

Oracle Identity Manager Connector Guide for Database Tables provides information about integrating Oracle Identity Manager with database tables.

> **Note:** This is a transitional release following Oracle's acquisition of Thor Technologies. 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 database tables.

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- *Oracle Identity Manager Release Notes*
- *Oracle Identity Manager Installation and Upgrade Guide for JBoss*
- *Oracle Identity Manager Installation and Upgrade Guide for WebLogic*
- *Oracle Identity Manager Installation and Upgrade 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 Connector Framework Guide*
- Connector guides for various third-party applications

Documentation Updates

Oracle is committed to delivering the best and most recent information available. For information about updates to the Oracle Identity Manager 9.0.1 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.
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.

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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 database tables is used to integrate Oracle Identity Manager with database tables.

> **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
- Reconciliation Module
- Files and Directories That Comprise the Connector

Supported Functionality

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

Function	Type	Description
Create User	Provisioning	Creates a user
Delete User	Provisioning	Deletes a user
Enable User or Disable User	Provisioning	Enables or disables a user
Reset User's Password	Provisioning	Resets a user's password
Update User's First Name	Provisioning	Updates a user's first name
Update User's Last Name	Provisioning	Updates a user's last name
Update User's Group	Provisioning	Updates a user's group
Update User's Title	Provisioning	Updates a user's title
Update User's Department	Provisioning	Updates a user's department

Function	Type	Description
Update User's Communication Language	Provisioning	Updates a user's communication language
Update User's Logon Language	Provisioning	Updates a user's logon language
Update User's Email Address	Provisioning	Updates a user's e-mail address
Update User's Telephone Number	Provisioning	Updates a user's telephone number
Update User's Time Zone	Provisioning	Updates a user's time zone
Update User's Date Format	Provisioning	Updates a user's date format
Update User's Role	Provisioning	Updates a user's role
Create User (Account Discovery)	Reconciliation	Reconciles new user accounts created
Delete User	Reconciliation	Reconciles user accounts that are deleted from the target system
Enable User or Disable User	Reconciliation	Reconciles user accounts that are enabled or disabled
Reset User's Password	Reconciliation	Reconciles user accounts with modified password
Update User's First name	Reconciliation	Reconciles user accounts with modified first name
Update User's Last Name	Reconciliation	Reconciles user accounts with modified last name
Update User's Group	Reconciliation	Reconciles user accounts with modified group
Update User's Title	Reconciliation	Reconciles user accounts with modified title
Update User's Department	Reconciliation	Reconciles user accounts with modified department
Update User's Communication Language	Reconciliation	Reconciles user accounts with modified communication language
Update User's Logon Language	Reconciliation	Reconciles user accounts with modified logon language
Update User's Email Address	Reconciliation	Reconciles user accounts found with modified e-mail address
Update User's Telephone Number	Reconciliation	Reconciles user accounts found with modified telephone number
Update User's Time Zone	Reconciliation	Reconciles user accounts found with modified time zone
Update User's Date Format	Reconciliation	Reconciles user accounts with modified date format
Update User's Decimal Notation	Reconciliation	Reconciles user accounts with modified decimal notation

Function	Type	Description
Update User's Role	Reconciliation	Reconciles user accounts found with modified role

Reconciliation Module

The reconciliation module handles the reconciliation of new, updated, and deleted profiles in the target database application. It creates a reconciliation event for each user profile to be reconciled.

The default data fields of each reconciliation event record must be taken from the configuration XML file. For reconciliation of new or updated user profiles, the default data fields are declared in the reconcileCreateUpdate section of the XML file. For reconciliation of deleted user profiles, the default data elements are declared in the reconcileDelete section. The reconciliation configuration XML code for reconciliation provides the flexibility for enabling or disabling the reconciliation of created, updated, and deleted users.

The following sections describe the configuration XML file content for the following reconciliation types:

- Reconciliation of New and Updated User Profiles
- Reconciliation of Deleted Users

Reconciliation of New and Updated User Profiles

The following is sample code from the configuration XML file for reconciliation of new and updated user profiles:

```
<operation name = "reconcileCreateUpdate" enabled="true">
    <task table_name="XELUSER1.MDL2_USER_PROF" xeltask_type="select">
        <column table_name="XELUSER1.MDL2_USER_PROF" col_name="USR_ID"
        data_type="VARCHAR2" data_typ_size="20" col_info="primary"
        required="true"
        col_type="xellerate" xel_data_source="xel_usr_id" />
        <column table_name="XELUSER1.MDL2_USER_ADDN_DET" col_name="USR_ID"
        data_type="VARCHAR2" data_typ_size="20" col_info="foreign"
        required="true"  col_type="xellerate" xel_data_source="xel_usr_id" />
        <look_up_group logic_operator="NA">
            <record_lookup_key table_name="XELUSER1.MDL2_USER_PROF"
            logic_operator="NA" comparison_operator="&gt;="
            col_name="USR_LAST_UPDATE" data_type="DATE" data_typ_size="50"
            col_type="join" xel_data_source="XEL_LAST_RECON_TIME"/>
            <record_lookup_key table_name="XELUSER1.MDL2_USER_ADDN_DET"
            logic_operator="AND" comparison_operator="&gt;="
            col_name="USR_LAST_UPDATE" data_type="DATE" data_typ_size="50"
            col_type="join" xel_data_source="XEL_LAST_RECON_TIME"/>
        </look_up_group>
        <look_up_group logic_operator="AND">
            <record_lookup_key logic_operator="NA" comparison_operator="="
            table_name="XELUSER1.MDL2_USER_PROF" col_name="USR_ID"
            data_type="VARCHAR2" data_typ_size="20" col_info="primary"
            required="true" col_type="join" xel_data_source="xel_usr_id" />
            <record_lookup_key logic_operator="AND" comparison_operator="="
            table_name="XELUSER1.MDL2_USER_ADDN_DET" col_name="USR_ID"
            data_type="VARCHAR2" data_typ_size="20" col_info="foreign"
            required="true" col_type="join" xel_data_source="xel_usr_id" />
        </look_up_group>
```

```
        </task>
        <task table_name="XELUSER1.MDL2_USER_PROF" xeltask_type="select">
            <column table_name="XELUSER1.MDL2_USER_PROF" col_name="USR_ID"
            data_type="VARCHAR2" data_typ_size="20" col_info="primary"
            required="true" col_type="xellerate" xel_data_source="xel_usr_id" />
            <column table_name="XELUSER1.MDL2_USER_PROF
            col_name="USR_FIRST_NAME" data_type="VARCHAR2" data_typ_size="60"
            required="true" col_type="xellerate" xel_data_source="xel_usr_first_
            name" />
            <column table_name="XELUSER1.MDL2_USER_PROF"
            col_name="USR_FIRST_NAME" data_type="VARCHAR2" data_typ_size="60"
            required="true" col_type="xellerate" xel_data_source="xel_usr_first_
            name" />
            <column table_name="XELUSER1.MDL2_USER_PROF" col_name="USR_LAST_NAME"
            data_type="VARCHAR2" data_typ_size="60" required="true" col_
            type="xellerate" xel_data_source="xel_usr_last_name" />
            <column table_name="XELUSER1.MDL2_USER_PROF" col_name="USR_PASSWORD"
            data_type="VARCHAR2" data_typ_size="40" required="true" col_
            type="xellerate" xel_data_source="xel_usr_password" encrypt="false"
            reconcile="true" encryption_impl=
            "com.thortech.xl.integration.dbadapter.security.EncryptionSupportImpl
            "/>
            <column table_name="XELUSER1.MDL2_USER_ADDN_DET"
            col_name="USR_GROUP" data_type="VARCHAR2" data_typ_size="50"
            required="true" col_type="xellerate" xel_data_source="xel_usr_group"
            />
            <column table_name="XELUSER1.MDL2_USER_ADDN_DET" col_name="USR_ROLE"
            data_type="VARCHAR2" data_typ_size="50" required="false" col_
            type="xellerate" xel_data_source="xel_usr_role" />
            <column table_name="XELUSER1.MDL2_USER_ADDN_DET" col_name="USR_TITLE"
            data_type="VARCHAR2" data_typ_size="50" required="false" col_
            type="xellerate" xel_data_source="xel_usr_title" />
            <column table_name="XELUSER1.MDL2_USER_ADDN_DET" col_name="USR_DEPT"
            data_type="VARCHAR2" data_typ_size="50" required="false" col_
            type="xellerate" xel_data_source="xel_usr_dept" />
            <column table_name="XELUSER1.MDL2_USER_ADDN_DET" col_name="USR_EMAIL"
            data_type="VARCHAR2" data_typ_size="60" required="false" col_
            type="xellerate" xel_data_source="xel_usr_email" />
            <column table_name="XELUSER1.MDL2_USER_ADDN_DET"
            col_name="USR_COMM_LANG" data_type="VARCHAR2" data_typ_size="50"
            required="false" col_type="xellerate" xel_data_source="xel_usr_comm_
            lang" />
            <column table_name="XELUSER1.MDL2_USER_ADDN_DET"
            col_name="USR_LOGON_LANG" data_type="VARCHAR2" data_typ_size="50"
            required="false" col_type="xellerate" xel_data_source="xel_usr_logon_
            lang" />
            <column table_name="XELUSER1.MDL2_USER_ADDN_DET"
            col_name="USR_TEL_NO" data_type="VARCHAR2" data_typ_size="15"
            required="false" col_type="xellerate" xel_data_source="xel_usr_tel_
            no" />
            <column table_name="XELUSER1.MDL2_USER_ADDN_DET"
            col_name="USR_TIME_ZONE" data_type="VARCHAR2" data_typ_size="50"
           required="false" col_type="xellerate" xel_data_source="xel_usr_time_zone"
            />
            <column table_name="XELUSER1.MDL2_USER_ADDN_DET"
            col_name="USR_DATE_FMT" data_type="VARCHAR2" data_typ_size="50"
            required="false" col_type="xellerate" xel_data_source="xel_usr_date_
            fmt" />
            <column table_name="XELUSER1.MDL2_USER_ADDN_DET"
            col_name="USR_DEC_NTN" data_type="VARCHAR2" data_typ_size="50"
```

```
                    required="false" col_type="xellerate" xel_data_source="xel_usr_dec_
                    ntn" />
                    <look_up_group logic_operator="NA">
                        <record_lookup_key table_name="XELUSER1.MDL2_USER_PROF"
                        logic_operator="NA" comparison_operator="&gt;="
                        col_name="USR_LAST_UPDATE" data_type="DATE" data_typ_size="50"
                        col_type="join" xel_data_source="XEL_LAST_RECON_TIME"/>
                        <record_lookup_key table_name="XELUSER1.MDL2_USER_ADDN_DET"
                        logic_operator="AND" comparison_operator="&gt;="
                        col_name="USR_LAST_UPDATE" data_type="DATE" data_typ_size="50"
                        col_type="join" xel_data_source="XEL_LAST_RECON_TIME"/>
                    </look_up_group>
                    <look_up_group logic_operator="AND">
                        <record_lookup_key logic_operator="NA" comparison_operator="="
                        table_name="XELUSER1.MDL2_USER_PROF" col_name="USR_ID"
                        data_type="VARCHAR2" data_typ_size="20" col_info="primary"
                        required="true" col_type="xellerate" xel_data_source="xel_usr_id"
                        />
                    </look_up_group>
                    <look_up_group logic_operator="AND">
                        <record_lookup_key logic_operator="NA" comparison_operator="="
                        table_name="XELUSER1.MDL2_USER_PROF" col_name="USR_ID"
                        data_type="VARCHAR2" data_typ_size="20" col_info="primary"
                        required="true" col_type="join" xel_data_source="xel_usr_id" />
                        <record_lookup_key logic_operator="AND" comparison_operator="="
                        table_name="XELUSER1.MDL2_USER_ADDN_DET" col_name="USR_ID"
                        data_type="VARCHAR2" data_typ_size="20" col_info="foreign"
                        required="true" col_type="join" xel_data_source="xel_usr_id" />
                    </look_up_group>
            </task>
    </operation>
```

In the preceding sample configuration XML, the names of the data elements are the values given for the xel_data_source tag. You can change these names. For example, the value XEL_LAST_RECON_TIME highlighted in bold font in the preceding sample configuration XML code. The same name is also used as the label for elements in each reconciliation event record.

The create or update reconciliation operation involves running two tasks. The first task identifies the users who have been modified or created after the last reconciliation. This returns a list of key field values for the modified and new users.

For example, if the key field to identify a user is the user ID, then this task returns a list of user IDs corresponding to the user profiles that have been modified or created after the last reconciliation.

The second task collects all required information about these users for creating the reconciliation event. The division of tasks is designed for optimal use of memory.

The lookup groups in the task help create lookup conditions for retrieving relevant data. The preceding sample configuration XML code implements the following lookup conditions:

- Join the two tables in which user profile information is stored, and retrieve nonrepeated data for these users.

- Perform incremental reconciliation by retrieving only those records that are modified after the last reconciliation.

The second task has one more lookup for the user ID, so that user information can be retrieved for each user ID by using the first task.

The time at which the previous reconciliation run was completed is stored in the `Reconciliation Timestamp` IT resource parameter. This value is updated with the new system timestamp after the end of the current reconciliation run. This value is compared against the last updated time in the target database tables, as given in the configuration XML file. In this file, the time at which the last reconciliation run was completed is represented as `XEL_LAST_RECON_TIME`. It is a connector configuration constant. You must not change it.

Note that incremental reconciliation is possible only if the target application is capable of updating the last update time in its database while modifying or creating records. If the target application does not have this feature, then you must not create the lookup group for comparing the last reconciliation time.

Reconciliation of Deleted Users

The following is sample code from the configuration XML file for reconciliation of users deleted from the target system:

```
<operation name = "reconcileDelete" enabled="true">
    <task table_name="XELUSER1.MDL2_USER_PROF" xeltask_type="select">
        <column table_name="XELUSER1.MDL2_USER_PROF" col_name="USR_ID"
        data_type="VARCHAR2" data_typ_size="20" col_info="primary"
        required="true" col_type="xellerate" xel_data_source="xel_usr_id"
        />
        <column table_name="XELUSER1.MDL2_USER_ADDN_DET"
        col_name="USR_ID" data_type="VARCHAR2" data_typ_size="20"
        col_info="foreign" required="true" col_type="xellerate"
        xel_data_source="xel_usr_id" />
        <look_up_group logic_operator="NA">
            <record_lookup_key logic_operator="NA" comparison_operator="="
            table_name="XELUSER1.MDL2_USER_PROF" col_name="USR_ID"
            data_type="VARCHAR2" data_typ_size="20" col_info="primary"
            required="true" col_type="join"xel_data_source="xel_usr_id"/>
            <record_lookup_key logic_operator="AND" comparison_
            operator="=" table_name="XELUSER1.MDL2_USER_ADDN_DET"
            col_name="USR_ID" data_type="VARCHAR2" data_typ_size="20"
            col_info="foreign" required="true" col_type="join
            xel_data_source="xel_usr_id" />
        </look_up_group>
    </task>
</operation>
```

Only user IDs are required for creating deletion reconciliation events. Therefore, the preceding configuration shows only the user ID as the data element to be retrieved according to the conditions given in the lookup group.

Files and Directories That Comprise the Connector

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

```
Database Servers\Database Application Table\Database Application Table Rev
2.1.1.zip
```

These files and directories are listed in the following table.

File in the Installation Media Directory	Description

The following files in the `xml\Xellerate Config` directory:
 	
`CreateUserAdapter.xml`
`DBTablesresadp.xml`
`DeleteUserAdapter.xml`
`UpdateCommLangAdapter.xml`
`UpdateDaetFmtAdapter.xml`
`UpdateDateFmtAdapter.xml`
`UpdateDecNotnAdapter.xml`
`UpdateDeptAdapter.xml`
`UpdateEmailAdapter.xml`
`UpdateFirstNameAdapter.xml`
`UpdateGroupAdapter.xml`
`UpdateLastNameAdapter.xml`
`UpdateLogonLangAdapter.xml`
`UpdatePasswordAdapter.xml`
`UpdateRoleAdapter.xml`
`UpdateStatusAdapter.xml`
`UpdateTelNoAdapter.xml`
`UpdateTimeZoneAdapter.xml`
`UpdateTitleAdapter.xml`
	These XML files contain code for the functionality implemented by the connector.

The following files in the `xml\DB Schema XML` directory:
 	
`OraApp1.xml`
`OraApp2.xml`
`OraPerf1.xml`
`SybApp1.xml`
`SybApp2.xml`
`xdb_app_map.xsd`	

`jar\dbadapter.jar`	This JAR file contains the class files that are used to implement provisioning and reconciliation.
`docs\B31115_01.pdf` `docs\html`	These are PDF and HTML versions of this guide, which provides instructions to deploy the connector.

The "Step 3: Copying the Connector Files and External Code" section on page 2-9 provides instructions to copy these files into the required directories.

2

Deploying the Connector

Deploying the connector involves the following steps:

- Step 1: Verifying Deployment Requirements
- Step 2: Configuring the Target System
- Step 3: Copying the Connector Files and External Code
- Step 4: Importing the Connector XML File
- Step 5: Configuring Reconciliation
- Step 6: Compiling Adapters

This chapter also discusses the following postdeployment steps:

- Security Considerations
- Troubleshooting

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	The target system can be one of the following: ■ Oracle9*i* Database ■ Sybase 12.5.2
Target system host platforms	Solaris 9
External code	■ `xerces.jar` (the XML parser) ■ `classes12.zip` (required if the target system is Oracle Database) ■ `jconn2.jar` (required if the target system is Sybase)

In addition to the requirements mentioned in the preceding table, you must ensure that the following requirements are addressed:

- JDBC connectivity is available to the target database.
- The target database application schema is analyzed and the corresponding XML file is available according to the IT resource definition.

- The JDBC driver and Xerces classes are available in the Oracle Identity Manager classpath.

- For secure connectivity to the target database, the required configuration has been performed on the database server.

Step 2: Configuring the Target System

For successful provisioning and reconciliation, you must analyze and configure the schema of the target application according to the configuration XML file. The configuration file is validated against the XML schema for database applications. Therefore, it is recommended that you review the schema before creating the XML file.

The configuration XML file can be divided into the following sections:

- target_application

- target_database

- mapping_data

- database_adapter

target_application

This section is used to identify the target application. The purpose of this section is to provide information that simplifies maintenance of the configuration file.

Section	Description	Attributes
Database	Name of the database	name
target_app_name	Name of the application	None
target_app_ver	Version of the application	None
target_app_provider	Vendor or provider of the application	None

target_database

This section contains information that is used to configure the database connection properties.

> **See Also:** "Security Considerations" on page 2-13

mapping_data

This section is used to keep track of the configuration files modification history.

database_adapter

This section is divided into operations. Each operation is further divided into one or more tasks. The number of tasks in an operation depends on the number of tables involved in the operation. Tasks are divided into columns depending on the target application table.

The following table explains the organization of the database_adapter section.

Description of the Section	Description of the Attributes	Possible Values of the Attributes
`operation` Each operation is linked with an Oracle Identity Manager connector.	`name` Type of Oracle Identity Manager operation	`create`, `update`, `delete`, `reconcileCreateUpdate`, or `reconcileDelete`
`task` Each operation is divided into one or more tasks. The number of tasks in an operation depends on the number of tables involved in the operation.	`table_name` Name of the table on which the task is going to operate	Any valid table name
	`xeltask_type` Type of task in the database	`insert`, `update`, `delete`, or `select`
`column` It is a representation of a single column in the target application table.	`col_name` Name of the column	Any valid column name
	`data_type` Data type	`VARCHAR`, `VARCHAR2`, `CHAR`, `LONGVARCHAR`, `REAL`, `DOUBLE`, `NUMERIC`, `DECIMAL`, `FLOAT`, `DATE`, `TIME`, `TIMESTAMP`, `NULL`, `BOOLEAN`, `OTHER`, or `INTEGER`
	`data_typ_size` Data type size	`20`
	`col_info` Table indexing and relation to other tables	`primary` or `secondary`
	`required` Specifies whether or not the value of this column can be NULL	`true` or `false`
	`col_type` Data source for the column to be used while creating a user	`xellerate`, `default`, `substitute`, or `interface` ■ `substitute`: To use, for example, `SYSDATE`. ■ `xellerate`: Provided by Oracle Identity Manager ■ `default`: Some default value ■ `interface`

Description of the Section	Description of the Attributes	Possible Values of the Attributes
	`xel_data_source` If `col_type` is `substitute`, then `xel_data_source` holds the substitution string (can be used for functions like `sysdate`, `sequence.nextVal`). If `col_type` is `default`, then `xel_data_source` holds the default value. If `col_type` is `xellerate`, then `xel_data_source` holds the mapped Oracle Identity Manager attribute name.	*<mapped attributes name>*/"E"/ SYSDATE
	`encrypt` Specifies whether or not this data must be encrypted	`true` or `false`
	`reconcile` Specifies whether or not this field can be reconciled	`true` or `false`
	`encryption_impl` Encryption method implementation class that provides this operation	Any fully qualified class name
`look_up_group` Grouping of lookup fields	`logic_operator` Used to connect two lookup groups with an operator	`AND` or `OR`
`record_lookup_key` This tag is used to collect the information required to identify a particular record in a table. Note that multiple lookup keys can be used to identify a record in a table.	`logic_operator` Used to connect two record lookup keys (column) with an operator in a group	`AND` or `OR`

	`comparison_operator`
	
	Operator used to compare the data with the given data for the column
		`<`
		
		`>`
		
		`=`
		
		`>=`
		
		`<=`
		
		`!=`

	`table_name` Name of the table	Any table name
	`col_name` Name of the column	Any column name

Description of the Section	Description of the Attributes	Possible Values of the Attributes
	data_type Data type	VARCHAR, VARCHAR2, CHAR, LONGVARCHAR, REAL, DOUBLE, NUMERIC, DECIMAL, FLOAT, DATE, TIME, TIMESTAMP, NULL, BOOLEAN, OTHER, or INTEGER
	data_typ_size Data type size	20
	col_info Table indexing and relation to other tables	primary or secondary
	required Specifies whether or not the value of this column can be NULL	true or false
	col_type In addition, the following tag is applicable here: join - xel_data_source This tag holds the common column to match for select query.	Xellerate and Default
	xel_data_source In addition to the description in the column section above, if col_type is join, then the value of xel_data_source is the mapped Oracle Identity Manager attribute name that is to be logically compared with the logic_operator.	*<mapped attributes name>* /"E"/ SYSDATE

Sample Configuration

Consider the following target database tables in Oracle Database.

MDL2_USER_PROF

Field Name	Type and Length	Comments	Required/Optional
USR_ID	VARCHAR(20)	Primary Key	Required
USR_FIRST_NAME	VARCHAR(60)	None	Required
USR_LAST_NAME	VARCHAR(60)	None	Required
USR_PASSWORD	VARCHAR(40)	None	Required
USR_STATUS	VARCHAR(5)	Default value is true	Required
USR_LAST_UPDATE	DATE	SYSDATE	Required

MDL2_USER_ADDN_DET

Field Name	Type and Length	Comments	Required/Optional
USR_ID	VARCHAR(20)	Foreign Key	Required
USR_GROUP	VARCHAR(50)	None	Optional
USR_ROLE	VARCHAR(50)	None	Optional
USR_TITLE	VARCHAR(50)	None	Optional
USR_DEPT	VARCHAR(50)	None	Optional
USR_EMAIL	VARCHAR(60)	None	Optional
USR_COMM_LANG	VARCHAR(50)	None	Optional
USR_LOGON_LANG	VARCHAR(50)	None	Optional
USR_TEL_NO	VARCHAR(15)	None	Optional
USR_TIME_ZONE	VARCHAR(50)	None	Optional
USR_DATE_FMT	VARCHAR(50)	None	Optional
USR_DEC_NTN	VARCHAR(50)	None	Optional
USR_LAST_UPDATE	DATE	SYSDATE	Required

Sample configurations discussed in the following sections are based on the structure of these two tables:

- Create User Configuration
- Update User Properties Configuration
- Update User Password Configuration
- Delete User Configuration

Create User Configuration

To create a user, the configuration XML must contain the table name, column names, and properties of each column. This is illustrated in the following sample XML code.

```
<operation name="create">
    <task table_name="XELUSER1.MDL2_USER_PROF" xeltask_type="insert">
        <column col_name="USR_ID" data_type="VARCHAR2" data_typ_size="20"
        col_info="primary" required="true" col_type="xellerate"
        xel_data_source="xel_usr_id" />
        <column col_name="USR_FIRST_NAME" data_type="VARCHAR2"
        data_typ_size="60" required="true" col_type="xellerate"
        xel_data_source="xel_usr_first_name" />
        <column col_name="USR_LAST_NAME" data_type="VARCHAR2"
        data_typ_size="60" required="true" col_type="xellerate"
        xel_data_source="xel_usr_last_name" />
        <column col_name="USR_PASSWORD" data_type="VARCHAR2"
        data_typ_size="40" required="true" col_type="xellerate"
        xel_data_source="xel_usr_password" encrypt="false" reconcile="false"
        encryption_impl=
        "com.thortech.xl.integration.dbadapter.security.EncryptionSu
        pportImpl" />
        <column col_name="USR_LAST_UPDATE" data_type="DATE"
        data_typ_size="60" required="true" col_type="substitute"
        xel_data_source="sysdate" />
    </task>
```

```
        <task table_name="XELUSER1.MDL2_USER_ADDN_DET" xeltask_type="insert">
            <column col_name="USR_ID" data_type="VARCHAR2" data_typ_size="20"
            col_info="primary" required="true" col_type="xellerate"
            xel_data_source="xel_usr_id" />
            <column col_name="USR_GROUP" data_type="VARCHAR2"
            data_typ_size="50" required="true" col_type="xellerate"
            xel_data_source="xel_usr_group" />
            <column col_name="USR_ROLE" data_type="VARCHAR2"
            data_typ_size="50" required="false" col_type="xellerate"
            xel_data_source="xel_usr_role" />
            <column col_name="USR_TITLE" data_type="VARCHAR2"
            data_typ_size="50" required="false" col_type="xellerate"
            xel_data_source="xel_usr_title" />
            <column col_name="USR_DEPT" data_type="VARCHAR2"
            data_typ_size="50" required="false" col_type="xellerate"
            xel_data_source="xel_usr_dept" />
            <column col_name="USR_EMAIL" data_type="VARCHAR2"
            data_typ_size="60" required="false" col_type="xellerate"
            xel_data_source="xel_usr_email" />
            <column col_name="USR_COMM_LANG" data_type="VARCHAR2"
            data_typ_size="50" required="false" col_type="xellerate"
            xel_data_source="xel_usr_comm_lang" />
            <column col_name="USR_LOGON_LANG" data_type="VARCHAR2"
            data_typ_size="50" required="false" col_type="xellerate"
            xel_data_source="xel_usr_logon_lang" />
            <column col_name="USR_TEL_NO" data_type="VARCHAR2"
            data_typ_size="15" required="false" col_type="xellerate"
            xel_data_source="xel_usr_tel_no" />
            <column col_name="USR_TIME_ZONE" data_type="VARCHAR2"
            data_typ_size="50" required="false" col_type="xellerate"
            xel_data_source="xel_usr_time_zone" />
            <column col_name="USR_DATE_FMT" data_type="VARCHAR2"
            data_typ_size="50" required="false" col_type="xellerate"
            xel_data_source="xel_usr_date_fmt" />
            <column col_name="USR_DEC_NTN" data_type="VARCHAR2"
            data_typ_size="50" required="false" col_type="xellerate"
            xel_data_source="xel_usr_dec_ntn" />
            <column col_name="USR_LAST_UPDATE" data_type="DATE"
            data_typ_size="60" required="true" col_type="substitute"
            xel_data_source="sysdate"/>
        </task>
</operation>
```

Update User Properties Configuration

The update operation requires lookup information for identifying the user and properties of the columns that are to be updated. This is illustrated in the following sample XML code.

```
<operation name="update" xel_data_source="xel_usr_dept">
    <task table_name="XELUSER1.MDL2_USER_ADDN_DET" xeltask_type="update">
        <column col_name="USR_DEPT" data_type="VARCHAR2"
        data_typ_size="50" required="true" col_type="xellerate"
        xel_data_source="xel_usr_dept" />
        <column col_name="USR_LAST_UPDATE" data_type="DATE"
        data_typ_size="60"  required="true" col_type="substitute"
        xel_data_source="sysdate" />
        <look_up_group logic_operator="NA">
            <record_lookup_key
            table_name="XELUSER1.MDL2_USER_ADDN_DET"
            logic_operator="NA"  comparison_operator="=" col_name="USR_ID"
```

```
                        data_type="VARCHAR2" data_typ_size="20" required="true"
                        col_type="xellerate" xel_data_source="xel_usr_id"/>
                </look_up_group>
        </task>
</operation>
```

Update User Password Configuration

The update password operation works the same way as the update user operation. In addition, it performs data encryption if the encrypt attribute is set to true. In such a situation, the Java class corresponding to the EncriptionSupportInf implementation class name from the encryption_impl attribute is loaded and used for data encryption before it is updated into the database.

This is illustrated in the following sample XML code.

```
<operation name="update" xel_data_source="xel_usr_password">
    <task table_name="XELUSER1.MDL1_USER_PROF" xeltask_type="update">
        <column col_name="USR_PASSWORD" data_type="VARCHAR2"
        data_typ_size="40" required="true" col_type="xellerate"
        xel_data_source="xel_usr_password" encrypt="true" reconcile="false"
        encryption_impl=
        "com.thortech.xl.integration.dbadapter.security.EncryptionSu
        pportImpl" />
        <column col_name="USR_LAST_UPDATE" data_type="DATE"
        data_typ_size="60"  required="true" col_type="substitute"
        xel_data_source="sysdate" />
        <look_up_group logic_operator="NA">
            <record_lookup_key table_name="XELUSER1.MDL1_USER_PROF"
            logic_operator="NA"  comparison_operator="=" col_name="USR_ID"
            data_type="VARCHAR2" data_typ_size="20" required="true"
            col_type="xellerate" xel_data_source="xel_usr_id"/>
        </look_up_group>
    </task>
</operation>
```

Delete User Configuration

The delete operation requires only lookup information to find the user. Column information is used to find the user in the table. The following is sample configuration XML code based on the structure of the MDL2_USER_PROF and MDL2_USER_ADDN_DET tables.

The lookup_up_group tags are used to group lookup conditions provided in record_lookup_key.

> **Note:**   There are two tasks to delete the user record from both tables. It is important to run the task related to the secondary table before the primary table task. If the order is not correct, then a referential integrity exception is thrown.

```
<operation name="delete">
    <task table_name="XELUSER1.MDL2_USER_PROF" xeltask_type="delete">
        <look_up_group logic_operator="NA">
            <record_lookup_key logic_operator="NA"  comparison_operator="="
            col_name="USR_ID" data_type="VARCHAR2" data_typ_size="20"
            required="true" col_type="xellerate" xel_data_source="xel_usr_
            id"/>
        </look_up_group>
```

```
        </task>
        <task table_name="XELUSER1.MDL1_USER_PROF" xeltask_type="delete">
            <look_up_group logic_operator="NA">
                <record_lookup_key logic_operator="NA"  comparison_operator="="
                col_name="USR_ID" data_type="VARCHAR2" data_typ_size="20"
                required="true" col_type="xellerate" xel_data_source="xel_usr_
                id"/>
            </look_up_group>
        </task>
    </operation>
```

Step 3: 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 ZIP file on the installation media:
>
> ```
> Database Servers\Database Application Table\Database
> Application Table Rev 2.1.1.zip
> ```
>
> Refer to "Files and Directories That Comprise the Connector" on page 1-6 for more information about these files.

Files in the Installation Media Directory	Destination Directory

The following files in the `xml\Xellerate Config` directory:
 	
`CreateUserAdapter.xml`
`DBTablesresadp.xml`
`DeleteUserAdapter.xml`
`UpdateCommLangAdapter.xml`
`UpdateDaetFmtAdapter.xml`
`UpdateDateFmtAdapter.xml`
`UpdateDecNotnAdapter.xml`
`UpdateDeptAdapter.xml`
`UpdateEmailAdapter.xml`
`UpdateFirstNameAdapter.xml`
`UpdateGroupAdapter.xml`
`UpdateLastNameAdapter.xml`
`UpdateLogonLangAdapter.xml`
`UpdatePasswordAdapter.xml`
`UpdateRoleAdapter.xml`
`UpdateStatusAdapter.xml`
`UpdateTelNoAdapter.xml`
`UpdateTimeZoneAdapter.xml`
`UpdateTitleAdapter.xml`
	`xellerate_home\xellerate\XLIntegrations\`
	`xml\Xellerate Config`

Files in the Installation Media Directory	Destination Directory

The following files in the `xml\DB Schema XML` directory:
 	
`OraApp1.xml`
`OraApp2.xml`
`OraPerf1.xml`
`SybApp1.xml`
`SybApp2.xml`
`xdb_app_map.xsd`
	`xellerate_home\xellerate\XLIntegrations\`
	`xml\DB Schema`

`jar\dbadapter.jar`	`xellerate_home\xellerate\JavaTasks`
`docs\B31115_01.pdf` `docs\html`	`xellerate_home\xellerate\XLIntegrations\` `docs`

Copy the following files to the *`xellerate_home`*`\xellerate\ext` directory:

- `classes12.zip` (for Oracle Database) or `jconn2.jar` (for Sybase)

- `xerces.jar`

Step 4: Importing the Connector XML File

To import the connector XML file 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 `DBTablesresadp.xml` file, which is in the *`xellerate_home`*`\xellerate\XLIntegrations\xml\Xellerate Config` 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 `Oracle` IT resource is displayed.

8. Specify values for the parameters of the `Oracle` IT resource. Use the table given in the "Defining IT Resources" section on page 2-11 for information about the values to be specified.

9. Click **Next.** The Provide IT Resource Instance Data page for a new instance of the `Database` 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. You must remove these nodes. To do this, right-click each such node and then select **Remove.**

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

After you import the connector XML file, proceed to the "Step 5: Configuring Reconciliation" section on page 2-11.

Defining IT Resources

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

Parameter Name	Parameter Description
`Database User ID`	Database user ID on the target database
	Sample value: `xeluser`
`Database Password`	Database user password on the target database
	Sample value: `xeluser`
`Database URL`	JDBC URL for the target database
	Sample value: `jdbc:acmewidgets:thin:@server ip:port:sid`
`Database Driver`	JDBC driver class
	Sample value: `acmewidgets.jdbc.driver.AcmeDriver`
`Application Name`	Target application name
	Sample value: `myapplication`
`Configuration XML Path`	Database connector configuration XML file path
`Reconciliation Timestamp`	Variable to store last create/update reconciliation time. This value is updated by the reconciliation adapter. You need not manually provide any data.

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

Step 5: Configuring Reconciliation

Configuring reconciliation involves creating the reconciliation scheduled task.

To create this scheduled task:

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 task are displayed.

5. Enter a number in the **Max Retries** field. This number represents the number of times Oracle Identity Manager should attempt to complete the task before assigning the ERROR status to the task.

6. Ensure that the **Disabled** and **Stop Execution** check boxes are cleared.

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 appropriate table in the "Specifying Values for the Scheduled Task Attributes"section on page 2-12 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.

After you define the scheduled task, proceed to the "Step 6: Compiling Adapters" section on page 2-12.

Specifying Values for the Scheduled Task Attributes

You must specify values for the following attributes of the 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
resource	Name of the IT resource for which the reconciliation process is to be run
application	Name of the target database application that should be reconciled
objectName	Resource object name of the connector

After you specify values for these scheduled task attributes, go 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 XML connector file. You must compile these adapters before you can use them to provision accounts on the target system.

- DBRES Create User

- DBRES Update First Name

- DBRES Update Last Name

- DBRES Update Password

- DBRES Update Status

- `DBRES Update Title`

- `DBRES Update Department`

- `DBRES Update Email`

- `DBRES Update Communication Language`

- `DBRES Update Logon Language`

- `DBRES Update Time Zone`

- `DBRES Update Date Format`

- `DBRES Update Telephone Number`

- `DBRES Update Decimal Notation`

- `DBRES Delete User`

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 the **Compile All** option.

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

3. Click **Start.** Oracle Identity Manager compiles the adapters that you specify.

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 multiple adapters simultaneously, use the Adapter Manager form. To compile one adapter at a time, use the Adapter Factory form. Refer to *Oracle Identity Manager Tools Reference Guide* for information about how to use these forms.

Security Considerations

This section outlines security considerations that you must address when working with this connector. The following topics are discussed in this section:

- Secure JDBC Connectivity

- Password Encryption and Decryption

Secure JDBC Connectivity

It is possible to establish secure JDBC connectivity with the target database by including the appropriate configuration in the configuration XML file and enabling the database server. Note that the security configuration differs with respect to the target database.

Configuration for Oracle Database
The following is the security configuration for Oracle Database:

```
<target_database>
    <database name="Oracle">
         <properties>
         <encryption_nego_level impl_class_name="oracle.net.encryption_
         client" value ="REQUESTED"/>
         <encryption_algorithm impl_class_name="oracle.net.encryption_
        client" value="DES40"/>
        <crypto_seed impl_class_name="oracle.net.crypto_seed"
        value="xelsysadmin_seed"/>
        <crypto_checksum_level
        impl_class_name="oracle.net.crypto_checksum_client"
        value="REQUIRED"/>
        <crypto_checksum_client
        impl_class_name="oracle.net.crypto_checksum_types_client"
        value="MD5"/>
    </properties>
    </database
</target_database>
```

This configuration contains the security properties to be provided to the JDBC driver for establishing a secure connection to Oracle Database. Note that if these parameters are not provided, then a nonsecure JDBC connection is established to the target database.

The following are the permitted values for each configuration parameter mentioned earlier.

Properties	Possible Values
encryption_nego_level	REJECTED, ACCEPTED, REQUESTED, or REQUIRED
encryption_algorithm	RC4_256, RC4_128, RC4_56, RC4_40, AES256, AES192, AES128, 3DES168, 3DES112, DES, or DES40
crypto_seed	Encryption Seed
crypto_checksum_level	REJECTED, ACCEPTED, REQUESTED, or REQUIRED
crypto_checksum_client	MD5 or SHA1

Configuration for Sybase

The following is the security configuration for Sybase:

```
<target_database>
<database name="Sybase">
    <properties>
        <cipher_suites impl_class_name="CIPHER_SUITES_1"
        value="SSL_DH_anon_EXPORT_WITH_RC4_40_MD5"/>
    </properties>
</database>
</target_database>
```

The possible values for cipher suite are as follows:

- SSL_DH_anon_EXPORT_WITH_RC4_40_MD5

- SSL_DH_DSS_EXPORT_WITH_DES40_CBC_SHA

- SSL_RSA_EXPORT_WITH_RC2_CBC_40_MD5

- SSL_DH_RSA_EXPORT_WITH_DES40_CBC_SHA

Password Encryption and Decryption

You can implement third-party encryption and decryption algorithms when you use this connector. The connector exposes the `EncryptionSupportIntf` interface, which must be implemented by the target database developer and made available in the Oracle Identity Manager classpath.

While configuring the encryption for a column, the fully qualified class name must be provided. Before updating the data in the database, the connector encrypts the data. If reconciliation of the encrypted password is possible, then the decryption method is used to retrieve the actual password and to reconcile the password to Oracle Identity Manager.

Troubleshooting

The following table provides solutions to some commonly encountered issues associated with this connector.

Problem Description	Returned Error Code	Solution
Oracle Identity Manager cannot establish a connection to the target database.	DATABASE CONNECTION FAILED	■ Ensure that the target database is running and available on the network. ■ Check the connection information for the target database, which is specified in the IT resource definition. ■ Check the authentication information for the target database, which is specified in the IT resource definition.
	DATABASE DRIVER NOT LOADED	Ensure that the database driver is available in the Oracle Identity Manager classpath.
A provisioning operation fails with an error code other than those described in the following rows.	CONFIGURATION ERROR	■ Ensure that the configuration XML file given in the IT resource definition exists at the specified file system path. ■ Ensure that the XML schema file exists at the location specified in the configuration XML file. ■ Ensure that the XML file adheres to the XML schema specified inside the file itself.
	DATA SIZE MISMATCH	Ensure that the data size of the user profile attributes in the XML file adheres to the process form limitations.
	MANDATORY FIELD MISSING	■ Ensure that values are provided for all user attributes specified as `required` in the configuration XML file. This can happen even if a blank string is provided. ■ Ensure that the process form is designed with fields marked as `required` according to the configuration XML file.

Problem Description	Returned Error Code	Solution
	`DATABASE OPERATION FAILED`	■ Ensure that the maximum size of user profile attributes given in the configuration XML file matches the size defined in the actual database schema. ■ Ensure that all the mandatory fields of the database table are marked as `required` in the configuration XML file.
Create User provisioning operation fails	`USER ALREADY EXISTS`	Check if the target database table already has a record with the same user ID (or a combination of whichever primary key fields exist for the table).
Create User or Reset Password provisioning operation fails	`ENCRYPTION INTERFACE MISSING`	Check if password encryption is set to `true` in the configuration XML file. Ensure that the encryption interface implementation class is available in the Oracle Identity Manager classpath.
	`ENCRYPT/DECRYPT ERROR`	This error occurs if an exception is thrown from the encryption implementation class. ■ Check if the encryption implementation class is working correctly. ■ Check the logs for a description of the error and stack trace.
Update Any User Profile Attribute, Delete a User, or Revoke a Provisioned Resource Object from a User provisioning operation fails	`USER DOES NOT EXIST`	Check if the record for the user for whom the provisioning operation is attempted exists in the target database tables.

3

Known Issues

The following is a known issue associated with this release of the connector:

Reconciliation of users deleted from the target system works as expected only if there is a single IT resource defined for the resource object.

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