Oracle® Identity Manager

Connector Guide for Oracle E-Business Suite User Management

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Oracle Identity Manager Connector Guide for Oracle E-Business Suite User Management, 11.1.1

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Preface

This guide describes the connector that is used to integrate Oracle Identity Manager with Oracle E-Business Suite.

Audience

This guide is intended for resource administrators and target system integration teams.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

Related Documents

For information about installing and using Oracle Identity Manager, visit the following Oracle Help Center page:

http://docs.oracle.com/cd/E52734_01/oim/index.html

For information about Oracle Identity Manager Connectors documentation, visit the following Oracle Help Center page:

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

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.

Convention	Meaning
`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 Oracle Identity Manager Connector for Oracle E-Business Suite User Management?

This chapter provides an overview of the updates made to the software and documentation for the Oracle E-Business Suite User Management connector in release 11.1.1.5.0.

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

- Software Updates

  This section describes updates made to the connector software.

- Documentation-Specific Updates

  This section describes major changes made to this guide. These changes are not related to software updates.

Software Updates

The following section discusses software updates:

Software Updates in Release 11.1.1.5.0

This is the first release of the Oracle Identity Manager connector for Oracle E-Business Suite User Management on ICF architecture. Therefore, there are no software updates in this release.

Documentation-Specific Updates

The following section discusses documentation-specific updates:

Documentation-Specific Updates in Release 11.1.1.5.0

The following is a documentation-specific update in revision "10" of release 11.1.1.5.0:

Additional prerequisite regarding EBS registration type added to Configuring the Connector for SSO

The following is a documentation-specific update in revision "9" of release 11.1.1.5.0:

The "Target system" row in Table 1-1 has been updated for the following:

- Oracle Database 19c has been added as one of the supported versions for running the target system.

- The note about applying a patch if you are using target system versions 12.2.4 or later has been modified.
- A note about applying an Oracle Database patch if your target system is running on Oracle Database release 19.*x* has been added.

The following is a documentation-specific update in revision "8" of release 11.1.1.5.0:

The "Oracle Identity Governance or Oracle Identity Manager" row in Table 1-1 has been modified to include support for Oracle Identity Governance release 12*c* PS4 (12.2.1.4.0).

The following is a documentation-specific update in revision "7" of release 11.1.1.5.0:

The sample value for parameter Latest Token in Table 3-12 and parameter Sync Token in Table 3-13 have been modified.

The following is a documentation-specific update in revision "6" of release 11.1.1.5.0:

In Postupgrade Steps, step 8 has been modified.

The following are documentation-specific updates in revision "5" of release 11.1.1.5.0:

- The following updates are made to Table 1-1:
  - The "Target System" row has been modified to include support for target versions 12.2.5 and 12.2.6.
  - The "Connector server" row has been modified to include a note related to JDBC driver.
  - The "SSO system" row has been modified to include Oracle Unified Directory as an LDAP-based repository.
- A note on Oracle Unified Directory has been added in Lookup.Objects.LDAP User.Oracle EBS User Management.CopyAttributesMap.

The following are documentation-specific updates in revision "4" of release 11.1.1.5.0:

- The "Oracle Identity Manager" row of Table 1-1 has been renamed as "Oracle Identity Governance or Oracle Identity Manager" and also updated for Oracle Identity Governance 12*c* (12.2.1.3.0) certification
- The "Target System" row of Table 1-1 has been modified to include exact target version from 12.2.*x* to 12.2.1 through 12.2.4.
- In Privileges Granted to the User Account, the wrapper packages in "Execute privileges granted to the following wrapper packages created in APPS schema" have been modified.

The following are documentation-specific updates in revision "3" of release 11.1.1.5.0:

- The "Target System" row of Table 1-1 has been updated to include support for Oracle Database 12*c*.
- Chapter 5, "Known Issues and Workarounds" has been removed as there are no known issues associated with this connector.

The following is a documentation-specific update in revision "2" of release 11.1.1.5.0:

The "JDK" row of Table 1-1 has been renamed to "Connector Server JDK".

1

About the Connector

This chapter introduces the Oracle E-Business Suite User Management connector. This chapter discusses the following topics:

- Introduction to the Connector
- Certified Components
- Usage Recommendation
- Certified Languages
- Connector Architecture
- Features of the Connector

Introduction to the Connector

Oracle Identity Manager (OIM) platform automates access rights management, security, and provisioning of IT resources. Oracle Identity Manager connects users to resources, and revokes and restricts unauthorized access to protect sensitive corporate information. The Oracle E-Business Suite User Management connector (EBS UM connector) enables you to use Oracle E-Business Suite as a target resource for Oracle Identity Manager.

An FND_USER record represents an Oracle E-Business User Management account. This record is the main component of the account data whose management is enabled by the connector. This connector can be used to manage either the FND_USER records or FND_USER records with TCA records. In other words, this connector is used to manage plain user accounts or user accounts with parties.

You can use the User Management connector to create Oracle E-Business Suite user accounts (FND_USER records) for OIM users and to grant user roles and responsibilities to these accounts. You can also reconcile newly created users and modified user accounts (FND_USER records) from the target system. These reconciled records are used to create and update Oracle E-Business User Management accounts assigned to OIM Users.

In addition to creating Oracle E-Business User Management accounts, you can use this connector to create Party or Vendors (Suppliers) in the target system. Party or vendors represent a Trading Community Architecture (TCA) record in the HZ_PARTIES table. Some applications such as iStore, iProcurement in the Oracle E-Business Suite require users to have a TCA record that is a representative or employee of parties and vendors in your organization.

The following are the types of TCA records that this connector supports:

- Parties
- Vendors or Suppliers

The object class used for the User Management connector with TCA party is `__ACCOUNT__`. Roles and responsibilities are handled as child data. You can use this connector to remove existing roles and responsibilities as well.

During user provisioning, if you enter the party or supplier information along with the EBS user information, the connector creates an E-Business user account first, creates the party or vendor next, and then establishes the link between the user record and TCA record. For target system users that are linked with party or Supplier records, the value in the PERSON_PARTY_ID column in the FND_USER table is the same as the value in the PARTY_ID column of the HZ_PARTIES table.

During a create or update user provisioning operation, you can link the target system user account with an existing HRMS employee record by providing Person ID.

Certified Components

These are the software components and their versions required for installing and using the connector.

Table 1-1 lists the certified components for the connector.

Table 1-1 Certified Components

Component	Requirement
Oracle Identity Manager	You can use one of the following releases of Oracle Identity Governance or Oracle Identity Manager: • Oracle Identity Governance 12c (12.2.1.4.0) • Oracle Identity Governance 12c (12.2.1.3.0) • Oracle Identity Manager 11*g* Release 2 PS3 (11.1.2.3.0) and any later BP in this release track • Oracle Identity Manager 11*g* Release 2 PS2 (11.1.2.2.0) and any later BP in this release track
Target system	The target system can be any one of the following: • Oracle E-Business Suite 12.1.1 through 12.1.3 • Oracle E-Business Suite 12.2.1 through 12.2.7 or later These applications may run on Oracle Database 10*g,* 11*g*, 12c, or 19c as either single database or Oracle RAC implementation. **Notes:** • If you are using 12.2.4 or later versions, then you must download and apply the latest EBS connector 11.1.1.5.0J *Patch 27733565*. To download the patch, sign in to My Oracle Support and search for the patch number on the Patches and Updates page. • If your target system is running on Oracle Database release 19.*x*, then download and apply the Oracle Database patch *31142749* from My Oracle Support. Applying this patch ensures that provisioning operations work fine. • Communication between Oracle Identity Manager and the target system can be in SSL or non-SSL mode.
Connector server	11.1.2.1.0 **Note:** The JDBC driver ojdbcx.jar is supported with character sets such as US7ASCII, WE8DEC, WE8ISO8859P1, WE8MSWIN1252, and UTF8. To use any other character sets and ensure all connector operations work successfully with the Connector Server, download the orai18n.jar file from the Oracle JDBC drivers OTN page and copy it to the lib directory of Connector Server.
Connector Server JDK	JDK 1.6 or later

Table 1-1 (Cont.) Certified Components

Component	Requirement
SSO system	The target system can use one of the following single sign-on (SSO) solutions: • Oracle Single Sign on with Oracle Internet Directory (release 11.1.1.7.0) as LDAP based repository • Oracle Access Manager with Microsoft Active Directory (2008, 2012 R2), Oracle Directory Server Enterprise Edition (11.1.1.7.0) or Novel eDirectory (8.8) as the LDAP-based repository
SoD engine	If you want to enable and use the Segregation of Duties (SoD) feature of Oracle Identity Manager with this target system, then install Oracle Applications Access Controls Governor release 8.6.4.

Usage Recommendation

Depending on the Oracle Identity Manager version that you are using, you must deploy and use one of the following connectors:

- If you are using an Oracle Identity Manager release that is earlier than Oracle Identity Manager 11*g* Release 2 PS2 (11.1.2.2.0) and you want to configure the connector to use the target system as a target resource, then use the 9.1.*x* version of the Oracle E-Business User Management connector.
- If you are using any of the Oracle Identity Manager releases listed in Table 1-1, then you must use the latest 11.1.1.*x* version of this connector.

Certified Languages

The connector supports the following languages:

- Arabic
- Chinese (Simplified)
- Chinese (Traditional)
- Czech
- Danish
- Dutch
- English (US)
- Finnish
- French
- French (Canadian)
- German
- Greek
- Hebrew
- Hungarian
- Italian

- Japanese
- Korean
- Norwegian
- Polish
- Portuguese
- Portuguese (Brazilian)
- Romanian
- Russian
- Slovak
- Spanish
- Swedish
- Thai
- Turkish

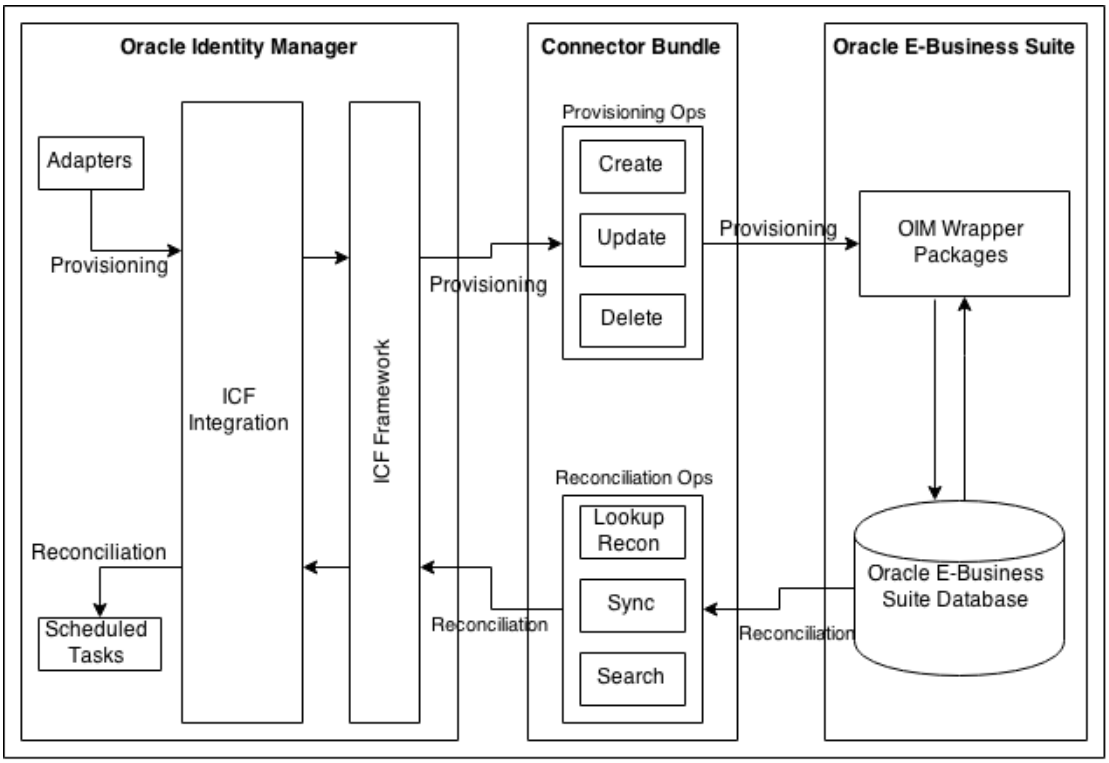
Connector Architecture

The Oracle E-Business User Management connector is implemented by using the Identity Connector Framework (ICF).

The ICF is a component that provides basic reconciliation and provisioning operations that are common to all Oracle Identity Manager connectors. In addition, ICF provides common features that developers would otherwise need to implement on their own, such as connection pooling, buffering, time outs, and filtering. The ICF is shipped along with Oracle Identity Manager. Therefore, you need not configure or modify the ICF.

Figure 1-1 shows the architecture of the Oracle E-Business Suite connectors.

Figure 1-1 Connector Architecture



During connector operations, Oracle Identity Manager interacts with a layer called ICF integration. ICF integration is specific to each application with which OIM interacts and uses the ICF API to invoke operations on the Identity Connector (IC). The connector then calls the target system APIs to perform operations on the resource.

The connector communicates with the target system by making calls to the stored procedures in OIM Wrapper packages, which in turn call the target system stored procedures internally. The OIM Wrapper packages are created in the target system when you run a script that is present in the connector installation package. The procedure to run this script is discussed later in this guide.

The basic function of this connector is to enable management of user data on Oracle E-Business Suite through Oracle Identity Manager. In other words, the Oracle E-Business Suite User Management connector enables you to use Oracle E-Business Suite (the target system) as a managed or target resource of Oracle Identity Manager. You can create and manage target system accounts (resources) for OIM Users through provisioning. In addition, data related to newly created and modified target system accounts can be reconciled (using scheduled tasks) and linked with existing OIM Users and provisioned resources.

Features of the Connector

The features of the connector include support for connector server, target resource reconciliation, Segregation of Duties (SoD) validation of role and responsibility entitlement requests, reconciliation of all existing or modified account data, limited and batched reconciliation, transformation and validation of account data during reconciliation and provisioning, and so on.

The following are the features of the connector:

- Support for Target Resource Reconciliation
- SoD Validation of Entitlement Provisioning
- Support for an SSO-Enabled Target System Installation
- Account Status Reconciliation and Provisioning
- Account Password Management
- Full and Incremental Reconciliation
- Batched Reconciliation
- Limited (Filtered) Reconciliation
- Support for Connector Server
- Connection Pooling
- Support for SSL Communication Between the Target System and Oracle Identity Manager

Support for Target Resource Reconciliation

You can use the EBS UM connector to configure the target system as a target resource of Oracle Identity Manager.

In this mode, you can use this connector to provision and reconcile the following entities from Oracle E-Business Suite:

- EBS accounts/FND_USR records
- TCA Party records/Vendor records

SoD Validation of Entitlement Provisioning

This connector supports the SoD feature. These are the focal points of this feature.

- The SoD Invocation Library (SIL) is bundled with Oracle Identity Governance release. The SIL acts as a pluggable integration interface with any SoD engine.
- The EBS UM connector is preconfigured to work with Oracle Applications Access Controls Governor as the SoD engine. To enable this, changes have been made in the approval and provisioning workflows of the connector.
- The SoD engine processes role and responsibility entitlement requests that are sent through the connector. Potential conflicts in role and responsibility assignments can be automatically detected.

See Configuring SoD for more information on configuring the connector for the SoD feature.

Support for an SSO-Enabled Target System Installation

Oracle E-Business Suite can be configured to use a single sign-on solution such as Oracle Single Sign-On and Oracle Access Manager, to authenticate users. Oracle Single Sign-On uses Oracle Internet Directory as an LDAP-based repository for storing user records. Oracle Access Manager can use Microsoft Active Directory, Oracle

Directory Server Enterprise Edition, or Novell eDirectory as the LDAP-based repository.

You can configure the connector to work with either one of these SSO solutions during reconciliation and provisioning operations.

The connector is shipped with an adapter that is responsible for copying SSO account details such as GUID and so on from an enterprise directory process form to EBS user process form.

See Configuring the Connector for SSO for information about configuring the connector for a single sign-on solution.

Account Status Reconciliation and Provisioning

When you enable an account on the target system, the Effective Date From field is set to the current date and the Effective Date To field is set to NULL on the target system.

When you disable an account on the target system, the Effective Date To field is set to the current date on the target system.

The same effect can be achieved through provisioning operations performed on Oracle Identity Manager. In addition, status changes made directly on the target system can be copied into Oracle Identity Manager during reconciliation.

See Provisioning Operations Performed in an SoD-Enabled Environment for more information about provisioning operations in an SoD-enabled environment.

Account Password Management

The connector supports basic password management features. For a particular user, you can specify when the user's password must expire by using the following process form fields:

- Password Expiration Type

  You use the Password Expiration Type field to specify the factor (or measure) that you want to use to set a value for password expiration. You can select either `Accesses` or `Days` as the password expiration type.

- Password Expiration Interval

  In the Password Expiration Interval field, you specify the number of access or days for which the user must be able to use the password.

For example, if you specify `Accesses` in the Password Expiration Type field and enter `20` in the Password Expiration Interval field, then the user is prompted to change the user's password at the twenty-first login. Similarly, if you specify `Days` in the Password Expiration Type field and enter `100` in the Password Expiration Interval field, then the user is prompted to change the user's password on the hundred and first day after setting a new password.

See Lookup.Oracle EBS UM.PasswordExpTypes for information about the lookup definition corresponding to the Password Expiration Type field.

Full and Incremental Reconciliation

In full reconciliation, all records are fetched from the target system to Oracle Identity Manager. In incremental reconciliation, only records that are added or modified after the last reconciliation run are fetched into Oracle Identity Manager.

You can switch from incremental to full reconciliation at any time after you deploy the connector. See section Performing Full and Incremental Reconciliation for more information on performing full and incremental reconciliation runs.

Batched Reconciliation

You can break down a reconciliation run into batches by specifying the number of records that must be included in each batch.

See Performing Batched Reconciliation for more information on performing batched reconciliation.

Limited (Filtered) Reconciliation

To limit or filter the records that are fetched into Oracle Identity Manager during a reconciliation run, you can specify the subset of added or modified target system records that must be reconciled.

See Performing Limited Reconciliation for more information on performing limited reconciliation.

Support for Connector Server

Connector Server is a component provided by ICF. By using one or more connector servers, the connector architecture permits your application to communicate with externally deployed bundles. In other words, a connector server enables remote execution of an Oracle Identity Manager connector.

A Java connector server is useful when you do not wish to execute a Java connector bundle in the same VM as your application. It can be beneficial to run a Java connector on a different host for performance improvements.

See Installation for more information about the installation options for this connector.

Connection Pooling

A connection pool is a cache of objects that represent physical connections to the target. Oracle Identity Manager connectors can use these connections to communicate with target systems.

At run time, the application requests a connection from the pool. If a connection is available, then the connector uses it and then returns it to the pool. A connection returned to the pool can again be requested for and used by the connector for another operation. By enabling the reuse of connections, the connection pool helps reduce connection creation overheads like network latency, memory allocation, and authentication.

One connection pool is created for each IT resource. For example, if you have three IT resources for three installations of the target system, then three connection pools will be created, one for each target system installation.

For more information about the parameters that you can configure for connection pooling, see Setting up the Lookup Definition for Connection Pooling.

Support for SSL Communication Between the Target System and Oracle Identity Manager

You can configure SSL to secure communication between Oracle Identity Manager and the target system.

See Configuring Secure Communication Between the Target System and Oracle Identity Governance for more information about securing communication between the target system and Oracle Identity Manager.

2

Deploying the Connector

The procedure to deploy the connector can be divided across three stages namely preinstallation, installation, and postinstallation.

This chapter contains the following sections:

- Preinstallation
- Installation
- Postinstallation
- Upgrading the Connector
- Postcloning Steps

Preinstallation

Preinstallation for the EBS UM connector involves performing a series of tasks on the target system.

Preinstallation information is divided across the following sections:

- Creating a Target System User Account for Connector Operations
- Determining Values for the JDBC URL and Connection Properties Parameters

Creating a Target System User Account for Connector Operations

This preinstallation step involves creating a user account in the target system that can be used by the connector to perform connector operations.

> **Note:**
>
> You must have DBA privileges to run the scripts described in this section and grant the required permissions to the target system user account.
>
> You must have Oracle Database Client installed on the computer on which you perform the procedure described in this section. The Oracle Database Client release must be the same as the database release. In addition, if Oracle Database Client is not installed on the database host computer, then the tnsnames.ora file on the Oracle Database Client host must contain an entry for the SID of the database.

Oracle Identity Manager requires a target system user account to access the target system during connector operations. You provide the credentials of this user account as part of Configuring the IT Resource for the Target System while creating an application.

To create a target system user account for connector operations:

1. From the installation media, copy the scripts directory to a temporary directory on either the target system host computer or a computer on which the Oracle Database Client has been installed.
2. On the computer where you copy the scripts directory, verify that there is a TNS entry in the tnsnames.ora file for the target system database.
3. Change to the directory containing the scripts directory and depending on the host platform, run either the Run_UM_DBScripts.sh or Run_UM_DBScripts.bat file. These files are present in the scripts directory of the installation media.
4. When you run the script, you are prompted for the following information:

   - `Enter the ORACLE_HOME`

     Set a value for the ORACLE_HOME environment variable. This prompt is displayed only if the ORACLE_HOME environment variable has not been set on the computer on which you are running the script.

   - `Enter the System User Name`

     Enter the login (user name) of a DBA account with the privileges to create and configure a new target system user.

   - `Enter the name of the database`

     Enter the connection string or service name given in the tnsnames.ora file to connect to the target system database.

     This connects you to the SQL*Plus client.

   - `Enter password`

     Enter the password of the APPS user in the target system. The Type and Package are created, and then the connection to the database is disconnected.

   - `Enter password`

     Enter the password of the dba user.

   - `Enter New database Username to be created`

     Enter a user name for the target system account that you want to create.

   - `Enter the New user password`

     Enter a password for the target system account that you want to create.

     This installs all wrappers packages under the APPS schema, creates the new target system account, and then grants all the required privileges on the tables and packages.

   - `Connecting with newly created database user`

     Enter the connection string or service name that you provided earlier.

   The user account for connector operations is created.

Privileges Granted to the User Account

This section lists the privileges that are granted to the user account created in Creating a Target System User Account for Connector Operations. The following privileges are granted to this account:

GRANT CREATE SYNONYM TO &USERNAME;

GRANT CONNECT, RESOURCE TO &USERNAME;

GRANT ALTER ANY PROCEDURE TO &USERNAME;

Execute permission granted to the following packages:

APPS.WF_LOCAL_SYNCH

APPS.FND_USER_PKG

APPS.FND_API

APPS.FND_GLOBAL

APPS.UMX_ACCESS_ROLES_PVT

APPS.FND_USER_RESP_GROUPS_API

Select privilege has been granted to the following tables:

APPS.FND_APPLICATION

APPS.FND_RESPONSIBILITY

APPS.FND_RESPONSIBILITY_TL

APPS.FND_USER_RESP_GROUPS_DIRECT

APPS.FND_APPLICATION_VL

APPS.FND_RESPONSIBILITY_VL

APPS.FND_SECURITY_GROUPS_VL

APPS.FND_USER_RESP_GROUPS_DIRECT

APPS.PER_ALL_PEOPLE_F

APPS.FND_APPLICATION_TL

APPS.WF_LOCAL_USER_ROLES

APPS.WF_USER_ROLES

APPS.WF_LOCAL_ROLES

SELECT, UPDATE privileges granted to the following tables:

APPS.FND_USER

APPS.HZ_PARTIES

APPS.HZ_PERSON_PROFILES

APPS.AP_SUPPLIERS

APPS.AP_SUPPLIER_CONTACTS

APPS.HZ_RELATIONSHIPS

APPS.UMX_ROLE_ASSIGNMENTS_V

Execute privileges granted to the following wrapper packages created in APPS schema:

APPS.OIM_FND_GLOBAL

APPS.OIM_FND_USER_TCA_PKG

APPS.WF_LOCAL_SYNCH

APPS.FND_OID_USERS

APPS.FND_OID_UTIL

In addition to the privileges granted above, the following synonyms are created or replaced:

SYNONYM FND_RESPONSIBILITY FOR APPS.FND_RESPONSIBILITY

SYNONYM FND_APPLICATION FOR APPS.FND_APPLICATION

SYNONYM FND_RESPONSIBILITY_VL FOR APPS.FND_RESPONSIBILITY_VL

SYNONYM FND_SECURITY_GROUPS_VL FOR APPS.FND_SECURITY_GROUPS_VL

SYNONYM FND_APPLICATION_VL FOR APPS.FND_APPLICATION_VL

SYNONYM FND_USER_RESP_GROUPS_DIRECT FOR APPS.FND_USER_RESP_GROUPS_DIRECT

SYNONYM FND_USER FOR APPS.FND_USER

SYNONYM FND_RESPONSIBILITY_TL FOR APPS.FND_RESPONSIBILITY_TL

SYNONYM FND_USER_RESP_GROUPS_DIRECT FOR APPS.FND_USER_RESP_GROUPS_DIRECT

SYNONYM PER_ALL_PEOPLE_F FOR APPS.PER_ALL_PEOPLE_F

SYNONYM FND_APPLICATION_TL FOR APPS.FND_APPLICATION_TL

SYNONYM WF_LOCAL_USER_ROLES FOR APPS.WF_LOCAL_USER_ROLES

SYNONYM WF_USER_ROLES FOR APPS.WF_USER_ROLES

SYNONYM WF_LOCAL_ROLES FOR APPS.WF_LOCAL_ROLES

SYNONYM FND_API FOR APPS.FND_API

SYNONYM FND_SECURITY_GROUPS FOR APPS.FND_SECURITY_GROUPS

SYNONYM FND_SECURITY_GROUPS_TL FOR APPS.FND_SECURITY_GROUPS_TL

SYNONYM HZ_PARTIES FOR APPS.HZ_PARTIES

SYNONYM HZ_PERSON_PROFILES FOR APPS.HZ_PERSON_PROFILES

SYNONYM FND_OID_USERS FOR APPS.FND_OID_USERS

SYNONYM FND_OID_UTIL FOR APPS.FND_OID_UTIL

SYNONYM UMX_ROLE_ASSIGNMENTS_V FOR APPS.UMX_ROLE_ASSIGNMENTS_V

SYNONYM WF_USER_ROLE_ASSIGNMENTS FOR APPS.WF_USER_ROLE_ASSIGNMENTS

SYNONYM AP_SUPPLIERS FOR APPS.AP_SUPPLIERS

SYNONYM AP_SUPPLIER_CONTACTS FOR APPS.AP_SUPPLIER_CONTACTS

SYNONYM HZ_RELATIONSHIPS FOR APPS.HZ_RELATIONSHIPS

SYNONYM ICX_USER_SEC_ATTR_PUB FOR APPS.ICX_USER_SEC_ATTR_PUB

Determining Values for the JDBC URL and Connection Properties Parameters

This section discusses the JDBC URL and Connection Properties parameters. You apply the information in this section while configuring the IT resource for your target system. This procedure is discussed later in this guide.

The values that you specify for the JDBC URL and Connection Properties parameters depend on the security measures that you have implemented:

- Supported JDBC URL Formats
- Only SSL Communication Is Configured
- Both Data Encryption and Integrity and SSL Communication Are Configured

Supported JDBC URL Formats

The following are the supported JDBC URL formats:

- Multiple database instances support one service (Oracle RAC)

  JDBC URL format:

  ```
  jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)
  (HOST=HOST1_NAME.DOMAIN)(PORT=PORT1_NUMBER))(ADDRESS=(PROTOCOL=TCP)
  (HOST=HOST2_NAME.DOMAIN)(PORT=PORT2_NUMBER))(ADDRESS=(PROTOCOL=TCP)
  (HOST=HOST3_NAME.DOMAIN)(PORT=PORT3_NUMBER)) . . . (ADDRESS=(PROTOCOL=TCP)
  (HOST=HOSTn_NAME.DOMAIN)(PORT=PORTn_NUMBER))
  (CONNECT_DATA=(SERVICE_NAME=ORACLE_DATABASE_SERVICE_NAME)))
  ```

  Sample value:

  ```
  jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=
  host1.example.com)(PORT=1521))(ADDRESS=(PROTOCOL=TCP)(HOST=
  host2.example.com)(PORT=1521))(ADDRESS=(PROTOCOL=TCP)(HOST=
  host3.example.com)(PORT=1521))(ADDRESS=(PROTOCOL=TCP)(HOST=
  host4.example.com)(PORT=1521))(CONNECT_DATA=(SERVICE_NAME= srvce1)))
  ```

- One database instance supports one service

  JDBC URL format:

  ```
  jdbc:oracle:thin:@HOST_NAME.DOMAIN:PORT_NUMBER:ORACLE_DATABASE_SERVICE_NAME
  ```

  Sample value:

  ```
  jdbc:oracle:thin:@host1.example:1521:srvce1
  ```

- One database instance supports multiple services (for Oracle Database 10*g* and later)

  JDBC URL format:

  ```
  jdbc:oracle:thin:@//HOST_NAME.DOMAIN:PORT_NUMBER/
  ORACLE_DATABASE_SERVICE_NAME
  ```

  Sample value:

```
jdbc:oracle:thin:@host1.example.com:1521/srvce1
```

Only SSL Communication Is Configured

After you configure SSL communication, the database URL is recorded in the tnsnames.ora file. See Local Naming Parameters in the tnsnames.ora File in *Oracle Database Net Services Reference* for detailed information about the tnsnames.ora file.

The following are sample formats of the contents of the tnsnames.ora file. In these formats, `DESCRIPTION` contains the connection descriptor, `ADDRESS` contains the protocol address, and `CONNECT_DATA` contains the database service identification information.

Sample Format 1:

```
NET_SERVICE_NAME=
 (DESCRIPTION=
   (ADDRESS=(PROTOCOL_ADDRESS_INFORMATION))
   (CONNECT_DATA=
     (SERVICE_NAME=SERVICE_NAME)))
```

Sample Format 2:

```
NET_SERVICE_NAME=
 (DESCRIPTION_LIST=
  (DESCRIPTION=
   (ADDRESS=(PROTOCOL_ADDRESS_INFORMATION))
   (ADDRESS=(PROTOCOL_ADDRESS_INFORMATION))
   (ADDRESS=(PROTOCOL_ADDRESS_INFORMATION))
   (CONNECT_DATA=
     (SERVICE_NAME=SERVICE_NAME)))
  (DESCRIPTION=
   (ADDRESS=(PROTOCOL_ADDRESS_INFORMATION))
   (ADDRESS=(PROTOCOL_ADDRESS_INFORMATION))
   (ADDRESS=(PROTOCOL_ADDRESS_INFORMATION))
   (CONNECT_DATA=
     (SERVICE_NAME=SERVICE_NAME))))
```

Sample Format 3:

```
NET_SERVICE_NAME=
 (DESCRIPTION=
  (ADDRESS_LIST=
   (LOAD_BALANCE=on)
   (FAILOVER=off)
   (ADDRESS=(PROTOCOL_ADDRESS_INFORMATION))
   (ADDRESS=(PROTOCOL_ADDRESS_INFORMATION)))
  (ADDRESS_LIST=
   (LOAD_BALANCE=off)
   (FAILOVER=on)
   (ADDRESS=(PROTOCOL_ADDRESS_INFORMATION))
   (ADDRESS=(PROTOCOL_ADDRESS_INFORMATION)))
  (CONNECT_DATA=
   (SERVICE_NAME=SERVICE_NAME)))
```

If you have configured only SSL communication and imported the certificate that you create on the target system host computer into the JVM certificate store of Oracle Identity Manager, then you must derive the value for the JDBC URL parameter from the value of *NET_SERVICE_NAME* in the tnsnames.ora file. For example:

> **Note:**
>
> As shown in this example, you must include only the `(ADDRESS=(PROTOCOL=TCPS)(HOST=`*`HOST_NAME`*`)(PORT=2484))` element because you are configuring SSL. You need not include other `(ADDRESS=(`*`PROTOCOL_ADDRESS_INFORMATION`*`))` elements.

```
jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCPS)(HOST=myhost)
(PORT=2484)))(CONNECT_DATA=(SERVER=DEDICATED)(SERVICE_NAME=mysid)))
```

Both Data Encryption and Integrity and SSL Communication Are Configured

If both data encryption and integrity and SSL communication are configured, then specify a value for the JDBC URL parameter in the following manner:

Enter a comma-separated combination of the values for the JDBC URL parameter described in Only SSL Communication Is Configured. For example:

```
jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCPS)(HOST=myhost)
(PORT=2484)))(CONNECT_DATA=(SERVER=DEDICATED)(SERVICE_NAME=mysid)))
```

Installation

You must install the connector in Oracle Identity Manager. If necessary, you can also deploy the connector in a Connector Server.

Installation information is divided across the following sections:

- Understanding Installation
- Running the Connector Installer
- Configuring the IT Resource for the Target System

Understanding Installation

Depending on where you want to run the connector code (bundle), the connector provides the following installation options:

- Run the connector code locally in Oracle Identity Manager.

  In this scenario, you deploy the connector in Oracle Identity Manager. Deploying the connector in Oracle Identity Manager involves performing the procedures described in Running the Connector Installer and Configuring the IT Resource for the Target System.

- Run the connector code remotely in a Connector Server.

  In this scenario, you deploy the connector in Oracle Identity Manager, and then, deploy the connector bundle in a Connector Server. See Using an Identity Connector Server in *Oracle Fusion Middleware Developing and Customizing Applications for Oracle Identity Manager* for information about installing, configuring, and running the Connector Server, and then installing the connector in a Connector Server.

Running the Connector Installer

To run the Connector Installer:

1. Copy the contents of the connector installation media directory into the following directory:

   OIM_HOME/server/ConnectorDefaultDirectory

2. Log in to Oracle Identity System Administration.
3. In the left pane, under System Management, click **Manage Connector.**
4. In the Manage Connector page, click **Install.**
5. From the Connector List drop-down list, select **Oracle EBS UM Connector *RELEASE_NUMBER***. This list displays the names and release numbers of connectors whose installation files you copy into the default connector installation directory in Step 1.

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

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

6. Click **Load**.
7. To start the installation process, click **Continue.**

   The following tasks are performed, in sequence:

   a. Configuration of connector libraries
   b. Import of the connector XML files (by using the Deployment Manager)
   c. Compilation of adapters

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

   - Retry the installation by clicking **Retry.**
   - Cancel the installation and begin again from Step 1.

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

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

> **Note:**
>
> At this stage, run the Oracle Identity Manager PurgeCache utility to load the server cache with content from the connector resource bundle in order to view the list of prerequisites. See Clearing Content Related to Connector Resource Bundles from the Server Cache for information about running the PurgeCache utility.
>
> There are no prerequisites for some predefined connectors.

b. Configuring the IT resource for the connector

   The procedure to configure the IT resource is described later in this guide.

c. Configuring the scheduled jobs

   The procedure to configure these scheduled jobs is described later in this guide.

Configuring the IT Resource for the Target System

The IT resource for the target system is created during connector installation. This IT resource contains connection information about the target system. Oracle Identity Manager uses this information during reconciliation and provisioning.

You must specify values for the parameters of the Oracle EBS UM IT resource as follows:

1. Log in to Oracle Identity System Administration.
2. In the left pane, under Configuration, click **IT Resource.**
3. In the IT Resource Name field on the Manage IT Resource page, enter `Oracle EBS UM` and then click **Search.** Alternatively, from the IT Resource Type menu, select the name of the IT resource type **Oracle EBS User Management,** and then click **Search.**
4. Click the edit icon corresponding to the Oracle EBS UM IT resource.
5. From the list at the top of the page, select **Details and Parameters.**
6. Specify values for the parameters of the Oracle EBS UM IT resource.

   Table 2-1 describes each parameter of the Oracle EBS UM IT resource.

Table 2-1 Parameters of the Oracle EBS UM IT Resource

Parameter	Description
batchSize	Enter the number of records that must be included in each batch fetched from the target system during reconciliation. Default value: `1000`
Configuration Lookup	This parameter holds the name of the configuration lookup definition. Default value: `Lookup.Configuration.Oracle EBS UM` You must not change the value of this parameter. However, if you create a copy of this lookup definition, then you can enter the name of the newly created lookup definition as the value of the Configuration Lookup Name parameter.
Connector Server Name	Enter the name of the connector server IT resource.
Context Application Name	An application context is a set of elements associated with an artifact in Oracle E-Business Suite. The context implements user preferences and access control on the artifact. The Context Application Name, Context Responsibility Name, and Context User ID parameters define the context that is used for connector operations. For the Context Application Name parameter, enter the name of the application to which this user belongs. Default value: `0`
Context Responsibility Name	Enter the responsibility assigned to the user in whose context connector operations are performed on the target system. Default value: `0`

Table 2-1 (Cont.) Parameters of the Oracle EBS UM IT Resource

Parameter	Description
Context User ID	Enter the user ID of the user in whose context connector operations are performed on the target system. Default value: 0
database	Enter the name of the target system database.
host	Enter the host name or IP address of the computer hosting the target system.
jdbcUrlTemplate	Enter the JDBC URL template of the target system database. See Determining Values for the JDBC URL and Connection Properties Parameters for information about JDBC URL formats.
port	Enter the number of the port at which the target system database is listening.
user	Enter the user ID of the database user account that Oracle Identity Manager uses to connect to the target system.
password	Enter the password of the database user account that Oracle Identity Manager uses to connect to the target system.
TopologyName	Name of the Segregation of Duties (SoD) topology, if any SoD integration exists. See Specifying a Value for the TopologyName IT Resource Parameter for more information about the values for this parameter.

7. To save the values, click **Update.**

Postinstallation

Postinstallation for the connector involves configuring Oracle Identity Manager, enabling logging to track information about all connector events, and configuring SSL. It also involves performing some optional configurations such as localizing the user interface.

Postinstallation steps are divided across the following sections:

- Configuring SoD
- Configuring Secure Communication Between the Target System and Oracle Identity Governance
- Configuring Oracle Identity Manager
- Clearing Content Related to Connector Resource Bundles from the Server Cache
- Managing Logging
- Setting up the Lookup Definition for Connection Pooling
- Configuring the Connector for SSO
- Localizing Field Labels in UI Forms

Configuring SoD

This section discusses the following procedures:

- Configuring the Oracle Applications Access Controls Governor to Act As the SoD Engine
- Specifying a Value for the TopologyName IT Resource Parameter

- Disabling and Enabling SoD

> **Note:**
>
> The ALL USERS group has INSERT, UPDATE, and DELETE permissions on the UD_EBS_USER, UD_EBS_RESP, UD_EBS_RLS, UD_EBSH_USR, UD_EBSH_RSP, UD_EBST_RLS, UD_EBST_USR, UD_EBST_RSP, and UD_EBST_RLS process forms. This is required to enable the following process:
>
> During SoD validation of an entitlement request, data first moves from a dummy object form to a dummy process form. From there, data is sent to the SoD engine for validation. If the request clears the SoD validation, then data is moved from the dummy process form to the actual process form. Because the data is moved to the actual process forms through APIs, the ALL USERS group must have INSERT, UPDATE, and DELETE permissions on the three process forms.

Configuring the Oracle Applications Access Controls Governor to Act As the SoD Engine

See Configuring Oracle Application Access Controls Governor in *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager* for information about this procedure.

Specifying a Value for the TopologyName IT Resource Parameter

The TopologyName IT resource parameter holds the name of the combination of the following elements that you want to use for SoD validation of entitlement provisioning operations:

- Oracle Identity Manager installation
- Oracle Applications Access Controls Governor installation
- Oracle E-Business Suite installation

The value that you specify for the TopologyName parameter must be the same as the value of the topologyName element in the SILConfig.xml file. If you are using default SIL registration, then specify `sodoaacg` as the value of the topologyName parameter.

For more information about this element, see Using Segregation of Duties (SoD) in *Oracle Fusion Middleware Developer's Guide for Oracle Identity Manager.*

Disabling and Enabling SoD

The following sections describe the procedures to disable and enable SoD:

- Disabling SoD
- Enabling SoD

Disabling SoD

> **Note:**
>
> The SoD feature is disabled by default. Perform the following procedure only if the SoD feature is currently enabled and you want to disable it.

Perform the following steps to disable SoD:

1. Log in to the System Administration console.
2. Set the XL.SoDCheckRequired system property to FALSE as follows:
   a. In the left pane, under System Management, click **System Configuration.** The Advanced Administration is displayed with the System Configuration section in the System Management tab is active.
   b. On the left pane, in the **Search System Configuration** field, enter `XL.SoDCheckRequired`, which is the name of the system property as the search criterion.
   c. In the search results table on the left pane, click the XL.SoDCheckRequired system property in the Property Name column.
   d. On the System Property Detail page, in the Value field, enter `FALSE`.
   e. Click **Save** to save the changes made.

      A message confirming that the system property has been modified is displayed.
3. Restart Oracle Identity Governance.

Enabling SoD

Perform the following steps to enable SoD:

1. Log in to the System Administration console.
2. Set the XL.SoDCheckRequired system property to TRUE as follows:
   a. In the left pane, under System Management, click **System Configuration.** The Advanced Administration is displayed with the System Configuration section in the System Management tab is active.
   b. On the left pane, in the **Search System Configuration** field, enter `XL.SoDCheckRequired`, which is the name of the system property as the search criterion.
   c. In the search results table on the left pane, click the XL.SoDCheckRequired system property in the Property Name column.
   d. On the System Property Detail page, in the Value field, enter `TRUE`.
   e. Click **Save** to save the changes made.

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

3. Restart Oracle Identity Governance.

Configuring Secure Communication Between the Target System and Oracle Identity Governance

To secure communication between Oracle Database and Oracle Identity Governance, you can perform either one or both of the following procedures:

> **Note:**
>
> To perform the procedures described in this section, you must have the permissions required to modify the TNS listener configuration file.

- Configuring Data Encryption and Integrity in Oracle Database
- Configuring SSL Communication in Oracle Database

Configuring Data Encryption and Integrity in Oracle Database

See Data Encryption in *Oracle Database Advanced Security Administrator's Guide* for information about configuring data encryption and integrity.

Configuring SSL Communication in Oracle Database

To enable SSL communication between Oracle Database and Oracle Identity Governance:

1. See Secure Socket Layer in *Oracle Database Advanced Security Administrator's Guide* for information about enabling SSL communication between Oracle Database and Oracle Identity Governance.
2. Export the certificate on the Oracle Database host computer.
3. Copy the certificate to Oracle Identity Governance.
4. Import the certificate into the JVM certificate store of the application server on which Oracle Identity Governance is running.

   To import the certificate into the certificate store, run the following command:

   ```
   keytool -import -file FILE_LOCATION -keystore TRUSTSTORE_LOCATION -storepass
   TRUSTSTORE_PASSWORD -trustcacerts -alias ALIAS
   ```

   In this command:

   - Replace *FILE_LOCATION* with the full path and name of the certificate file.
   - Replace *ALIAS* with an alias for the certificate.
   - Replace *TRUSTSTORE_PASSWORD* with a password for the certificate store.
   - Replace *TRUSTSTORE_LOCATION* with one of the certificate store paths given in Table 2-2. This table shows the location of the certificate store for each of the supported application servers.

> **Note:**
>
> In an Oracle Identity Governance cluster, you must import the file into the certificate store on each node of the cluster.

Table 2-2 Certificate Store Locations

Application Server	Certificate Store Location
Oracle WebLogic Server	• If you are using Oracle jrockit_R27.3.1-jdk, then copy the certificate into the following directory: *JROCKIT_HOME*/jre/lib/security • If you are using the default Oracle WebLogic Server JDK, then copy the certificate into the following directory: *WEBLOGIC_HOME*/java/jre/lib/security/cacerts
IBM WebSphere Application Server	• For a nonclustered configuration of any supported IBM WebSphere Application Server release, import the certificate into the following certificate store: *WEBSPHERE_HOME*/java/jre/lib/security/cacerts • For IBM WebSphere Application Server 6.1.*x*, in addition to the `cacerts` certificate store, you must import the certificate into the following certificate store: *WEBSPHERE_HOME*/Web_Sphere/profiles/*SERVER_NAME*/config/cells/*CELL_NAME*/nodes/*NODE_NAME*/trust.p12 For example: C:/Web_Sphere/profiles/AppSrv01/config/cells/tcs055071Node01Cell/nodes/tcs055071Node0/trust.p12 • For IBM WebSphere Application Server 5.1.*x*, in addition to the `cacerts` certificate store, you must import the certificate into the following certificate store: *WEBSPHERE_HOME*/etc/DummyServerTrustFile.jks
JBoss Application Server	*JAVA_HOME*/jre/lib/security/cacerts
Oracle Application Server	*ORACLE_HOME*/jdk/jre/lib/security/cacerts

Configuring Oracle Identity Manager

You must create additional metadata such as a UI form and an application instance for the resource against which you want to perform reconciliation and provisioning operations. In addition, you must run entitlement and catalog synchronization jobs. These procedures are described in the following sections:

- Creating and Activating a Sandbox
- Creating a New UI Form
- Associating the Form with the Application Instance
- Publishing a Sandbox
- Harvesting Entitlements and Sync Catalog
- Updating an Existing Application Instance with a New Form

Creating and Activating a Sandbox

See Managing Sandboxes in *Oracle Fusion Middleware Developing and Customizing Applications for Oracle Identity Manager* for instructions on creating and activating a sandbox.

Creating a New UI Form

See Managing Forms in *Oracle Fusion Middleware Administering Oracle Identity Manager* for instructions on creating a new UI form. While creating the UI form, ensure that you select the resource object corresponding to the EBS UM connector that you want to associate the form with.

> **Note:**
>
> - While creating a new UI form, the form type should be Parent Form + Child Tables (Master/Detail).
> - Ensure that you select the **Generate Entitlement Forms** check box.

Associating the Form with the Application Instance

By default, an application instance named **Oracle EBS UM Application Instance** is automatically created after you install the connector. You must associate this application instance with the form created in Creating a New UI Form.

See Managing Application Instances in *Oracle Fusion Middleware Administering Oracle Identity Manager* for instructions on modifying an application instance.

After updating the application instance, you must publish it to an organization to make the application instance available for requesting and subsequent provisioning to users. However, as a best practice, perform the following procedure before publishing the application instance:

1. In the System Administration console, deactivate the sandbox.
2. Log out of the System Administration console.
3. Log in to the Self Service console and activate the sandbox that you deactivated in Step 1.
4. In the Catalog, check for the Application Instance UI (form fields) and ensure that it appears correctly.
5. Publish the application instance only if everything appears correctly. Otherwise, fix the issues and then publish the application instance.

See Managing Organizations Associated With Application Instances in *Oracle Fusion Middleware Administering Oracle Identity Manager* for instructions on publishing an application instance to an organization.

Publishing a Sandbox

Before you publish a sandbox, perform the following procedure as a best practice to validate all sandbox changes made till this stage as it is hard to revert changes once a sandbox is published:

1. In the System Administration console, deactivate the sandbox.
2. Log out of the System Administration console.
3. Log in to the Self Service console using the xelsysadm user credentials and then activate the sandbox that you deactivated in Step 1.
4. In the Catalog, ensure that the EBS UM application instance form appears with correct fields.
5. Publish the sandbox. See Publishing a Sandbox in *Oracle Fusion Middleware Developing and Customizing Applications for Oracle Identity Manager* for instructions on publishing a sandbox.

Harvesting Entitlements and Sync Catalog

To harvest entitlements and sync catalog:

1. Run the scheduled jobs for lookup field synchronization listed in Scheduled Jobs for Lookup Field Synchronization.
2. Run the Entitlement List scheduled job to populate Entitlement Assignment schema from child process form table. See Predefined Scheduled Tasks in *Oracle Fusion Middleware Administering Oracle Identity Manager* for more information about this scheduled job.
3. Run the Catalog Synchronization Job scheduled job. See Predefined Scheduled Tasks in *Oracle Fusion Middleware Administering Oracle Identity Manager* for more information about this scheduled job.

Updating an Existing Application Instance with a New Form

For any changes you do in the Form Designer, you must create a new UI form and update the changes in an application instance. To update an existing application instance with a new form:

1. Create a sandbox and activate it as described in Creating and Activating a Sandbox.
2. Create a new UI form for the resource as described in Creating a New UI Form.
3. Open the existing application instance.
4. In the **Form** field, select the new UI form that you created.
5. Save the application instance.
6. Publish the sandbox as described in Publishing a Sandbox.

Clearing Content Related to Connector Resource Bundles from the Server Cache

When you deploy the connector, the resource bundles are copied from the resources directory on the installation media into the Oracle Identity Manager database. Whenever you add a new resource bundle to the connectorResources directory or make a change in an existing resource bundle, 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, switch to the *OIM_HOME*/server/bin directory.
2. Enter one of the following commands:
   - On Microsoft Windows: `PurgeCache.bat All`
   - On UNIX: `PurgeCache.sh All`

   When prompted, enter the user name and password of an account belonging to the SYSTEM ADMINISTRATORS group. In addition, you are prompted to enter the service URL in the following format:

   `t3://OIM_HOST_NAME:OIM_PORT_NUMBER`

   In this format:
   - Replace *`OIM_HOST_NAME`* with the host name or IP address of the Oracle Identity Manager host computer.
   - Replace *`OIM_PORT_NUMBER`* with the port on which Oracle Identity Manager is listening.

Managing Logging

Oracle Identity Manager uses the Oracle Diagnostic Logging (ODL) logging service for recording all types of events pertaining to the connector.

The following topics provide detailed information about logging:

- Understanding Log Levels
- Enabling logging

Understanding Log Levels

Oracle Identity Manager uses Oracle Java Diagnostic Logging (OJDL) for logging. OJDL is based on java.util.logger. 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:

- SEVERE.intValue()+100

  This level enables logging of information about fatal errors.
- SEVERE

  This level enables logging of information about errors that might allow Oracle Identity Manager to continue running.
- WARNING

This level enables logging of information about potentially harmful situations.

- INFO

  This level enables logging of messages that highlight the progress of the application.

- CONFIG

  This level enables logging of information about fine-grained events that are useful for debugging.

- FINE, FINER, FINEST

  These levels enable logging of information about fine-grained events, where FINEST logs information about all events.

These log levels are mapped to ODL message type and level combinations as shown in Table 2-3.

Table 2-3 Log Levels and ODL Message Type:Level Combinations

Log Level	ODL Message Type:Level
SEVERE.intValue()+100	INCIDENT_ERROR:1
SEVERE	ERROR:1
WARNING	WARNING:1
INFO	NOTIFICATION:1
CONFIG	NOTIFICATION:16
FINE	TRACE:1
FINER	TRACE:16
FINEST	TRACE:32

The configuration file for OJDL is logging.xml, which is located at the following path:

DOMAIN_HOME/config/fmwconfig/servers/*OIM_SERVER*/logging.xml

Here, *DOMAIN_HOME* and *OIM_SERVER* are the domain name and server name specified during the installation of Oracle Identity Manager.

Enabling logging

To enable logging in Oracle WebLogic Server:

1. Edit the logging.xml file as follows:
   a. Add the following blocks in the file:

```
<log_handler name="ebs-um-handler" level='[LOG_LEVEL]'
class='oracle.core.ojdl.logging.ODLHandlerFactory'>
<property name='logreader:' value='off'/>
     <property name='path' value='[FILE_NAME]'/>
     <property name='format' value='ODL-Text'/>
     <property name='useThreadName' value='true'/>
     <property name='locale' value='en'/>
     <property name='maxFileSize' value='5242880'/>
     <property name='maxLogSize' value='52428800'/>
     <property name='encoding' value='UTF-8'/>
   </log_handler>
```

```
<logger name='ORG.IDENTITYCONNECTORS.EBS' level='[LOG_LEVEL]'
useParentHandlers='false'>
     <handler name='ebs-um-handler'/>
     <handler name='console-handler'/>
   </logger>
```

b. Replace both occurrences of **[LOG_LEVEL]** with the ODL message type and level combination that you require. Table 2-3 lists the supported message type and level combinations.

   Similarly, replace **[FILE_NAME]** with the full path and name of the log file in which you want log messages to be recorded.

   The following blocks show sample values for **[LOG_LEVEL]** and **[FILE_NAME]** :

```
<log_handler name='ebs-um-handler' level='NOTIFICATION:1'
class='oracle.core.ojdl.logging.ODLHandlerFactory'>
<property name='logreader:' value='off'/>
     <property name='path'
value='F:\MyMachine\middleware\user_projects\domains\base_domain1\servers\oim_s
erver1\logs\oim_server1-diagnostic-1.log'/>
     <property name='format' value='ODL-Text'/>
     <property name='useThreadName' value='true'/>
     <property name='locale' value='en'/>
     <property name='maxFileSize' value='5242880'/>
     <property name='maxLogSize' value='52428800'/>
     <property name='encoding' value='UTF-8'/>
   </log_handler>

<logger name='ORG.IDENTITYCONNECTORS.EBS' level='NOTIFICATION:1'
useParentHandlers='false'>
     <handler name='ebs-um-handler'/>
     <handler name='console-handler'/>
   </logger>
```

   With these sample values, when you use Oracle Identity Manager, all messages generated for this connector that are of a log level equal to or higher than the `NOTIFICATION:1` level are recorded in the specified file.

2. Save and close the file.
3. Set the following environment variable to redirect the server logs to a file:

   For Microsoft Windows:

```
set WLS_REDIRECT_LOG=FILENAME
```

   For UNIX:

```
export WLS_REDIRECT_LOG=FILENAME
```

   Replace ***FILENAME*** with the location and name of the file to which you want to redirect the output.
4. Restart the application server.

Setting up the Lookup Definition for Connection Pooling

By default, this connector uses the ICF connection pooling. Table 2-4 lists the connection pooling properties, their description, and default values set in ICF:

Table 2-4 Connection Pooling Properties

Property	Description
Pool Max Idle	Maximum number of idle objects in a pool. Default value: `10`
Pool Max Size	Maximum number of connections that the pool can create. Default value: `10`
Pool Max Wait	Maximum time, in milliseconds, the pool must wait for a free object to make itself available to be consumed for an operation. Default value: `150000`
Pool Min Evict Idle Time	Minimum time, in milliseconds, the connector must wait before evicting an idle object. Default value: `120000`
Pool Min Idle	Minimum number of idle objects in a pool. Default value: `1`

If you want to modify the connection pooling properties to use values that suit requirements in your environment, then:

1. Log in to the Design Console.
2. Expand **Administration,** and then double-click **Lookup Definition.**
3. Search for and open the **Lookup.Configuration.Oracle EBS UM** lookup definitions.
4. On the Lookup Code Information tab, click **Add.** A new row is added.
5. In the **Code Key** column of the new row, enter `Pool Max Idle.`
6. In the **Decode** column of the new row, enter a value corresponding to the Pool Max Idle property.
7. Repeat Steps 4 through 6 for adding each of the connection pooling properties listed in Table 2-4.
8. Click the Save icon.

Configuring the Connector for SSO

> **Note:**
>
> - Perform the procedure described in this section only if you want to configure the connector to work with a single sign-on solution during reconciliation and provisioning operations.
> - Before you perform this procedure, ensure that the connector for the LDAP-based repository of your single sign-on solution has been installed in your production environment.
> - Before performing this procedure, the EBS registration of OID needs to be of Type 4. This prevents EBS attempting to create the user in OID when an EBS UM account or user is provisioned by OIM. This is not required as LDAPSync or a Connector in OIM will have already created the user in OID. If EBS registration of OID has already been performed specifying a different type, then de-register and register again specifying provisioning type = 4.

You must perform the following steps to configure the connector for SSO:

1. Log in to the Design Console.
2. Modify the resource object as follows:
   a. Expand **Resource Management,** and then double-click **Resource Object.**
   b. In the Name field, enter `Oracle EBS User Management` and then click **Search.**
   c. On the Depends On tab, click **Assign.**
   d. Select the resource object corresponding to your SSO target (for example, **OID User),** and then click **OK.**
   e. Click the Save icon.
3. Modify the **Update SSO Attributes** process task to assign an event handler as follows:
   a. Expand **Process Management,** and then double-click **Process Definition.**
   b. Search for and open the **Oracle EBS UM User** process definition.
   c. On the Tasks tab, double-click the **Update SSO Attributes** process task.
   d. In the Editing Task: Update SSO Attributes dialog box, on the Integration tab, click **Add.**

      The Handler Selection dialog box is displayed.
   e. In the Handler Type region, select the **System** option, and then select the **CopyProcessFormData** event handler from the Handler Name region.
   f. Click the Save icon.
   g. In the confirmation dialog box that is displayed, click **OK.**

      The CopyProcessFormData event handler is assigned to the process task.
4. Modify the **Create EBS User** process task to assign a generated task as follows:

a. On the Tasks tab of the Oracle EBS UM User process definition, double-click the **Create EBS User** process task.

   The Editing Task: Create EBS User dialog box is displayed.

b. On the Responses tab, select the response code **SUCCESS.**

c. From the Tasks to Generate region, click **Assign.**

d. In the dialog box that is displayed, move the **Update SSO Attributes** task name from the right column to the left, and then click **OK.**

   The Update SSO Attributes task is assigned to the process task.

e. Click the Save icon and close the Editing Task: Create EBS User dialog box.

5. Ensure that the lookup definition corresponding to the LDAP server that you are using exists and contains the right entries. For example, if you are using OID, then ensure the Lookup.Objects.OID User.Oracle EBS User Management.CopyAttributesMap exists and contains the following entry:

   - **Code Key:** orclGuid
   - **Decode:** SSO GUID

   See Preconfigured Lookup Definitions for a list of lookup definitions corresponding to your LDAP server.

6. Modify the Oracle EBS UM Application Instance as follows:

   a. Log in to the System Administration console.

   b. Create and activate a Sandbox. See Managing Sandboxes in *Oracle Fusion Middleware Developing and Customizing Applications for Oracle Identity Manager* for instructions on creating and activating a sandbox

   c. Modify the Oracle EBS UM Application Instance to specify the application instance of your SSO target (for example, OID) as a parent instance. See Modifying Application Instance Attributes in *Oracle Fusion Middleware Administering Oracle Identity Manager* for instructions on modifying an application instance.

   d. Publish the sandbox. See Publishing a Sandbox in *Oracle Fusion Middleware Developing and Customizing Applications for Oracle Identity Manager* for instructions on publishing a sandbox.

Localizing Field Labels in UI Forms

To localize field label that you add to in UI forms:

1. Log in to Oracle Enterprise Manager.
2. In the left pane, expand Application Deployments and then select **oracle.iam.console.identity.sysadmin.ear.**
3. In the right pane, from the Application Deployment list, select **MDS Configuration.**
4. On the MDS Configuration page, click **Export** and save the archive to the local computer.
5. Extract the contents of the archive, and open the following files in a text editor:

   - For Oracle Identity Manager 11*g* Release 2 PS2 (11.1.2.2.0):

     SAVED_LOCATION\xliffBundles\oracle\iam\ui\runtime\BizEditorBundle_en.xlf

- For releases prior to Oracle Identity Manager 11*g* Release 2 PS2 (11.1.2.2.0):

  SAVED_LOCATION\xliffBundles\oracle\iam\ui\runtime\BizEditorBundle.xlf

6. Edit the BizEditorBundle.xlf file in the following manner:

   a. Search for the following text:

   ```
   <file source-language="en"
   original="/xliffBundles/oracle/iam/ui/runtime/BizEditorBundle.xlf"
   datatype="x-oracle-adf">
   ```

   b. Replace with the following text:

   ```
   <file source-language="en" target-language="LANG_CODE"
   original="/xliffBundles/oracle/iam/ui/runtime/BizEditorBundle.xlf"
   datatype="x-oracle-adf">
   ```

   In this text, replace *LANG_CODE* with the code of the language that you want to localize the form field labels. The following is a sample value for localizing the form field labels in Japanese:

   ```
   <file source-language="en" target-language="ja"
   original="/xliffBundles/oracle/iam/ui/runtime/BizEditorBundle.xlf"
   datatype="x-oracle-adf">
   ```

   c. Search for the application instance code. This procedure shows a sample edit for Oracle E-Business Suite application instance. The original code is:

   ```
   <trans-unit id="$
   {adfBundle['oracle.adf.businesseditor.model.util.BaseRuntimeResourceBundle']
   ['persdef.sessiondef.oracle.iam.ui.runtime.form.model.user.entity.userEO.UD_EBS
   _UM_USRNAME__c_description']}">
   <source>User Name</source>
   <target/>
   </trans-unit>
   <trans-unit
   id="sessiondef.oracle.iam.ui.runtime.form.model.EBSUMForm11.entity.EBSUMForm11E
   O.UD_EBS_UM_USRNAME__c_LABEL">
   <source>User Name</source>
   <target/>
   </trans-unit>
   ```

   d. Depending on the connector you are using, open the resource file (for example, EBS-UM.properties) from the connector package, and get the value of the attribute from the file, for example, global.udf.UD_EBS_UM_USER_NAME=\u4567d.

   e. Replace the original code shown in Step 6.c with the following:

   ```
   <trans-unit id="$
   {adfBundle['oracle.adf.businesseditor.model.util.BaseRuntimeResourceBundle']
   ['persdef.sessiondef.oracle.iam.ui.runtime.form.model.user.entity.userEO.UD_EBS
   _UM_USRNAME__c_description']}">
   <source>User Name</source>
   <target>\u4567d</target>
   </trans-unit>
   <trans-unit
   id="sessiondef.oracle.iam.ui.runtime.form.model.EBSUMForm11.entity.EBSUMForm11E
   O.UD_EBS_UM_USRNAME__c_LABEL">
   <source>User Name</source>
   <target>\u4567d</target>
   </trans-unit>
   ```

   f. Repeat Steps 6.a through 6.d for all attributes of the process form.

g. Save the file as BizEditorBundle_*LANG_CODE*.xlf. In this file name, replace *LANG_CODE* with the code of the language to which you are localizing.

   Sample file name: BizEditorBundle_ja.xlf.

7. Repackage the ZIP file and import it into MDS.

> **See Also:**
>
> Deploying and Undeploying Customizations in *Oracle Fusion Middleware Developing and Customizing Applications for Oracle Identity Manager,* for more information about exporting and importing metadata files

8. Log out of and log in to Oracle Identity Manager.

Upgrading the Connector

If you have already deployed an earlier release of this connector, then upgrade the connector to the current release 11.1.1.5.0. The following sections discuss the procedure to upgrade the connector:

> **Note:**
>
> - Upgrade of the EBS UM connector from Oracle EBS UM TCA connector and the plain Oracle EBS UM connector release 9.1.0.7.*x* to 11.1.1.5.0 is supported.
> - Before you perform the upgrade procedure, it is strongly recommended that you create a backup of the Oracle Identity Manager database. Refer to the database documentation for information about creating a backup.
> - As a best practice, first perform the upgrade procedure in a test environment.

- Preupgrade Steps
- Upgrade Steps
- Postupgrade Steps

Preupgrade Steps

Perform the following preupgrade steps:

1. Perform a reconciliation run to fetch all latest updates to Oracle Identity Manager.
2. Define the source connector (an earlier release of the connector that must be upgraded) in Oracle Identity Manager. You define the source connector to update the Deployment Manager XML file with all customization changes made to the connector. See Managing Connector Lifecycle in *Oracle Fusion Middleware Administering Oracle Identity Manager* for more information.
3. If required, create the connector XML file for a clone of the source connector.

4. If you are using Oracle Identity Manager release 11.1.2.*x,* then:
   a. Log in to the Design Console.
   b. Expand **Development Tools** and then double-click **Form Designer.**
   c. Create a new version for all child forms in your environment. For example, create a new version for the UD_EBS_RESP child form. This is the child form for Responsibilities.
   d. Open the child form version.
   e. On the Properties tab, except for the Entitlement and OIAParentAttribute properties, delete all the existing properties. In other words, delete all lookup query properties currently associated with the form fields such as Responsibility Name.
   f. For each column name, add the Lookup Code property and set its property value to the corresponding lookup definition name. For example, for the Application Name column, add the Lookup Code property and then set its value to `Lookup.EBS.Responsibility`.
   g. Repeat Step 4.f for the remaining columns. The following table lists the column names and the corresponding lookup definitions:

Column	Lookup Definition
Application Name	Lookup.EBS.Application
Security Group Name	Lookup.EBS.SecurityGroup
Role Name	Lookup.EBS.UMX.Roles

   h. Make version active.
   i. Create UI form.
5. Disable all the scheduled jobs by stopping the scheduler service.

Upgrade Steps

Depending on the environment in which you are upgrading the connector, perform one of the following steps:

- Staging Environment

  Perform the upgrade procedure by using the wizard mode.
- Production Environment

  Perform the upgrade procedure by using the silent mode.

See Managing Connector Lifecycle in *Oracle Fusion Middleware Administering Oracle Identity Manager* for detailed information about the wizard and silent modes.

Postupgrade Steps

Perform the following procedure:

1. Download the latest version of this connector from Oracle Technology Network and extract its contents to any directory on the computer hosting Oracle Identity Manager.

2. Run the Upload JARs utility to post the latest version of the connector bundle JAR file (org.identityconnectors.ebs-1.0.1115.jar) from the /bundle directory of the installation media to the Oracle Identity Manager database.

   For Microsoft Windows:

   OIM_HOME/server/bin/UploadJars.bat

   For UNIX:

   OIM_HOME/server/bin/UploadJars.sh

   When you run the utility, you are prompted to enter the login credentials of the Oracle Identity Manager administrator, URL of the Oracle Identity Manager host computer, context factory value, type of JAR file being uploaded (specify the JAR type as ICFBundle, option `4`), and the location from which the JAR file is to be uploaded.

3. Run the Form Version Control (FVC) utility to manage data changes on a form after an upgrade operation. To do so:

   a. In a text editor, open the fvc.properties file located in the *OIM_DC_HOME* directory and include the following entries:

   ```
   ResourceObject;Oracle EBS User Management
   FormName;UD_EBST_USR
   FromVersion;SPECIFY_THE_VERSION_OF_FORM_THAT_WAS_IN_THE_ACTIVE_STATUS_BEFORE_THE_UPGRADE
   ToVersion;SPECIFY_THE_VERSION_OF_FORM_THAT_IS_IN_THE_ACTIVE_STATUS_AFTER_THE_UPGRADE
   ```

   b. Run the FVC utility. This utility is copied into the following directory when you install the design console:

   For Microsoft Windows:

   OIM_DC_HOME/fvcutil.bat

   For UNIX:

   OIM_DC_HOME/fvcutil.sh

   When you run this utility, you are prompted to enter the login credentials of the Oracle Identity Manager administrator, and the logger level and log file location.

   > **See Also:**
   >
   > Using the Form Version Control Utility in *Oracle Fusion Middleware Administering Oracle Identity Manager* for detailed information about the FVC utility

4. Run the Post Upgrade Script as follows:

   a. Connect to the Oracle Identity Manager database by using the OIM User credentials.

   b. If you are upgrading the Oracle EBS UM TCA connector, then run the **PostUpgradeScript_TCAEBSUM.sql** script located in the *OIM_HOME*/server/ConnectorDefaultDirectory/EBSUM_PCKG/upgrade directory.

c. If you are upgrading the plain EBS UM connector, then run the **PostUpgradeScript_PlainEBSUM.sql** script located in the *OIM_HOME*/server/ConnectorDefaultDirectory/EBSUM_PCKG/upgrade directory.

5. Configure the upgraded IT resource of the source connector. See Configuring the IT Resource for the Target System for information about configuring the IT resource.
6. Change the literal value for child forms as follows:
   a. Log in to the Design Console.
   b. Expand **Process Management,** and then double-click **Process Definition.**
   c. Search for and open the **Oracle EBS UM User** process definition.
   d. On the Tasks tab, double-click the **Add User Responsibility** process task.

      The Editing Task: Add User Responsibility dialog box is displayed.
   e. On the Integration tab, double-click the **childTableName** adapter variable.

      The Edit Mapping for Variable dialog box is displayed.
   f. In the Literal Value field, depending on the connector that you are upgrading from, perform one of the following steps:
      - If you are upgrading the Oracle EBS UM TCA connector from release 9.1.0.7.*x* to this release, then change the value from UD_UM_RESP to `UD_EBST_RSP`.
      - If you are upgrading the plain Oracle EBS UM connector from release 9.1.0.7.*x* to this release, then change the value from UD_UM_RESP to `UD_EBS_RSP`.
   g. Click the Save icon and close the dialog box.
   h. Repeat Steps 6.d through 6.g for the **Update User Responsibility** and **Remove User Responsibility** process tasks.
   i. If you are upgrading the Oracle EBS UM TCA connector from release 9.1.0.7.*x* to this release, then repeat Steps 6.d through 6.g for the following process tasks by changing the value of the Literal Value field from UD_UM_ROLE to `UD_EBST_RLS`:
      - Add User Role
      - Update User Role
      - Remove User Role
   j. If you are upgrading the plain Oacle EBS UM connector from release 9.1.0.7.*x* to this release, then repeat Steps 6.d through 6.g for the following process tasks by changing the value of the Literal Value field from UD_UM_ROLE to `UD_EBS_RLS`:
      - Add User Role
      - Update User Role
      - Remove User Role
7. Change the name of the child form in the **Lookup.Oracle EBS UM.UM.ProvAttrMap** lookup definition as follows:
   a. Expand **Administration,** and then double-click **Lookup Definition.**
   b. Search for and open the **Lookup.Oracle EBS UM.UM.ProvAttrMap** lookup definition.
   c. In the Code Key column:

- If you are upgrading the Oracle EBS UM TCA connector, then search for all entries beginning with **UD_UM_RESP** and replace it with `UD_EBST_RSP`. For example, replace the UD_UM_RESP~Application Name[LOOKUP] entry with `UD_EBST_RSP~Application Name[LOOKUP]`.
  Similarly, search for all entries beginning with **UD_UM_ROLE** and replace it `with UD_EBST_RLS`. For example, replace the UD_UM_ROLE~Role Start Date[DATE] entry with `UD_EBST_RLS~Role Start Date[DATE]`.
- If you are upgrading the plain Oracle EBS UM connector, then search for all entries beginning with **UD_UM_RESP** and replace it with `UD_EBS_RSP`. For example, replace the UD_UM_RESP~Application Name[LOOKUP] entry with `UD_EBS_RESP~Application Name[LOOKUP]`.
  Similarly, search for all entries beginning with **UD_UM_ROLE** and replace it with `UD_EBS_RLS`. For example, replace the UD_UM_ROLE~Role Start Date[DATE] entry with `UD_EBS_RLS~Role Start Date[DATE]`.

d. Click the Save icon.

8. Modify the UD_EBS_UM Updated process task to set itResourceFieldName adapter variable as follows:
   a. Expand **Process Management**, and then double-click **Process Definition**.
   b. Search for and open the Oracle EBS UM User process definition.
   c. On the Tasks tab, double-click the **UD_EBS_UM Updated** process task.

      The Editing Task: UD_EBS_UM Updated dialog box is displayed.
   d. On the Integration tab:
      - If you are upgrading the Oracle EBS UM TCA connector, then change the literal value of itResourceFieldName adapter variable from UD_EBS_UM_EBS_ITRES to UD_EBST_USR_EBS_ITRES.
      - If you are upgrading the plain Oracle EBS UM connector, then change the literal value from to UD_EBS_UM_EBS_ITRES to UD_EBS_USER_EBS_ITRES.
   e. Click the Save icon and close the dialog box.
   f. Click the Save icon of the task and close the task.
   g. Click the Save icon of the process definition.
9. Remove the old prepopulate adapter associated with the process form field as follows:
   - If you are upgrading the Oracle EBS UM TCA connector, then:
     a. Expand **Development Tools,** and then double-click **Form Designer.**
     b. Search for and open the **UD_EBST_USR** form.
     c. Create a new version (for example, **v_11.1.1.5.0_1**) of the form and save it.
     d. Select the newly created form version.
     e. On the Pre-Populate tab, select the row containing the old prepopulate adapter **EBSPrePopFirstName**, and then click **Delete**.
     f. Click **OK** in the Alert dialog box to confirm that you want to proceed with deleting the prepopulate adapter.

g. Repeat Steps 9.e and 9.f to delete the **EBSPrePopLastName** prepopulate adapter associated with the Party Last Name form field.

h. Click the Save icon and then Click **Make Version Active**.

- If you are upgrading the Oracle EBS UM connector, then:

  a. Expand **Development Tools,** and then double-click **Form Designer.**

  b. Search for and open the **UD_EBS_USR** form.

  c. Create a new version (for example, **v_11.1.1.5.0_1**) of the form and save it.

  d. Select the newly created form version.

  e. On the Pre-Populate tab, select the row containing the old prepopulate adapter **EBSPrePopSystemDate**, and then click **Delete**.

  f. Click **OK** in the Alert dialog box to confirm that you want to proceed with deleting the prepopulate adapter.

  g. Click the Save icon and then Click **Make Version Active**.

10. Update the localization properties. To do so, you must update the resource bundle of a user locale with new names of the process form attributes for proper translations after upgrading the connector. You can modify the properties file of your locale in the resources directory of the connector bundle.

    For example, the process form (UD_EBS_UM) attributes are referenced in the Japanese properties file, EBS-UM_ja.properties, as global.udf.UD_EBS_UM_PARTY_FNAME. During upgrade, the process form name is changed to old form name UD_EBST_USR (in case of EBS UM TCA upgrade) or UD_EBS_USER (in case of EBS Plain UM upgrade) to global.udf.UD_EBS_UM_PARTY_FNAME. Therefore, you must add the process form attributes to global.udf.UD_EBS_UM_PARTY_FNAME.

11. Restart Oracle Identity Manager. Alternatively, you can purge the cache for the changes to reflect in Oracle Identity Manager. See Purging Cache in *Oracle Fusion Middleware Administering Oracle Identity Manager* for more information about the PurgeCache utility.

12. Replicate all the changes made to the Form Designer of the Design Console to a new UI form as follows:

    a. Log in to Oracle Identity System Administration.

    b. Create and active a sandbox. See Creating and Activating a Sandbox for more information.

    c. Create a new UI form to view the upgraded fields. See Creating a New UI Form for more information about creating a UI form.

    d. Associate the newly created UI form with the application instance of your target system. To do so, open the existing application instance for your resource, from the Form field, select the form (created in Step 12.c), and then save the application instance.

    e. Publish the sandbox. See Publishing a Sandbox for more information.

After upgrading the connector, you can perform either full reconciliation or incremental reconciliation. This ensures that records created or modified since the last reconciliation run (the one that you performed in Preupgrade Steps) are fetched into Oracle Identity Manager. From the next reconciliation run onward, the reconciliation engine automatically enters a value for the Latest Token attribute.

Before you perform lookup field synchronization, ensure to remove all preupgrade entries from the lookup definitions Oracle Identity Manager. After upgrade these values must be synchronized with the lookup fields in the target system.

See Performing Full and Incremental Reconciliation for more information about performing full or incremental reconciliation.

Postcloning Steps

You can clone this connector by setting new names for some of the objects that comprise the connector. The outcome of the process is a new connector XML file. Most of the connector objects, such as Resource Object, Process Definition, Process Form, IT Resource Type Definition, IT Resource Instances, Lookup Definitions, Adapters, Reconciliation Rules and so on in the new connector XML file have new names.

> **Note:**
>
> Managing Connector Lifecycle in *Oracle Fusion Middleware Administering Oracle Identity Manager* for detailed information about cloning connectors and the postcloning steps.

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

- IT Resource

  The cloned connector has its own set of IT resources. You must configure both the cloned connector IT resources and ensure you use the configuration lookup definition of the cloned connector.

- Scheduled Job

  The values of the Resource Object Name and IT Resource scheduled job attributes in the cloned connector refer to the values of the base connector. Therefore, these values (values of the Resource Object Name and IT resource scheduled job attributes that refer to the base connector) must be replaced with the new cloned connector artifacts.

- Lookup Definition

  The cloned lookup definition (for example, Lookup.Oracle EBS UMClone.UM.ProvAttrMap) corresponding to the Lookup.Oracle EBS UM.UM.ProvAttrMap lookup definition has Code Key entries related to child form fields that still map to the old child form fields. You must change the values of these Code Key entries so that they map to the cloned child form fields.

  For example, consider UD_UM_ROL1 and UD_UM_RES1 to be the cloned child forms of the UD_UM_ROLE and UD_UM_RESP child forms respectively. After cloning, the Lookup.Oracle EBS UMClone.UM.ProvAttrMap lookup definition contains Code Key entries that correspond to the fields of the old child form UD_UM_ROLE and UD_UM_RESP respectively. To ensure that the Code Key

entries point to the fields of the cloned child form (UD_UM_ROL1 and UD_UM_RES1), specify the following values in the corresponding Code Key columns:

- UD_UM_ROL1~Application Name[LOOKUP]
- UD_UM_ROL1~Role Expiration Date[DATE]
- UD_UM_ROL1~Role Name[LOOKUP]
- UD_UM_ROL1~Role Start Date[DATE]
- UD_UM_RES1~Application Name[LOOKUP]
- UD_UM_RES1~Responsibility Description
- UD_UM_RES1~Responsibility End Date[DATE]
- UD_UM_RES1~Responsibility Name[LOOKUP]
- UD_UM_RES1~Responsibility Start Date[DATE]
- UD_UM_RES1~Security Group[LOOKUP]

- Process Tasks

  You must change the literal value of the **childTableName** adapter variable from UD_UM_ROLE and UD_UM_RESP to the cloned form names UD_UM_ROL1 anUD_UM_RES1, respectively in the following process tasks:

  - Add User Responsibility Process Task
  - Add User Role Process Task
  - Update User Responsibility Process Task
  - Update User Role Process Task
  - Remove User Responsibility Process Task
  - Remove User Role Process Task

  You must change the literal value of the parent form from **UD_EBS_UM** to the cloned form name **UD_EBS_U1** in the **UD_EBS_UM Updated** in the Bulk adapter process task.

- Localization Properties

  You must update the resource bundle of a user locale with new names of the process form attributes for proper translations after cloning the connector. You can modify the properties file of your locale in the resources directory of the connector bundle.

  For example, the process form (UD_EBS_UM) attributes are referenced in the Japanese properties file, EBS-UM_ja.properties, as global.udf.UD_EBS_UM_PARTY_FNAME. During cloning, if you change the process form name from UD_EBS_UMCLONED to global.udf.UD_EBS_UMCLONED _PARTY_FNAME, then you must add the process form attributes to global.udf.UD_EBS_UM_PARTY_FNAME.

- Replicate changes made to the form designer to a new UI form

  To do so, perform the procedure described in Postupgrade Steps.

3
Using the Connector

This chapter provides information about the following topics:

> **Note:**
>
> These sections provide both conceptual and procedural information about configuring the connector. It is recommended that you read the conceptual information before you perform the procedures.

- Lookup Definitions Used During Connector Operations
- Reconciliation Scheduled Jobs
- Configuring Reconciliation
- Configuring Provisioning
- Uninstalling the Connector

Lookup Definitions Used During Connector Operations

Lookup definitions that are used during reconciliation and provisioning operations are either preconfigured or synchronized with the target system.

Lookup definitions used during connector operations can be categorized as follows:

- Lookup Definitions Synchronized with the Target System
- Preconfigured Lookup Definitions

Lookup Definitions Synchronized with the Target System

During a provisioning operation, you use a lookup field on the process form to specify a single value from a set of values. For example, you use the Responsibilities lookup field to select a responsibility to be assigned from the list of responsibilities in the lookup field. When you deploy the connector, lookup definitions corresponding to the lookup fields on the target system are created in Oracle Identity Manager. Lookup field synchronization involves copying additions or changes made to the target system lookup fields into the lookup definitions in Oracle Identity Manager.

The following is the format in which data is stored after lookup definition synchronization:

Code Key: *<IT_RESOURCE_KEY>~<LOOKUP_FIELD_VALUE>*

In this format:

- *IT_RESOURCE_KEY* is the numeric code assigned to each IT resource in Oracle Identity Manager.
- *LOOKUP_FIELD_VALUE* is the connector attribute value defined for code.

Sample value: `245~0`

Decode: *<IT_RESOURCE_NAME>~<LOOKUP_FIELD_VALUE>*

In this format:

- *IT_RESOURCE_KEY* is the name of the IT resource in Oracle Identity Manager.
- *LOOKUP_FIELD_VALUE* is the connector attribute value defined for decode.

Sample value: `Oracle EBS UM~FND`

During a provisioning operation, lookup fields are populated with values corresponding to the target system that you select for the operation.

Preconfigured Lookup Definitions

This section discusses the other lookup definitions that are created in Oracle Identity Manager when you deploy the connector. These lookup definitions are either prepopulated with values or values must be manually entered in them after the connector is deployed. The other lookup definitions are as follows:

- Lookup.Configuration.Oracle EBS UM
- Lookup.Oracle EBS UM.UM.Configuration
- Lookup.Oracle EBS UM.UM.ProvAttrMap
- Lookup.Oracle EBS UM.UM.ReconAttrMap
- Lookup.Oracle EBS UM.PartyType
- Lookup.Oracle EBS UM.PasswordExpTypes
- Lookup.Objects.EDIR User.Oracle EBS User Management.CopyAttributesMap
- Lookup.Objects.LDAP User.Oracle EBS User Management.CopyAttributesMap
- Lookup.Objects.OID User.Oracle EBS User Management.CopyAttributesMap
- Lookup.Objects.AD User.Oracle EBS User Management.CopyAttributesMap

Lookup.Configuration.Oracle EBS UM

The Lookup.Configuration.Oracle EBS UM holds connector configuration entries that are used during target resource reconciliation and provisioning operations.

Table 3-1 lists the default entries in this lookup definition.

Table 3-1 Entries in the Lookup.Configuration.Oracle EBS UM Lookup Definition

Code Key	Decode	Description
Bundle Name	org.identityconnectors.ebs	This entry holds the name of the connector bundle class. Do *not* modify this entry.
Bundle Version	1.0.1115	This entry holds the version of the connector bundle class. Do *not* modify this entry.
Connector Name	org.identityconnectors.ebs.EBSConnector	This entry holds the name of the connector class. Do *not* modify this entry.

Table 3-1 (Cont.) Entries in the Lookup.Configuration.Oracle EBS UM Lookup Definition

Code Key	Decode	Description
User Configuration Lookup	Lookup.Oracle EBS UM.UM.Configuration	This entry holds the name of the lookup definition that contains configuration information specific to the user object type. See Lookup.Oracle EBS UM.UM.Configuration for more information about this lookup definition.

Lookup.Oracle EBS UM.UM.Configuration

The Lookup.Oracle EBS UM.UM.Configuration lookup definition holds configuration entries that are specific to the user object type. This lookup definition is used during user management operations when your target system is configured as a target resource.

Table 3-2 lists the default entries in this lookup definition.

Table 3-2 Entries in the Lookup.Oracle.EBS UM.UM.Configuration Lookup Definition

Code Key	Decode	Description
Provisioning Attribute Map	Lookup.Oracle EBS UM.UM.ProvAttrMap	This entry holds the name of the lookup definition that contains configuration information specific to the provisioning attribute map. See Lookup.Oracle EBS UM.UM.ProvAttrMap for more information about this lookup definition
Recon Attribute Map	Lookup.Oracle EBS UM.UM.ReconAttrMap	This entry holds the name of the lookup definition that contains configuration information specific to the reconciliation attribute map. See Lookup.Oracle EBS UM.UM.ProvAttrMap for more information about this lookup definition

Lookup.Oracle EBS UM.UM.ProvAttrMap

The Lookup.Oracle EBS UM.UM.ProvAttrMap definition holds mappings between process form fields (Code Key values) and target system attributes (Decode). This lookup definition is used during provisioning operations. This lookup definition is preconfigured. Table 3-3 lists the default entries in this lookup definition.

Table 3-3 Entries in the Lookup.Oracle EBS UM.UM.ProvAttrMap Lookup Definition

Code Key	Decode
Description	DESCRIPTION
Effective End Date[DATE]	END_DATE
Effective Start Date[DATE]	START_DATE
Email	EMAIL_ADDRESS
Fax	FAX
Party First Name	PARTY_FIRST_NAME
Party Id	PARTY_ID
Party Last Name	PARTY_LAST_NAME

Table 3-3 (Cont.) Entries in the Lookup.Oracle EBS UM.UM.ProvAttrMap Lookup Definition

Code Key	Decode
Party Type	PARTY_TYPE
Password	__PASSWORD__
Password Expiration Interval	PASSWORD_LIFESPAN
Password Expiration Type	PASSWORD_EXP_TYPE
Person Id	EMPLOYEE_ID
SSO GUID	USER_GUID
Supplier Name	SUPPLIER_NAME
Supplier Party Id[WRITEBACK]	SUPPLIER_PARTY_ID
UD_UM_RESP~Application Name[LOOKUP]	__RESPONSIBILITY__~__RESPONSIBILITY__~RESPONSIBILITY_APP_ID
UD_UM_RESP~Responsibility Description	__RESPONSIBILITY__~__RESPONSIBILITY__~RESP_DESCRIPTION
UD_UM_RESP~Responsibility End Date[DATE]	__RESPONSIBILITY__~__RESPONSIBILITY__~RESP_END_DATE
UD_UM_RESP~Responsibility Name[LOOKUP]	__RESPONSIBILITY__~__RESPONSIBILITY__~RESPONSIBILITY_ID
UD_UM_RESP~Responsibility Start Date[DATE]	__RESPONSIBILITY__~__RESPONSIBILITY__~RESP_START_DATE
UD_UM_RESP~Security Group[LOOKUP]	__RESPONSIBILITY__~__RESPONSIBILITY__~SECURITY_GROUP_ID
UD_UM_ROLE~Application Name[LOOKUP]	__ROLE__~__ROLE__~ROLE_APP_ID
UD_UM_ROLE~Role Expiration Date[DATE]	__ROLE__~__ROLE__~EXPIRATION_DATE
UD_UM_ROLE~Role Name[LOOKUP]	__ROLE__~__ROLE__~ROLE_ID
UD_UM_ROLE~Role Start Date[DATE]	__ROLE__~__ROLE__~ROLE_START_DATE
User Id	__UID__
User Name	__NAME__

Lookup.Oracle EBS UM.UM.ReconAttrMap

The Lookup.Oracle EBS UM.UM.ReconAttrMap definition holds mappings between resource object fields (Code Key values) and target system attributes (Decode). These lookup definitions are used during reconciliation. This lookup definitions is preconfigured. Table 3-4 lists the default entries in this lookup definition.

Table 3-4 Entries in the Lookup.Oracle EBS UM.UM.ReconAttrMap Lookup Definition

Code Key	Decode
Description	DESCRIPTION
Effective End Date[DATE]	END_DATE
Effective Start Date[DATE]	START_DATE
Email	EMAIL_ADDRESS

Table 3-4 (Cont.) Entries in the Lookup.Oracle EBS UM.UM.ReconAttrMap Lookup Definition

Code Key	Decode
Fax	FAX
Party First Name	PARTY_FIRST_NAME
Party Id	PARTY_ID
Party Last Name	PARTY_LAST_NAME
Party Type	PARTY_TYPE
Password Expiration Interval	PASSWORD_LIFESPAN
Password Expiration Type	PASSWORD_EXP_TYPE
Person Id	EMPLOYEE_ID
Responsibilities~Application Name[LOOKUP]	__RESPONSIBILITY__~__RESPONSIBILITY__~RESPONSIBILITY_APP_ID
Responsibilities~Responsibility Description	__RESPONSIBILITY__~__RESPONSIBILITY__~RESP_DESCRIPTION
Responsibilities~Responsibility End Date[DATE]	__RESPONSIBILITY__~__RESPONSIBILITY__~RESP_END_DATE
Responsibilities~Responsibility Name[LOOKUP]	__RESPONSIBILITY__~__RESPONSIBILITY__~RESPONSIBILITY_ID
Responsibilities~Responsibility Start Date[DATE]	__RESPONSIBILITY__~__RESPONSIBILITY__~RESP_START_DATE
Responsibilities~Security Group[LOOKUP]	__RESPONSIBILITY__~__RESPONSIBILITY__~SECURITY_GROUP_ID
Roles~Application Name[LOOKUP]	__ROLE__~__ROLE__~ROLE_APP_ID
Roles~Role Expiration Date[DATE]	__ROLE__~__ROLE__~EXPIRATION_DATE
Roles~Role Name[LOOKUP]	__ROLE__~__ROLE__~ROLE_ID
Roles~Role Start Date[DATE]	__ROLE__~__ROLE__~ROLE_START_DATE
SSO GUID	USER_GUID
Status	__ENABLE__
Supplier Name	SUPPLIER_NAME
Supplier Party Id	SUPPLIER_PARTY_ID
User Id	__UID__
User Name	__NAME__

Lookup.Oracle EBS UM.PartyType

The Lookup.Oracle EBS UM.PartyType lookup definition holds information about the types of parties that you can select for a target system account, which you create through Oracle Identity Manager.

The following is the format of the Code Key and Decode values in this lookup definition:

- **Code Key:** The type of party
- **Decode:** Description of the type of party

> **Note:**
>
> You cannot add new entries to this lookup definition.

Table 3-5 lists the default entries in this lookup definition.

Table 3-5 Entries in the Lookup.Oracle EBS UM.PartyType Lookup Definition

Code Key	Decode
Party	Party
Supplier	Supplier

Lookup.Oracle EBS UM.PasswordExpTypes

The Lookup.Oracle EBS UM.PasswordExpTypes lookup definition holds the options that you can select to specify when the password for the target system account (created through Oracle Identity Manager) must expire.

The following is the format of entries in this lookup definition:

- **Code Key:** The type of password expiry
- **Decode:** The type of password expiry

Table 3-6 lists the default entries in this lookup definition.

Table 3-6 Entries in the Lookup.Oracle EBS UM.PasswordExpTypes Lookup Definition

Code Key	Decode
Accesses	Accesses
Days	Days
None	None

Lookup.Objects.EDIR User.Oracle EBS User Management.CopyAttributesMap

The Lookup.Objects.EDIR User.Oracle EBS User Management.CopyAttributesMap lookup definition is used to configure the connector to work with an SSO solution during provisioning operations. In other words, this lookup definition is used when the target system is configured to use Oracle Access Manager to authenticate users. Oracle Access Manager in turn uses Novell eDirectory as an LDAP-based repository for storing user records.

The Lookup.Objects.EDIR User.Oracle EBS User Management.CopyAttributesMap lookup definition holds information that is used internally by an OIM adapter to copy field values from a Novell eDirectory account to the target system account. For example, the entries in the Lookup.Objects.EDIR User.Oracle EBS User Management.CopyAttributesMap lookup definition are used internally by the OIM adapter to copy the Reference ID value of a Novell eDirectory account to the SSO GUID field of the EBS UM account.

The following is the format of entries in this lookup definition:

- **Code Key:** Name of the field in the target system that must be populated with a value from a corresponding field in Novell eDirectory
- **Decode:** Corresponding field name in Novell eDirectory

Table 3-7 lists the default entries in this lookup definition.

Table 3-7 Entries in the Lookup.Objects.EDIR User.Oracle EBS User Management.CopyAttributesMap Lookup Definition

Code Key	Decode
Reference ID	SSO GUID

Lookup.Objects.LDAP User.Oracle EBS User Management.CopyAttributesMap

The Lookup.Objects.LDAP User.Oracle EBS User Management.CopyAttributesMap lookup definition is used when the target system is configured to use either Oracle Single Sign-On or Oracle Access Manager, to authenticate users. Oracle Single Sign-On and Oracle Access Manager in turn use an LDAP-based repository for storing user records.

The Lookup.Objects.LDAP User.Oracle EBS User Management.CopyAttributesMap lookup definition holds information is used internally by an OIM adapter to copy field values from an LDAP-based repository account to the target system account. For example, the entries in the Lookup.Objects.LDAP User.Oracle EBS User Management.CopyAttributesMap lookup definition are used internally by the OIM adapter to copy the NsuniqueID value of an LDAP account to the SSO GUID field of the EBS UM account.

The following is the format of entries in this lookup definition:

- **Code Key:** Name of the field in the target system that must be populated with a value from a corresponding field in any LDAP-based repository
- **Decode:** Corresponding field name in the LDAP-based repository

Table 3-8 lists the default entries in this lookup definition.

Table 3-8 Entries in the Lookup.Objects.LDAP User.Oracle EBS User Management.CopyAttributesMap Lookup Definition

Code Key	Decode
NsuniqueID	SSO GUID

Lookup.Objects.OID User.Oracle EBS User Management.CopyAttributesMap

The Lookup.Objects.OID User.Oracle EBS User Management.CopyAttributesMap lookup definition is used when the target system is configured to use Oracle Single Sign-On to authenticate users. Oracle Single Sign-On in turn uses Oracle Internet Directory as an LDAP-based repository for storing user records.

The Lookup.Objects.OID User.Oracle EBS User Management.CopyAttributesMap lookup definition holds information that is used internally by an OIM adapter to copy field values from an Oracle Internet Directory account to the target system account. For example, the entries in the Lookup.Objects.OID User.Oracle EBS User Management.CopyAttributesMap lookup definition are used internally by the OIM adapter to copy the orclGuid value of an OID account to the SSO GUID field of the EBS UM account.

The following is the format of entries in this lookup definition:

- **Code Key:** Name of the field in the target system that must be populated with a value from a corresponding field in OID
- **Decode:** Corresponding field name in OID

Table 3-9 lists the default entries in this lookup definition.

Table 3-9 Entries in the Lookup.Objects.OID User.Oracle EBS User Management.CopyAttributesMap Lookup Definition

Code Key	Decode
orclGuid	SSO GUID

Lookup.Objects.AD User.Oracle EBS User Management.CopyAttributesMap

The Lookup.Objects.AD User.Oracle EBS User Management.CopyAttributesMap lookup definition is used when the target system is configured to use Oracle Single Sign-On to authenticate users. Oracle Single Sign-On in turn uses Active Directory as an LDAP-based repository for storing user records.

The Lookup.Objects.AD User.Oracle EBS User Management.CopyAttributesMap lookup definition holds information that is used internally by an OIM adapter to copy field values from a Microsoft Active Directory account to the target system account. For example, the entries in the Lookup.Objects.AD User.Oracle EBS User Management.CopyAttributesMap lookup definition are used internally by the OIM adapter to copy the Unique Id value of an AD account to the SSO GUID field of the EBS UM account.

The following is the format of entries in this lookup definition:

- **Code Key:** Name of the field in the target system that must be populated with a value from a corresponding field in AD
- **Decode:** Corresponding field name in AD

Table 3-9 lists the default entries in this lookup definition.

Table 3-10 Entries in the Lookup.Objects.AD User.Oracle EBS User Management.CopyAttributesMap Lookup Definition

Code Key	Decode
Unique Id	SSO GUID

Reconciliation Scheduled Jobs

When you run the Connector Installer, the scheduled jobs are automatically created in Oracle Identity Manager.

The following sections provide more information:

- Scheduled Jobs for Lookup Field Synchronization
- Scheduled Job for Target User Reconciliation

- Scheduled Job for Incremental Target User Reconciliation
- Scheduled Job for Target User Delete Reconciliation
- Configuring Scheduled Jobs

Scheduled Jobs for Lookup Field Synchronization

Lookup field synchronization involves copying additions or changes made to the target system lookup fields into the lookup definitions in Oracle Identity Manager.

The following scheduled jobs are used for lookup fields synchronization:

- Oracle EBS UM Target Applications Lookup Reconciliation
- Oracle EBS UM Target Responsibilities Lookup Reconciliation
- Oracle EBS UM Target Roles Lookup Reconciliation
- Oracle EBS UM Target Security Groups Lookup Reconciliation

You must specify values for the attributes of these scheduled jobs. Table 3-11 describes the attributes of these scheduled jobs. Configuring Scheduled Jobs describes the procedure to configure scheduled jobs.

Table 3-11 Attributes of the Scheduled Jobs for Lookup Field Synchronization

Attribute	Description
Code Key Attribute	Name of the connector or target system attribute that is used to populate the Code Key column of the lookup definition (specified as the value of the Lookup Name attribute). Default value: `CODE` **Note:** Do *not* change the value of this attribute.
Decode Attribute	Name of the connector or target system attribute that is used to populate the Decode column of the lookup definition (specified as the value of the Lookup Name attribute). Default value: `DECODE` **Note:** Do *not* change the value of this attribute.
IT Resource Name	Enter the name of the IT resource for the target system installation from which you want to reconcile user records. Default value: `Oracle EBS UM`
Lookup Name	Enter the name of the lookup definition in Oracle Identity Manager that must be populated with values fetched from the target system. Depending on the scheduled job that you are using, the default values are as follows: • For Oracle EBS UM Target Applications Lookup Reconciliation: `Lookup.Oracle EBS UM.Applications` • For Oracle EBS UM Target Responsibilities Lookup Reconciliation: `Lookup.Oracle EBS UM.Responsibilities` • For Oracle EBS UM Target Roles Lookup Reconciliation: `Lookup.Oracle EBS UM.Roles` • For Oracle EBS UM Target Security Groups Lookup Reconciliation: `Lookup.Oracle EBS UM.SecurityGroups`

Table 3-11 (Cont.) Attributes of the Scheduled Jobs for Lookup Field Synchronization

Attribute	Description
Object Type	Enter the type of object you want to reconcile. Depending on the scheduled job that you are running, the default value is one of the following: • For Oracle EBS UM Target Applications Lookup Reconciliation: `__APPLICATIONS__` • For Oracle EBS UM Target Responsibilities Lookup Reconciliation: `__RESPONSIBILITIES__` • For Oracle EBS UM Target Roles Lookup Reconciliation: `__ROLES__` • For Oracle EBS UM Target Security Groups Lookup Reconciliation: `__SECURITY_GROUPS__`

Scheduled Job for Target User Reconciliation

The Oracle EBS UM Target User Reconciliation scheduled job is used for user data reconciliation.

You must specify values for the attributes of the Oracle EBS UM Target User Reconciliation scheduled job. Table 3-12 describes the attributes of this scheduled job.

Table 3-12 Attributes of the Oracle EBS UM Target User Reconciliation Scheduled Job

Attribute	Description
Filter	Enter the search filter for fetching records from the target system during a reconciliation run. See Performing Limited Reconciliation for more information. Sample Value: `equalTo('__UID__','1017905')`
Incremental Recon Attribute	Enter the name of the target system attribute that holds the timestamp at which the user record was modified.
ITResource Name	Enter the name of the IT resource for the target system installation from which you want to reconcile user records. Default value: `Oracle EBS UM`
Latest Token	This attribute holds the value of the attribute that is specified as the value of the Incremental Recon Attribute attribute. The Latest Token attribute is used for internal purposes. By default, this value is empty. Note: Do not enter a value for this attribute. The reconciliation engine automatically enters a value in this attribute. Sample value: `<Long>1234567890</Long>`
Object Type	Enter the type of object you want to reconcile. Default value: `User` **Note:** User is the only object that is supported. Therefore, do not change the value of the attribute.
Resource Object Name	Enter the name of the resource object that is used for reconciliation. Default value: `Oracle EBS User Management`
Scheduled Task Name	Name of the scheduled task that is used for reconciliation. Default value: `Oracle EBS UM Target User Reconciliation`

Scheduled Job for Incremental Target User Reconciliation

The Oracle EBS UM Target Incremental User Reconciliation scheduled job is used for incremental reconciliation of user data.

You must specify values for the attributes of the Oracle EBS UM Target Incremental User Reconciliation scheduled job. Table 3-13 describes the attributes of this scheduled job.

Table 3-13 Attributes of the Oracle EBS UM Target Incremental User Reconciliation Scheduled Job

Attribute	Description
ITResource Name	Enter the name of the IT resource for the target system installation from which you want to reconcile user records. Default value: `Oracle EBS UM`
Object Type	Enter the type of object you want to reconcile. Default value: `User`
Resource Object Name	Enter the name of the resource object that is used for reconciliation. Default value: `Oracle EBS UM User`
Scheduled Task Name	Name of the scheduled task that is used for reconciliation. Default value: `Oracle EBS UM Target Incremental User Reconciliation`
Sync Token	This attribute must be left blank when you run incremental reconciliation for the first time. This ensures that data about all records from the target system are fetched into Oracle Identity Manager. After the first reconciliation run, the connector automatically enters a value for this attribute in an XML serialized format. From the next reconciliation run onward, only data about records that are modified since the last reconciliation run ended are fetched into Oracle Identity Manager. Sample value: `<Long>123454502019</Long>`

Scheduled Job for Target User Delete Reconciliation

The Oracle EBS UM Target User Delete Reconciliation scheduled job is used for user data reconciliation.

You must specify values for the attributes Oracle EBS UM Target User Delete Reconciliation scheduled job.

Table 3-14 describes the attributes of this scheduled job.

Table 3-14 Attributes of the Oracle EBS UM Target User Delete Reconciliation Scheduled Job

Attribute	Description
ITResource Name	Enter the name of the IT resource for the target system installation from which you want to reconcile user records. Default value: `Oracle EBS UM`
Object Type	Enter the type of object you want to reconcile. Default value: `User`

Table 3-14 (Cont.) Attributes of the Oracle EBS UM Target User Delete Reconciliation Scheduled Job

Attribute	Description
Resource Object Name	Enter the name of the resource object that is used for reconciliation. Default value: `Oracle EBS UM User`

Configuring Scheduled Jobs

You can apply this procedure to configure the scheduled jobs for lookup field synchronization and reconciliation.

See Scheduled Jobs for Lookup Field Synchronization and Reconciliation for the list of scheduled jobs that you can configure.

To configure a scheduled job:

1. Log in to Oracle Identity System Administration.
2. In the left pane, under System Management, click **Scheduler.**
3. Search for and open the scheduled task as follows:
   a. On the left pane, in the Search field, enter the name of the scheduled job as the search criterion. Alternatively, you can click **Advanced Search** and specify the search criterion.
   b. In the search results table on the left pane, click the scheduled job in the Job Name column.
4. On the Job Details tab, you can modify the following parameters:
   - **Retries:** Enter an integer value in this field. This number represents the number of times the scheduler tries to start the job before assigning the Stopped status to the job.
   - **Schedule Type:** Depending on the frequency at which you want the job to run, select the appropriate schedule type.

   > **Note:**
   >
   > See Creating Jobs in *Oracle Fusion Middleware Administering Oracle Identity Manager* for detailed information about schedule types.

   In addition to modifying the job details, you can enable or disable a job.
5. On the Job Details tab, in the Parameters region, specify values for the attributes of the 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.
> - Values (either default or user-defined) must be assigned to all the attributes. If even a single attribute value is left empty, then reconciliation is not performed.

6. Click **Apply** to save the changes.

> **Note:**
>
> You can use the Scheduler Status page in Identity System Administration to either start, stop, or reinitialize the scheduler.

Configuring Reconciliation

Reconciliation involves duplicating in Oracle Identity Manager the creation of and modifications to user accounts on the target system.

This section provides details on the following topics related to configuring reconciliation:

- Reconciliation Queries
- Reconciliation Rules
- Reconciliation Action Rules
- Performing Full and Incremental Reconciliation
- Performing Limited Reconciliation

Reconciliation Queries

The User Management connector is configured to perform target resource reconciliation with the target system. Data from newly created and updated target system records is brought to Oracle Identity Manager and used to create and update Oracle E-Business Suite resources provisioned to OIM Users.

A SQL query is used to fetch target system records during reconciliation. All predefined SQL queries that are required to perform reconciliation are stored in the search.properties file. The search.properties file is a common file for all EBS Suite connectors. In other words, the search.properties file contains the queries for the EBS UM, HRMS Target, HRMS Trusted connectors.

When you run a scheduled job, the connector locates the corresponding SQL query in the search.properties file and then runs it on the target system database. Target system records that meet the query criteria are returned to Oracle Identity Manager.

Depending on your requirements, you can modify existing queries or add your own query in the search.properties. This is discussed later in this guide.

Information in the search.properties file is virtually divided into two parts. The first part lists entries containing the SQL query names in the following format:

OBJ_NAME.*OP_NAME*.*MODE*=*QUERY_NAME*

In this format:

- *OBJ_CLASS* is the name of the object class on which the reconciliation operation must be performed.
- *OP_NAME* is the type of reconciliation operation to be performed. A reconciliation operation can be a search op, sync op, or lookup op.
- *QUERY_NAME* is the name of the SQL query that is to be run on the target system database.

The second part lists the SQL query names and the corresponding SQL queries.

The following are the entries corresponding to the EBS UM connector in the search.properties file:

- __ACCOUNT__.search=UM_USER_RECON

  This query is used to reconcile all newly created and modified user records from the target system. The reconciliation operation that is performed is search based.

- __ACCOUNT__.sync=UM_USER_SYNC

  This query is used to reconcile all newly created and modified user records from the target system. The reconciliation operation that is performed is sync based.

- __APPLICATIONS__.lookup=LOOKUP_APPLICATION_QUERY

  This query is used to synchronize values in the fnd_application table of the target system with the Lookup.Oracle EBS UM.Applications lookup definition in Oracle Identity Manager.

- __ROLES__.lookup=LOOKUP_ROLES_QUERY

  This query is used to synchronize values in the fnd_application table of the target system with the Lookup.Oracle EBS UM.Roles lookup definition in Oracle Identity Manager.

- __RESPONSIBILITIES__.lookup=LOOKUP_RESPONSIBILITY_QUERY

  This query is used to synchronize values in the fnd_responsibility_vl table of the target system with the Lookup.Oracle EBS UM.Responsibilities lookup definition in Oracle Identity Manager.

- __SECURITY_GROUPS__.lookup=LOOKUP_SECURITY_GROUP_QUERY

  This query is used to synchronize values in the fnd_security_groups table of the target system with the Lookup.Oracle EBS UM.SecurityGroups lookup definition in Oracle Identity Manager.

Reconciliation Rules

The following sections provide information about the reconciliation rules for this connector:

- Reconciliation Rule for Target Resource Reconciliation
- Viewing Reconciliation Rules for Target Resource Reconciliation

Reconciliation Rule for Target Resource Reconciliation

The following is the process-matching rule:

Rule name: Oracle EBS User

Rule element: User Login Equals User Name

In the rule element:

- User Login is the User ID field of the OIM User form.
- User Name is the __NAME__ field of the target system.

Viewing Reconciliation Rules for Target Resource Reconciliation

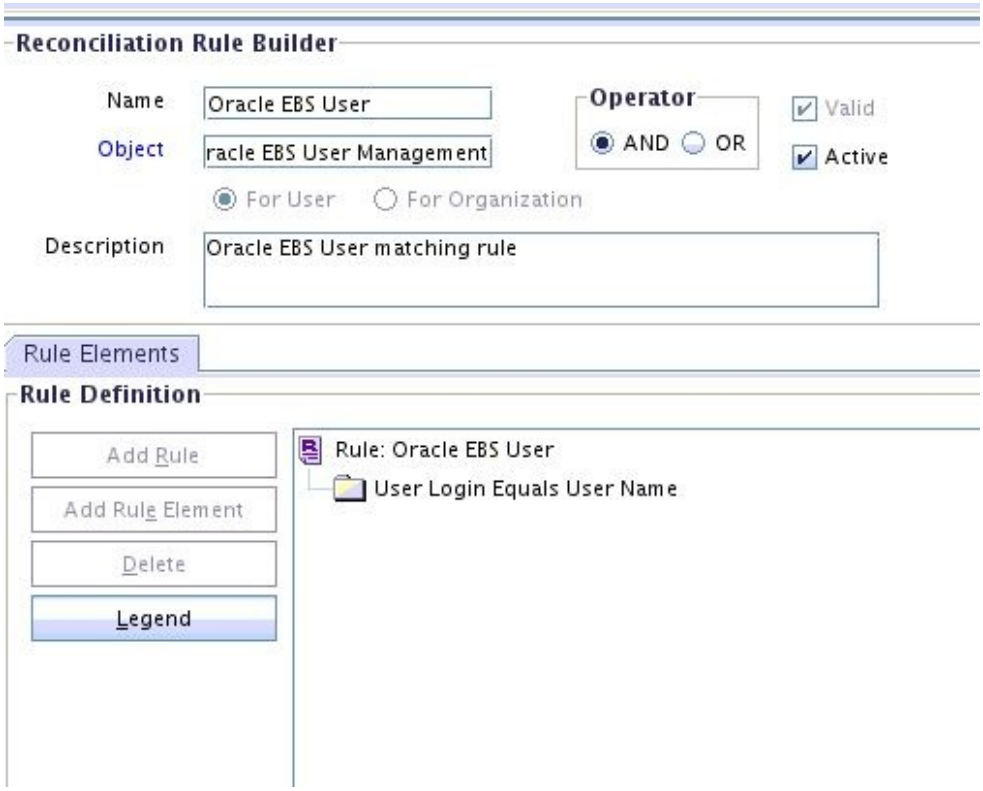
After you deploy the connector, you can view the reconciliation rule for target resource reconciliation by performing the following steps:

> **Note:**
>
> Perform the following procedure only after the connector is deployed.

1. Log in to the Oracle Identity Manager Design Console.
2. Expand **Development Tools.**
3. Double-click **Reconciliation Rules.**
4. Search for the **Oracle EBS User** rule name.

   Figure 3-1 shows the reconciliation rule for target resource reconciliation.

Figure 3-1 Reconciliation Rule for Target Resource Reconciliation



Reconciliation Action Rules

The following sections provide information about the reconciliation rules for this connector:

- Target Resource Reconciliation Action Rule for the EBS User Management Connector
- Viewing Reconciliation Action Rules for Target Resource Reconciliation in the Design Console

Target Resource Reconciliation Action Rule for the EBS User Management Connector

Table 3-15 lists the action rules for target resource reconciliation.

Table 3-15 Action Rules for Target Resource Reconciliation

Rule Condition	Action
No Matches Found	None
One Entity Match Found	Establish Link
One Process Match Found	Establish Link

> **Note:**
>
> No action is performed for rule conditions that are not predefined for this connector. You can define your own action rule for such rule conditions. See the following sections in *Oracle Fusion Middleware Developing and Customizing Applications for Oracle Identity Manager* for information about setting or modifying a reconciliation action rule:
>
> - Setting a Reconciliation Action Rule (Developing Identity Connectors using Java)
> - Setting a Reconciliation Action Rule (Developing Identity Connectors using .NET)

Viewing Reconciliation Action Rules for Target Resource Reconciliation in the Design Console

After you deploy the connector, you can view the reconciliation action rules for target resource reconciliation by performing the following steps:

1. Log in to the Oracle Identity Manager Design Console.
2. Expand **Resource Management**.
3. Double-click **Resource Objects**.
4. Search for and open the **Oracle EBS User Management** resource object.
5. Click the **Object Reconciliation** tab, and then click the **Reconciliation Action Rules** tab. The Reconciliation Action Rules tab displays the action rules defined for this connector. Figure 3-2 shows the reconciliation action rule for target resource reconciliation.

Figure 3-2 Reconciliation Action Rules for Target Resource Reconciliation

Performing Full and Incremental Reconciliation

Full reconciliation involves reconciling all existing user records from the target system into Oracle Identity Manager. After you deploy the connector, you must first perform full reconciliation. In addition, you can switch from incremental reconciliation to full reconciliation whenever you want to ensure that all target system records are reconciled in Oracle Identity Manager.

To perform full reconciliation, ensure that no values are specified for the Latest Token and Filter attributes of the scheduled jobs for reconciling user records.

In incremental reconciliation, only records created or modified after the latest date/timestamp the last reconciliation was run are considered for reconciliation. To perform incremental reconciliation, configure and run the scheduled job for incremental reconciliation. The first time you run the scheduled job for incremental reconciliation, note that a full reconciliation is performed.

Performing Limited Reconciliation

By default, all target system records that are added or modified after the last reconciliation run are reconciled during the current reconciliation run. You can customize this process by specifying the subset of added or modified target system records that must be reconciled.

You can perform limited reconciliation by creating filters for the reconciliation module. This connector provides a Filter attribute (a scheduled job attribute) that allows you to use any of the Oracle EBS User Management resource attributes to filter the target system records.

When you specify a value for the Filter attribute, only the target system records that match the filter criterion are reconciled into Oracle Identity Manager. If you do not specify a value for the Filter attribute, then all the records in the target system are reconciled into Oracle Identity Manager.

You specify a value for the Filter attribute while configuring the user reconciliation scheduled job. The following are a few examples of the values for the Filter attribute:

- To reconcile all target system accounts whose user name is like 'jo*', use the filter `startsWith('user_name', 'jo')`.
- To reconcile all target system accounts whose email address is like '*@example.com', use the filter `endsWith('EMAIL_ADDRESS', '@example.com')`.
- To reconcile all target system accounts whose start date is later than 1st August, 2015, use the filter `greaterThan('START_DATE', 1438367400000)`. Note that the date value must be specified in milliseconds.

For detailed information about ICF Filters, see ICF Filter Syntax in *Oracle Fusion Middleware Developing and Customizing Applications for Oracle Identity Manager.*

Performing Batched Reconciliation

During a reconciliation run, all changes in the target system records are reconciled into Oracle Identity Manager. Depending on the number of records to be reconciled, this process may require a large amount of time. In addition, if the connection breaks during reconciliation, then the process would take longer to complete.

You can configure batched reconciliation to avoid these problems.

To configure batched reconciliation, you must specify value for the batchSize parameter of the IT resource. Use this parameter to specify the number of records that must be included in each batch. By default, this value is set to `1000`.

Configuring Provisioning

This section discusses the following topics:

- Provisioning Procedures
- Provisioning Functions
- Performing Provisioning Operations in Oracle Identity Manager
- Provisioning Operations Performed in an SoD-Enabled Environment

Provisioning Procedures

Provisioning involves management of user accounts and assignment of responsibilities and roles to users in the target system. When you allocate (or provision) an Oracle E-Business Suite resource to an OIM User, the operation results in the creation of an account on Oracle E-Business Suite for that user. Similarly, when you update the resource on Oracle Identity Manager, the same update is made to the account on the target system.

The connector uses stored procedures for performing provisioning operations. These stored procedures are available in the wrapper packages of the target system. Information about all stored procedures used for performing provisioning operations is defined in the Procedures.properties file. The same file contains stored procedures information for both the EBS UM and HRMS Target connectors.

When you perform a provisioning operation, the connector locates the corresponding stored procedure in the Procedures.properties file and then runs it on the target system to complete the provisioning operation.

Depending on your requirements, you can modify existing stored procedures or add your own stored procedures to the Procedures.properties file. This is discussed later in the guide.

The first property in the Procedures.properties file, DB.PACKAGES, lists all the wrapper packages that are used during connector operations. The subsequent entries in this file are in the following format:

OBJ_NAME.OP_NAME.TCA_TYPE=WRAPPER_PCKG.STORED_PROC

In this format:

- *OBJ_NAME* is the name of the object on which the provisioning operation must be performed.
- *OP_NAME* is the type of provisioning operation to be performed. For example, a provisioning operation can be either create, update, delete, enable, or disable.
- *TCA_TYPE* is the type of TCA record, whether party or supplier. *TCA_TYPE* is present only for entries corresponding to TCA record provisioning.
- *WRAPPER_PCKG* is the name of the wrapper package.
- *STORED_PROC* is the name of the stored procedure in the wrapper package that is to be run to on the target system to complete the provisioning operation.

The following are the entries corresponding to the EBS UM connector in the Procedures.properties file:

- **Entries corresponding to the __ACCOUNT__ object:**
  - __ACCOUNT__.create=OIM_FND_USER_TCA_PKG.CREATEUSER

    In this entry, the CREATEUSER stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for performing the Create User provisioning operation against the __ACCOUNT__ object.
  - __ACCOUNT__.create.userparty=OIM_FND_USER_TCA_PKG.CREATEUSERPARTY

    In this entry, the CREATEUSERPARTY stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for creating a user record with an existing TCA record.
  - __ACCOUNT__.validatepartyandperson=OIM_FND_USER_TCA_PKG.VALIDATEPARTYANDPERSON

    In this entry, the VALIDATEPARTYANDPERSON stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for validating person and party records before creating an account.
  - __ACCOUNT__.update=OIM_FND_USER_TCA_PKG.UPDATEUSER

    In this entry, the UPDATEUSER stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for performing the Update provisioning operation against the __ACCOUNT__ object.
  - __ACCOUNT__.enable=OIM_FND_USER_TCA_PKG.ENABLEUSER

    In this entry, the ENABLEUSER stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for enabling the user account of the __ACCOUNT__ object.
  - __ACCOUNT__.disable=OIM_FND_USER_TCA_PKG.DISABLEUSER

    In this entry, the DISABLEUSER stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for disabling the user account of the __ACCOUNT__ object.
  - __ACCOUNT__.update.username=OIM_FND_USER_TCA_PKG.CHANGE_USER_NAME

    In this entry, the CHANGE_USER_NAME stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for performing the Update user name provisioning operation against the __ACCOUNT__ object.
  - __ACCOUNT__.update.password=OIM_FND_USER_TCA_PKG.CHANGEPASSWORD

    In this entry, the CHANGEPASSWORD stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for performing the Update user password provisioning operation against the __ACCOUNT__ object.
  - __ACCOUNT__.update.userparty=OIM_FND_USER_TCA_PKG.UPDATEUSERPARTY

    In this entry, the UPDATEUSERPARTY stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for performing the Update user party provisioning operation against the __ACCOUNT__ object.

- __ACCOUNT__.delete=OIM_FND_USER_TCA_PKG.REVOKEUSER

  In this entry, the DELETE_PERSON_API stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for performing the Delete provisioning operation against the __ACCOUNT__ object.

- __ACCOUNT__.create.supplier=OIM_FND_USER_TCA_PKG.CREATE_SUPPLIER

  In this entry, the CREATE_SUPPLIER stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for performing the Create Supplier provisioning operation against the __ACCOUNT__ object.

- __ACCOUNT__.create.supplier_contact=OIM_FND_USER_TCA_PKG.CREATE_SUPPLIER_CONTACT

  In this entry, the CREATE_SUPPLIER_CONTACT stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for performing the Create Supplier Contact provisioning operation against the __ACCOUNT__ object.

- __ACCOUNT__.create.supplier_secattr=OIM_FND_USER_TCA_PKG.CREATE_SUPPLIER_SECURITY_ATTRS

  In this entry, the CREATE_SUPPLIER_SECURITY_ATTRS stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for performing the Create Security Attributes provisioning operation against the __ACCOUNT__ object.

- __ACCOUNT__.create.linkuser=OIM_FND_USER_TCA_PKG.LINK_USER_PARTY

  In this entry, the LINK_USER_PARTY stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for linking a user record with an existing party record. The LINK_USER_PARTY stored procedure is invoked soon after CREATEUSERPARTY stored procedure.

- __ACCOUNT__.create.party=OIM_FND_USER_TCA_PKG.CREATE_PARTY

  In this entry, the CREATE_PARTY stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for creating a new party record.

- __ACCOUNT__.update.party=OIM_FND_USER_TCA_PKG.UPDATE_PARTY

  In this entry, the UPDATE_PARTY stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for performing the Update Party record provisioning operation against the __ACCOUNT__ object.

- **Entries corresponding to child objects:**

  - __RESPONSIBILITY__.add=OIM_FND_USER_TCA_PKG.ADDRESP

    In this entry, the ADDRESP stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for adding responsibilities for the __ACCOUNT__ object.

  - __RESPONSIBILITY__.remove =OIM_FND_USER_TCA_PKG.DELRESP

    In this entry, the DELRESP stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for removing responsibilities for the __ACCOUNT__ object.

  - __ROLE__.add=OIM_FND_USER_TCA_PKG.PROPAGATEUSERROLE

    In this entry, the PROPAGATEUSERROLE stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for adding roles for the __ACCOUNT__ object.

  - __ROLE__.remove=OIM_FND_USER_TCA_PKG.REVOKEUSERROLE

In this entry, the REVOKEUSERROLE stored procedure of the OIM_FND_USER_TCA_PKG wrapper package is used for removing roles for the __ACCOUNT__ object.

Provisioning Functions

Table 3-16 lists the provisioning functions that are supported by the connector. The Adapter column gives the name of the adapter that is used when the function is performed.

Table 3-16 Provisioning Functions

Function	Adapter
Add Child Data	adpEBSUMADDCHILDDATA
Create	adpEBSUMCREATE
Delete	adpEBSUMDELETE
Disable User	adpEBSUMDISABLEUSER
Enable User	adpEBSUMENABLEUSER
Remove Child Data	adpEBSUMREMOVECHILDDATA
Update Child Data	adpEBSUMUPDATECHILDDATA
Update Single Attributes	adpEBSUMUPDATESINGLEATTRIBUTE
User Bulk Update	adpEBSUMUSERBULKUPDATE

Performing Provisioning Operations in Oracle Identity Manager

To perform provisioning operations in Oracle Identity Manager:

1. Log in to Oracle Identity Administrative and User console.
2. Create a user. See Managing Users in *Oracle Fusion Middleware Performing Self Service Tasks with Oracle Identity Manager* for more information about creating a user.
3. On the Account tab, click **Request Accounts.**
4. In the Catalog page, search for and add to cart the application instance created in Associating the Form with the Application Instance, and then click **Checkout.**
5. Specify value for fields in the application form and then click **Ready to Submit.**
6. Click **Submit.**
7. If you want to provision entitlements, then:
   a. On the Entitlements tab, click **Request Entitlements.**
   b. In the Catalog page, search for and add to cart the entitlement, and then click **Checkout.**
   c. Click **Submit.**

Provisioning Operations Performed in an SoD-Enabled Environment

Provisioning a resource for an OIM User involves using Oracle Identity Governance to create an Oracle E-Business Suite User Management account for the user.

The following are the types of provisioning operations:

- Direct provisioning
- Provisioning triggered by policy changes

This section discusses the following topics:

- Overview of the Provisioning Process in an SoD-Enabled Environment
- Direct Provisioning in an SoD-Enabled Environment

Overview of the Provisioning Process in an SoD-Enabled Environment

The following is the sequence of steps that take places during a provisioning operation performed in an SoD-enabled environment:

1. The provisioning operation triggers the appropriate adapter.
2. The adapter carries provisioning data to the corresponding API on the target system.
3. If you select an account or entitlements to be provisioned to the OIM User, then the SoD check is initiated. The SoDChecker task submits the User Account and Entitlements details in a form of Duties list to Oracle Application Access Controls Governor. In other words, the SoD validation process takes place asynchronously.
4. The Web service of Oracle Application Access Controls Governor receives the entitlement data.
5. After Oracle Application Access Controls Governor runs the SoD validation process on the entitlement data, the response from the process is returned to Oracle Identity Governance.
6. The status of the process task that received the response depends on the response. If the entitlement data clears the SoD validation process, then the status of the process task changes to Completed. This translates into the entitlement being granted to the user. If the SoD validation process returns the failure response, then status of the process task changes to Canceled.

Direct Provisioning in an SoD-Enabled Environment

The procedure for direct provisioning in an SoD-enabled environment is similar to the procedure for direct provisioning in a typical environment.

To provision a resource by using the direct provisioning approach:

1. Log in to the Administrative and User Console.
2. If you want to first create an OIM User and then provision a target system account, then:
   a. On the Identity Manager - Self Service page, click **Administration**.
   b. On the Welcome to Identity Administration page, in the Users section, click **Create User.**
   c. On the Create User page, enter values for the OIM User fields, and then click **Save.**

3. If you want to provision a target system account to an existing OIM User, then:
   a. On the Welcome to Identity Administration page, search for the OIM User by selecting **Users** from the drop-down list on the left pane.
   b. From the list of users displayed in the search results, select the OIM User. The user details page is displayed on the right pane.
4. On the user details page, click the **Resources** tab.
5. From the Action menu, select **Add Resource**. Alternatively, you can click the add resource icon with the plus (+) sign. The Provision Resource to User page is displayed in a new window.
6. On the Step 1: Select a Resource page, select the resource that you want to provision from the list and then click **Continue.**
7. On the Step 2: Verify Resource Selection page, click **Continue.**
8. On the Step 3: Provide Resource Data page for process data, enter the details of the account that you want to create on the target system and then click **Continue.**
9. On the Step 3: Provide Process Data page for role data, specify the role name for the account, and then click **Add**. If you want to add more than one role, repeat the process. Then, click **Continue.**
10. On the Step 4: Verify Process Data page, verify the data that you have provided and then click **Continue.**
11. The "Provisioning has been initiated" message is displayed. To view the newly provisioned resource, perform one of the following steps:
    a. Close the window displaying the "Provisioning has been initiated" message.
    b. On the **Accounts** tab of the user details page, click **Refresh** to view the newly provisioned resource.
12. To view the process form, on the Accounts tab of the user details page, select the row displaying the newly provisioned resource, and then click **Open.** The Edit Form page is displayed.

> **Note:**
>
> If Oracle Identity Governance is not SoD enabled, then SOD Check Status field shows SODCheckNotInitiated.

13. To view the Resource Provisioning Details page, on the **Accounts** tab of the user details page, select **Resource History.**

> **Note:**
>
> SoD validation by Oracle Application Access Controls Governor is asynchronous. The validation process returns a result as soon as it is completed.

14. After the SoD validation process is initiated, the results of the process are brought to Oracle Identity Governance. To view the process form, on the Accounts tab of

the User Details page, select the row displaying the newly provisioned resource, and then click **Open.** The Edit Form page is displayed.

On this page, the SOD Check Status field shows SoDCheckCompleted. Because a violation by the SoD engine in this particular example, the SoD Check Violation field shows the details of the violation.

In addition, the Resource Provisioning Details page shows the status of the SODChecker and Holder tasks as Completed.

On this page, the status of the Add User Role tasks is Canceled because the request failed the SoD validation process.

15. As the administrator assigning a resource to a user, you can either end the process when a violation is detected or modify the assignment data and then resend it. To modify the assignment data, on the Resource tab of the user details page, select the row containing the resource, and then click **Open.**
16. In the Edit Form window that is displayed, you can modify the role and profile data that you had selected earlier.

> **Note:**
>
> To modify a set of entitlements In the Edit Form window, you must first remove all entitlements and then add the ones that you want to use.

17. After the SoD validation process is initiated, the results of the process are brought to Oracle Identity Governance. On the Accounts tab of the user details page, select the row containing the resource, and then click **Open.** The process form is displayed.

    On this form, the SOD Check Status field shows SoDCheckCompleted. Because no violation was detected by the SoD engine, the SoDCheckResult field shows `Passed`.

    In addition, the Resource Provisioning Details page shows the status of the SODChecker and Holder tasks as Completed.

    On the Resource Provisioning Details page, the state of the Add Role to User task is completed.

Uninstalling the Connector

Uninstalling the connector deletes all the account-related data associated with the resource objects of the connector.

If you want to uninstall the connector for any reason, see Uninstalling Connectors in *Oracle Fusion Middleware Administering Oracle Identity Manager.*

4
Extending the Functionality of the Connector

You can extend the functionality of the connector to address your specific business requirements.

This chapter contains the following sections:

- Adding New Attributes for Reconciliation and Provisioning
- Adding New Multivalued Attributes for Reconciliation and Provisioning
- Configuring Transformation of Data During User Reconciliation
- Configuring Validation of Data During Reconciliation and Provisioning

Adding New Attributes for Reconciliation and Provisioning

You can add new attributes such as Customer Id to the existing set of attributes. For this, you need to add new parameters to wrapper procedure and then update the reconciliation query to include the new attribute.

By default, the attributes listed in Table 3-3 are mapped for reconciliation and provisioning between Oracle Identity Manager and the target system. If required, you can map additional single-valued attributes for reconciliation and provisioning.

The following sections describe the procedures to be performed for adding new single-valued attributes:

- Summary of Steps to Add New Attributes for Reconciliation and Provisioning
- Extending the Connector Schema
- Updating Connector Artifacts
- Updating the search.properties File
- Updating the Procedures.properties File

Summary of Steps to Add New Attributes for Reconciliation and Provisioning

The following is a summary of high-level steps to be performed to add a new attribute for reconciliation and provisioning:

1. Update the DB wrapper package to include the new single-valued attribute in the **get_schema()** stored procedure as described in Extending the Connector Schema.
2. Update the connector artifacts to include the new attribute as described in Updating Connector Artifacts.
3. Update the connector bundle to include the new attribute in the search.properties file as described in Updating the search.properties File.

4. Update the connector bundle to include the new attribute in the Procedures.properties file as described in Updating the Procedures.properties File.

Extending the Connector Schema

You must extend the connector schema to include new attributes for reconciliation and provisioning. This section discusses the following topics:

- Understanding Connector Schema Extension
- Adding New Attributes to the Connector Schema

Understanding Connector Schema Extension

You can extend the connector schema by adding new attributes to the get_schema() stored procedure in the OIM_FND_USER_TCA_PKG.pck wrapper package. Extending the connector schema requires you to understand the following concepts:

- **Attribute initialization**

  The following initialization statement reserves an internal array that holds attribute definitions of the connector schema:

  ```
  attr.extend(NUM);
  ```

  Here, *NUM* defines the size of the array that is to be initialized. The size of the array must always be greater than or equal to the number of attributes defined. For example, the initialization statement `attr.extend(20);` reserves an internal array of 20 attributes for initialization.

- **Attribute definition**

  After initialization, you define the information for each attribute by adding a statement in the following format:

  attr (*ORD_NO*) := attributeinfo(*ATTR_NAME*,*ATTR_TYPE*,*CREATE_FLAG*,*UPDATE_FLAG*,*REQUIRED_FLAG*,*READ_FLAG*);

  In this format:

  - *ORD_NO* is the order of the attribute in the array. This is mandatory.
  - *ATTR_NAME* is the name of single-valued attribute.
  - *ATTR_TYPE* is the SQL datatype of the single-valued attribute.
  - *CREATE_FLAG* is a flag to represent whether the attribute is required during a create provisioning operation.
  - *UPDATE_FLAG* is a flag to represent whether the attribute can be updated.
  - *REQUIRED_FLAG* is a flag to represent whether the attribute is mandatory.
  - *READ_FLAG* is flag to represent whether the attribute can be read.

  A value of `1` or `0` for each flag denotes True or False, respectively. For example, a value `1, 0, 1, 0` for the flags means that the attribute is a mandatory attribute and must be considered during create provisioning operations.

- **Attribute array extension**

You can increase the array size post initialization by including the following statement:

```
attr.extend;
```

Each inclusion of this statement increments the array size by 1.

Adding New Attributes to the Connector Schema

You must extend the connector schema by updating the DB wrapper package to include the new attribute for reconciliation and provisioning as follows:

1. Open any SQL client (for example, SQL Developer) and connect to the target system database using the apps user.
2. Open the body of the **OIM_FND_USER_TCA_PKG.pck** wrapper package.
3. Select the **get_schema()** stored procedure. The list of attributes defined in the stored procedure is displayed.
4. If the number of attributes defined exceeds the number of attributes initialized, then:
   a. Add the following attribute initialization statement:

      ```
      attr.extend;
      ```

   b. Enter the definition for the new attribute that you want to add in the following format:

      attr (*ORD_NO*) := attributeinfo(*ATTR_NAME*,*ATTR_TYPE*,*CREATE_FLAG*,*UPDATE_FLAG*,*REQUIRED_FLAG*,*READ_FLAG*);

      For example, if you are adding a new attribute to hold the customer Id for a user account, then include the following statements:

      ```
      attr.extend;
      attr (28) := attributeinfo('CUSTOMER_ID','varchar2',1,1,0,1);
      ```

      In this example, a value of `1,1,0,1` for the flags means that the CUSTOMER_ID attribute is required during create provisioning operations, it can be updated and read.
5. If the number of attributes defined does not exceed the number of attributes initialized then add only the definition for the new attribute. For example, `attr (28) := attributeinfo('CUSTOMER_ID','varchar2',1,1,0,1);`
6. Re-compile the wrapper package.

Updating Connector Artifacts

You must update the connector artifacts to include the new single-valued attribute added in Extending the Connector SchemaUpdating connector artifacts involves performing the following procedures:

- Creating a Process Form Field
- Updating the Oracle EBS User Management Resource Object
- Updating the Oracle EBS UM User Process Definition
- Updating the Lookup Definition for Reconciliation Attribute Mapping
- Updating the Lookup Definition for Provisioning Attribute Mapping
- Creating a Reconciliation Profile for the Oracle EBS User Management Resource Object

- Enabling Provisioning Operations on the New Attribute

Creating a Process Form Field

You must add the new single-valued attribute as a field on the process form as follows:

1. Expand **Development Tools,** and then double-click **Form Designer.**
2. Search for and open the **UD_EBS_UM** process form.
3. Click **Create New Version** to create a version of the form.
4. In the **Label** field, enter the version name. For example, `version#1`.
5. Click the Save icon.
6. Select the current version created in Step 4 from the Current Version list.
7. Click **Add** to create a new field for the single-valued attribute, and provide the values for that attribute.

   For example, if you are adding the Customer Id attribute, then enter the following values in the Additional Columns tab:

Field	Value
Name	`UD_EBS_UM_CUSTOMER_ID`
Variant Type	`String`
Length	100
Field Label	Customer Id
Field Type	`TextField`
Order	`25`

8. Click the Save icon.
9. Click **Make Version Active.**

Updating the Oracle EBS User Management Resource Object

Update the resource object to add a reconciliation field corresponding to the new single-valued attribute created in Creating a Process Form Field as follows:

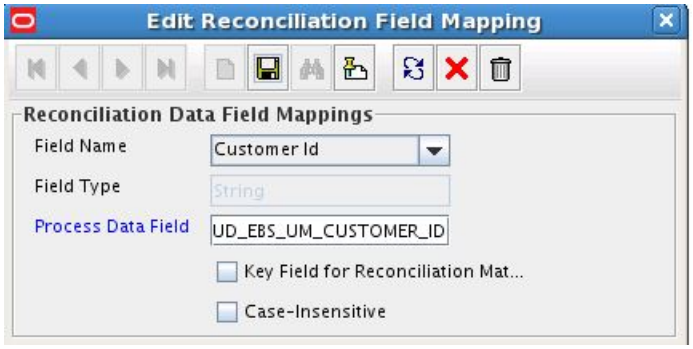
1. Expand the **Resource Management** folder, and then double-click **Resource Objects.**
2. Search for and open the **Oracle EBS User Management** resource object.
3. On the Object Reconciliation tab, click **Add Field** to open the Add Reconciliation Field dialog box.
4. In the Field Name field, enter the name of the attribute. For example, `Customer Id`.
5. From the **Field Type** list, select a data type for the field. For example, **String.**
6. If you want to designate the attribute as a mandatory attribute, then select the check box.
7. Click the Save icon and close the dialog box.

Updating the Oracle EBS UM User Process Definition

Create a reconciliation field mapping for the single-valued attribute in the process definition as follows:

1. Expand **Process Management** and then double-click **Process Definition.**
2. Search for and open the **Oracle EBS UM User** process definition.
3. On the Reconciliation Field Mapping tab, click **Add Field Map.**
4. From the Field name list in the Add Reconciliation Field Mapping dialog box, select the name that you have assigned to the attribute created in the resource object. For example, select **Customer Id.**
5. Double-click the Process Data field, and from the pop-up that appears, select the newly added field created in Creating a Process Form Field.

   The following screenshot shows the Add Reconciliation Field Mapping dialog box in which the Field Name list and Process Data Field are set:



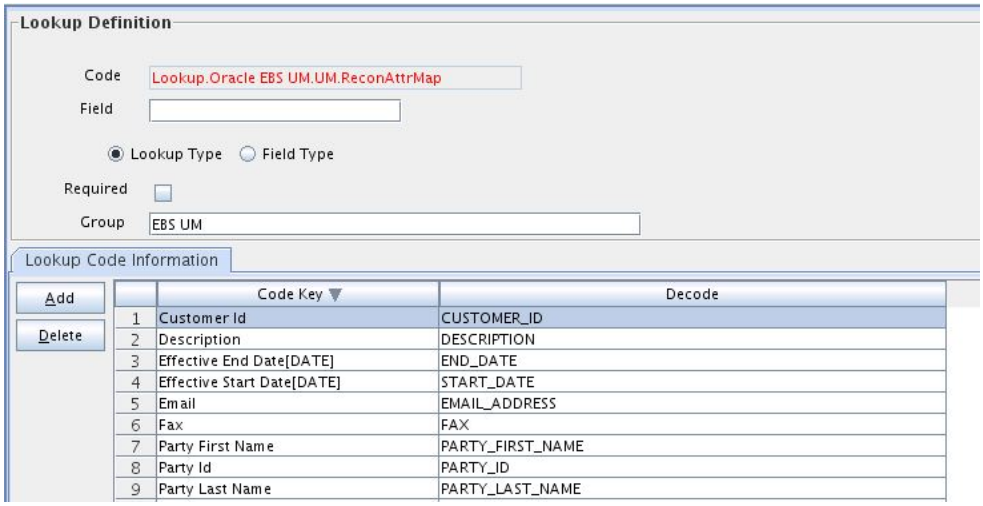
6. Click the Save icon and close the dialog box.

Updating the Lookup Definition for Reconciliation Attribute Mapping

Add an entry for the attribute in the lookup definition for reconciliation attribute mapping as follows:

1. Expand the **Administration** folder, and then double-click **Lookup Definition.**
2. Search for and open the **Lookup.Oracle EBS UM.UM.ReconAttrMap** lookup definition.
3. To add a row, click **Add.**
4. In the Code Key column, enter the name that you have set for the attribute in the resource object. For example, enter `Customer Id`.
5. In the Decode column, enter the name of the column name that is returned by the SQL query. For example, enter `CUSTOMER_ID`.

   The following screenshot shows the Lookup.Oracle EBS UM.UM.ReconAttrMap lookup definition with the newly added entry:



6. Click the Save icon.

Updating the Lookup Definition for Provisioning Attribute Mapping

Add an entry for the attribute in the lookup definition for provisioning attribute mapping as follows:

1. Expand the **Administration** folder, and then double-click **Lookup Definition.**
2. Search for and open the **Lookup.Oracle EBS UM.UM.ProvAttrMap** lookup definition.
3. To add a row, click **Add.**
4. In the Code Key column, enter the name that you have set for the attribute in the resource object. For example, enter `Customer Id`.
5. In the Decode column, enter the name of the column name that is returned by the SQL query. For example, enter `CUSTOMER_ID`.
6. Click the Save icon.

Creating a Reconciliation Profile for the Oracle EBS User Management Resource Object

Create a reconciliation profile to copy all the changes made to the resource object (in the earlier section) into MDS:

1. Expand the **Resource Management** folder, and then double-click **Resource Objects.**
2. Search for and open the **Oracle EBS User Management** resource object.
3. On the Object Reconciliation tab, click **Create Reconciliation Profile.**
4. Click the Save icon.

Enabling Provisioning Operations on the New Attribute

Update the process definition by creating process tasks for handling provisioning operations on the newly added single-valued attribute as follows:

1. Expand **Process Management,** and then double-click **Process Definition.**
2. Search for and open the **Oracle EBS UM User** process definition.
3. On the Tasks tab, click **Add.**

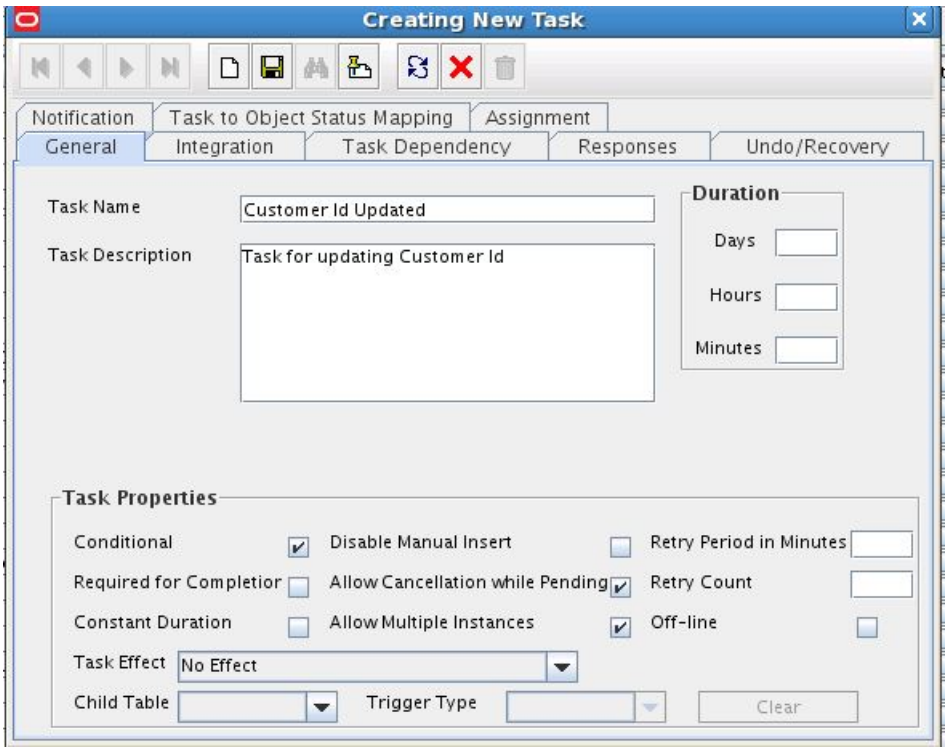
   The Creating New Task dialog box is displayed.
4. In the **Task Name** field, enter the name of the process task. For example, enter `Customer Id Updated`.
5. In the **Task Description** field, enter a description for the task. For example, enter `Task for Customer Id updation`.
6. In the Task Properties region, select the properties to suit your requirement. For example, perform the following actions in the Task Properties region:
   - Select the following checkboxes:

     Conditional

     Allow Cancellation while Pending

     Allow Multiple Instances
   - From the Task Effect list, select **No Effect.**

   The following is a screenshot of the Creating New Task dialog box with relevant details filled in:



7. Click the Save icon.
8. On the Integration tab, click **Add** to assign an adapter for the process task created in the preceding steps.
9. In the Handler Selection dialog box, select the **Adapter** option.

10. From the list of adapters displayed in the Handler Name region, select the adapter that you want to assign to the process task. For example, select the **adpEBSUMUPDATESINGLEATTRIBUTE** adapter.
11. Click the Save icon and close the dialog box.
12. On the Integration tab, from the table in the Adapter Variables region, select the variable that you want to map. For example, select the **fieldName** variable.
13. Click **Map.**
14. In the Edit Data Mapping For Variable dialog box, create the adapter variable mapping as per your requirement. For example, create the following mapping:
    - **Variable Name:** `fieldName`
    - **Map To:** `Literal`
    - **Qualifier:** `String`
    - **Literal Value:** `UD_EBS_UM_CUSTOMER_ID`
15. Click the Save icon and close the dialog box.
16. Perform Steps 12 through 15 for the remaining variables listed in the Adapter Variables region. The following table lists sample values that you can select from the Map To, Qualifier, and Literal Value lists for each variable:

Variable	Map To	Qualifier	Literal Value
fieldOldValue	Process Data	Customer Id, Old Value:select	NA
AdapterReturnCode	Response Code	NA	NA
objectType	Literal	String	User
ItResourceFieldName	Literal	String	UD_EBS_UM_IT_RESOURCE_NAME
fieldValue	Process Data	Customer Id	NA
processInstanceKey	Process Data	Process Instance	NA

17. Click the Save icon on the Process Definition form.
18. On the Responses tab, click **Add** to add the SUCCESS response code, with Status C. This ensures that if the custom task is successfully run, then the status of the task is displayed as Completed. Similarly, add the CONNECTION_FAILED response code, with Status R.
19. Click the Save icon and close the dialog box, and then save the process definition.

Updating the search.properties File

Update the search.properties file to include the newly added single-valued attribute as follows:

1. Extract the contents of the org.identityconnectors.ebs-1.0.1115.jar file into a directory of your choice.
2. In a text editor, open the search.properties located in the configuration directory.
3. Search for the SQL query that must include the column name corresponding to the newly created attribute. For example, search for the UM_USER_RECON query.

4. If the SQL query already contains the column name corresponding to the newly added attribute, then you can skip the rest of the steps mentioned in this section.
5. If the SQL query does not include information about the newly added column name, then modify it to include the newly added column.

   See Sample SQL Queries Updated to Include Single-Valued Attributes for a sample query that includes the CUSTOMER_ID column in the UM_USER_RECON query.
6. Repeat Steps 3 through 5 to update the remaining SQL queries such as UM_USER_SYNC, if applicable. For example, modify the UM_USER_SYNC SQL query to include `PAPF.CUSTOMER_ID AS CUSTOMER_ID` in the select query.
7. Save the changes and close the file.
8. Verify the updated queries.
9. Update the connector bundle (org.identityconnectors.ebs-1.0.1115.jar) by running the following command:

   ```
   jar -cvfm org.identityconnectors.ebs-1.0.11150.jar META-INF/MANIFEST.MF *
   ```
10. Run the Oracle Identity Manager Update JARs utility to update the new connector bundle (updated in Step 9) to the Oracle Identity Manager database. This utility is copied into the following location when you install Oracle Identity Manager:

    > **Note:**
    >
    > Before you use this utility, verify that the WL_HOME environment variable is set to the directory in which Oracle WebLogic Server is installed.

    For Microsoft Windows:

    OIM_HOME/server/bin/UpdateJars.bat

    For UNIX:

    OIM_HOME/server/bin/UpdateJars.sh

    When you run the utility, you are prompted to enter the login credentials of the Oracle Identity Manager administrator, URL of the Oracle Identity Manager host computer, context factory value, type of JAR file being uploaded, and the location from which the JAR file is to be uploaded. Specify 4 as the value of the JAR type.

Updating the Procedures.properties File

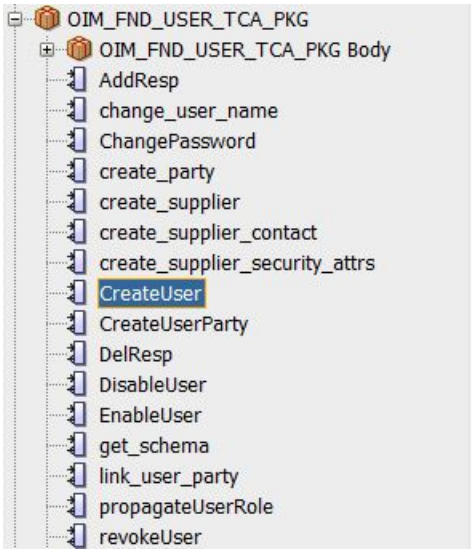
In order to support the newly added attribute (Customer Id) during create and update provisioning operations, you must update the stored procedure that is invoked in the Procedures.properties file. To do so:

1. In a text editor, open the Procedures.properties file for editing.
2. Search for and determine the names of wrapper packages and stored procedures used for invoking the create person and update person provisioning operations. For example, **OIM_FND_USER_TCA_PKG.CREATEUSER** and **OIM_FND_USER_TCA_PKG.UPDATEUSER** are the wrapper packages and stored procedures used for the create user and update user provisioning operations.
3. Update the stored procedures determined in the earlier step as follows:

a. Open any SQL client (for example, SQL Developer) and connect to the target system database using the apps user.

b. Open the wrapper package and add the newly added attribute (for example, Customer Id) to the create user and update user stored procedures. For example, open the OIM_FND_USER_TCA_PKG package and add the newly added attribute to the CreateUser and UpdateUser stored procedures.

   The following screenshot highlights the stored procedures that must be updated in the OIM_FND_USER_TCA_PKG package to include the newly added attribute:



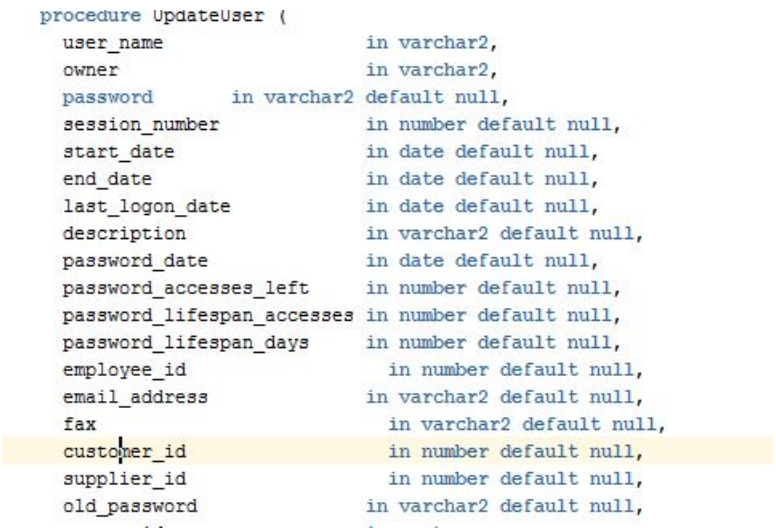
c. Select the CreateUser stored procedure and update the input parameters to include the newly added attribute.

   The following screenshot highlights the newly added attribute (customer_id) in the CreateUser stored procedure:

```
procedure CreateUser (
  user_name                  in varchar2,
  owner                      in varchar2,
  password       in varchar2 default null,
  session_number             in number default 0,
  start_date                 in date default sysdate,
  end_date                   in date default null,
  last_logon_date            in date default null,
  description                in varchar2 default null,
  password_date              in date default null,
  password_accesses_left     in number default null,
  password_lifespan_accesses in number default null,
  password_lifespan_days     in number default null,
  employee_id                in number default null,
  email_address              in varchar2 default null,
  fax                        in varchar2 default null,
  customer_id                in number default null,
  supplier_id                in number default null,
  user_guid                  in raw,
  user_id out NUMBER);
```

d. Select the UpdateUser stored procedure and update the input parameters to include the newly added attribute.

The following screenshot highlights the newly added attribute (customer_id) in the UpdateUser stored procedure:



```
procedure UpdateUser (
  user_name                 in varchar2,
  owner                     in varchar2,
  password       in varchar2 default null,
  session_number            in number default null,
  start_date                in date default null,
  end_date                  in date default null,
  last_logon_date           in date default null,
  description               in varchar2 default null,
  password_date             in date default null,
  password_accesses_left    in number default null,
  password_lifespan_accesses in number default null,
  password_lifespan_days    in number default null,
  employee_id                 in number default null,
  email_address             in varchar2 default null,
  fax                         in varchar2 default null,
  customer_id                 in number default null,
  supplier_id                 in number default null,
  old_password              in varchar2 default null,
```

e. Open **OIM_FND_USER_TCA_PKG Body** and select the **CreateUser** stored procedure.

f. Update the CreateUser API call in the procedure with the newly added attribute.

The following screenshots that show the updated CreateUser API:

```
procedure CreateUser( user_name                 in varchar2,
                      owner                     in varchar2,
                      password       in varchar2 default null,
                      session_number            in number default 0,
                      start_date                in date default sysdate,
                      end_date                  in date default null,
                      last_logon_date           in date default null,
                      description               in varchar2 default null,
                      password_date             in date default null,
                      password_accesses_left    in number default null,
                      password_lifespan_accesses in number default null,
                      password_lifespan_days    in number default null,
                      employee_id               in number default null,
                      email_address             in varchar2 default null,
                      fax                       in varchar2 default null,
                      customer_id               in number default null,
                      supplier_id               in number default null,
                      user_guid                 in raw,
                      user_id out NUMBER)
is
  x_user_name                fnd_user.user_name%type;
  x_owner                    varchar2(200);
  x_unencrypted_password     varchar2(200);
  x_session_number           number default 0;
  x_start_date               date;
  x_end_date                 date;
  x_last_logon_date          date;
  x_description              varchar2(200);
  x_password_date            date;
  x_password_accesses_left   number;
  x_password_lifespan_accesses number;
  x_password_lifespan_days   number;
  x_employee_id              number;
  x_email_address            fnd_user.email_address%type;
  x_fax                      fnd_user.fax%type;
  x_customer_id              number;
  x_supplier_id              number;
  x_user_id                  number;
  x_user_guid                fnd_user.user_guid%type;
begin
  if password_lifespan_accesses is null then
    x_password_lifespan_accesses := FND_USER_PKG.null_number;
  else
    x_password_lifespan_accesses := password_lifespan_accesses;
  end if;
  if password_lifespan_days is null then
    x_password_lifespan_days := FND_USER_PKG.null_number;
  else
    x_password_lifespan_days := password_lifespan_days;
  end if;
  x_user_name              := user_name;
  x_owner                  := owner;
  x_unencrypted_password   := password;
  x_session_number         := session_number;
  x_start_date             := start_date;
  x_end_date               := end_date;
  x_last_logon_date        := last_logon_date;
  x_description            := description;
  x_password_date          := sysdate;
  x_password_accesses_left := password_accesses_left;
  x_employee_id            := employee_id;
  x_email_address          := email_address;
  x_fax                    := fax;
  x_customer_id            := customer_id;
  x_supplier_id            := supplier_id;
  x_user_guid              := user_guid;
  if x_start_date > x_end_date then
       raise_application_error (-20001, error_message);
  end if;
  FND_USER_PKG.CreateUser(x_user_name,
                          x_owner,
                          x_unencrypted_password,
                          x_session_number,
                          x_start_date,
                          x_end_date,
                          x_last_logon_date,
                          x_description,
                          x_password_date,
                          x_password_accesses_left,
                          x_password_lifespan_accesses,
                          x_password_lifespan_days,
                          x_employee_id,
                          x_email_address,
                          x_fax,
                          x_customer_id,
                          x_supplier_id);
 if x_user_guid is not null then
    update fnd_user set user_guid = x_user_guid  where user_name = x_user_name;
 end if;
 SELECT USER_ID into x_user_id FROM FND_USER WHERE USER_NAME=x_user_name;
 user_id := x_user_id;
end CreateUser;
```

g. Repeat Steps 3.3.c through 3.3.f to update the UPDATEUSER stored procedure to include the newly added attribute.

h. Re-compile the wrapper package.

This completes the procedure to add a new single-valued attribute for reconciliation and provisioning.

Adding New Multivalued Attributes for Reconciliation and Provisioning

You can add new multivalued attributes for reconciliation and provisioning.

By default, the attributes listed in Table 3-3 are mapped for reconciliation and provisioning between Oracle Identity Manager and the target system. If required, you can map additional multivalued attributes for reconciliation and provisioning. The following sections describe the procedures to be performed for adding new multivalued attributes. The **Security Attributes** multivalued attribute has been used as an example to illustrate these procedures.

- Summary of Steps to Add New Multivalued Attributes for Reconciliation and Provisioning
- Extending the Connector Schema
- Extending Oracle Identity Manager Metadata
- Creating Scheduled Jobs
- Updating the Connector Bundle
- Adding APIs to Wrapper Packages

Summary of Steps to Add New Multivalued Attributes for Reconciliation and Provisioning

The following a summary of high-level steps to be performed to add a new multivalued attribute for reconciliation and provisioning:

1. Update the DB wrapper package to include the new multivalued attribute. You must include the parent attribute in the main attribute list of the get_schema procedure and then create an attribute list with all the child attributes as described in Extending the Connector Schema.
2. Update Oracle Identity Manager metadata to include the new attribute as described in Extending Oracle Identity Manager Metadata.
3. Create a scheduled job to synchronize values in the target system attributes corresponding to the newly created multivalued attribute with values in Oracle Identity Manager as described in Creating Scheduled Jobs.
4. Update the connector bundle to include the new multivalued attribute in the search.properties and Procedures.properties file as described in Updating the Connector Bundle.
5. Add APIs to Wrapper packages to enable provisioning operation on the newly added multivalued attribute as described in Adding APIs to Wrapper Packages.

Extending the Connector Schema

You must extend the connector schema to include a new multivalued attribute for reconciliation and provisioning. To do so:

1. Open any SQL client and connect to database using **APPS** user.
2. Open the body of the **OIM_FND_USER_TCA_PKG.pck** wrapper package.
3. Select the **get_schema()** stored procedure.
4. Declare the new multivalued attribute. The syntax for declaring the new multivalued attribute is as follows:

   ```
   attr := attributelist();
   ```

5. Initialize the attribute list by specifying the number of child attributes that the new multivalued attribute must contain in the following format:

   ```
   attr.extend(NUM);
   ```

   Here, *NUM* is the number of child attributes. Internally, an array for the specified number of child attributes is created.

   Sample value: `attr.extend(4);`

   You can also initialize the attribute list or increase the number of child attributes in the list by 1 by using the following statement for each child attribute to be added:

   ```
   attr.extend;
   ```

   > **See Also:**
   >
   > Sample Code Snippets for Extending the Connector Schema for sample code snippets

6. Define each child attribute to include information such as the attribute name, datatype, and permission flags in the following format:

   attr (*ORD_NO*) := attributeinfo(*ATTR_NAME*,*ATTR_TYPE*,*CREATE_FLAG*,*UPDATE_FLAG*,*REQUIRED_FLAG*,*READ_FLAG*)

   In this format:

   - *ORD_NO* is the order of the attribute in the list. This is mandatory.
   - *ATTR_NAME* is the name of the child attribute.
   - *ATTR_TYPE* is the SQL datatype of the child attribute.
   - *CREATE_FLAG* is a flag to represent whether the attribute is required during a create provisioning operation.
   - *UPDATE_FLAG* is a flag to represent whether the attribute can be updated.
   - *REQUIRED_FLAG* is a flag to represent whether the attribute is mandatory.
   - *READ_FLAG* is flag to represent whether the attribute can be read.

A value of `1` or `0` for each flag denotes True or False, respectively. For example, a value `1, 0, 1, 0` for the flags mean that the attribute is a mandatory attribute and must be considered during create provisioning operations.

7. End the new multivalued attribute definition and schema by using the following statements:

```
schemaout.extend;
schemaout(ORD_NO) := schema_object('ATTR_NAME', attr)
```

In this statement, *ORD_NO* is the order of the multivalued attribute in the connector schema and *ATTR_NAME* is the name of the multivalued attribute being added. The following are sample statements:

```
schemaout.extend;
schemaout( 4 ) := schema_object('__SECURITY_ATTRS__',attr);
```

8. Re-compile the wrapper package.

Extending Oracle Identity Manager Metadata

You must extend the metadata of Oracle Identity Manager to include the new attribute added in Extending the Connector Schema. Extending Oracle Identity manager metadata involves performing the following procedures:

- Creating Lookup Definitions
- Creating Child Process Form
- Updating the Parent Process Form
- Updating the Lookup Definition for Reconciliation Attribute Mapping
- Updating the Lookup Definition for Provisioning Attribute Mapping
- Updating the Oracle EBS User Management Resource Object
- Updating the Oracle EBS UM User Process Definition
- Replicating Form Designer Changes to a New UI Form
- Enabling Provisioning Operations on the New Attribute

Creating Lookup Definitions

You must create lookup definitions for the new attribute, added in Extending the Connector Schema, as follows:

1. Log in to the Design Console.
2. Expand the **Administration** folder, and then double-click **Lookup Definition.**
3. In the Code field, enter the name of the lookup definition. For example, enter `Lookup.Oracle EBS UM.SecAttrNames`.
4. Select the Lookup Type option to specify that the look up definition represents a lookup field.
5. In the **Group** field, enter the name of the form on which the lookup definition is displayed. For example, enter `EBS UM`.
6. Click the Save icon.

The lookup definition is created. The associated lookup field will be displayed in the form you specified.

7. Repeat Steps 2 through 6 for creating the **Lookup.Oracle EBS UM.SecAttrTypes** lookup definition.

Creating Child Process Form

Create a child process form for the newly added attributes as follows:

1. Expand **Development Tools,** and then double-click **Form Designer.**
2. In the **Table Name** field, enter the name of the database table that is associated with the form. For example, enter `UD_UM_SEC`.
3. In the Description field, enter explanatory information about the form. For example, enter `Form for UM security attributes`.
4. Select the **Process** option. This is because the form is assigned to a provisioning process.
5. Click the Save icon.

   The form is created. The words Initial Version are displayed in the Latest Version field.
6. On the Additional Columns tab, click **Add.**

   A blank row is displayed.
7. Enter values for columns such as Name, Variant Type, Length, Field Label and so on for all the attributes that you want to add to the form.
8. Repeat Steps 6 and 7 for each attribute that you want. The following table provides a list of sample attributes that you can add:

Name	Variant Type	Length	Field Label	Field Type	Order
UD_UM_SEC_APP_ID	String	200	Application Name	Lookup Field	1
UD_UM_SEC_ATTR_NAME	String	200	Security Attribute Name	Lookup field	2
UD_UM_SEC_ATTR_VALUE	String	200	Security Attribute Value	TextField	3
UD_UM_SEC_ATTR_TYPE	String	200	Security Attribute Type	Lookup Field	4

9. Click the Save icon.
10. On the Properties tab, select the data field to which you want to add a property and property value, and then click **Add Property.** For example, select the **Application Name** data field and the click **Add Property.**
11. In the Add Property dialog box, select the Property Name and then enter the property value. For example, from the **Property Name** list, select **Lookup Code** and in the **Property Value** field, enter `Lookup.Oracle EBS UM.Applications`.
12. Click the Save icon and close the dialog box.
13. Repeat Steps 10 through 12 for each field to which you want to add a property and property value. The following table lists the sample data fields and the corresponding property values:

Column Name	Column Type	Property Name	Property Value
Security Attribute Name	Lookup field	Lookup Code	Lookup.Oracle EBS UM.SecAttrNames
Security Attribute Type	Lookup field	Lookup Code	Lookup.Oracle EBS UM.SecAttrTypes

14. Click the Save icon.
15. Click **Make Version Active.** Accept any confirmation message that is displayed.

Updating the Parent Process Form

Update the parent process form of the newly added attribute as follows:

1. Expand **Development Tools,** and then double-click **Form Designer.**
2. Search for and open the **UD_EBS_UM** process form.
3. Click **Create New Version** to create a version of the form.
4. In the **Label** field, enter the version name. For example, `version#2`.
5. Click the Save icon.
6. Select the current version created in Step 4 from the Current Version list.
7. On the Child Table(s) tab, click **Assign** to assign the child table to the form.
8. From the Assign Child Table(s) dialog box, select the newly created child form and click the right arrow. For example, select **UD_UM_SEC.**
9. Click **OK.**

   The selected child table is assigned to the form.
10. Click the Save icon.
11. Click **Make Version Active.**

Updating the Lookup Definition for Reconciliation Attribute Mapping

Add an entry for the new attribute in the lookup definition for reconciliation attribute mapping as follows:

1. Expand the **Administration** folder, and then double-click **Lookup Definition.**
2. Search for and open the **Lookup.Oracle EBS UM.UM.ReconAttrMap** lookup definition.
3. To add a row, click **Add.**
4. In the Code Key and Decode columns, enter values corresponding to the newly added child attributes. The Code Key and Decode values must be in the following format:

   Code Key: *MULTIVALUED_FIELD_NAME~CHILD_FORM_FIELD_NAME*[LOOKUP]

   In this format:

   - *MULTIVALUED_FIELD_NAME* is the name field on the parent process form.
   - *CHILD_FORM_FIELD_NAME* is the name of the field on the child process form.
   - [LOOKUP] is a flag denoting that the field is a lookup field.

   Decode: Corresponding target system attribute.
5. Repeat Steps 3 and 4 for every newly added child attribute. The following table lists the sample entries you can add:

Code Key	Decode
SecAttrs~Application Name[LOOKUP]	__SECURITY_ATTRS__~__SECURITY_ATTRS__~SECURITY_APP_ID
SecAttrs~Security Attribute Name[LOOKUP]	__SECURITY_ATTRS__~__SECURITY_ATTRS__~SECURITY_ATTR_NAME
SecAttrs~Security Attribute Value	__SECURITY_ATTRS__~__SECURITY_ATTRS__~SECURITY_ATTR_VALUE
SecAttrs~Security Attribute Type[LOOKUP]	__SECURITY_ATTRS__~__SECURITY_ATTRS__~SECURITY_ATTR_TYPE

6. Click the Save icon.

Updating the Lookup Definition for Provisioning Attribute Mapping

Add an entry for the attribute in the lookup definition for provisioning attribute mapping as follows:

1. Expand the **Administration** folder, and then double-click **Lookup Definition.**
2. Search for and open the **Lookup.Oracle EBS UM.UM.ProvAttrMap** lookup definition.
3. To add a row, click **Add.**
4. In the Code Key and Decode columns, enter values corresponding to the newly added child attributes. The Code Key and Decode values must be in the following format:

   Code Key: *CHILD_FORM_NAME~CHILD_FIELD_LABEL*[LOOKUP]

   In this format:

   - *CHILD_FORM_NAME* specifies the name of the child form.
   - *CHILD_FIELD_NAME* specifies the name of the field on the child form.
   - [LOOKUP] is a flag denoting that the field is a lookup field.

   Decode: Corresponding target system attribute.
5. Repeat Steps 3 and 4 for every newly added child attribute. The following table lists the sample entries you can add:

Code Key	Decode
UD_UM_SEC~Application Name[LOOKUP]	__SECURITY_ATTRS__~__SECURITY_ATTRS__~SECURITY_APP_ID
UD_UM_SEC~Security Attribute Name[LOOKUP]	__SECURITY_ATTRS__~__SECURITY_ATTRS__~SECURITY_ATTR_NAME
UD_UM_SEC~Security Attribute Value	__SECURITY_ATTRS__~__SECURITY_ATTRS__~SECURITY_ATTR_VALUE
UD_UM_SEC~Security Attribute Type[LOOKUP]	__SECURITY_ATTRS__~__SECURITY_ATTRS__~SECURITY_ATTR_TYPE

6. Click the Save icon.

Updating the Oracle EBS User Management Resource Object

In the resource object, add the reconciliation field corresponding to the new attribute as follows:

1. Expand the **Resource Management** folder, and then double-click **Resource Objects.**
2. Search for and open the **Oracle EBS User Management** resource object.
3. On the Object Reconciliation tab, click **Add Field** to open the Add Reconciliation Field dialog box.
4. In the Field Name field, enter the name of the attribute. For example, `SecAttrs`.
5. From the **Field Type** list, select a data type for the field. For example, select **Multi-Valued Attribute.**
6. If you want to designate the attribute as a mandatory attribute, then select the **Required** check box.
7. Click the Save icon and close the dialog box.
8. Right-click the newly created field (for example, SecAttrs) and select **Define Property Fields.**

   For example, in the **Field Name** field, enter `Application Name` and select **String** from the **Field Type** list.
9. Click the Save icon and close the dialog box.
10. Repeat Steps 8 and 9 for adding all the child fields. The following table lists the sample field names and field types that you can add:

Field Name	Field Type
Security Attribute Name	String In addition, select the Required checkbox to designate this attribute as mandatory
Security Attribute Value	String
Security Attribute Type	String

11. Click **Create Reconciliation Profile.** This copies changes made to the resource object into the MDS.

Updating the Oracle EBS UM User Process Definition

Create a reconciliation field mapping for the newly added attribute in the process definition as follows:

1. Expand **Process Management** and then double-click **Process Definition.**
2. Search for and open the **Oracle EBS UM User** process definition.
3. On the Reconciliation Field Mapping tab, click **Add Table Map** to map the newly created multivalued field.
4. In the Add Reconciliation Table Mapping dialog box, from the Field Name list, select the multivalued field on the target system that you created in the resource object in Updating the Oracle EBS User Management Resource Object. For example, select **SecAttrs.**

5. From the Table Name list, select the child table process form created in Creating Child Process Form.For example, select **UD_UM_SEC.**
6. Click the Save icon and close the dialog box.
7. Right-click the multivalued field you just mapped, and select **Define Property Field Map** from the menu that is displayed. For example, right-click the **SecAttrs** multivalued field and the select **Define Property Field Map.**
8. From the **Field Name** list, select child field you want to map. For example, select **Application Name.**
9. Double-click the **Process Data Field** field, select the correct mapping from the Lookup dialog box and click **OK.** For example, double-click **Process Data Field** field, and then select **UD_UM_SEC_APP_ID.**
10. Repeat Steps 7 through 9 for each child field defined on the multivalued field. The following table lists sample field names and process data fields that you can add:

Field Name	Process Data Field
Security Attribute Name	_UM_SEC_ATTR_NAME In addition, select the **Key Field for Reconciliation Matching** check box.
Security Attribute Value	UD_UM_SEC_ATTR_VALUE
Security Attribute Type	UD_UM_SEC_ATTR_TYPE

11. Click the Save icon.

Replicating Form Designer Changes to a New UI Form

Replicate all the changes made to the Form Designer of the Design Console to a new UI form as follows:

1. Log in to Oracle Identity System Administration.
2. Create and active a sandbox. See Creating and Activating a Sandbox for more information.
3. Create a new UI form to view the upgraded fields. See Creating a New UI Form for more information about creating a UI form.
4. Associate the newly created UI form with the application instance of your target system. To do so, open the existing application instance for your resource, from the Form field, select the form (created in the previous step), and then save the application instance.
5. Publish the sandbox. See Publishing a Sandbox for more information.

Enabling Provisioning Operations on the New Attribute

Update the process definition by creating process tasks for handling provisioning operations on the newly added attribute as follows:

1. Expand **Process Management,** and then double-click **Process Definition.**
2. Search for and open the **Oracle EBS UM User** process definition.
3. On the Tasks tab, click **Add.**

   The Creating New Task dialog box is displayed.

4. In the **Task Name** field, enter the name of the process task. For example, enter `Add Attributes`.
5. In the **Task Description** field, enter a description for the task. For example, enter `Task to add security attributes`.
6. In the Task Properties region, select the properties to suit your requirement and click the Save icon. For example, perform the following actions in the Task Properties region:
   - Select the following checkboxes:

     Conditional

     Allow Cancellation while Pending

     Allow Multiple Instances
   - From the Child Table list, select the child table name, **UD_UM_SEC.**
   - From the Trigger Type list, select **Insert.**
7. On the Integration tab, click **Add** to assign an adapter for the process task created in the preceding steps.
8. In the Handler Selection dialog box, select the **Adapter** option.
9. From the list of adapters displayed in the Handler Name region, select the adapter that you want to assign to the process task. For example, select the **adpEBSUMADDCHILDDATA** adapter.
10. Click the Save icon and close the dialog box.
11. On the Integration tab, in the table in the Adapter Variables region, click the variable that you want to map. For example, click the **objectType** variable.
12. In the Edit Data Mapping For Variable dialog box, create the adapter variable mapping as per your requirement. For example, create the following mapping:

    Variable Name: `objectType`

    Map To: `Literal`

    Qualifier: `String`

    Literal Value: `User`
13. Click the Save icon and close the dialog box.
14. Perform Steps 11 through 13 for the remaining variables listed in the Adapter Variables region. The following table lists sample values that you can select from the Map To, Qualifier, and Literal Value lists for each variable:

Variable	Map To	Qualifier	Literal Value
procInstanceKey	Process Data	Process Instance	NA
itResourceFieldName	Literal	String	UD_EBS_UM_EBS_ITRES
childTableName	Literal	String	UD_UM_SEC
childPrimaryKey	Process Data	Child Primary Key	NA
Adapter return value	Response Code	NA	NA

15. Click the Save icon on the Process Definition form.
16. Repeat Steps 3 through 15 to create process tasks for Update and Delete provisioning operations.

17. On the Responses tab, click **Add** to add at least the SUCCESS response code, with Status C. This ensures that if the custom task is successfully run, then the status of the task is displayed as Completed.
18. Click the Save icon and close the dialog box, and then save the process definition.

Creating Scheduled Jobs

> **Note:**
>
> Perform the procedure described in this section for lookup schedule job that is used for any lookup attribute that can be a parent attribute or a child attribute.

You must create scheduled jobs for synchronizing values in the target system attributes (corresponding to the newly created multivalued field) with the lookup definitions created Creating Lookup Definitions. To do so:

1. Log in to the Oracle Identity System Administration Console.
2. In the left pane, under System Configuration, click **Scheduler.** The Advanced Administration is displayed with the Scheduler section in the System Management tab active.
3. On the left pane, from the Actions menu, select **Create.** Alternatively, you can click the icon with the plus (+) sign beside the View list.
4. On the Create Job page, enter values in the following fields under the Job Information section:
   - **Job Name:** Enter a name for the job. For example, enter `Oracle EBS UM Target Security Attributes Lookup Reconciliation.`
   - **Task:** Specify or select the name of the scheduled task that runs the job. For example, select **Oracle EBS UM Target Connector Lookup Reconciliation.**
   - Enter values for the remaining fields such Start Date, Retries, and Schedule Type.
5. In the Parameters section, enter values for all the parameters of the scheduled job. For example, the following are the scheduled job parameters and their values:
   - **Code Key Attribute:** `Code`
   - **Decode Attribute:** `Decode`
   - **IT Resource Name:** `Oracle EBS UM`
   - **Lookup Name:** `Lookup.Oracle EBS UM.SecAttrNames`
   - **Object Type:** `__SECURITY_ATTR_NAMES__`
6. Click **Apply.**
7. Repeat Steps 2 through 6 to create scheduled jobs for any remaining multivalued fields. For example, repeat these steps to create a scheduled job for reconciling values into the **Lookup.Oracle EBS UM.SecAttrTypes** lookup definition with the **__SECURITY_ATTR_TYPES__** object type.

Updating the Connector Bundle

You must update the connector bundle (org.identityconnectors.ebs-1.0.1115.jar) to include all the updates made in the earlier sections. To do so:

1. Download the connector bundle (org.identityconnectors.ebs-1.0.11150.jar) file from the Oracle Identity Manager database by running the Download JARs utility. This utility is copied into the following location when you install Oracle Identity Manager:

   > **Note:**
   >
   > Before you use this utility, verify that the WL_HOME environment variable is set to the directory in which Oracle WebLogic Server is installed.

   For Microsoft Windows:

   OIM_HOME/server/bin/DownloadJars.bat

   For UNIX:

   OIM_HOME/server/bin/DownloadJars.sh

   When you run the utility, you are prompted to enter the login credentials of the Oracle Identity Manager administrator, URL of the Oracle Identity Manager host computer, context factory value, type of JAR file being uploaded, and the location from which the JAR file is to be uploaded. Specify `4` as the value of the JAR type.

2. Extract the contents of the JAR file to any directory on the computer hosting Oracle Identity Manager.
3. In a text editor, open the search.properties file located in the configuration directory of the extracted JAR file.
4. In the first part of the search.properties file, add entries corresponding to the newly added attributes
5. In the first part of the search.properties file, add entries corresponding entries for the newly added attribute by defining the object name, type of reconciliation operation, and the SQL query name. For example, add the following entries:

   ```
   __SECURITY_ATTR_NAMES__.lookup=LOOKUP_SECATTR_NAME_QUERY
   __SECURITY_ATTR_TYPES__.lookup=LOOKUP_SECATTR_DATATYPE_QUERY
   ```

   In this example:

   - `__SECURITY_ATTR_NAMES` and `__SECURITY_ATTR_TYPES__` are the object names
   - `lookup` specifies that the query in this qntry will be used for performing lookup field synchronization.
   - `LOOKUP_SECATTR_NAME_QUERY` and `LOOKUP_SECATTR_DATATYPE_QUERY` are the SQL query names.
6. In the second part of the search.properties file, add the SQL query corresponding to the SQL query name specified in Step 5. For example, add the following entries:

   ```
   LOOKUP_SECATTR_DATATYPE_QUERY= select datatype as CODE, datatype as DECODE from
   ( select distinct(DATA_TYPE) as datatype from AK_ATTRIBUTES)
   ```

```
LOOKUP_SECATTR_NAME_QUERY= select sa.ATTRIBUTE_CODE as CODE,
(CONCAT(fa.application_short_name || '~', sa.ATTRIBUTE_CODE)) AS DECODE FROM
fnd_application fa, AK_ATTRIBUTES sa where
fa.application_id=sa.attribute_application_id
```

7. Update the SQL queries of UM_USER_RECON and UM_USER_SYNC to include information about the newly added attributes. For example, update both the UM_USER_RECON and UM_USER_SYNC SQL queries with the SQL query in Sample SQL Queries Updated to Include Multivalued Attributes.
8. Save and close the search.properties file.
9. In a text editor, open the Procedures.properties file located in the configuration directory of the JAR file extracted in Step 2.
10. Add entries to corresponding to the newly added attributes. For example, add the following entries:

    ```
    __SECURITY_ATTRS__.add=OIM_FND_USER_TCA_PKG.ADDUSERSECURITYATTRIBUTE
    __SECURITY_ATTRS__.remove=OIM_FND_USER_TCA_PKG.DELETEUSERSECURITYATTRIBUTE
    ```

    See Provisioning Procedures for information about the format for adding entries to the Procedures.properties file.
11. Save and close the Procedures.properties file.
12. Re-create the connector bundle JAR file with the updated .properties files.
13. Run the Oracle Identity Manager Upload JARs utility to post the new connector bundle (updated in Step 12) to the Oracle Identity Manager database. This utility is copied into the following location when you install Oracle Identity Manager:

    > **Note:**
    >
    > Before you use this utility, verify that the WL_HOME environment variable is set to the directory in which Oracle WebLogic Server is installed.

    For Microsoft Windows:

    OIM_HOME/server/bin/UploadJars.bat

    For UNIX:

    OIM_HOME/server/bin/UploadJars.sh

    When you run the utility, you are prompted to enter the login credentials of the Oracle Identity Manager administrator, URL of the Oracle Identity Manager host computer, context factory value, type of JAR file being uploaded, and the location from which the JAR file is to be uploaded. Specify `4` as the value of the JAR type.

Adding APIs to Wrapper Packages

You must add APIs to Wrappers packages to enable the connector to perform provisioning operations on the newly added attribute. To do so:

1. Open any SQL client. For example, SQL Developer.

2. Open specification of the **OIM_FND_USER_TCA_PKG** package and then add entries that define the methods and their input parameters for performing provisioning operations. For example, add the following methods for the newly added attribute:

```
procedure addUserSecurityAttribute(user_id in number, SECURITY_ATTR_NAME in
varchar2, SECURITY_APP_ID varchar2,SECURITY_ATTR_VALUE varchar2,SECURITY_ATTR_TYPE
varchar2);
procedure deleteUserSecurityAttribute(user_id in number, SECURITY_ATTR_NAME in
varchar2, SECURITY_APP_ID varchar2,SECURITY_ATTR_VALUE varchar2,SECURITY_ATTR_TYPE
varchar2);
```

3. Open the **OIM_FND_USER_TCA_PKG** package body and add the implementation of methods defined in the preceding step. For example, add the following implementation for the newly added attribute:

```
procedure addUserSecurityAttribute(user_id in number, SECURITY_ATTR_NAME in
varchar2, SECURITY_APP_ID varchar2,SECURITY_ATTR_VALUE varchar2,SECURITY_ATTR_TYPE
varchar2)
    IS
          x_return_status VARCHAR2(2000);
          x_msg_count NUMBER;
          x_msg_data VARCHAR2(2000);
  l_varchar2_value varchar2(2000);
  l_date_value date;
  l_number_value NUMBER;
    begin
    if SECURITY_ATTR_TYPE = 'NUMBER' then
l_number_value := SECURITY_ATTR_VALUE;
elsif SECURITY_ATTR_TYPE = 'DATE' then
    l_date_value := SECURITY_ATTR_VALUE;
else
l_varchar2_value := SECURITY_ATTR_VALUE;
end if;
        icx_user_sec_attr_pub.create_user_sec_attr(
           p_api_version_number   => 1,
           p_return_status        => x_return_status,
           p_msg_count            => x_msg_count,
           p_msg_data             => x_msg_data,
           p_web_user_id          => user_id,
           p_attribute_code       => SECURITY_ATTR_NAME,
           p_attribute_appl_id    => SECURITY_APP_ID,
           p_varchar2_value       => l_varchar2_value,
           p_date_value           => l_date_value,
           p_number_value         => l_number_value,
           p_created_by           => -1,
           p_creation_date        => sysdate,
           p_last_updated_by      => -1,
           p_last_update_date     => sysdate,
           p_last_update_login    => -1);
    end addUserSecurityAttribute;

procedure deleteUserSecurityAttribute(user_id in number, SECURITY_ATTR_NAME in
varchar2, SECURITY_APP_ID varchar2,SECURITY_ATTR_VALUE varchar2,SECURITY_ATTR_TYPE
varchar2)
    IS
          x_return_status VARCHAR2(2000);
          x_msg_count NUMBER;
          x_msg_data VARCHAR2(2000);
  l_varchar2_value varchar2(2000);
  l_date_value date;
  l_number_value NUMBER;
    begin
```

```
    if SECURITY_ATTR_TYPE = 'NUMBER' then
l_number_value := SECURITY_ATTR_VALUE;
elsif SECURITY_ATTR_TYPE = 'DATE' then
    l_date_value := SECURITY_ATTR_VALUE;
else
l_varchar2_value := SECURITY_ATTR_VALUE;
end if;
        icx_user_sec_attr_pub.Delete_User_Sec_Attr(
           p_api_version_number   => 1,
           p_return_status        => x_return_status,
           p_msg_count            => x_msg_count,
           p_msg_data             => x_msg_data,
           p_web_user_id          => user_id,
           p_attribute_code       => SECURITY_ATTR_NAME,
           p_attribute_appl_id    => SECURITY_APP_ID,
           p_varchar2_value       => l_varchar2_value,
           p_date_value           => l_date_value,
           p_number_value         => l_number_value
    );
    end deleteUserSecurityAttribute;
```

4. Save and close the file.
5. Rerun the scripts to compile the wrapper package.

Configuring Transformation of Data During User Reconciliation

You can configure transformation of reconciled single-valued account data according to your requirements.

> **Note:**
>
> This section describes an optional procedure. Perform this procedure only if you want to configure transformation of data during reconciliation.

You can configure transformation of reconciled single-valued data according to your requirements. For example, you can use email to create a different value for the Email field in Oracle Identity Manager.

To configure transformation of data:

1. Write code that implements the required transformation logic in a Java class.

   The following sample transformation class creates a value for the Email attribute by using values fetched from the EMAIL_ADDRESS column of the target system:

```
package oracle.iam.connectors.common.transform;

import java.util.HashMap;

public class TransformAttribute {

      /*
      Description:Abstract method for transforming the attributes
```

```
      param hmUserDetails<String,Object>

      HashMap containing parent data details

      param hmEntitlementDetails <String,Object>

      HashMap containing child data details

      */
      public Object transform(HashMap hmUserDetails, HashMap
hmEntitlementDetails,String sField) {
      /*
       * You must write code to transform the attributes.
       Parent data attribute values can be fetched by
       using hmUserDetails.get("Field Name").
       *To fetch child data values, loop through the
       * ArrayList/Vector fetched by hmEntitlementDetails.get("Child
Table")
       * Return the transformed attribute.
       */
      String sEmail= "trans" + (String)hmUserDetails.get(sField);
      return sEmail;
      }
}
```

2. Create a JAR file to hold the Java class.
3. Run the Oracle Identity Manager Upload JARs utility to post the JAR file to the Oracle Identity Manager database. This utility is copied into the following location when you install Oracle Identity Manager:

> **Note:**
>
> Before you use this utility, verify that the `WL_HOME` environment variable is set to the directory in which Oracle WebLogic Server is installed.

   For Microsoft Windows:

   OIM_HOME/server/bin/UploadJars.bat

   For UNIX:

   OIM_HOME/server/bin/UploadJars.sh

   When you run the utility, you are prompted to enter the login credentials of the Oracle Identity Manager administrator, URL of the Oracle Identity Manager host computer, context factory value, type of JAR file being uploaded, and the location from which the JAR file is to be uploaded. Specify 1 as the value of the JAR type.
4. Create a lookup definition for transformation and add an entry to it as follows:
   a. Log in to the Design Console.
   b. Expand **Administration,** and then double-click **Lookup Definition.**
   c. In the Code field, enter `Lookup.Oracle EBS UM.UM.ReconTransformation` as the name of the lookup definition.
   d. Select the **Lookup Type** option.
   e. On the Lookup Code Information tab, click **Add.**

A new row is added.

f. In the **Code Key** column, enter the name of the resource object field into which you want to store the transformed value. For example: `Email`.

g. In the **Decode** column, enter the name of the class that implements the transformation logic. For example, `oracle.iam.connectors.common.transform.TransformAttribute`.

h. Save the changes to the lookup definition.

5. Add an entry in the Lookup.Oracle EBS UM.UM.Configuration lookup definition to enable transformation as follows:

   a. Expand **Administration,** and then double-click **Lookup Definition.**

   b. Search for and open the **Lookup.Oracle EBS UM.UM.Configuration** lookup definition.

   c. Create an entry that holds the name of the lookup definition used for transformation as follows:

      Code Key: `Recon Transformation Lookup`

      Decode: `Lookup.Oracle EBS UM.UM.ReconTransformation`

   d. Save the changes to the lookup definition.

Configuring Validation of Data During Reconciliation and Provisioning

You can configure validation of reconciled and provisioned single-valued data according to your requirements.

For example, you can validate data fetched from the Email attribute to ensure that it does not contain the number sign (#). In addition, you can validate data entered in the First Name field on the process form so that the number sign (#) is not sent to the target system during provisioning operations.

For data that fails the validation check, the following message is displayed or recorded in the log file:

```
oracle.iam.connectors.icfcommon.recon.SearchReconTask : handle : Recon event
skipped, validation failed [Validation failed for attribute: [FIELD_NAME]]
```

To configure validation of data:

1. Write code that implements the required validation logic in a Java class.

   The following sample validation class checks if the value in the Email attribute contains the number sign (#):

```
package com.validate;
import java.util.*;
public class MyValidation {
public boolean validate(HashMap hmUserDetails,
                HashMap hmEntitlementDetails, String field) {
             /*
          * You must write code to validate attributes. Parent
          * data values can be fetched by using hmUserDetails.get(field)
          * For child data values, loop through the
          * ArrayList/Vector fetched by hmEntitlementDetails.get("Child
```

```
Table")
         * Depending on the outcome of the validation operation,
         * the code must return true or false.
         */
         /*
         * In this sample code, the value "false" is returned if the field
         * contains the number sign (#). Otherwise, the value "true" is
         * returned.
         */
            boolean valid=true;
            String sEmail=(String) hmUserDetails.get(field);
            for(int i=0;i<sEmail.length();i++){
              if (sEmail.charAt(i) == '#'){
                    valid=false;
                    break;
              }
            }
            return valid;
      }
}
```

2. Create a JAR file to hold the Java class.
3. Run the Oracle Identity Manager Upload JARs utility to post the JAR file to the Oracle Identity Manager database. This utility is copied into the following location when you install Oracle Identity Manager:

   > **Note:**
   >
   > Before you use this utility, verify that the `WL_HOME` environment variable is set to the directory in which Oracle WebLogic Server is installed.

   For Microsoft Windows:

   OIM_HOME/server/bin/UploadJars.bat

   For UNIX:

   OIM_HOME/server/bin/UploadJars.sh

   When you run the utility, you are prompted to enter the login credentials of the Oracle Identity Manager administrator, URL of the Oracle Identity Manager host computer, context factory value, type of JAR file being uploaded, and the location from which the JAR file is to be uploaded. Specify 1 as the value of the JAR type.
4. If you created the Java class for validating a process form field for reconciliation, then:
   a. Log in to the Design Console.
   b. Expand **Administration,** and then double-click **Lookup Definition.**
   c. In the Code field, enter `Lookup.Oracle EBS UM.UM.ReconValidation` as the name of the lookup definition.
   d. Select the **Lookup Type** option.
   e. On the Lookup Code Information tab, click **Add.**

      A new row is added.
   f. In the Code Key column, enter the resource object field name. For example, `Email`.

g. In the Decode column, enter the class name. For example, `com.validate.MyValidation.`

h. Save the changes to the lookup definition.

i. Search for and open the **Lookup.Oracle EBS UM.UM.Configuration** lookup definition.

j. Create an entry with the following values:

Code Key: `Recon Validation Lookup`

Decode: `Lookup.Oracle EBS UM.UM.ReconValidation`

k. Save the changes to the lookup definition.

5. If you created the Java class for validating a process form field for provisioning, then:

a. Log in to the Design Console.

b. Expand **Administration,** and then double-click **Lookup Definition.**

c. In the Code field, enter `Lookup.Oracle EBS UM.UM.ProvValidation` as the name of the lookup definition.

d. Select the **Lookup Type** option.

e. On the Lookup Code Information tab, click **Add.**

A new row is added.

f. In the **Code Key** column, enter the process form field name. In the **Decode** column, enter the class name.

g. Save the changes to the lookup definition.

h. Search for and open the **Lookup.Oracle EBS UM.UM.Configuration** lookup definition.

i. Create an entry with the following values:

Code Key: `Provisioning Validation Lookup`

Decode: `Lookup.Oracle EBS UM.UM.ProvValidation`

j. Save the changes to the lookup definition.

A

Sample SQL Queries for the UM_USER_RECON and UM_USER_SYNC SQL Query Names

This appendix lists sample SQL queries that can be used to update the UM_USER_RECON and UM_USER_SYNC queries in the search.properties file.
This appendix contains the following sections:

- Sample SQL Queries Updated to Include Single-Valued Attributes
- Sample SQL Queries Updated to Include Multivalued Attributes

Sample SQL Queries Updated to Include Single-Valued Attributes

Use this SQL query to update the UM_USER_RECON and UM_USER_SYNC queries.

If you have added a single-valued attribute (Customer Id) as part of performing the procedure described Adding New Attributes for Reconciliation and Provisioning:

```
with roledata as ( \
               select
fa.application_id,fa.application_short_name,wlr.name,ura.user_name
user_name ,ura.start_date active_from,ura.end_date active_to from wf_local_roles
wlr,wf_user_role_assignments ura,fnd_application fa where ura.role_name like 'UMX%'
AND wlr.parent_orig_system = 'UMX' and  wlr.name=ura.role_name and
fa.application_short_name = wlr.owner_tag and  ( (ura.start_date < nvl(ura.end_date,
TO_DATE('31-DEC-4712','dd-mon-yyyy')) and ura.start_date > sysdate) or sysdate between
ura.start_date and nvl(ura.end_date, TO_DATE('31-DEC-4712','dd-mon-yyyy')) ) \
               ) , party as ( \
               select USER_ID AS user_id,USER_GUID AS user_guid,sysdate  as
system_date, LAST_UPDATE_DATE DATE_UPDATED, case when password_lifespan_days > 0 then
'Days' when password_lifespan_accesses > 0 then 'Accesses' else 'None' end as
PASSWORD_EXP_TYPE, case when password_lifespan_days > 0 then password_lifespan_days
when password_lifespan_accesses > 0 then password_lifespan_accesses else null end as
PASSWORD_LIFESPAN, EMPLOYEE_ID as EMPLOYEE_ID, USER_NAME AS user_name,
TO_NUMBER(SUPPLIER_ID) as SUPPLIER_ID, session_number as session_number,CUSTOMER_ID as
CUSTOMER_ID, DESCRIPTION as description, EMAIL_ADDRESS as EMAIL_ADDRESS, FAX as FAX,
START_DATE  AS START_DATE, END_DATE AS END_DATE,'Supplier' as
PARTY_TYPE,b.person_first_name as party_first_name,b.person_last_name as
party_last_name,b.party_id as party_id ,b.party_name as supplier_name,b.sup_party_id
as supplier_party_id,null as security_group_id, null as responsibility_ID,null as
RESPONSIBILITY_APP_ID, null AS RESP_END_DATE,null AS RESP_START_DATE,null as
ROLE_ID ,null as role_start_date ,null as expiration_date ,null as
RESP_DESCRIPTION,null as ROLE_APP_ID  from fnd_user a,(   select
hp.party_id,hp.person_first_name,hp.person_last_name,hp1.party_name,hp1.party_id as
sup_party_id FROM hz_relationships hr , hz_parties hp,hz_parties hp1 where
hr.subject_ID = hp1.party_id and hr.object_ID=hp.party_id and
hr.subject_type='ORGANIZATION' and hr.object_type='PERSON') b where a.person_party_id=
b.party_id \
```

```
                union all \
                select USER_ID AS user_id,USER_GUID AS user_guid,sysdate  as
system_date, LAST_UPDATE_DATE  DATE_UPDATED, case when password_lifespan_days >
0 then 'Days' when password_lifespan_accesses > 0 then 'Accesses' else 'None'
end as PASSWORD_EXP_TYPE, case when password_lifespan_days > 0 then
password_lifespan_days when password_lifespan_accesses > 0 then
password_lifespan_accesses else null end as PASSWORD_LIFESPAN, EMPLOYEE_ID as
EMPLOYEE_ID, USER_NAME AS user_name,  TO_NUMBER(SUPPLIER_ID) as SUPPLIER_ID,
session_number as session_number,CUSTOMER_ID as CUSTOMER_ID, DESCRIPTION as
description, EMAIL_ADDRESS as EMAIL_ADDRESS, FAX as FAX, START_DATE AS
START_DATE,END_DATE AS END_DATE,'Party' as PARTY_TYPE,b.person_first_name as
party_first_name,b.person_last_name as party_last_name,b.party_id as
party_id,null as supplier_name,null as supplier_party_id,null as
security_group_id, null as responsibility_ID,null as RESPONSIBILITY_APP_ID, null
AS RESP_END_DATE,null AS RESP_START_DATE ,null as ROLE_ID ,null as
role_start_date ,null as expiration_date ,null as RESP_DESCRIPTION,null as
ROLE_APP_ID from fnd_user a,(   select
hp.party_id,hp.person_first_name,hp.person_last_name  FROM hz_parties hp) b
where a.person_party_id not in (select hr.object_ID FROM hz_relationships hr
where hr.subject_type='ORGANIZATION' and hr.object_type='PERSON') and
a.person_party_id= b.party_id \
                union all \
                select USER_ID AS user_id,USER_GUID AS user_guid,sysdate as
system_date, LAST_UPDATE_DATE  DATE_UPDATED, case when password_lifespan_days >
0 then 'Days' when password_lifespan_accesses > 0 then 'Accesses' else 'None'
end as PASSWORD_EXP_TYPE, case when password_lifespan_days > 0 then
password_lifespan_days when password_lifespan_accesses > 0 then
password_lifespan_accesses else null end as PASSWORD_LIFESPAN, EMPLOYEE_ID as
EMPLOYEE_ID, USER_NAME AS user_name,  TO_NUMBER(SUPPLIER_ID) as SUPPLIER_ID,
session_number as session_number,CUSTOMER_ID as CUSTOMER_ID, DESCRIPTION as
description, EMAIL_ADDRESS as EMAIL_ADDRESS, FAX as FAX, START_DATE AS
START_DATE,END_DATE  AS END_DATE,null as PARTY_TYPE,null as
party_first_name,null as party_last_name,null as party_id,null as
supplier_name,null as supplier_party_id,null as security_group_id, null as
responsibility_ID,null as RESPONSIBILITY_APP_ID, null AS RESP_END_DATE,null AS
RESP_START_DATE ,null as ROLE_ID ,null as role_start_date ,null as
expiration_date ,null as RESP_DESCRIPTION,null as ROLE_APP_ID from fnd_user a
where person_party_id IS NULL \
                ) \
                select * from ( \
                select RESULTTABLE.*,ROW_NUMBER() OVER (ORDER BY user_id) AS
Row_Num from \
                ( \
                select * from party \
                union all \
                select f.USER_ID AS user_id,f.user_guid as
user_guid,f.system_date,f.DATE_UPDATED,f.PASSWORD_EXP_TYPE,f.PASSWORD_LIFESPAN,f.
EMPLOYEE_ID, f.USER_NAME,f.SUPPLIER_ID, f.session_number,f.CUSTOMER_ID,
f.DESCRIPTION , f.EMAIL_ADDRESS , f.FAX , f.START_DATE,f.END_DATE,f.PARTY_TYPE,
f.party_first_name,f.party_last_name,f.party_id,f.supplier_name,f.supplier_party_
id,s.security_group_id as security_group_id, (CONCAT(a.application_ID || '~',
r.responsibility_id)) as responsibility_id,ur.RESPONSIBILITY_APPLICATION_ID as
RESPONSIBILITY_APP_ID,ur.END_DATE  AS RESP_END_DATE,ur.START_DATE  AS
RESP_START_DATE, null as ROLE_ID ,null as role_start_date ,null as
expiration_date ,ur.DESCRIPTION as RESP_DESCRIPTION,null as ROLE_APP_ID from
party f,FND_USER_RESP_GROUPS_DIRECT ur, fnd_application_vl a,
fnd_responsibility_vl r, fnd_security_groups_vl s where f.user_id = ur.user_id
and ur.responsibility_ID = r.responsibility_ID and r.application_ID =
a.application_ID and ur.security_group_id = s.security_group_id and
( (ur.START_DATE < nvl(ur.END_DATE, TO_DATE('31-DEC-4712','dd-mon-yyyy')) and
ur.START_DATE > sysdate) or sysdate between ur.START_DATE and nvl(ur.END_DATE,
```

```
TO_DATE('31-DEC-4712','dd-mon-yyyy')) ) \
              union all \
              select f.USER_ID AS user_id,f.user_guid as
user_guid,f.system_date,f.DATE_UPDATED,f.PASSWORD_EXP_TYPE,f.PASSWORD_LIFESPAN,f.EMPLOY
EE_ID, f.USER_NAME,f.SUPPLIER_ID, f.session_number,f.CUSTOMER_ID, f.DESCRIPTION ,
f.EMAIL_ADDRESS , f.FAX , f.START_DATE,f.END_DATE,f.PARTY_TYPE,
f.party_first_name,f.party_last_name,f.party_id,f.supplier_name,f.supplier_party_id,
null as security_group_id, null as responsibility_id, null as RESPONSIBILITY_APP_ID,
null AS RESP_END_DATE,null AS RESP_START_DATE,  (CONCAT(r.application_id || '~',
r.name)) AS ROLE_ID ,r.active_from  AS role_start_date,r.active_to  AS
expiration_date,null as RESP_DESCRIPTION,r.application_id as ROLE_APP_ID  from party
f , roledata r where  f.user_name = r.user_name \
              ) RESULTTABLE  \
              --<FILTER> \
              )  WHERE Row_Num BETWEEN <START_ROW_NUMBER> and <END_ROW_NUMBER>
```

Sample SQL Queries Updated to Include Multivalued Attributes

Use this SQL query to update the UM_USER_RECON and UM_USER_SYNC queries.

The following SQL query can be used to update the UM_USER_RECON and UM_USER_SYNC queries if you have added new security attributes as part of performing the procedure described in Updating the Connector Bundle:

```
with roledata as ( \
              select
fa.application_id,fa.application_short_name,wlr.name,ura.user_name
user_name ,ura.start_date active_from,ura.end_date active_to from wf_local_roles
wlr,wf_user_role_assignments ura,fnd_application fa where   ura.role_name like 'UMX%'
AND wlr.parent_orig_system = 'UMX' and  wlr.name=ura.role_name and
fa.application_short_name = wlr.owner_tag and  ( (ura.start_date < nvl(ura.end_date,
TO_DATE('31-DEC-4712','dd-mon-yyyy')) and ura.start_date > sysdate) or sysdate between
ura.start_date and nvl(ura.end_date, TO_DATE('31-DEC-4712','dd-mon-yyyy')) ) \
              ) ,  securitydata as ( \
              select userak.web_user_id as user_id,userak.attribute_code as
SECURITY_ATTR_NAME, userak.attribute_application_id as
SECURITY_APP_ID,NVL(userak.VARCHAR2_VALUE,NVL(to_char(userak.DATE_VALUE),userak.NUMBER_
VALUE)) as SECURITY_ATTR_VALUE,ak.DATA_TYPE as SECURITY_ATTR_TYPE from
ak_web_user_sec_attr_values userak,AK_ATTRIBUTES ak where
ak.attribute_code=userak.attribute_code and ak.attribute_application_id=
userak.attribute_application_id \
              ), party as ( \
              select null as SECURITY_ATTR_NAME, null as SECURITY_APP_ID, null as
SECURITY_ATTR_VALUE,null as SECURITY_ATTR_TYPE,USER_ID AS user_id,USER_GUID AS
user_guid,sysdate  as system_date,    LAST_UPDATE_DATE  DATE_UPDATED, case when
password_lifespan_days > 0 then 'Days' when password_lifespan_accesses > 0 then
'Accesses' else 'None' end as PASSWORD_EXP_TYPE, case when password_lifespan_days > 0
then password_lifespan_days when password_lifespan_accesses > 0 then
password_lifespan_accesses else null end as PASSWORD_LIFESPAN, EMPLOYEE_ID as
EMPLOYEE_ID, USER_NAME AS user_name,  TO_NUMBER(SUPPLIER_ID) as   SUPPLIER_ID,
session_number as session_number,CUSTOMER_ID as CUSTOMER_ID, DESCRIPTION as
description, EMAIL_ADDRESS as EMAIL_ADDRESS, FAX as FAX, START_DATE  AS START_DATE,
END_DATE  AS END_DATE,'Supplier' as PARTY_TYPE,b.person_first_name as
party_first_name,b.person_last_name as party_last_name,b.party_id as
party_id ,b.party_name as supplier_name,b.sup_party_id as supplier_party_id,null as
security_group_id, null as responsibility_ID,null as RESPONSIBILITY_APP_ID, null AS
RESP_END_DATE,null AS RESP_START_DATE,null as ROLE_ID ,null as role_start_date ,null
as expiration_date ,null as RESP_DESCRIPTION,null as ROLE_APP_ID  from fnd_user a,
(   select
hp.party_id,hp.person_first_name,hp.person_last_name,hp1.party_name,hp1.party_id as
```

```
sup_party_id FROM hz_relationships hr , hz_parties hp,hz_parties hp1 where
hr.subject_ID = hp1.party_id and hr.object_ID=hp.party_id
 and hr.subject_type='ORGANIZATION' and hr.object_type='PERSON') b where
a.person_party_id= b.party_id \
               union all \
               select null as SECURITY_ATTR_NAME, null as SECURITY_APP_ID, null
as SECURITY_ATTR_VALUE,null as SECURITY_ATTR_TYPE,USER_ID AS user_id,USER_GUID
AS user_guid,sysdate  as system_date,    LAST_UPDATE_DATE  DATE_UPDATED, case
when password_lifespan_days > 0 then 'Days' when password_lifespan_accesses > 0
then 'Accesses' else 'None' end as PASSWORD_EXP_TYPE, case when
password_lifespan_days > 0 then password_lifespan_days when
password_lifespan_accesses > 0 then password_lifespan_accesses else null end as
PASSWORD_LIFESPAN, EMPLOYEE_ID as  EMPLOYEE_ID, USER_NAME AS user_name,
TO_NUMBER(SUPPLIER_ID) as   SUPPLIER_ID, session_number as
session_number,CUSTOMER_ID as CUSTOMER_ID,    DESCRIPTION as description,
EMAIL_ADDRESS as EMAIL_ADDRESS, FAX as FAX, START_DATE  AS START_DATE,END_DATE
AS END_DATE,'Party' as PARTY_TYPE,b.person_first_name as
party_first_name,b.person_last_name as party_last_name,b.party_id as
party_id,null as supplier_name,null as supplier_party_id,null as
security_group_id, null as responsibility_ID,null as RESPONSIBILITY_APP_ID, null
AS RESP_END_DATE,null AS RESP_START_DATE ,null as ROLE_ID ,null as
role_start_date ,null as expiration_date ,null as RESP_DESCRIPTION,null as
ROLE_APP_ID from fnd_user a,(   select
hp.party_id,hp.person_first_name,hp.person_last_name  FROM hz_parties hp) b
where a.person_party_id not in (select hr.object_ID FROM hz_relationships hr
where hr.subject_type='ORGANIZATION' and hr.object_type='PERSON') and
a.person_party_id= b.party_id \
               union all \
               select null as SECURITY_ATTR_NAME, null as SECURITY_APP_ID, null
as SECURITY_ATTR_VALUE,null as SECURITY_ATTR_TYPE,USER_ID AS user_id,USER_GUID
AS user_guid,sysdate  as system_date,    LAST_UPDATE_DATE  DATE_UPDATED, case
when password_lifespan_days > 0 then 'Days' when password_lifespan_accesses > 0
then 'Accesses' else 'None' end as PASSWORD_EXP_TYPE, case when
password_lifespan_days > 0 then password_lifespan_days when
password_lifespan_accesses > 0 then password_lifespan_accesses else null end as
PASSWORD_LIFESPAN, EMPLOYEE_ID as  EMPLOYEE_ID, USER_NAME AS user_name,
TO_NUMBER(SUPPLIER_ID) as   SUPPLIER_ID, session_number as
session_number,CUSTOMER_ID as CUSTOMER_ID,    DESCRIPTION as description,
EMAIL_ADDRESS as EMAIL_ADDRESS, FAX as FAX, START_DATE  AS START_DATE,END_DATE
AS END_DATE,null as PARTY_TYPE,null as party_first_name,null as
party_last_name,null as party_id,null as supplier_name,null as
supplier_party_id,null as security_group_id, null as responsibility_ID,null as
RESPONSIBILITY_APP_ID, null AS RESP_END_DATE,null AS RESP_START_DATE ,null as
ROLE_ID ,null as role_start_date ,null as expiration_date ,null as
RESP_DESCRIPTION,null as ROLE_APP_ID from fnd_user a where person_party_id IS
NULL \
               ) \
               select * from ( \
               select RESULTTABLE.*,ROW_NUMBER() OVER (ORDER BY user_id) AS
Row_Num from \
               ( \
               select * from party \
               union all \
               select f.SECURITY_ATTR_NAME, f.SECURITY_APP_ID,
f.SECURITY_ATTR_VALUE,f.SECURITY_ATTR_TYPE,f.USER_ID AS user_id,f.user_guid as
user_guid,f.system_date,f.DATE_UPDATED,f.PASSWORD_EXP_TYPE,f.PASSWORD_LIFESPAN,f.
EMPLOYEE_ID, f.USER_NAME,f.SUPPLIER_ID, f.session_number,f.CUSTOMER_ID,
f.DESCRIPTION , f.EMAIL_ADDRESS , f.FAX , f.START_DATE,f.END_DATE,f.PARTY_TYPE,
f.party_first_name,f.party_last_name,f.party_id,f.supplier_name,f.supplier_party_
id,s.security_group_id as security_group_id, (CONCAT(a.application_ID || '~',
r.responsibility_id)) as responsibility_id,ur.RESPONSIBILITY_APPLICATION_ID as
```

```
RESPONSIBILITY_APP_ID,ur.END_DATE  AS RESP_END_DATE,ur.START_DATE  AS RESP_START_DATE,
null as ROLE_ID ,null as role_start_date ,null as expiration_date ,ur.DESCRIPTION as
RESP_DESCRIPTION,null as ROLE_APP_ID from party f,FND_USER_RESP_GROUPS_DIRECT ur,
fnd_application_vl a, fnd_responsibility_vl r, fnd_security_groups_vl s where
f.user_id = ur.user_id and ur.responsibility_ID = r.responsibility_ID and
r.application_ID = a.application_ID and ur.security_group_id = s.security_group_id
and  ( (ur.START_DATE < nvl(ur.END_DATE, TO_DATE('31-DEC-4712','dd-mon-yyyy')) and
ur.START_DATE > sysdate) or sysdate between ur.START_DATE and nvl(ur.END_DATE,
TO_DATE('31-DEC-4712','dd-mon-yyyy')) ) \
               union all \
               select f.SECURITY_ATTR_NAME, f.SECURITY_APP_ID,
f.SECURITY_ATTR_VALUE,f.SECURITY_ATTR_TYPE,f.USER_ID AS user_id,f.user_guid as
user_guid,f.system_date,f.DATE_UPDATED,f.PASSWORD_EXP_TYPE,f.PASSWORD_LIFESPAN,f.EMPLOY
EE_ID, f.USER_NAME,f.SUPPLIER_ID, f.session_number,f.CUSTOMER_ID, f.DESCRIPTION ,
f.EMAIL_ADDRESS , f.FAX , f.START_DATE,f.END_DATE,f.PARTY_TYPE,
f.party_first_name,f.party_last_name,f.party_id,f.supplier_name,f.supplier_party_id,
null as security_group_id, null as responsibility_id, null as RESPONSIBILITY_APP_ID,
null AS RESP_END_DATE,null AS RESP_START_DATE,  (CONCAT(r.application_id || '~',
r.name)) AS ROLE_ID ,r.active_from  AS role_start_date,r.active_to  AS
expiration_date,null as RESP_DESCRIPTION,r.application_id as ROLE_APP_ID  from party
f , roledata r where  f.user_name = r.user_name \
               union all \
               select sa.SECURITY_ATTR_NAME as SECURITY_ATTR_NAME, sa.SECURITY_APP_ID
as SECURITY_APP_ID, sa.SECURITY_ATTR_VALUE as
SECURITY_ATTR_VALUE,sa.SECURITY_ATTR_TYPE as SECURITY_ATTR_TYPE,f.USER_ID AS
user_id,f.user_guid as
user_guid,f.system_date,f.DATE_UPDATED,f.PASSWORD_EXP_TYPE,f.PASSWORD_LIFESPAN,f.EMPLOY
EE_ID, f.USER_NAME,f.SUPPLIER_ID, f.session_number,f.CUSTOMER_ID, f.DESCRIPTION ,
f.EMAIL_ADDRESS , f.FAX , f.START_DATE,f.END_DATE,f.PARTY_TYPE,
f.party_first_name,f.party_last_name,f.party_id,f.supplier_name,f.supplier_party_id,
null as security_group_id, null as responsibility_id, null as RESPONSIBILITY_APP_ID,
null AS RESP_END_DATE,null AS RESP_START_DATE, null AS ROLE_ID ,null  AS
role_start_date,null  AS expiration_date,null as RESP_DESCRIPTION,null as ROLE_APP_ID
from party f , securitydata sa where  f.user_id = sa.user_id \
               ) RESULTTABLE  \
               --<FILTER> \
               )  WHERE Row_Num BETWEEN <START_ROW_NUMBER> and <END_ROW_NUMBER>
```

B

Sample Code Snippets for Extending the Connector Schema

This appendix lists sample code snippets for extending the connector schema by adding a multivalued attribute (for example, __SECUTIRY_ATTRS__). All the code snippets listed in this appendix consider __SECURITY_ATTRS__ as the multivalued attribute being added to the connector schema.

The following is a sample code snippet for extending the connector schema to include the multivalued attribute that has been initialized by specifying the number of child attributes:

```
        attr := attributelist();
        attr.extend(5);
        attr (1) := attributeinfo('SECURITY_ATTR_NAME','varchar',1,1,1,1);
        attr (2) := attributeinfo('SECURITY_ATTR_VALUE','varchar',1,1,1,1);
        attr (3) := attributeinfo('SECURITY_ATTR_TYPE','varchar',1,1,1,1);
        attr (4) := attributeinfo('SECURITY_APP_ID','varchar',1,1,1,1);

        schemaout.extend;
    schemaout( 4 ) := schema_object('__SECURITY_ATTRS__',attr);
```

The following is a sample code snippet for extending the connector schema to include the multivalued attribute without initializing the child attributes in advance:

```
        attr := attributelist();
        attr.extend;
        attr (1) := attributeinfo('SECURITY_ATTR_NAME','varchar',1,1,1,1);
        attr.extend;
        attr (2) := attributeinfo('SECURITY_ATTR_VALUE','varchar',1,1,1,1);
        attr.extend;
        attr (3) := attributeinfo('SECURITY_ATTR_TYPE','varchar',1,1,1,1);
        attr.extend;
        attr (4) := attributeinfo('SECURITY_APP_ID','varchar',1,1,1,1);

        schemaout.extend;
    schemaout( 4 ) := schema_object('__SECURITY_ATTRS__',attr);
```

The following is a sample code snippet for extending the connector schema to include the multivalued attribute with mixed ways of initializing the child attributes:

```
        attr := attributelist();
        attr.extend(2);
        attr (1) := attributeinfo('SECURITY_ATTR_NAME','varchar',1,1,1,1);
        attr (2) := attributeinfo('SECURITY_ATTR_VALUE','varchar',1,1,1,1);
        attr.extend;
        attr (3) := attributeinfo('SECURITY_ATTR_TYPE','varchar',1,1,1,1);
        attr.extend;
        attr (4) := attributeinfo('SECURITY_APP_ID','varchar',1,1,1,1);

        schemaout.extend;
    schemaout( 4 ) := schema_object('__SECURITY_ATTRS__',attr);
```

C

Files and Directories in the EBS User Management Connector Package

This appendix lists the table that describes the files and directories corresponding to the Oracle E-Business Suite User Management connector.
The contents of the connector installation package are described in Table C-1.

Table C-1 Files and Directories in the Installation Package

File in the Installation Package Directory	Description
bundle/org.identityconnectors.ebs-1.0.11150.jar	This JAR file contains the connector bundle.
configuration/EBS-UM-CI.xml	This XML file contains configuration information that is used during the connector installation process.
resources/EBS-UM.properties	This file is a resource bundle that contains language-specific information that is used by the connector. During connector installation, these resource bundles are copied to the Oracle Identity Manager database. **Note:** A **resource bundle** is a file containing localized versions of the text strings that are displayed on the Administrative and User Console. These text strings include GUI element labels and messages.
scripts/OIM_FND_GLOBAL.pck	This package contains the procedures that are called to initialize the global security context for a database session during provisioning operations.
scripts/OIM_FND_USER_TCA_PKG.pck	This is a customized wrapper package for creating and updating party records.
scripts/OIM_TYPES.pck	This package file contains SQL statements used for creating Oracle types. Oracle types are used for storing OIM schema.
scripts/OimUser.sql scripts/OimUserAppstablesSynonyms.sql scripts/OimUserGrants.sql scripts/OimUserSynonyms.sql	These files contain the SQL scripts to create a target system user account, grant the required rights to the user, and create synonyms of various database objects to be used by the connector. See Creating a Target System User Account for Connector Operations for more information about this user.
scripts/Run_UM_DBScripts.bat scripts/Run_UM_DBScripts.sh	This file contains commands to run the SQL scripts for creating a service account with the required grants. See Creating a Target System User Account for Connector Operations for more information about this user.
upgrade/PostUpgradeScript_PlainEBSUM.sql	This file is used during the plain Oracle EBS User Management connector upgrade procedure.
upgrade/PostUpgradeScript_TCAEBSUM.sql	This file is used during Oracle EBS User Management TCA connector upgrade procedure.

Table C-1 (Cont.) Files and Directories in the Installation Package

File in the Installation Package Directory	Description
xml/EBS-UM-ConnectorConfig.xml	This XML file contains definitions for the following connector components: • Resource objects • IT resource types • IT resource instance • Process forms • Process tasks and adapters • Process definition • Prepopulate rules • Lookup definitions • Reconciliation rules • Scheduled tasks

D

Scheduled Jobs for Lookup Field Synchronization and Reconciliation

This appendix lists the table that describes the scheduled jobs that you can configure.

Table D-1 lists the scheduled jobs.

Table D-1 Scheduled Jobs for Lookup Field Synchronization and Reconciliation

Scheduled Task	Description
Oracle EBS UM Target User Reconciliation	This scheduled job is used for user reconciliation. See Scheduled Job for Target User Reconciliation for information about this scheduled job.
Oracle EBS UM Target Incremental User Reconciliation	This scheduled job is used for incremental reconciliation of user information. See Scheduled Job for Incremental Target User Reconciliation for more information.
Oracle EBS UM Target User Delete Reconciliation	This scheduled job is used for reconciliation of deleted user records. See Scheduled Job for Target User Delete Reconciliation for more information.
Oracle EBS UM Target Applications Lookup Reconciliation	This scheduled job is used to synchronize values of the applications lookup fields between Oracle Identity Manager and the target system. See Scheduled Jobs for Lookup Field Synchronization for information about this scheduled job.
Oracle EBS UM Target Responsibilities Lookup Reconciliation	This scheduled job is used to synchronize values of the responsibilities lookup fields between Oracle Identity Manager and the target system. See Scheduled Jobs for Lookup Field Synchronization for information about this scheduled job.
Oracle EBS UM Target Roles Lookup Reconciliation	This scheduled job is used to synchronize values of the roles lookup fields between Oracle Identity Manager and the target system. See Scheduled Jobs for Lookup Field Synchronization for information about this scheduled job.
Oracle EBS UM Target Security Groups Lookup Reconciliation	This scheduled job is used to synchronize values of the security groups lookup fields between Oracle Identity Manager and the target system. See Scheduled Jobs for Lookup Field Synchronization for information about this scheduled job.

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