

Oracle® Communications Data Model

Installation Guide

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Preface

The *Oracle Communications Data Model Installation Guide* describes how to install and configure Oracle Communications Data Model.

Audience

This guide is intended for anyone responsible for installing Oracle Communications Data Model on a supported operating system platform.

Installation of Oracle Communications Data Model requires basic knowledge of Oracle Database, Oracle OLAP, Oracle Data Mining, Oracle Warehouse Builder, and Oracle Business Intelligence Suite Enterprise Edition.

Documentation Accessibility

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Access to Oracle Support

Oracle customers 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 more information about Oracle Communications Data Model, see the following documents in the Oracle Communications Data Model documentation set

- *Oracle Communications Data Model Operations Guide*
- *Oracle Communications Data Model Reference*
- *Oracle Communications Data Model Release Notes*

Conventions

The following text conventions are used in this document:

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

Hardware and Software Requirements

This chapter describes the hardware and software requirements of Oracle Communications Data Model:

- [Supported Platforms](#)
- [Hardware Requirements](#)
- [Software Requirements](#)

Before you install Oracle Communications Data Model, you must verify that all hardware and software requirements are met.

Supported Platforms

Oracle Communications Data Model is supported on the following platforms. For each platform, the given operating system version or later versions are required:

- Linux x86-64
 - Asianux Server 3 SP2
 - Oracle Linux 4 Update 7
 - Oracle Linux 5 Update 2
 - Oracle Linux 5 Update 5 (with the Oracle Unbreakable Enterprise Kernel for Linux)
 - Red Hat Enterprise Linux 4 Update 7
 - Red Hat Enterprise Linux 5 Update 2
 - Red Hat Enterprise Linux 5 Update 5 (with the Oracle Unbreakable Enterprise Kernel for Linux)
 - Red Hat Enterprise Linux 6
 - SUSE Linux Enterprise Server 10 SP2
 - SUSE Linux Enterprise Server 11
- Oracle Solaris on SPARC (64-bit)
 - Oracle Solaris 10 U6 (5.10-2008.10)
 - Oracle Solaris 11 11/11 SPARC
- Oracle Solaris on x86-64 (64-bit)
 - Oracle Solaris 10 U6 (5.10-2008.10)
 - Oracle Solaris 11 11/11 X86

- AIX 5L Based Systems (64-bit)
 - AIX 5L V5.3 TL 09 SP1 ("5300-09-01"), 64 bit kernel
 - AIX 6.1 TL 02 SP1 ("6100-02-01"), 64-bit kernel
 - AIX 7.1 TL 0 SP1 ("7100-00-01-1037"), 64-bit kernel

Note: There are special considerations when installing Oracle Communications Data Model on AIX, AIX, see "[AIX Platform: Changing the Database Parameter](#)" on page 3-5.

Hardware Requirements

The Oracle Database installation guide for your platform includes procedures for checking that your installation meets the hardware and operating system requirements for Oracle Database.

Additionally, for a complete installation of Oracle Communications Data Model, the minimum hardware requirement is disk space of at least 10 GB.

Software Requirements

The minimum software requirements for Oracle Communications Data Model are as follows:

- Operating System: For details of supported platforms, see "[Supported Platforms](#)" on page 1-1.
- Oracle Database 11g Release 2 Enterprise Edition (11.2.0.3 or later), including the options specified in "[Oracle Database Requirements](#)" on page 1-3.
- Oracle Warehouse Builder. See "[Oracle Warehouse Builder](#)" on page 1-3. (Oracle Warehouse Builder is required to use the ETL supplied with Oracle Communications Data Model.)
- Oracle Business Intelligence Suite Enterprise Edition 11.1.1.5 or higher. See "[Oracle Business Intelligence Suite Enterprise Edition](#)" on page 1-3 (this is Optional for installing Oracle Communications Data Model and the Reports, but is required to view and use the reports).
- Oracle Data Integrator Enterprise Edition 11g (11.1.1.5.0 or higher). See "[Oracle Data Integrator Enterprise Edition](#)" on page 1-4 (this is optional for Oracle Communications Data Model component installation and required for the Application Adapters installation).
- Oracle GoldenGate 11g (11.1.1.1 or higher) See "[Oracle GoldenGate](#)" on page 1-4 (this is optional for Oracle Communications Data Model component installation and optional for the NCC Adapters installation, depending on whether you are using real-time feed with the NCC Adapter).

Note: The recommended patches and software versions are accurate as of product release. For the latest recommendations for database supported platforms, see <https://support.oracle.com/>.

Oracle Database Requirements

Oracle Communications Data Model requires Oracle Database 11g Release 2 Enterprise Edition (11.2.0.3 or later).

Tip: When you install the Database ensure that the database character set is Unicode (AL32UTF8) to support multi-language installations since Oracle Communications Data Model permits the installation of support for English and one other language.

Installation of the Oracle Communications Data Model component requires the following options to the Database:

- Oracle Partitioning
- Oracle Online Analytical Processing (OLAP)
- Oracle Data Mining

Tip: To confirm that you have Oracle Data Mining and OLAP options installed, follow the instructions outlined in "[Confirming that Oracle Data Mining and OLAP Options are Installed](#)" on page 3-2.

After you download and install the Database, upgrade to the latest patch. Patches are available from My Oracle Support at the following location:

<http://support.oracle.com>

Oracle Warehouse Builder

Oracle Communications Data Model requires the version of Oracle Warehouse Builder that comes as with Oracle Database 11g Release 2 Enterprise Edition. The ETL provided with Oracle Communications Data Model uses Oracle Warehouse Builder. For instructions on installing and configuring Oracle Warehouse Builder, see *Oracle Warehouse Builder Installation and Administration Guide for Windows and Linux*.

Tip: To confirm that you have Oracle Warehouse Builder installed, follow the instructions outlined in "[Confirming that the OWBSYS Schema Exists](#)" on page 3-2.

Oracle Business Intelligence Suite Enterprise Edition

You must have the Oracle Business Intelligence Suite Enterprise Edition installed before you can view and use the Oracle Communications Data Model reports. (Oracle Business Intelligence Suite Enterprise Edition is not required for the installation of the Oracle Communications Data Model component and the installation of Oracle Communications Data Model Reports is valid without Oracle Business Intelligence Suite Enterprise Edition installed).

Oracle Business Intelligence Suite Enterprise Edition 11.1.1.5 or higher can be downloaded from the "Oracle Business Intelligence 11g downloads" link on Oracle Technology Network at:

<http://www.oracle.com/technetwork/middleware/bi-enterprise-edition/downloads/index.html>

Installation instructions are included in the documentation.

Oracle Data Integrator Enterprise Edition

If you install Application Adapters, you must also install Oracle Data Integrator Enterprise Edition. Oracle Data Integrator Enterprise Edition 11g (11.1.1.5.0) can be downloaded from Oracle Technology Network at:

<http://www.oracle.com/technetwork/middleware/data-integrator/downloads/index.html>

Installation instructions are included in the documentation. For more information, see

<http://www.oracle.com/technetwork/middleware/data-integrator/documentation/index.html>

For more information on Oracle Communications Data Model Adapters, see *Oracle Communications Data Model Operations Guide*.

Oracle GoldenGate

If you install Application Adapters, using, installing, and configuring Oracle GoldenGate is optional depending on whether you want to use real-time feeds.

Oracle GoldenGate 11g (11.1.1.1.0) can be downloaded from Oracle Technology Network at:

<http://www.oracle.com/technetwork/middleware/goldengate/downloads/index.html>

Installation instructions are included in the documentation. For more information, see

<http://www.oracle.com/technetwork/middleware/goldengate/documentation/index.html>

For more information on Oracle Communications Data Model Adapters, see *Oracle Communications Data Model Operations Guide*.

Introduction to Oracle Communications Data Model Installation

This chapter describes how to install Oracle Communications Data Model and other components you use to create an Oracle Communications Data Model data warehouse:

- [Types of Installations Provided for Oracle Communications Data Model](#)
- [Overview of the Installation Process](#)

Types of Installations Provided for Oracle Communications Data Model

Using the Oracle Universal Installer you can perform two types of Oracle Communications Data Model installation:

- Installation of the Oracle Communications Data Model component, itself. You *must* install this component to create an Oracle Communications Data Model data warehouse.
- Installation of reports (and schemas) that you can use for ideas about how to design your own reports. Installing the reports is optional.
- Installation of the Oracle Communications Data Model Application Adapters.

Different items are installed depending on whether you install the database objects, the reports and schemas, or the adapters.

Communications Data Model Installation

When you perform a **Communications Data Model** installation of Oracle Communications Data Model, the Oracle Universal Installer installs the Oracle Communications Data Model component without data. Specifically, the installer creates the following schemas in the target database:

- `ocdm_sys` which is the main schema for Oracle Communications Data Model. This schema contains all the relational and OLAP components of Oracle Communications Data Model, including the Oracle Communications Data Model data mining results tables.
- `ocdm_mining` which is the data mining schema of Oracle Communications Data Model. This schema contains all the mining components of Oracle Communications Data Model *except* the data mining results tables.

See: For detailed information about all created objects in the `OCDM_SYS` and `OCDM_MINING` schemas, see the *Oracle Communications Data Model Reference*.

There is no data in these two schemas. You need to populate data into the schema.

Sample Reports Installation

When you perform a **Sample Reports** installation of the Oracle Communications Data Model, the installer creates the Oracle Communications Data Model sample schema in the target database. Specifically, the installer installs:

- The following files that provide the data for the reports:
 - `ocdm_sample.dmp.zip` which is a dump file of the schemas that contain the sample data for the relational and data mining components of Oracle Communications Data Model.
- **Tip:** The default user name for the schema is `ocdm_sample_sys`.
- `ocdm_sample.eif` which is a dump file containing sample data for the Oracle Communications Data Model analytic workspace (that is, the OLAP cubes).
- The following files that define and create the sample reports:
 - `ocdm.rpd`
 - `ocdmwebcat.zip`

Application Adapters Installation

When you perform an **Application Adapters** installation, the installer creates the adapter schema in the target database and adds the adapter related files to Oracle Communications Data Model home directory.

Note: To complete the installation and configuration with the NCC Adapter and **Application Adapters** type installation, you need to perform additional steps after running the installer, as described in [Appendix A, "NCC Adapter Installation and Configuration"](#).

The NCC Adapter that is installed with the Application Adapters type installation feeds pre-paid billing data from the Oracle Communications Network Charging and Control application to the Oracle Communications Data Model. The NCC Adapter includes an option to feed data in real-time using Oracle GoldenGate to the Oracle Communications Data Model staging layer, or to extract, load and transform the data in batch mode.

Specifically, the installer creates and installs:

- `adapters` directory and files which contains the Application Adapters files required for Oracle Communications Network Charging and Control Adapter for Oracle Communications Data Model.

Oracle Communications Data Model Home Directory Structure

The installation image contains the following directories under `ORACLE_HOME/ocdm:`

- `adapters:` which contains the Application Adapters files required for Oracle Communications Network Charging and Control Adapter for Oracle Communications Data Model installation (placed in the `ncc` directory).
- `report:` which contains the sample report files required for Oracle Communications Data Model installation.

- pdm: which contains the physical schema dump, creation script, and lookup value population as listed in the following table.

Subdirectory	Description
relational	Relational schema installation scripts and relational related files
relational/calendar	Calendar data population package
relational/ddl	Relational schema installation scripts
relational/intra_etl	Intra-ETL Oracle Warehouse Builder dump and related files
relational/lookup_value	Lookup data population script
relational/sample_schema	Physical sample schema
mining	Data mining scripts and related files
olap	OLAP scripts and related files

Overview of the Installation Process

Installation of Oracle Communications Data Model requires the following tasks:

1. Read *Oracle Communications Data Model Release Notes* to identify any last minute changes.
2. Verify that your system is one of the supported platforms and that it satisfies the hardware and software requirements as described in [Chapter 1, "Hardware and Software Requirements."](#)
3. Identify and perform any necessary pre-installation tasks, as described in ["Pre-installation Tasks"](#) on page 3-1.
4. Install the Oracle Communications Data Model component, the Oracle Communications Data Model reports, or Application Adapters as described in ["Installer Execution"](#) on page 3-5.

Tip: you can also perform a silent installation, see ["Silent Installation"](#) on page 3-9 for more information.

5. Identify and perform any necessary post-installation tasks, as described in ["Post-Installation Tasks"](#) on page 3-11.
6. Install the additional components that you need to create an Oracle Communications Data Model data warehouse or run the reports, as described in [Chapter 4, "Installation of Additional Components."](#)

Note 1: To deinstall Oracle Communications Data Model, you do *not* simply run the Oracle Universal Installer in deinstall mode. To deinstall Oracle Communications Data Model, follow the directions in [Chapter 5, "Backup, Recovery, and Deinstallation of Oracle Communications Data Model."](#)

Note 2: You *must* deinstall Oracle Communications Data Model before you re-install it over an existing version of Oracle Communications Data Model.

Installation of Oracle Communications Data Model

This chapter describes how to install Oracle Communications Data Model:

- [Pre-installation Tasks](#)
- [Installer Execution](#)
- [Silent Installation](#)
- [Post-Installation Tasks](#)

Pre-installation Tasks

Before you install the Oracle Communications Data Model, perform the following tasks:

- Back up the Oracle Database.
- Ensure that the software required for Oracle Communications Data Model is installed, as described in "[Ensuring that Required Software is Installed](#)" on page 3-1.
- Set the maximum processes initialization parameter, as described in "[Changing the Default Value for the Maximum Processes Initialization Parameter](#)" on page 3-3.
- Increase the maximum number of data files, as described in "[Changing the Maximum Data Files Option](#)" on page 3-3.
- If you are using the Database Vault Option, disable the option, as described in "[Disabling the Data Vault Option on the Database](#)" on page 3-4.
- If you are installing Oracle Communications Data Model on one of the AIX platforms listed in "[Supported Platforms](#)" on page 1-1, change an Oracle Database parameter as described in "[AIX Platform: Changing the Database Parameter](#)" on page 3-5.
- Ensure that the tnsnames.ora file includes a value for SERVICE_NAME, as described in "[Ensuring That a Value is Set for the Service Name](#)" on page 3-5.

Ensuring that Required Software is Installed

As discussed in "[Software Requirements](#)" on page 1-2, you must have certain software installed before you can successfully install the Oracle Communications Data Model component or the Oracle Communications Data Model sample data and reports.

Take the following steps to ensure that for each type of installation, the required software is installed:

- Before you install Oracle Communications Data Model:
 - Confirm that the required Database options are installed by following the steps outlined in ["Confirming that Oracle Data Mining and OLAP Options are Installed"](#) on page 3-2.
 - Confirm that Oracle Warehouse Builder is installed by following the steps outlined in ["Confirming that the OWBSYS Schema Exists"](#) on page 3-2.
- Before you install the sample data and reports for Oracle Communications Data Model, confirm that Oracle Business Intelligence Suite Enterprise Edition is installed as described in ["Confirming that Oracle Business Intelligence Suite Enterprise Edition is Installed"](#) on page 3-2.

Confirming that Oracle Data Mining and OLAP Options are Installed

To check that the Oracle Data Mining and OLAP options are installed, log in as SYS and enter the following SQL queries:

```
SELECT VALUE FROM V$OPTION WHERE PARAMETER = 'Data Mining';  
SELECT VALUE FROM V$OPTION WHERE PARAMETER = 'OLAP';
```

If these queries return TRUE, the options are installed.

Confirming that the OWBSYS Schema Exists

To check that OWBSYS schema exists, log in to the Database as DBA and issue the following statements:

```
SELECT COUNT(*) FROM DBA_USERS WHERE USERNAME='OWBSYS';
```

If this query returns a value larger than zero (0), OWBSYS schema exists.

If the OWBSYS schema does not exist, take the following steps:

1. Go to the \$ORACLE_HOME/owb/UnifiedRepos directory.
2. Login to the Database as SYSDBA.
3. Execute the following SQL statement.

```
@cat_owb.sql
```

4. When prompted to enter a tablespace name, input USERS

Confirming that Oracle Business Intelligence Suite Enterprise Edition is Installed

To test that Oracle Business Intelligence Suite Enterprise Edition is installed, open the following link in a browser. (Note that the 9704 value in the link is the value of the default Oracle Business Intelligence Suite Enterprise Edition port; if you specified a different port when you installed Oracle Business Intelligence Suite Enterprise Edition, use the value for that port.)

```
http://hostname:9704/analytics
```

The sample Oracle Business Intelligence Suite Enterprise Edition login window is displayed.

If Oracle Business Intelligence Suite Enterprise Edition is not installed, see ["Oracle Business Intelligence Suite Enterprise Edition"](#) on page 1-3.

Changing the Default Value for the Maximum Processes Initialization Parameter

Oracle Communications Data Model requires that the initial value for the PROCESSES initialization parameter be set to a value greater than the default database installation value.

How to determine the current value for the PROCESSES parameter

To determine the current value for the maximum processes parameter, log in as DB with DBA account, and then execute the following SQL statement:

```
show parameter processes;
```

How to change the value for the maximum processes

To change the value for the maximum processes, issue the following statements. Depending on your database options, the value specified for processes should be set to a minimum value greater than or equal to 250.

```
alter system set processes=250 scope=spfile;
shutdown immediate
startup
```

Changing the Maximum Data Files Option

Oracle Communications Data Model supports the partition of transaction-related fact tables according to your data volume estimation. You can specify the start year, end year and then the transaction related fact tables are partitioned by the date as one partition for each month.

In order to support the partition of transaction-related fact tables, you might need a different value for the maximum number of data files that is presently specified for the Database.

How to determine the value for maximum number of data files

Use the following formula to determine the value that you need for the maximum number of data files:

$$\text{Maximum Datafiles} = \text{Default Value} + 300 + ((\text{End year}) - (\text{Start year}) + 1) * 12$$

How to determine the current value for the maximum number of data files

To determine the current value for the maximum number of data files, log in as DB with DBA account, and then execute the following SQL statement.

```
show parameter db_files
```

In the results for this statement, the `value` column shows the current maximum number of data files.

How to change the value for the maximum number of data files

To change the value for the maximum number of data files, issue the following statements where *new_number* is the new value that you want to specify.

```
alter system set db_files = new_number scope = spfile;
shutdown immediate
startup
```

Disabling the Data Vault Option on the Database

The Oracle Communications Data Model installer requires additional steps on a Vault-enabled database. For an Oracle Database with the Vault option on, take the following steps to disable the Vault option before you install Oracle Communications Data Model.

To find out if the Oracle Database is Vault-enabled, do the following:

```
SELECT * FROM V$OPTION WHERE PARAMETER = 'Oracle Database Vault';
```

If this command returns true, then the Vault option is enabled.

To disable the Vault option, do the following:

1. On UNIX systems, ensure that the environment variables, ORACLE_HOME, ORACLE_SID, and PATH are correctly set.
2. Log in to SQL*Plus as user SYS with the SYSOPER privilege.
3. Shut down the Database.
4. From the command line, stop the Database Control console process and the listener. For example:

```
sqlplus sys as sysoper
Enter password: password
SQL> SHUTDOWN IMMEDIATE
SQL> EXIT
$ emctl stop dbconsole
$ lsnrctl stop listener_name
```

For Oracle RAC installations, shut down each database instance as follows:

```
$ srvctl stop database -d db_name
```

5. Disable the Oracle Database Vault option with the following commands (this is a UNIX system example):

```
cd $ORACLE_HOME/rdbms/lib
make -f ins_rdbms.mk dv_off
cd $ORACLE_HOME/bin
relink all
```

For Oracle RAC installations, run these commands on all nodes.

6. Startup the Database, Database Control console process, and listener. For example, on UNIX, Log in to SQL*Plus as user SYS with the SYSOPER privilege and restart the database. Then from the command line, restart the Database Control console process and listener. For example:

```
sqlplus sys as sysoper
Enter password: password
SQL> STARTUP
SQL> EXIT
$ emctl start dbconsole
$ lsnrctl start listener_name
```

For Oracle RAC installations, restart each database instance as follows:

```
$ srvctl start database -d db_name
```

Once you have installed Oracle Communications Data Model, you re-enable the Vault, as described in ["Re-Enabling the Vault Option on the Database"](#) on page 3-13.

AIX Platform: Changing the Database Parameter

If you are installing Oracle Communications Data Model on AIX, apply the following Oracle Database parameter change:

1. Login to the Database with DBA account.
2. Execute the following statement:

```
alter system set "_olap_parallel_update_small_threshold"=2147483647
scope=spfile;
```

3. Restart the Database.

Ensuring That a Value is Set for the Service Name

Ensure that in `tnsname.ora`, the service name is provided. To do this, perform the following steps:

1. Go to the directory: `$ORACLE_HOME/network/admin`.
2. Edit `tnsnames.ora` to make sure the "SERVICE_NAME" value is provided. For example:

```
orcl11g =
(DESCRIPTION =
(AADDRESS = (PROTOCOL = TCP)(HOST = server1.us.oracle.com)(PORT = 1521))
(CONNECT_DATA =
(SERVER = DEDICATED)
(SERVICE_NAME = orcl)
)
)
```

Installer Execution

Before you install Oracle Communications Data Model, perform the necessary pre-installation tasks described in "[Pre-installation Tasks](#)" on page 3-1.

Note: You must install Oracle Communications Data Model on the "localhost" where the database server is located. You can determine the value of your "localhost" by issuing the following command where *db-name* is the name of your Oracle database.

```
tnsname db-name
```

Follow these steps to install Oracle Communications Data Model:

1. Log in using the user id that you plan to use to run the installation. You should use the same user id to install Oracle Communications Data Model as used to install the Oracle Database and Oracle Business Intelligence Suite Enterprise Edition.
2. Set the `ORACLE_HOME` environment variable to the location of the Database on which to install Oracle Communications Data Model.

For example, suppose that Oracle Home is in the directory
`/loc/app/oracle/product/dbhome`

In a Bourne, Bash, or Korn shell, use these commands to set `ORACLE_HOME`:

```
$ ORACLE_HOME=/loc/app/oracle/product/dbhome
```

```
$ export ORACLE_HOME
```

In a C shell, use this command to set ORACLE_HOME

```
% setenv ORACLE_HOME /loc/app/oracle/product/dbhome
```

3. Start the installer from the directory that contains the Oracle Communications Data Model installation files:

```
cd directory-containing-OCDM_installation-files
./runInstaller
```

4. The **Welcome** page is displayed. Click **Next**.
5. In the **Select Installation Type** page, select the type of Oracle Communications Data Model installation that you want to perform:
 - If you want to install the Oracle Communications Data Model component, select **Communications Data Model**. Making this selection performs the installation described in "[Communications Data Model Installation](#)" on page 2-1.
 - If you want to install the Oracle Communications Data Model reports and sample data, select **Sample Reports**. Making this selection performs the installation described in "[Sample Reports Installation](#)" on page 2-2.
 - If you want to install the Oracle Communications Data Model Adapters, select **Application Adapters**. Making this selection performs the installation described in "[Application Adapters Installation](#)" on page 2-2.

Oracle Communications Data Model supports English and 9 other languages. To add support for one language in addition to English, click **Product Languages** and select the language.

Click **Next**.

6. In the **Specify Home Details** page, verify that the **Name** and **Path** correspond to the Database in which you want to install Oracle Communications Data Model. You can click **Browse** to navigate to any valid local data file path.

Click **Next**.

7. In the **Product-Specific Prerequisite Checks** page, if one or more items are flagged, manually verify that your environment meets the minimum requirements. For details about performing this manual verification, click the flagged item and review the details in the box at the bottom of the page.

When the status of all items are checked as **Succeeded**, click **Next**.

8. In the **Specify Database Connection Information** page, provide the following information:
 - Select the **Net Service Name** which is the alias used for a connect descriptor to connect to the Oracle Database where Oracle Communications Data Model will be installed.

Tip: A net service name is a simple name for a service that resolves to a connect descriptor. Net service names are populated from the `OracleHome/network/admin/tnsnames.ora` file.
 - Enter the **Password for SYSTEM user** of the Oracle Database where Oracle Communications Data Model will be installed.

Click **Next**.

9. The **Specify Real Time Feed Information** page shows in the **Application Adapters** install type. Use this page to choose whether you want to use a real-time feed with Oracle GoldenGate.

If you select **Yes**, then you also need to specify the Oracle GoldenGate staging details.

With **Staging on Other** selected, enter:

- **Source (Remote) Host Name:** Specify the host name for the source machine where Oracle GoldenGate is installed. This is the remote host name.
- **Source (Remote) Port Number:** Specify the port number of Oracle GoldenGate manager port (for the source machine), on which Oracle GoldenGate manager is configured and running. This is port number of the remote host.
- **Other (Remote) Host Name:** Provide the host name for the target machine where Oracle GoldenGate is installed. This is a remote host name other than the system the where Oracle Communications Data Model is installed.
- **Other (Remote) Port Number:** Provide the port number for the target machine where Oracle GoldenGate is installed. This is a remote port number on a system other than the system the where Oracle Communications Data Model is installed.

With **Staging on Target** selected, enter:

- **Source (Remote) Host Name:** Specify the host name for the source machine where Oracle GoldenGate is installed. This is the remote host name.
- **Source (Remote) Port Number:** Specify the port number of Oracle GoldenGate manager port (for the source machine), on which Oracle GoldenGate manager is configured and running. This is port number of the remote host.
- **Target (Local) Host Name:** This is the local host where Oracle Communications Data Model is being installed. The value is pre-populated and is a non-editable field.
- **Target (Local) Port Number:** Provide the port number of Oracle GoldenGate manager port, on which Oracle GoldenGate manager is configured and running. This is the port number of the local host where Oracle GoldenGate manager is running and Oracle Communications Data Model is being installed.

Click **Next**.

10. The **Specify OCDM Schema Information** page shows when you select to install the component, **Communications Data Model**. In this dialog specify where all of the data files that correspond to the Oracle Communications Data Model tablespace should reside:

- If you do *not* want to use the Automatic Storage Management (ASM) feature in Oracle Database, but instead want to explicitly specify a folder name, select **File System** and enter a folder name. You can click **Browse** to navigate to any valid local data file path.

Click **Next**.

- If you have stored your Oracle database files using the Automatic Storage Management (ASM) feature, and you also want store Oracle Communications

Data Model data files using ASM, select **Automatic Storage Management (ASM)**.

Click **Next**.

In the **Select ASM Disk Group** page, select the disk group in which you want to install the Oracle Communications Data Model data files.

Click **Next**.

11. The **Specify OCDM Sample Schema Information** page shows when you select to install the **Sample Reports**. In this dialog you specify where all of the data files that correspond to the Oracle Communications Data Model sample schemas should reside:

- If you do *not* want to use the Automatic Storage Management (ASM) feature in Oracle Database, but instead want to explicitly specify a folder name, select **File System** and enter a folder name. You can click **Browse** to navigate to any valid local data file path.

Click **Next**.

- If you have stored your Oracle database files using the Automatic Storage Management (ASM) feature, and you also want store Oracle Communications Data Model data files using ASM, select **Automatic Storage Management (ASM)**.

Click **Next**.

In the **Select ASM Disk Group** page, select the disk group in which you want to install the Oracle Communications Data Model data files.

Click **Next**. When you install the sample reports, the next page shows the installer Summary that summarizes the information that you specified, as shown in step 15.

12. In the **Specify Calendar Date Range** page, specify the calendar date range by providing values for **Start Date** and **Number of Years**. The installer uses this information to populate the calendar data. A recommended **Number of Years** value is 15 years. Specifying larger **Number of Years** values proportionally increases the time it takes to implement the partitioning portion of Oracle Communications Data Model install activity. The start year specified with **Start Date** should be the lowest possible dates from your historical data load (lowest possible CDR date typically). There is no easy method to incrementally extend the time dimension, so your initial choice for **Number of Years** should be specified to meet your needs for a reasonably long time.

Start Date must be in the format YYYY-MM-DD; for example, 2011-01-01 stands for January 1, 2011. **Number of Years** must be a whole number.

Note: These calendar dates have nothing to do with the number of years you will effectively keep the data. The calendar as such is totally independent of the Information Lifecycle Management process you may use.

Click **Next**.

13. In the **Specify Partitions for reference and base tables** page, specify the number of Second Level hash partitions for each entity, Organization, Company, Access Method, Account, and Contract. Specify a value for each field. If you enter an

invalid value the installer shows a dialog displaying the valid values. For each value you specify, you should choose a value that is a power of 2 (for example: 4, 8, 16, 32, 64 and so on).

Click **Next**.

14. In the **Specify Adapter Information** page, which shows in the **Application Adapter** install type, select the application adapter name, either **Billing and Revenue Management System (BRM)** or **Network Charging Control (NCC)**.

Click **Next**.

15. The installer summarizes the information that you specified. Check that this information is correct. If necessary, click **Back** to return to previous screens and make corrections. When you are satisfied with the information, click **Install**.
16. The Oracle Communications Data Model component or sample reports are installed. If there are any problems, messages are displayed. After the installation finishes, the end of installation screen appears. Click **Exit** to end the installer.

After you exit the installer, perform any necessary post-installation tasks described in ["Post-Installation Tasks"](#) on page 3-11. Then install the other components that you need to create an Oracle Communications Data Model warehouse, as described in [Chapter 4, "Installation of Additional Components."](#)

Silent Installation

A silent installation has no graphical output and no input by the user. It is accomplished by supplying Oracle Universal Installer with a response file and specifying the `-silent` flag on the command line. Use silent installation when you want the same installation parameter on more than one computer.

Selecting a Response File

Before performing a silent installation, you must provide information specific to your installation in a response file. The installer will fail if you attempt an installation using a response file that is not configured correctly. Response files are text files that you can create or edit in a text editor. The response file (`cdm.rsp`) is located in the `/response` directory in the directory that contains the Oracle Communications Data Model installation files. Edit the response file according to your requirements for silent installation. To use a response file, first copy it to your system.

Note: You must install Oracle Communications Data Model on the "localhost" where the database server is located. You can determine the value of your "localhost" by issuing the following command where `db-name` is the name of your Oracle database.

```
tnsname db-name
```

Editing the Response File

Use any text editor to edit the response file to include information specific to your system. You must specify values for variables in your response file. Each variable listed in the response file is associated with a comment, which identifies the variable type. For example:

```
string = "Sample Value"
Boolean = True or False
```

```
Number = 1000
StringList = {"StringValue 1", "String Value 2"}
```

The values that are given as `<Value Required>` must be specified for silent installation. Remove the comment from the variable values in the response file before starting the Oracle Communications Data Model installation.

Specifying a Response File and Starting the Installation

Before you specify a response file, ensure that all values in the response file are correct. To make Oracle Universal Installer use the response file at installation time, specify the location of the response file as a parameter when starting Oracle Universal Installer. To perform a silent installation, use the `-silent` parameter as follows:

```
./runInstaller -silent -responseFile absolute_path_and_filename
```

Caution: During installation, response files may be copied to subdirectories in the Oracle home. If you have provided passwords or other sensitive information in your response files, then for security purposes you should delete them after completing and verifying the installation.

Silent Installation Log Files

The success or failure of silent installations is logged in the `installActions.log` file. Additionally, the silent installation creates the `silentInstall.log` file. The log files are created in the `/oraInventory/logs` directory. The `silentInstallDate_Time.log` file contains the following line if the installation was successful:

```
The installation of Oracle Communications Data Model was successful.
```

The corresponding `installActionsDate_Time.log` file contains specific information regarding installation.

Security Tips for Silent Installations

The response file contains the installation password in clear text. To minimize security issues, follow these guidelines:

- Set the permissions on the response files so that they are readable only by the operating system user performing the silent installation.
- If possible, remove the response files from the system after the silent installation is completed.

Error Handling

Values for variables that are of the wrong context, format, or type are treated as if no value were specified. Variables that are outside any section are ignored. If you attempt a silent installation with an incorrect or incomplete response file, or if Oracle Universal Installer encounters an error, such as insufficient disk space, then the installation will fail.

Post-Installation Tasks

Once you have executed the Installer take the following steps to perform post-installation steps, cleanup, and configuration:

1. After you install Oracle Communications Data Model, obtain the IP Patch. The IP Patch includes additional documentation. To obtain the IP Patch and for the latest information about Oracle Communications Data Model patch sets, go to My Oracle Support at <https://support.oracle.com>.
2. Unlock the OCDM_SYS and OCDM_MINING accounts, as described in "Unlocking the OCDM_SYS and OCDM_MINING Accounts" on page 3-11.
3. If you installed the Oracle Communications Data Model sample reports, unlock the OCDM_SAMPLE account, as described in "Unlocking the OCDM_SAMPLE Account" on page 3-12.
4. If you installed the Oracle Communications Data Model sample reports, then recompile the OLAP Views, as described in "Recompiling OLAP Views" on page 3-12.
5. If you installed the Oracle Communications Data Model sample reports and you do not want users to make changes to the schemas, grant only select privileges to those users as described in "Limiting User Privileges When You have Installed the Sample Reports" on page 3-12.
6. Assign Grants to OCDM_MINING, as described in "Assigning Grants to OCDM_MINING" on page 3-12.
7. Configure the OLAP working environment, as described in "Configuring the Working OLAP Environment" on page 3-13.
8. If you want to use the Database Vault Option and disabled it before installation re-enable the options, as described in "Re-Enabling the Vault Option on the Database" on page 3-13.
9. Ensure that the Oracle Communications Data Model objects are valid, as described in "Ensuring That Oracle Communications Data Model Objects Are Valid" on page 3-14.
10. If necessary, change the values specified for PGA_AGGREGATE_TARGET and WORKAREA_SIZE_POLICY, as described in "Ensuring That PGA_AGGREGATE_TARGET is Set to the Proper Value" on page 3-14.
11. If you installed the Oracle Communications Data Model sample reports, install the BIEE 11g rpd and WebCat, as described in "Installing RPD and WebCat for Business Intelligence Suite Enterprise Edition" on page 3-15.
12. If you installed Application Adapters, perform the additional installation and configuration steps as described in Appendix A, "NCC Adapter Installation and Configuration" to complete the installation and configuration of the NCC Adapter.

After performing these tasks, install the other components that you need to create an Oracle Communications Data Model warehouse, as described in Chapter 4, "Installation of Additional Components."

Unlocking the OCDM_SYS and OCDM_MINING Accounts

At the end of the installation, the OCDM_SYS and OCDM_MINING accounts are locked. To unlock these accounts:

1. Log in the Database with a DBA id and password.

Note: The password is case sensitive.

2. Unlock the accounts by issuing the following SQL statements.

```
alter user ocdm_sys account unlock;  
alter user ocdm_mining account unlock;
```

Unlocking the OCDM_SAMPLE Account

At the end of the installation of the Oracle Communications Data Model sample reports, the OCDM_SAMPLE account is locked. To unlock this account:

1. Log in the Database with a DBA id and password.

Note: The password is case sensitive.

2. Unlock the account by issuing the following SQL statement.

```
alter user ocdm_sample account unlock identified by <password>;
```

Recompiling OLAP Views

After you unlock the ocdm_sample account, login with this account and execute the following statements to recompile the OLAP views in the sample schema:

```
ALTER VIEW CUST_RVN_VIEW_OLAPC COMPILE;  
ALTER VIEW CUST_RVN_VIEW_FIN COMPILE;
```

Limiting User Privileges When You have Installed the Sample Reports

By default, when you perform a Sample Reports type of Oracle Communications Data Model installation, the sample reports connect to OCDM_SYS schema directly. For security reason, you may want to grant only select privileges to users who will be working with these reports. To grant only select privileges, take the following steps:

1. Create a dedicated reporting user (for example, OCDM_Report).
2. Grant select privilege for all Oracle Communications Data Model tables required for reporting to the user you created in Step 1. The easy way is to grant the select privilege for all Oracle Communications Data Model tables, which start with one of the following prefixes: DWA, DWB, DWD, DWR, DWL.
3. Create a view (or synonym) in OCDM_Report schema, pointing to the OCDM_SYS tables.
4. In the Oracle Business Intelligence Suite Enterprise Edition repository, change the connection information to point to the new schema.

Assigning Grants to OCDM_MINING

Log in to the database using an ID that has been granted the system privilege with the ADMIN OPTION or that has been granted the GRANT ANY PRIVILEGE system privilege.

Configuring the Working OLAP Environment

To set up a working OLAP environment for an Oracle Communications Data Model warehouse, configure the database with the following parameter and configuration settings:

- Set `sga_target` to 35% of available memory.
- Set `pga_aggregate_target` to 35% of available memory
- Set `olap_page_pool_size=0`. (This specifies dynamic page pool.)
- Set `_olap_page_pool_hi=30` (that is, lower than default of 50).
- Set `_olap_parallel_update_threshold` and `_olap_parallel_update_small_threshold` to a high value (for example, ~2Gb. . . 2147483647). These settings turn off parallel update for the analytic workspace.
- Set `memory_max_target` to value greater than SGA and PGA settings. This is maximum amount of memory used for both SGA and PGA. The SGA and PGA settings specified are the minimum settings. (Note that failure to set `memory_max_target` leads to failure of instance startup (the next time these settings are validated which occurs if spfile had an older and distinct setting for `memory_max_target`).

The following statements illustrate changing these settings.

```
alter system set sga_target=1365M scope=spfile;
alter system set pga_aggregate_target=1365M scope=spfile;
alter system set memory_max_target=3030M scope=spfile;
alter system set olap_page_pool_size=0 scope=spfile;
alter system set "_olap_parallel_update_small_threshold"=2147483647 scope=spfile;
alter system set "_olap_page_pool_hi"=30 scope=spfile;
alter system set job_queue_processes=5 scope=spfile;
shutdown immediate;
startup;
```

Re-Enabling the Vault Option on the Database

If you are using the Database Vault Option and disabled it before installation as described in ["Disabling the Data Vault Option on the Database"](#) on page 3-4, re-enable the Vault option by taking the following steps:

1. Shutdown the Database, Database Control console process, and listener. For example on UNIX, ensure that the environment variables, `ORACLE_HOME`, `ORACLE_SID`, and `PATH` are correctly set. Log in to SQL*Plus as user `SYS` with the `SYSOPER` privilege and shut down the database. Then from the command line, stop the Database Control console process and listener. For example:

```
sqlplus sys as sysoper
Enter password: password
SQL> SHUTDOWN IMMEDIATE
SQL> EXIT
$ emctl stop dbconsole
$ lsnrctl stop listener_name
```

For Oracle RAC installations, shut down each database instance as follows:

```
$ srvctl stop database -d db_name
```

2. Enable the Oracle Database Vault option.

```
cd $ORACLE_HOME/rdbms/lib
```

```
make -f ins_rdbms.mk dv_on
make -f ins_rdbms.mk ioracle
```

3. Startup the Database, Database Control console process, and listener. For example, on UNIX, Log in to SQL*Plus as user SYS with the SYSOPER privilege and restart the database. Then from the command line, restart the Database Control console process and listener. For example:

```
sqlplus sys as sysoper
Enter password: password
SQL> STARTUP
SQL> EXIT
$ emctl start dbconsole
$ lsnrctl start listener_name
```

For Oracle RAC installations, restart each database instance as follows:

```
$ srvctl start database -d db_name
```

4. For Oracle RAC installations, repeat these steps for each node on which the database is installed.

Ensuring That Oracle Communications Data Model Objects Are Valid

To ensure that all Oracle Communications Data Model objects are valid, log in to the database with a DBA id and password and recompile all objects in OCDM_SYS and OCDM_MINING by issuing the following SQL statements:

```
exec utl_recomp.recomp_serial('OCDM_SYS');
exec utl_recomp.recomp_serial('OCDM_MINING');
```

Ensuring That PGA_AGGREGATE_TARGET is Set to the Proper Value

For good performance, you need to ensure that the PGA_AGGREGATE_TARGET is set to the proper value which depends on the physical RAM of your Database Server. You also need to ensure that the WORKAREA_SIZE_POLICY parameter is set to AUTO.

See: For information on tuning the PGA_AGGREGATE_TARGET initialization parameter, see *Oracle Database Performance Tuning Guide*.

Note: Setting PGA_AGGREGATE_TARGET to a nonzero value has the effect of automatically setting the WORKAREA_SIZE_POLICY parameter to AUTO.

Installing Oracle Business Intelligence Suite Enterprise Edition Catalog for Oracle Communications Data Model

Once Oracle Business Intelligence Suite Enterprise Edition is installed, follow these steps to install an Oracle Business Intelligence Suite Enterprise Edition catalog for Oracle Communications Data Model:

Tip: In these directions, replace *BIEE_HOME* with the name of the directory where Oracle Business Intelligence Suite Enterprise Edition is installed, and replace *BIEE_DATA_HOME* with the name of the directory where Oracle Business Intelligence Suite Enterprise Edition data is stored.

1. Add a definition for `ocdm_db` for the Oracle Communications Data Model repository to use when connecting to the database. Add this definition to the file `$ORACLE_HOME/network/admin/tnsnames.ora`:

```
ocdm_db =
(DESCRIPTION =
(AADDRESS = (PROTOCOL = TCP)(HOST = hostname.domain)(PORT = port-number))
(CONNECT_DATA =
(SERVER = DEDICATED)
(SERVICE_NAME = SID) # Change your SID, Hostname, and Listener PortNumber
)
)
```

Tip: Be careful to split these commands properly when you add them to the file; for example, do not add them as one long concatenated line of code.

Note: If you want to use another database name, you must change the `tnsname` in the Oracle Business Intelligence Suite Enterprise Edition repository. See the Oracle Business Intelligence Suite Enterprise Edition documentation for directions for defining a database connection in repository.

Installing RPD and WebCat for Business Intelligence Suite Enterprise Edition

If you installed the Oracle Communications Data Model Oracle sample reports, you need to deploy the Oracle Communications Data Model RPD and webcat on the Business Intelligence Suite Enterprise Edition 11g instance. For more information on deploying RPD and webcat in BIEE, see the *Oracle Fusion Middleware System Administrator's Guide for Oracle Business Intelligence Enterprise Edition*.

After you use the installer to install the sample reports you can find the `rpd` file and the `webcat` file in the directory `$ORACLE_HOME/ocdm/report`, in the following files:

`ocdm.rpd`

`ocdmwebcat.zip`

Before you deploy the webcat, you need to unzip `ocdmwebcat.zip`.

Perform the following steps to deploy the Oracle Communications Data Model `rpd` and `webcat`.

1. Use your browser to open the weblogic Enterprise Manager portal:

```
http://SERVERNAME:7001/em
```

Login with the weblogic admin ID and password.

Go to Business Intelligence --> coreapplication --> Deployment--> Repository and then deploy the `rpd` and `webcat`.

Notice that when you deploy the `rpd` you need to provide the `rpd` password, you can find Oracle Communications Data Model `rpd` password in IP patch. For information on obtaining the IP Patch, see the *Oracle Communications Data Model Release Notes*.

2. Use your browser to open the weblogic console portal:

`http://SERVERNAME:7001/console/login/LoginForm.jsp`

Login with your weblogic admin ID and password. Go to your security realm and create a user named "ocdm" and set a password for this user.

3. Following the instructions to "Refresh the User GUIDs" to update the GUIDs. For more information, see *Oracle Fusion Middleware Administrator's Guide*.

Installation of Additional Components

This chapter describes how to install Oracle components that you did not need to install before you installed the Oracle Communications Data Model component or sample reports, but that you will use when you are creating an Oracle Communications Data Model data warehouse:

- [Installing and Configuring Workflow](#)
- [Creating an Oracle Business Intelligence Suite Enterprise Edition Catalog](#)
- [Installing Analytic Workspace Manager](#)

Installing and Configuring Workflow

There are two ways to execute the Oracle Communications Data Model intra-ETL:

- Without using Oracle Warehouse Builder Workflow. In this case, you execute the following file:

```
$Oracle_Home/ocdm/pdm/relational/intra_etl/owb_exec/ocdm_execute_wf.sh
```

In this case, you do *not* need to install and configure Workflow as explained in this topic.

- Using Oracle Warehouse Builder Workflow. The Intra-ETL provided in Oracle Communications Data Model that populates your Oracle Communications Data Model data warehouse uses a process flow designed using the Oracle Warehouse Builder Workflow component.

In this case, before you can execute that intra-ETL you must perform the following tasks:

1. Install Oracle Warehouse Builder Workflow, as described in "[Installing Oracle Warehouse Builder Workflow](#)" on page 4-1.
2. Import the Oracle Communications Data Model intra-ETL into Workflow, as described in "[Importing Oracle Communications Data Model Intra-ETL into Workflow](#)" on page 4-2.
3. Configure Oracle Warehouse Builder Workflow to work with Oracle Communications Data Model, as described in "[Configuring Oracle Warehouse Builder Workflow](#)" on page 4-2.

Installing Oracle Warehouse Builder Workflow

To install Oracle Warehouse Builder workflow, take the following steps:

1. Go to `$ORACLE_HOME/owb/wf/install`

2. Execute `wfinstall.csh`

The Oracle Workflow Configuration Assistant opens.

3. Enter values for the Workflow account, Workflow, SYS password, and TNS Connect Descriptor.

For TNS Connect Descriptor, use the following syntax where you replace *local-host*, *port-number*, and *service-name* with the appropriate values.

```
(DESCRIPTION = (ADDRESS_LIST = (ADDRESS = (PROTOCOL = TCP) (HOST=local-host) (PORT = port-number))) (CONNECT_DATA = (SERVICE_NAME = service-name))
```

Click **Submit**.

Importing Oracle Communications Data Model Intra-ETL into Workflow

To import the Oracle Communications Data Model intra-ETL into Workflow, take the following steps:

1. Log into the Design Center of Oracle Warehouse Builder.
2. Select **File**, then **Import**, and then **Warehouse Builder Metadata**.
3. For file, specify the following value:

```
$ORACLE_HOME/ocdm/pdm/relational/intra_etl/owb/OCDM_Intra_ETL.mdl
```
4. Select **Import selected objects from file**, then click **Select Object**.
5. Select **OLAP_PFLW**, then click > (Continue).
6. Click **OK**.
7. Click **Import**.
8. After the import, you can see OLAP_PFLW under OCDM_INTRA_ETL project of Oracle Workflow.

Configuring Oracle Warehouse Builder Workflow

To configure Oracle Warehouse Builder workflow to work with Oracle Communications Data Model, take the following steps:

1. In the Design Center of Oracle Warehouse Builder, select **View**, and then **Location Navigator**.
2. Expand **Locations**, then **Process Flow and Schedules**, then **Oracle Workflow**.
3. Right click **OWF_LOCATION**, select **Open**.
4. Edit the connection information.
5. Click **Test Connection** to test the connection; if successful, click **OK**.

Creating an Oracle Business Intelligence Suite Enterprise Edition Catalog

The sample reports provided with Oracle Communications Data Model are created using the Oracle Business Intelligence Suite Enterprise Edition. In order to modify these reports or to use them as the basis for creating new reports you must have installed Oracle Business Intelligence Suite Enterprise Edition and have created an Oracle Business Intelligence Suite Enterprise Edition catalog for Oracle Communications Data Model.

Installing Oracle Business Intelligence Suite Enterprise Edition

If you installed Oracle Communications Data Model sample reports, you installed Oracle Business Intelligence Suite Enterprise Edition as a pre-installation step before you ran the installer. If you installed the Oracle Communications Data Model component rather than the sample reports, then install Oracle Business Intelligence Suite Enterprise Edition by following the instructions given in "[Oracle Business Intelligence Suite Enterprise Edition](#)" on page 1-3.

You also need to create a catalog. For more information, see "[Installing Oracle Business Intelligence Suite Enterprise Edition Catalog for Oracle Communications Data Model](#)" on page 3-14.

Tip: To check that Oracle Business Intelligence Suite Enterprise Edition is installed, follow the instructions in "[Confirming that Oracle Business Intelligence Suite Enterprise Edition is Installed](#)" on page 3-2.

Installing Analytic Workspace Manager

Although not required before you install Oracle Communications Data Model, you need to install the Analytic Workspace Manager to view and modify Oracle Communications Data Model OLAP cubes. Analytic Workspace Manager 11g is installed as a standalone product. The latest version of Analytic Workspace Manager is available at the Oracle OLAP home page at

<http://www.oracle.com/technetwork/database/options/olap/index.html>

Installation instructions are included in the documentation.

Backup, Recovery, and Deinstallation of Oracle Communications Data Model

This chapter explains how to deinstall Oracle Communications Data Model:

- [Backing Up and Recovering Oracle Communications Data Model](#)
- [Pre-Deinstallation Tasks](#)
- [Deinstallation Script Execution](#)
- [Post-Deinstallation Tasks](#)

Backing Up and Recovering Oracle Communications Data Model

Backing up and recovering Oracle Communications Data Model involves a two-step process to 1) backup or recover the relational objects, and 2) backup or recover the analytic workspace that is part of Oracle Communications Data Model. These steps are outlined in the following topics:

- [Exporting Oracle Communications Data Model](#)
- [Importing Oracle Communications Data Model](#)

Exporting Oracle Communications Data Model

Take the following steps to backup Oracle Communications Data Model:

1. Backup the OCDM_SYS and OCDM_MINING schemas by executing the expdp utility.

This utility exports all physical tables containing the data and trained mining models. For more information, see *Oracle Database Utilities*.

2. Backup the analytic workspace that is part of the Oracle Communications Data Model. The analytic workspace is backed up as an EIF file, named OCDM_BAK.EIF, which is generated under the *ORACLE_HOME/ocdm/pdm/olap* directory.
 - a. Connect to the Database with `ocdm_sys`.
 - b. Issue the following SQL statements.

```
exec dbms_aw.execute('AW ATTACH OCDM');
exec dbms_aw.execute('CDA OCDM_OLAP_DIR');
exec dbms_aw.execute('EXPORT ALL TO EIF FILE ', 'OCDM_BAK.EIF', '
NOTEMPDATA');
exec dbms_aw.execute('AW DETACH OCDM');
```

Importing Oracle Communications Data Model

Take the following steps to restore Oracle Communications Data Model from the backup files:

1. Restore the `OCDM_SYS` and `OCDM_MINING` schemas by executing the `impdp` utility.

This utility imports all physical tables containing the data and trained mining models. For more information, see *Oracle Database Utilities*.

2. Connect to the Database with `ocdm_sys`, and import the analytic workspace that was saved as an EIF file, named `OCDM_BAK.EIF`, under the `ORACLE_HOME/ocdm/pdm/olap` directory.

```
exec dbms_aw.execute('IMPORT ALL TO EIF FILE ', 'OCDM_BAK.EIF');
```

Overview: Deinstalling Oracle Communications Data Model

To deinstall Oracle Communications Data Model, you do *not* simply run Oracle Universal Installer in deinstall mode. Instead, you perform the following tasks:

1. Backup Oracle Communications Data Model, as described in "[Exporting Oracle Communications Data Model](#)" on page 5-1.
2. Stop any sessions that use the Oracle Communications Data Model schemas, as described in "[Pre-Deinstallation Tasks](#)" on page 5-2.
3. Execute the deinstallation script, as described in "[Deinstallation Script Execution](#)" on page 5-3.
4. If you are deinstalling the sample reports, perform the tasks described in "[Post-Deinstallation Tasks](#)" on page 5-3.

Note: To deinstall Oracle Communications Data Model, you do *not* simply run the Oracle Universal Installer in deinstall mode.

Pre-Deinstallation Tasks

The deinstallation script removes the `ocdm_sys` and `ocdm_mining` schemas. Consequently, before you run the deinstallation script, ensure that there are no active sessions that connect to either the `ocdm_sys` schema or the `ocdm_mining` schema.

Identifying if the `ocdm_sys` or `ocdm_mining` schemas are active

To identify if there are active sessions connecting to these schemas take the following steps:

1. Sign in as DBA.
2. Execute the following SQL statements:

```
select SID,SERIAL# from v$session where USERNAME='OCDM_SYS';  
select SID,SERIAL# from v$session where USERNAME='OCDM_MINING';
```

If either of these queries returns a session ID, then there is an active session.

Ending an active `ocdm_sys` or `ocdm_mining` schema session

To end an active session, execute the following statements in which you replace `sid` and `serial` are the session ID and serial number returned by the earlier queries.

```
alter system kill session 'sid,serial' ;
```

Deinstallation Script Execution

To execute the Oracle Communications Data Model deinstallation script:

1. Set the ORACLE_HOME to the location of the Database on which to deinstall Oracle Communications Data Model.

For example, suppose that Oracle Home is in the directory
/loc/app/oracle/product/dbhome

In a Bourne, Bash, or Korn shell, use these commands to set ORACLE_HOME:

```
$ ORACLE_HOME=/loc/app/oracle/product/dbhome
$ export ORACLE_HOME
```

In a C shell, use this command to set ORACLE_HOME

```
% setenv ORACLE_HOME /loc/app/oracle/product/dbhome
```

2. Execute the Oracle Communications Data Model deinstallation script:

```
$ORACLE_HOME/ocdm/ocdm_deinstall.sh
```

3. When prompted, enter the SYSTEM password.

The script de-configures Oracle Communications Data Model and executes the Oracle Universal Installer in deinstall silent mode.

If you are deinstalling the sample reports, after the deinstallation script runs, perform the tasks described in "[Post-Deinstallation Tasks](#)" on page 5-3.

Post-Deinstallation Tasks

If you are deinstalling the Oracle Communications Data Model sample reports, follow these steps to perform additional cleanup:

1. Delete ocdm.rpd in the directory *BIHome/Server/Repository*.
2. Delete the ocdmwebcat folder in *BIDataHome/web/catalog*.
3. Delete the following line from *BIHome/Server/Config/NQSConfig.INI*:

```
Star = ocdm.rpd, DEFAULT
```

NCC Adapter Installation and Configuration

This appendix shows how to install and set up the following:

- Oracle Communications Network Charging and Control Adapter for Oracle Communications Data Model (NCC Adapter)
- Oracle Data Integrator components to create an operational E-LT environment
- Oracle GoldenGate Extract and Replicat processes

This appendix includes the following sections:

- [Prerequisites for NCC Adapter Configuration](#)
- [Oracle Communications Data Model NCC Adapter Installation Overview](#)
- [Setting Up Staging Schema for Oracle Communications Data Model NCC Adapter](#)
- [Configuring Oracle Data Integrator for Oracle Communications Data Model NCC Adapter](#)
- [Setting Up Oracle GoldenGate for Oracle Communications Data Model NCC Adapter](#)

Note: The steps in this section can take a significant amount of time to complete.

The NCC Adapter that is installed with the Application Adapters type installation feeds pre-paid billing data from the Oracle Communications Network Charging and Control application to the Oracle Communications Data Model. The NCC Adapter includes an option to feed data in real-time using Oracle GoldenGate to the Oracle Communications Data Model staging layer, or to extract, load and transform the data in batch mode using Oracle Data Integrator.

Prerequisites for NCC Adapter Configuration

The following are prerequisites for installing the Oracle Communications Network Charging and Control Adapter for Oracle Communications Data Model (NCC Adapter):

- Before following the steps in this appendix you need to perform an Application Adapters installation, as described in "[Types of Installations Provided for Oracle Communications Data Model](#)" on page 2-1 and in "[Installer Execution](#)" on page 3-5.

- Before following the steps in this appendix, you need to install Oracle Data Integrator software. For more information, see ["Confirming that Oracle Data Integrator Enterprise Edition is Installed"](#) on page A-2.
- Before following the steps in this appendix, if select to use real-time feeds with Oracle GoldenGate, then you need to download the Goldengate software according to the NCC Adapter source database version and Oracle Communications Data Model target database version before starting this adapter installation. For more information, see ["Installing Oracle GoldenGate"](#) on page A-25.
- The installation and set up steps assume the following recommended Oracle Data Integrator configuration:
 - The Data Warehouse database schema is hosted on the same database instance as the ODI Repository.

Confirming that Oracle Data Integrator Enterprise Edition is Installed

To verify your Oracle Data Integrator Enterprise Edition installation, launch ODI Studio:

1. Select **Start Menu > All Programs > Oracle > Oracle Data Integrator > ODI Studio**.
2. In Designer Navigator, click **Connect To Repository...**

If Oracle Data Integrator Enterprise Edition is not installed, see ["Oracle Data Integrator Enterprise Edition"](#) on page 1-4.

Confirming that Oracle GoldenGate is Installed

If you install the Oracle Communications Network Charging and Control Adapter for Oracle Communications Data Model (NCC Adapter), using, installing, and configuring Oracle GoldenGate is optional depending on whether you want to use Real-time staging with the NCC Adapter.

If Oracle GoldenGate is not installed, see ["Oracle GoldenGate"](#) on page 1-4.

Oracle Communications Data Model NCC Adapter Installation Overview

This appendix includes instructions for setting up the staging database for data loading, transformation, and validation of source data. To begin working you need to set up ODI Master Repository and Work Repository and use Oracle Data Integrator (ODI) and optionally if you are using Oracle GoldenGate, you need to install and configure Oracle GoldenGate to perform real-time ETL.

- [Setting Up Staging Schema for Oracle Communications Data Model NCC Adapter](#)
- [Configuring Oracle Data Integrator for Oracle Communications Data Model NCC Adapter](#)
- [Setting Up Oracle GoldenGate for Oracle Communications Data Model NCC Adapter](#)

Setting Schema OCDM_SYS Reference Tables Load Values for NCC

Execute the following scripts in the Oracle Communications Data Model schema (OCDM_SYS) to insert unknown (-1) records into all reference tables to maintain

referential integrity between Oracle Communications Data Model tables with NCC source data.

Scripts Location:

```
"$NCC_OCDM_HOME/utl/disable_constraint.sql"
```

```
"$NCC_OCDM_HOME/utl/enable_constraint.sql"
```

```
"$NCC_OCDM_HOME/utl/insert_dummy_reference.sql"
```

```
"$NCC_OCDM_HOME/utl/disable_constraint_final.sql"
```

Connect to the OCDM_SYS schema from sqlplus, from "\$NCC_OCDM_HOME/utl" directory and execute the following scripts as follows:

```
SQL> @./disable_constraint.sql
```

```
SQL> @./enable_constraint.sql
```

```
SQL> @./insert_dummy_reference.sql
```

```
SQL> exec disb_cons;
```

```
SQL> exec insert_ref;
```

```
SQL> exec enab_cons;
```

```
SQL> @./disable_constraint_final.sql
```

The procedures do the following:

- `disb_cons`: disable all the constraints in Oracle Communications Data Model.
- `insert_ref`: insert one record with value -1 in all reference tables.
- `enab_cons`: enable all the disabled constraints.

The scripts in "disable_constraint_final.sql" disable some specific Oracle Communications Data Model FK constraints to insert NCC source data.

Setting Up Staging Schema for Oracle Communications Data Model NCC Adapter

The following describes the NCC Adapter staging schema:

- Staging Schema Creation (for example: `ncc_stg`)

Create staging schema (`ncc_stg`) by executing the following `create_ncc_stg.sql` file from sqlplus by connecting `sys/system` users:

Script Location: "\$NCC_OCDM_HOME/staging_install_ddl/create_ncc_stg.sql"

```
SQL> @./create_ncc_stg.sql
```

```
Creating Relational Schema and Granting required privileges
```

```
Enter value for user_name:ncc_stg
```

```
Enter value for password:ncc_stg
```

```
Connecting Target Schema (for example:OCDM_SYS)
```

```
Enter value for user_name: ocdm_sys
```

```
Enter value for password: passwd
```

- Staging Schema (`ncc_stg`) Objects

The `create_ncc_stg.sql` file executes the following files and creates the following objects in the `ncc_stg` schema and target `ocdm_sys` schema:

Staging Schema (`ncc_stg`) Objects:

Normal Staging Tables (Table name is same as source table name)

Previous Day Tables (**_LD)
 Delta Tables (**_DELTA)
 Delta History Tables (**_DELTA_H)
 Event Detail Record (EDR) Functions
 Event Detail Record (EDR) Types
 Event Detail Record (EDR) Views
 Staging load Procedures (post_staging_load, pre_ocdm_load & pre_staging_load)

Target Schema (ocdm_sys) Objects:

Update Churn Date Procedure (update_churn_date)
 Look Up Tables Load Procedure (Look_Up_load_One_Time)
 Reference Tables Update Procedures
 (update_acct,
 update_cnrt,
 update_cust,
 update_prod,
 update_prpd_vchr_instnc &
 update_sbrp)
 "

- Staging Schema (ncc_stg) Files

Staging Schema (ncc_stg) Objects Creation Files:

Scripts Location:

"\$NCC_OCDM_HOME/staging_install_ddl/ddl_rqd_tables_stg_delta.sql"
 "\$NCC_OCDM_HOME/staging_install_ddl/ddl_rqd_tables_stg_delta_h.sql"
 "\$NCC_OCDM_HOME/staging_install_ddl/ddl_rqd_tables_stg_ld.sql"
 "\$NCC_OCDM_HOME/staging_install_ddl/ddl_rqd_tables_stg_normal.sql"
 "\$NCC_OCDM_HOME/staging_install_ddl/edr_package.sql"
 "\$NCC_OCDM_HOME/staging_install_ddl/edr_types.sql"
 "\$NCC_OCDM_HOME/staging_install_ddl/edr_views.sql"
 "\$NCC_OCDM_HOME/staging_install_ddl/procedure_rqd_stg.sql"
 "\$NCC_OCDM_HOME/staging_install_ddl/procedure_rqd_trg.sql"
 "\$NCC_OCDM_HOME/staging_install_ddl/ddl_rqd_tables_stg_normal_pk.sql"
 "\$NCC_OCDM_HOME/staging_install_ddl/ddl_rqd_views_stg_normal.sql"
 "\$NCC_OCDM_HOME/staging_install_ddl/ogg_option_input_param_tab.sql"

Configuring Oracle Data Integrator for Oracle Communications Data Model NCC Adapter

Configuring Oracle Data Integrator for Oracle Communications Data Model includes the following steps:

- [Creating and Connecting to ODI Master Repository](#)
- [Creating and Connecting to ODI Work Repository](#)
- [Importing the ODI Master Repository](#)
- [Importing the ODI Work Repository](#)
- [Setting up the ODI Topology](#)
- [Configure Change Capture Using a Data Pump](#)

Creating and Connecting to ODI Master Repository

1. Open ODI Studio:

Start > Programs > Oracle > Oracle Data Integrator > ODI Studio

Figure A-1 Opening ODI Studio



2. Open the New Gallery:

File > New

In the New Gallery, in the **Categories** tree, select **ODI**.

Select from the **Items** list the **Master Repository Creation Wizard**.

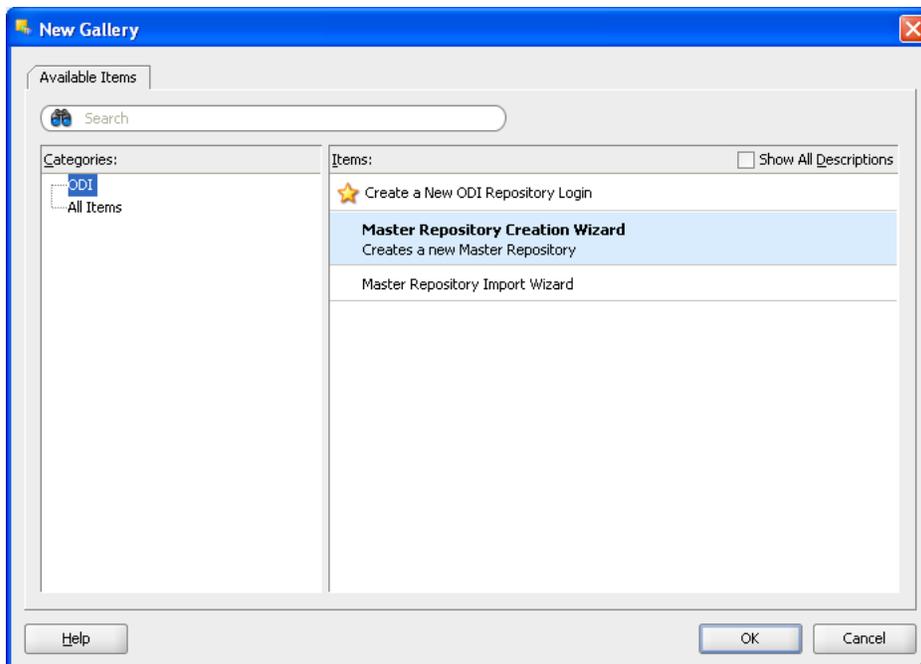
Click **OK**.

The Master Repository Creation Wizard appears.

Figure A-2 ODI Studio New Gallery



Figure A-3 ODI Studio New Gallery Create Master Repository



3. In the Master Repository Creation Wizard, select the browse icon of the JDBC Driver and then select Oracle JDBC Driver. Click **OK**.

Edit the JDBC URL to read: jdbc:oracle:thin:@localhost:1521:orcl

- Enter the User as `repo` and the Password as `password`.
- Click **Test Connection** and verify successful connection.
- Click **OK**.
- On the Master Repository Creation Wizard screen, Click **Next**.

Figure A-4 ODI Studio Master Repository Creation Wizard

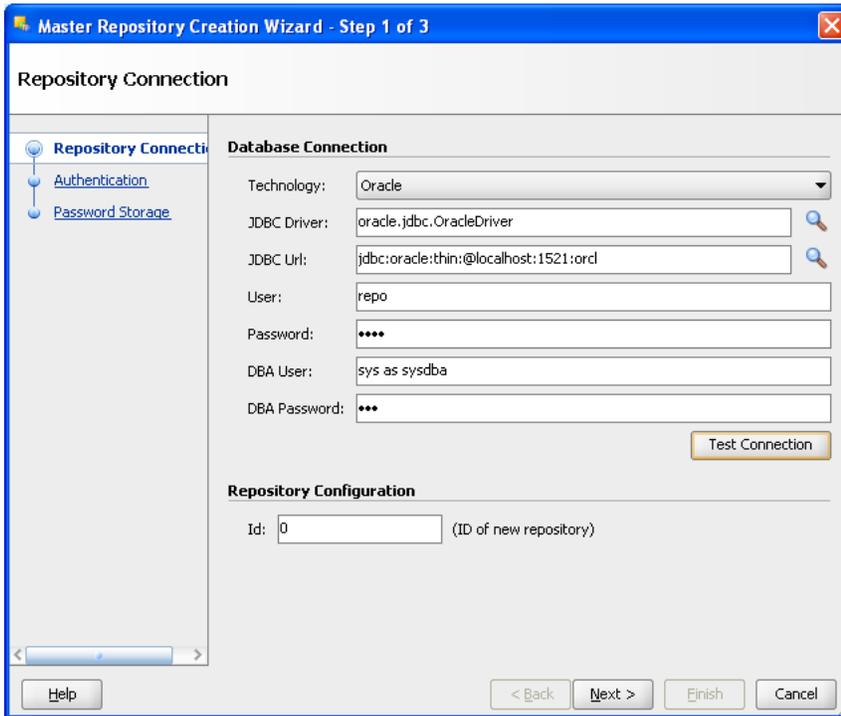
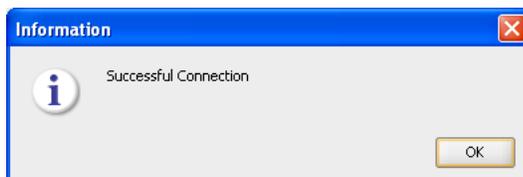


Figure A-5 ODI Studio Master Repository Successful Creation



4. In the Authentication window, enter Supervisor Password as `password`.
Enter `password` again to confirm the password.
Click **Next**.
Note: ODI User names and passwords are case-sensitive.

Figure A-6 ODI Studio Master Repository Creation Password

The screenshot shows the 'Master Repository Creation Wizard - Step 2 of 3' window. The title bar is blue with a close button. The window is titled 'Authentication'. On the left, there is a vertical pane with three items: 'Repository Connection', 'Authentication' (highlighted in blue), and 'Password Storage'. The main area contains instructions: 'Select the authentication mode that this master repository will use. Use ODI authentication to manage users using ODI's internal security system. Use External authentication if you wish to use an external enterprise identity store, such as Oracle Internet Directory, to manage user authentication.' There are two radio button options: 'Use ODI Authentication' (selected) and 'Use External Authentication'. Under 'Use ODI Authentication', there are three text input fields: 'Supervisor User:' with the value 'SUPERVISOR', 'Supervisor Password:' with masked characters '*****', and 'Confirm Password:' with masked characters '*****'. Under 'Use External Authentication', there are two empty text input fields for 'Supervisor User:' and 'Supervisor Password:'. At the bottom, there are four buttons: 'Help', '< Back', 'Next >', 'Finish', and 'Cancel'.

5. In the Password Storage window, select **Internal password Storage**, and then click **Finish**. When Master Repository is successfully created, you will see the Oracle Data Integrator Information message.
Click **OK**. The ODI Master repository is now created.

Figure A-7 ODI Studio Master Repository Creation Finish

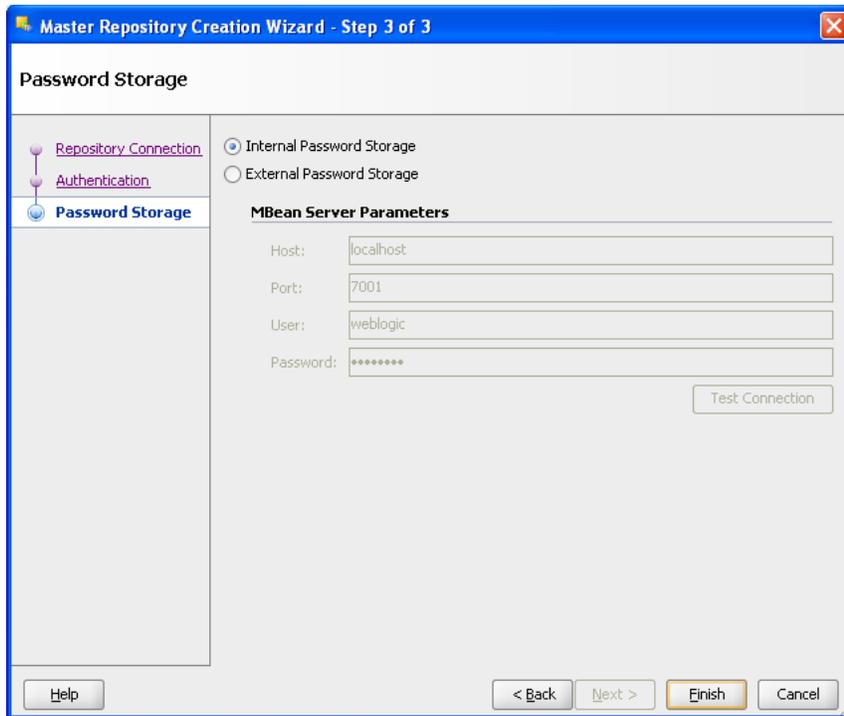
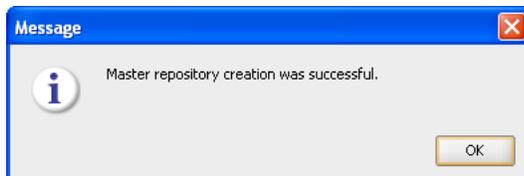
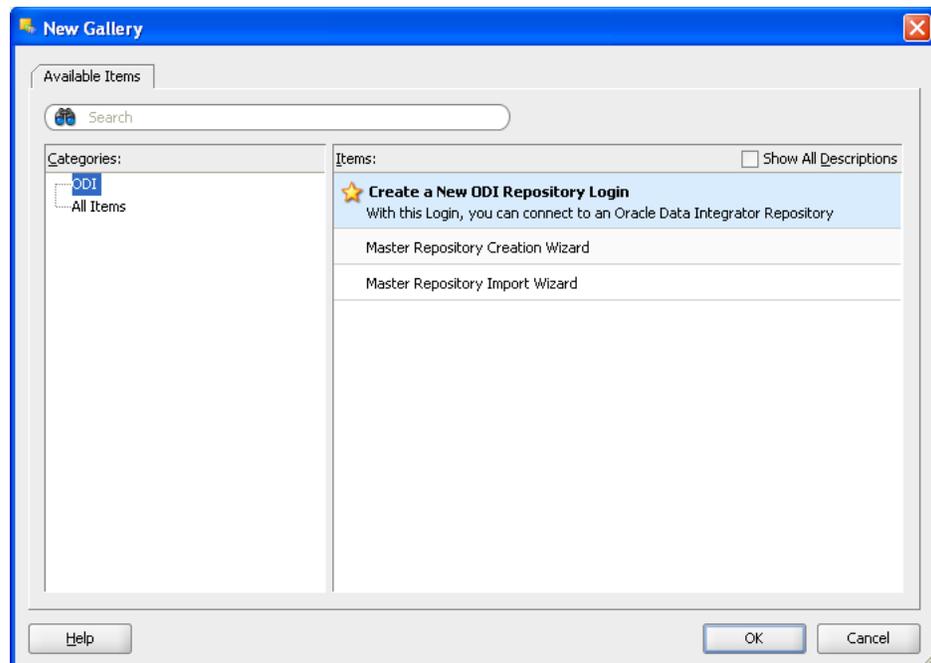


Figure A-8 ODI Studio Master Repository Creation Complete



6. You connect to the ODI Master repository by creating a new ODI Master Login. Open the New Gallery by choosing **File > New**. In the New Gallery, in the Categories tree, select **ODI**. From the Items list select **Create a New ODI Repository Login**.

Figure A-9 ODI Studio New Gallery ODI Repository Login



7. Configure Repository Connections with the parameters from the tables provided below. To enter the JDBC URL, click the button next to JDBC URL field and select `jdbc:oracle:thin:@<host>:<port>:<sid>` as shown in the screenshot, then edit the URL. Select Master Repository only button.
 Click **Test**.
 Verify successful connection and click **OK**.
 Click **OK** to save the connection.

Table A-1 Oracle Data Integrator Connection

Parameter	Value
Login Name	NCC Master Repository
User	SUPERVISOR
Password	<i>password</i>

Table A-2 Database Connection (Master Repository)

Parameter	Value
User	repo
Password	<i>password</i>
Driver List	Oracle JDBC Driver
Driver Name	oracle.jdbc.OracleDriver

Table A-2 (Cont.) Database Connection (Master Repository)

Parameter	Value
Url	jdbc:oracle:thin:@<system_name>:<listener port>:<SID> For example: jdbc:oracle:thin:@localhost:1521:orcl

Note: Do not copy and paste in the JDBC URL field. This may cause problems with entering a valid URL string. Instead, open the drop-down menu and select the correct driver from the list. Type the correct URL in the URL field.

Figure A-10 ODI Studio Repository Connection Information

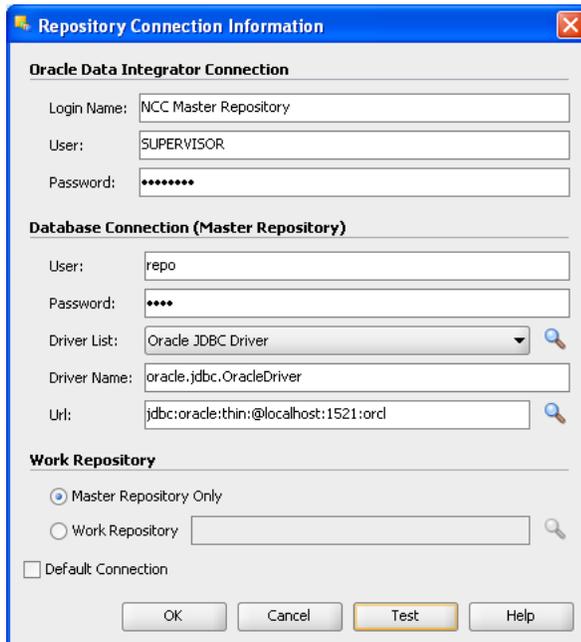
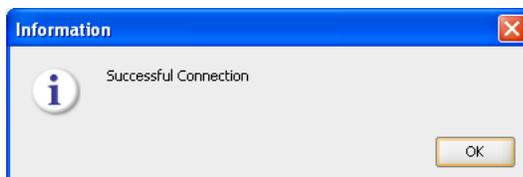


Figure A-11 ODI Studio Repository Connection Successful



- Click Connect to Repository. Select the newly created repository connection Master Repository from the drop-down list. Click OK. The ODI Topology Manager starts. You are now successfully logged in to the ODI Topology Manager.

Figure A–12 ODI Studio Connect to Repository



Figure A–13 Oracle Data Integrator Login

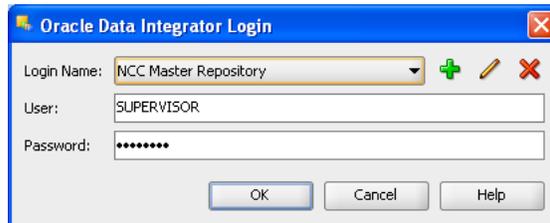
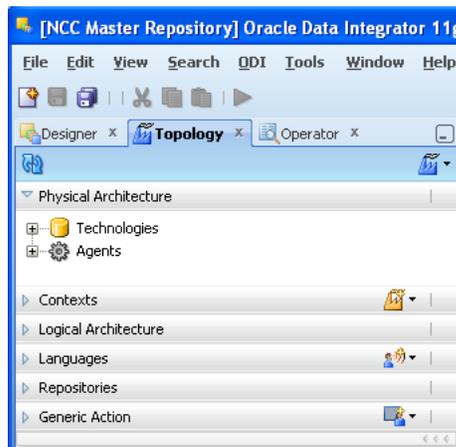


Figure A–14 Oracle Data Integrator NCC Master Repository Topology



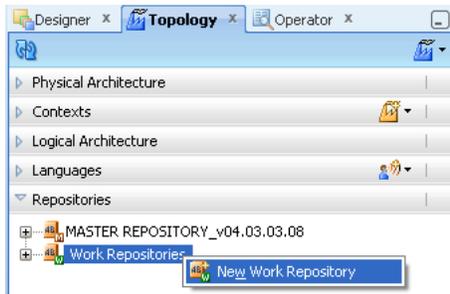
Creating and Connecting to ODI Work Repository

1. After you create the Oracle Database schema and user, use ODI Topology Navigator to create the ODI Work repository.

In ODI, click the **Topology Navigator** tab and then click **Repositories** panel. Right-click the **Work Repositories** node and select **New Work Repository**.

The Create Work Repository Wizard opens.

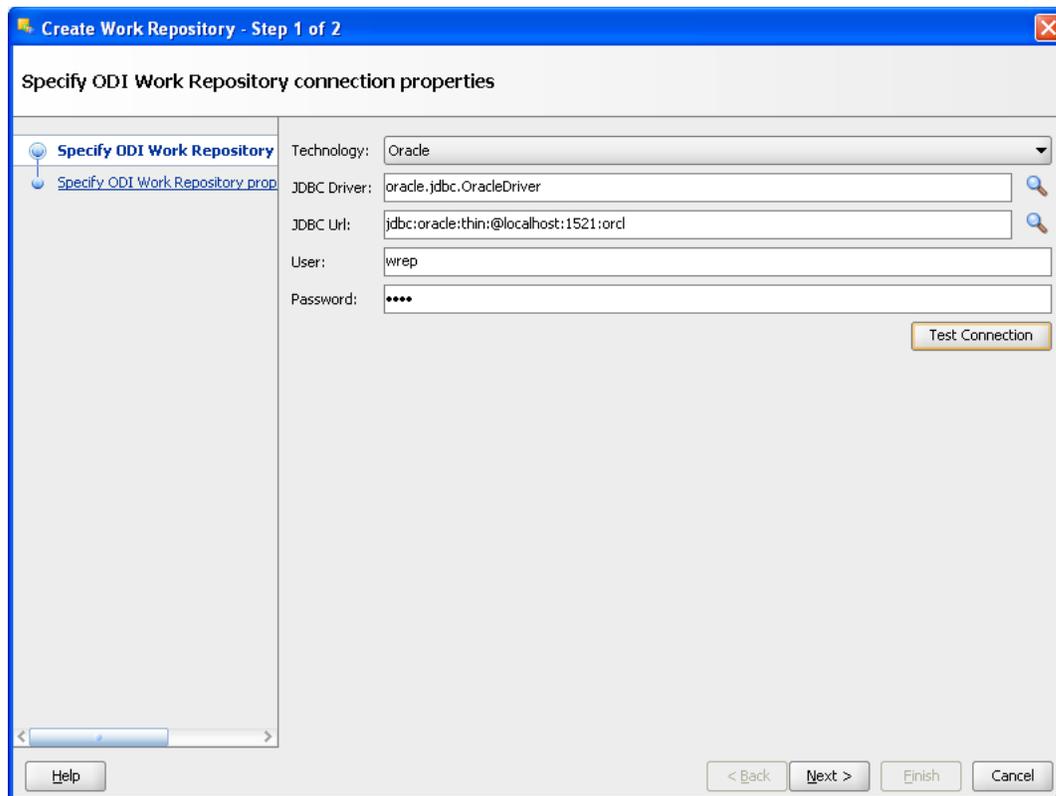
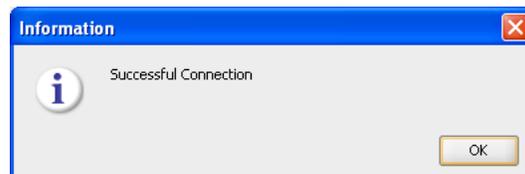
Figure A-15 ODI Topology Navigator New Work Repository



2. In the screen that follows, enter the parameters shown in [Table A-3](#).
 Click **Test** to verify a successful connection and click **OK**.
 Click **Next**.

Table A-3 New Work Repository Parameters

Parameter	Value
Technology	Oracle
Driver Name	oracle.jdbc.driver.OracleDriver
JDBC Url	jdbc:oracle:thin:@<system_name>:<listener port>:<SID> For example: jdbc:oracle:thin:@localhost:1521:orcl
User	wrep
Password	<i>password</i>

Figure A–16 ODI Studio Create Work Repository Test Connection**Figure A–17 ODI Repository Create Work Repository Successful Connection**

3. In the Specify ODI Work Repository properties page, set the following values:
 - Set **Id** to: 1.
 - Set **Name** to: WORKREP_NCC.
 - Enter **Password**: *password*.
 - In the **Work Repository Type** list, select **Development**.
 - Click **Finish**.

Figure A-18 ODI Studio Create ODI Work Repository Properties

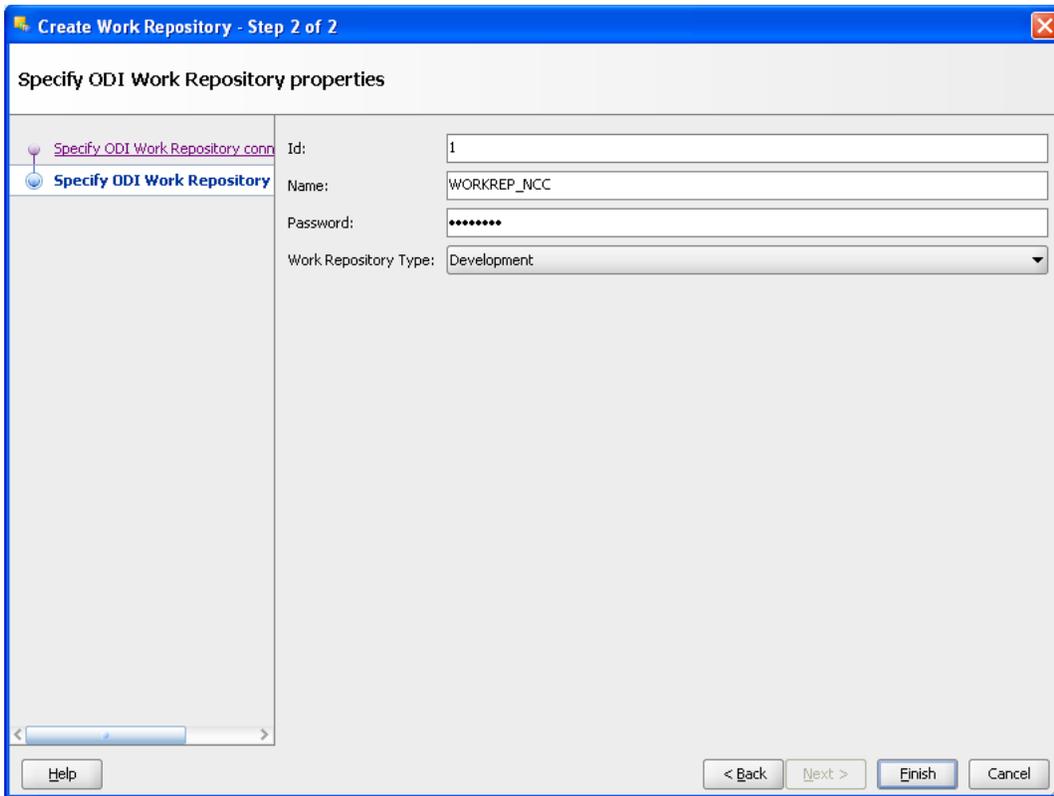
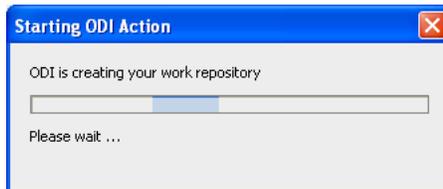


Figure A-19 ODI Studio Create ODI Work Repository Starting ODI Action



4. In the Create Work Repository Login window, click **Yes**.
 Enter the Login name: NCC Work Repository.
 Click **OK**.
 Verify that the newly created work repository is now in the work repositories tree view.

Figure A-20 ODI Studio Create ODI Work Repository Create Login

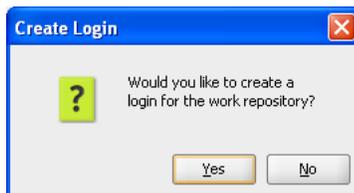


Figure A–21 ODI Studio ODI Work Repository Enter Login Name

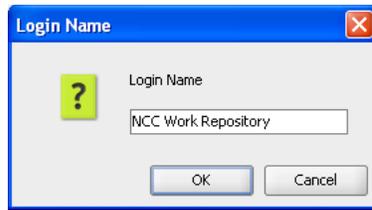


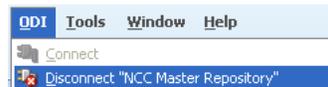
Figure A–22 ODI Studio ODI Work Repository Topology



5. Now you disconnect from the Master repository and connect to the Work repository.

Click **ODI** and select **Disconnect "NCC Master Repository"**.

Figure A–23 ODI Studio Disconnect from Master Repository



6. Click **Connect to Repository**.

From the Login Name drop-down list, select "NCC Work Repository".

Enter Password: *password*.

Click **OK**.

Click the **Designer** tab.

The ODI Designer screen appears as shown in [Figure A–24](#).

Figure A–24 ODI Studio Connect to Repository NCC Work Repository

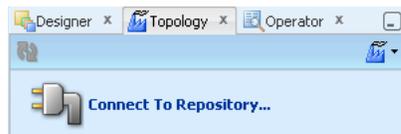
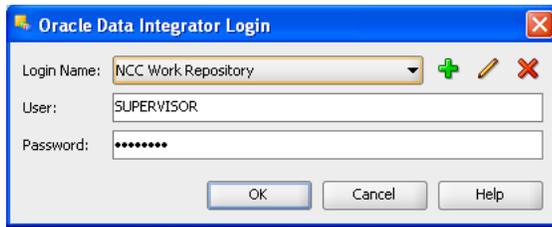


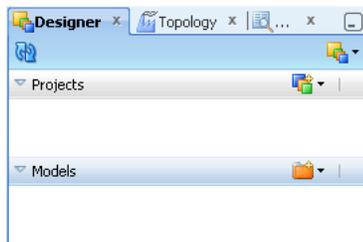
Figure A–25 ODI Studio Oracle Data Integrator Login



You have now successfully created and connected to the ODI Work repository.

7. If you check Designer tab no Projects and Models have existed in this work repository.

Figure A–26 ODI Studio Designer Tab



Importing the ODI Master Repository

The Master Repository Import and Export procedure allows you to transfer the whole repository, Topology and Security domains included, from one repository to another.

To import a master repository in an existing master repository:

1. From the Topology Navigator toolbar menu select **Import > Master Repository...**
2. Select the Import Mode and the import Folder or Zip File.
3. Click **OK**.

The specified file(s) are imported into the current master repository.

Figure A–27 ODI Studio Import Master Repository

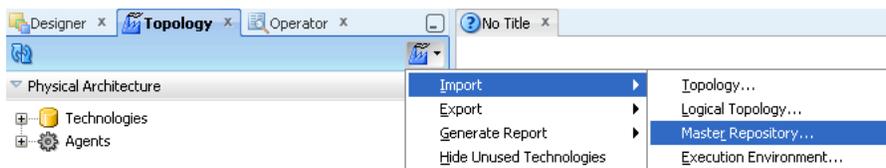


Figure A–28 ODI Studio Import Master Repository Mode and Options



Browse Master Repository from below specified location

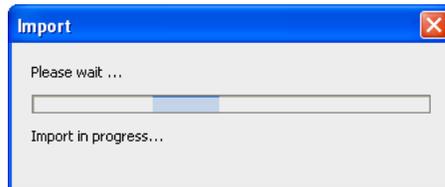
Repository Location:

"\$NCC_OCDM_HOME/odi_repository/ncc_ocdm_adapter_master.zip"

Figure A–29 ODI Studio Open and Import Master Repository



Figure A–30 ODI Studio Import Master Repository Progress



Check the Import Report and save this report by clicking **Save**.

Figure A–31 ODI Studio Import Master Repository Report

Object Type	Object Name	Imported As	Original ID	New ID After Import	Parent Type After Import	
Logical Schema	BRM_SRC_LS	BRM_SRC_LS	2000	2000	Technology	F
Logical Schema	BRM_STG_LS	BRM_STG_LS	5000	5000	Technology	C
Logical Schema	NCC_BE_LS	NCC_BE_LS	6000	6000	Technology	C
Logical Schema	NCC_CCS_LS	NCC_CCS_LS	10000	10000	Technology	C
Logical Schema	NCC_STG_LS	NCC_STG_LS	8000	8000	Technology	C
Logical Schema	OCDM_SYS_LS	OCDM_SYS_LS	4000	4000	Technology	C

Importing the ODI Work Repository

Importing or exporting a work repository allows you to transfer all work repository objects from one repository to another.

To import a work repository:

1. From the Designer Navigator toolbar menu select **Import > Work Repository...**
2. Select the Import Mode and the import Folder or Zip File.
3. Click **OK**.

The specified file(s) are imported into the work repository.

Figure A–32 ODI Studio Import Work Repository

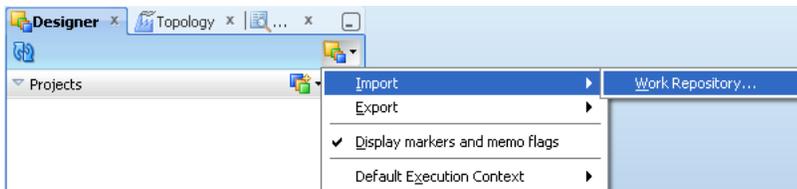
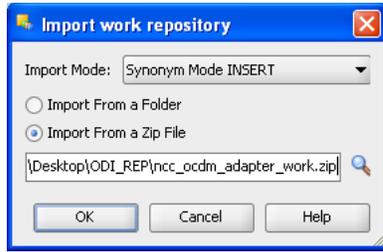


Figure A–33 ODI Studio Import Work Repository from Zip File



Browse Work Repository from the specified location:

\$NCC_OCDM_HOME/odi_repository/ncc_ocdm_adapter_work.zip

Figure A–34 ODI Studio Open Work Repository

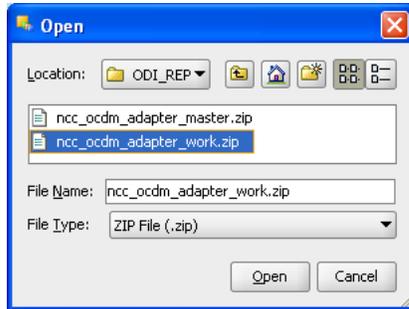


Figure A–35 ODI Studio Open and Import Work Repository Progress

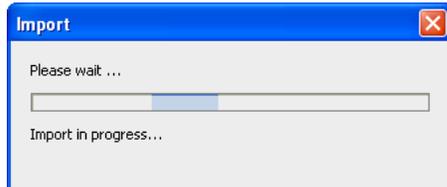
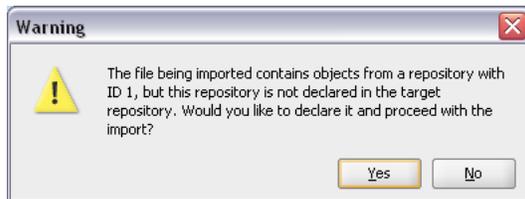


Figure A–36 ODI Studio Import Work Repository Warning



You can check the Import Report and you can save the report by clicking **Save**.

Figure A-37 ODI Studio Import Work Repository Report

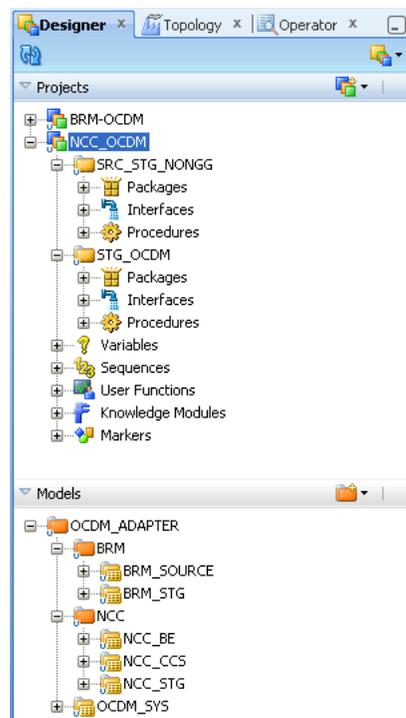
The screenshot shows a window titled "Import report" with a sub-header "Import Report". Below the sub-header, it says "Synonym Insert Update" and "Imported Objects". The main content is a table with the following columns: Object Type, Object Name, Imported As, Original ID, New ID After Import, Parent Type After Import, and Parent Name After Import. The table lists ten objects, including a Project and several Knowledge Modules.

Object Type	Object Name	Imported As	Original ID	New ID After Import	Parent Type After Import	Parent Name After Import
Project	NCC-OCDM	NCC-OCDM	7001	7001		
Marker Group	Priorities	Priorities	19001	19001	Project	NCC-OCDM
Marker Group	Progress	Progress	20001	20001	Project	NCC-OCDM
Marker Group	Smileys	Smileys	21001	21001	Project	NCC-OCDM
Knowledge Module	IKM SQL Control Append	IKM SQL Control Append	37001	37001	Project	NCC-OCDM
Knowledge Module	CKM Oracle	CKM Oracle	29001	29001	Project	NCC-OCDM
Knowledge Module	IKM Oracle Incremental Update (PL SQL)	IKM Oracle Incremental Update (PL SQL)	31001	31001	Project	NCC-OCDM
Knowledge Module	IKM SQL Incremental Update	IKM SQL Incremental Update	32001	32001	Project	NCC-OCDM
Knowledge Module	LKM SQL to Oracle	LKM SQL to Oracle	34001	34001	Project	NCC-OCDM

At the bottom of the window, there are "Save..." and "Close" buttons.

If you use the Designer tab Projects and Models you can view the projects and models that are in the work repository.

Figure A–38 ODI Studio Designer Tab Viewing Projects and Models



Setting up the ODI Topology

To set up the ODI Topology, do the following:

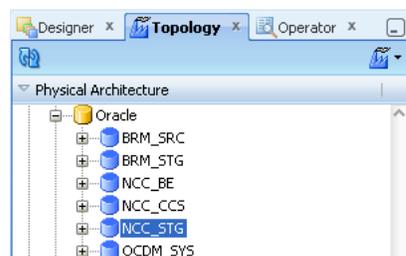
- [Setting up the Physical Data Servers](#)
- [Setting up the Physical Schema](#)
- [Setting up the Logical Data Servers](#)

Setting up the Physical Data Servers

To set up the Physical Data Servers:

1. From the Topology Navigator Display the Physical Architecture tab.
2. Expand the Technologies node.
3. Expand the Oracle node to display the Physical Data Servers.

Figure A–39 ODI Studio Physical Data Servers



4. Double-click the NCC_STG node to display the Data Server: <Name> dialog.

5. Display the Definition tab and enter the appropriate information, as described in Table A-4.

Figure A-40 ODI Studio Data Server Definition Dialog

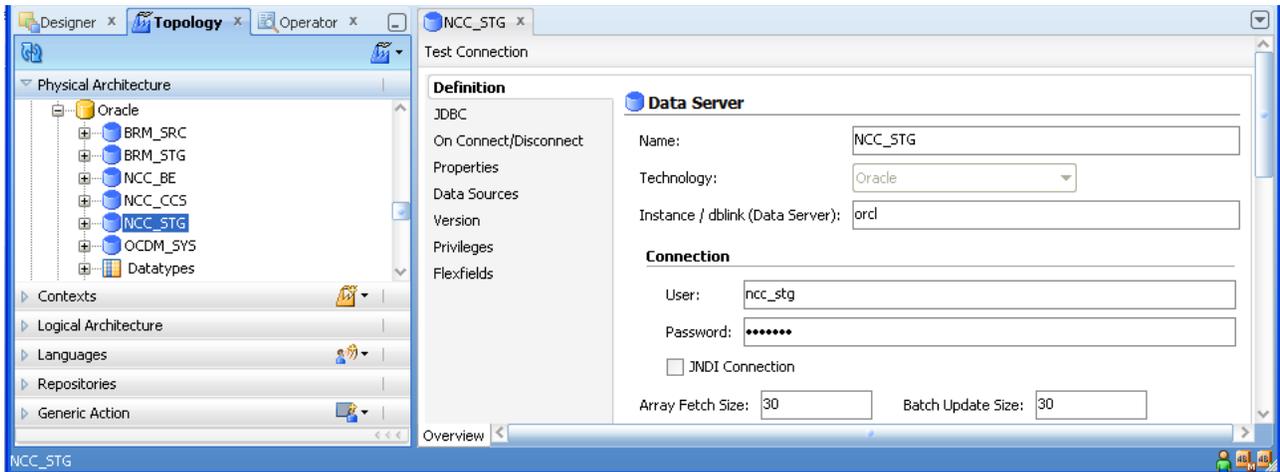


Table A-4 ODI Studio Data Server Definition Fields and Values

Field	Description
Name	Do not change name of the Data Server.
Technology	Do not change the default value Oracle.
Instance / dblink (Data Server)	Specify a database instance name. Use the Oracle SID name. For example, ORCL
User	Specify <User Name>. For example, ncc_stg This is the warehouse database user name.
Password	Specify <Password>. For example, ncc_stg This is default password for the warehouse database user name.
Array Fetch Size	Specify a value suitable to your environment (Do not change the default value).
Batch Update Size	Specify a value suitable to your environment (Do not change the default value).

6. Display the JDBC tab and enter the appropriate information, as described in Table A-5.

Figure A-41 ODI Studio Data Server JDBC Tab

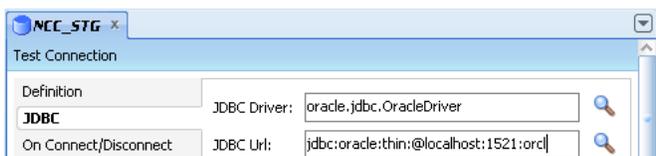
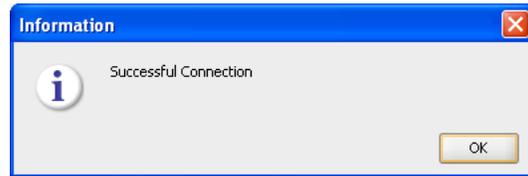


Table A-5 ODI Studio Data Server JDBC Tab Fields and Values

Field	Description
JDBC Driver	Specify oracle.jdbc.driver.OracleDriver.
JDBC Url	Specify in the format jdbc:oracle:thin:@<host>:<port>:<sid>. Replace <host>, <port> and <sid> with the values for the database hosting the ODI Repositories. For example, 'jdbc:oracle:thin:@localhost:1521:orcl'.

- Click Test to display the Test Connection for: <Connection> dialog.

Figure A-42 ODI Studio Data Server Test Connection



- Click the **Save** icon to save the details.

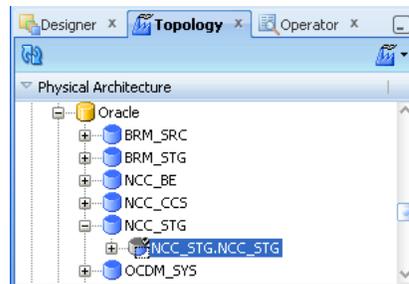
Note: Follow the same steps (1-8) to configure NCC_BE, NCC_CCS and OCDM_SYS Physical Data Servers.

Setting up the Physical Schema

To set up the Physical Schema for a Data Server:

- From the Topology Navigator Display the Physical Architecture tab.
- Expand the Technologies node.
- Expand the Oracle node to display the Physical Data Servers.
- Expand the Data Server node.

Figure A-43 ODI Studio Physical Architecture Data Server Node



- Double-click NCC_STG.NCC_STG to display the Physical Schema: <Name> dialog.
- Display the Definition tab and enter the appropriate information, as described in [Table A-6](#).

Figure A–44 ODI Studio Physical Schema Definition Tab

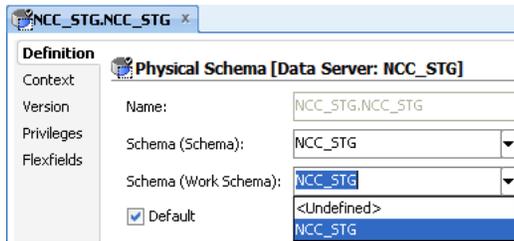


Table A–6 ODI Studio Physical Schema Definition Tab Properties and Values

Field	Description
Schema (Schema)	Make sure that <i><Physical Schema></i> is selected from the drop down list.(For example: NCC_STG)
Schema (Work Schema)	Make sure that <i><Physical Schema></i> is selected from the drop down list.(For example: NCC_STG)

Note: Do not change the other field values.

7. Click to save the details.

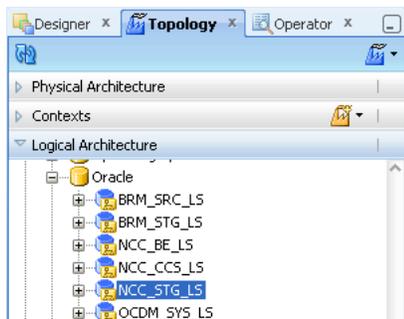
Note: Follow the same steps (1-7) to configure NCC_BE, NCC_CCS and OCDM_SYS Physical Schemas.

Setting up the Logical Data Servers

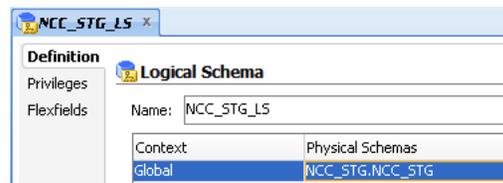
To set up the Logical Data Servers:

1. From the Topology Navigator Display the Logical Architecture tab.
2. Expand the Technologies node.
3. Expand the Oracle node to display the Logical Data Servers.

Figure A–45 ODI Studio Logical Architecture for Logical Data Server



4. Double-click the NCC_STG_LS node to display the Logical Data Server: *<Name>* dialog.
5. Display the Definition tab.
6. Edit the NCC_STG_LS Logical Data Server and ensure that for the appropriate Context (for example, Global, Development...), the value in the Physical Schemas column is set to NCC_STG.NCC_STG'(Physical Schema created in Physical Data Server).

Figure A-46 ODI Studio Logical Data Server Definition Tab for Logical Schema

7. Click the **Save** icon to save the details.

Note: Follow the same steps (1-7) to configure NCC_BE_LS, NCC_CCS_LS and OCDM_SYS_LS Logical Data Server.

Setting Up Oracle GoldenGate for Oracle Communications Data Model NCC Adapter

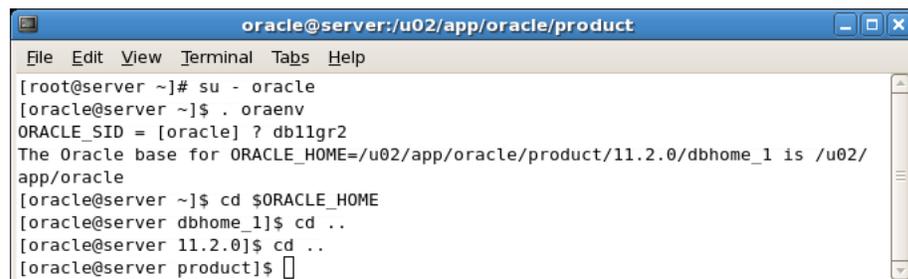
To set up Oracle GoldenGate for Oracle Communications Data Model, you perform the following steps:

- [Installing Oracle GoldenGate](#)
- [Configuring Oracle GoldenGate](#)

Installing Oracle GoldenGate

To install Oracle GoldenGate, do the following:

1. Change directory to the database installation path (For example: /u02/app/oracle/product).

Figure A-47 Changing Directory to the Oracle GoldenGate Installation Path

2. Create a directory named (gg) for installing Oracle GoldenGate under the product folder:

```
[oracle@server product]$ mkdir /u02/app/oracle/product/gg
```

Or manually create the folder (gg) by going directly in the product folder:

```

[oracle@server product]$ export GGATE= /u02/app/oracle/product/gg
[oracle@server product]$ cd $GGATE
[oracle@server gg]$

```

3. Copy the downloaded Oracle GoldenGate (for example: V22228-01.zip) into gg folder (for information on downloading Oracle GoldenGate, see "[Oracle GoldenGate](#)" on page 1-4).
4. Unzip the software in the folder using following command:

```
[oracle@server gg]$ unzip V22228-01.zip
```

5. After you unzip the file, use the .tar extension file to extract Oracle GoldenGate.

6. Tar the Oracle GoldenGate .tar file using the following command:

```
[oracle@server gg] tar -xf <filename>.tar
```

7. Now export the path to GG libraries to LD_LIBRARY_PATH using the command:

```
export LD_LIBRARY_PATH=$ORACLE_HOME/lib:/u02/app/oracle/product/gg
```

8. Now start the GG command line utility (ggsci):

```
[oracle@server gg]$ ./ggsci
```

This command connects you to the Oracle GoldenGate server.

For example:

```
Oracle GoldenGate Command Interpreter for Oracle Version 11.1.1.0.0 Build 078
Linux, x86, 32bit (optimized), Oracle 11 on Jul 28 2010 13:22:25 Copyright (C)
1995, 2010, Oracle and/or its affiliates. All rights reserved.
```

```
GGSCI (server.oracle.com) 1>
```

9. Create the necessary working directories for gg:

```
GGSCI (server.oracle.com) 1>create subdirs
GGSCI (server.oracle.com) 2>exit
[oracle@server gg]$ mkdir $GGATE/diroyb
[oracle@server gg]$ mkdir $GGATE/discard
```

10. After these steps Oracle GoldenGate is installed.

After Oracle GoldenGate is installed you prepare and configure the source and target database for Oracle GoldenGate Replication.

Configuring Oracle GoldenGate

To set up the Oracle GoldenGate Schema:

1. Switch the database server to archive log mode.

Note: Setting the database server to archivelog mode is recommended on a production system. This mode is not required for testing or for use on a development system.

Connect to sqlplus from oracle user:

```
[oracle@server dbhome_1]$ sqlplus / as sysdba
SQL>shutdown immediate
SQL>startup mount
SQL>alter database archivelog;
SQL>alter database open;
```

2. Enable minimal supplemental logging:

```
SQL>alter database add supplemental log data;
```

Figure A-48 Commands to Set Database Options for Oracle GoldenGate Configuration

```

oracle@server:/u02/app/oracle/product/11.2.0.1.0
File Edit View Terminal Tabs Help
[root@server ~]# su - oracle
[oracle@server ~]$ . oraenv
ORACLE_SID = [oracle] ? db11gr2
The Oracle base for ORACLE_HOME=/u02/app/oracle/pro
app/oracle
[oracle@server ~]$ cd $ORACLE_HOME
[oracle@server dbhome_1]$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.1.0 Production on Thu Apr
Copyright (c) 1982, 2009, Oracle. All rights reser

Connected to:
Oracle Database 11g Enterprise Edition Release 11.2
With the Partitioning, OLAP, Data Mining and Real A

SQL> shutdown immediate
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL> startup mount
ORACLE instance started.

Total System Global Area 1707446272 bytes
Fixed Size 1336988 bytes
Variable Size 1241516388 bytes
Database Buffers 452984832 bytes
Redo Buffers 11608064 bytes
Database mounted.
SQL> alter database archivelog;

Database altered.

SQL> alter database open;

Database altered.

SQL> alter database add supplemental log data;

Database altered.

SQL>

```

Switch log to start supplemental logging:

```
SQL> ALTER SYSTEM SWITCH LOGFILE;
SQL> ALTER SYSTEM SWITCH LOGFILE;
```

Verify supplemental logging is enabled (with the following command showing a result: 'YES').

```
SQL> SELECT SUPPLEMENTAL_LOG_DATA_MIN FROM V$DATABASE;
```

3. Prepare the database to support database replication. Turn off recyclebin for the database:

```
SQL>alter system set recyclebin=off scope=spfile;
```

4. Create the schema for ddl replication:

```
SQL>create user ggate identified by qwerty default tablespace users temporary
tablespace temp;
```

5. Grant necessary privileges to the new user:

```
SQL> grant connect,resource to ggate;
SQL> grant select any dictionary, select any table to ggate;
SQL> grant create table to ggate;
SQL> grant flashback any table to ggate;
SQL> grant execute on dbms_flashback to ggate;
SQL> grant execute on utl_file to ggate;
SQL> GRANT SELECT ANY TABLE, INSERT ANY TABLE, UPDATE ANY TABLE, DELETE ANY
TABLE TO GGATE;
SQL> Grant alter any table to ggate;
```

6. Exit SQL:

```
SQL>exit
```

Go to the following path and issue the following commands:

```
[oracle@server product]$ export GGATE= /u02/app/oracle/product/gg
[oracle@server product]$ cd $GGATE
```

These commands change the prompt to:

```
[oracle@server gg]$
```

Start sqlplus:

```
[oracle@server gg]$sqlplus '\ as sysdba'
```

7. Now run the supplied scripts and verify the creation of the necessary objects to support ddl replication:

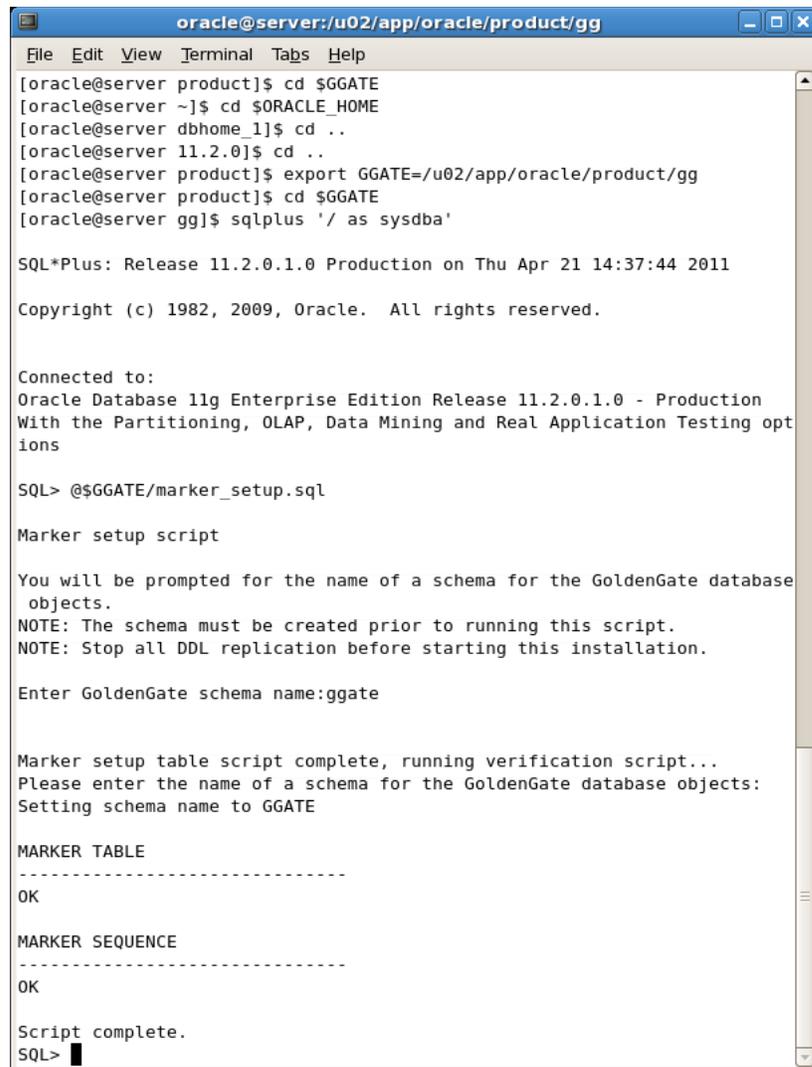
a. Run the script:

```
SQL> @$GGATE/marker_setup.sql
```

With this command you will be prompted for the name of the schema:

Enter the schema as: **ggate**

[Figure A-49](#) shows the screenshot for these steps.

Figure A-49 Configuring Oracle GoldenGate

```
oracle@server:/u02/app/oracle/product/gg
File Edit View Terminal Tabs Help
[oracle@server product]$ cd $GGATE
[oracle@server ~]$ cd $ORACLE_HOME
[oracle@server dbhome_1]$ cd ..
[oracle@server 11.2.0]$ cd ..
[oracle@server product]$ export GGATE=/u02/app/oracle/product/gg
[oracle@server product]$ cd $GGATE
[oracle@server gg]$ sqlplus '/ as sysdba'

SQL*Plus: Release 11.2.0.1.0 Production on Thu Apr 21 14:37:44 2011

Copyright (c) 1982, 2009, Oracle. All rights reserved.

Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - Production
With the Partitioning, OLAP, Data Mining and Real Application Testing opt
ions

SQL> @$GGATE/marker_setup.sql

Marker setup script

You will be prompted for the name of a schema for the GoldenGate database
objects.
NOTE: The schema must be created prior to running this script.
NOTE: Stop all DDL replication before starting this installation.

Enter GoldenGate schema name:ggate

Marker setup table script complete, running verification script...
Please enter the name of a schema for the GoldenGate database objects:
Setting schema name to GGATE

MARKER TABLE
-----
OK

MARKER SEQUENCE
-----
OK

Script complete.
SQL> █
```

b. Execute the script:

```
SQL> @$GGATE/ddl_setup.sql
```

Figure A–50 Oracle GoldenGate Configuration Running ddl_setup Script

```

oracle@server:/u02/app/oracle/product/gg
File Edit View Terminal Tabs Help

Marker setup table script complete, running verification script...
Please enter the name of a schema for the GoldenGate database objects:
Setting schema name to GGATE

MARKER TABLE
-----
OK

MARKER SEQUENCE
-----
OK

Script complete.
SQL> @$GGATE/ddl_setup.sql

GoldenGate DDL Replication setup script

Verifying that current user has privileges to install DDL Replication...
Checking user sessions...

There are 1 user sessions currently open (first 3 are shown):

PROGRAM
-----
OS_USER                                USERNAME
-----
SID          SER#          PID
-----
JDBC Thin Client
oracle
195          4          5195

IMPORTANT: Oracle sessions that used or may use DDL must be disconnected.
If you
continue, some of these sessions may cause DDL to fail with ORA-6508.

To proceed, enter yes. To stop installation, enter no.
Enter yes or no:yes
    
```

After entering the value: **Yes** you should see the values shown in [Figure A–51](#).

Figure A–51 Oracle GoldenGate Configuration Values from ddl_setup Script

```

You will be prompted for the name of a schema for the GoldenGate database
objects.
NOTE: For an Oracle 10g source, the system recycle bin must be disabled.
For Oracle 11g and later, it can be enabled.
NOTE: The schema must be created prior to running this script.
NOTE: Stop all DDL replication before starting this installation.

Enter GoldenGate schema name:ggate

You will be prompted for the mode of installation.
To install or reinstall DDL replication, enter INITIALSETUP
To upgrade DDL replication, enter NORMAL
Enter mode of installation:INITIALSETUP
    
```

After entering **INITIALSETUP** you see the result as shown in [Figure A–52](#).

Figure A-52 Oracle GoldenGate Configuration with Script Complete ddl_setup Screen

```

oracle@server:/u02/app/oracle/product/gg
File Edit View Terminal Tabs Help
-----
No errors
No errors

DDL TRIGGER INSTALL STATUS
-----
OK

DDL TRIGGER RUNNING STATUS
-----
ENABLED

STAYMETADATA IN TRIGGER
-----
OFF

DDL TRIGGER SQL TRACING
-----
0

DDL TRIGGER TRACE LEVEL
-----
0

LOCATION OF DDL TRACE FILE
-----
/u02/app/oracle/diag/rdbms/db11gr2/db11gr2/trace/ggs_ddl_trace.log

Analyzing installation status...

STATUS OF DDL REPLICATION
-----
SUCCESSFUL installation of DDL Replication software components

Script complete.
SQL>

```

- c. Enter the command to run the role_setup.sql script:

```
SQL> @$GGATE/role_setup.sql
```

- d. Enter the command to grant access to the GGS_GGUSER_ROLE:

```
SQL> grant GGS_GGSUSER_ROLE to ggate;
```

- e. Enter the command to run the ddl_enable.sql script:

```
SQL> @$GGATE/ddl_enable.sql
```

Follow the prompts as shown in [Figure A-53](#).

Figure A-53 Oracle GoldenGate Configuration for Scripts: role_setup.sql,

```

oracle@server:/u02/app/oracle/product/gg
File Edit View Terminal Tabs Help

STATUS OF DDL REPLICATION
-----
-----
SUCCESSFUL installation of DDL Replication software components

Script complete.
SQL> @$GGATE/role_setup.sql

GGS Role setup script

This script will drop and recreate the role GGS_GGSUSER_ROLE
To use a different role name, quit this script and then edit the params.s
ql script to change the gg_role parameter to the preferred name. (Do not
run the script.)

You will be prompted for the name of a schema for the GoldenGate database
objects.
NOTE: The schema must be created prior to running this script.
NOTE: Stop all DDL replication before starting this installation.

Enter GoldenGate schema name:ggate
Wrote file role_setup_set.txt

PL/SQL procedure successfully completed.

Role setup script complete

Grant this role to each user assigned to the Extract, GGSCI, and Manager
processes, by using the following SQL command:

GRANT GGS_GGSUSER_ROLE TO <loggedUser>

where <loggedUser> is the user assigned to the GoldenGate processes.
SQL> grant GGS_GGSUSER_ROLE to ggate;

Grant succeeded.

SQL> @$GGATE/ddl_enable.sql

Trigger altered.

SQL> █

```

- f. Connect to ggate user and check that the following 13 tables were created:

```

GGS_BF_CACHE
GGS_DDL_COLUMNS
GGS_DDL_HIST
GGS_DDL_HIST_ALT
GGS_DDL_LOG_GROUPS
GGS_DDL_OBJECTS
GGS_DDL_PARTITIONS
GGS_DDL_PRIMARY_KEYS
GGS_MARKER
GGS_SETUP
GGS_STICK
GGS_TEMP_COLS
GGS_TEMP_UK

```

Note: Follow the same steps in ["Installing Oracle GoldenGate"](#) on page A-25 and ["Configuring Oracle GoldenGate"](#) on page A-26 to install and configure Oracle GoldenGate in source systems (ncc_ccs and ncc_be) and the staging server (ncc_stg).

Oracle GoldenGate Process Checking Command Reference

Table A-7 provides a summary of Oracle GoldenGate process commands. Note: Run these commands from GGSCI.

Table A-7 Oracle GoldenGate Process Commands Summary

Process Area	Commands
To Start All Services	Manager: Start Manager Extract: Start Extract <Extract Group> Replicate: Start Replicat <Replicat Group> Extract & Replicat: Start ER *
To Stop All Services	Manager: Stop Manager Extract: Stop Extract <Extract Group> Replicate: Stop Replicat <Replicat Group> Extract & Replicat: Stop ER *
To Check Services Status	All Services: Info All Manager: Info Mgr Extract: Info Extract <Extract Group> Replicate: Info Replicat <Replicat Group>
To View Report	Extract: View Report <Extract Group> Replicate: View Report <Replicat Group>

Configure Change Capture Using a Data Pump

The goals of this method are to:

- Configure and add the Extract process that will capture changes
- Add the local trail that will store these changes
- Configure and add a data pump Extract to read the local trail and create a remote trail on the target
- Add the remote trail
- Start the two Extract processes

Configure the Primary Extract and Data Pump

Add the Extract group and data pump Extract group

On the src_ccs Source System:

Execute the following command on the CCS <source> system to define an Extract group named ext1 and to define a data pump Extract named dpump to pull data from the local GoldenGate trail and route these changes to GoldenGate on the target:

```
[oracle@server gg]$ $GGATE/./ggsci paramfile $GGATE/diroby/ncc_ogg_src_cdc_cmd_101_sms.oby
```

On the be_ccs Source System:

Execute the following command on the BE <source> system to define an Extract group named ext1 and to define a data pump Extract named dpump to pull data from the local GoldenGate trail and route these changes to GoldenGate on the target:

```
[oracle@server gg]$ $GGATE/./ggsci paramfile $GGATE/diroby/ ncc_ogg_src_cdc_cmd_102_vws.oby
```

Note: In a non Oracle RAC environment, the THREADS parameter can be omitted or the THREADS *<instances>* can be set to 1.

Configure Change Delivery

Add the Replicat group

Execute the following command on the *<staging>* system to add delivery groups named rep1 and rep2:

```
[oracle@server gg]$ $GGATE/./ggsci paramfile $GGATE/diroby/ ncc_ogg_stg_cdc_cmd.oby
```

Note: Refer to your Extract set up for the correct two-character *<trail id>*.

Start the Extract Processes

Start the primary Extract process and data pump Extract process:

Execute the following command on the *<source>* systems:

On the src_ccs Source System:

```
[oracle@server gg]$ $GGATE/./ggsci paramfile $GGATE/diroby/ncc_ogg_src_cdc_start_cmd_101.oby
```

On the be_ccs Source System:

```
[oracle@server gg]$ $GGATE/./ggsci paramfile $GGATE/diroby/ncc_ogg_src_cdc_start_cmd_102.oby
```

Start the Replicat Process

Execute the following command on the *<staging>* system.

```
[oracle@server gg]$ $GGATE/./ggsci paramfile $GGATE/diroby/ncc_ogg_stg_cdc_start_cmd.oby
```

BRM Adapter Installation and Configuration

This appendix shows how to install and set up the following:

- Oracle Communications Billing and Revenue Management Adapter for Oracle Communications Data Model (BRM Adapter)
- Oracle Data Integrator components to create an operational E-LT environment
- Oracle GoldenGate Extract and Replicat processes

This appendix includes the following sections:

- [Prerequisites for BRM Adapter Configuration](#)
- [Installation Overview for BRM Adapter](#)
- [Setting Schema OCDM_SYS Reference Tables Load Values for BRM Adapter](#)
- [Setting Up Staging Schema for BRM Adapter](#)
- [Configuring Oracle Data Integrator for BRM Adapter \(Non Oracle GoldenGate Option\)](#)
- [Setting Up Oracle GoldenGate for BRM Adapter](#)
- [Troubleshooting the Installation of the BRM Adapter](#)

Note: The steps in this appendix can take a significant amount of time to complete.

The BRM Adapter can be installed with the Oracle Communications Data Model Application Adapters type installation. The BRM Adapter includes an option to feed data in real-time using Oracle GoldenGate to the Oracle Communications Data Model staging layer, or to extract, load and transform the data in batch mode using Oracle Data Integrator.

Prerequisites for BRM Adapter Configuration

The following are prerequisites for installing the Billing and Revenue Management to Oracle Communication Data Model Adapter:

- Before following the steps in this appendix you need to perform an Application Adapters installation, as described in "[Types of Installations Provided for Oracle Communications Data Model](#)" on page 2-1 and in "[Installer Execution](#)" on page 3-5.

- Before following the steps in this appendix, you need to install Oracle Data Integrator software. For more information, see.
- Before following the steps in this appendix, if you decide to use real-time feeds with Oracle GoldenGate, then you need to download the Oracle GoldenGate software according to the Adapter source database version and Oracle Communications Data Model target database version. For more information, see ["Installing Oracle GoldenGate on Target for BRM Adapter"](#) on page B-27.
- The installation and set up steps assume the following recommended Oracle Data Integrator configuration:
 - The Data Warehouse database schema is hosted on the same database instance as the ODI Repository.

Confirming that Oracle Data Integrator Enterprise Edition is Installed

To verify your Oracle Data Integrator Enterprise Edition installation, launch ODI Studio:

1. Select **Start Menu > All Programs > Oracle > Oracle Data Integrator > ODI Studio**.
2. In Designer Navigator, click **Connect To Repository...**

If Oracle Data Integrator Enterprise Edition is not installed, see ["Oracle Data Integrator Enterprise Edition"](#) on page 1-4.

Confirming that Oracle GoldenGate is Installed

If you install the Billing and Revenue Management to Oracle Communication Data Model Adapter (BRM Adapter), using, installing, and configuring Oracle GoldenGate is optional depending on whether you want to use Real-time staging with the BRM Adapter.

If Oracle GoldenGate is not installed, see ["Oracle GoldenGate"](#) on page 1-4.

Installation Overview for BRM Adapter

To install and set up the Billing and Revenue Management to Oracle Communication Data Model Adapter, Oracle GoldenGate Extract and Replicat process, and Oracle Data Integrator components to create an operational E-LT environment. Perform the tasks in this appendix sequentially.

This appendix includes instructions for setting up the staging database for data loading, transformation, and validation of source data. To begin working you need to set up ODI Master Repository and Work Repository and use Oracle Data Integrator (ODI) and optionally if you are using Oracle GoldenGate, you need to install and configure Oracle GoldenGate to perform real-time ETL.

Notes:

- Before following the steps in this appendix, you must have installed the Oracle Data Integrator software.
- The installation and set up steps in this chapter assume the following recommended ODI configuration:
- The ODI Master Repository database schema is created in same database instance.
- The ODI Work Repository database schema is created in same database instance.

- The Data Warehouse database schema is hosted on the same database instance as the ODI Repository.

Oracle Communications Data Model Adapter Installation Overview:

The following steps explain how to install Billing and Revenue management (BRM) to Oracle Communication Data Model Adapter. These steps include setting up the staging database for data loading, transformation, and validation of source data. Before you begin installing the BRM Adapter, you need to set up the ODI Master Repository and Work Repository.

Use Oracle Data Integrator (ODI) and Oracle GoldenGate together to perform real-time ETL.

Oracle Communications Data Model Adapter Installation Steps:

1. [Setting Schema OCDM_SYS Reference Tables Load Values for BRM Adapter](#)
2. [Setting Up Staging Schema for BRM Adapter](#)
3. [Configuring Oracle Data Integrator for BRM Adapter \(Non Oracle GoldenGate Option\)](#)
4. [Setting Up Oracle GoldenGate for BRM Adapter](#)

Setting Schema OCDM_SYS Reference Tables Load Values for BRM Adapter

While running the `create_brm_stg.sql` script, the script creates the desired reference tables and scripts that are required for the target schema (OCDM_SYS).

Setting Up Staging Schema for BRM Adapter

Staging Schema Creation (using the example, `brm_stg`).

Create staging schema (`brm_stg`) by executing the script `create_brm_stg.sql` from sqlplus by connecting as `sys/system` user:

Script Location: `$BRM_OCDM_HOME/staging_install_ddl/create_brm_stg.sql`

```
SQL> @./create_brm_stg.sql
Creating Relational Schema and Granting required privileges
Enter value for user_name: brm_stg [Depends on stage-schema name of the user]
Enter value for password: passwd
```

```
Connecting Target Schema (OCDM_SYS)
Enter value for user_name: ocdm_sys
Enter value for password: passwd
```

The `create_brm_stg.sql` file executes and creates the following objects and files in the `brm_stg` and `ocdm_sys` schemas.

Staging Schema (`brm_stg`) Objects Created:

- Normal Staging Tables (Table name is same as source table name)
- Previous Day Tables (**_LD)
- Delta Tables (**_D)
- Delta History Tables (**_D_H)

- Input Parameter Table (BRM_MAPPING_TAB)
- Staging Function (UTC_TO_ORACLE)
- Staging load Procedures (pre_staging_load, post_staging_load, pre_ocdm_load.sql)
- Staging Views (EVENT_BILLING_PAYMENT_T_MAP_VW, SERVICE_T_MAP_VW, ADDRESS_VW, EVENT_BAL_IMPACT_COLL_VW)
- Date Parameter Table (BRM_ETL_PARAMETER)
- Grant Scripts

Note: This assumes a daily update. However, the same tables will be used for a lower or higher update frequency, up to real-time change.

Target Schema (ocdm_sys) Objects Created:

Table B-1 ocdm_sys Objects Created

Procedures

DEL_OCDM
DISB_CONS
ENAB_CONS
GEO_CITY_MAP
GEO_CNTRY_MAP
GEO_STATE_MAP
INSERT_REF
POSTCD_MAP
UPDATE_ACCT_ACCT
UPDATE_ACCT_BILLINFO
UPDATE_ACCT_PREF_PYMT_MTHD
UPDATE_ADDR_LOC
UPDATE_BASE_PROD_KEY
UPDATE_CUST
UPDATE_CUST_FCNG_SRVC
UPDATE_PROD
UPDATE_PROD_MKT_PLN
UPDATE_PROD_RTNG_PLN
UPDATE_PRTY
UPDATE_PRTY_FOR_CUST
UPDATE_SBRP
UPDATE_SBRP_CHRGS
UPDATE_SRVC_SPEC

UTC_TO_ORACLE Function:

Plus the UTC to Oracle Date function: UTC_TO_ORACLE

Staging and Target Schemas (brm_stg and ocdm_sys) Object Creation (files created in directory \$BRM_OCDM_HOME/staging_install_ddl):

Table B-2 Script Files Created

Files Created

brm_disable_constraint.sql
 brm_map_tab.sql
 brm_views.sql
 ddl_rqd_tables_stg_delta.sql
 ddl_rqd_tables_stg_delta_h.sql
 ddl_rqd_tables_stg_ld.sql
 ddl_rqd_tables_stg_normal.sql
 del_ocdm.sql
 disabled_constraint.sql
 enabled_constraint.sql
 etl_parameter.sql
 grant_script.sql
 index_on_stage_tables.sql
 insert_brm_mapping_tab.sql
 insert_ref.sql
 insert_script.sql
 ocdm_procedures.sql
 post_staging_load.sql
 pre_ocdm_load.sql
 pre_staging_load.sql
 scd2_update.sql
 utc_to_oracle.sql
 utc_to_oracle.sql

Configuring Oracle Data Integrator for BRM Adapter (Non Oracle GoldenGate Option)

Configuring Oracle Data Integrator for Oracle Communications Data Model use with the BRM Adapter includes the following steps:

- [Creating and Connecting to ODI Master Repository](#)
- [Creating and Connecting to ODI Work Repository](#)
- [Importing the ODI Master Repository](#)
- [Importing the ODI Work Repository](#)
- [Setting up the ODI Topology](#)

Creating and Connecting to ODI Master Repository

Connect to DBA user / as sysdba.

```
SQL>/ as sysdba
```

You have to create the RDBMS schema/user (Oracle 11g) for the Master and Work repositories. The schemas can be created by executing the following SQL commands:

```
SQL> create user repo identified by repo default tablespace users temporary
tablespace temp;
```

```
SQL> create user wrep identified by wrep default tablespace users temporary
tablespace temp;
```

Grant connect privileges to the newly created users by executing these SQL commands:

```
SQL> grant connect, resource to repo;
```

```
SQL> grant execute on dbms_lock to repo;
```

```
SQL> grant connect, resource to wrep;
```

```
SQL> grant execute on dbms_lock to repo;
```

Note that the users shown are just examples. You can choose whatever user you want; just and make sure you use the same user when you create repositories and log-in information for the ODI.

1. Open ODI Studio, as shown in [Figure B-1](#):

Start > Programs > Oracle > Oracle Data Integrator > ODI Studio

Figure B-1 Opening ODI Studio



2. Open the New Gallery as shown in [Figure B-2](#):

File > New

In the New Gallery, in the **Categories** tree, select **ODI**.

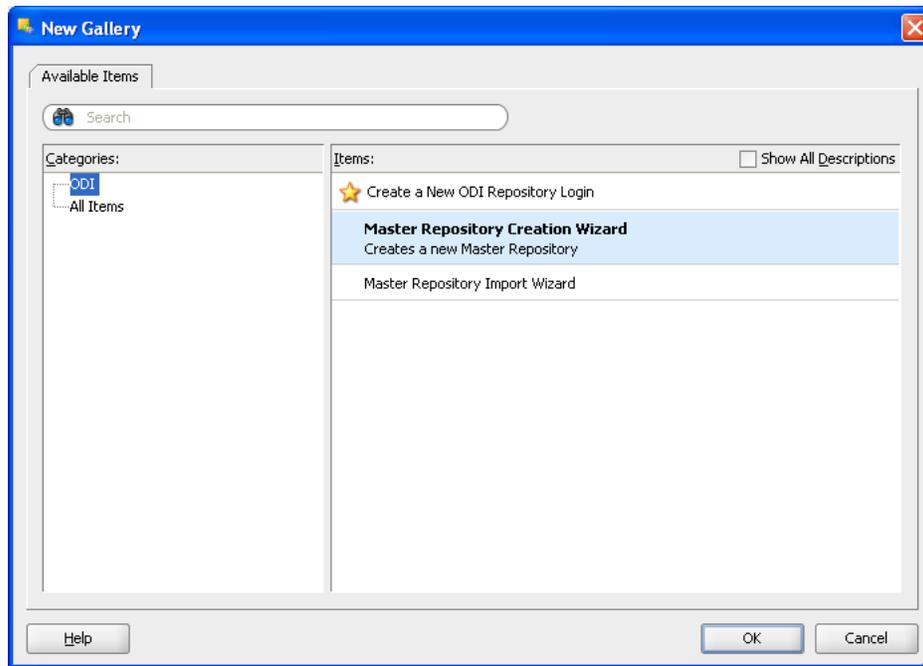
Select from the **Items** list the **Master Repository Creation Wizard**.

Click **OK**.

The Master Repository Creation Wizard appears.

Figure B-2 ODI Studio New Gallery



Figure B-3 ODI Studio New Gallery Create Master Repository

3. In the Master Repository Creation Wizard, select the browse icon of the JDBC Driver and then select Oracle JDBC Driver. Click **OK**.

Edit the JDBC URL to read: jdbc:oracle:thin: @localhost:1521:orcl

Enter the User as repo and the Password as *password*.

Click **Test Connection** and verify successful connection.

Click **OK**.

On the Master Repository Creation Wizard screen, Click **Next**, as shown in [Figure B-4](#).

Figure B-4 ODI Studio Master Repository Creation Wizard

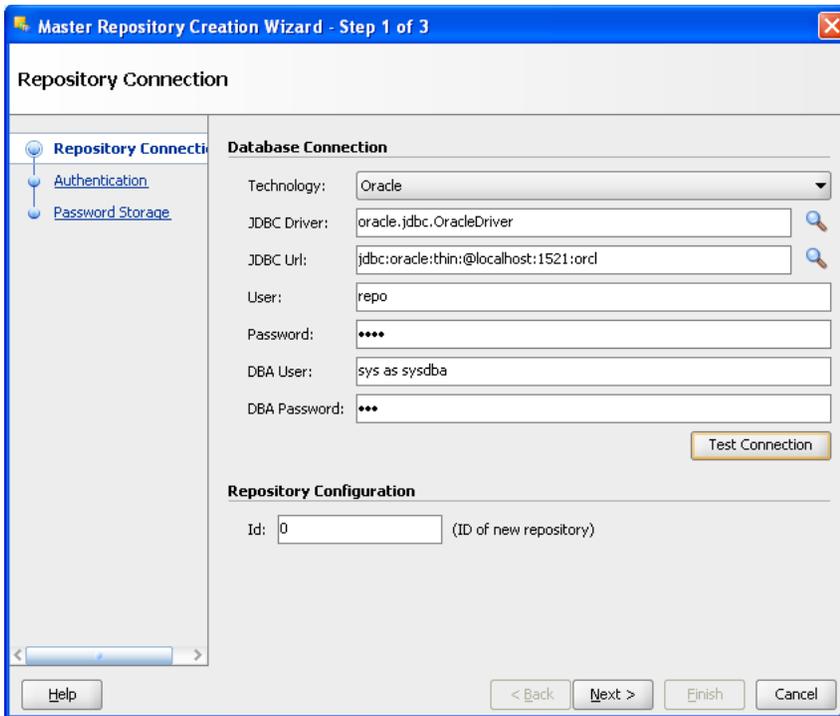
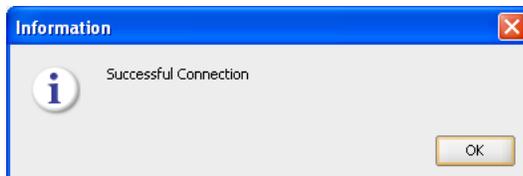


Figure B-5 ODI Studio Master Repository Successful Creation



4. In the Authentication window, enter Supervisor Password as *password*. Enter *password* again to confirm the password, as shown in [Figure B-6](#). Click **Next**.

Note: ODI User names and passwords are case-sensitive.

Figure B–6 ODI Studio Master Repository Creation Password

The screenshot shows the 'Master Repository Creation Wizard - Step 2 of 3' window. The title bar is blue with a close button. The window is titled 'Authentication'. On the left, there is a tree view with three items: 'Repository Connection', 'Authentication' (selected), and 'Password Storage'. The main area contains the following text: 'Select the authentication mode that this master repository will use. Use ODI authentication to manage users using ODI's internal security system. Use External authentication if you wish to use an external enterprise identity store, such as Oracle Internet Directory, to manage user authentication.' There are two radio button options: 'Use ODI Authentication' (selected) and 'Use External Authentication'. Under 'Use ODI Authentication', there are three text boxes: 'Supervisor User:' with the value 'SUPERVISOR', 'Supervisor Password:' with masked characters '*****', and 'Confirm Password:' with masked characters '*****'. Under 'Use External Authentication', there are two empty text boxes: 'Supervisor User:' and 'Supervisor Password:'. At the bottom, there are four buttons: 'Help', '< Back', 'Next >', 'Finish', and 'Cancel'.

5. In the Password Storage window, select **Internal password Storage**, and then click **Finish**. When Master Repository is successfully created, you will see the Oracle Data Integrator Information message.
Click **OK**. The ODI Master repository is now created.

Figure B-7 ODI Studio Master Repository Creation Finish

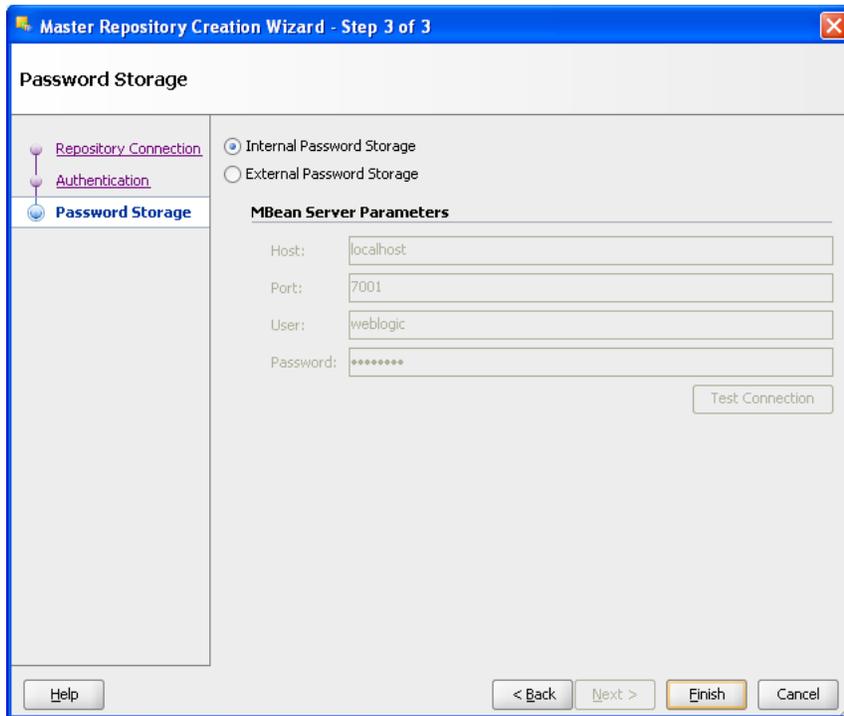
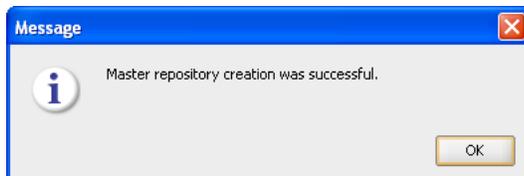
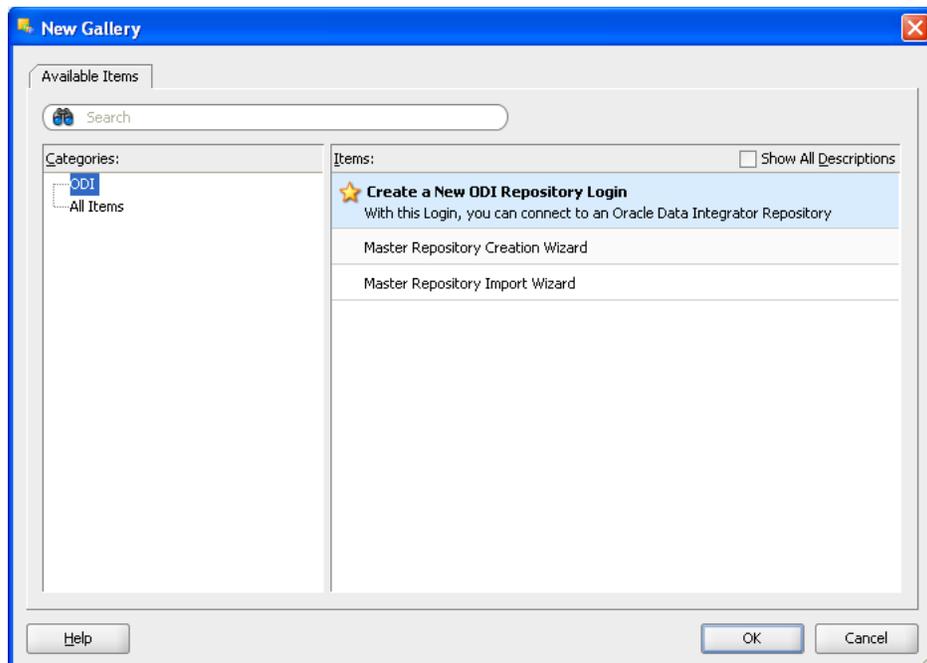


Figure B-8 ODI Studio Master Repository Creation Complete



6. You connect to the ODI Master repository by creating a new ODI Master Login. Open the New Gallery by choosing **File > New**. In the New Gallery, in the Categories tree, select **ODI**. From the Items list select **Create a New ODI Repository Login**, as shown in [Figure B-9](#).

Figure B–9 ODI Studio New Gallery ODI Repository Login



7. Configure Repository Connections with the parameters from the tables provided below. To enter the JDBC URL, click the button next to JDBC URL field and select `jdbc:oracle:thin:@<host>:<port>:<sid>` as shown in the screenshot, then edit the URL. Select Master Repository only button.

Click **Test**.

Verify successful connection and click **OK**.

Click **OK** to save the connection.

Table B–3 Oracle Data Integrator Connection

Parameter	Value
Login Name	master_repo
User	SUPERVISOR
Password	<i>password</i>

Table B–4 Database Connection (Master Repository)

Parameter	Value
User	repo
Password	<i>password</i>
Driver List	Oracle JDBC Driver
Driver Name	oracle.jdbc.OracleDriver

Table B-4 (Cont.) Database Connection (Master Repository)

Parameter	Value
Url	jdbc:oracle:thin:@<system_name>:<listener port>:<SID> For example: jdbc:oracle:thin:@localhost:1521:orcl

Note: Do not copy and paste in the JDBC URL field. This may cause problems with entering a valid URL string. Instead, open the drop-down menu and select the correct driver from the list. Type the correct URL in the URL field.

Figure B-10 ODI Studio Repository Connection Information

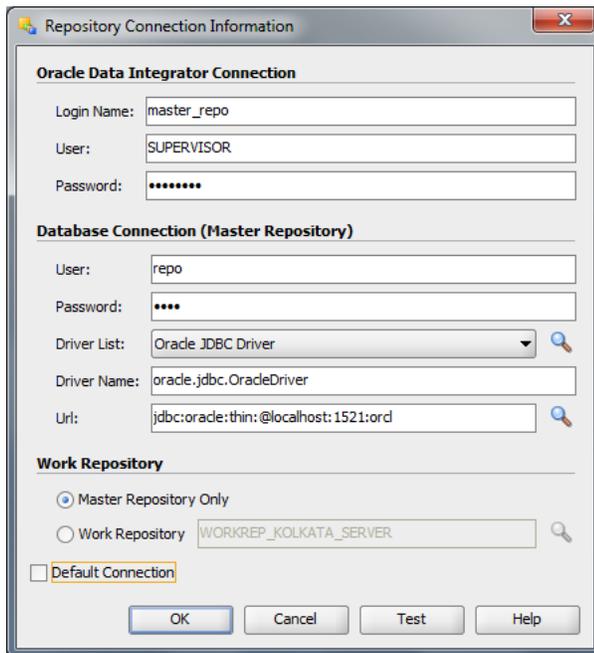
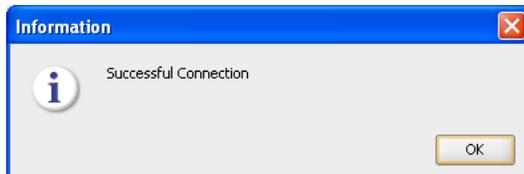


Figure B-11 ODI Studio Repository Connection Successful



- Click Connect to Repository. Select the newly created repository connection Master Repository from the drop-down list. Click OK. The ODI Topology Manager starts. You are now successfully logged in to the ODI Topology Manager.

Figure B–12 ODI Studio Connect to Repository



Figure B–13 Oracle Data Integrator Login

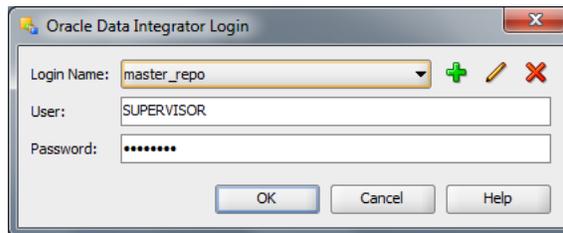
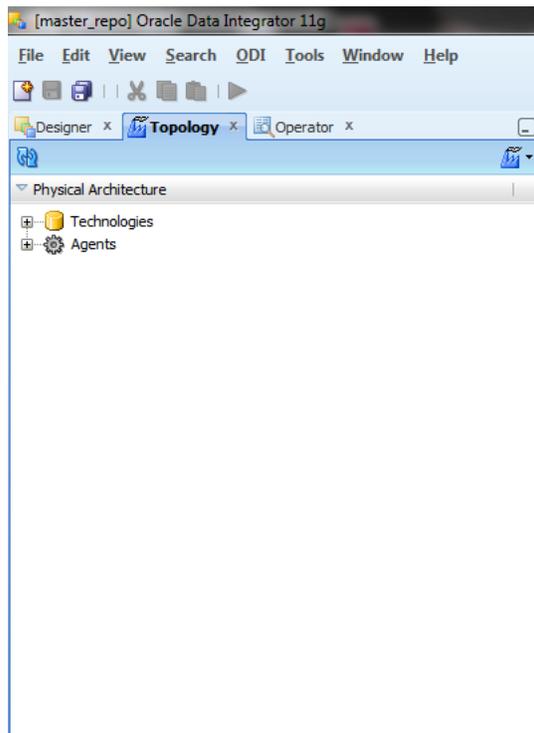


Figure B–14 Oracle Data Integrator Master Repository Topology



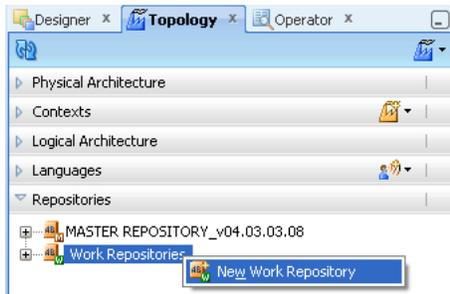
Creating and Connecting to ODI Work Repository

1. After you create the Oracle Database schema and user, use ODI Topology Navigator to create the ODI Work repository.

In ODI, click the **Topology Navigator** tab and then click **Repositories** panel. Right-click the **Work Repositories** node and select **New Work Repository**.

The Create Work Repository Wizard opens.

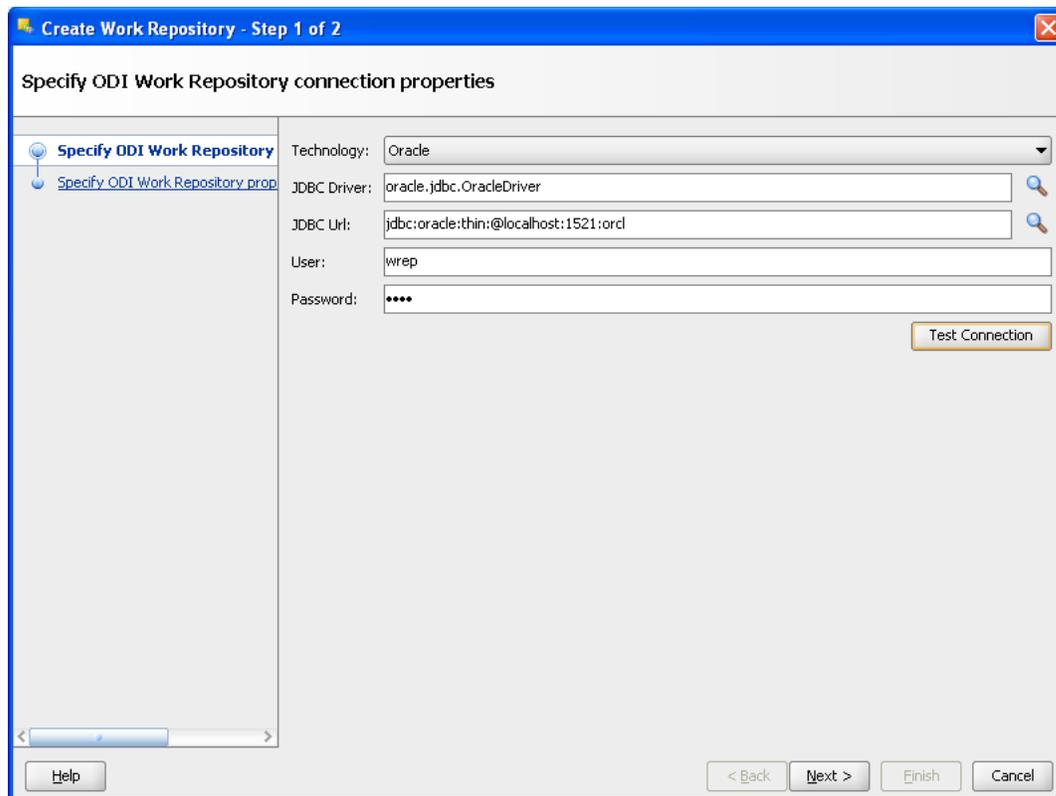
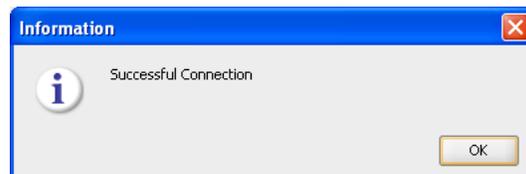
Figure B–15 ODI Topology Navigator New Work Repository



2. In the screen that follows, enter the parameters shown in [Table B–5](#).
 Click **Test Connection** to verify a successful connection and click **OK**.
 Click **Next**.

Table B–5 New Work Repository Parameters

Parameter	Value
Technology	Oracle
Driver Name	oracle.jdbc.driver.OracleDriver
JDBC Url	jdbc:oracle:thin:@<system_name>:<listener port>:<SID> For example: jdbc:oracle:thin:@localhost:1521:orcl
User	wrep
Password	<i>password</i>

Figure B–16 ODI Studio Create Work Repository Test Connection**Figure B–17 ODI Repository Create Work Repository Successful Connection**

3. In the Specify Work Repository properties page, set the following values, as shown in [Figure B–18](#):
 - Set **Id** to: 5.
 - Set **Name** to: WORKREP_KOLKATA_SERVER.
 - Enter **Password**: *password*.
 - In the **Work Repository Type** list, select **Development**.
 - Click **Finish**.

Figure B-18 ODI Studio Create ODI Work Repository Properties

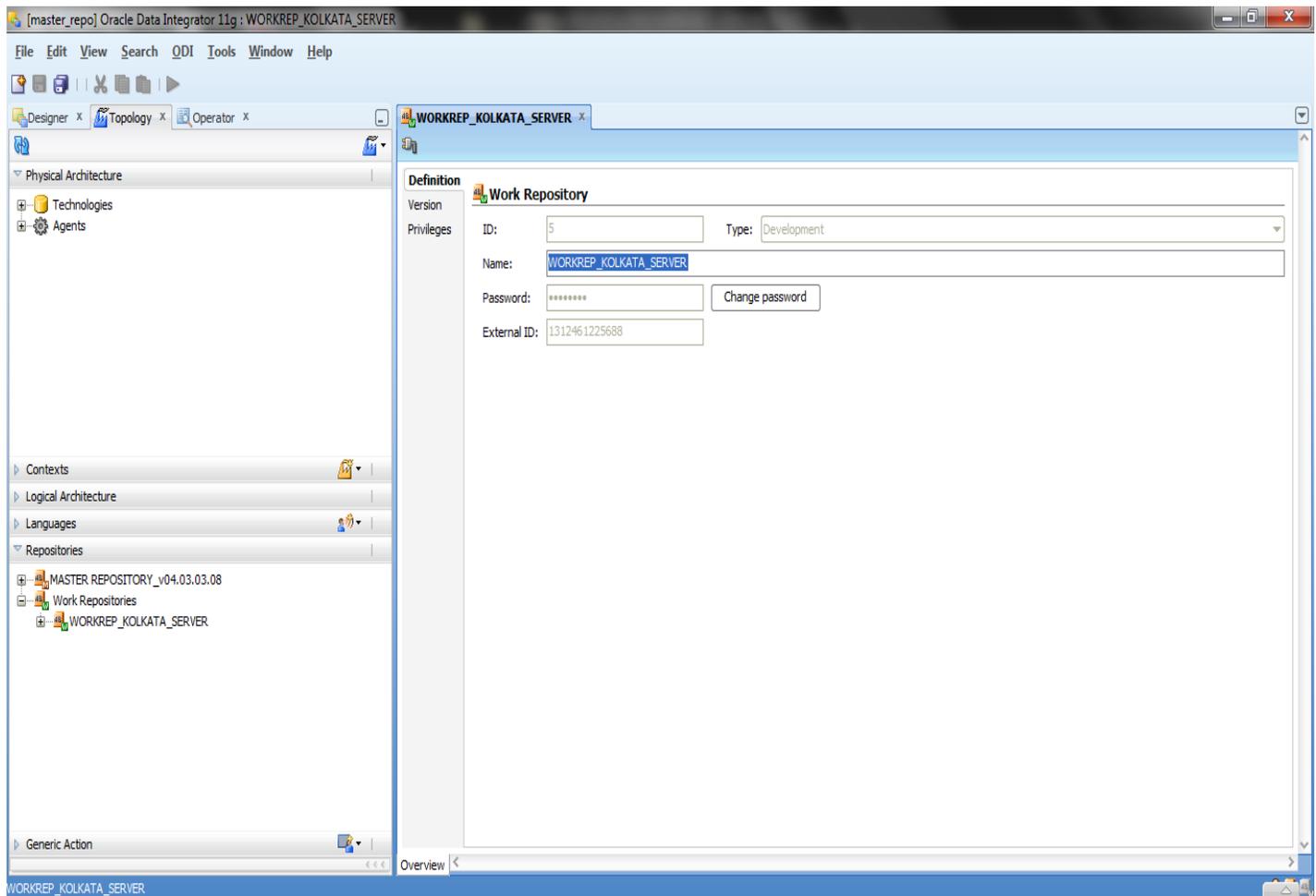
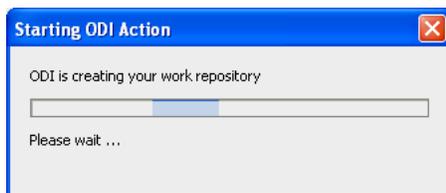


Figure B-19 ODI Studio Create ODI Work Repository Starting ODI Action



4. In the Create Work Repository Login window, click **Yes**.
Enter the Login name: WORKREP_KOLKATA_SERVER
Click **OK**.
Then, verify that the newly created work repository is now in the work repositories tree view.

Figure B–20 ODI Studio Create ODI Work Repository Create Login Name

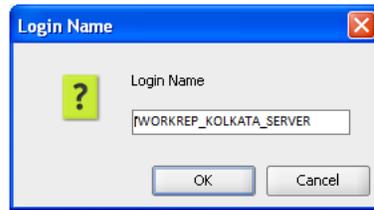


Figure B–21 ODI Studio Create ODI Work Repository Create Login

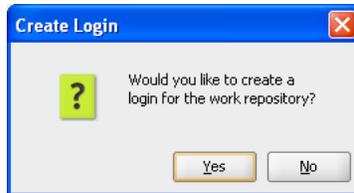
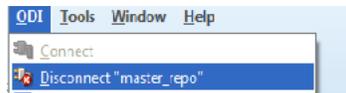


Figure B–22 ODI Studio ODI Work Repository Topology



5. Now you disconnect from the Master repository and connect to the Work repository. Click **ODI** and select **Disconnect "master_repo"**.

Figure B–23 ODI Studio Disconnect from Master Repository



6. Click **Connect to Repository**.

From the Login Name drop-down list, select "WORKREP_KOLKATA_SERVER".

Enter Password: *password*.

Click **OK**.

Click the Designer tab.

The ODI login dialog appears as shown in [Figure B–25](#).

Figure B–24 ODI Studio Connect to Work Repository

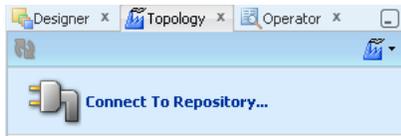
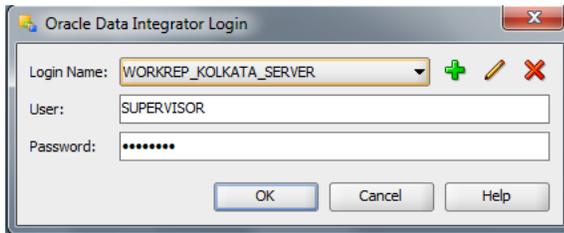


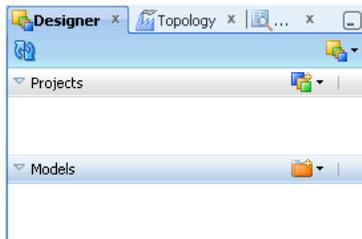
Figure B–25 ODI Studio Oracle Data Integrator Login



You have now successfully created and connected to the ODI Work repository.

7. If you check Designer tab no Projects and Models are shown in the new work repository.

Figure B–26 ODI Studio Designer Tab



Importing the ODI Master Repository

The Master Repository Import and Export procedure allows you to transfer the whole repository, Topology and Security domains included, from one repository to another.

To import a master repository in an existing master repository:

1. From the Topology Navigator toolbar menu select **Import > Master Repository...**
2. Select the Import Mode and the import Folder or Zip File.
3. Click **OK**.
4. The specified file(s) are imported into the current master repository.

Figure B–27 ODI Studio Import Master Repository

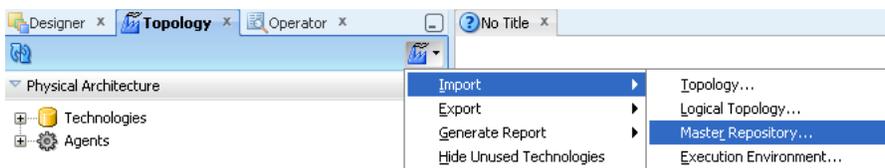
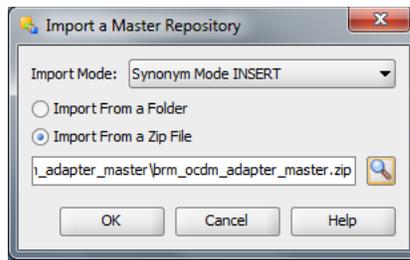


Figure B–28 ODI Studio Import Master Repository Mode and Options



5. Browse Master Repository from the specified location.

Repository Location:

"\$BRM_OCDM_HOME/odi_repository/brm_ocdm_adapter_master.zip"

Figure B–29 Import Master Repository

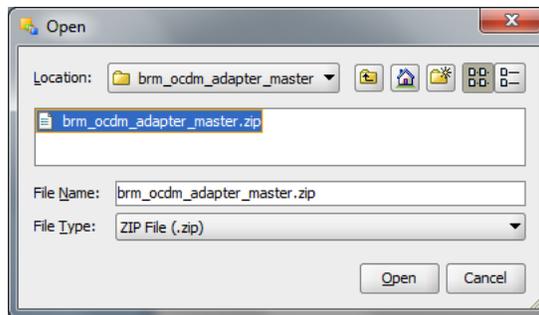
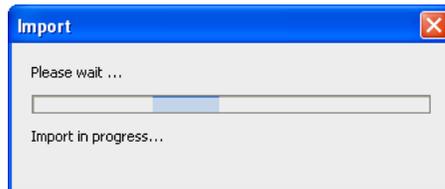


Figure B–30 ODI Studio Import Master Repository Progress



6. Check the Import Report, as shown in [Figure B–31](#), and save this report by clicking **Save**.

Figure B–31 Import Repository Report

The screenshot shows a window titled 'Import report' with a sub-header 'Import Report'. Below the sub-header, it says 'Synonym Insert' and 'Imported Objects'. A table lists the imported objects with columns for Object Type, Object Name, Imported As, Original ID, New ID After Import, and Parent Type After Import. At the bottom of the window are 'Save...' and 'Close' buttons.

Object Type	Object Name	Imported As	Original ID	New ID After Import	Parent Type After Import
Logical Schema	BRM_SRC_LS	BRM_SRC_LS	2000	2000	Technology
Logical Schema	BRM_STG_LS	BRM_STG_LS	5000	5000	Technology
Logical Schema	NCC_BE_LS	NCC_BE_LS	6000	6000	Technology
Logical Schema	NCC_CCS_LS	NCC_CCS_LS	10000	10000	Technology
Logical Schema	NCC_STG_LS	NCC_STG_LS	8000	8000	Technology
Logical Schema	OCDM_SYS_LS	OCDM_SYS_LS	4000	4000	Technology

Importing the ODI Work Repository

Importing or exporting a work repository allows you to transfer all work repository objects from one repository to another.

To import a work repository:

1. From the Designer Navigator toolbar menu select **Import > Work Repository...**
2. Select the Import Mode and the import Folder or Zip File.
3. Click **OK**.

The specified file(s) are imported into the work repository.

Figure B–32 ODI Studio Import Work Repository

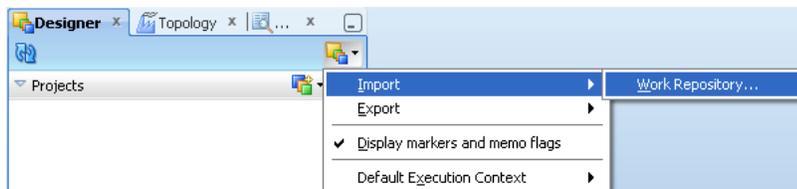
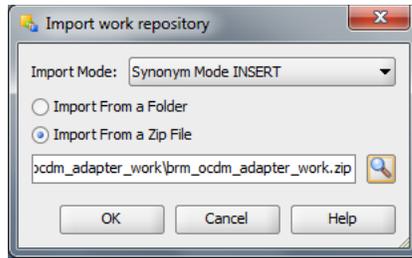


Figure B–33 ODI Studio Import Work Repository from Zip File



Browse Work Repository from the specified location:

\$BRM_OCDM_HOME/odi_repository/brm_ocdm_adapter_work.zip

Figure B–34 ODI Studio Import Work Repository from Zip File

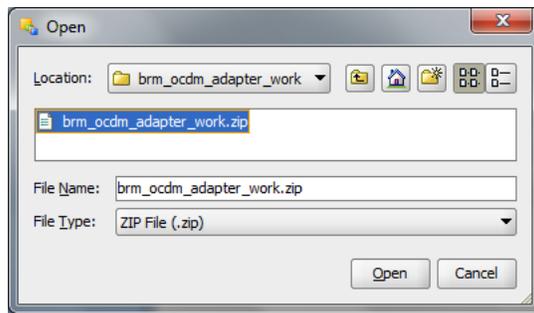


Figure B–35 ODI Studio Open and Import Work Repository Progress

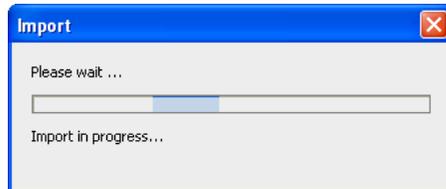
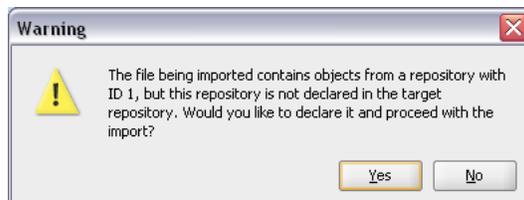


Figure B–36 ODI Studio Import Work Repository Warning



You can check the Import Report, as shown in [Figure B–37](#). To save the report click **Save**.

Figure B–37 ODI Studio Import Work Repository Report

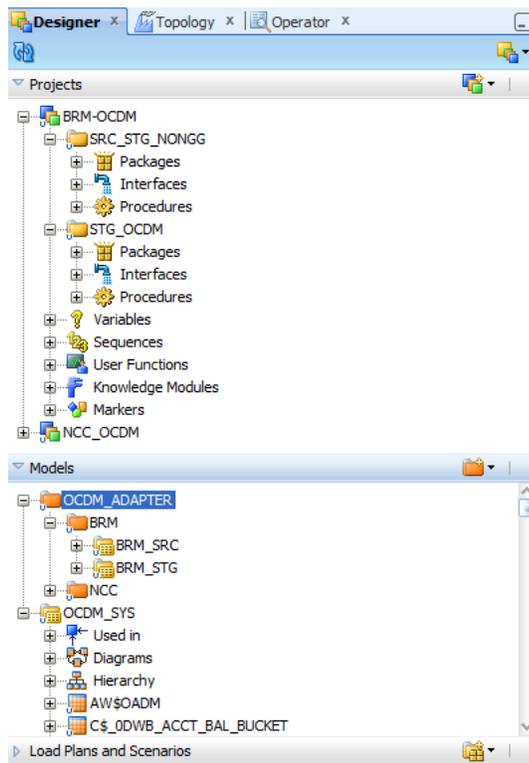
The screenshot shows the 'Import report' window in ODI Studio. The title bar reads 'Import report'. Below the title bar, there is a sub-header 'Import Report' and a note 'Synonym Insert Update'. The main content is a table titled 'Imported Objects' with the following columns: Object Type, Object Name, Imported As, Original ID, New ID After Import, Parent Type After Import, and Parent Name After Import. The table lists various objects including Projects, Marker Groups, and Knowledge Modules.

Object Type	Object Name	Imported As	Original ID	New ID After Import	Parent Type After Import	Parent Name After Import
Project	BRM-OCDM	NCC-OCDM	7001	7001		
Marker Group	Priorities	Priorities	19001	19001	Project	BRM-OCDM
Marker Group	Progress	Progress	20001	20001	Project	BRM-OCDM
Marker Group	Smileys	Smileys	21001	21001	Project	BRM-OCDM
Knowledge Module	IKM SQL Control Append	IKM SQL Control Append	37001	37001	Project	BRM-OCDM
Knowledge Module	CKM Oracle	CKM Oracle	29001	29001	Project	BRM-OCDM
Knowledge Module	IKM Oracle Incremental Update (PL SQL)	IKM Oracle Incremental Update (PL SQL)	31001	31001	Project	BRM-OCDM
Knowledge Module	IKM SQL Incremental Update	IKM SQL Incremental Update	32001	32001	Project	BRM-OCDM
Knowledge Module	LKM SQL to Oracle	LKM SQL to Oracle	34001	34001	Project	BRM-OCDM

At the bottom of the window, there are 'Save...' and 'Close' buttons.

If you use the Designer tab Projects and Models you can view the projects and models that are in the work repository.

Figure B–38 Shows the ODI Designer Navigator with Projects and Models



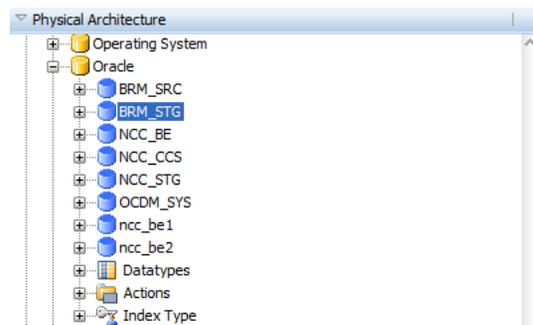
Setting up the ODI Topology

To set up the ODI Topology, do the following:

Setting up the Physical Data Servers

1. From the Topology Navigator Display the Physical Architecture tab.
2. Expand the Technologies node.
3. Expand the Oracle node to display the Physical Data Servers.

Figure B–39 ODI Studio Physical Data Servers



4. Double-click the BRM_STG node to display the Data Server: <Name> dialog.
5. Display the Definition tab and enter the appropriate information, as described in.

Figure B–40 ODI Studio Data Server Definition Dialog

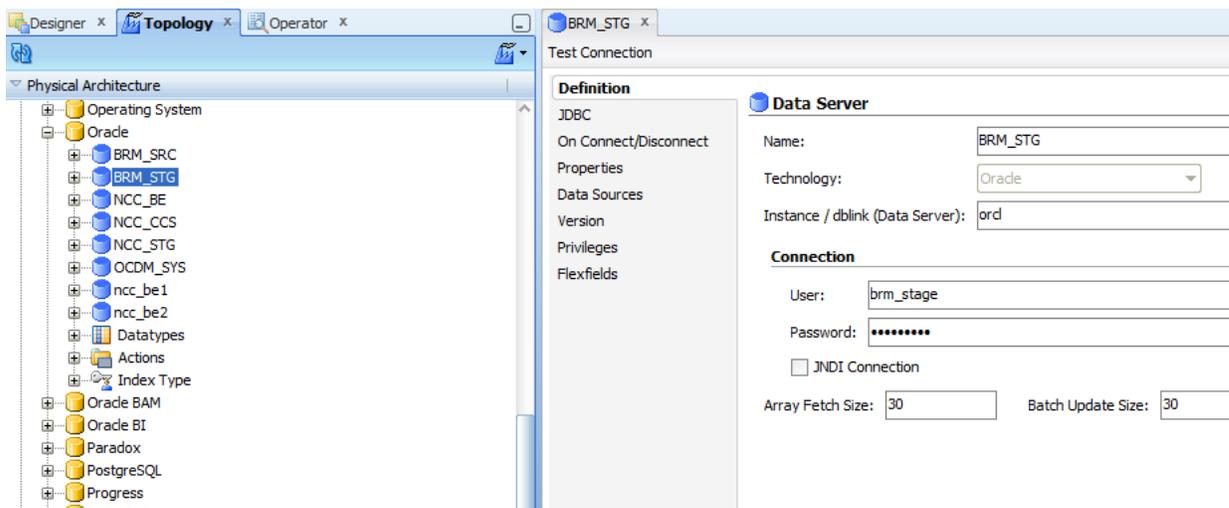


Table B–6 ODI Studio Data Server Definition Fields and Values

Field	Description
Name	Do not change name of the Data Server.
Technology	Do not change the default value Oracle.
Instance/dblink (Data Server)	Specify a database instance name. Use the Oracle SID name. For example, ORCL

Table B–6 (Cont.) ODI Studio Data Server Definition Fields and Values

Field	Description
User	Specify <User Name>. For example, brm_stg This is the warehouse database user name.
Password	Specify <Password>. This is the default password for the warehouse database user name.
Array Fetch Size	Specify a value suitable to your environment (Do not change the default value).
Batch Update Size	Specify a value suitable to your environment (Do not change the default value).

6. Display the JDBC tab and enter the appropriate information, as described in [Table B–7](#).

Figure B–41 ODI Studio Data Server JDBC Tab

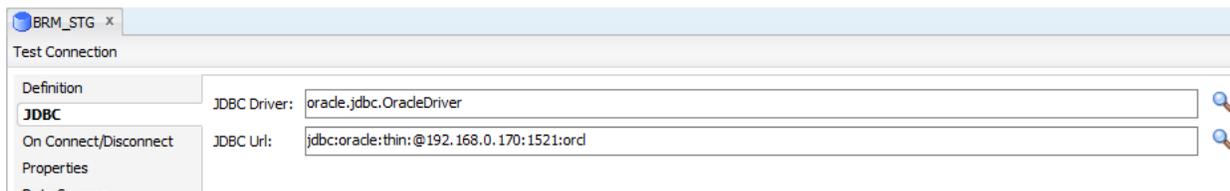
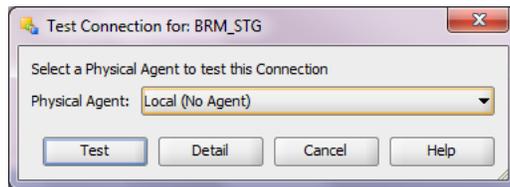


Table B–7 ODI Studio Data Server JDBC Tab Fields and Values

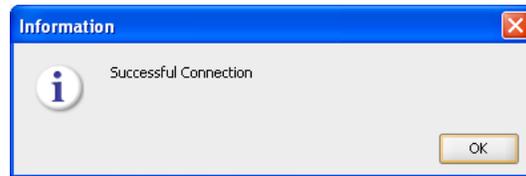
Field	Description
JDBC Driver	Specify oracle.jdbc.driver.OracleDriver.
JDBC Url	Specify in the format jdbc:oracle:thin:@<host>:<port>:<sid>. Replace <host>, <port> and <sid> with the values for the database hosting the ODI Repositories. For example, 'jdbc:oracle:thin:@localhost:1521:orcl'.

7. After entering the required values, click **Test**. This shows the dialog in [Figure B–42](#).

Figure B–42 ODI Studio Data Server Test Connection



8. Click **Test** to display the Test Connection for: <Connection> dialog.

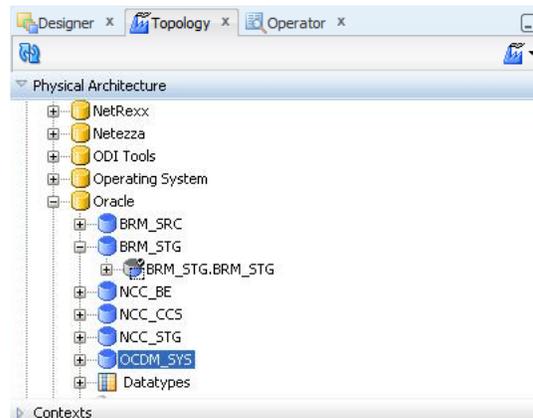
Figure B-43 Test Connection Information Dialog

9. Click the **Save** icon to save the details.

Setting up the Physical Schema

To set up the Physical Schema for a Data Server:

1. From the Topology Navigator Display the Physical Architecture tab.
2. Expand the Technologies node.
3. Expand the Oracle node to display the Physical Data Servers.
4. Expand the Data Server node.

Figure B-44 ODI Studio Physical Architecture Data Server Node

5. Double-click BRM_STG.BRM_STG to display the Physical Schema: <Name> dialog.
6. Display the Definition tab and enter the appropriate information, as described in [Table B-8](#).

Figure B–45 ODI Studio Physical Schema Definition Tab



Table B–8 ODI Studio Physical Schema Definition Tab Properties and Values

Field	Description
Schema (Schema)	Make sure that <Physical Schema> is selected from the drop down list.(For example: BRM_STAGE)
Schema (Work Schema)	Make sure that <Physical Schema> is selected from the drop down list.(For example: BRM_STG)

Note: Do not change the other field values.

7. Click to save the details.

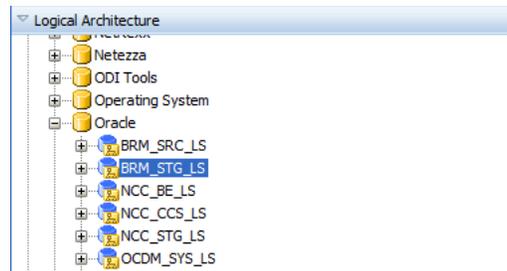
Note: Follow the same steps (1-7) to configure BRM_SRC and OCDM_SYS Physical Schemas.

Setting up the Logical Data Servers

To set up the Logical Data Servers:

1. From the Topology Navigator Display the Logical Architecture tab.
2. Expand the Technologies node.
3. Expand the Oracle node to display the Logical Data Servers.

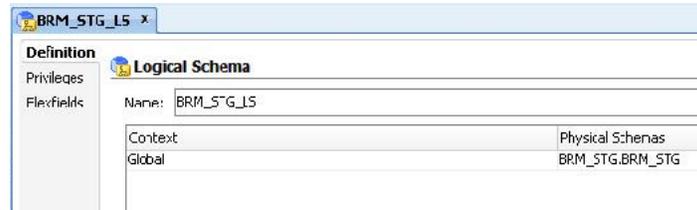
Figure B–46 ODI Studio Logical Architecture for Logical Data Server



4. Double-click the BRM_STG_LS node to display the Logical Data Server: <Name> dialog.
5. Display the Definition tab.
6. Edit the BRM_STG_LS Logical Data Server and ensure that for the appropriate Context (for example, Global, Development...), the value in the Physical Schemas

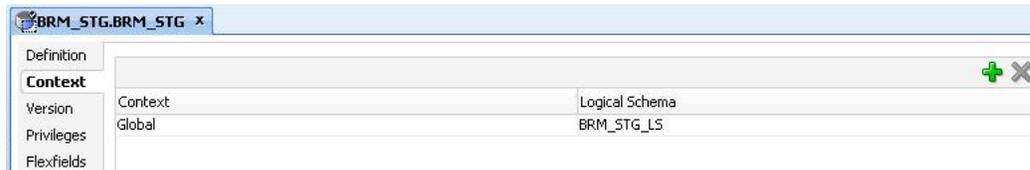
column is set to BRM_STG_BRM_STG (Physical Schema created in Physical Data Server).

Figure B–47 ODI Studio Logical Data Server Definition Tab for Logical Schema



7. Click the **Save** icon to save the details.
8. After checking whether the context is set properly, ensure that in the Topology->Physical Architecture tab that the context tab of physical schemas points to the right logical context.

Figure B–48 ODI Studio Logical Data Server Context Tab



Note: Follow these steps (1-7) to configure the BRM_SRC_LS and OCDM_SYS_LS Logical Data Servers. When you finish these steps, the installation of ODI is complete.

Setting Up Oracle GoldenGate for BRM Adapter

To set up Oracle GoldenGate for Oracle Communications Data Model, perform the following steps:

- [Installing Oracle GoldenGate on Target for BRM Adapter](#)
- [Configuring Oracle GoldenGate on Target for BRM Adapter](#)
- [Installing Oracle GoldenGate on Source for BRM Adapter](#)
- [Configuring Oracle GoldenGate on Source System for BRM Adapter](#)
- [Starting Oracle GoldenGate Processes on Source System](#)
- [Starting Oracle GoldenGate Processes on Target System](#)

Installing Oracle GoldenGate on Target for BRM Adapter

To use BRM Adapter real-time capturing, install and configure Oracle GoldenGate (GG) as follows:

1. Change directory to the database installation path (For example: /u02/app/oracle/product).

Figure B-49 Changing Directory to the Oracle Database Installation Path


```

oracle@server:/u02/app/oracle/product
File Edit View Terminal Tabs Help
[root@server ~]# su - oracle
[oracle@server ~]$ . oraenv
ORACLE_SID = [oracle] ? db11gr2
The Oracle base for ORACLE_HOME=/u02/app/oracle/product/11.2.0/dbhome_1 is /u02/
app/oracle
[oracle@server ~]$ cd $ORACLE_HOME
[oracle@server dbhome_1]$ cd ..
[oracle@server 11.2.0]$ cd ..
[oracle@server product]$

```

2. Create a directory named (gg) for installing Oracle GoldenGate under the product folder:

```
[oracle@server product]$ mkdir /u02/app/oracle/product/gg
```

Or manually create the folder (gg) by going directly in the product folder:

```
[oracle@server product]$ export GGATE=/u02/app/oracle/product/gg
[oracle@server product]$ cd $GGATE
[oracle@server gg]$
```

3. Copy the downloaded software (for example: V22228-01.zip) into gg folder (for information on downloading Oracle GoldenGate, see "[Oracle GoldenGate](#)" on page 1-4).
4. Unzip the software in the folder using following command:

```
[oracle@server gg]$ unzip V22228-01.zip
```

5. After you unzip the file, use the .tar extension file with the tar command to extract Oracle GoldenGate:

Tar the Oracle GoldenGate .tar file using the following command:

```
[oracle@server gg] tar -xf filename.tar
```

6. Now export the path to GG libraries to LD_LIBRARY_PATH using the command:

```
export LD_LIBRARY_PATH=$ORACLE_HOME/lib:$GGATE
```

7. Now start the GG command line utility (ggsci):

```
[oracle@server gg]$ ./ggsci
```

This command connects you to the Oracle GoldenGate server. For example:

```

Oracle GoldenGate Command Interpreter for Oracle
Version 11.1.1.0.0 Build 078
Linux, x86, 32bit (optimized), Oracle 11 on Jul 28 2010 13:22:25
Copyright (C) 1995, 2010, Oracle and/or its affiliates. All rights reserved

```

8. Create the necessary working directories for gg:

```

GGSCI (server.oracle.com) 1>create subdirs
GGSCI (server.oracle.com) 2>exit
[oracle@server gg]$ mkdir $GGATE/diroyb

```

9. After these steps Oracle GoldenGate is installed.

After Oracle GoldenGate is installed you prepare the source and target database for Oracle GoldenGate Replication.

Note: Steps 1 to 9 in "Installing Oracle GoldenGate on Target for BRM Adapter" on page B-27 are common for both the source and target databases. These same steps are shown in the section, "Installing Oracle GoldenGate on Source for BRM Adapter" on page B-30.

Configuring Oracle GoldenGate on Target for BRM Adapter

To set up the Oracle GoldenGate Schema, do the following:

1. Create ggate schema:

```
SQL>sqlplus / as sysdba;
SQL> create user ggate identified by ggate default tablespace users temporary
tablespace temp;
```

Note: For the Oracle Goldengate schema, a default password (for example "ggate") is provided during the setup phase. You can change this, but then you need to change the default password in the related prm and oby files; for more details see step 4, "Edit ggate default schema and password".

2. Grant privileges to ggate schema:

```
SQL> grant connect, resource, unlimited tablespace to ggate;
SQL> grant select any dictionary to ggate;
SQL> grant execute on utl_file to ggate;
SQL> grant alter any table to ggate;
SQL> grant create table to ggate;
SQL> grant select any table, insert any table, update any table, delete any
table to ggate;
SQL>exit;
```

3. Copy target config file to \$GGATE directory:

The files for the target machine have been generated in:

```
$OCDM\utl\adapter\brm\goldengate_param\stg
```

These files must be copied on the target machine, to the following location \$GGATEE using the same directory structure.

- copy files contained in goldengate_param\stg\dirprm to \$GGATEE\dirprm
- copy files contained in goldengate_param\stg\diroby to \$GGATEE\diroby

4. Edit the default schema and password:

The default schema and password are "ggate",

- edit file \$GGATE\diroby\ brm_ogg_stg_cdc_cmd.oby according the environment; use the correct value in the following command:

```
DBLOGIN USERID userid, PASSWORD passwd
```

- Edit the file \$GGATE\dirprm\ globals.prm according the environment, change the value in the following commands:

```
GGSHEMA ggate
CHECKPOINTTABLE ggate.ggschkpt
```

5. Config manager port:

The default manager port at the target is 7809, if required, edit the port in the file:

```
$GGATEE\dirprm\mgr.prm
```

6. Edit BRM_SRC and BRM_STG at REPLICAT:

The default BRM_SRC and BRM_STG schema are "brm_src", and "brm_stg", edit the file \$GGATEE\dirprm\repbrm.prm, and change the two schema names according to the environment. For example, change the following:

```
map brm_src.ACCOUNT_NAMEINFO_T, TARGET brm_stg.ACCOUNT_NAMEINFO_T, KEYCOLS
(OBJ_ID0,REC_ID), REPERROR (1403, DISCARD)
```

to

```
map pin5003.ACCOUNT_NAMEINFO_T, TARGET brm_stg_ogg.ACCOUNT_NAMEINFO_T, KEYCOLS
(OBJ_ID0,REC_ID), REPERROR (1403, DISCARD)
```

7. Add the Replicat group:

Execute the following command on the <target> system to add a delivery group named repbrm.

```
[oracle@server gg]$ $GGATE/./ggsci paramfile $GGATE/diroyby/ brm_ogg_stg_cdc_
cmd.oby
```

Note: you can run the batch commands in brm_ogg_stg_cdc_cmd.oby manually to see the result of each single command. For example:

First login to ggsci and execute the following:

```
./ggsci
```

```
GGSCI (slc00tcw) 1> ADD REPLICAT repbrm, EXTTRAIL ./dirdat/rt, checkpointtable
ggate.ggschkpt
```

Installing Oracle GoldenGate on Source for BRM Adapter

To use BRM Adapter real-time capturing, install and configure Oracle GoldenGate (GG) as follows:

1. Change directory to the database installation path (For example: /u02/app/oracle/product).

Figure B-50 Changing Directory to the Oracle Database Installation Path



```
oracle@server:u02/app/oracle/product
File Edit View Terminal Tabs Help
[root@server ~]# su - oracle
[oracle@server ~]$ . oraenv
ORACLE_SID = [oracle] ? db11gr2
The Oracle base for ORACLE_HOME=/u02/app/oracle/product/11.2.0/dbhome_1 is /u02/
app/oracle
[oracle@server ~]$ cd $ORACLE_HOME
[oracle@server dbhome_1]$ cd ..
[oracle@server 11.2.0]$ cd ..
[oracle@server product]$
```

2. Create a directory named (gg) for installing Oracle GoldenGate under the product folder:

```
[oracle@server product]$ mkdir /u02/app/oracle/product/gg
```

Or manually create the folder (gg) by going directly in the product folder:

```
[oracle@server product]$ export GGATE=/u02/app/oracle/product/gg
[oracle@server product]$ cd $GGATE
```

- ```
[oracle@server gg]$
```
3. Copy the downloaded software (for example: V22228-01.zip) into gg folder (for information on downloading Oracle GoldenGate, see ["Oracle GoldenGate"](#) on page 1-4).
  4. Unzip the software in the folder using following command:
 

```
[oracle@server gg]$ unzip V22228-01.zip
```
  5. After you unzip the file, use the .tar extension file with the tar command to extract Oracle GoldenGate:
 

Tar the Oracle GoldenGate .tar file using the following command:

```
[oracle@server gg] tar -xf filename.tar
```
  6. Now export the path to GG libraries to LD\_LIBRARY\_PATH using the command:
 

```
export LD_LIBRARY_PATH=$ORACLE_HOME/lib:$GGATE
```
  7. Now start the GG command line utility (ggsci):
 

```
[oracle@server gg]$./ggsci
```

This command connects you to the Oracle GoldenGate server. For example:

```
Oracle GoldenGate Command Interpreter for Oracle
Version 11.1.1.0.0 Build 078
Linux, x86, 32bit (optimized), Oracle 11 on Jul 28 2010 13:22:25
Copyright (C) 1995, 2010, Oracle and/or its affiliates. All rights reserved
```
  8. Create the necessary working directories for gg:
 

```
GGSCI (server.oracle.com) 1>create subdirs
GGSCI (server.oracle.com) 2>exit
[oracle@server gg]$ mkdir $GGATE/diroyb
```
  9. After these steps Oracle GoldenGate is installed.

## Configuring Oracle GoldenGate on Source System for BRM Adapter

1. Switch the database to archive log mode as follows:
 

```
[oracle@server dbhome_1]$ sqlplus / as sysdba
SQL>shutdown immediate
SQL>startup mount
SQL>alter database archivelog;
SQL>alter database open;
```
2. Enable minimal supplemental logging:
 

```
SQL>alter database add supplemental log data;
```

Switch log to start supplemental logging:

```
SQL> ALTER SYSTEM SWITCH LOGFILE;
SQL> ALTER SYSTEM SWITCH LOGFILE;
```

Verify supplemental logging is enabled (with a result of 'YES')

```
SQL> SELECT SUPPLEMENTAL_LOG_DATA_MIN FROM V$DATABASE;
```
3. Turn off recyclebin for the database

```
SQL>alter system set recyclebin=off scope=spfile;
```

#### 4. Create ggate schema:

```
SQL> create user ggate identified by ggate default tablespace users temporary
tablespace temp;
```

Note: For the Oracle Goldengate schema, a default password (for example "ggate") is provided during the setup phase. You can change this, but you also need to change the default password in the related prm and oby files.

#### 5. Grant privileges to ggate schema:

```
SQL> grant connect, resource, unlimited tablespace to ggate;
SQL> grant select any dictionary to ggate;
SQL> grant select any table to ggate;
SQL> grant alter any table to ggate;
SQL> grant flashback any table to ggate;
SQL> grant execute on dbms_flashback to ggate;
SQL> grant execute on utl_file to ggate;
SQL> exit;
```

To do Trandata, you need to enable supplemental logging on the source system. To enable Supplemental logging, use the command:

```
alter database add supplemental log data;
```

#### 6. Copy source config file to \$GGATE directory

The files for the source machines have been generated in \$OCDM \utl\adapter\brm\goldengate\_param\src

These files must be copied on the source machines to the following location \$GGATEE using the same directory structure:

- copy files in goldengate\_param\src\dirprm to \$GGATEE\dirprm
- copy files in goldengate\_param\src\diroby to \$GGATEE\diroby

#### 7. Config manager port

The default manager port at source is 7890. As required, edit this port in the file:

```
$GGATEE\dirprm\mgr.prm
```

#### 8. Config RMTHOST

Change the RMTHOST and MGRPORT in expbrm.prm files in the \$GGATEE\dirprm directory as required for your working environment:

```
RMTHOST <Remote Host Name>, MGRPORT <Port>
```

For example:

```
rmthost slc00tcw, mgrport 7809
```

#### 9. Config BRM\_SRC schema at EXTRACT

The default source schema for the BRM Adapter is BRM\_SRC. Change the source schema name through your source system schemas. For example (brm\_src ->pin5003)

Change BRM\_SRC schema at \$GGATE\dirprm\extbrm.prm.

For example:

```
Table pin5003.ACCOUNT_NAMEINFO_T, KEYCOLS (OBJ_ID0,REC_ID)
```

Change BRM\_SRC schema at \$GGATE\dirprm\extpbrm.prm

For example:

```
Table pin5003.ACCOUNT_NAMEINFO_T;
```

Change BRM\_SRC schema at \$GGATE\diroby\ brm\_ogg\_src\_cdc\_cmd.oby. For example:

```
add TRANDATA pin5003.ACCOUNT_NAMEINFO_T COLS(OBJ_ID0,REC_ID), NOKEY
```

Note:

- a. In the file brm\_ogg\_src\_cdc\_cmd.oby, use the following command for all current mapping tables except table ACCOUNT\_T:

```
ADD TRANDATA <Source Schema Name>.<Table Name> COLS(col1, col2,...), NOKEY
```

- b. If the TRANDATA of each table has been done, use the following command to delete it:

```
DELETE TRANDATA <Source Schema Name>.*
```

## 10. Configure Change Capture using a Data Pump:

The goals of this method are to:

- Configure and add the Extract process that will capture changes.
- Add the local trail that will store these changes.
- Configure and add a data pump Extract to read the local trail and create a remote trail on the target.
- Add the remote trail.

Execute the following command on the *<source>* system to define an Extract group named *extbrm* and to define a data pump Extract named *extpbrm* to pull data from the local Oracle GoldenGate trail and route these changes to Oracle GoldenGate on the target.

```
[oracle@server gg]$ $GGATE/./ggsci paramfile $GGATE/diroby/brm_ogg_src_cdc_
cmd.oby
```

Note: In most of the cases, run the batch commands mentioned in the oby file one by one manually in the Oracle GoldenGate command line util (ggsci) .

## Starting Oracle GoldenGate Processes on Source System

To start the primary Extract process and data pump Extract process, run the following command on the *source* systems.

```
[oracle@server gg]$ $GGATE/./ggsci paramfile $GGATE/diroby/brm_ogg_src_cdc_start_cmd.oby
```

## Starting Oracle GoldenGate Processes on Target System

To start the Oracle GoldenGate processes on the target system, run the following command on the *target* system:

```
[oracle@server gg]$ $GGATE/./ggsci paramfile $GGATE/diroby/brm_ogg_stg_cdc_start_cmd.oby
```

## Oracle GoldenGate Process Checking Command Reference

[Table B-9](#) provides a summary of Oracle GoldenGate process commands. Note: Run these commands from GGSCI.

**Table B-9 Oracle GoldenGate Process Commands Summary**

| Process Area             | Commands                                                                                                                                        |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| To Start All Services    | Manager: Start Manager<br>Extract: Start Extract <Extract Group><br>Replicat: Start Replicat <Replicat Group><br>Extract & Replicat: Start ER * |
| To Stop All Services     | Manager: Stop Manager<br>Extract: Stop Extract <Extract Group><br>Replicat: Stop Replicat <Replicat Group><br>Extract & Replicat: Stop ER *     |
| To Check Services Status | All Services: Info All<br>Manager: Info Mgr<br>Extract: Info Extract <Extract Group><br>Replicat: Info Replicat <Replicat Group>                |
| To View Report           | Extract: View Report <Extract Group><br>Replicat: View Report <Replicat Group>                                                                  |

## Troubleshooting the Installation of the BRM Adapter

To de-install the existing repositories, do the following:

```
Drop user (Master_Repo_user) cascade;
create user (Master_Repo_user) identified by (pswd) default tablespace users
temporary tablespace temp;
grant connect, resource to (Master_Repo_user);
grant execute on dbms_lock to (Master_Repo_user);
```

This section includes the following topics:

- [Master and Work Repository Import Errors](#)
- [Error ODI-26005: Importing an Object from Another Repository](#)
- [Troubleshooting Error: An internal error occurred while opening the diagram...](#)

### Master and Work Repository Import Errors

**Error Message:**

```
Error: /.../.../.../...xml (No such file or directory)
```

This error could occur when you import repositories using the "Import from a Zip File" option.

**Workaround:**

To resolve this error "unzip" the Master and Work Repository zip files and start the import again using the "Import from a Folder" option.

**Error Recovery: Reimporting Master Repository**

To import a master repository (in an existing master repository):

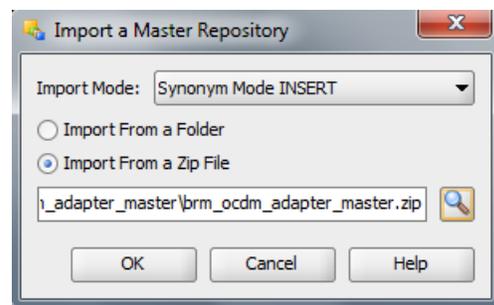
1. From the Topology Navigator toolbar menu select Import > Master Repository... (as shown in [Figure B-51](#)).

**Figure B-51 ODI Studio Import Master Repository**



2. Select the Import Mode, the "Import from a Folder" and click OK ([Figure B-52](#)).

**Figure B-52 Reimport: Import From a Folder**

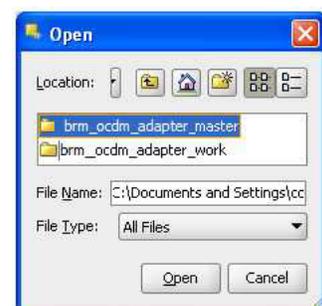


The specified file(s) are imported into the current master repository.

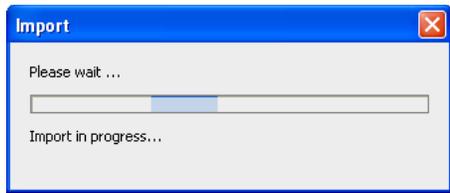
3. Browse the Master Repository from the specified location:

Repository Location: "\$BRM\_OCDM\_HOME/odi\_repository/brm\_ocdm\_adapter\_master"

**Figure B-53 ODI Studio Open and Import Master Repository**

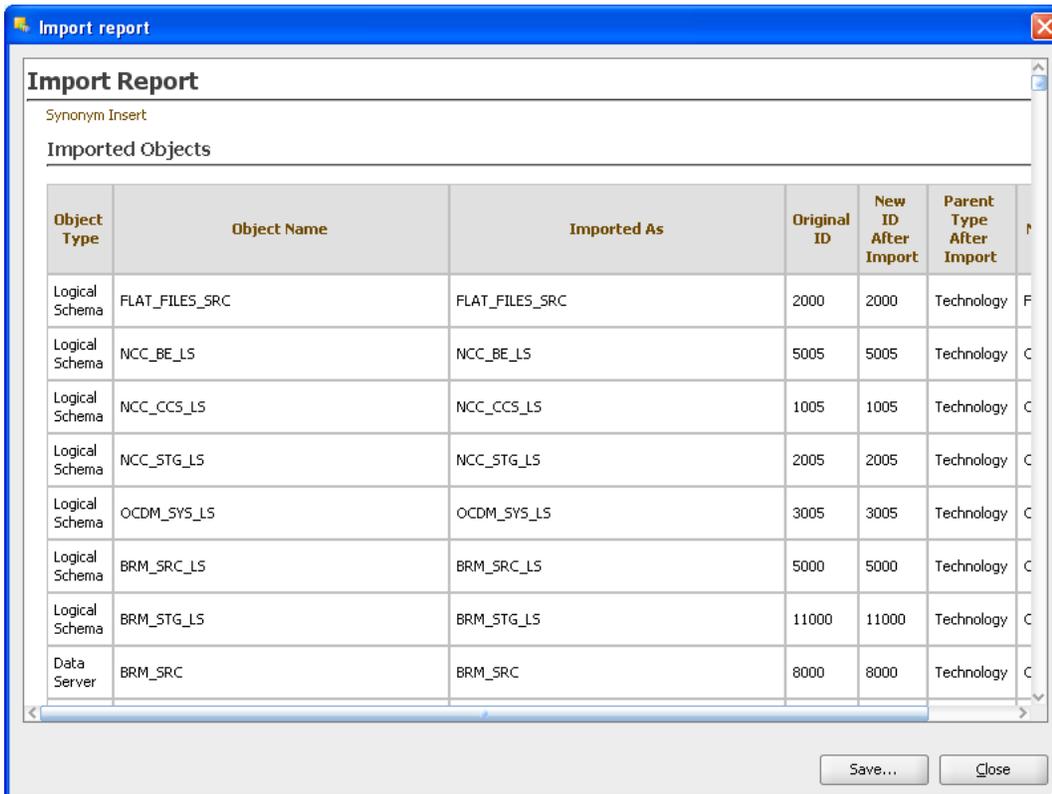


**Figure B–54 ODI Studio Import Master Repository Progress**



4. You can check the Import Report and you can save this report by clicking **Save**.

**Figure B–55 Reimport: Import Report Listing**



### Error Recovery: Reimporting Work Repository

#### To import a work repository:

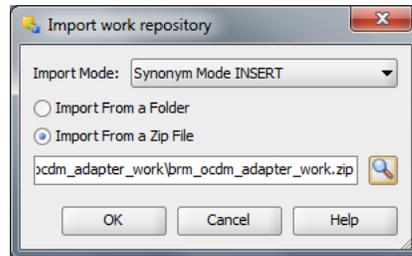
1. From the Designer Navigator toolbar menu select **Import > Work Repository...** (as shown in [Figure B–56](#)).

**Figure B–56 ODI Studio Import Work Repository**



2. Select the Import Mode: Import From a Folder or Import From a Zip file, and click OK.

**Figure B-57 ODI Studio Import Work Repository from Zip File**



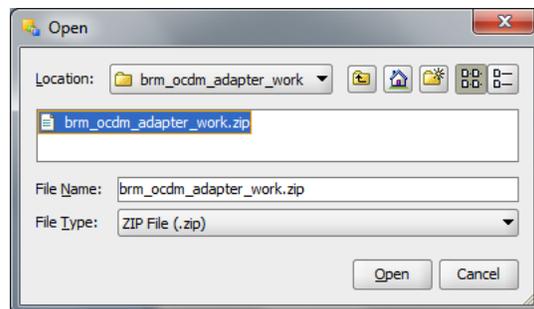
The specified file(s) are imported into the work repository.

3. Browse the Work Repository from the specified location.

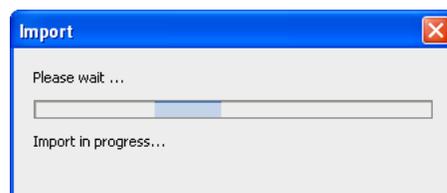
Repository Location:

\$BRM\_OCDM\_HOME/odi\_repository/brm\_ocdm\_adapter\_work.zip

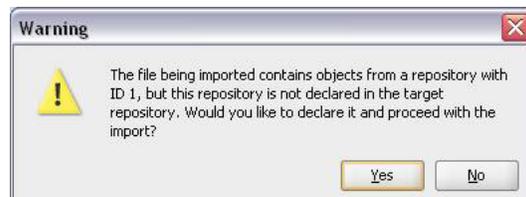
**Figure B-58 ODI Studio Import Work Repository from Zip File**



**Figure B-59 ODI Studio Open and Import Work Repository Progress**



**Figure B-60 Reimport: Work Repository Warning Message Dialog**



You can check the Import Report and to save report, click **Save**.

**Figure B–61 Reimport: Work Repository Report**

**Import Report**  
Synonym Insert

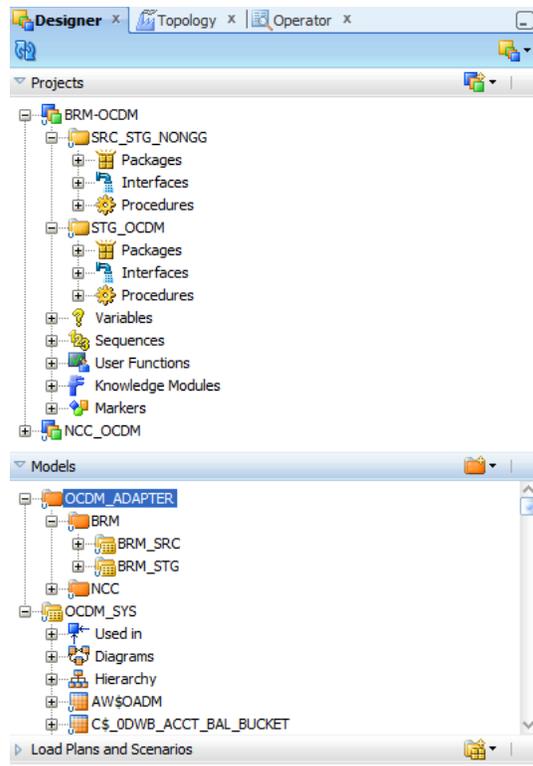
**Imported Objects**

| Object Type  | Object Name            | Imported As            | Original ID | New ID After Import |
|--------------|------------------------|------------------------|-------------|---------------------|
| Model Folder | OCDM_ADAPTER           | OCDM_ADAPTER           | 3001        | 3001                |
| Model Folder | BRM                    | BRM                    | 2005        | 2005                |
| Model        | BRM_STG                | BRM_STG                | 12001       | 12001               |
| Sub-Model    | Global                 | Global                 | 12001       | 12001               |
| Datastore    | ACCOUNT_NAMEINFO_T_D   | ACCOUNT_NAMEINFO_T_D   | 436005      | 436005              |
| Datastore    | ACCOUNT_NAMEINFO_T_D_H | ACCOUNT_NAMEINFO_T_D_H | 437005      | 437005              |
| Datastore    | ACCOUNT_NAMEINFO_T_LD  | ACCOUNT_NAMEINFO_T_LD  | 438005      | 438005              |
| Datastore    | ACCOUNT_T_D            | ACCOUNT_T_D            | 439005      | 439005              |
| Datastore    | ACCOUNT_T_D_H          | ACCOUNT_T_D_H          | 440005      | 440005              |
| Datastore    | ACCOUNT_T_LD           | ACCOUNT_T_LD           | 441005      | 441005              |
| Datastore    | BAL_GRP_T_D            | BAL_GRP_T_D            | 442005      | 442005              |

Buttons: Save... Close

View the Designer tab Projects and Models areas to see the contents of the work repository.

**Figure B-62** Shows the ODI Designer Navigator with Projects and Models



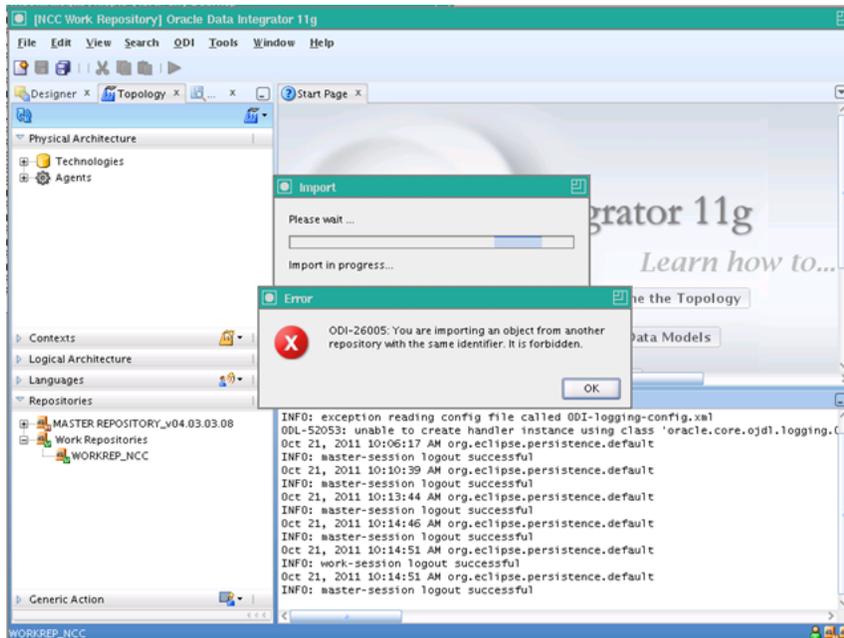
## Error ODI-26005: Importing an Object from Another Repository

### Error Message:

ODI-26005: You are importing an object from another repository with the same identifier...

Possible cause: An object in the import file has an identifier which already exists in the repository.

**Figure B-63 Troubleshooting BRM Adapter Problems**



**Workaround:**

Consider manually changing the "com.sunopsis.dwg.dwgobj.SnpImportRep" object section of the import XML file to use a unique identifier.

To resolve this error (ODI-26005), make changes depending on the repository:

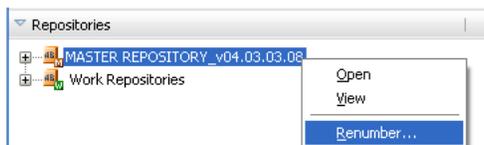
- [Resolve ODI Error on Master Repository](#)
- [Resolve ODI Error on Work Repository](#)

**Resolve ODI Error on Master Repository**

Master Repository: To change the ID of ODI master repository, you can "Renumber.." the repository ID with these steps:

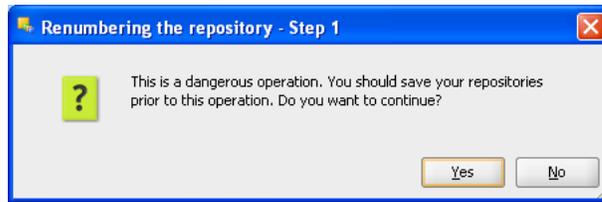
1. From the Topology Navigator, expand Repositories tab.
2. Right click Master Repository and click "Renumber", as shown in [Figure B-64](#).

**Figure B-64 Renumber Master Repository**



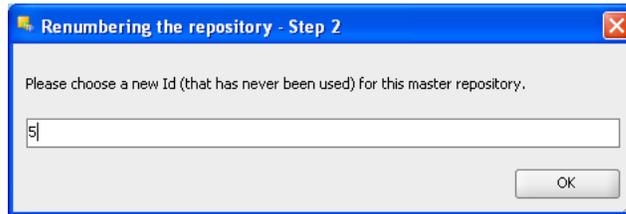
3. This opens the dialog, "Renumbering the repository - Step 1". Click **Yes** to renumber the repository ID, as shown in [Figure B-65](#).

**Figure B–65 Renumber Repository Step 1**



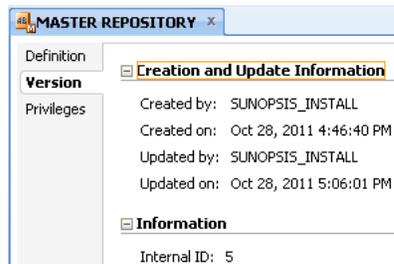
4. Provide the New ID for the Master repository and click **OK**. This displays the Renumbering the repository - Step 2 dialog, as shown in [Figure B–66](#).

**Figure B–66 Renumber Repository Step 2**



5. To check the changed ID, double click master repository and open version tab and check if the new ID is assigned, as shown in [Figure B–67](#).

**Figure B–67 Check Repository ID**

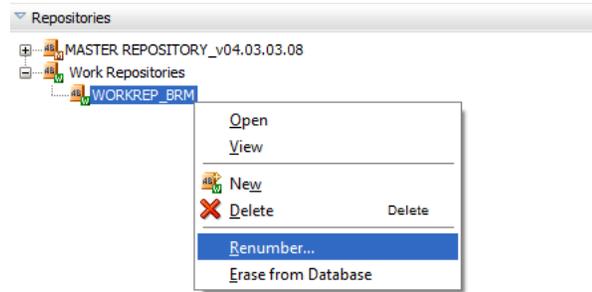


### Resolve ODI Error on Work Repository

To change the ID of ODI work repository, you can "Renumber.." the repository ID as follows:

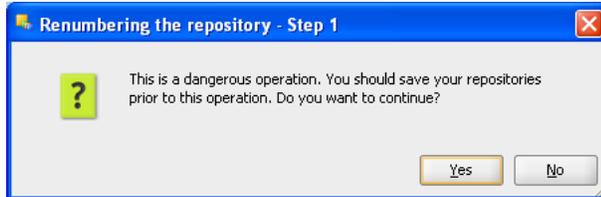
1. From the Topology Navigator, expand Repositories tab.
2. Expand the "Work Repositories", Right click Work Repository and then click "Renumber".

**Figure B–68 Renumber Work Repository**



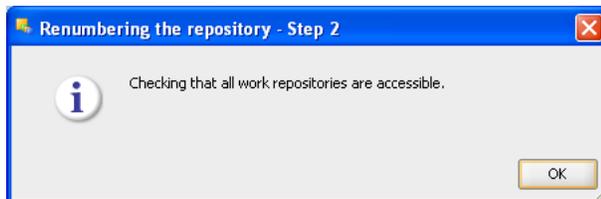
3. This opens the dialog, "Renumbering the repository - Step 1". Click **Yes** to renumber the repository ID.

**Figure B–69 Renumber Work Repository Step 1**



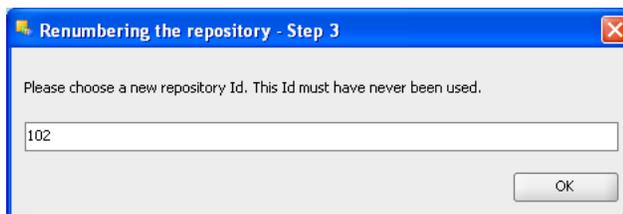
4. Click **OK** in the Renumbering the repository - Step 2 dialog.

**Figure B–70 Renumber Work Repository Step 2**



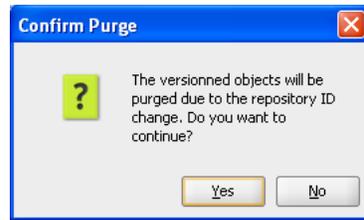
5. Provide the New ID for the Work repository and click **OK**.

**Figure B–71 Renumber Work Repository Step 3**



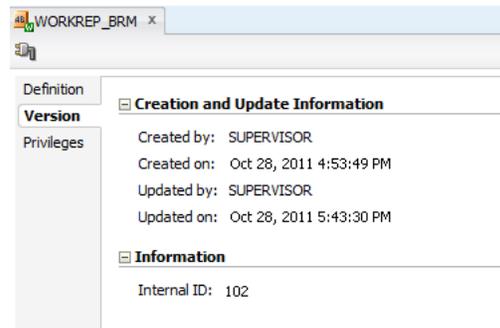
6. Click **Yes** to confirm the change.

**Figure B-72 Verify the Renumber Operation**



7. To check the changed ID, double click work repository and open version tab and check that the new ID is assigned.

**Figure B-73 Verify the Changed Repository ID**



## Troubleshooting Error: An internal error occurred while opening the diagram...

The following error may happen and is related to an issue with ODI version 11.1.1.5.0:

ERROR: An internal error occurred while opening the diagram

### Workaround:

From ODI Studio, open the corrupted Integration Interface, go to the "Version" tab, and get the internal ID. Connect to the database that hosts the ODI Work Repository tables, run the following SQL commands, and apply the changes:

```
delete from SNP_TXT
where I_TXT in (
select I_TXT_XMI_DATA
from SNP_DIAGRAM
where I_POP = <your internal ID>);
delete from SNP_DIAGRAM
where I_POP = <your internal ID>;
commit;
```

When you open the Integration Interface the next time, it creates a new Mapping and Flow map, and hence the issue should be resolved.



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## License Information

| Product                                                 | Subproduct                                                                                      | Licensing Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oracle Communications Data Model                        |                                                                                                 | <p>Oracle Communications Data Model is a standards-based, pre-built approach to communications data warehousing enabling a communications company to realize the power of insight more quickly.</p> <p>Oracle Communications Data Model includes the following:</p> <ul style="list-style-type: none"> <li>■ Communications industry specific data model conformance certified with TM Forum's Information Framework (SID).</li> <li>■ Physical implementation of the data model consisting of a foundation layer in third-normal-form schema, as well as dimensional models leveraging star schemas and OLAP cubes.</li> <li>■ Automatic data movement (intra-ETL) to populate the dimensional models based on data from the foundation layer.</li> <li>■ Pre-defined data mining models for churn prediction, churn factors, customer segmentation, customer sentiment, and others.</li> <li>■ Pre-built sample reports and dashboards.</li> </ul> <p><b>Prerequisites:</b> Oracle Communications Data Model requires the use of other Oracle software, which must be licensed separately. Contact your Oracle sales representative for additional information.</p> |
| Oracle Communications Data Model - Application Adapters | Oracle Communications Network Charging and Control Adapter for Oracle Communications Data Model | <p>The Oracle Communications Network Charging and Control Adapter for Oracle Communications Data Model (NCC Adapter) extracts data from an Oracle Communications Prepaid Charging application and loads and transforms that data into an Oracle Communications Data Model environment.</p> <p>The NCC Adapter supports two options for data loading:</p> <ul style="list-style-type: none"> <li>■ Standard - where data is loaded to Oracle Communications Data Model in customer defined intervals.</li> <li>■ Real-Time - where data is loaded to Oracle Communications Data Model staging in near-real-time intervals as transactions occur in NCC.</li> </ul> <p><b>Prerequisites:</b> NCC Adapter requires the use of other Oracle software, which must be licensed separately. Contact your Oracle sales representative for additional information.</p>                                                                                                                                                                                                                                                                                                         |

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| <b>Product</b>                                          | <b>Subproduct</b>                                                                                 | <b>Licensing Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oracle Communications Data Model - Application Adapters | Oracle Communications Billing and Revenue Management Adapter for Oracle Communications Data Model | <p>The Oracle Communications Billing and Revenue Management Adapter for Oracle Communications Data Model (BRM Adapter) extracts data from an Oracle Communications Billing and Revenue Management application and loads and transforms that data into an Oracle Communications Data Model environment.</p> <p>The BRM Adapter supports two options for data loading:</p> <ul style="list-style-type: none"> <li>■ Standard: where data is loaded to Oracle Communications Data Model in customer defined intervals.</li> <li>■ Real-Time: where data is loaded to Oracle Communications Data Model staging in near-real-time intervals as transactions occur in Oracle Communications Billing and Revenue Management.</li> </ul> <p><b>Prerequisites:</b> BRM Adapter requires the use of other Oracle software, which must be licensed separately. Contact your Oracle sales representative for additional information.</p> |

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