Oracle® Business Intelligence Applications

ETL Guide

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Oracle Business Intelligence Applications ETL Guide, 11g Release 1 (11.1.1.10)

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Contents

Preface

Oracle Business Intelligence Applications is a comprehensive suite of prebuilt solutions that deliver pervasive intelligence across an organization, empowering users at all levels - from front line operational users to senior management - with the key information they need to maximize effectiveness. Intuitive and role-based, these solutions transform and integrate data from a range of enterprise sources and corporate data warehouses into actionable insight that enables more effective actions, decisions, and processes.

Oracle BI Applications is built on Oracle Business Intelligence Suite Enterprise Edition (Oracle BI EE), a comprehensive set of enterprise business intelligence tools and infrastructure, including a scalable and efficient query and analysis server, an ad-hoc query and analysis tool, interactive dashboards, proactive intelligence and alerts, and an enterprise reporting engine.

Audience

This document is intended for managers and implementers of Oracle BI Applications.

Related Documents

See the Oracle Business Intelligence Applications documentation library for additional documentation resources.

Go to http://docs.oracle.com/cd/E51479_01/index.htm for a list of related Oracle Business Intelligence Applications documents.

Conventions

These text conventions are used in this document.

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

New Features for Oracle BI Applications ETL Administrators

Here are the new features for Oracle BI Applications ETL administrators.

A diagnostic healthcheck phase is now included in ETL prior to extract. Health Check queries applicable for the current load plan are run against the source data and all reported data issues are collected in a generated HTML report available from Configuration Manager, which includes problematic source data that may cause ETL failure or data loss or corruption in the data warehouse, a description of detected issues, and actions to resolve health check failures.

1 ETL Overview

The Oracle Business Intelligence Applications Extract, Transform, and Load (ETL) architecture and supporting technologies provide the ability to load data into your data warehouse.

Topics

Before Running ETL

Before you begin running Oracle BI Applications ETL processes, you must have completed the installation and setup of Oracle BI Applications.

For information on installation, see *Oracle Business Intelligence Applications Installation Guide*.

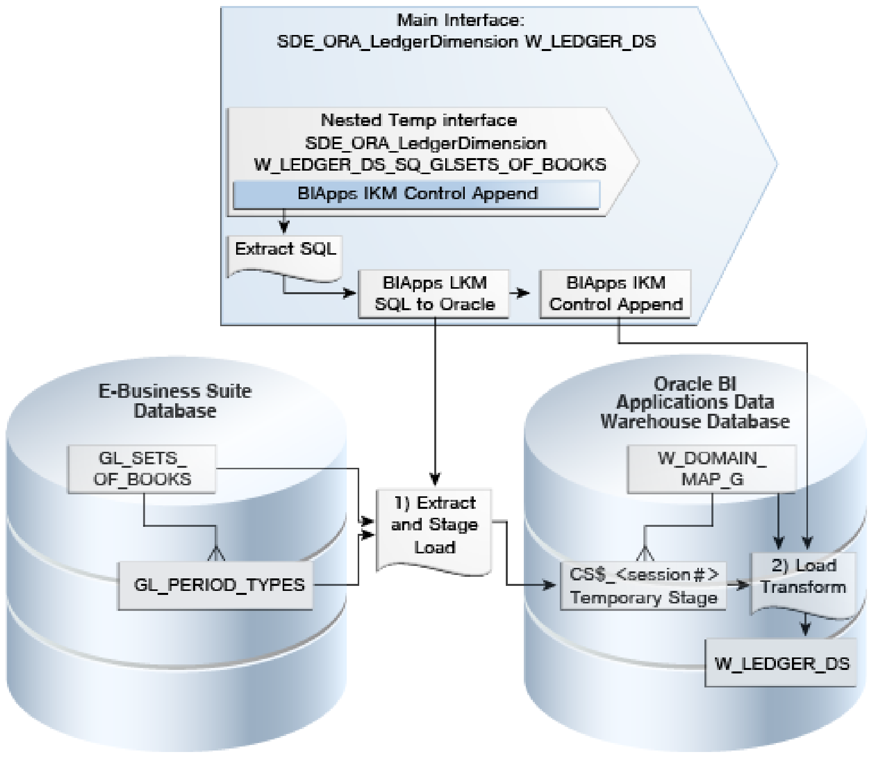
You must also have run the domains load plan, which loads source-specific data into Oracle BI Applications Configuration Manager tables. This enables Configuration Manager to display the appropriate source-specific values as choices in drop-down lists for setup objects. For instructions on running the domains load plan, see *Oracle Business Intelligence Applications Installation Guide*.

About ETL Architecture

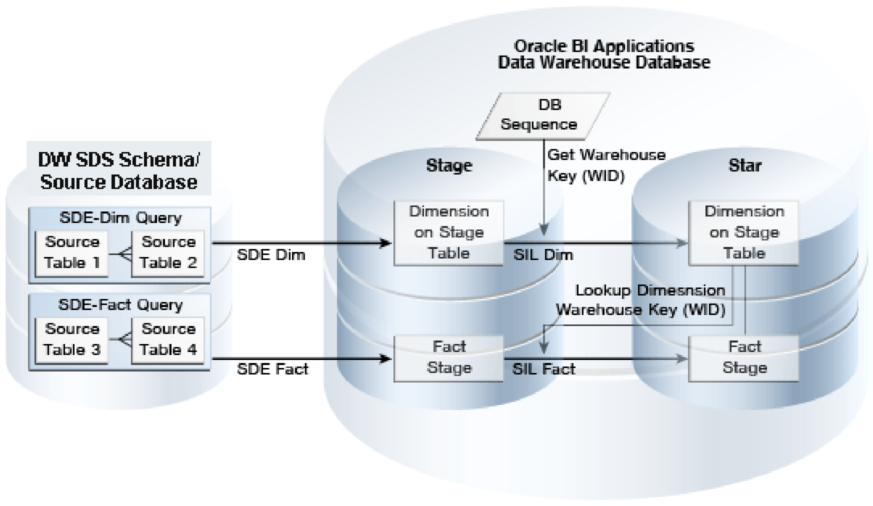
Typically, the extract-load-transform process has two main steps: The first step is the extract and stage load step, and the second step is the load transform step.

The extract and stage load step is generated from a combination of the main interface and the temporary interface. The load transform step is generated as a result of the integration knowledge module (IKM). In this on-premise example, step 1 issues a SQL statement on the source that joins the GL_SET_OF_BOOKS table with the GL_PERIOD_TYPES table. The join is executed on the source database, and the resulting data is staged. Then, a second join occurs at the load transform stage between the W_DOMAIN_G table and the temporary stage table, which results in the loading of the stage table W_LEDGER_DS.

Note that Oracle Database is the only database type supported for the Oracle BI Applications repository schemas and the Business Analytics Warehouse.


Main Interface:
SDE_ORA_LedgerDimension W_LEDGER_DS
Nested Temp interface
SDE_ORA_LedgerDimension
W_LEDGER_DS_SQ_GLSETS_OF_BOOKS
BIApps IKM Control Append
Extract SQL
BIApps LKM SQL to Oracle
BIApps IKM Control Append
E-Business Suite Database
GL_SETS_OF_BOOKS
GL_PERIOD_TYPES
1) Extract and Stage Load
Oracle BI Applications Data Warehouse Database
W_DOMAIN_MAP_G
CS$_<session#> Temporary Stage
2) Load Transform
W_LEDGER_DS

There are four main stages: The first, unique to cloud sources, is the SDS stage, which loads and incrementally maintains replicated data into a Source Dependent Data Store schema from cloud sources, for example Fusion Cloud, Taleo Cloud, and so on. A Health Check stage generates a diagnostic report identifying problematic source data that may cause ETL failure or data loss or corruption in the data warehouse. The SDE (source dependent extract) tasks then extract data from either SDS schema tables in the case of cloud sources or source dimension and fact tables in the case of on-premise sources, and load the data into universal dimension and fact staging tables. The SIL tasks are common and load data from the universal staging tables into the warehouse staging tables. This figure depicts a dependency between the dimension table and the fact table. Therefore, the SIL DIM must be executed before the SIL FACT, to resolve the dimension key. The SIL DIM has a database sequence that generates the key, and then the SIL FACT looks up that key when loading the fact staging table.



About ETL Phases

Oracle BI Applications ETL processes includes these phases: SDS, Health Check, SDE, SIL, and PLP.

- SDS stands for Source Dependent Data Store. In this phase, a separate schema on the data warehouse database is maintained as a replication of the source transactional systems' tables, deletes, as well as additional optimizations for incremental ETL. Each SDS requires its own separate schema because there can be multiple SDS each having the same object names. Typically, you would see a corresponding load plan step, "SDS Load Phase", in your generated load plan when you enable extraction from cloud sources, for example when extracting data from Fusion Cloud, Taleo Cloud, and so on. SDS Load Phase tasks extract data from cloud sources and stage it in SDS tables.
- Health Check is a preliminary ETL phase in which a diagnostic report is generated to identify problematic source data that may cause ETL failure or data loss or corruption in the data warehouse. The report is downloaded from Configuration Manager and includes any problematic data, a description of detected issues, and actions to resolve health check failures.
- SDE stands for Source Dependent Extract. In this phase, SDE tasks extract data from the source system and SDS and stage it in staging tables. SDE tasks are source specific.
- SIL stands for Source Independent Load. Load tasks transform and port the data from staging tables to base fact or dimension tables. SIL tasks are source independent.
- PLP stands Post Load Process. PLP tasks are only executed after the dimension and fact tables are populated. A typical usage of a PLP task is to transform data from a base fact table and load it into an aggregate table. PLP tasks are source independent.

About the ODI Repository

The ODI Repository for Oracle BI Applications comprises two repositories: master and work.

- Master Repository. Topology of resources, security, version management. A master repository is usually associated with multiple work repositories, but work repositories are always attached to a single Master repository
- Work Repository. Contains data models and projects. This is the development and execution repository.

The master and work repositories must reside in the same database schema, and the database type must be Oracle. Both the master and work repositories are set up during the Oracle BI Applications installation process.

The default ODI repository ID is 500. This ID is part of the internal ID for every object that is created within the ODI repository. Having a repository ID greater than or equal to 500 is critical to ensure that the objects you create do not overlap with any current or future Oracle BI Applications objects. If you change the default ODI repository ID, make sure the new value is greater than 500.

About Load Plans

A load plan is an executable object that comprises and organizes the child objects (referred to as steps) that carry out the ETL process. A load plan is made up of a sequence of several types of steps. Each step can contain several child steps. Depending on the step type, the steps can be executed conditionally, in parallel or sequentially.

You define a load plan in Oracle BI Applications Configuration Manager by selecting a data source and one or more fact groups. This selection determines which steps need to be performed during the ETL process. Each fact group belongs to a specific functional area or areas that are associated with one or more offerings, which, in turn, are related to a data server. A transactional data source is associated with one or more data servers.

After you define the load plan, you then generate it to build it in the ODI repository. You then execute the load plan to perform the ETL process.

For more information about working with Oracle BI Applications load plans, see Managing Load Plans . For information about the topic of load plans in the context of Oracle Data Integrator, see *Oracle Fusion Middleware Developer's Guide for Oracle Data Integrator*.

About Changed Data Capture

Oracle BI Applications has two ETL modes for loading data into the Oracle Business Analytics Warehouse: full and incremental.

During a full load, Oracle BI Applications extracts:

- All records from tables that are sources for dimension tables.
- Records created after an "Initial Extract Date" from tables that are sources for fact tables. The Initial Extract Date defines a cut-off so that not all records are loaded into the data warehouse. You set the Initial Extract Date value for each data source in the Oracle BI Applications Configuration Manager.

An ETL process can extract a record from a single table or from multiple tables. When a record is the result of joining multiple tables, one of these tables is identified as the *base* table, which defines the granularity of the record. When extracting fact records, Oracle BI Applications only compares the "Created Date" of the base table to the Initial Extract Date.

During an incremental load, Oracle BI Applications extracts records that have changed or were created after a "Last Extract Date." This is done by comparing the Last Extract Date value to a "Last Updated Date" (or LUD) type column in the source table. If the source table does not have such a column, Oracle BI Applications extracts all records from that table. The Last Extract Date is a value that is calculated based on the last time data was extracted from that table less a "Prune Days" value. The Prune Days parameter is used to extend the window of the ETL extract beyond the last time the ETL actually ran. This is to ensure records that may have somehow been missed in a prior ETL are picked up in the next ETL. Records can be missed in an ETL process when a record is being updated while the ETL process is running and was not committed until after the ETL completed.

You set the Prune Days parameter value in Oracle BI Applications Configuration Manager before the first full load ETL and it automatically takes effect in any subsequent incremental ETL. Setting a small value means the ETL will extract fewer records, thus improving performance; however, this increases the chances that records are not detected. Setting a large number is useful if ETL runs are infrequent, but this increases the number of records that are extracted and updated in the data warehouse. Therefore, you should not set the Prune Days value to a very large number. A large Prune Days number can also be used to trigger re-extracting records that were previously processed but have not changed. The value for Prune Days should never be set to 0.

If you have not set the Prune Days parameter prior to running a full ETL, but want to use one for a current incremental load, you can do so using the RESET_LAST_EXTRACT_DATE scenario in the RESET_LAST_EXTRACT_DATE procedure. For the scenario, in ODI Designer, set the BIAPPS.DATASOURCE_NUM_ID parameter to the source system’s ID and set the BIAPPS.PRUNE_DAYS parameter to the desired prune days. Execute the RESET_LAST_EXTRACT_DATE procedure from the ODI Console to set the Prune Days.

As stated above, an ETL process can extract a record from a single table but more commonly extracts records that are the result of joining multiple tables. When extracting from multiple tables, one table is identified as the base table, which defines the granularity of the record. When there is a change in the base table, an extract is triggered for the record. However, there can be cases where a change occurs in a non-base table but not in the base table itself. If a change occurs in a non-base table and this should trigger an extract of the record, these tables are referred to as "auxiliary" tables. Thus, when determining if a record should be extracted, Oracle BI Applications compares not only the LUD column in the base table but the LUD columns in all auxiliary tables. If the LUD column changed in any of these tables, the record is extracted. If changes can occur in a table that is not relevant to triggering an extract, this table's LUD column is not compared in the incremental filtering logic.

About Knowledge Modules

Knowledge Modules (KMs) implement different tasks within the Oracle Business Analytics Warehouse system.

The following are the different types of KMs available:

- **Reverse-engineering (RKM)**. Used for reading the table and other object metadata from source databases and to import tables, columns, and indexes into a model. For more information about RKMs, see About Reverse Knowledge Modules.
- **Loading (LKM)**. Used for efficient extraction of data from source databases for loading into a staging area (database-specific bulk unload utilities can be used where available).
- **Integration (IKM).** Used to load data into a target with different strategies, for example, slowly changing dimensions and insert/update strategies.
- **Check (CKM)**. Used to validate and cleanse data.
- **Journalizing (JKM)**. Used to record the new and changed data within either a single table or view or a consistent set of tables or views.
- **Service (SKM)**. Exposes data in the form of Web services.

About Reverse Knowledge Modules

Oracle BI Applications uses the ODI reverse engineering process to populate the repository with metadata from the source system. RKMs retrieve metadata from data storage and load it into the repository.

For example, RKMs detects the description of tables, columns, data types, constraints, and comments from a database to load the repository. RKMs support various technologies, such as databases, XML files, and various types of flat files. You can also use RKMs to retrieve non-standard metadata from databases or applications, such as Oracle E-Business Suite, Siebel CRM, PeopleSoft, and so on.

The RKM role is to perform customized reverse engineering for a model. The RKM handles connecting to the application or metadata provider then transforming and writing the resulting metadata into the ODI repository. The metadata is written into temporary tables, and then the RKM calls the ODI API to read from these tables and write to the ODI metadata tables of the Work repository in incremental update mode.

Note that the Oracle BI Applications ODI repository contains the relevant source data models. Therefore, you would need to run an RKM only if you have customized tables in the source system and want to import these changes to the ODI repository. For more information about customizing tables and tasks, see Customizing the Oracle Business Analytics Warehouse.

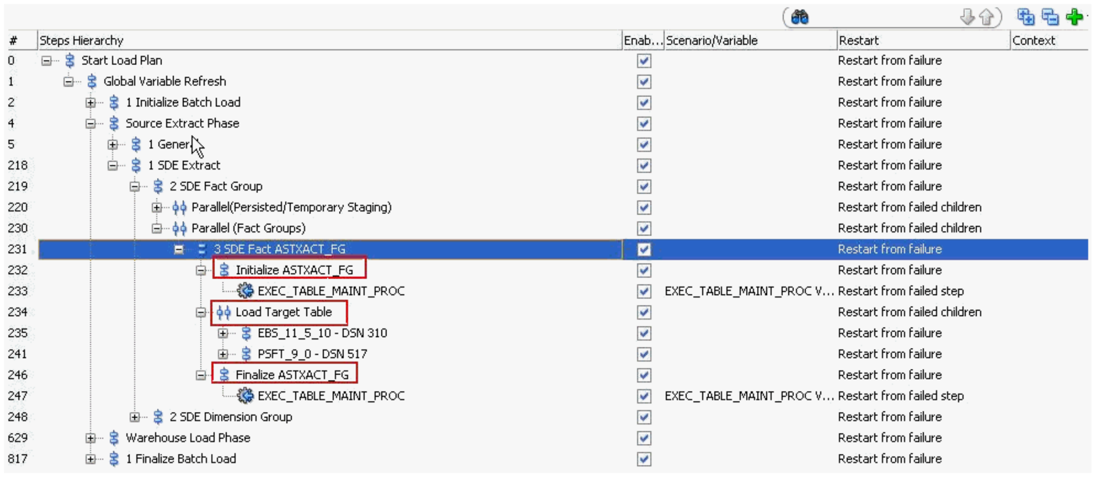
About Multi-Source Environments

Oracle BI Applications supports the loading of data into the Oracle Business Analytics Warehouse from multiple source systems. If the same adaptor is required for two different sources, then this requires the adaptors' model and maps to be duplicated in the ODI repository.

Consider a scenario in which you have a PeopleSoft 9.0 source and an Oracle EBS 11.5.10 source, both loading the target fact table ASTXACT_FG. Loading this target table includes three serial steps:

1. Initialize Target Table (ASTXACT_FG).
2. Load Target Table (ASTXACT_FG).
3. Finalize Target Table (ASTXACT_FG).

This figure shows these load plan steps in ODI Studio.



#	Steps Hierarchy	Enab...	Scenario/Variable	Restart	Context
0	Start Load Plan	✓		Restart from failure	
1	Global Variable Refresh	✓		Restart from failure	
2	1 Initialize Batch Load	✓		Restart from failure	
4	Source Extract Phase	✓		Restart from failure	
5	1 Gener	✓		Restart from failure	
218	1 SDE Extract	✓		Restart from failure	
219	2 SDE Fact Group	✓		Restart from failure	
220	Parallel(Persisted/Temporary Staging)	✓		Restart from failed children	
230	Parallel (Fact Groups)	✓		Restart from failed children	
231	3 SDE Fact ASTXACT_FG	✓		Restart from failure	
232	Initialize ASTXACT_FG	✓		Restart from failure	
233	EXEC_TABLE_MAINT_PROC	✓	EXEC_TABLE_MAINT_PROC V...	Restart from failed step	
234	Load Target Table	✓		Restart from failed children	
235	EBS_11_5_10 - DSN 310	✓		Restart from failure	
241	PSFT_9_0 - DSN 517	✓		Restart from failure	
246	Finalize ASTXACT_FG	✓		Restart from failure	
247	EXEC_TABLE_MAINT_PROC	✓	EXEC_TABLE_MAINT_PROC V...	Restart from failed step	
248	2 SDE Dimension Group	✓		Restart from failure	
629	Warehouse Load Phase	✓		Restart from failure	
817	1 Finalize Batch Load	✓		Restart from failure	

Data from both sources, PeopleSoft 9.0 and Oracle EBS 11.5.10, is being loaded into the target table (ASTXACT_FG) for the first time, which means a full load will occur; and, generally, when a full load occurs, the target table is truncated. In this case, the load plans can run in parallel because the data sources are not dependent on each other; however, the load from the second source should not truncate the target table if it already contains data from the first source. This issue is resolved as follows: The Initialize Target Table step truncates the target table. The Load Target Table step, in turn, has two child parallel steps. Each of these loads the target from each source system. Finally, the Finalize Target Table step creates any indexes and analyzes the table. Thus, the generated load plan ensures that the Note that you can have separate load plans for each source, but load plans should not run in parallel. table is truncated only at the required time (in this case, only once before any source system loads it).

Note:

Oracle BI Applications Configuration Manager and ODI will not stop load plans from running in parallel; however, it is recommended that you do not do so because of the following reasons:

- All load plans truncate target tables upon the initial load. If you run load plans in parallel, one load plan can truncate the data loaded by the preceding load plan.
- The mappings from SILOS onwards are common and not based on the source system. If load plans are run in parallel, you can have a situation in which only partial data is loaded from the second source due to the data that was loaded from the first source. To resolve this issue, you need to make sure that the first load plan completes successfully before the second load plan runs.

  In other words, when loading a fact table, the fact table could be connecting with multiple dimension and lookup tables to get the final data. When load plans are running parallel, some of the dimension, lookup, and staging tables could also have data from a second source. This could lead to some lookups and dimensions not returning appropriate value for the second source, since they have not yet been completely loaded

About ETL Roles

Access to Configuration Manager and Functional Setup Manager is controlled through these duty roles.

Oracle BI Applications has two duty roles for ETL operations:

- Load Plan Operator Duty
- Load Plan Administrator Duty

Oracle BI Applications has the following additional duty roles:

- BI Applications Administrator Duty
- BI Applications Functional Developer Duty
- BI Applications Implementation Manager Duty

The security administrator must grant the appropriate duty roles to a user based on the user's job responsibilities. For information on the Configuration Manager and Functional Setup Manager screens that each duty role has access to, see *Oracle Business Intelligence Applications Security Guide*.

The BI Applications administrator, load plan operator, and load plan administrator users will require appropriate access to ODI. In addition to these users being created in the LDAP system, these users must also be created in the ODI Repository, and they must be granted the Supervisor profile or an appropriate ODI profile. The BI Applications administrator must be granted the Supervisor role in ODI. Work with your security administrator to obtain the appropriate duty roles.

For more information about managing security in ODI, see *Oracle Fusion Middleware Developer's Guide for Oracle Data Integrator*.

About Cloud Sources

Performing ETL from Fusion Cloud sources is a collaborative effort. Data extracted from cloud-hosted source application database tables using standard SDE knowledge module logic is uploaded automatically to Oracle Universal Content management for uptake by on-premise ETL developers and operators.

At appropriate intervals, new or incremental datasets required to create and maintain the on-premise data warehouse are updated in an Oracle Source Dependent Schema (SDS), which serves as the on-premise copy of the cloud data for the purposes of aggregating, transforming, and loading it into the on-premise data warehouse. Once data is available in the cloud SDS database schema, you can create and run load plans to load the warehouse tables in Configuration Manager.

In the case of Taleo and RightNow data sources, data is sourced automatically directly from the respective cloud transactional tables and loaded into the data warehouse staging tables during SIL processing.

2 Managing Load Plans

The tasks for managing load plans are usually performed by either ETL developers or ETL operators using Oracle BI Applications Configuration Manager.

ETL Developer Tasks

- Defining Load Plans
- Duplicating Load Plans
- Editing Load Plans
- Generating Load Plans
- Scheduling Load Plans
- Executing Load Plans

ETL Operator Tasks

- About Diagnostics Healthcheck and ETL Diagnostics and Automatic Correction
- Downloading Diagnostic Healthcheck Reports
- Downloading Error Data from Diagnostics
- Monitoring Load Plan Runs
- Restarting Load Plans
- Stopping Load Plans

Overview of Load Plan Life Cycle

A load plan life cycle comprises four phases.

- Phase 1: Define load plan

  In this phase, you define load plan properties in the Oracle BI Applications Configuration Manager, including selecting a data source and one or more fact groups. This selection determines which steps need to be performed during the ETL process.

- Phase 2: Generate load plan

  In this phase, you launch a generation process from Oracle BI Applications Configuration Manager that propagates the load plan properties to the ODI Repository, where the load plan is built.

- Phase 3: Execute load plan

In this phase, you start a load plan run from Oracle BI Applications Configuration Manager, which executes the steps of the load plan. Executing a load plan creates a load plan instance and a first load plan run. If a run is restarted, a new load plan run is created under this load plan instance. Each execution attempt of the load plan instance is preserved as a different load plan run in the log.

- Phase 4: Monitor load plan

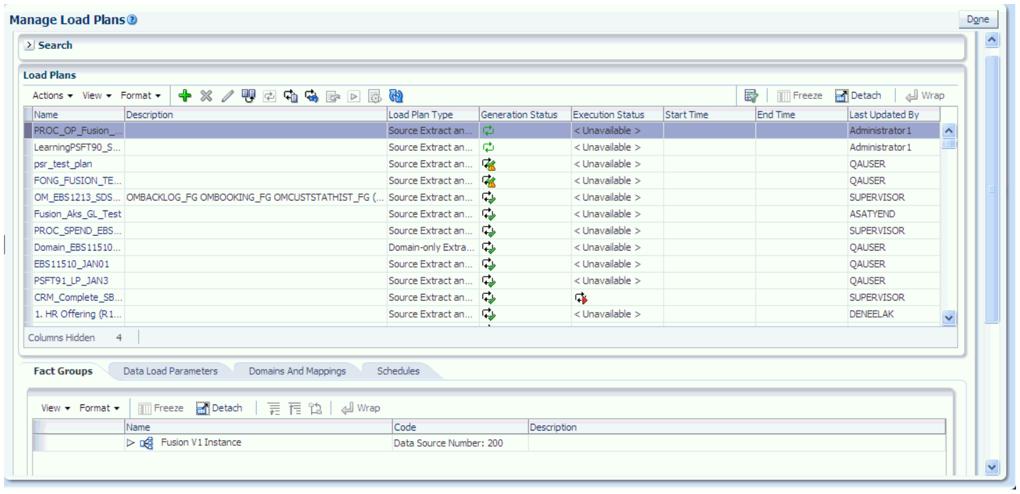
  In this phase, you monitor the load plan run in the Load Plan Details page of the Oracle BI Applications Configuration Manager. The Load Plan Details page provides a view of the ODI Repository through Oracle Data Integrator Console.

Defining Load Plans

Define load plan properties in the Oracle BI Applications Configuration Manager, including selecting a data source and one or more fact groups. This selection determines which steps need to be performed during the ETL process.

1. In the Tasks pane of Oracle BI Applications Configuration Manager, select **Manage Load Plans**, which appears under the Load Plans Administration heading.

   The Manage Load Plans page is displayed.



Name	Description	Load Plan Type	Generation Status	Execution Status	Start Time	End Time	Last Updated By
PROC_OP_Fusion_...		Source Extract an...		< Unavailable >			Administrator1
LearningPSFT90_S...		Source Extract an...		< Unavailable >			Administrator1
psr_test_plan		Source Extract an...		< Unavailable >			QAUSER
FONG_FUSION_TE...		Source Extract an...		< Unavailable >			QAUSER
OM_EBS1213_SDS...	OMBACKLOG_FG OMBOOKING_FG OMCUSTSTATHIST_FG (...	Source Extract an...		< Unavailable >			SUPERVISOR
Fusion_Aks_GL_Test		Source Extract an...		< Unavailable >			ASATYEND
PROC_SPEND_EBS...		Source Extract an...		< Unavailable >			SUPERVISOR
Domain_EBS11510...		Domain-only Extra...		< Unavailable >			QAUSER
EBS11510_JAN01		Source Extract an...		< Unavailable >			QAUSER
PSFT91_LP_JAN3		Source Extract an...		< Unavailable >			QAUSER
CRM_Complete_SB...		Source Extract an...					SUPERVISOR
1. HR Offering (R1...		Source Extract an...		< Unavailable >			DENEELAK

Name	Code	Description
Fusion V1 Instance	Data Source Number: 200	

2. In the Load Plans toolbar, click the **Add** icon.

   The Define Load Plan page is displayed.

3. On the first page of the Define Load Plan series, specify the following information:

Field	Description
Name	Enter a unique name for the load plan.
Description	(Optional) Enter additional information about the load plan.

Field	Description
Load Plan Type	Select a load plan type. Possible values are the following: • **Source Extract (SDE)** - Includes only those tasks that extract from the source and loads data into staging tables. • **Source Extract and Load (SDE, SIL and PLP)** - Includes all tasks to extract from the source and load the data warehouse tables. • **Warehouse Load (SIL and PLP)** - Includes only those tasks that extract from the staging tables and load the data warehouse tables. Note that it may be useful to generate separate source-specific and data warehouse-specific load plans. By decoupling the load plans, this allows scheduling a source-specific load plan to run during hours when most users are not using the source system and scheduling a separate load of the data warehouse when most users are not using the data warehouse. • **Domain-only Extract and Load (SDE and SIL)** - Includes all tasks required to extract domain-related records from the source and load the data into the domain-related tables in the Oracle Business Analytics Warehouse. Note that domains are used extensively in Oracle BI Applications Configuration Manager and several properties must be configured before executing a regular load plan. These properties depend on the domain values found in the transactional database.
Source Instances	Select the data sources from which the fact groups will be selected.

4. Click **Next.**

   The second page of the Define Load Plan series is displayed.

5. In the Available Selections tab, select the fact groups you want to include in the load plan definition.

   Note that fact groups may belong to a hierarchy of fact groups. You can select only the top level parent fact group and not a child fact group.

   A load plan must contain at least one fact group; multiple fact groups may be selected from one or more data sources.

6. Click **Save**.

   - Click **Save** to save the load plan. After a load plan is saved, it is displayed in the Load Plans master list.

   - Click **Save and Generate Load Plan** to save the load plan and immediately generate it.

Duplicating Load Plans

Follow this procedure to duplicate an existing load plan.

1. In the Tasks pane of Oracle BI Applications Configuration Manager, select **Manage Load Plans**, which appears under the Load Plans Administration heading.

   The Manage Load Plans page is displayed.

2. In the Load Plans master list, select the load plan you want to duplicate.
3. In the Load Plans toolbar, click the **Duplicate** icon.

   The Duplicate Load Plan page is displayed.
4. On the first page of the Duplicate Load Plan series, specify the following information:

Field	Description
Name	Enter a unique name for the load plan.
Description	(Optional) Enter additional information about the load plan.
Load Plan Type	(Optional) Select a load plan type. Possible values are the following: • Source Extract (SDE) • Source Extract and Load (SDE, SIL and PLP) • Warehouse Load (SIL and PLP) • Domain-only Extract and Load (SDE and SIL)
Source Instances	(Optional) Select the data sources from which the fact groups will be selected.

5. Click **Next**.

   The second page of the Duplicate Load Plan series is displayed.
6. In the Available Selections tab, select the fact groups you want to include in the load plan definition.

   Note that fact groups may belong to a hierarchy of fact groups. You can select only the top level parent fact group and not a child fact group.

   A load plan must contain at least one fact group, and multiple fact groups may be selected from one or more data sources.
7. Click **Save**.

   A submenu is displayed with the following options:

   - Click **Save** to save the load plan. After a load plan is saved, it is displayed in the Load Plans master list.
   - Click **Save and Generate Load Plan** to save the load plan and immediately generate it.

Editing Load Plans

Follow this procedure to edit an existing load plan.

1. In the Tasks pane of Oracle BI Applications Configuration Manager, select **Manage Load Plans**, which appears under the Load Plans Administration heading.

   The Manage Load Plans page is displayed.
2. In the Load Plans master list, select the load plan you want to edit.

3. In the Load Plans toolbar, click the **Edit** icon.

   The Edit Load Plan page is displayed.

4. You can edit these properties:

Field	Description
Name	Enter a unique name for the load plan.
Description	(Optional) Enter additional information about the load plan.
Load Plan Type	(Optional) Select a load plan type. Possible values are the following: • Source Extract (SDE) • Source Extract and Load (SDE, SIL and PLP) • Warehouse Load (SIL and PLP) • Domain-only Extract and Load (SDE and SIL) **Note:** The Load Plan Type of an existing Load Plan can't be changed.
Source Instances	(Optional) Select the data sources from which the fact groups will be selected.

5. Click **Next**.

   The second page of the Edit Load Plan series is displayed.

6. In the Available Selections tab, select the fact groups you want to include in the load plan definition.

   Note that fact groups may belong to a hierarchy of fact groups. You can select only the top level parent fact group and not a child fact group.

   A load plan must contain at least one fact group, and multiple fact groups may be selected from one or more data sources.

7. Click **Save**.

   A submenu is displayed with the following options.

   - Click **Save** to save the load plan. After a load plan is saved, it is displayed in the Load Plans master list.

   - Click **Save and Generate Load Plan** to save the load plan and immediately generate it.

Generating Load Plans

When you generate a load plan, the load plan is built in the ODI Repository. A load plan must be successfully generated before it can be executed.

Load plans must be generated serially or the process will fail. Do not launch a second load plan generation if one is already underway. You must wait until the first generation process completes before you launch the next generation process.

1. In the Tasks pane of Oracle BI Applications Configuration Manager, select **Manage Load Plans**, which appears under the Load Plans Administration heading.

   The Manage Load Plans page is displayed.

2. In the Load Plans master list, select the load plan you want to generate.

3. In the Load Plans toolbar, click the **Generate** icon.

   The possible icons that can appear in the Generation Status column of the Load Plan master list are described in the following table. Click the **Refresh** icon to refresh the display.

Generation Status Icon	Description
🔄▶	Starting
🔄	In Progress
🔄✓	Succeeded
🔄✗	Failed

You can execute a load plan or schedule it for execution after it has been successfully generated.

Scheduling Load Plans

Follow this procedure to schedule a load plan for execution.

1. In the Tasks pane of Oracle BI Applications Configuration Manager, select **Manage Load Plans**, which appears under the Load Plans Administration heading.

   The Manage Load Plans page is displayed.

2. In the Load Plans list, select the load plan you want to schedule.

3. Select the Schedules tab.

4. Click **Add** in the Schedules tab toolbar.

The Schedule Load Plan dialog is displayed.

5. Select:

Field	Description
Context	The ODI context to be used when the load plan is run. Note that **Global** is the only supported context.
Local Agent	The ODI local agent to be used when the load plan is run.
Log Level	The level of logging information to retain. The Oracle BI Applications Configuration Manager uses Oracle Diagnostic Logging. For information about managing log files and diagnostic data, see *Oracle Fusion Middleware Administrator's Guide*.
Status	Status of the schedule. Possible values are the following • Active • Inactive • Active for the period
Recurrence	Frequency of occurrence. Possible values are the following: • On Agent Startup • Simple • Hourly • Daily • Weekly • Monthly (day of the month) • Monthly (week day) • Yearly Depending on the Recurrence option you select, options for selecting the date and time are dynamically displayed.

6. Click **Schedule**.

Executing Load Plans

Follow this procedure to execute a load plan.

Note the following points:

- You can have separate load plans for each source, but load plans should not run in parallel
- You can only execute a load plan if it was successfully generated. See Generating Load Plans for instructions.

1. In the Tasks pane of Oracle BI Applications Configuration Manager, select **Manage Load Plans**, which appears under the Load Plans Administration heading.

   The Manage Load Plans page is displayed.

2. In the Load Plans list, select the load plan you want to execute.

3. In the Load Plans toolbar, click the **Execute** icon.

   The Execute Load Plan dialog is displayed.

4. Specify the following information:

Field	Description
Context	The ODI context to be used when the load plan is run. Note that **Global** is the only supported context.
Logical Agent	The ODI logical agent to be used when the load plan is run.
Oracle Data Integrator Work Repository	The name of the ODI Work repository.

5. Click **OK**.

   The following icons show the possible execution statuses that appear in the Execution Status column in the Load Plan master list. Click the **Refresh** icon to refresh the display.

Generation Status Icon	Description
⚡	Starting
🔄	In Progress
✓	Succeeded
✗	Failed
▶	Not Executed

6. (Optional) Click the **Show Execution Status Details** icon to display detailed information about the status of the execution.

About Diagnostics Healthcheck and ETL Diagnostics and Automatic Correction

Diagnostic Health Check is a preliminary ETL phase in which a diagnostic report is generated to identify problematic source data that may cause ETL failure or data loss or corruption in the data warehouse. In the event of a failure of an ETL task, diagnostics are run and error handling and automatic correction are performed to enable the load plan to restart and continue.

During ETL, when you run a load plan, the relevant source data is queried to generate a healthcheck report. The health check queries are seed data XML files and can be found at `{bi.oracle.home}/biapps/etl/data_files/src_files/BIA_11/metadata/healthcheck_xml` The report is downloaded from Configuration

Manager and includes any problematic data, a description of detected issues, and actions to resolve health check failures.

Email Notifications

If an email address is configured for ETL email notification during Functional Setup Manager configuration, an email is sent in the following cases:

- If the health check scenario fails, an email is sent with a summary of the health check results.
- If the load plan execution fails, an email is sent with a list of failed tasks during that load plan execution.
- If the load plan execution completes, an email is sent with a list of tasks that are in failed state in any of the load plan instance runs and a summary of auto corrections performed (if any), during the ETL.

Automatic Correction of Data Errors

Some common data errors that can cause ETL tasks to fail are automatically diagnosed and corrected during the ETL, allowing for the load plan to restart and complete.

Data Error Type	Automatic Correction
Duplicate rows being inserted into the target table causes a unique constraint violation.	One row is inserted and the duplicate rows are rejected.
String values larger than allowed being inserted into`varchar` or `char` columns.	All `varchar` columns are truncated to the precision allowed by each column before insert. Exception: key columns defined in the interface are not truncated.
All other issues, including: • Number values larger than allowed being inserted into numeric columns. • NULL value being inserted into a `NOT NULL` column. • Invalid data, for example alphanumeric being inserted into a number column, invalid date strings, and so on.	Row is rejected. For dimension load tasks, instead of rejecting rows, the row is inserted into the target table with the "unspecified" value for all the columns except the key columns (typically INTEGRATION_ID and DATASOURCE_NUM_ID). This is done to ensure that fact rows inserted during ETL which refer to a dimension row will not have a dangling foreign key.

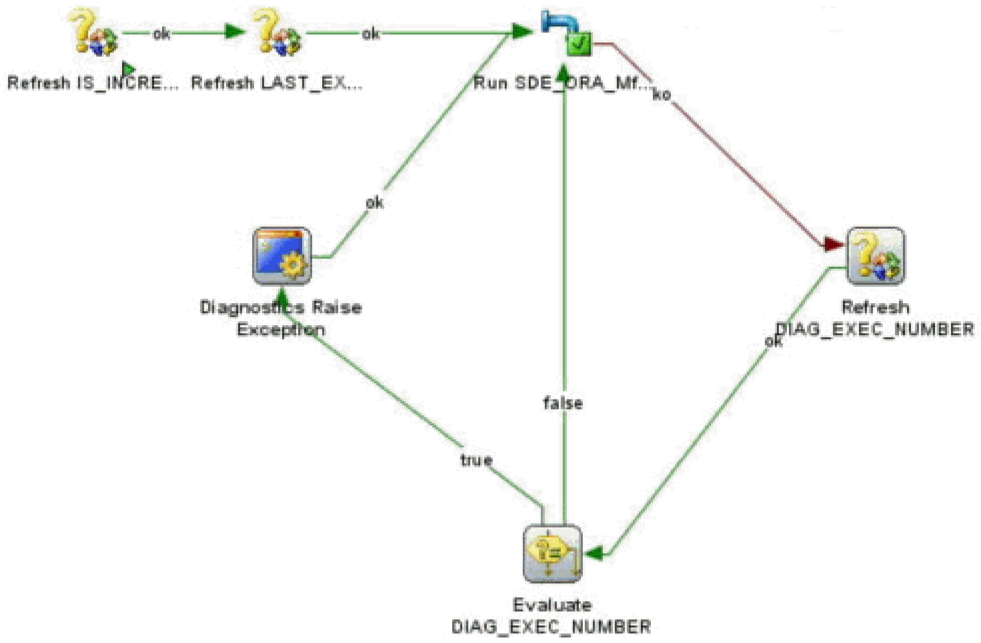
The following Knowledge Modules have been enhanced to support diagnostic features during load plan execution process:

- IKM BIAPPS Oracle Control Append
- IKM BIAPPS Oracle Incremental Update
- IKM BIAPPS Oracle Fact Incremental Update
- IKM BIAPPS Oracle Slowly Changing Dimension
- IKM BIAPPS Oracle Event Queue Delete Append
- IKM BIAPPS Oracle Fact Event Queue Delete Append

- IKM BIAPPS CLOUD Oracle Incremental Update
- CKM BIAPPS Oracle

Package Structure for Error Handling and Automatic Correction

All ODI packages that have a main interface step using one of the diagnostic-enabled IKMs include a loop as shown in the example below. Each interface step in the package that uses one of the above IKMs will have a "ko" flow. At a high level, if there is no failure in the interface step, the scenario execution will complete successfully after executing the interface step. However, if there is a failure in the interface step, the control is transferred to the "ko" flow, which executes "Refresh DIAG_EXEC_NUMBER" and "Evaluate DIAG_EXEC_NUMBER" steps and then re-runs the interface step in diagnostic mode. The interface step now tries to capture Data Manipulation Language (DML) data errors (if any) in an error table and tries to auto correct them based on a set of predefined rules as described above, for example trimming string lengths in case of a string length overflow error.



If the diagnostic framework is not able to automatically correct the error records, they are rejected in an error table so that the non-error rows can be loaded in the target and the scenario execution can complete successfully.

If the failure was caused by a system error or error in LKM steps, the interface step is more likely to fail again, in which case the control is transferred to "Diagnostic Raise Exception" procedure step and fail the scenario execution.

Enabling and Disabling Diagnostic Features

ETL diagnostics and automatic correction can be turned on or off using two parameters in Configuration Manager, both of which are set to Y by default:

- `DIAG_ERR_LOG_SUPPORTED` — This parameter controls whether the ODI IKM code performs any auto corrections for DML data errors or not. If disabled, ODI IKM will not attempt to perform any automatic corrections on data. Upon failure of a task, it will still re-run the interface step in diagnostic mode, but raises an error after attempting to capture the data errors.

- `DIAG_AUTOCORRECT`— This parameter controls the ETL diagnostic and auto correction feature. When disabled, failed interface steps are not re-run in diagnostic mode.

To reset these parameters, navigate to the Manage Data Loads Parameters page in Configuration Manager and set them to `N`. After resetting these parameters your load plan must be regenerated for the change to take effect.

Downloading Diagnostic Healthcheck Reports

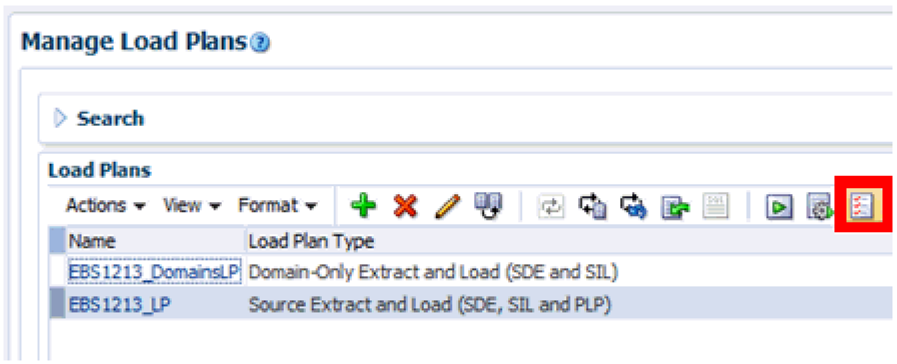
Follow this procedure to download a diagnostic healthcheck report:

1. In the Tasks pane of Oracle BI Applications Configuration Manager, select **Manage Load Plans**, which appears under the Load Plans Administration heading.

   The Manage Load Plans page is displayed.

2. In the Load Plans master list, select the load plan that has failed and whose report you want to download.

3. Click the **Show Data Problems** button.



Name	Load Plan Type
EBS1213_DomainsLP	Domain-Only Extract and Load (SDE and SIL)
EBS1213_LP	Source Extract and Load (SDE, SIL and PLP)

4. In the Load Plan Data Problems window, select the row showing the task name as DIAGNOSTIC HEALTHCHECK and click **Download**.

5. In your browser, download the zip file containing the report, then unzip the file on your system.

Downloading Error Data from Diagnostics

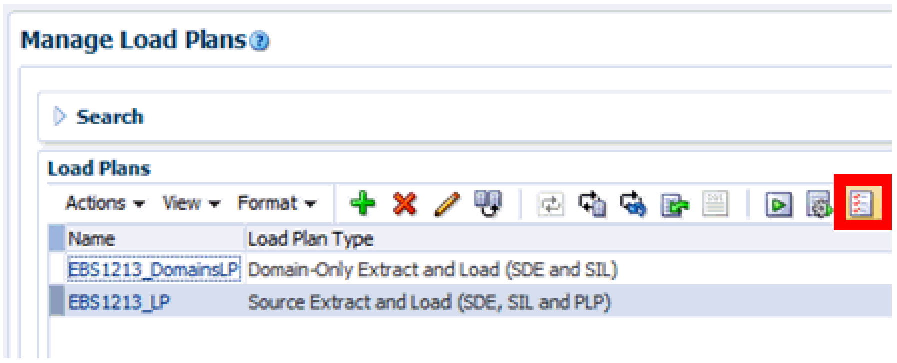
You can download error data from automatic ETL diagnostics. Follow this procedure to download error data:

1. In the Tasks pane of Oracle BI Applications Configuration Manager, select **Manage Load Plans**, which appears under the Load Plans Administration heading.

   The Manage Load Plans page is displayed.

2. In the Load Plans master list, select the load plan that has failed and whose report you want to download.

3. Click the **Show Data Problems** button.



Name	Load Plan Type
EBS1213_DomainsLP	Domain-Only Extract and Load (SDE and SIL)
EBS1213_LP	Source Extract and Load (SDE, SIL and PLP)

4. In the list of tasks that encountered data problems and were corrected, the task name and the target table this task is inserting into or updating are noted. These are the rows were the Component column has a value of "ETL". Select each of these rows and click **Download**.

5. In your browser, download the zip file containing the report, then unzip the file on your system.

6. Each line in the file is an entire row of data for the target table with all of the columns. Along with the columns of the target table, there are some system columns in the file to describe the error number, error message and other information useful in understanding the problem with each row of data and what kind of automatic correction was done by the ETL program.

Monitoring Load Plan Runs

You can monitor a load plan run by viewing the execution status information on the Load Plan Execution Details page of Oracle BI Applications Configuration Manager.

1. In the Tasks pane of Oracle BI Applications Configuration Manager, select **Manage Load Plans**, which appears under the Load Plans Administration heading.

   The Manage Load Plans page is displayed.

2. In the Load Plans master list, select the load plan whose execution details you want to view.

3. In the Load Plans toolbar, click the **Show Execution Status Details** icon.

   The Oracle Data Integrator Console is displayed.

4. Log into the Oracle Data Integrator Console by entering an appropriate **User ID** and **Password**.

   The Load Plan Details page is displayed. For a description of the information displayed on this page, see Load Plan Details Page.

Restarting Load Plans

When you run ETL to load data from a source system into the Oracle Business Analytics Warehouse, it is possible that you may need to restart the ETL load after a failure. This section explains the options available for restart and describes the implications of using each of those options.

Examples of circumstances and reasons for load plan failure include the following:

- Issues identified in the healthcheck ETL phase. These issues need to be fixed before restarting the load plan.
- Problem with access either to source or target database due to network failure or expired or otherwise incorrect user names and passwords.
- Failure of ODI agent.
- Problem with space or storage. Able to connect to source or target database but the query fails to run due to lack of temp space, disk space, and so on. For files it could due to inadequate space where the file needs to be placed.
- Problem with data, for example incorrect data with lengths larger than the target column can hold, or null values in Not Null columns.

After such a failure during ETL, to avoid restarting the entire load plan after a failure, which would require inefficient re-runs of all ETL tasks, you must restart the load from the same point in its execution once the cause of failure has been diagnosed and resolved. Some of these circumstances for failure are automatically diagnosed and resolved by ETL diagnostics and auto-correction. For information about automatic correction and restart, see About Diagnostics Healthcheck and ETL Diagnostics and Automatic Correction.

About Restartability Grain

When you restart a load plan after a failure, you may not restart again from the exact point of failure, depending on where it occurred and on dependencies between load plan steps. The point of restartability is that the end result of the load plan execution is the same regardless of any load plan failure.

The following example describes one such dependency-driven requirement for re-running a step that has already completed: In a load plan with two steps, the first step truncates the table, and the second inserts records into the table, intermittently committing the records. The load plan is run and fails at the second step due to a space issue. After the issue is resolved, restarting the load plan from the second step would be incorrect, because the target has some inserted rows. Restart should instead begin with the first step so that the target table is truncated again and newly inserted data does not cause any duplicates.

To maintain data integrity in the case of restart, the grain would vary depending on the location in the step hierarchy of the failed step and on the Restart setting for the step in the Load Plan Manager.

Within the Steps Hierarchy in Load Plan Manager, you can view and edit the Restart setting of a step in the Restart column. The default settings for different steps in the hierarchy support data integrity in restarts:

- Root steps are set to 'Restart From Failure' if Serial and 'Restart from failed Children' if Parallel.
- Sub steps are set to 'Restart From Failure' if Serial and 'Restart from failed Children' if Parallel.
- Scenario steps are set to 'Restart from Failed Step'

The examples below highlight the implications for each type of load plan step.

Serial Load Plan Step

Serial steps are represented by a horizontal icon in the Steps hierarchy in Load Plan Manager, and by default have a Restart setting of Restart from Failure. In a case where the load plan fails when running such a step to load a Dimension Group with multiple serial sub-steps loading individual dimensions, the load plan on restart would start from the individual sub-step that failed. Any successfully completed serial sub-steps would not be run again.

Parallel Load Plan Step

Parallel steps are represented by a vertical icon in the Steps hierarchy in Load Plan Manager and by default have a Restart setting of Restart from Failed Children. In a typical run, a parallel step with five parallel sub-steps under it would have all five sub-steps executed in parallel, subject to free sessions being available. If two of those five steps completed and then the load plan were to fail, when the load plan was restarted, all the steps that did not complete or failed would be started again.

Scenario Step

At the lowest order in any load plan are the scenario steps. While the parent steps, whether serial or parallel, are used to set the dependencies, the scenario steps are those which load the tables. A scenario step, in turn, could have one or more sub-steps, corresponding to the number of steps inside the package.

In the case of a scenario step failure during execution, consider that the scenario step may have multiple steps, all under the same session in the Operator log but identified with different step numbers: 0, 1, 2, and so on. In the case of restart, the scenario would execute from the failed parent scenario step, re-running all sub-steps.

Note:

If you use the Load Plan Generator to generate a load plan, it will automatically conform to the standard above. If you are manually altering a generated load plan or creating a new load plan without using Load Plan Generator, then you should ensure that you conform to the standard above.

Restarting Load Plans

Use ODI Studio or ODI Console to restart a load plan.

Follow this procedure to restart a load plan using ODI Studio. The restart option is enabled only on the last run for a load plan. A load plan can be restarted any number of times and each time it progresses from the last failure.

Note: When you restart the load plan, set the Log Level to 6. Log Level 6 will enable you to see variable values resolved in session logs

1. In ODI Operator, navigate to the Operator log, and select the last failed run for a load plan.
2. Double-click the load plan run, and select the **Restart Option**.

   You can also right-click the last run in the Operator log and select **Restart**.

Restarting Load Plans Using ODI Console

Follow this procedure to restart a load plan using ODI Console. The restart option is enabled only on the last run for a load plan. A load plan can be restarted any number of times and each time it progresses from the last failure.

Note: When you restart the load plan, set the Log Level to 6. Log Level 6 will enable you to see variable values resolved in session logs

1. In ODI Console, go to **Runtime**, select **Sessions/Load Plan Executions**, and then select the load plan execution that has failed.
2. Click **Restart**.

   The Restart button is displayed only when the selected load plan is the most recent run of the load plan.

Troubleshooting Load Plans

A load plan must be restarted when it has stopped with an error. An alternate case where restart may be required is when a load plan is not doing anything at all, for example, when a load plan is executed and nothing has changed after 30 minutes. The following checklist can be used to assist in troubleshooting a non-responsive load plan.

1. Check the maximum number of sessions set to run against the agent.

   In ODI Operator, verify that the number of sessions running is equal to the maximum. If so, then the other sessions are waiting for the running sessions to complete. Proceed to the next step.

2. Clean out stale sessions.

   Stale sessions are sessions that are incorrectly left in a running state after an agent or repository crash. If an agent crashes or loses its connection the repository after it has started a session, it is not be able to update the status of the session in the repository, and such a session becomes stale. Until the stale session is cleaned it shows up as running in the repository but actually is not.

   Stale sessions are cleaned in multiple ways. Some examples are listed below:

   - You can manually request specific agents to clean stale sessions in Operator Navigator or Topology Navigator.
   - Stale sessions are cleaned when you restart an agent.
   - When an agent starts any new session, it checks for and resolves stale sessions. However, if the agent has lost connection to the repository, then it cannot clean stale sessions.

3. Check if the agent is alive.

   To test the agent to see if it is running and still has a connection to the repository, open it in the Topology Navigator in ODI Studio and select the Test tab. If the agent test fails, then restart the agent after fixing the issue.

4. Verify that the ODI Repository and the server hosting it are running and have not experienced a failure.
5. If your load plan is in error and you have verified all of the above, then restart the load plan.

Note: When you restart the load plan, set the Log Level to 6. Log Level 6 will enable you to see variable values resolved in session logs.

Alternate Options for Restarting Load Plans

You can restart failed load plans using these alternate methods.

Using Mark as Complete

In most cases the load plan restart method described earlier in this section is the recommended approach. This approach ensures data integrity and leaves no scope for manual error. However, at times you may want to run a load plan step manually. For example, if a step is inserting duplicate records which are causing failure, rerunning the step would still insert duplicates. In such a case, you may need to manually correct the data outside of the load plan and then skip that step when you restart the load plan. For this kind of situation, you can use the Mark as Complete option.

When you mark a load plan step as complete, it ensures that when the load plan is restarted, the marked step is not executed. It is then the responsibility of the person making this setting to ensure that the load for that step is carried out outside the load plan.

To mark a step as complete, right-click the step and select Mark As Complete. This can be done at the scenario step or at any step higher than that.

Marking a step complete at a higher level in the step hierarchy would mean that none of the child steps under that parent step would be executed upon load plan restart, even if they are otherwise eligible. For this reason, marking a step as complete should be treated as an advanced task and must be done only with a full understanding of its impact. There is no single recommendation that pertains in all cases, so the setting must be done carefully and only on a case-by-case basis.

Running a Scenario Standalone

When you are monitoring a load plan, you may not completely know how to fix a scenario step failure, but may wish to use the 'mark as complete' option for the failed scenario step instead of waiting for complete resolution. This prevents a step failure from precluding an entire load plan completing, while allowing you to inform the ETL team about the failed scenario step and work on a resolution. The ETL team might then fix the scenario and want to run it standalone outside the load plan to complete the load.

As in marking a step as complete, running a scenario standalone should be treated as an advanced task and the person running the scenario must be aware of the following:

- A scenario run outside of a load plan by itself invokes the Table Maintenance process. This could, depending on the setting, truncate the table before the load.

  To understand this, consider that when a scenario is run inside a load plan table maintenance tasks are carried out as explicit steps (the parent step name would be either Initialize or Finalize). The scenario by itself does not call the Table Maintenance process when run from within the load plan. Rather, this is controlled by the EXECUTION_ID variable, which is set to the load plan instance ID. If this variable has a value greater than 0 when a scenario is run, the Table Maintenance process is not invoked, as would be the case when a scenario is run from within a load plan with an instance ID. However, if this variable does not have a value greater than 0, then the scenario invokes the Table Maintenance process. This is the case when a scenario is run outside the load plan. If you set a value for the EXECUTION_ID when invoking the scenario from outside a load plan, the table maintenance steps would not be called.

- A scenario step could have many variable values set, either dynamically in the case of a refresh variable or explicitly by overriding its value at that scenario step in the load plan. When running a scenario outside the load plan, all the scenario variables would have only their default values. For this reason, care should be taken to set the variables appropriately before calling a scenario from outside the load plan. You can check the variable values that are present in the load plan by looking at the Operator log, provided the log level was set to 6 when the load plan ran. The Oracle BI Applications Configuration Manager uses Oracle Diagnostic Logging. For information about managing log files and diagnostic data, see *Oracle Fusion Middleware Administrator's Guide*.

Related Features and Considerations

These feature for Oracle BI Applications features are related to restartability and describes some other related considerations.

Using CKM to Filter Erroneous Data

If a scenario step is failing due to bad source data, it may sometimes be desirable to enable the CKM option to load the valid records and route the error records to a separate table. Examples of situations where this may be appropriate are the load of null values when they should have a value or data lengths longer than allowed target column lengths. Once the load completes, you could correct the erroneous data and have it automatically picked up in a subsequent load.

Note:

Use of CKM can slow the load considerably because every record and column could potentially be checked before loading. For this reason, this is not an option that you want to turn on across the entire load plan.

Note:

Error handling and logging of erroneous data is now automatically handled by the ETL process. Please see About Diagnostics Health Check for more details.

Regenerating a Scenario During a Load Plan Execution

Consider a case where a load plan is started and fails at a scenario step. You fix the issue and regenerate the scenario, then restart the load plan and may expect it to pick the new scenario, but this is not what happens. If a load plan has been started and a scenario regenerated, the regenerated scenario code is not picked up when the load plan is restarted. To force the regenerated scenario to be picked up, you have two options:

- Start a new load plan run, accepting the overhead associated with restarting the load from the beginning.
- Run the regenerated scenario as stand-alone outside the load plan, marking that scenario step as complete in the load plan before restarting the load plan.

  Refer to Alternate Options for Restarting Load Plans for implications of using these options.

Restarting Long Running Jobs

Consider a case where you have a scenario that takes two hours to run. The scenario fails at the insert new rows step, after loading the C$ and I$ steps. On restart, the scenario attempts to reload the C$ again. You instead want it to restart from the insert new rows steps only. This use is not supported. The restartability mechanism has been put in place in such a way that restarting a load plan is all you need to do. You do not need to clean up any data in between load plan executions, because the data is committed to the target table only after all the Knowledge Module steps are successful. If the load fails before complete success, no data is committed to that specific target table as part of the failed session. (Note: C$ and I$ tables are created afresh on restart and hence data to these tables would be committed in between).

Note:

New C$ and I$ tables are created on restart and hence data to these tables would be committed in between load plan start and restart.

Stale C$ and I$ Tables

On restart, new C$ and I$ tables are created, but since the previous load did not complete, these tables from the previous session are not dropped. The load plan generated using Load Plan Generator has a step at the end of the load plan called Clean Stale Work Tables which takes a variable called ETL_DTOP_STG_OLDER_THAN_DAYS whose default value is 30 days. When this step runs, it drops any C$ and I$ tables that are older than the specified variable value.

Note:

C$ and I$ tables are useful tables when you want to debug a failed scenario. It might not be advisable to set the ETL_DTOP_STG_OLDER_THAN_DAYS value as too small—for example, one day—as you might lose valuable information for debugging.

Stopping Load Plans

You can stop a load plan run from by accessing the Load Plan Execution page in Configuration Manager (click Show Execution Status Details in the toolbar) or from ODI Studio.

1. In Operator Navigator, select the running or waiting load plan run to stop from the Load Plan Executions accordion.
2. Right-click, and select **Stop Normal** or **Stop Immediate**.
   - **Stop Normal** — In normal stop mode, the agent in charge of stopping the load plan sends a Stop Normal signal to each agent running a session for this load

plan. Each agent will wait for the completion of the current task of the session and then end the session in error. Exception steps will not be executed by the load plan and once all exceptions are finished the load plan is moved to an error state.

- **Stop Immediate** — In immediate stop mode, the agent in charge of stopping the load plan sends a Stop Immediate signal to each agent running a session for this load plan. Each agent will immediately end the session in error and not wait for the completion of the current task of the session. Exception steps will not be executed by the load plan and once all exceptions are finished the load plan is moved to an error state.

3. In the Stop Load Plan dialog, select an agent to stop the load plan.
4. Click **OK**.

For more information about stopping load plan runs from ODI Studio, see *Oracle Fusion Middleware Developer's Guide for Oracle Data Integrator*.

3

Additional Administration Tasks

ETL administrators perform a variety of diagnostic, configuration, and deployment tasks.

Topics

Additional Administration Tasks

Here are some administration topics related to Oracle BI Applications ETL processes.

Generating DDL Warehouse Scripts

The Business Analytics Warehouse tables are automatically deployed during the installation process when the Business Analytics Applications Suite Repository Creation Utility (RCU) executes a shipped DDL script. The RCU does not prompt for which tablespace to assign to the individual tables and related indexes nor does it provide a mechanism for you to alter the shipped DDL. To introduce changes to the Business Analytics Warehouse data model, you use ODI to generate a new DDL script.

For instructions on generating DDL scripts and assigning tablespaces to tables and indexes, refer to Generating DDL and Assigning Tablespaces to Tables and Indexes in *Oracle Business Intelligence Applications Installation Guide*.

Logging and Diagnostics

Oracle BI Applications Configuration Manager uses Oracle Diagnostic Logging. For information about managing log files and diagnostic data, see *Oracle Fusion Middleware Administrator's Guide*.

Creating ETL Tables for Siebel Sources

If your source system is Siebel and you are deploying one of the following offerings, you need to create S_ETL tables in the Siebel database:

- Oracle Marketing Analytics
- Oracle Price Analytics
- Oracle Sales Analytics
- Oracle Service Analytics

To create the S_ETL tables, you generate a Data Definition Language (DDL) script, which then must be provided to the Siebel database administrator, who will need to create the necessary tables in the Siebel database.

Note that the database user used for the ETL connection will require all Data Manipulation Language (DML) privileges (SELECT, INSERT, DELETE, UPDATES) and DDL (TRUNCATE) privileges to S_ETL tables.

1. Launch ODI Studio, and display the Designer navigator.
2. In the Projects editor, expand the following folders: BIApps Project, Components, Sources, Siebel, Oracle, Generate Siebel DDL, Packages, Generate Siebel DDL, Scenarios.
3. Right-click **GENERATE_SIEBEL_DDL Version 001**, and then click **Execute**.
4. Select the Context, ODI Agent, and Log Level, and then click **OK**.
5. Indicate the information for each option.

Option	Description
CREATE_SCRIPT_FILE	Select **Latest Value** and Enter **Y** in the Value field.
REFRESH_MODE	Enter **FULL**.
CHAR_CLAUSE	Provided for Unicode support. If set to **Y**, the CHAR clause will be included in the DDL.
RUN_DDL	Enter **N**.
SCRIPT_LOCATION	Enter the path where you want the script to be created. The file name will be similar to `BIA_Siebel_Schema_DDL_<run ID>.sql`.
TABLE_MASK	The default value % will compare all tables.

Using a Database Link for ETL

Set up direct links to replace the default ODBC links to improve ETL performance. Database Link Mode can be used only when the source database is Oracle and a compatible DB Link can be created from the Oracle Warehouse to the source.

Database link mode should be used only when the source database is Oracle and a compatible database link can be created from the Oracle Warehouse to the source. The LKM assumes that a database link already exists with the following naming convention: `<`*`DATASERVER_NAME`*`>.WORLD@DSN_<`*`DSN_ID`*`>`. This database link must exist in the warehouse and be accessible using the warehouse credentials (user specified against the warehouse connection in ODI).

To use a database link for ETL:

1. Have a database administrator create a private database link.
2. In Configuration Manager, update the `ETL_SRC_VIA_DBLINK` parameter.
   a. Log in to Configuration Manager.
   b. On the Tasks bar, click the **Manage Data Load Parameters** link.

c. In the Search pane, select the source system in the Source Instance drop-down list.

d. Select Code in the Parameter drop-down list, and enter `ETL_SRC_VIA_DBLINK` in the adjacent field.

e. Click **Search**.

f. In the Data Load Parameters list, Click the default **No** value to open the Edit Parameter Value dialog box.

g. In the Parameter Value drop-down list, select **Yes**.

h. Click **Save and Close**.

Fix Event Queue Knowledge Module

Certain ETL maps which use the IKM BIAPPS Oracle Event Queue Delete Append KM can fail, requiring changes to the IKM BIAPPS Oracle Event Queue Delete Append KM.

Error Message

You need to fix the IKM BIAPPS Oracle Event Queue Delete Append KM when ETL maps fail with the following error:

```
ODI-17517: Error during task interpretation.
Task: 11 java.lang.Exception: BeanShell script error: Sourced file: inline evaluation
of: `` if (errLogSupport.equalsIgnoreCase("Y")  &&
errLogOption.equalsIgnoreCase("Y")  . . . '' : Attempt to resolve method:
equals() on undefined variable or class name: isPartitioned : at Line: 8 : in
file: inline evaluation of: `` if (errLogSupport.equalsIgnoreCase("Y")  &&
errLogOption.equalsIgnoreCase("Y")  . . . '' : isPartitioned .equals ( "Y" )
```

Affected Scenarios

The maps affected by the KM are listed below. After the KM fix, the scenarios present in these mapping folders need to be regenerated. PLP and SIL scenarios are mandatory and the SDE scenarios of the PLVs you use need to be regenerated. For example, if you are using E-Business Suite, then those SDE, SIL, and PLP scenarios need to be regenerated.

PLP:

- PLP_WorkforceCompensationFact_Quarter
- PLP_SupervisorHierarchy_Analysis_Top
- PLP_SupervisorStatusDimension
- PLP_WorkforceBalanceAggregate_Temp
- PLP_WorkforceCompensationFact_Year
- PLP_WorkforceEventFact_Age
- PLP_WorkforceEventFact_Merge
- PLP_WorkforceEventFact_Month
- PLP_WorkforceEventFact_Pow

- PLP_Workforce_GainLossFact_NonSupChanges
- PLP_Workforce_GainLoss_Tmp_SupChanges
- PLP_Workforce_Gen01_GainLossFact_Frozen
- PLP_Workforce_Gen01_GainLossFact_Live

SIL

- SIL_AbsenceEventFact
- SIL_AssignmentSupervisorDimension
- SIL_WorkforceEventFact

Fusion SDE

- SDE_FUSION_AssignmentSupervisorDimension
- SDE_FUSION_AssignmentSupervisorDimension
- SDE_FUSION_DomainGeneral_ProjectAwardFundingSource
- SDE_FUSION_DomainGeneral_ProjectAwardInstitution
- SDE_FUSION_DomainGeneral_ProjectAwardKeyword
- SDE_FUSION_PersistedStage_WorkforceEvent
- SDE_FUSION_PersistedStage_WorkforceEvent
- SDE_FUSION_WorkforceEventFact
- SDE_FUSION_WorkforceEventFact

E-Business Suite SDE

- SDE_ORA_AssignmentSupervisorDimension
- SDE_ORA_HRPersonLegDimension
- SDE_ORA_PersistedStage_WorkforceEvent
- SDE_ORA_PersistedStage_WorkforceEvent_Supervisor
- SDE_ORA_WorkforceEventFact

PeopleSoft SDE

- SDE_PSFT_AssignmentSupervisorDimension
- SDE_PSFT_HRPersonLegislation_XLegs
- SDE_PSFT_PersistedStage_WorkforceEvent
- SDE_PSFT_PersistedStage_WorkforceEvent_Headcount
- SDE_PSFT_PersistedStage_WorkforceEvent_PositionHolder
- SDE_PSFT_PersistedStage_WorkforceEvent_WorkerPosition
- SDE_PSFT_WorkforceEventFact

To make the changes required:

1. In ODI Designer, log in as a user with privileges to edit KMs.
2. In the repository, expand **Knowledge Modules**, then **Integration (IKM)**, and open the **IKM BIAPPS Oracle Event Queue Delete Append** KM.
3. Double-click on **Create I$ Table**
4. Enter the below code:

```
<$ if (errLogSupport.equalsIgnoreCase("Y")
&& errLogOption.equalsIgnoreCase("Y") ) { $>

/* Creates the flow table which is the replica of Target table during Error
Logging Mode */
CREATE TABLE  <%=odiRef.getTable("L", "INT_NAME", "W")%>
AS SELECT <%=odiRef.getColList("", "[COL_NAME],", "\n\t", "", "(INS and REW)")%>
     CAST('' AS VARCHAR2(100)) ERROR_TYPE_IND
     ,CAST('' AS UROWID) DIAGNOSTIC_ROWID
     ,CAST('' AS VARCHAR2(10)) IND_UPDATE
FROM  <%=odiRef.getTable("L","TARG_NAME","A")%> <
%=odiRef.getOption("FLOW_TABLE_OPTIONS")%>
WHERE 1=2
<$ }
else if ("<%=odiRef.getOption("FLOW_CONTROL")%>".equals("1") ||
   ("<%=odiRef.getOption("OBI_EVENT_QUEUE_UPDATE")%>".equals("1") && "<
%=refreshType%>".equals("TARGET")) ||
   ("#IS_INCREMENTAL".equals("Y") ) && (errLogSupport.equalsIgnoreCase("N") ||
errLogOption.equalsIgnoreCase("N") ))  { $>
CREATE TABLE <%=odiRef.getTable("L", "INT_NAME", "W")%>
(  <%=odiRef.getColList("", "[COL_NAME]\t\t[DEST_WRI_DT] NULL", ",\n\t", "", "UK")
%>
 <%=odiRef.getColList(",\n\t", "[COL_NAME]\t\t<? if (\u0022[DEST_DT]\u0022.equals
(\u0022NUMBER\u0022)) {?>NUMBER<?} else if (\u0022[DEST_DT]\u0022.equals
(\u0022VARCHAR2\u0022)) {?>VARCHAR2(4000)<?} else {?>[DEST_WRI_DT]<?}?> NULL", ",
\n\t", "", "NOT UK")%>
)
<%=odiRef.getOption("FLOW_TABLE_OPTIONS")%>
<$ }
else { $>
/* Step bypassed. It runs only in error logging mode if ETL diagnostics is
supported */
<$ } $>
```

5. Regenerate the scenarios.

4 Customizing the Oracle Business Analytics Warehouse

In all likelihood, you'll want to customize the ETL functionality in Oracle Business Intelligence Applications.

Topics

What is Customization in Oracle Business Intelligence Applications?

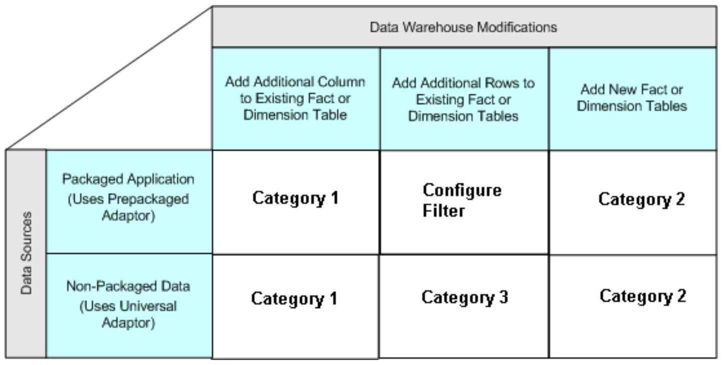
In Oracle Business Intelligence Applications, customization is defined as changing the preconfigured behavior to enable you to analyze new information in your business intelligence dashboards.

For example, you might want to add a column to a dashboard by extracting data from the field HZ_CUST_ACCOUNTS.ATTRIBUTE1 and storing it in the Oracle Business Analytics Warehouse in the X_ACCOUNT_LOG field.

The type of data source that you have determines the type of customization that you can do. Data sources can be one of the following types:

- Packaged applications (for example, Oracle Fusion or EBS), which use prepackaged adapters.
- Non-packaged data sources, which use the Universal adapter.

The figure summarizes the category of customization that you can perform for each type of data source and type of modification.


Data Warehouse Modifications
Add Additional Column to Existing Fact or Dimension Table
Add Additional Rows to Existing Fact or Dimension Tables
Add New Fact or Dimension Tables
Data Sources
Packaged Application (Uses Prepackaged Adaptor)
Non-Packaged Data (Uses Universal Adaptor)
Category 1
Configure Filter
Category 2
Category 1
Category 3
Category 2

Customizations are grouped into the following categories:

- **Category 1.** In a Category 1 customization, you add additional columns from source systems that have pre-packaged adapters and load the data into existing Oracle Business Analytics Warehouse tables. For more information about performing Category 1 customizations, see Category 1 Customizations: Adding Columns to Existing Fact or Dimension Tables.

- **Category 2.** In a Category 2 customization, you use pre-packaged adapters to add new fact or dimension tables to the Oracle Business Analytics Warehouse. Category 2 customizations normally require that you build new SDE and SIL mappings. For more information about performing Category 2 customizations, see Category 2 Customizations: Adding Additional Tables.

- **Category 3.** In a Category 3 customization, you use the Universal adapter to load data from sources that do not have pre-packaged adapters. For more information about performing Category 3 customizations, see Category 3 Customizations: Adding New Data as a Whole Row into a Standard Dimension Table.

For detailed information about tables and naming conventions, see *Oracle Business Analytics Warehouse Data Model Reference*.

When you customize ETL Packages and Interfaces, you usually work in the `\Oracle BI Applications\Mappings` folder in the Projects view in ODI Studio's Designer Navigator.

Note: The customization methodology is to make a copy of the ETL task and version both the original and copy while a datastore is simply versioned. These versions allow you to revert functionality if required as well as identify changes that have been introduced through customization, patches or upgrades.

Note: You must not rename, delete, or move packaged objects in the ODI repository unless you are directed to do so by Oracle Support. For example, a datastore in the Fact Staging folder should not be moved to the Dimension Staging folder, or a packaged index named W_EXAMPLE_F_U1 should not be renamed to W_EXAMPLE_F_U2, unless directed by Oracle Support. You can make copies of packaged ODI objects and place them in custom folders, but do not delete, rename or move the original objects.

About the Customization Process

You can customize your ETL functionality after you have performed a Business Analysis and Technical Analysis.

However, this information does not cover the other typical tasks that you need to perform:

- Business Analysis — before you start customization, you typically analyze your current BI dashboards to determine the changes you need to support your business or organization.
- Technical Analysis — when you have identified your business requirements, you need to determine the technical changes you need to make, by identifying source tables, staging tables, target tables, and ODI Packages and Interfaces that you need to modify.
- RPD Modification — having made the customizations in the ETL functionality, you need to modify your RPD to expose the new data in your dashboards. For more information about RPD modification, refer to the Oracle Business Intelligence Enterprise Edition documentation library.

Patching Customized Objects

This section explains what you must do to re-apply a customization to an object that has been patched. For example, if you install an Oracle Business Intelligence Applications patch that modifies the Supply Chain and Order Management application, you might need to manually re-apply customizations that you have made to the Supply Chain and Order Management application.

A patch only installs changed repository objects, not the whole Work Repository. Therefore, you only need to re-apply customizations to mappings that have been changed by the patch. For example, if a patch only modifies the Supply Chain and Order Management application, you only need to manually re-apply customizations that you have made to the Supply Chain and Order Management application. Customizations in other applications are not affected by the patch.

As part of customizing an ETL task (including interfaces and package under a specific task folder), you copy the task folder to be customized to a 'Custom' folder, version the copy once to freeze the original state and again to capture the customized state. For information about modifying and versioning ETL customizations, refer to Typical Steps to Extend Mappings in the Oracle Business Analytics Warehouse.

Different ODI objects can be customized and patched. Depending on the object, different steps need to be followed to merge the patch and customizations.

If an object was customized but is not being patched, this section does not apply. Similarly, if an object is patched but was not customized, there is no need to follow these steps.

Note:

All customization steps have you create a 'Custom' adaptor folder where customized ETL tasks are stored. This is not required but is considered a best practice to make identifying customized content easier.

Patching Customized ETL Tasks

If the ETL task to be patched was customized, you should follow these steps. Note that there are two use cases where an ETL task may have been customized, either at the direction of Oracle to quickly apply a fix before a patch becomes available or as the result of normal implementation activities to enhance Oracle BI Applications with additional functionality.

Customization Performed at Direction of Oracle

If the customization was performed at the direction of Oracle as a means to manually implement a fix, you should have a separate copy of the original object in a separate 'Custom' or 'Patch' folder. The ETL task has a scenario associated with it whose version is set to a value higher than 001. To apply a patch, simply delete this scenario. The patched out-of-the-box scenario is automatically used the next time the load plan runs.

Customization Performed as an Extension of Functionality

If the object being patched was customized to introduce new behavior, the fix and the customizations need to be merged into a single ETL task. When originally customizing the task, the customization methodology requires that you create a copy of the ETL task and version it, for example to version 001. This version represents the original state of the ETL task. Prior to customization, you version the ETL task again, for example to version 002. You then apply your customizations to the new version. You can use ODI's version compare utility to note the changes that have been introduced.

Prior to patching the out-of-the-box ETL task, you need to version the out-of-the-box ETL task, to version 001 for example, then version it again, for example to 002. You then apply the patch. The 001 version represents the original state of the ETL task and 002 now represents the patched state. You can compare the out-of-the-box 002 version to the out-of-the-box 001 version to determine the changes introduced by the patch.

Note that you now have two original, or '001', versions, both representing the original state of the ETL task. You also now have two 002 versions, one a custom version and the other a patched version.

To get the fixes from the patch to appear in the custom folder, one approach is to manually apply the changes noted in the patched 002 version directly in the customized 002 version and then regenerate the scenario. This is the simplest approach and is recommended when a patch fix is relatively simple to determine and deploy.

If the patch fix is relatively complex while the customizations are relatively simple, an alternate approach is to re-apply the customizations to a new copy of the patched version. In this case, you rename the 002 custom version of the ETL task, for example to include 'Old' or 'Prior' as a suffix, copy the 002 ptched version to the Custom adaptor, version it, version it again, then re-apply your customizations to the latest version. Generate the scenario with a larger number. If the original ETL task uses 001 and your 'prior' customized ETL task uses 002, you would then use 003 with this latest copy.

Patching Customized Datastores

As part of the customization methodology, datastores that are customized are first versioned to represent the original out-of-the-box state and versioned again to represent the customized state. If a datastore was customized and needs to be patched, the patching process should merge the datastore so that the custom and patch changes are reflected in the same datastore. While not required, you may want to create another version of the datastore prior to applying the patch, which would represent the patched and customized state.

Patching Other Objects

Generally speaking, Oracle does not recommend directly customizing commonly used objects such as Knowledge Modules, Variables and User Defined Functions. If such an object needs to be customized to manually apply a fix at Oracle's direction or to enhance out-of-the-box functionality, a copy should be made of the object, versioned to freeze the original state, and then versioned again to reflect the customized state. At this point, ETL tasks follow the same customization steps and are modified to use the custom copies of these objects. Follow the same steps as patching customized ETL tasks.

Category 1 Customizations: Adding Columns to Existing Fact or Dimension Tables

Category 1 customizations add additional columns from source systems that have pre-packaged adapters and load the data into existing Oracle Business Analytics Warehouse tables.

Category 1 customizations involve extracting additional columns from source systems for which pre-packaged adapters are included (for example, Oracle E-Business Suite) and loading the data into existing Oracle Business Analytics Warehouse tables. For Category 1 customizations, data can also come from non-packaged sources, but this section assumes that the sources have already been mapped with a Universal adapter and only need to be extended to capture additional columns. (The initial mapping of a Universal adapter is considered a Category 3 customization. For information, see Category 3 Customizations: Adding New Data as a Whole Row into a Standard Dimension Table.)

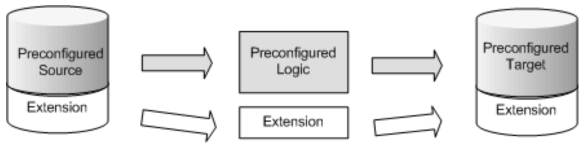
To see additional columns in the Oracle Business Analytics Warehouse, the columns must first be passed through the ETL process. The existing mappings and tables are extensible. Oracle Business Intelligence Applications provides a methodology to extend preconfigured mappings to include these additional columns and load the data into existing tables.

Oracle Business Intelligence Applications recognizes two types of customization: extension and modification. The supported extension logic allows you to add to existing objects. For example, you can extract additional columns from a source, pass them through existing mappings, and populate new columns added to an existing table. Generally, Oracle Business Intelligence Applications does not allow you to modify existing logic or columns. You should not change existing calculations to use different columns, and you should not remap existing columns to be loaded from different sources.

For example, if you want to calculate revenue differently from the existing logic, you should create a new column (for example, X_REVENUE) and populate it with a custom mapping expression. You can then remap the Oracle Business Intelligence repository to point to the new X_REVENUE column.

Most datastores have a single placeholder column named X_CUSTOM. Each ETL task has mapping expressions to populate this column. These serve as templates for customizing ODI datastores and interfaces. When creating new custom columns, follow the naming convention of including the X_ prefix to help distinguish custom columns.

In the figure, the preconfigured logic is shaded in gray. You should not modify anything contained within these objects. You should add customizations to existing objects rather than creating new packages and interfaces, which allows them to run parallel to the existing logic.



Typical Steps to Extend Mappings in the Oracle Business Analytics Warehouse

The most common reason for extending the Oracle Business Analytics Warehouse is to extract existing columns from a source system and map them to an existing Oracle Business Analytics Warehouse table (either fact or dimension). This type of change typically requires you to extend the interfaces within a SIL package.

If the data is coming from a packaged source, then you will also need to extend the interfaces within an appropriate SDE adapter package. If the data is coming from a non-packaged source, then you must use a Universal adapter package. If an appropriate package does not already exist, you will need to create a Universal adapter package with interfaces.

To extend an ODI package in the Oracle Business Analytics Warehouse:

1. Create new SDE and SIL Adaptor folders (do not copy existing Adaptor folder as this will copy all subfolders).

   Rename folders to include `Custom` or some other useful identifier in the name, and set Release Tag to match that of the existing Adaptor folder. Do this for both the SDE and SIL folders.

   a. Right-click the Mappings folder and select **New Sub-Folder**.

   b. Set Name as CUSTOM _*Original Folder Name*.

      For example, CUSTOM_SDE_ORA11510_Adaptor, CUSTOM_SILOS represent custom SDE and SIL folders.

   c. Click the **Connect Navigator** button in the Designer tab.

   d. Select **Edit Release Tags**.

   e. Select the release tag that corresponds to your source. For example, EBS_11_5_10.

   f. Select the custom SDE folder you created and add it to the release tag.

   g. Click **Next**, then click **Finish**.

   h. Repeat the above steps for the CUSTOM_SILOS folder, associating it with the BIA_11 Release Tag.

2. Enable versioning for the preconfigured Task Folder to be customized.

   The version comment should indicate this is the base version of the task. Subsequent patches applied to this task in the future would require increasing the version in the comment so that it can be compared to the original task to identify any changes.

   a. Right-click the Task folder and select **Version**, then **Create Version**.

   b. Accept the default version number, 1.0.0.0.

   c. Add a description indicating that this is the original version of this task.

3. Duplicate the Task folder to be customized by copying it.

   Cut and paste the copied task folder to the Custom adaptor, and rename it to remove the 'Copy of…' prefix.

4. Using the same method as in step 2, enable versioning of copied Task folder.

   The version comment should indicate this is the original version. This versioning enables comparison of the customized task to a copy of the original version to determine all changes that have been introduced.

5. Create another version of the copied task.

   The version comment should indicate this is the customized version. Use the same steps as above.

6. Version the Model that the datastore to be customized exists in, for example, Oracle BI Applications.

   Submodels and datastores cannot be versioned. The version comment should indicate this is the base or original version.

7. Create a new version of the model, with a version comment indicating that this is where customizations are introduced.

   The models can now be compared to show differences. If the model ever needs to be patched, the model should be versioned again so that the patched version can be compared to the custom and original version.

8. Apply customizations to the datastore and task.

   Customizations should be additive as much as possible rather than overwriting existing content. For example, if you don't like the way a particular column is calculated, add a new custom column and map it in the way you prefer. In the RPD, have the logical column point to this new custom column rather than the original column.

9. Prior to generating scenarios, ensure the **Scenario Naming Convention** User Parameter has a value of `%FOLDER_NAME(2)%_%OBJECT_NAME%`.

10. Generate a new scenario for the custom task using the same scenario name as the original.

    ODI enforces unique scenario names and versions. Use the same scenario name for the custom task so that the load plan executes this ETL task rather than the out-of-the-box ETL task. Retain the same scenario name but use a different, higher version number. The load plan always executes the scenario with the largest version number. By using the same scenario name but with a larger higher version number, the custom scenario will be executed without requiring any changes in the load plan.

    a. Note the name of the out-of-the-box scenario.

       Navigate to the original Task folder - Packages - *Package Name*- Scenarios - *Scenario Name*. Make a note of the Scenario Name (you can double-click the scenario and use CTRL-C to copy the scenario name).

b. Generate a scenario for the custom task.

   Navigate to the custom Task folder - Packages - *Package Name*, then right-click the package and select **Generate Scenario**. Use the original scenario name as noted (you can use CTRL-V to paste the name if you copied it). Set the version number to `002` (or any value larger than the default, 001, used by the out-of-the-box scenario).

c. Check the Generate scenario as if all underlying objects are materialized checkbox, then click **OK**.

d. Select **Use All** from the Startup Parameters drop-down, then click **OK**.

e. Click **OK**.

When you execute the load plan, it now executes the custom task rather than the original task. In the future if you make changes to any of the interfaces or the package, you can either regenerate the existing scenario or generate a new scenario. Unless you need separate scenarios, it is recommended that you regenerate the existing scenario. To do this, right-click the scenario and select **Regenerate**.

11. Generate the Load Plan.

12. Execute the Load Plan.

Example of Extending the Oracle Business Analytics Warehouse

This working example illustrates adding additional columns from source systems that have pre-packaged adapters and loading the data into existing Oracle Business Analytics Warehouse tables (known as a Category 1 customization).

In this example, a company has identified additional fields in a source system table HZ_CUST_ACCOUNTS that need to be added to the Oracle Business Analytics Warehouse table W_ORG_D. Data is passed from an existing source table to an existing target table, known as a category 1 customization. The company uses an extension field to capture information related to organizations referred to as 'ACCOUNT_LOG.' In addition, the company wants to include the name of the person who last updated the record as an attribute of the organization.

In this example, you want to extract information from the following two fields that are not extracted by the out-of-the-box application:

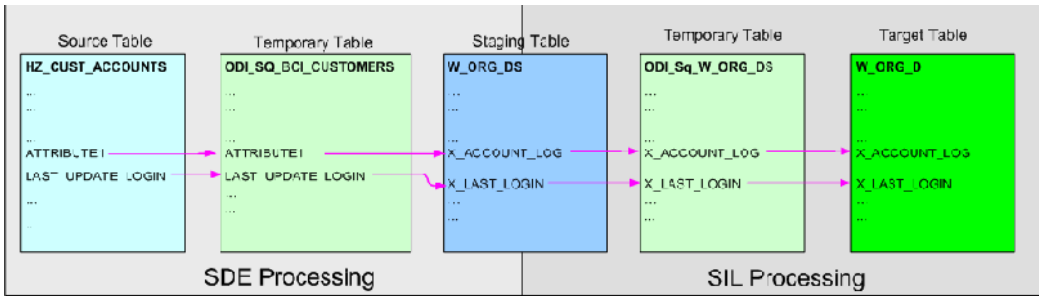
- HZ_CUST_ACCOUNTS.ATTRIBUTE1

  ATTRIBUTE1 is currently not extracted from the source table HZ_CUST_ACCOUNTS into the temporary table ODI_SQ_BCI_CUSTOMERS.

- HZ_CUST_ACCOUNTS.LAST_UPDATE_LOGIN

  LAST_UPDATE_LOGIN is currently extracted from the source table HZ_CUST_ACCOUNTS into the temporary table ODI_SQ_BCI_CUSTOMERS, but is not loaded into the staging table W_ORG_DS.

The diagram below shows the two fields ATTRIBUTE1 and LAST_UPDATE_LOGIN as they pass from the source system table to the target table via the tables: HZ_CUST_ACCOUNTS to ODI_SQ_BCI_CUSTOMERS to W_ORG_DS to ODI_Sq_W_ORG_DS to W_ORG_D.



The customization is done in two parts:

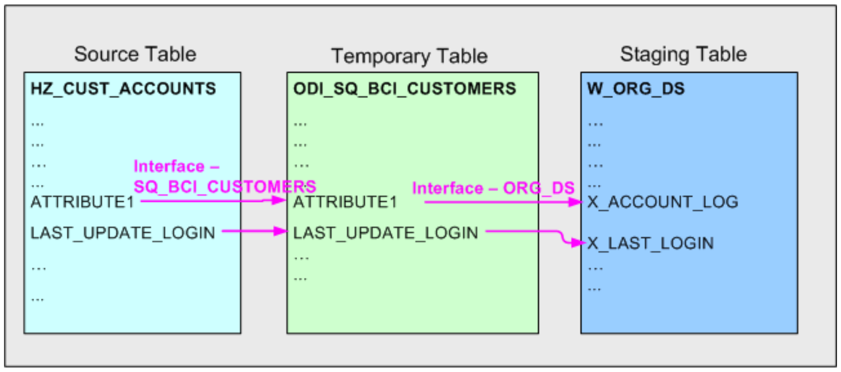
- SDE Processing, which extracts data from the source system and loads it into the staging area (for more information, see Example of Extracting Data from an Oracle EBS 11.5.10 Data Packaged Source into the ODI Staging Area).

- SIL Processing, which extracts data from the staging area and loads it into the target table (for more information, see Example of Loading Data from the Staging Area into an Existing Target Table).

Example of Extracting Data from an Oracle EBS 11.5.10 Data Packaged Source into the ODI Staging Area

This example shows how data is extracted from an existing source table into the staging area.

The diagram below shows the new ETL mappings that you need to load the new data into the staging area, and the ODI Interfaces that you need to modify.



Note: The diagram above only shows the incremental interfaces.

To customize the ETL process to load these two fields into the staging area, you need to:

- Extract the HZ_CUST_ACCOUNTS.ATTRIBUTE1 value from the source table HZ_CUST_ACCOUNTS into the temporary table ODI_SQ_BCI_CUSTOMERS using the Interfaces SQ_BCI_CUSTOMERS and SQ_BCI_CUSTOMERS_FULL.

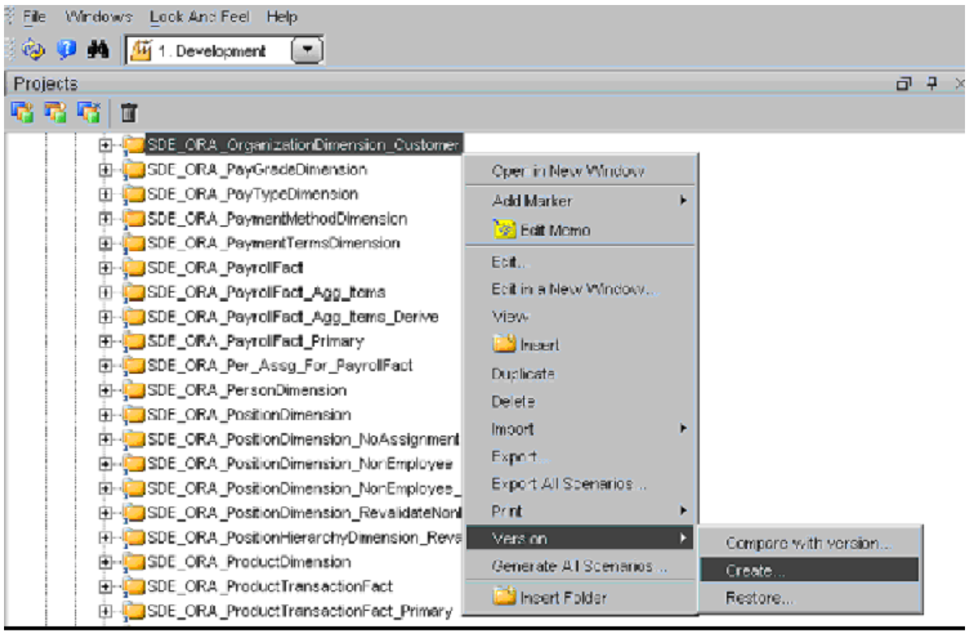
  Then, load the ODI_SQ_BCI_CUSTOMERS.ATTRIBUTE1 value from the temporary table ODI_SQ_BCI_CUSTOMERS into the X_ACCOUNT_LOG field in the staging table W_ORG_DS using the Interfaces ORG_DS and ORG_DS_FULL.

- Load the SQ_BCI_CUSTOMERS.LAST_UPDATE_LOGIN value from the temporary table ODI_SQ_BCI_CUSTOMERS into the X_LAST_LOGIN field in the staging table W_ORG_DS using the Interfaces ORG_DS and ORG_DS_FULL.

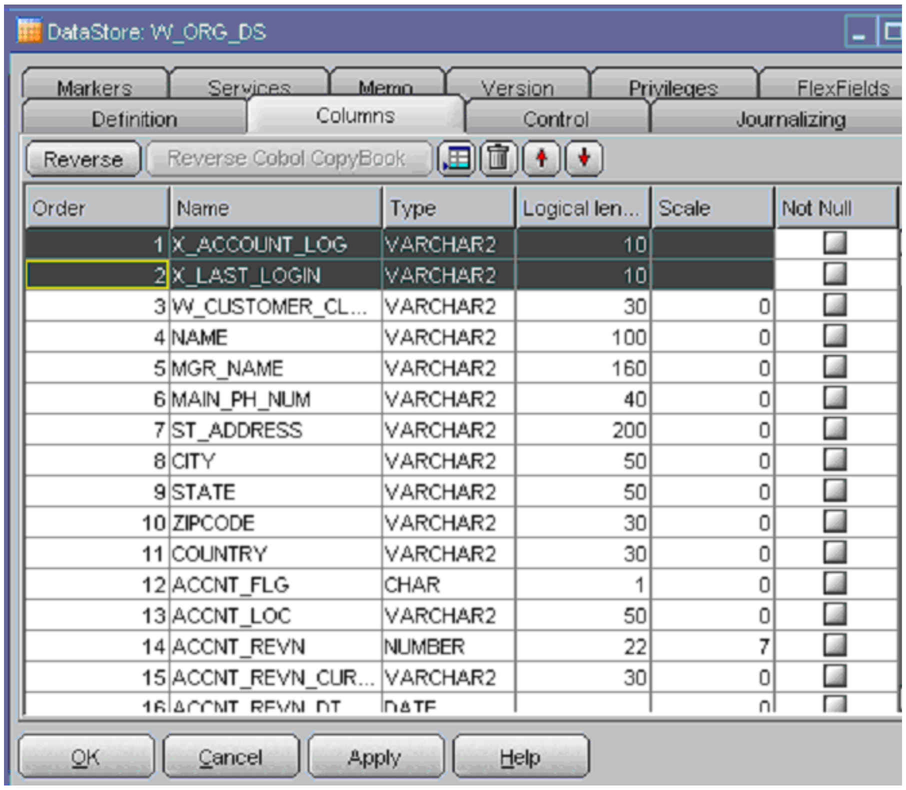
Note: Remember that LAST_UPDATE_LOGIN value is already extracted from the source table HZ_CUST_ACCOUNTS into the temporary table ODI_SQ_BCI_CUSTOMERS, but is not loaded into the staging table W_ORG_DS.

To extract data from an Oracle EBS 11.5.10 Data Packaged Source:

1. In ODI Designer, display the Projects view, expand the `Oracle BI Applications\Mappings\SDE_ORA11510_Adaptor` folder.
2. Right-click the **SDE_ORA_OrganizationDimension_Customer** folder, and choose **Version**, then **Create** to display the Create: *Object* dialog, and specify a unique version number and optional version description.


File
Windows
Look And Feel
Help
1. Development
Projects
SDE_ORA_OrganizationDimension_Customer
SDE_ORA_PayGradeDimension
SDE_ORA_PayTypeDimension
SDE_ORA_PaymentMethodDimension
SDE_ORA_PaymentTermsDimension
SDE_ORA_PayrollFact
SDE_ORA_PayrollFact_Agg_Items
SDE_ORA_PayrollFact_Agg_Items_Derive
SDE_ORA_PayrollFact_Primary
SDE_ORA_Per_Assg_For_PayrollFact
SDE_ORA_PersonDimension
SDE_ORA_PositionDimension
SDE_ORA_PositionDimension_NoAssignment
SDE_ORA_PositionDimension_NonEmployee
SDE_ORA_PositionDimension_NonEmployee_
SDE_ORA_PositionDimension_RevalidateNon
SDE_ORA_PositionHierarchyDimension_Reva
SDE_ORA_ProductDimension
SDE_ORA_ProductTransactionFact
SDE_ORA_ProductTransactionFact_Primary
Open in New Window
Add Marker
Edit Memo
Edit...
Edit in a New Window...
View
Insert
Duplicate
Delete
Import
Export...
Export All Scenarios...
Print
Version
Generate All Scenarios...
Insert Folder
Compare with version...
Create...
Restore...

3. Display the Models view, expand the Dimension Stage folder, and edit the W_ORG_DS data store to display the DataStore: *Name* dialog, and display the Columns tab.



Order	Name	Type	Logical len...	Scale	Not Null
1	X_ACCOUNT_LOG	VARCHAR2	10		☐
2	X_LAST_LOGIN	VARCHAR2	10		☐
3	W_CUSTOMER_CL...	VARCHAR2	30	0	☐
4	NAME	VARCHAR2	100	0	☐
5	MGR_NAME	VARCHAR2	160	0	☐
6	MAIN_PH_NUM	VARCHAR2	40	0	☐
7	ST_ADDRESS	VARCHAR2	200	0	☐
8	CITY	VARCHAR2	50	0	☐
9	STATE	VARCHAR2	50	0	☐
10	ZIPCODE	VARCHAR2	30	0	☐
11	COUNTRY	VARCHAR2	30	0	☐
12	ACCNT_FLG	CHAR	1	0	☐
13	ACCNT_LOC	VARCHAR2	50	0	☐
14	ACCNT_REVN	NUMBER	22	7	☐
15	ACCNT_REVN_CUR...	VARCHAR2	30	0	☐
16	ACCNT_REVN_DT	DATE		0	☐

4. Create the following columns:

   - X_ACCOUNT_LOG (VARCHAR2(10))
   - X_LAST_LOGIN (VARCHAR2(10))

5. In the Models view, right click on the model 'Oracle BI Applications' and select Generate DDL to display the Generate DDL dialog.

   The Generate DDL option deploys the changes in the database.

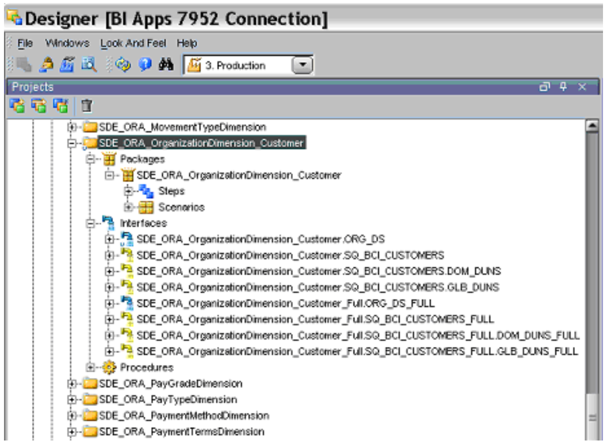
6. Select the check-box in the Synchronize column next for the W_ORG_DS table.

7. Click the (...) button to the right of the **Generation Folder** field to display the Select a folder dialog, and select the `\Utilities\System` folder, and click **OK**.

8. When the Procedure: DDL *Name* dialog is displayed, click **Execute**.

   Display ODI Operator and make sure that the procedure executes successfully.

9. Display the Projects view, expand the Mappings folder, and expand the SDE_ORA_OrganizationDimension_Customer folder.


Designer [BI Apps 7952 Connection]
File Windows Look And Feel Help
3. Production
Projects

```
SDE_ORA_MovementTypeDimension
SDE_ORA_OrganizationDimension_Customer
  Packages
    SDE_ORA_OrganizationDimension_Customer
      Steps
      Scenarios
  Interfaces
    SDE_ORA_OrganizationDimension_Customer.ORG_DS
    SDE_ORA_OrganizationDimension_Customer.SQ_BCI_CUSTOMERS
    SDE_ORA_OrganizationDimension_Customer.SQ_BCI_CUSTOMERS.DOM_DUNS
    SDE_ORA_OrganizationDimension_Customer.SQ_BCI_CUSTOMERS.GLB_DUNS
    SDE_ORA_OrganizationDimension_Customer_Full.ORG_DS_FULL
    SDE_ORA_OrganizationDimension_Customer_Full.SQ_BCI_CUSTOMERS_FULL
    SDE_ORA_OrganizationDimension_Customer_Full.SQ_BCI_CUSTOMERS_FULL.DOM_DUNS_FULL
    SDE_ORA_OrganizationDimension_Customer_Full.SQ_BCI_CUSTOMERS_FULL.GLB_DUNS_FULL
  Procedures
SDE_ORA_PayGradeDimension
SDE_ORA_PayTypeDimension
SDE_ORA_PaymentMethodDimension
SDE_ORA_PaymentTermsDimension
```

10. Edit the Interface SDE_ORA_OrganizationDimension_Customer.SQ_BCI_CUSTOMERS to display the Interface: Name dialog.

a. Display the Diagram tab, and select the **ATTRIBUTE1** field in the Target Datastore area.

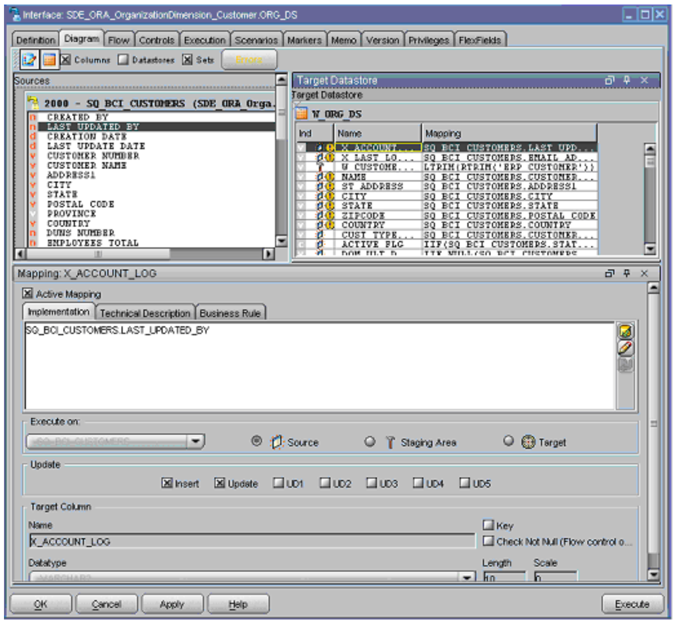
b. Use the Launch Expression Editor icon to display the Expression Editor dialog, and then select **HZ_CUST_ACCOUNTS.ATTRIBUTE1** as the value in the **Implementation** field.

c. Click **OK** to save the details.

11. Repeat Step 10 for the Interface SDE_ORA_OrganizationDimension_Customer.SQ_BCI_CUSTOMERS_FULL.

12. Edit the Interface SDE_ORA_OrganizationDimension_Customer.ORG_DS to display the Interface: *Name* dialog.

a. Display the Diagram tab, and select the **X_ACCOUNT_LOG** field in the Target Datastore area.



```
2000 - SQ_BCI_CUSTOMERS (SDE_ORA_Orga...
CREATED_BY
LAST_UPDATED_BY
CREATION_DATE
LAST_UPDATE_DATE
CUSTOMER_NUMBER
CUSTOMER_NAME
ADDRESS1
CITY
STATE
POSTAL_CODE
PROVINCE
COUNTRY
DUNS_NUMBER
EMPLOYEES_TOTAL
```

Target Datastore: W_ORG_DS

Ind	Name	Mapping
	X_ACCOUNT...	SQ_BCI_CUSTOMERS.LAST_UPD...
	X_LAST_LO...	SQ_BCI_CUSTOMERS.EMAIL_AD...
	W_CUSTOME...	LTRIM(RTRIM('ERP CUSTOMER'))
	NAME	SQ_BCI_CUSTOMERS.CUSTOMER...
	ST_ADDRESS	SQ_BCI_CUSTOMERS.ADDRESS1
	CITY	SQ_BCI_CUSTOMERS.CITY
	STATE	SQ_BCI_CUSTOMERS.STATE
	ZIPCODE	SQ_BCI_CUSTOMERS.POSTAL_CODE
	COUNTRY	SQ_BCI_CUSTOMERS.COUNTRY
	CUST_TYPE...	SQ_BCI_CUSTOMERS.CUSTOMER...
	ACTIVE_FLG	IIF(SQ_BCI_CUSTOMERS.STAT...
	DOM_ULT_D...	IIF ISNULL(SQ_BCI_CUSTOMERS...

Mapping: X_ACCOUNT_LOG

☒ Active Mapping

Implementation | Technical Description | Business Rule

SQ_BCI_CUSTOMERS.LAST_UPDATED_BY

Execute on: SQ_BCI_CUSTOMERS [✓ Source] Staging Area Target

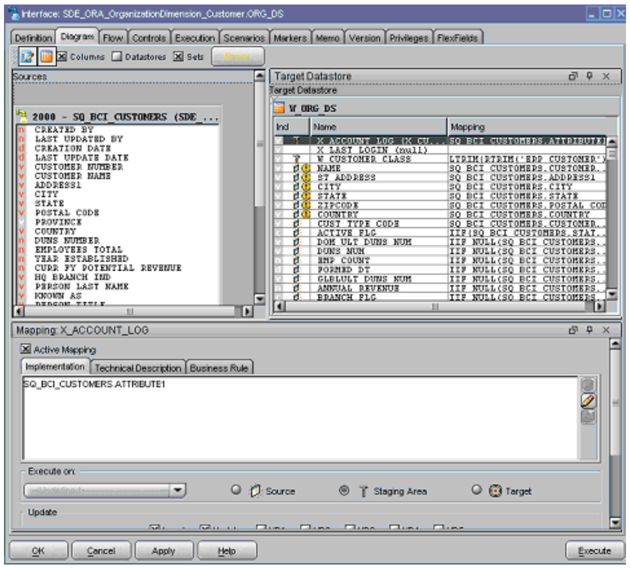
Update: ☒ Insert ☒ Update ☐ UD1 ☐ UD2 ☐ UD3 ☐ UD4 ☐ UD5

Target Column

Name: X_ACCOUNT_LOG ☐ Key ☐ Check Not Null (Flow control o...

Datatype: VARCHAR2 Length: 10 Scale: 0

b. Use the Launch Expression Editor icon to display the Expression Editor dialog, and then select **SQ_BCI_CUSTOMERS.ATTRIBUTE1** as the value in the **Implementation** field.


Interface: SDE_ORA_OrganizationDimension_Customer.ORG_DS

2000 - SQ_BCI_CUSTOMERS (SDE_...

```
CREATED_BY
LAST_UPDATED_BY
CREATION_DATE
LAST_UPDATE_DATE
CUSTOMER_NUMBER
CUSTOMER_NAME
ADDRESS1
CITY
STATE
POSTAL_CODE
PROVINCE
COUNTRY
DUNS_NUMBER
EMPLOYEES_TOTAL
YEAR_ESTABLISHED
CURR_FY_POTENTIAL_REVENUE
HQ_BRANCH_IND
PERSON_LAST_NAME
KNOWN_AS
PERSON_TITLE
```

W_ORG_DS

Ind	Name	Mapping
	X_ACCOUNT_LOG (X_CU...	SQ_BCI_CUSTOMERS.ATTRIBUTE1
	X_LAST_LOGIN (null)	
	W_CUSTOMER_CLASS	LTRIM(RTRIM('ERP_CUSTOMER')
	NAME	SQ_BCI_CUSTOMERS.CUSTOMER_
	ST_ADDRESS	SQ_BCI_CUSTOMERS.ADDRESS1
	CITY	SQ_BCI_CUSTOMERS.CITY
	STATE	SQ_BCI_CUSTOMERS.STATE
	ZIPCODE	SQ_BCI_CUSTOMERS.POSTAL_COD
	COUNTRY	SQ_BCI_CUSTOMERS.COUNTRY
	CUST_TYPE_CODE	SQ_BCI_CUSTOMERS.CUSTOMER_
	ACTIVE_FLG	IIF(SQ_BCI_CUSTOMERS.STAT...
	DOM_ULT_DUNS_NUM	IIF NULL(SQ_BCI_CUSTOMERS...
	DUNS_NUM	IIF NULL(SQ_BCI_CUSTOMERS...
	EMP_COUNT	IIF NULL(SQ_BCI_CUSTOMERS...
	FORMED_DT	IIF NULL(SQ_BCI_CUSTOMERS...
	GLBLULT_DUNS_NUM	IIF NULL(SQ_BCI_CUSTOMERS...
	ANNUAL_REVENUE	IIF NULL(SQ_BCI_CUSTOMERS...
	BRANCH_FLG	IIF NULL(SQ_BCI_CUSTOMERS...

Mapping: X_ACCOUNT_LOG

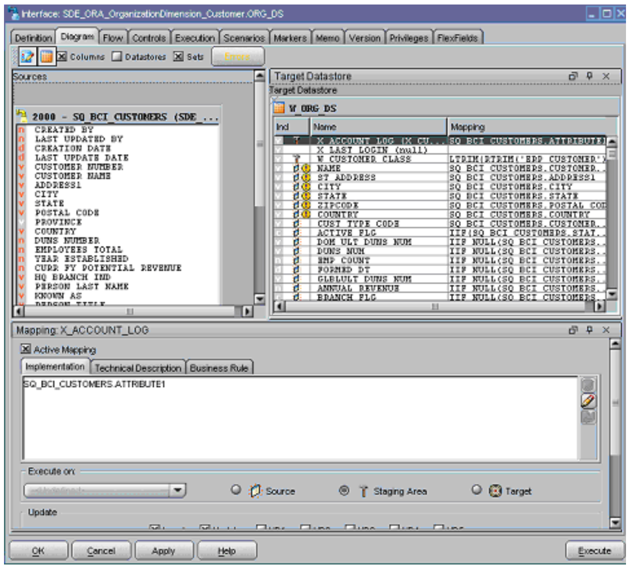
[✓] Active Mapping

SQ_BCI_CUSTOMERS.ATTRIBUTE1

Execute on: Source [✓ Staging Area] Target

c. Select the **X_LAST_LOGIN** field in the Target Datastore area.

d. Use the Launch Expression Editor icon to display the Expression Editor dialog, and then select **SQ_BCI_CUSTOMERS.LAST_UPDATE_LOGIN** as the value in the **Implementation** field.


Interface: SDE_ORA_OrganizationDimension_Customer.ORG_DS

2000 - SQ_BCI_CUSTOMERS (SDE_...

W_ORG_DS

Ind	Name	Mapping
	X_ACCOUNT_LOG (X_CU...	SQ_BCI_CUSTOMERS.ATTRIBUTE1
	X_LAST_LOGIN (null)	
	W_CUSTOMER_CLASS	LTRIM(RTRIM('ERP_CUSTOMER')

Mapping: X_ACCOUNT_LOG

[✓] Active Mapping

SQ_BCI_CUSTOMERS.ATTRIBUTE1

Execute on: Source [✓ Staging Area] Target

e. Click **OK** to save the details.

13. Repeat Step 12 for the Interface SDE_ORA_OrganizationDimension_Customer.ORG_DS_FULL.

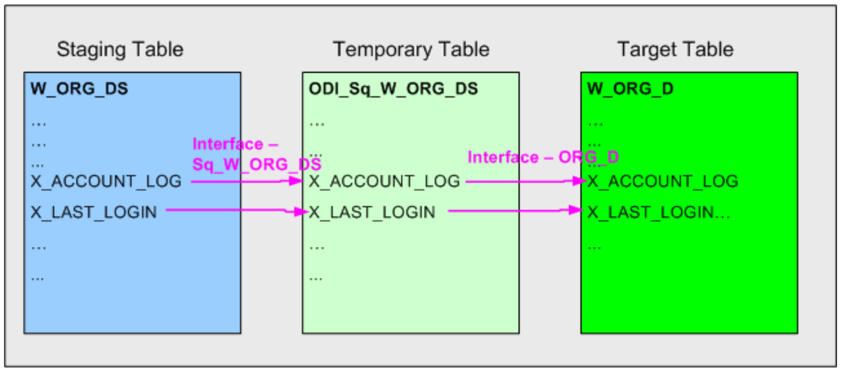
14. Right-click the scenario SDE_ORA_OrganizationDimension_Customer and select **Regenerate**.

Now that you have set up the ETL process for extracting and staging the data, you need to load the new data into the data warehouse. For more information, see Example of Loading Data from the Staging Area into an Existing Target Table.

Example of Loading Data from the Staging Area into an Existing Target Table

This example shows how data is loaded from the staging area into an existing target table.

The diagram below shows the new ETL mappings that you need to load the new data from the staging area into the target table, and the ODI Interfaces that you need to modify.



To customize the ETL process to load these two fields into the staging area, you need to:

- Load the X_ACCOUNT_LOG value and X_LAST_LOGIN value from the staging table W_ORG_DS into the temporary table SQ_W_ORG_DS using the Interfaces Sq_W_ORG_DS and Sq_W_ORG_DS_FULL.
- Load the X_ACCOUNT_LOG value and X_LAST_LOGIN value from the temporary table ODI_Sq_W_ORG_DS into the Target table W_ORG_D using the Interfaces ORG_D, ORG_D_FULL, and ORG_D_UNSPC.

To extract data from an Oracle EBS 11.5.10 Data Packaged Source:

1. In ODI Designer, display the Projects view, expand the Oracle BI Applications \Mappings\SILOS folder.
2. Right-click the **SIL_OrganizationDimension** folder, and choose **Version**, then **Create** to display the Create: *Object* dialog, and specify a unique version number and optional version description.
3. Display the Models view, expand the Dimension Stage folder, and edit the W_ORG_DS data store to display the DataStore: *Name* dialog, and display the Columns tab.
4. Make sure that these columns are setup:
   - X_ACCOUNT_LOG (VARCHAR2(10))
   - X_LAST_LOGIN (VARCHAR2(10))
5. Repeat steps 3 and 4 for the W_ORG_D data store.
6. In the Models view, right click the Oracle BI Applications model and select **Generate DDL** to display the Generate DDL dialog.

The Generate DDL option deploys the changes in the database.

7. Select the check-box in the Synchronize column next for the W_ORG_DS table.
8. Click the (...) button to right of the **Generation Folder** field to display the Select a folder dialog, and select the `\Utilities\System` folder, and click **OK**.
9. When the Procedure: DDL *Name* dialog is displayed, click **Execute**.

   Display ODI Operator and make sure that the procedure executes successfully.
10. Display the Projects view, expand the Mappings folder, and expand the SIL_OrganizationDimension folder.
11. Edit the Interface Sq_W_ORG_DS to display the Interface: *Name* dialog.
    a. Display the Diagram tab, and select the **X_ACCOUNT_LOG** field in the Target Datastore area.
    b. Use the Launch Expression Editor icon to display the Expression Editor dialog, and then select **W_ORG_DS.X_ACCOUNT_LOG** as the value in the **Implementation** field.
    c. Select the **X_LAST_LOGIN** field in the Target Datastore area.
    d. Use the Launch Expression Editor icon to display the Expression Editor dialog, and then select **W_ORG_DS.X_LAST_LOGIN** as the value in the **Implementation** field.
    e. Click **OK** to save the details.
12. Repeat Step 11 for the Interface Sq_W_ORG_DS_FULL.
13. Edit the Interface ORG_D to display the Interface: *Name* dialog.
    a. Display the Diagram tab, and select the X_ACCOUNT_LOG field in the Target Datastore area.
    b. Use the Launch Expression Editor icon to display the Expression Editor dialog, and then select **Sq_W_ORG_DS.X_ACCOUNT_LOG** as the value in the **Implementation** field.
    c. Select the **X_LAST_LOGIN** field in the Target Datastore area.
    d. Use the Launch Expression Editor icon to display the Expression Editor dialog, and then select **Sq_W_ORG_DS.X_LAST_LOGIN** as the value in the **Implementation** field.
    e. Click **OK** to save the details.
14. Repeat Step 13 for the Interface ORG_D_FULL and ORG_D_UNSPC.
15. Right-click the scenario SILOS\SIL_OrganizationDimension and select **Regenerate**.

Tips for Modifying the SQ_BCI_ Interface

Follow these tips to modify the SQ_BCI_Interface.

- A new source table should always be defined on right side of a LEFT OUTER join syntax with existing source tables. Using an INNER join or a RIGHT OUTER join can result in loss of records.

- Make sure that you define joins to match on a unique set of values. If you do not define a join that ensures a unique relationship, you might get a Cartesian product, which changes the granularity and results in duplicate errors.

If it is not possible to define a unique join, then do the following:

1. Create an inline view interface sourcing from the new table, outputting necessary columns plus a column LKP_ACTIVE.

   For example, you might specify the expression for LKP_ACTIVE as:

   ```
   IS_FIRST(
   ARG_GROUP(columns to be partitioned by),
   ARG_GROUP(columns to be ordered by))
   ```

   Note: In the above example, the IS_FIRST command and the matching filter are only needed if multiple records might be returned.

2. Bring the inline view interface into an existing interface with a filter LKP_ACTIVE=1, which guarantees that at most one record will be returned.

   As a best practice, you should comment custom code that you introduce. Comments should include the developer's name and the date that the code was added.

Other Types of Customizations Requiring Special Handling

These types of customization require special handling.

Topics:

- How to Modify Category 2 SCD Behavior
- How to Add A Dimension to an Existing Fact
- How to Add a DATE_WID column to a Fact

How to Modify Category 2 SCD Behavior

The BI Applications ETL process supports Type I and Type II slowly changing dimension behavior. Some dimensions are enabled only for Type I behavior while other dimensions are enabled to also support Type II behavior.

Of those dimensions that support Type II behavior, different dimension attributes have different Slowly Changing behavior including some attributes being treated as Type I.To enable or disable Type II behavior associated with a dimension.

Note: Modifying the Type-II tracking logic is the only change that you should make to shipped logic.

To modify a Category 2 SCD Trigger:

1. In ODI Designer, modify the dimension datastore.

   a. In the Models view, expand the **Oracle BI Applications** folder, **Oracle BI Applications** (Model), and **Dimension** (Submodel).

   b. Double-click the Dimension table.

   c. In the Definition tab, change the OLAP type value to either **Dimension** (only supports Type I changes) or **Slowly Changing Dimension** (supports Type II changes).

2. Modify the SIL Dimension Task.

   a. Navigate to the SIL task that populates this dimension.

   b. Double-click the **Main** interface.

   c. In the Flow subtab, select the Target (ORACLE_BI_APPLICATIONS) window.

   d. If the Property Window is not visible, open it by clicking the Menu Options **View – Property Inspector**.

   e. Change the IKM Selector value to `IKM BIAPPS Oracle Slowly Changing Dimension` if enabling Type II behavior or `IKM BIAPPS Oracle Incremental Update` if removing Type II behavior.

   f. Regenerate the scenario.

Enabling or Disabling Type II Behavior Associated with a Dimension

You can modify which columns are treated as Type I or Type II in a dimension that is configured to support Type II behavior. If a dimension is configured to support only Type I behavior, the following changes will have no effect as all columns are treated as Type I.

1. In ODI Designer, modify the dimension datastore.

   In the Models view, expand the 'Oracle BI Applications' folder, Oracle BI Applications (Model), Dimension (Submodel), and Columns.

2. Double-click the column whose SCD behavior you want to change.

3. In the Description subtab Slowly Changing Dimensions Behavior drop-down list, select the column behavior.

   To implement Type I behavior, select Overwrite on Change. To implement Type II behavior, select Add Row on Change. If enabling Type II behavior for a custom dimension, be sure to set columns as follows:

   - ROW_WID - Surrogate Key
   - INTEGRATION_ID, DATASOURCE_NUM_ID - Natural Key
   - CURRENT_FLG - Current Record Flag
   - EFFECTIVE_FROM_DT - Starting Timestamp
   - EFFECTIVE_TO_DT - Ending Timestamp

How to Add A Dimension to an Existing Fact

You can add a dimension to an existing fact, adding a dimension and dimension staging datastores as well as associated SDE and SIL processes, which also requires extending the fact and fact staging tables to reflect the association with the new dimension.

Customize Fact Datastores and Tasks

The Fact related datastores and tasks must be extended to reflect the new dimension.

Both the W_*Fact Name*_FS and W_*Fact Name*_F datastores must be extended.

1. Extend the Fact Staging datastore by adding an ID column that follows the naming convention X_*name*_ID and datatype VARCHAR2(80).

   The Oracle BI Applications Model should already be versioned.

   a. Navigate to **Models**, **Oracle BI Applications** (Folder), **Oracle BI Applications** (Model), **Fact Stage** (Submodel) and double-click the **Fact Staging** Table.

   b. In the Columns subtab, select the **X_CUSTOM**column.

   c. Click the green **+** symbol to add a column below the X_CUSTOM column.

2. Extend the Fact datastore by adding a WID column that follows the naming convention X_*name*_WID and datatype NUMBER(10).

   Follow the same steps as above to add a column to the fact datastore.

3. Add a foreign key constraint to the fact table that refers to the custom dimension table created previously.

   The foreign key constraint ensures the Custom SIL task is included in the generated load plan. The Custom SDE task is included in the generated load plan because it populates the staging table that is used as a source for the custom SIL task.

   a. Drill into the Fact datastore.

   b. Right-click the **Constraints** subfolder below the Fact datastore and select **New Reference**.

      The naming convention is FK_*Fact Table_Dimension Table*.

   c. If there are multiple WID columns that need to reference the same dimension table, enumerate each with a numeric suffix, for example, FK_WC_CUSTOM_F_WC_CUSTOM_D1. Type must be 'User Reference'.

   d. Select **Custom Dimension** from the Table drop-down list.

   e. In the Columns subtab, click the green **+** symbol to add a new column.

   f. For the Foreign Table column, select the custom WID column in the fact table. For the Primary Table column, select the ROW_WID column in the dimension table.

4. Add a non-unique bitmap index on the X_*name*_WID column.

   a. Drill into the Fact datastore.

   b. Right-click the **Constraints** subfolder below the Fact datastore and select **New Key**.

      The naming convention is Fact Table_F*n*.

   c. Enumerate each of these indexes with a numeric suffix, for example, WC_CUSTOM_F1.
   d. Select the Not Unique Index radio button.
   e. In the Columns subtab, add the WID column using the shuttle button.
   f. In the Control subtab, check the Defined in the Database and Active check boxes.
   g. In the Flexfields subtab, set the index type value to QUERY and the bitmap index value to Y.

5. Modify the Fact SDE task.

   Pass the value from the source table to the custom X_*name*_ID column in the staging table. In the mapping expression, include any necessary conversion functions to get the data into the VARCHAR2(80) format.

6. Modify the Fact SIL task. Add logic to retrieve the ROW_WID value from the custom dimension.

   This is usually done in one of the following ways. There is no significant difference between these two methods:

   a. Add the dimension as a source in the SQ temp interface.

      Join on the fact table's ID column and the dimension table's INTEGRATION_ID column and the fact and dimension DATASOURCE_NUM_ID columns. If the dimension is a Type II dimension, include a range join on the fact's canonical date between the dimension's effective dates. Configure the join as a Left Outer Join. Pass the ROW_WID column as an output.

   b. Add the dimension as a lookup in the main interface.

      The Lookup join is on the fact table's ID column and the dimension table's INTEGRATION_ID column and the fact and dimension DATASOURCE_NUM_ID columns. If the dimension is a Type II dimension, include a range join on the fact's canonical date between the dimension's effective dates. Configure the Lookup Type as 'SQL left-outer join in the from clause'.

7. In the mapping expression to populate the custom WID column in the main interface, embed the ROW_WID column from the dimension table in a function that defaults NULL values to **0**.

   For example, `COALESCE(SQ_W_AP_HOLDS_FS.PURCHASE_ORG_WID,0)`

How to Add a DATE_WID column to a Fact

This use case is similar to adding a regular Dimension to a fact but in this case, a Date dimension is used. There are several Date related dimension, each representing dates in a different manner (fiscal, enterprise, and so on) and different granularities (day, week, month, etc.).

Joins between a fact and Date dimension table are performed on a Date specific WID column. The Date WID column is a 'smart key' value that represents the date in `YYYYMMDD` format. There is no need to do a lookup to resolve the ROW_WID of the

Date dimension, rather you pass the Date column through the ETL process and convert it to this format.

Each fact table has exactly one 'canonical' Date specific WID column. This is the primary date used to drive various date-related calculations. There is no particular metadata to identify this column but lookups to effective dated tables will use this column in the ETL and various date-related expressions in the RPD will also use this column. All packaged fact tables have a single canonical date already identified. When creating custom fact tables, one Date WID column should be nominated as the canonical date and consistently used.

Follow the same steps as adding a dimension to a fact with the following changes. There is no need to create a custom SDE as we use the existing Date dimension.

The Fact related datastores and tasks must be extended to reflect the new dimensionality. Both the W_*Fact Name*_FS and W_*Fact Name*_F datastores must be extended.

1. Extend the Fact Staging datastore by adding a DT column that follows the naming convention X_*name*_DT.

   This column should have the format DATE(7).

2. Extend the Fact datastore by adding both custom DT and DT_WID columns.

   These follow the naming convention X_*name*_DT and X_*name*_DT_WID.

3. Add a foreign key constraint to the Date dimension or dimensions. If there are multiple WID columns that need to reference the same date dimension table, enumerate each with a numeric suffix.

4. Modify the Fact SDE task.

   Pass the value from the source table to the custom X_name_DT column in the staging table. Apply any conversions required to get the data into DATE format.

5. Modify the Fact SIL task. Pass the X_*name*_DT value from the staging table to the corresponding column in the fact table.

   In the mapping expression to populate the custom X_*name*_DT_WID column in the main interface, embed the DT column in a function that calculates the DT_WID value, defaulting to 0 when the supplied DT value is NULL. For example, `CALCULATE_DT_WID_DFLT(SQ_W_AP_HOLDS_FS.HOLD_DATE,0)`.

Category 2 Customizations: Adding Additional Tables

Category 2 customizations use pre-packaged adapters to add new fact or dimension tables to the Oracle Business Analytics Warehouse.

You can build entirely new tables that will be loaded with data from a source table that is not already extracted from. For example, you might want to create a new Project dimension table. In this case, you create new dimension and staging tables as well as new extract and load ETL mappings.

When creating a new custom table, use the prefix WC_ to help distinguish custom tables from tables provided by Oracle as well as to avoid naming conflicts in case Oracle later releases a table with a similar name. For example, for your Project dimension you might create a WC_PROJECT_DS and a WC_PROJECT_D table.

When you create a new dimension or fact table, use the required system columns that are part of each of the Oracle Business Analytics Warehouse tables to maintain consistency and enable you to reference existing table structures. When you create a new table, you need to define the table and indices in ODI Designer Models area first. The destination model for the Oracle Business Analytics Warehouse is Oracle BI Applications.

About the Main Required Columns

For custom staging tables, the following columns are required:

- INTEGRATION_ID — Stores the primary key or the unique identifier of a record as in the source table.
- DATASOURCE_NUM_ID — Stores the data source from which the data is extracted.

For dimension and fact tables, the required columns are the INTEGRATION_ID and DATASOURCE_NUM_ID columns plus these:

- ROW_WID — A sequence number generated during the ETL process, which is used as a unique identifier for the Oracle Business Analytics Warehouse.
- ETL_PROC_WID — Stores the ID of the ETL process information.

About the DATASOURCE_NUM_ID Column

The tables in the Oracle Business Analytics Warehouse schema have DATASOURCE_NUM_ID as part of their unique user key. While the transactional application normally ensures that a primary key is unique, it is possible that a primary key is duplicated between transactional systems. To avoid problems when loading this data into the data warehouse, uniqueness is ensured by including the DATASOURCE_NUM_ID as part of the user key. This means that the rows can be loaded in the same data warehouse tables from different sources if this column is given a different value for each data source.

Additional Information About Customizing

Learn about miscellaneous information about customization in Oracle Business Intelligence Applications.

About the Update Strategy

For loading new fact and dimension tables, design a custom process on the source side to detect the new and modified records. The SDE process should be designed to load only the changed data (new and modified). If the data is loaded without the incremental process, the data that was previously loaded will be erroneously updated again. For example, the logic in the preconfigured SIL mappings looks up the destination tables based on the INTEGRATION_ID and DATASOURCE_NUM_ID and returns the ROW_WID if the combination exists, in which case it updates the record. If the lookup returns null, it inserts the record instead. In some cases, last update date(s) stored in target tables are also compared in addition to the columns specified above to determine insert or update. Look at the similar mappings in the preconfigured folder for more details.

About Indices and Naming Conventions

Staging tables typically do not require any indices. Use care to determine if indices are required on staging tables. Create indices on all the columns that the ETL will use for dimensions and facts (for example, ROW_WIDs of Dimensions and Facts, INTEGRATION_ID and DATASOURCE_NUM_ID and flags). Carefully consider which columns or combination of columns filter conditions should exist, and define indices to improve query performance. Inspect the preconfigured objects for guidance.

Name all the newly created tables as WC_. This helps visually isolate the new tables from the preconfigured tables. Keep good documentation of the customizations done; this helps when upgrading your data warehouse. Once the indices are decided upon, they should be registered in the ODI Model (for more information, see Adding an Index to an Existing Fact or Dimension Table).

Adding a New Fact Table to the Oracle Business Analytics Warehouse

Custom tables should follow the WC_ naming convention to help distinguish from preconfigured tables. Follow this procedure to add a new fact table to the Oracle Business Analytics Warehouse.

Placeholder fact and dimension groups to which you can add your own custom content are provided out-of-the-box. These follow the X_CUSTOM naming convention. You may introduce your own custom fact and dimension groups. For information about how to do this, see About Creating Custom Fact and Dimension Groups. The following steps assume content is being added to an out-of-the-box X_CUSTOM fact or dimension group. If you create custom groups, use those instead.

1. Create the custom fact datastores and tasks.

   Create a WC_<*fact name*>_F datastore under the 'Oracle BI Applications – Fact' model. Create a WC_<*fact name*>_FS datastore under the 'Oracle BI Applications – Fact Stage' model. Use the WC_SAMPLE_FS and WC_SAMPLE_F datastores as templates. These datastores include all required system columns.

   The specific submodel that a table belongs to drives the table maintenance behavior. For example, tables in the 'Fact Stage' submodel will always be truncated during each ETL run while tables in the 'Fact' submodel are only truncated during a Full ETL run.

   A fact can be defined in ODI either manually, by generating the DDL to create the table in the database or by defining the table in the database and importing the definition into ODI using the BI Apps RKM. If using the RKM, the imported table will automatically be placed in the 'Other' submodel and will need to be moved into the 'Fact Staging' and 'Fact' submodels as appropriate. The OLAP type also needs to be set for the fact table to 'Fact Table'.

2. Add a foreign key constraint to all dimension tables associated with this fact. If the custom fact table joins to any custom dimension tables, be sure to complete the steps to introduce the custom dimensions prior to creating the custom fact table.

   The Dimension SDE task will be included in the generated load plan because it populates the staging table that is used as a source for the Dimension SIL task.

   a. Drill into the Fact datastore.

   b. Right-click the **Constraints** subfolder below the Fact datastore and select **New Reference**.

      The naming convention is FK_<*Fact Table*>_<*Dimension Table*>.

      If there are multiple WID columns that need to reference the same dimension table, enumerate each with a numeric suffix. For example, FK_WC_CUSTOM_F_WC_CUSTOM_D1.

   c. Set the Type to **User Reference**, select the dimension from the **Table** drop-down list and, in the **Columns** subtab, click the green '+' button on the top right to add a new column.

   d. For the Foreign Table column, select the custom WID column in the fact table.

      For the Primary Table column, select the ROW_WID column in the dimension table.

3. Create an SDE and SIL task in the Custom SDE and SIL adaptor folders. Use the SDE_<*Product Line Code*>_SampleFact and SIL_SampleFact tasks as a template.

   These tasks include the logic required to populate the system columns.

4. Add Load Plan step to the **3 SDE Facts X_CUSTOM_FG <*Product Line Version Code*>** Load Plan Component. Note that if you are using a custom fact group, in the following steps, replace references to X_CUSTOM with the name of your custom fact group.

   > **Note:** If you are using a custom fact group, in the following steps, replace references to X_CUSTOM with the name of your custom fact group.

   a. In Designer, navigate to **Load Plans and Scenarios**, **BIAPPS Load Plan**, then **Load Plan Dev Components**.

   b. Navigate to **SDE - <*Product Line Version Code*>** and double-click the **3 SDE Facts X_CUSTOM_FG <*Product Line Version Code*>**Load Plan Component.

   c. Select the **X_CUSTOM_FG** step.

   d. Click the green '+' symbol near the top right and select the **Run Scenario Step** option.

   e. Provide the Scenario Name, Version should be -1, Step Name should match the Task name. Set the Restart Type to **Restart from failed step**.

5. Add a Load Plan step to **3 SIL Facts X_CUSTOM_FG** Load Plan Component.

   > **Note:** If you are using a custom fact group, in the following steps, replace references to X_CUSTOM with the name of your custom fact group.

   a. In Designer, navigate to **Load Plans and Scenarios**, **BIAPPS Load Plan**, then **Load Plan Dev Components**.

   b. Navigate to SIL and double-click the **3 SIL Facts X_CUSTOM_FG** Load Plan Component.

   c. Select the **X_CUSTOM_FG** step.

   d. Click the green '+' symbol near the top right and select the **Run Scenario Step** option.

   e. Provide the Scenario Name, Version should be -1, Step Name should match the Task name. Set the Restart Type to **Restart from failed step**.

Manually Create a Fact Table

You can create a new fact table.

1. In Designer, navigate to **Models**, **Oracle BI Applications (Folder)** , **Oracle BI Applications (Model)** , **Fact Stage (Submodel)**, then right-click the **WC_SAMPLE_FS datastore** and select **Duplicate Selection**.
2. Double-click the new datastore and rename it.

   Name and Resource Name should match the actual table name. Alias can be the same or a more user friendly value.
3. In the Columns subtab, add all columns
4. Repeat the same steps to create the Fact Table by copying the WC_SAMPLE_F datastore under the 'Facts' submodel.
5. For the fact table, set the OLAP type to **Fact Table**.
6. Generate the DDL to create the table in the database.

Import Fact Tables into ODI

You can import existing fact tables into ODI.

1. In Designer, navigate to **Models** , **Oracle BI Applications (Folder)** then double-click the Oracle BI Applications model.
2. In the Reverse Engineer subtab, indicate the tables to be imported under the LIST_OF_TABLES option.

   To import multiple tables, provide a comma separated list.
3. Click **Reverse Engineer**.

   A session is started that imports the table or tables into ODI. The Reverse Engineer process places all tables in the Other submodel.
4. Drag and drop W_%_FS tables into the Fact Stage submodel and the W_%_F table into the Fact submodel.
5. For the fact table, set the OLAP type to **Fact Table**.
6. Generate the DDL to create the table in the database.

Create a Custom Dimension Datastore and Tasks

Create the custom dimension datastores and tasks.

Create a WC_<*dimension name*>_D datastore under the 'Oracle BI Applications – Dimension' model. Create a WC_<*dimension name*>_DS datastore under the 'Oracle BI Applications – Dimension Stage' model. Use the WC_SAMPLE_DS and WC_SAMPLE_D datastores as templates. These datastores include all required system columns. Custom tables should follow the WC_ naming convention to help distinguish from shipped tables.

Note:

The specific submodel that a table belongs to drives the table maintenance behavior. For example, tables in the 'Dimension Stage' submodel will always be truncated at each ETL run while tables in the 'Dimension' submodel are truncated only during a Full ETL run. Do not create a 'Custom' submodel to place your datastores as table maintenance will not be implemented properly for tables in such a submodel.

As described below, a dimension can be defined either in ODI, generating DDL to create the table in the database, or by defining the table in the database and importing the definition into ODI using the BI Applications RKM. If you use the RKM, the imported table is automatically placed in the 'Other' submodel and needs to be moved into the 'Dimension Staging' and 'Dimension' submodels as appropriate. Also, the OLAP type will need to be set for the dimension to 'Dimension' or 'Slowly Changing Dimension' as appropriate.

'X_CUSTOM' placeholder load plan components are provided as templates but should not be used for new custom content. Create a new dimension group in Configuration Manager. For information about how to do this, see About Creating Custom Fact and Dimension Groups.

Manually Create the Dimension Tables in ODI

You can create the dimension and tasks manually using ODI.

1. In Designer, navigate to **Models**, **Oracle BI Applications** (Folder), **Oracle BI Applications** (Model), then **Dimension Stage** (Submodel).
2. Right-click the **WC_SAMPLE_DS** datastore and select **Duplicate Selection**.
3. Double-click the new datastore and rename it.

   Name and Resource Name should match the actual table name. Alias can be the same or a more user friendly value.
4. In the Columns subtab, add all columns.
5. Repeat the same steps to create the Dimension Table by copying the **WC_SAMPLE_D** datastore under the Dimensions submodel.
6. For the dimension table, set the OLAP type to either **Dimension** if this is a Type I dimension or to **Slowly Changing Dimension** if this is a Type II dimension.

Import Custom Dimension Tables into ODI

You can import custom dimension tables into ODI.

1. In Designer, navigate to **Models**, **Oracle BI Applications** (Folder) and double-click the **Oracle BI Applications Model**.
2. In the Reverse Engineer subtab, indicate the tables to be imported under the LIST_OF_TABLES option.

   To import multiple tables, provide a comma-separated list.
3. Click the **Reverse** Engineer button to start a session that imports the table(s) into ODI.

The Reverse Engineer process places all tables in the Other submodel.

4. Drag and drop **W_%_DS** tables into the Dimension Stage submodel and the **W_%_D** table into the Dimension submodel.
5. Double-click the new dimension datastore and set the OLAP type to either **Dimension** if this is a Type I dimension or to **Slowly Changing Dimension** if this is a Type II dimension.

Create an ODI Sequence for the Custom Dimension

Create an ODI sequence for the custom dimension. A database sequence is used to populate the ROW_WID column of the dimension. The Generate DDL procedure is used to generate the DDL required to create the database trigger in the database. Use WC_SAMPLE_D_SEQ as a template.

1. In Designer, navigate to **Projects**, **BI Apps Project**, then **Sequences**.
2. Right-click the Sequence folder and select **New Sequence**.
3. Set name to ***Dimension Name*_SEQ**.
4. Select the **Native** sequence radio button.
5. Set the Schema to **DW_BIAPPS11G**.

   Generally, the Native sequence name should match the ODI name unless this causes the name length to exceed 30 characters, in which case, you can shorten the name to meet this limit. This is the name of the database trigger created to populate the ROW_WID column.
6. Generate the DDL to create the table in the database.

Note: If you manually created the dimension in ODI, this will generate the DDL to create both the table and sequence. If you imported the dimension into ODI, this will generate the DDL to create the sequence only.

Create SDE and SIL Tasks

Create SDE and SIL tasks in the Custom SDE and SIL adaptor folders.

Use the SDE_*Product Line Code*_SampleDimension and SIL_SampleDimension tasks as a template. These tasks include the logic required to populate the system columns. Finally, generate scenarios for these tasks.

About Creating Custom Fact and Dimension Groups

Once you have completed customization steps to include custom tables and ETL tasks, create custom fact and dimension groups in ODI and Configuration Manager to incorporate your changes into the Load Plans that orchestrate ETL.

Data Warehouse tables are populated by ETL tasks which are orchestrated by a Load Plan. When creating custom content, new data warehouse tables and associated ETL tasks are created and need to be incorporated into a Load Plan so that the custom tables are populated along with the standard tables.

A Load Plan is built by assembling several Load Plan Components into an integrated load plan. Load Plan Components are organized into level 0, 1, 2, and 3 components. Level 3 Load Plan Components execute the actual ETL tasks, while the other Load

Plan Components are considered system Load Plan Components, and are used in building up and organizing the Load Plan. These Load Plan Components are assembled into a combined Load Plan by the Load Plan Generator.

In order to have custom content such as custom dimensions or custom facts incorporated into a Load Plan that includes out-of-the-box content, custom Load Plan Components must be created. The Load Plan Generator can then include these components when building a load plan.

For steps on creating custom tables and ETL tasks, refer to Customizing the Oracle Business Analytics Warehouse. The following topics describe how to create new Load Plan Components to execute these ETL tasks. Pre-existing '3 Dims X_CUSTOM_DIM' and '3 Dims X_CUSTOM_FG' Load Plan Components are provided as templates and the steps in the following topics describe copying these X_CUSTOM components and updating the copies to reflect custom content. The steps are essentially the same regardless of which group you are adding, only the template you start with changes.

Creating Custom Fact and Dimension Groups in ODI

The first step in creating custom fact and dimension groups is performed in ODI Designer.

1. Add the custom load plan component.

   a. In ODI Designer, navigate to the Designer tab and under Load Plans and Scenarios, expand the BIAPPS Load Plan and then Load Plan Dev Components.

   b. Expand the appropriate subfolder for the custom Load Plan Component you are adding.

      If you are adding a SIL Load Plan Component, expand the SIL subfolder. If you are creating a SDE Load Plan Component, expand the SDE subfolder, then expand the appropriate product line subfolder.

2. Duplicate an existing X_CUSTOM Load Plan Component.

   The following Load Plan Components are generally preconfigured with all required variables and other settings, so copying these components saves you the trouble of adding variables and configuring required settings:

   - 3_SDE Dims X_CUSTOM_DIM <PLV_CODE>
   - 3 SDE Fact X_CUSTOM_FG <PLV_CODE>
   - 3 SIL Dims X_CUSTOM_DIM
   - 3 SIL Fact X_CUSTOM_FG

3. Rename the Load Plan Component.

   In the properties for the copied component, delete the 'Copy of ' prefix. For an SDE Load Plan Component, it is very important to retain the Product Line Version code (for example, EBS_11_5_10 and so on) as the suffix, because the suffix is used by Load Plan Generator to determine whether a Load Plan Component is included in a load plan that extracts from a particular data source. Rename the X_CUSTOM_DIM or X_CUSTOM_FG portion of the Load Plan Component name to match the code of the Dimension Group or Fact Group that is registered in Configuration Manager. Load Plan Generator uses this portion of the component's name to coordinate with Configuration Manager to include Load Plan Components for those Groups specified in Configuration Manager.

4. In the Steps subtab, rename the first, or Root, step to match the custom Group Code. Variables can be assigned values at the Fact and Dimension Group level, and are refreshed at the root level. ETL refresh logic takes the name of the root step and passes it to Configuration Manager to get the value for the variable.

5. Add the Custom Level 3 Load Plan Component to the Level 2 System Load Plan Component.

   a. Navigate to the Designer tab and under Load Plans and Scenarios, expand the Load Plan System Components.

   b. If you are adding a SDE Load Plan Component, expand the SDE subfolder. If you are adding a SIL Load Plan Component, expand the SIL subfolder.

   c. If you are adding a Dimension Group, double-click the Level 2 Dimension Group Load Plan Component. If you are adding a Fact Group, double click the Level 2 Fact Group Load Plan Component.

   d. Navigate to the Steps subtab of the Load Plan Component, right-click the $${3 X_CUSTOM_DIM} Load Plan Step, and select **Duplicate Selection**.

   e. Rename the Load Plan Step, replacing the X_CUSTOM_DIM or X_CUSTOM_FG suffix with the Group Code value used in the custom Load Plan Component and root step names. The portion within the brackets must match the custom Load Plan Component name exactly (ignoring the Product Line Version Code suffix in the case of SDE load plan components). Load Plan Generator uses this value to incorporate the Level 3 Load Plan Component into the generated load plan.

6. Add Load Plan steps to the '3 SDE Dims X_CUSTOM_DIM <*Product Line Version Code*>' and '3 SIL Dims X_CUSTOM_DIM' Load Plan Components you created.

   The following steps use 'X_CUSTOM' in describing the changes to the Load Plan Components. Replace this with the actual dimension name used when you created your custom Load Plan Components.

   a. In Designer, navigate to **Load Plans and Scenarios**, **BIAPPS Load Plan**, **Load Plan Dev Components**, **SDE -** ***Product Line Version Code*** and double-click the **3 SDE Dims X_CUSTOM_DIM** ***Product Line Version Code*** Load Plan Component.

   b. In the Steps subtab, select the **X_CUSTOM_DIM** step.

   c. Click the green **+**symbol near the top right and select **Run Scenario Step**.

   d. Provide the Scenario Name, set the Version as **-1**, and set the Step Name to match the Task name. Set the Restart Type to **Restart from failed step**.

   e. In Designer, navigate to **Load Plans and Scenarios**, **BIAPPS Load Plan**, **Load Plan Dev Components**, **SIL** and double-click the **3 SIL Dims X_CUSTOM_DIM** Load Plan Component.

   f. In the Steps subtab, select the **X_CUSTOM_DIM** step.

   g. Click the green **+**symbol near the top right and select **Run Scenario Step**.

   h. Provide the Scenario Name, set the Version as **-1**, and set the Step Name to match the Task name . Set the Restart Type to **Restart from failed step**.

To associate your custom dimension with a fact table, see How to Add A Dimension to an Existing Fact in Category 1 Customizations: Adding Columns to Existing Fact or Dimension Tables.

Creating Custom Fact and Dimension Groups in Configuration Manager

The last step in creating custom fact and dimension groups is performed in Configuration Manager.

1. In order to add custom Fact or Dimension Groups, the user, if not the Administrative User, must be granted the following roles:
   - BIA_CONFIGURE_CREATE_EDIT_DIMGROUP_PRIV
   - BIA_CONFIGURE_CREATE_EDIT_FACTGROUP_PRIV
2. In Configuration Manager, click **Manage Business Intelligence Applications**.
3. Select an offering where the custom Fact or Dimension Group most closely fits.
4. In the 'Associated Fact and Dimension Groups table, click **Actions** and select either **Create Fact Group** or **Create Dimension Group**.
5. Enter a Group Code, Group Name and Group Description.
   - The Group Code value must exactly match the value used when creating the corresponding ODI Load Plan Component. Dimension Groups use _DIM as a suffix while Fact Groups use _FG as a suffix. As a best practice, use X_ as a prefix to easily identify custom groups.
   - The Group Name and Description can be any value that is useful and meaningful. As a best practice, you may want to include either 'Custom' or your company name as a prefix to easily identify groups you have added.

The remaining steps for creating Fact Groups and Dimension Groups are different.

Creating Custom Dimension Groups

To create a Custom Dimension Group, you need to associate it to an existing Fact Group, so if the custom Dimension Group is to be associated with a custom Fact Group, be sure to add the Fact Group first.

1. In the Associated Fact and Dimension Groups list for the offering you added a new group for, click **Actions** and select **Create Dimension Group**.
2. In the Create Dimension Group dialog box, select a Fact Group from the Associate Fact Group list and add it to the right-hand list of associated Fact Groups.

   Note: The dialog box doesn't filter the Fact Groups by the offering you selected when creating the new group. Be sure to only select those Fact Groups that are actually associated with the offering you are adding the custom Dimension Group to.

3. Click **OK**.

The custom Dimension Group is now added to the offering and associated with a Fact Group.

Category 3 Customizations: Adding New Data as a Whole Row into a Standard Dimension Table

Category 3 customizations use the Universal adapter to load data from sources that do not have pre-packaged adapters.

Topics:

- How to Add New Data as a Whole Row Into a Standard Dimension Table
- Configuring Extracts
- Configuring Loads

How to Add New Data as a Whole Row Into a Standard Dimension Table

Follow this procedure to add new data as a whole row into a standard dimension table in the Oracle Business Analytics Warehouse.

1. Identify and understand the existing structure of staging tables.

   Refer to *Oracle Business Analytics Warehouse Data Model Reference* for the table structures. Non-system columns can include the null value.

2. Create a custom SDE interface to load the data into the staging table in the custom folder for this purpose.

   The staging table needs to be populated with incremental data (rows that have been added or changed since the last Refresh ETL process), for performance reasons.

3. Populate the INTEGRATION_ID column with the unique identifier for the record.

   The combination of INTEGRATION_ID and DATASOURCE_NUM_ID is unique. Populate the INTEGRATION_ID column with the unique identifier for the record. The combination of INTEGRATION_ID and DATASOURCE_NUM_ID is unique.

4. After the data is populated in the staging table, use the standard SIL interfaces to populate the dimension target tables.

Configuring Extracts

Each application has prepackaged logic to extract particular data from a particular source. You need to capture all data relevant to your reports and ad hoc queries by addressing what type of records you want and do not want to load into the Oracle Business Analytics Warehouse.

Extract interfaces generally consist of source tables, expressions used in the target columns, and a staging table. If you want to extract new data using the existing interface, you have to modify the extract interface to include the new data.

Extracting Data from a New Source Table

Extract interfaces (which have the SQ_* naming convention) reside in source-specific folders within the repository. Extract interfaces are used to extract data from the source system. You can configure these extract interfaces to perform the following:

- Extract data from a new source table.

- Set incremental extraction logic.

Extracting New Data Using an Existing Source Table

You can configure extract mappings and Interfaces in the Oracle Business Analytics Warehouse to accommodate additional source data.

For example, if your business divides customer information into separate tables based on region, then you would have to set up the extract interface to include data from these tables.

To modify an existing interface to include new data:

1. Modify the existing interface to extract information from the source, and add it to an appropriate extension column.
2. Modify the Expressions in the target table to perform any necessary transformations.
3. Save the changes.
4. Regenerate the scenario.

You have to determine which type of extension column to map the data to in the staging table. After you modified the extract interface, you would also have to modify the corresponding load interfaces (SDE and SIL) to make sure that the extension columns that you added are connected all the way from the staging table to the target data warehouse table.

Setting Up the Delimiter for a Source File

When you load data from a Comma Separated Values (CSV) formatted source file, if the data contains a comma character (,), you must enclose the source data with a suitable enclosing character known as a delimiter that does not exist in the source data.

Note: Alternatively, you could configure your data extraction program to enclose the data with a suitable enclosing character automatically.

For example, you might have a CSV source data file with the following data:

```
Months, Status
January, February, March, Active
April, May, June, Active
```

If you loaded this data without modification, ODI would load 'January' as the Months value, and 'February' as the Status value. The remaining data for the first record (that is, March, Active) would not be loaded.

To enable ODI to load this data correctly, you might enclose the data in the Months field within the double-quotation mark enclosing character (" ") as follows:

```
Months, Status
"January, February, March", Active
"April, May, June", Active
```

After modification, ODI would load the data correctly. In this example, for the first record ODI would load 'January, February, March' as the Months value, and 'Active' as the Status value.

To set up the delimiter for a source file:

1. Open the CSV file containing the source data.
2. Enclose the data fields with the enclosing character that you have chosen (for example, (").

   You must choose an enclosing character that is not present in the source data. Common enclosing characters include single quotation marks (') and double quotation marks (").
3. Save and close the CSV file.
4. In ODI Designer, display the Models view, and expand the Oracle BI Applications folder.

   Identify the data stores that are associated with the modified CSV files. The CSV file that you modified might be associated with one or more data stores.
5. In ODI Designer, change the properties for each of these data stores to use the enclosing character.
   a. Double-click the data source, to display the DataStore: *Name* dialog.
   b. Display the Files tab.
   c. Use the **Text Delimiter** field to specify the enclosing character that you used in step 2 to enclose the data.
   d. Click **OK** to save the changes.

You can now load data from the modified CSV file.

Configuring Loads

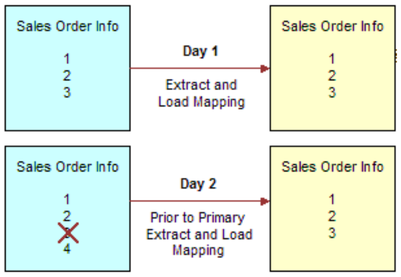
You can customize the way that Oracle Business Intelligence Applications loads data into the Oracle Business Analytics Warehouse.

About Primary Extract and Delete Mappings Process

Before you decide to enable primary extract and delete sessions, it is important to understand their function within the Oracle Business Analytics Warehouse. Primary extract and delete mappings allow your analytics system to determine which records are removed from the source system by comparing primary extract staging tables with the most current Oracle Business Analytics Warehouse table.

The primary extract mappings perform a full extract of the primary keys from the source system. Although many rows are generated from this extract, the data only extracts the Key ID and Source ID information from the source table. The primary extract mappings load these two columns into staging tables that are marked with a *_PE suffix.

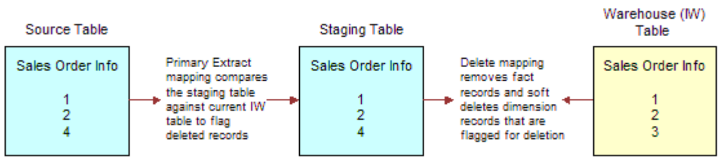
The figure provides an example of the beginning of the extract process. It shows the sequence of events over a two day period during which the information in the source table has changed. On day one, the data is extracted from a source table and loaded into the Oracle Business Analytics Warehouse table. On day two, Sales Order number three is deleted and a new sales order is received, creating a disparity between the Sales Order information in the two tables.



The figure shows the primary extract and delete process that occurs when day two's information is extracted and loaded into the Oracle Business Analytics Warehouse from the source. The initial extract brings record four into the Oracle Business Analytics Warehouse. Then, using a primary extract mapping, the system extracts the Key IDs and the Source IDs from the source table and loads them into a primary extract staging table.

The extract mapping compares the keys in the primary extract staging table with the keys in the most current the Oracle Business Analytics Warehouse table. It looks for records that exist in the Oracle Business Analytics Warehouse but do not exist in the staging table (in the preceding example, record three), and sets the delete flag to Y in the Source Adapter, causing the corresponding record to be marked as deleted.

The extract mapping also looks for any new records that have been added to the source, and which do not already exist in the Oracle Business Analytics Warehouse; in this case, record four. Based on the information in the staging table, Sales Order number three is physically deleted from Oracle Business Analytics Warehouse. When the extract and load mappings run, the new sales order is added to the warehouse.


Source Table
Sales Order Info
1
2
4
Primary Extract mapping compares the staging table against current IW table to flag deleted records
Staging Table
Sales Order Info
1
2
4
Delete mapping removes fact records and soft deletes dimension records that are flagged for deletion
Warehouse (IW) Table
Sales Order Info
1
2
3

About Working with Primary Extract and Delete Mappings

The primary extract (*_Primary) and delete mappings (*_IdentifyDelete and *_Softdelete) serve a critical role in identifying which records have been physically deleted from the source system. However, there are some instances when you can disable or remove the primary extract and delete mappings, such as when you want to retain records in the Oracle Business Analytics Warehouse that were removed from the source systems' database and archived in a separate database.

Because delete mappings use Source IDs and Key IDs to identify purged data, if you are using multiple source systems, you must modify the SQL Query statement to verify that the proper Source ID is used in the delete mapping. In addition to the primary extract and delete mappings, the configuration of the delete flag in the load mapping also determines how record deletion is handled.

You can manage the extraction and deletion of data in the following ways:

- Deleting the configuration for source-archived records
- Deleting records from a particular source
- Enabling delete and primary-extract sessions
- Configuring the Record Deletion flag

- Configuring the Record Reject flag

Deleting the Configuration for Source-Archived Records

Some sources archive records in separate databases and retain only the current information in the main database. If you have enabled the delete mappings, you must reconfigure the delete mappings in the Oracle Business Analytics Warehouse to retain the archived data.

To retain source-archived records in the Oracle Business Analytics Warehouse, make sure the LAST_ARCHIVE_DATE parameter value is set properly to reflect your archive date. The delete mappings will not mark the archived records as 'deleted'.

Customizing Stored Lookups and Adding Indexes

Learn about how this information applies to all categories of customization in Oracle Business Intelligence Applications.

- How Dimension Keys are Looked Up and Resolved
- Adding an Index to an Existing Fact or Dimension Table

How Dimension Keys are Looked Up and Resolved

By default, dimension key resolution is performed by the Oracle Business Analytics Warehouse in the load mapping. The load interface uses prepackaged, reusable lookup transformations to provide pre-packaged dimension key resolution.

There are two commonly used methods for resolving dimension keys. The first method, which is the primary method used, is to perform a lookup for the dimension key. The second method is to supply the dimension key directly into the fact load mapping.

If the dimension key is not provided to the Load Interface through database joins, the load mapping performs the lookup in the dimension table. The load mapping does this using prepackaged Lookup Interfaces. To look up a dimension key, the Load Interface uses the INTEGRATION_ID, the DATASOURCE_NUM_ID, and the Lookup date, which are described in the table below.

Port	Description
INTEGRATION ID	Uniquely identifies the dimension entity within its source system. Formed from the transaction in the Source Adapter of the fact table.
DATASOURCE_NUM_ID	Unique identifier of the source system instance.
Lookup Date	The primary date of the transaction; for example, receipt date, sales date, and so on.

If Type II slowly changing dimensions are enabled, the load mapping uses the unique effective dates for each update of the dimension records. When a dimension key is looked up, it uses the fact's primary or 'canonical' date to resolve the appropriate dimension key. The effective date range gives the effective period for the dimension record. The same entity can have multiple records in the dimension table with different effective periods due to Type II slowly changing dimensions. This effective date range is used to exactly identify a record in its dimension, representing the information in a historically accurate manner.

There are four columns needed for the load interface lookup: INTEGRATION ID, DATASOURCE_NUM_ID, and Lookup Date (EFFECTIVE_FROM_DT and EFFECTIVE_TO_DATE). The lookup outputs the ROW_WID (the dimension's primary key) to the corresponding fact table's WID column (the fact tables foreign key).

Adding an Index to an Existing Fact or Dimension Table

Dimension and Fact Tables in the Oracle Business Analytics Warehouse use an ETL Index for Unique/Binary Tree index, and Query Index for Non-Unique/Bit Map Index.

To add an index to an existing fact or dimension table:

1. In ODI Designer, display the **Models** view, and expand the **Oracle BI Applications** folder.
2. Expand the Fact or Dimension node as appropriate.
3. Expand the table in which you want to create the index.
4. Right-click on the **Constraints** node, and select **Insert Key** to display the Key: New dialog.
5. Display the **Description** tab.
6. Select the **Alternate Key** radio button, and update the name of the Index in the **Name** field.
7. Display the Column tab.
8. Select the column on which you want to create the index.
9. Display the FlexFields tab.
10. Use the settings to specify the index type, as follows:
    - For Query type indexes (the default), define the index as an Alternate Key for unique indexes and as Not Unique Index for non-unique indexes.
    - For ETL type indexes, clear the check box for the INDEX_TYPE parameter and set the value to `ETL`. In addition, set the value of the IS_BITMAP parameter to **N** and define the index as an Alternate Key for unique indexes and as Not Unique Index for non unique indexes.
11. Save the changes.

About Resolving Dimension Keys

By default, dimension key resolution is performed by the Oracle Business Analytics Warehouse in the load mapping. The load interface uses prepackaged, reusable lookup transformations to provide pre-packaged dimension key resolution.

There are two commonly used methods for resolving dimension keys. The first method, which is the primary method used, is to perform a lookup for the dimension key. The second method is to supply the dimension key directly into the fact load mapping.

Resolving the Dimension Key Using Lookup

If the dimension key is not provided to the Load Interface through database joins, the load mapping performs the lookup in the dimension table. The load mapping does this using prepackaged Lookup Interfaces. To look up a dimension key, the Load Interface uses the INTEGRATION_ID, the DATASOURCE_NUM_ID, and the Lookup date, which are described in the table below.

Port	Description
INTEGRATION ID	Uniquely identifies the dimension entity within its source system. Formed from the transaction in the Source Adapter of the fact table.
DATASOURCE_NUM_ID	Unique identifier of the source system instance.
Lookup Date	The primary date of the transaction; for example, receipt date, sales date, and so on.

If Type II slowly changing dimensions are enabled, the load mapping uses the unique effective dates for each update of the dimension records. When a dimension key is looked up, it uses the fact's primary or 'canonical' date to resolve the appropriate dimension key. The effective date range gives the effective period for the dimension record. The same entity can have multiple records in the dimension table with different effective periods due to Type II slowly changing dimensions. This effective date range is used to exactly identify a record in its dimension, representing the information in a historically accurate manner.

There are four columns needed for the load interface lookup: INTEGRATION ID, DATASOURCE_NUM_ID, and Lookup Date (EFFECTIVE_FROM_DT and EFFECTIVE_TO_DATE). The lookup outputs the ROW_WID (the dimension's primary key) to the corresponding fact table's WID column (the fact tables foreign key).

Custom Domains

Domains are similar to list of values and lookups commonly found in transactional systems. These often have language independent code, and one or more language dependent values associated with them. In BI Applications, they are used to support multiple languages and aggregations.

For example, we may have the domain GENDER with the domain members `M` and `F`. To support multiple languages, we may have corresponding English values of Man and Woman, and French values of Homme and Femme – the appropriate value returned based on the user's preferred language.

Domains are often used as criteria in analyses. For example, a report such as Total # of Employees by Gender issues a SQL statement similar to `SELECT GENDER, COUNT(*) FROM` *`Table`* `GROUP BY GENDER`.

BI Applications ships a number of domains out-of-the-box that are used to support multiple languages and analyses. Customers may wish to extend BI Applications with additional domains to support their user's multi-language and analytical needs.

The two different types of domains are source-based and conformed.

- Source-based domains are values that are extracted directly from the source system and loaded into the data warehouse with minimal changes (other than to default for NULL values).
- Conformed domains are meant to provide a consistent set of analyses across multiple heterogeneous source systems that may use different codes to represent the same thing – the ETL process takes the source-based code and matches or conforms it to a BI Applications-specific code.

BI Applications support only custom source domains in the data warehouse. Mapping a new custom source domain to an existing conformed domain is not supported.

For more information about domains, see About Multi-Language Support in *Oracle Business Intelligence Applications Administrator's Guide*.

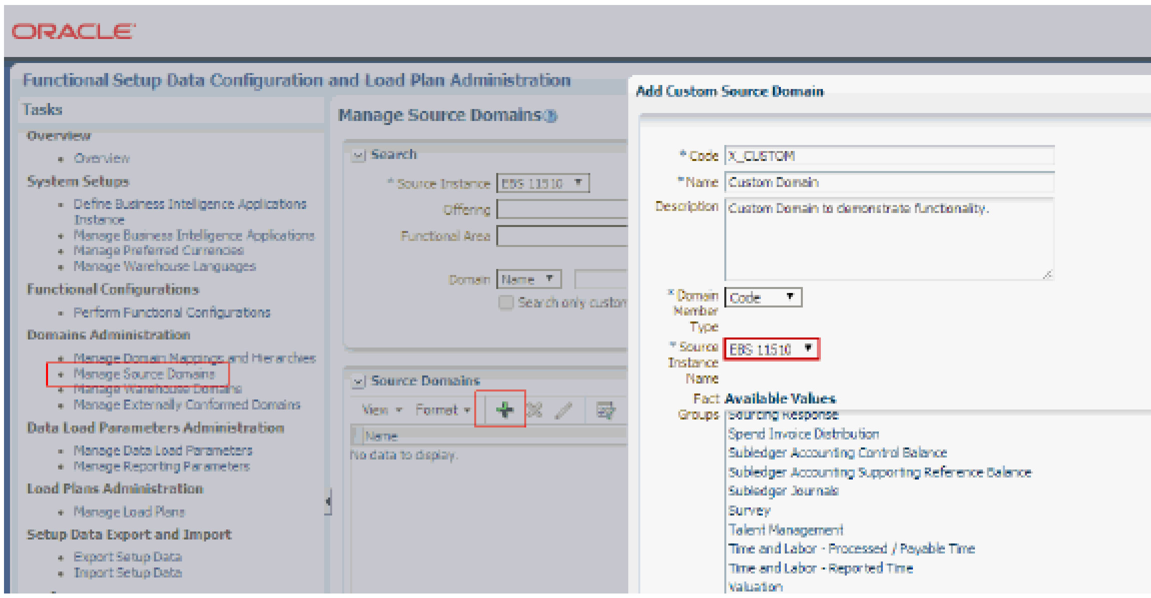
Extending BI Applications with Custom Source Domains

Extend BI Applications with custom source domains.

1. Define a custom domain in Configuration Manager.

   See About Working With Domains and Domain Mappings for more information on how to create a custom domain and associate it with a Fact or Dimension Group. Note the Domain Code value used. If the Domain Code is not entered correctly at any point, records associated with the domain can cause errors.

   While not required, it is a good practice to use a prefix with Domain Codes, such as X_, to easily distinguish custom codes from Oracle-supplied Domain Codes, for example, `X_CUSTOM`.


ORACLE
Functional Setup Data Configuration and Load Plan Administration
Tasks
Overview
Overview
System Setups
Define Business Intelligence Applications Instance
Manage Business Intelligence Applications
Manage Preferred Currencies
Manage Warehouse Languages
Functional Configurations
Perform Functional Configurations
Domains Administration
Manage Domain Mappings and Hierarchies
Manage Source Domains
Manage Warehouse Domains
Manage Externally Conformed Domains
Data Load Parameters Administration
Manage Data Load Parameters
Manage Reporting Parameters
Load Plans Administration
Manage Load Plans
Setup Data Export and Import
Export Setup Data
Import Setup Data
Manage Source Domains
Search
Source Domains
View
Format
Name
No data to display.
Add Custom Source Domain
Available Values

Search: * Source Instance: EBS 11510; Offering: ; Functional Area: ; Domain: Name; Search only custom

Add Custom Source Domain

* Code	X_CUSTOM
* Name	Custom Domain
Description	Custom Domain to demonstrate functionality.
* Domain Member Type	Code
* Source Instance Name	EBS 11510

Fact Groups — Available Values:
Sourcing Response
Spend Invoice Distribution
Subledger Accounting Control Balance
Subledger Accounting Supporting Reference Balance
Subledger Journals
Survey
Talent Management
Time and Labor - Processed / Payable Time
Time and Labor - Reported Time
Valuation

2. Extend Data Warehouse and Staging tables with new Domain column.

   Oracle recommends that the Domain column reflects the Domain Code. However, Domain columns should always have `_CODE` as a suffix, for example, `X_CUSTOM_CODE`.

3. Create Custom Domain SDE.

If the source domain is extracted from a source table, create an ETL task to extract the domain members and load them into the W_DOMAIN_MEMBER_GS table. Follow the regular customization steps for creating a custom SDE task with the following additions:

a. Create custom interface and package for the target table, W_DOMAIN_MEMBER_GS. Follow these guidelines for the mapping expressions that populate the columns in W_DOMAIN_MEMBER_GS.

Column	Expression	Notes
DOMAIN_CODE	Hard-code the value assigned in BI Applications Configuration Manager when the domain was registered, for example, X_CUSTOM.	
DOMAIN_TYPE_CODE	'S'	
DOMAIN_MEMBER_CODE		Map to the language independent value that identifies the domain member.
DOMAIN_MEMBER_NAME		Map to the language dependent value that corresponds to the short text name of the domain member.
DOMAIN_MEMBER_DESCR		Map to the language dependent value that corresponds to the long text description of the domain member. If there is no description type field, map to the same field as Name.
DOMAIN_MEMBER_REF_CODE	'__NOT_APPLICABLE__'	
LANGUAGE_CODE	DOMAIN_MEMBER_MAP('LANGUAGE', *OLTP Language Column*, #DATASOURCE_NUM_ID, 'W_LANGUAGE')	LANGUAGE is an example of a conformed domain. Map the LANGUAGE column to the appropriate language column in the OLTP. If OLTP table does not support multiple languages, seed using '#BIAPPS. LANGUAGE_BASE'

Column	Expression	Notes
INTEGRATION_ID	'*Domain Code registered in Configuratin Manager for this Domain*' ||'~'|| *OLTP Column that identifies the Domain member*	Concatenate the domain code with the domain member code, for example, X_CUSTOM.
DATASOURCE_NUM_ID	#DATASOURCE_NUM_I D	

b. Implement the filter expression.

If the OLTP table supports multiple languages, implement the following filter:

```
<OLTP Language Column> IN (#LANGUAGE_LIST)
```

If the OLTP table does not support multiple languages, do not implement a filter on language.

c. Use the 'IKM BIAPPS Oracle Incremental Update' IKM.

d. Add the Custom SDE to the Domain Load Plan Component.

Navigate to the appropriate 3 SDE General Domain Load Plan Component: **Load Plans and Scenarios**, **BIAPPS Load Plan**, **SDE**, ***Adaptor Code_version number***, then **3 SDE General Domain** ***version number*** .

Add a new Step. Have the step execute the custom Domain SDE's scenario. Populate the 'Keywords' property with DOMAIN=Value assigned in Configuration Manager when the domain was registered.

This step allows the Load Plan Generator to associate the Domain with a particular Fact or Dimension Group. When you generate a Load Plan, you tell the Load Plan Generator which Fact Group to use. The Load Plan Generator includes any Domain ETL tasks that are stamped with a 'Domain' Keyword that is associated with this Fact Group.

Note: Because the out-of-the-box Load Plan is modified, patches override the customization. You may need to reapply any customizations after load plan patches are applied.

4. Extend regular SDE and SIL ETL tasks to populate the new Domain column.

Follow the regular customization methodology for extending the SDE and SIL ETL tasks to populate the Fact or Dimension table with the following addition.

- In the SDE, set the mapping expression for the Domain column as `DOMAIN_DEFAULT_UNASSIGNED(<OLTP Column>)`.
- In the SIL, set the mapping expression for the Domain column as:
  – `DOMAIN_DEFAULT_NOT_APPLICABLE(<Staging Table Column>)`
  – `DOMAIN_DEFAULT_NOT_APPLICABLE(X_CUSTOM_CODE)`

5. Extend RPD Physical Layer.

Other than exposing the custom Domain column in the Fact or Dimension table, no other changes are required.

6. Extend the RPD Logical Layer.

   a. Map the physical column to a logical column. Use in any filters or calculations as required.

   b. Implement `LOOKUP()` function if MLS required.

      - Create a new logical column. For 'Names', map to "Core"."Lookup - Domain Source"."Domain Member Name" while 'Descriptions' are mapped to "Core"."Lookup - Domain Source"."Domain Member Description"

      - Set the Column Source as **Derived from existing columns using an expression**.

      - Set the expression as follows (if you are exposing the Name):

```
Lookup(DENSE   "Core"."Lookup - Domain Source"."Domain Member Name" ,
'<Domain Code registered in BIACM>',
<Logical Column mapped to physical column>,
VALUEOF(NQ_SESSION."USER_LANGUAGE_CODE") ,
<Logical column that maps to physical DATASOURCE_NUM_ID column>)
```

7. Extend the RPD Presentation Layer.

   Expose the logical Name and Description columns in the Presentation Layer as required.