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Oracle Warehouse Builder 11gR2: Feature Groups, Licensing and Feature Usage Management

ORACLE

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Introduction

This paper provides an overview of the different groups of features in Warehouse Builder 11gR2, including:

- Basic ETL features, that support simple relational and dimensional ETL solutions that leverage the Oracle database
- Enterprise ETL features, that support advanced data integration, data warehousing, BI tools, and user productivity in advanced development and deployment scenarios
- Data quality features, that enhance data warehousing data profiling, data rule management, measuring and monitoring data quality, and cleansing data in a manner integrated with ETL processes
- Application adapters that support connectivity to ERP applications from SAP and Oracle

While the Fusion Middleware 11g licensing guide remains the authoritative description of exactly which objects and behaviors in OWB are covered by the Oracle Data Integrator Enterprise Edition (ODI-EE) license, this document is intended to present a more user-oriented perspective on the features in each group, and help map them onto different use cases

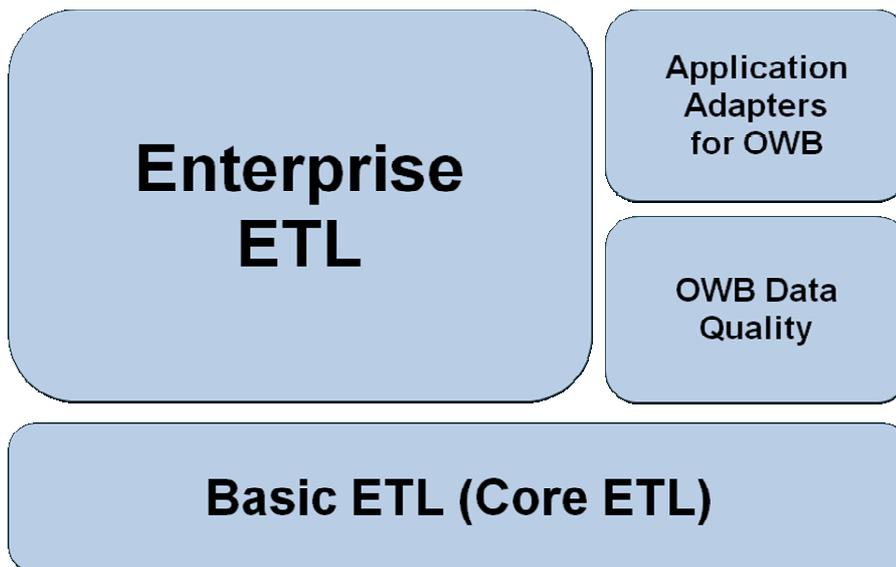
This paper also describes the feature usage management capabilities in OWB 11.2, which make it possible to disable groups of features as a way to avoid inadvertent use of capabilities not under license.

Warehouse Builder 11gR2: Feature Groups Overview

From its beginning, Warehouse Builder was targeted at addressing the requirements of Oracle data warehousing, starting with basic data warehouse design and ETL code generation, and expanding over time to address more complex use cases, and deployment, execution and auditing of ETL jobs. Warehouse Builder 10.1 covered the basics of these, and Warehouse Builder 10gR2, 11gR1 and 11gR2 each introduced major new functionality around data warehouse and ETL design, data quality, data integration.

Up through the 10.1 release, Warehouse Builder in its entirety was licensed as part of Oracle Internet Developer Suite. 10gR2 and 11gR2 introduced changes to the licensing and packaging of Warehouse Builder, to reflect the substantial new functionality added as of the 10gR2 release.

The following diagram represents the major feature groups in Warehouse Builder 10gR2 and later:



Warehouse Builder Feature Groups: High-Level

The feature groups can be broadly described as follows:

- **Basic ETL, or Core ETL:** Provides the essentials for building data warehouse ETL solutions on the Oracle database, including relational and dimensional object design, relational and basic dimensional ETL, and loading data from Oracle databases, flat files, some XML source file support, and heterogeneous connectivity through Oracle database gateways. ETL mappings and basic process flow logic are available. OMB*Plus scripting and Warehouse Builder experts is provided for automation of supported tasks. Many data warehousing features in the Oracle

Database, such as Oracle OLAP and external tables, are exposed. Support for match-merge and integration with third-party name and address providers is also included.

- In general, the Basic ETL feature set is a superset of Warehouse Builder 10.1 capabilities, so customers upgrading from older releases who have not modified their designs significantly will not find that they are not using any of the advanced feature groups.
- **Enterprise ETL:** Extends Warehouse Builder to a full-featured data warehouse-centric design and data integration tool, integrated with Oracle's business intelligence tools (Discoverer and OBI-EE). Adds advanced dimensional ETL (including automated SCD support), native non-Oracle platform support, advanced data integration modes (change data capture, real-time data integration and Web Services), metadata management, multiple configurations to simplify deployment across development, test and production environments, and developer productivity features for developing advanced data integration solutions.

Specific data objects, mapping operators, process flow activities, and combinations of properties and configuration settings expose the Enterprise ETL functionality within the same design and runtime environments as the core ETL capabilities.

- **Data Quality:** Provides data profiling, data cleansing and data governance features tailored around the data quality issues associated with ETL, data warehousing, and business intelligence, and integrated with the rest of your Warehouse Builder design and ETL metadata.
- **Application Adapters:** Provide business-level views of data from ERP applications, to eliminate the need to design ETL around obscurely named base tables. Also, for SAP R/3, provides native, high-performance data extraction capabilities based on generating ABAP code that runs on your SAP system.

Enterprise ETL Feature Group Details

The following diagram summarizes the features in the Enterprise ETL feature group in OWB 10.2, 11.1 and 11.2.

Enterprise ETL Features

10gR2/11gR1:

- Design Repository in RAC
- Pluggable Mappings
- XML/Nested Table Mapping Operators
- Streams and Spatial Transformations
- Type 2 & 3 SCD Support
- Target Load Ordering
- Advanced Process Flow Activities
- Activity Templates
- Discoverer Integration
- XML File Targets
- Transportable Modules
- Integrated Scheduler
- Lineage/Impact Analysis
- Multiple Configurations
- User-Defined Objects/Properties

11gR2 adds:

- Cube MVs support
- Orphan Management
- PL/SQL Chunking
- Real-time (CDC, AQ)
- OBIEE integration
- Configuration Templates
- KMs/Code Templates
- Extensible Platforms
- JDBC Connectivity
- Flexible Bulk Loads
- Web Services Integration
- COBOL Copybook metadata

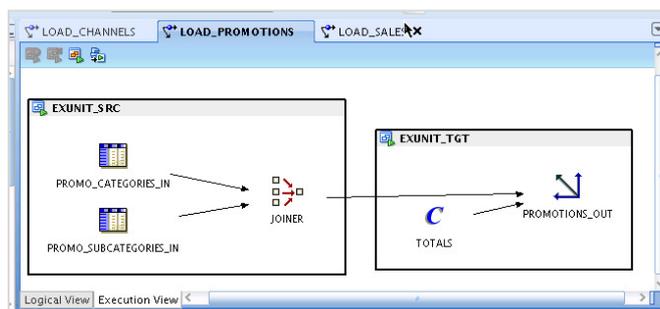
It is useful to look at each of these features in more detail.

Data Integration Features

Extensible Platforms, Code Template Mappings, JDBC (11gR2)

OWB 11gR2 adds the ability to define new database (or other data source) platforms, including descriptions of the native data types of the platform, and to work with those native data types in ETL mappings.

ETL mappings that use the extensible platform definitions use code templates (which are similar to ODI 10 knowledge modules) for code generation. Such mappings are called code template mappings. Code template mappings appear in the Projects Navigator in their own Template Mappings node. Each has an execution view where workload is divided among sources and targets and code templates are assigned.



Elements of OWB 11gR2 associated with the code template mapping and extensible platform features are part of the Enterprise ETL feature group. For example:

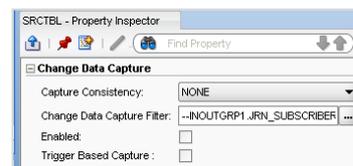
- Using OMB*Plus to create new platform definitions
- Using Native Database Connections instead of gateways
- Using JDBC connectivity for accessing non-Oracle data sources
- Using template mappings in the template mapping module in Projects Navigator
- Adding new code templates beyond those pre-seeded with OWB

Change Data Capture Mappings (11gR2)

OWB provides Change Data Capture capabilities as part of the code template mappings framework based on Oracle Data Integrator technology. Change Data Capture mappings rely on the code template mapping framework and use Journaling code templates.

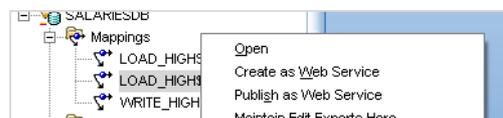


CDC mapping functionality is exposed through Change Data Capture properties and CDC-related options on database modules or table operators in mappings.



Publishing OWB Jobs as Web Services (11gR2)

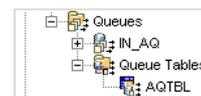
OWB 11gR2 jobs (e.g. mappings and process flows) can be exposed as Web Services. One common use case for this is to enable their invocation from external schedulers such as Oracle BPEL. The Control Center Agent runtime is used to host the web service. In the UI publishing web services is accessed through the Projects Navigator.



Use of the Control Center Agent-based mechanism for creating web services is an Enterprise ETL feature. (Other mechanisms, such as Oracle Database Web Services, can be used with OWB Basic ETL.)

Advanced Queue Operators in Real-Time Mappings (11gR2)

OWB 11gR2 can publish messages to and consume messages from Oracle Advanced Queues. This can be used to implement real-time mappings that load data in batch or trickle-feed modes.

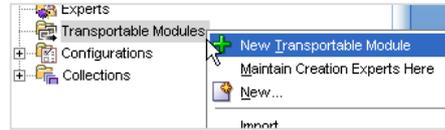


This feature is exposed through Queues within Oracle database modules, and use of Queue operators in ETL mappings.



Transportable Modules for Bulk Data Movement

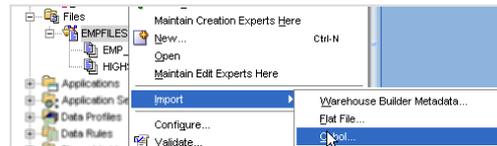
Transportable modules provide a mechanism for using Oracle transportable tablespaces and/or Oracle Data Pump exports and imports to move large volumes of data between Oracle databases with high performance and minimized downtime, and to create exports of data for purposes such as populating data marts and archiving data.



To use transportable module functionality, create transportable module objects in the Projects Navigator.

Cobol Copybook Metadata Import (11gR2)

OWB 11gR2 adds the ability to extract metadata from COBOL copybooks, making it simpler to use flat files originating from mainframe systems as sources for ETL. To access the Cobol Copybook metadata import, in Projects Explorer, right-click a flat file module, then choose **Import** → **Cobol...**



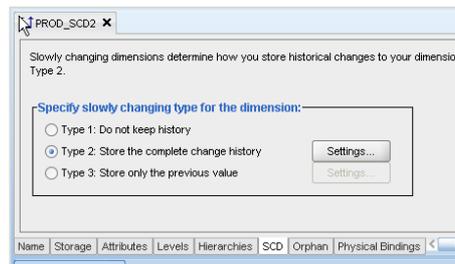
In Basic ETL you can define the structure of such flat files manually instead of importing the copybook metadata.

Data Warehousing and BI Features

SCD Types 2 and 3 Support

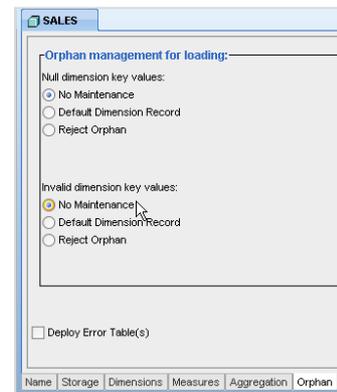
Warehouse Builder 10gR2 and 11gR1 dimensional modeling and ETL support includes advanced functionality to handle slowly changing dimension loading.

To use this Enterprise ETL feature, design a dimension object and set Type 2 or Type 3 in the SCD tab.



Orphan Row Management (11gR2)

Warehouse Builder can perform automated orphan row management during cube and dimension ETL loads, automating the handling of null and invalid key values. This eliminates a common source of ETL load failures.



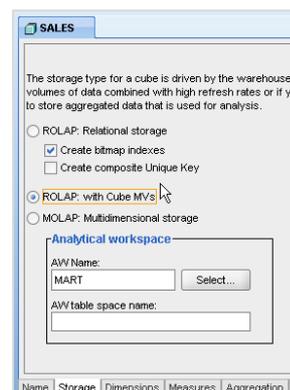
Orphan row management features are exposed in the Cube or Dimension editor, where the Orphan tab is used to access the orphan management policy settings.

By default, orphan management is disabled; that is, the Orphan Management for Loading policy is set to “No Maintenance.” Any other setting is an Enterprise ETL feature.

Cube-Organized Materialized Views Support (11gR2)

In OWB 11gR2 you can use the database’s underlying cube-organized materialized views feature to add Oracle OLAP-level performance to a ROLAP-based data warehouse design.

To enable the use of cube-organized materialized views, use the Storage tab on the Cube editor, and select “ROLAP: with Cube MVs.”



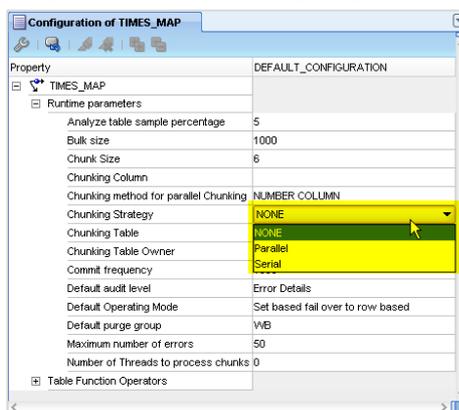
Chunking (11gR2)

OWB 11gR2 adds two forms of PL/SQL chunking in OWB:

- Serial chunking is useful in scenarios where it is not possible to process all source data in one set. The primary use case for serial chunking is loading Type 2 SCDs, where multiple updates to a single target row must be processed separately.

To configure serial chunking parameters for a mapping, use the SCD Updates and Runtime Parameters nodes in the Mapping Configuration Editor.

- Parallel chunking, which enables you to update table data in parallel with incremental commit in two high-level steps. In the first step, the rows in a table are grouped into smaller sized chunks. In the second step, a user-specified statement is executed in parallel on these chunks and a commit is issued after the processing is complete. To configure parallel chunking parameters for a mapping, use the Chunking Options and Runtime Parameters nodes in the Mapping Configuration Editor.

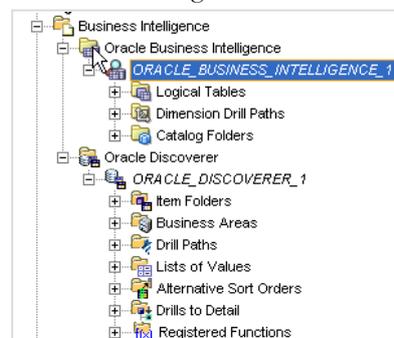


Use of either parallel or serial chunking strategies is an Enterprise ETL feature.

Integration with Oracle Discoverer (10gR2+) and OBI EE (11gR2)

OWB can create design metadata for both Oracle Discoverer and Oracle Business Intelligence Enterprise Edition (11gR2 only). Objects associated with this functionality include any of those in the Projects Navigator Business Intelligence section:

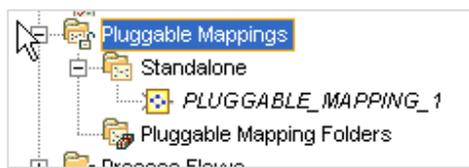
- Oracle Discoverer Item Folders, Business Areas, Drill Paths, Lists of Values, Alternative Sort Orders, Drills to Detail, and Registered Functions
- OBIEE: Logical Tables, Dimension Drill Paths and Catalog Folders



Mapping Features

Pluggable Mappings

A pluggable mapping is a reusable grouping of connected mapping operators that function as a single operator. Pluggable mappings appear in the Projects Navigator, either standalone or organized into folders.



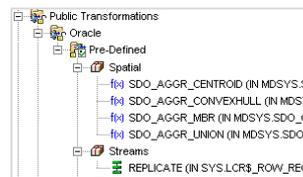
Advanced Mapping Operators: XML, Nested Tables and Object Types

The EXPAND, CONSTRUCT and VARRAY operators from the Enterprise ETL feature group are used to access object types, nested tables, and VARRAYs. These are accessed from the Component Palette while using the Mapping Editor.



Pre-Seeded Spatial and Streams Transformations

OWB includes several pre-seeded transformations that are related to Oracle Spatial and Oracle Streams. These appear in the Globals Navigator under Public Transformations → Oracle → Spatial and under Public Transformations → Oracle → Streams.



Target Load Ordering

Target Load Ordering is used in mappings that have multiple targets, to control the order in which the different targets are populated. To enable Target Load Ordering functionality, you must do both of the following steps:

- Enable the “Use Target Load Ordering” configuration option in

Code generation options	
Optimized code	
Use Target Load Ordering	true
	true
	false

the mapping configuration. Note that the configuration option defaults to True.

- In the mapping properties, enter a Target Load Order property that specifies the order to use.



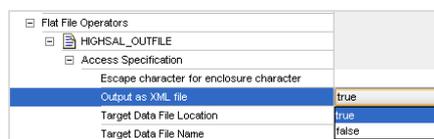
To avoid the use of target load ordering in a mapping, either set the configuration option to false, or clear the Target Load Order property.

Writing to XML Files as Targets

While writing data to delimited flat files is part of the Basic ETL feature group, writing to an XML file as a target is part of the Enterprise ETL feature group.

Writing to XML targets is performed by:

- Using a flat file operator as a target
- Configuring the flat file operator access specification for the mapping to set the “Output as XML file” option to “true”.

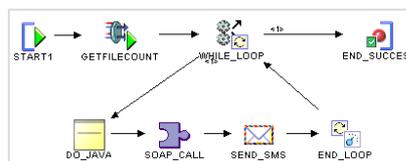


Process Flow Features

Advanced Process Flow Activities

Basic process flow activities are part of Basic ETL. However, the following advanced activities are considered Enterprise ETL:

- Activities used for advanced flow of control: process flow variables, Assign, Set Status, For Loop, While Loop, and Route.
- The OMB*Plus, EJB (Enterprise Java Bean) and Java Class activities for calling external functionality (11gR2)
- The Web Service process flow activity, for calling external Web services (11gR2)
- The Notification activity for sending email



Activity Templates

Activity templates let you create re-usable task flow activities with most of their parameters pre-populated. This simplifies the consistent creation of frequently used process flow activities.

Manageability Features

Integrated Scheduler

In Basic ETL, OWB jobs can be scheduled using any external scheduler that can call a PL/SQL function. OWB also includes an integrated scheduler, accessed by creating Schedules in the Projects Navigator. Any use of the integrated schedule is Enterprise ETL functionality.



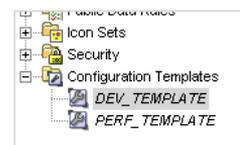
Multiple Configurations (10gR2+) and Configuration Templates (11gR2)

Multiple configurations simplify the management of different sets of configuration options that affect code generation, deployment and execution of ETL jobs. Multiple configurations are exposed through the Configurations node in the Projects Navigator.



Basic ETL allows only the use of the pre-seeded DEFAULT_CONFIGURATION. (Configuration options can of course be changed, but multiple configurations cannot be created.)

Configuration templates simplify specifying configuration options across entire projects—for example, specifying default code generation options to apply to all mappings in your project. Configuration templates are managed from the Globals Navigator.



Metadata Management Features

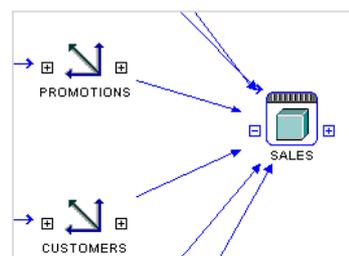
Hosting the OWB Design-Time Repository on RAC

The OWB 11.2 repository contains both design-time metadata (your OWB projects in workspaces) and run-time metadata (audit generated for deployment and execution). If you create or import design metadata into an OWB repository hosted on a RAC database, that is considered a use of Enterprise ETL functionality. Note that all OWB workspaces include a small number of pre-seeded objects such as the MY_PROJECT project. The presence of such objects is not considered a use of Enterprise ETL functionality.

Metadata Lineage and Impact Analysis

Warehouse Builder’s Metadata Dependency Manager, part of OWB Design Center, is used to interactively trace data lineage and perform impact analysis across your ETL design.

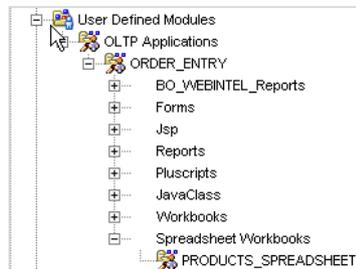
Automated metadata change propagation lets you propagate design changes to an object to downstream objects affected by the change. It is accessed through the Metadata Dependency Manager.



User-Defined Metadata Objects and Properties (UDOs and UDPs)

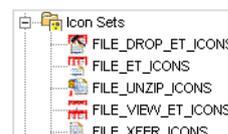
The OWB metadata repository can be extended to represent objects not directly supported in OWB (user-defined objects, or UDOs) and to annotate existing or user-defined objects with new user-defined properties (UDPs).

User-defined objects are exposed in the Projects Navigator under the User-Defined Modules node. Defining UDOs and UDPs is performed through OMB*Plus commands such as OMBDEFINE and OMBREDEFINE CLASS_DEFINITION.



Custom Icon Sets

You can define custom icon sets and associate icons with individual objects to more clearly suggest their nature or function to end users. For example, user-defined objects for representing Java objects could be represented by a coffee_cup icon. OMB*Plus scripts must be used to assign an object the necessary properties to reference an icon set.



Icon sets are exposed in Globals Navigator.

Data Profiling and Quality Feature Group

The Data Profiling and Quality feature group includes the data quality-related features added to Warehouse Builder in the 10gR2 release:

- Data Profiling
- Data Rules
- Use of Data Rules in ETL
- Automated Data Cleansing and Correction Mappings
- Data Auditors



Note that Warehouse Builder 10.1 and earlier included third party name and address server integration and the match-merge operator, which address data quality-related requirements. These continue to be part of Basic ETL, not part of the Data Profiling and Quality feature group.

Data Profile Editor and Data Profiles

Warehouse Builder's integrated data profiling analyzes the content, structure, and relationships within data to uncover patterns and rules, inconsistencies, anomalies, and redundancies.

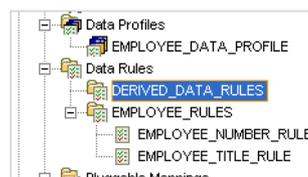
Warehouse Builder data profiling is accessed by creating Data Profile objects in the Projects Navigator, and then using the Data Profile Editor to select profiling sources, configure profiling options, and display results.



Data Rules

Data Rule objects are used to represent patterns and rules that can be discovered in data profiling, applied in ETL mappings to separate compliant and non-compliant data, and tested with data auditors.

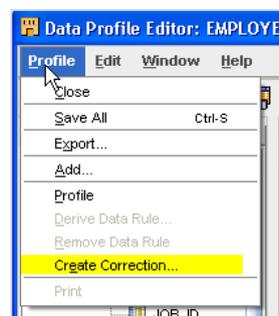
Every Warehouse Builder workspace contains a number of pre-seeded data rules accessible through the Globals Navigator. Every project in Projects Navigator has a Data Rules node. Data Rules can be referenced in numerous places in the Design Center UI, including:



- The Data Profile Editor, where rules can be generated from profiling results;
- The object editors, such as the Table editor, where a table may have data rules associated with individual columns;
- ETL mappings, where rules may be attached to table operators;
- Data auditors, which define objects and rules to test against them, and reporting actions to take when non-compliant data is found.

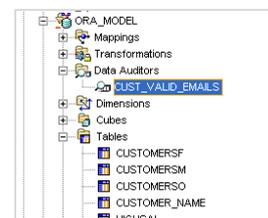
Automated Data Cleansing and Correction Mappings

Warehouse Builder can generate ETL mappings that represent data cleansing processes based on data rules and frequently used data cleansing strategies. This functionality is accessed from within the Data Profile Editor, by selecting "Create Correction". The Create Correction Wizard prompts you for the data sources to cleanse, rules to use to identify non-compliant data, and the cleansing strategies to use to generate corrected data.



Data Auditors

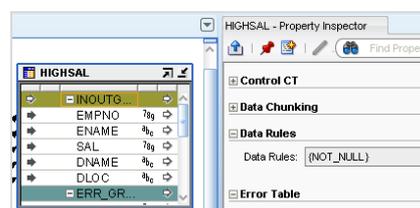
Data Auditors let you monitor data in tables with data rules and generate warnings when the data exceeds a given error threshold. Data auditors are exposed in an Oracle database module in the Projects Navigator.



The Data Auditor can be run from within Projects Navigator, or scheduled to run periodically by including a Data Auditor activity in a process flow and scheduling the process flow.

Data Rules Used in ETL Mappings

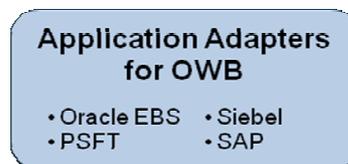
Data rules can be applied to a table operator in a mapping, with the result that compliant and non-compliant data are routed into two different flows within the body of the mapping.



Data rules are enabled on operators in a mapping using the Data Rules section of the Property Inspector for the mapping operator.

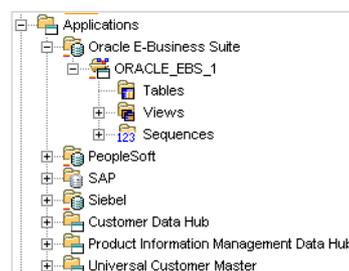
Application Adapters for OWB

The application adapters for OWB enable connectivity to a range of ERP applications. Each application adapter provides a business-level view of the objects in the application's schema, making it simpler to extract data from or load data into the schema.



ERP Application Adapters

Out of the box, the supported applications include: Oracle E-Business Suite, Peoplesoft, SAP and Siebel. The SAP adapter also provides ABAP code generation for extracting data from SAP R/3 data sources using methods approved and supported by SAP.



Master Data Management Hub Adapters

Specialized application adapters are also provided for three master data management applications: the Customer Data Hub (CDH), Product Information Management (PIM), and Universal

Customer Master (UCM). These adapters are associated with a database option called Data Watch and Repair, and are not considered part of the Application Adapters for OWB feature group.

Custom Application Adapters API

The framework for building application adapters is an open framework which can be accessed using documentation available in the Warehouse Builder SDK. Creating your own custom ERP application adapters is an Enterprise ETL feature.

Licensing for Warehouse Builder Feature Groups

Over time, the licensing for Warehouse Builder has changed. Licensed options have changed names, and some required licenses have moved from the Database price list to the Oracle Middleware price list.

The final sources of truth on licensing questions are the current Oracle Database and Oracle Middleware licensing documentation, and the Oracle Price Lists. The table below summarizes Warehouse Builder 10gR2 and later feature groups and names of licensed products and options with which they have been associated over time.

Feature Group	License/Option Names
Basic ETL	(none– DB SE, SE One, and EE)
Enterprise ETL	Enterprise ETL Option Oracle Data Integrator Enterprise Edition**
Data Profiling/Quality	Data Quality Option Oracle DB Data Profiling and Quality **
SAP Application Connector	SAP Application Connector Application Adapter for OWB **
Other Application Connectors	Warehouse Builder Application Connector Application Adapter for OWB **
MDM Hub connectors	Data Watch and Repair

**** February 2009:**

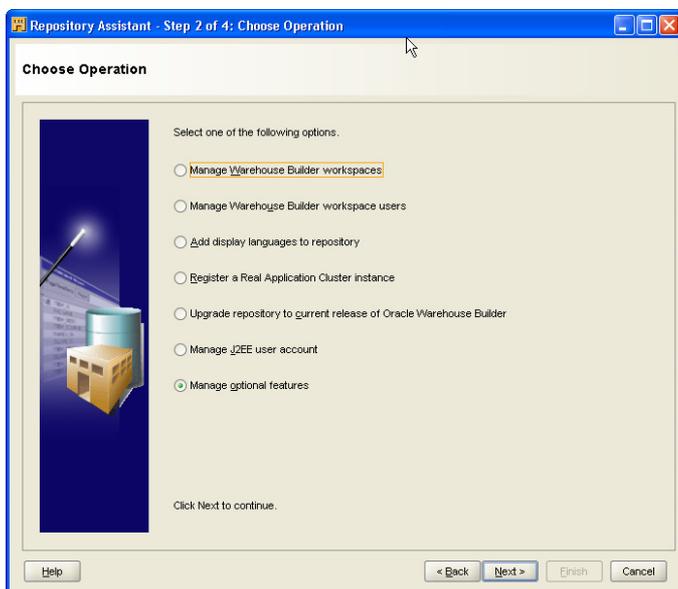
- **ODI Enterprise Edition license introduced, covers OWB EE and ODI**
- **Starred items moved to FMW price list and changed names**
- **Data Profiling/Quality: names change– stays on DB price list**
- **License name changes to better align with ODI**

For details on acquiring the currently available licenses for the feature groups you need, including any license migration options among products, contact your Oracle sales representative.

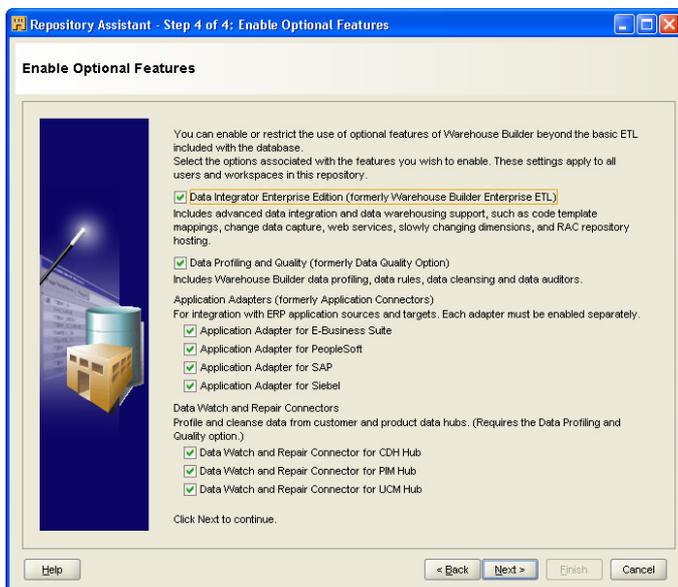
Managing Optional Features in OWB 11.2.0.2 and Later

Warehouse Builder 11.2.0.2 and later provide a means of configuring your repository to enable or disable the use of features outside the Basic ETL feature group. The controls provided let administrators prevent individual developers from using advanced features in most circumstances.

In the Warehouse Builder Repository Assistant, choose the “Manage optional features” operation, as shown below:



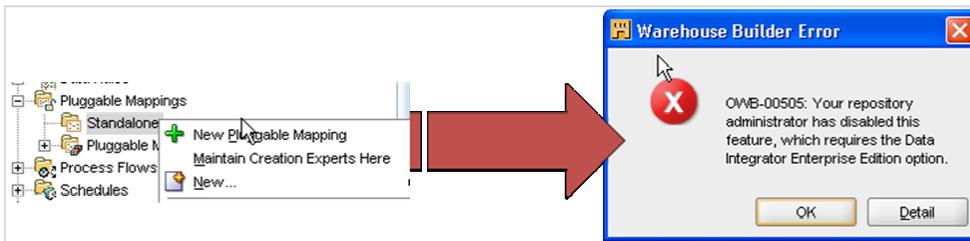
After you provide the password for OWBSYS, Repository Assistant will prompt you with a list of licensed option names, associated with the feature groups above:



Check or un-check the boxes for each feature group, based on which ones you want to enable for developers. Once you select the appropriate boxes, the controls will be in place for all workspaces in the OWB repository.

After making the changes, users should exit and restart their OWB Design Center and OMB*Plus command line sessions. After the restart, the new selections will take effect.

These controls affect the use of features in the advanced feature groups at design-time and at run-time, and when using OMB*Plus scripting and importing MDL with advanced features included. Sensible error messages are provided in each case. For example, if the Enterprise ETL/ODI-EE feature group is disabled, then in Design Center, on creating a pluggable mapping, an error dialog is displayed:



Note: While the goal has been to perfectly align optional features managed with this mechanism with the contents of the licensing documentation, the licensing documentation is the final source of truth.

Conclusion

To get the most out of Warehouse Builder, take advantage of the full feature set of the product, including the advanced feature groups. The capabilities they add elevate the basic ETL provided with the Oracle database, to make it a full-featured, manageable enterprise solution for the most demanding data integration and data warehousing needs.

For more information about the feature groups and licensing of Oracle Warehouse Builder, visit the OWB page on OTN, here:

<http://www.oracle.com/technetwork/developer-tools/warehouse>

Join the Oracle Warehouse Builder and Oracle Data Integrator LinkedIn Group here:

<http://www.linkedin.com/groups?gid=140609>



OWB 11gR2: Feature Groups, Licensing and
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Author: C. Antonio Romero

Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:
Phone: +1.650.506.7000
Fax: +1.650.506.7200
oracle.com



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