Oracle® Fusion Middleware

Developing Knowledge Modules with Oracle Data Integrator

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Preface

This manual describes how to develop your own Knowledge Modules for Oracle Data Integrator.

This preface contains the following topics:.

- Audience
- Documentation Accessibility
- Related Documents
- Conventions

Audience

This document is intended for developers who want to make advanced use of Oracle Data Integrator and customize Knowledge Modules for their integration processes.

Documentation Accessibility

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

Access to Oracle Support

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

Related Documents

For more information, see the following documents in *Oracle Data Integrator Library*.

- Release Notes for Oracle Data Integrator
- Understanding Oracle Data Integrator
- Administering Oracle Data Integrator
- Developing Integration Projects with Oracle Data Integrator
- Installing and Configuring Oracle Data Integrator
- Upgrading Oracle Data Integrator
- Connectivity and Knowledge Modules Guide for Oracle Data Integrator

- Migrating From Oracle Warehouse Builder to Oracle Data Integrator
- Oracle Data Integrator Tool Reference
- Data Services Java API Reference for Oracle Data Integrator
- Open Tools Java API Reference for Oracle Data Integrator
- Getting Started with SAP ABAP BW Adapter for Oracle Data Integrator
- Java API Reference for Oracle Data Integrator
- Getting Started with SAP ABAP ERP Adapter for Oracle Data Integrator
- *Oracle Data Integrator 12c Online Help*, which is available in ODI Studio through the JDeveloper Help Center when you press **F1** or from the main menu by selecting **Help**, and then **Search** or **Table of Contents**.

Conventions

The following text conventions are used in this document:

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

1

Introduction to Knowledge Modules

It is important to understand the concept of a knowledge module (KM) and the different types of KMs available in ODI.
This chapter includes the following sections:

- What is a Knowledge Module?
- Reverse-Engineering Knowledge Modules (RKM)
- Check Knowledge Modules (CKM)
- Loading Knowledge Modules (LKM)
- Integration Knowledge Modules (IKM)
- Extract Knowledge Modules (XKM)
- Journalizing Knowledge Modules (JKM)
- Service Knowledge Modules (SKM)
- Guidelines for Knowledge Module Developers

What is a Knowledge Module?

Knowledge Modules (KMs) are procedures that use templates to generate code. Each KM is dedicated to a specialized job in the overall data integration process. The code in the KMs appears in nearly the form that it will be executed except that it includes Oracle Data Integrator (ODI) substitution methods enabling it to be used generically by many different integration jobs. The code that is generated and executed is derived from the declarative rules and metadata defined in the ODI Designer module.

- A KM will be reused across several mappings or models. To modify the behavior of hundreds of jobs using hand-coded scripts and procedures, developers would need to modify each script or procedure. In contrast, the benefit of Knowledge Modules is that you make a change once and it is instantly propagated to hundreds of transformations. KMs are based on logical tasks that will be performed. They don't contain references to physical objects (datastores, attributes, physical paths, etc.)
- KMs can be analyzed for impact analysis.
- KMs can't be executed standalone. They require metadata from mappings, datastores and models.

KMs fall into 7 different categories as summarized in the table below:

Knowledge Module	Description	Usage
Reverse-engineering KM	Retrieves metadata to the Oracle Data Integrator work repository	Used in models to perform a customized reverse-engineering

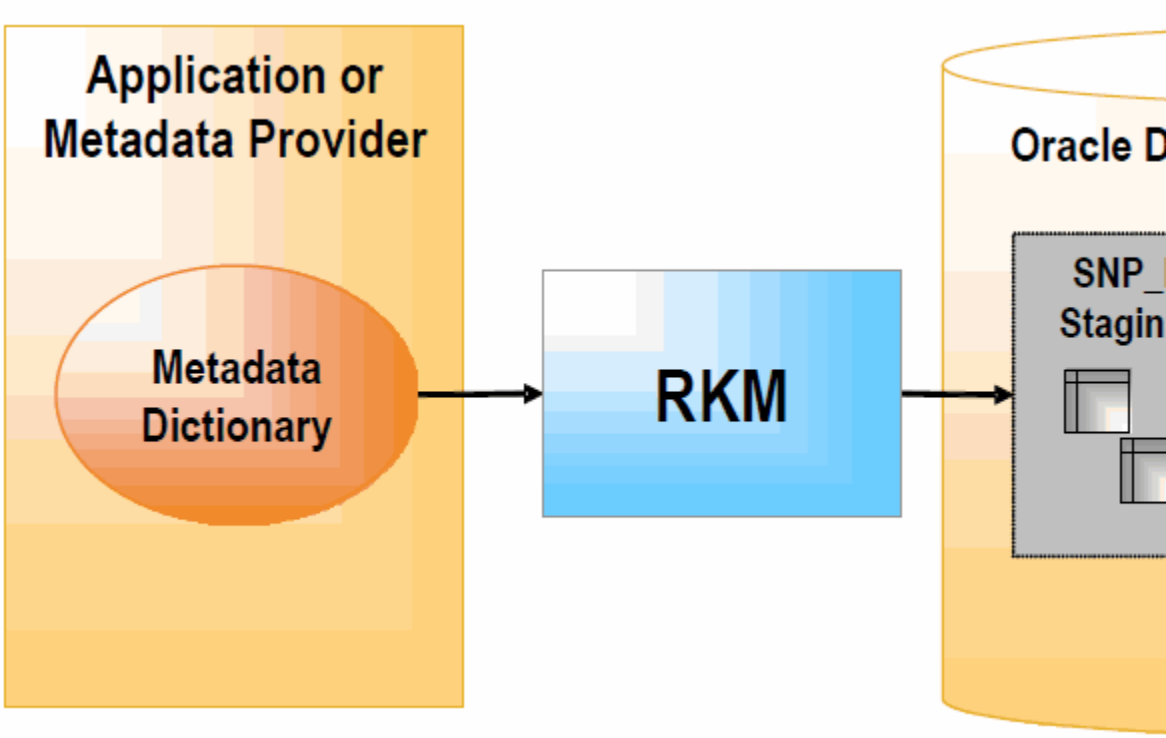
Knowledge Module	Description	Usage
Check KM	Checks consistency of data against constraints	• Used in models, sub models and datastores for data integrity audit • Used in mappings for flow control or static control
Loading KM	Loads heterogeneous data to a staging area, or facilitates movement of data from one server to a different server	Used in mappings with heterogeneous sources
Integration KM	Integrates data from a source or staging execution unit to a target	Used in mappings
Extract KM	Builds code generation metadata about sources and intermediate mapping components	Used in mappings
Journalizing KM	Creates the Change Data Capture framework objects in the source staging area	Used in models, sub models and datastores to create, start and stop journals and to register subscribers.
Service KM	Generates data manipulation web services	Used in models and datastores

The following sections describe each type of Knowledge Module.

Reverse-Engineering Knowledge Modules (RKM)

The RKM role is to perform customized reverse engineering for a model. The RKM is in charge of connecting to the application or metadata provider then transforming and writing the resulting metadata into Oracle Data Integrator's repository. The metadata is written temporarily into the SNP_REV_xx tables. The RKM then calls the Oracle Data Integrator API to read from these tables and write to Oracle Data Integrator's metadata tables of the work repository in incremental update mode. This is illustrated below:

Figure 1-1 Reverse-engineering Knowledge Modules



A typical RKM follows these steps:

1. Cleans up the SNP_REV_xx tables from previous executions using the OdiReverseResetTable tool.
2. Retrieves sub models, datastores, attributes, unique keys, foreign keys, conditions from the metadata provider to SNP_REV_SUB_MODEL, SNP_REV_TABLE, SNP_REV_COL, SNP_REV_KEY, SNP_REV_KEY_COL, SNP_REV_JOIN, SNP_REV_JOIN_COL, SNP_REV_COND tables.
3. Updates the model in the work repository by calling the OdiReverseSetMetaData tool.

Check Knowledge Modules (CKM)

The CKM is in charge of checking that records of a data set are consistent with defined constraints. The CKM is used to maintain data integrity and participates in the overall data quality initiative. The CKM can be used in 2 ways:

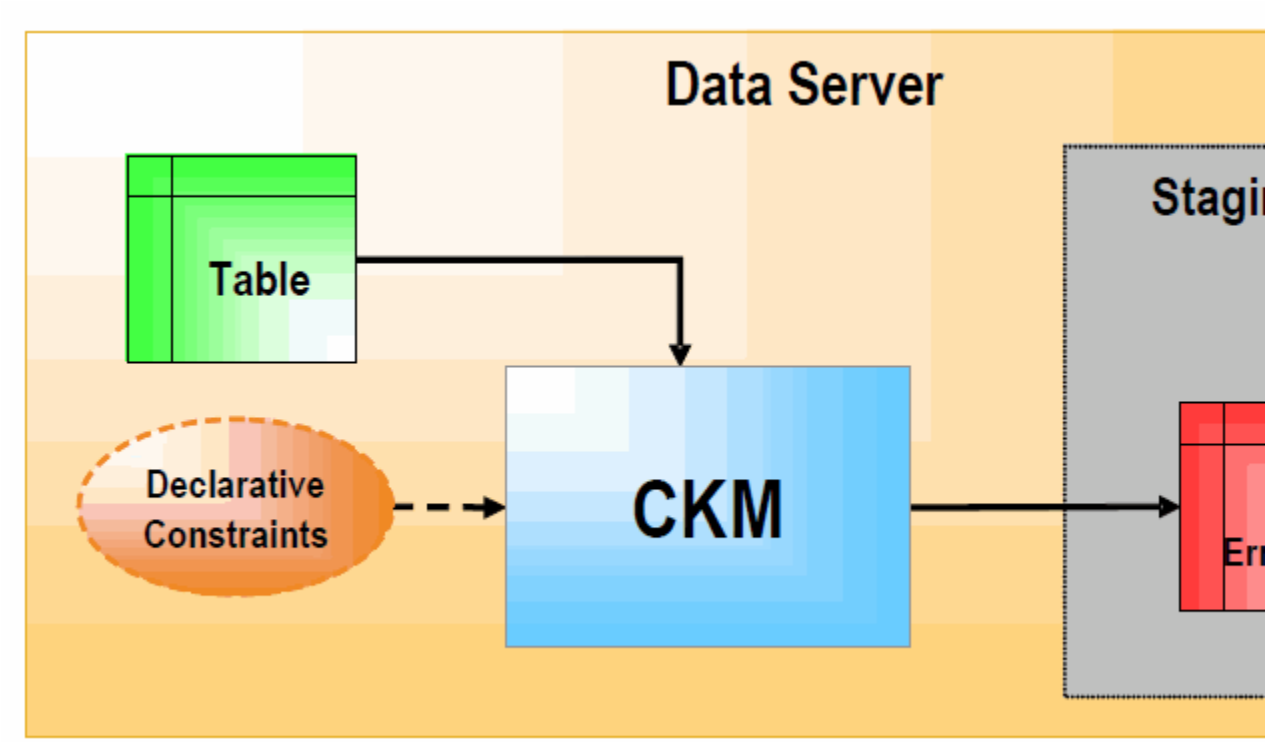
- To check the consistency of existing data. This can be done on any datastore or within mappings, by setting the STATIC_CONTROL option to "Yes". In the first case, the data checked is the data currently in the datastore. In the second case, data in the target datastore is checked after it is loaded.
- To check consistency of the incoming data before loading the records to a target datastore. This is done by using the FLOW_CONTROL option. In this case, the CKM simulates the constraints of the target datastore on the resulting flow prior to writing to the target.

In summary: the CKM can check either an existing table or the temporary "I$" table created by an IKM.

The CKM accepts a set of constraints and the name of the table to check. It creates an "E$" error table which it writes all the rejected records to. The CKM can also remove the erroneous records from the checked result set.

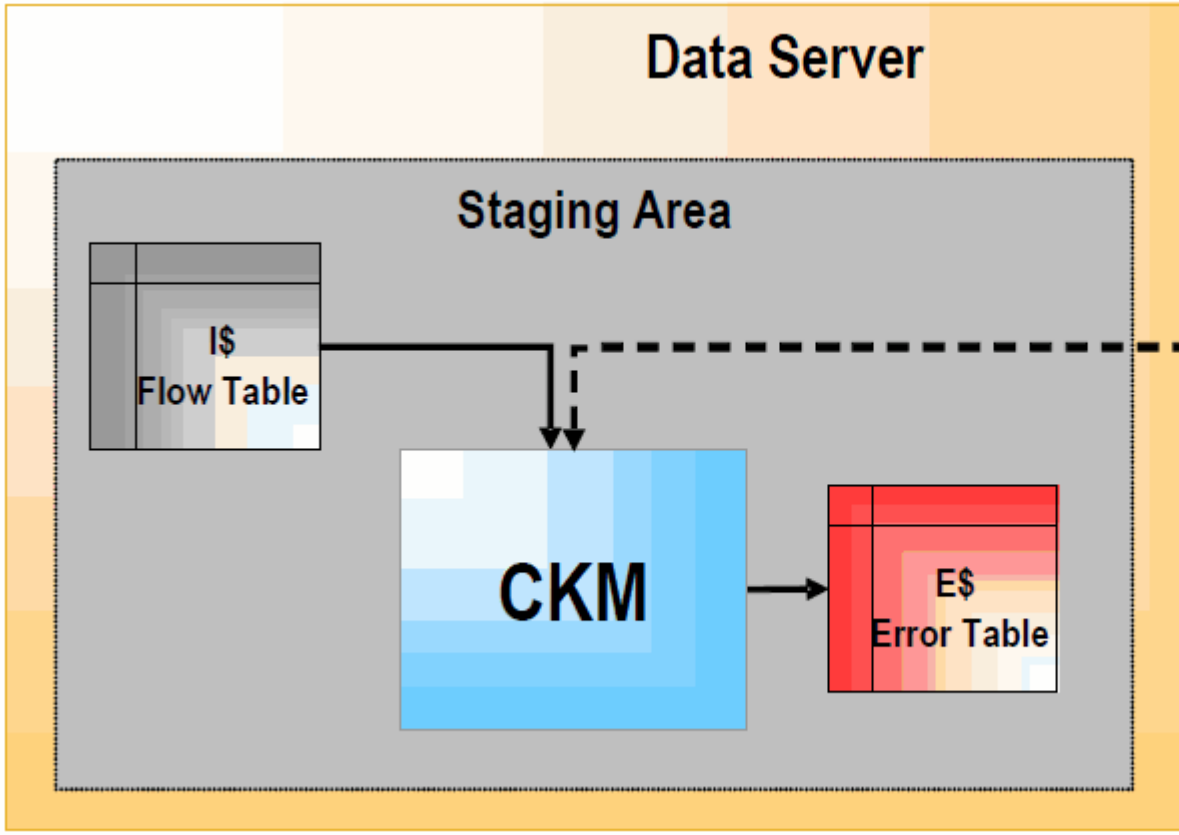
The following figures show how a CKM operates in both STATIC_CONTROL and FLOW_CONTROL modes.

Figure 1-2 Check Knowledge Module (STATIC_CONTROL)



In STATIC_CONTROL mode, the CKM reads the constraints of the table and checks them against the data of the table. Records that don't match the constraints are written to the "E$" error table in the staging area.

Figure 1-3 Check Knowledge Module (FLOW_CONTROL)



In FLOW_CONTROL mode, the CKM reads the constraints of the target table of the Mapping. It checks these constraints against the data contained in the "I$" flow table of the staging area. Records that violate these constraints are written to the "E$" table of the staging area.

In both cases, a CKM usually performs the following tasks:

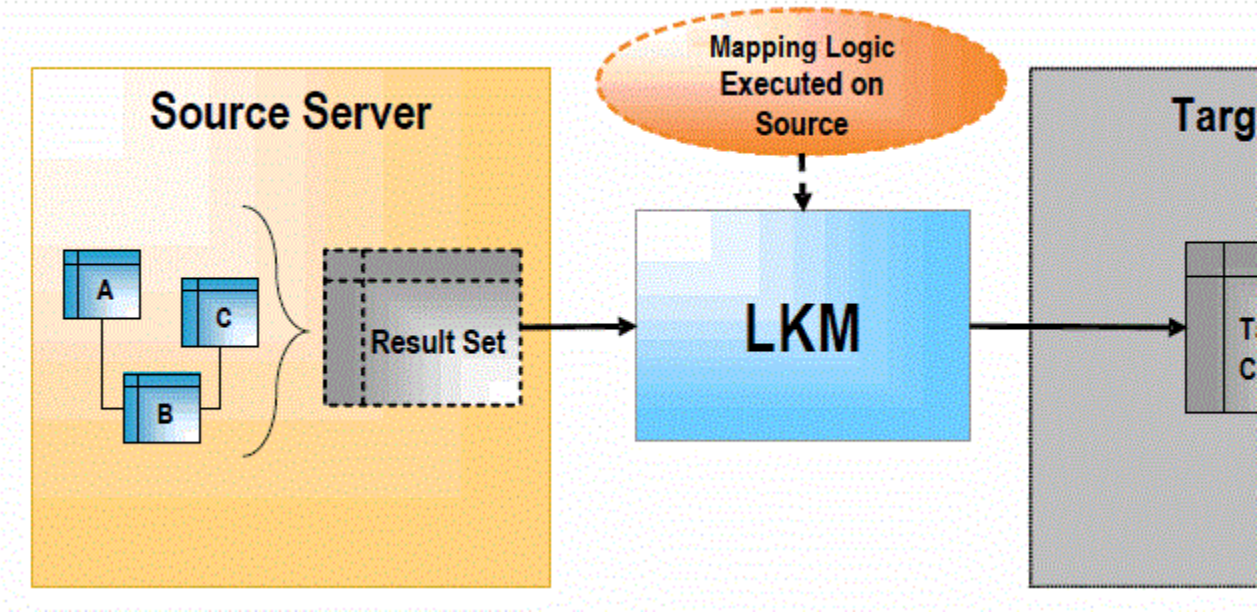
1. Create the "E$" error table on the staging area. The error table should contain the same columns as the attributes in the datastore as well as additional columns to trace error messages, check origin, check date etc.
2. Isolate the erroneous records in the "E$" table for each primary key, alternate key, foreign key, condition, mandatory column that needs to be checked.
3. If required, remove erroneous records from the table that has been checked.

Loading Knowledge Modules (LKM)

An LKM is in charge of loading source data from a source server to a target server, which can be a staging area or the final target. It is used by mappings when some of the source datastores are not on the same data server as the staging or target server for those sources. The LKM implements the mapping component logic that need to be executed on the source server. It will either retrieve a single result set and load it into a “C$” staging table (LKM type = PERSISTENT), or it can set up some transparent access mechanism that allows the target server to access the source server data

(LKM Type = TRANSPARENT_SOURCE), or set up a transparent access mechanism to allow the source server to directly access the target server and directly load the target datastores (LKM type = TRANSPARENT_TARGET).

Figure 1-4 Loading Knowledge Module



1. The LKM creates the "C$" temporary table in the staging area. This table will hold records loaded from the source server.
2. The LKM obtains a set of pre-transformed records from the source server by executing the appropriate transformations on the source. For SQL-type LKMs, this is done by a single SQL SELECT query when the source server is an RDBMS. When the source doesn't have SQL capacities (such as flat files or applications), the LKM simply reads the source data with the appropriate method (read file or execute API).
3. The LKM loads the records into the "C$" table of the staging area.

> **Note:**
>
> When staging area is same as source, “C$” table is created in the target area.

For an LKM of type TRANSPARENT_SOURCE:

a. The LKM creates a transparent access mechanism to allow the target server to access the source data

b. The LKM creates a code generation metadata object that stores the information about the sources and the source mapping logic, and passes this object to the target IKM.

For an LKM of type TRANSPARENT_TARGET:

a. The LKM creates a transparent access mechanism to allow the source server to access the target datastores.

b. The LKM obtains a set of pre-transformed records from the source server by executing the appropriate transformations on the source.

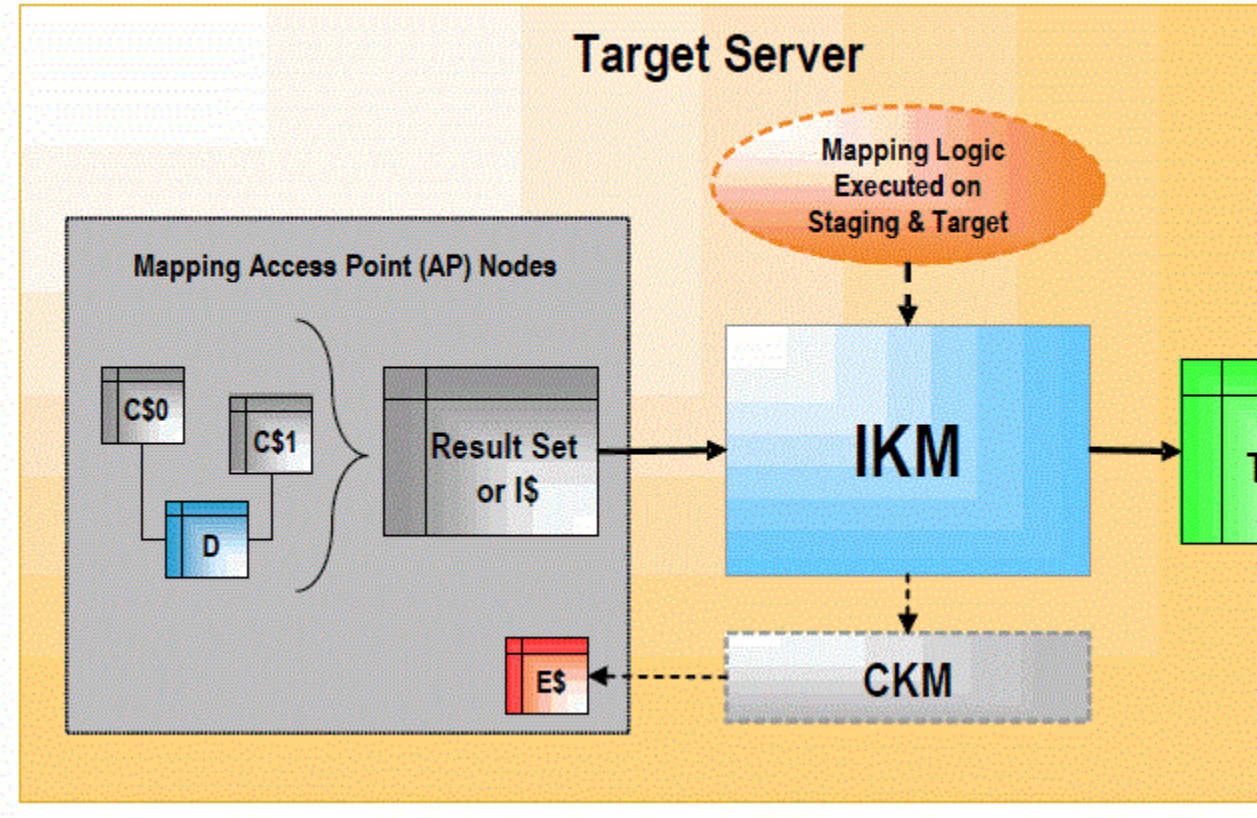
c. The LKM loads the data directly into the target datastore, using the transparent access mechanism created in step 1.

A mapping may require several LKMs when it uses datastores from different sources. When all source datastores are on the same data server as the staging area, no LKM is required.

Integration Knowledge Modules (IKM)

The IKM is in charge of writing the final, transformed data to the target tables. Every mapping uses a single IKM, for each target that is to be loaded. When the IKM is started, it assumes that all loading phases for the remote servers have already carried out their tasks. This means that all remote source data sets have been loaded by LKMs into "C$" temporary tables in the staging area, or the source datastores are on the same data server as the staging area, or source transparent access mechanisms have been set up. Therefore, the IKM simply needs to execute the "Staging and/or Target" transformations, joins and filters on the "C$" tables, or tables located on the same data server as the staging area, or tables on other servers that can be transparently accessed. The resulting set is usually processed by the IKM and written into an"I$" temporary table, or directly loaded into the target. These final transformed records can be written in several ways depending on the IKM selected in your mapping. They may be simply appended to the target, or compared for incremental updates or for slowly changing dimensions. There are 2 types of IKMs: those that assume that the staging area is on the same server as the target datastore, and those that can be used when it is not. These are illustrated below:

Figure 1-5 Integration Knowledge Module (Staging Area on Target)

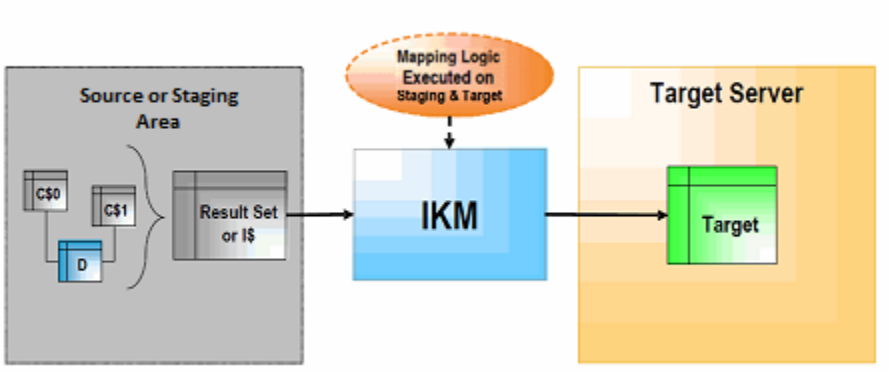


When the staging area is on the target server, the IKM usually follows these steps:

1. The IKM executes a single set-oriented SELECT statement to carry out staging area and target declarative rules on all "C$" tables and local tables (such as D in the figure). This generates a result set.
2. Simple "append" IKMs directly write this result set into the target table. More complex IKMs create an "I$" table to store this result set.
3. If the data flow needs to be checked against target constraints, the IKM calls a CKM to isolate erroneous records and cleanse the "I$" table.
4. The IKM writes records from the "I$" table or the result set to the target following the defined strategy (incremental update, slowly changing dimension, etc.).
5. The IKM drops the "I$" temporary table.
6. Optionally, the IKM can call the CKM again to check the consistency of the target datastore.

These types of KMs do not manipulate data outside of the target server. Data processing is set-oriented for maximum efficiency when performing jobs on large volumes.

Figure 1-6 Integration Knowledge Module (Staging Area Different from Target)



When the staging area is different from the target server, as shown in Figure 1-6, the IKM usually follows these steps:

1. The IKM executes a single set-oriented SELECT statement to carry out declarative rules on all "C$" tables and tables located on the source or staging area (such as D in the figure). This generates a result set.
2. The IKM loads this result set into the target datastore, following the defined strategy (append or incremental update).

This architecture has certain limitations, such as:

- A CKM cannot be used to perform a data integrity audit on the data being processed.
- Data needs to be extracted from the staging area before being loaded to the target, which may lead to performance issues.

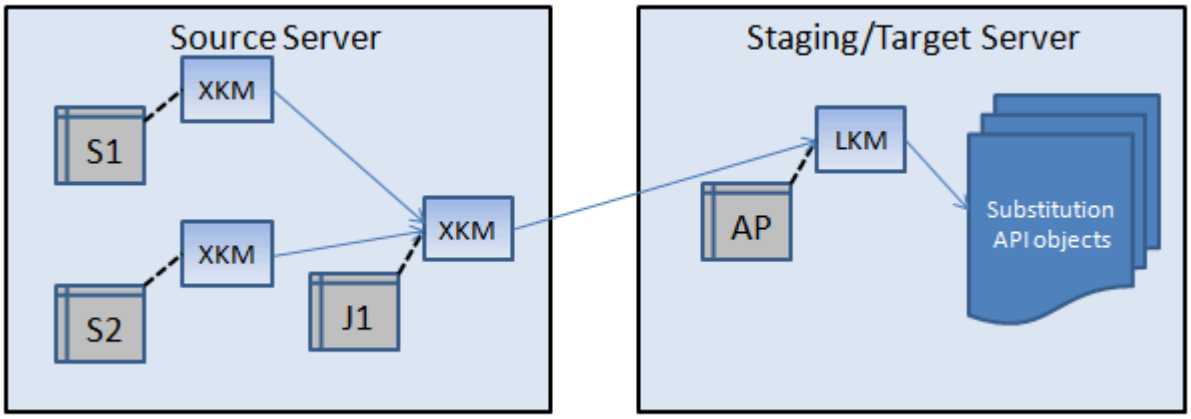
Extract Knowledge Modules (XKM)

The XKM is responsible for gathering and assembling the mapping logic for source and intermediate mapping components, and storing it in a set of code generation object known as an “Abstract Syntax Tree” or AST objects. The AST objects are tailored to generating executable code in some form.

Prior to the 12c release of ODI, each interface or mapping was assigned one LKM and one IKM, and possibly one CKM. Starting from ODI 12c, each component in a mapping physical design will have an assigned Component KM. A component KM can be an XKM, LKM, IKM, or CKM. An XKM is assigned to each source or intermediate node, an LKM is assigned to each AP node, and an IKM is assigned to each target datastore node. During code generation, the mapping code generator iterates through all the mapping component nodes, and each Component KM contributes some information to the final generated result code. Each Component KM has an associated delegate script, that is implemented as an ODI internal java class or by a groovy script. The delegate script for each KM is used to generate a java AST object. The generated AST object is then passed as an input parameter to the next node’s KM delegate class. When an LKM for an AP node or an IKM for a target node is reached, a combined AST tree is produced, which includes all the AST objects produced by all the upstream nodes. The AST tree can then be used as a substitution API object to substitute values into the LKM or IKM task line commands.

The following diagram shows the code generation process including the contribution by XKMs:

Figure 1-7 Extract Knowledge Modules (XKM)

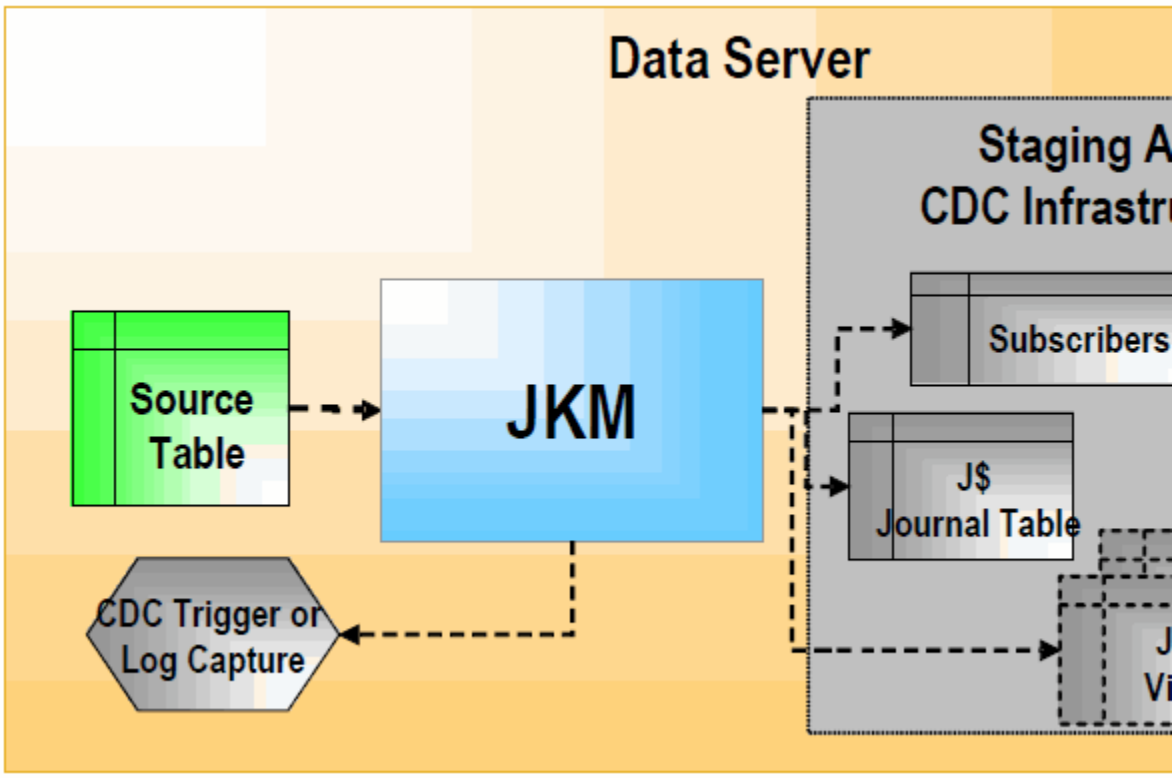


The XKM typically does not generate any session steps of its own. Its main function is to provide java AST object instances to the downstream Component KMs.

Journalizing Knowledge Modules (JKM)

JKMs create the infrastructure for Change Data Capture on a model, a sub model or a datastore. JKMs are not used in mappings, but rather within a model to define how the CDC infrastructure is initialized. This infrastructure is composed of a subscribers table, a table of changes, views on this table and one or more triggers or log capture programs as illustrated below.

Figure 1-8 Journalizing Knowledge Module



Service Knowledge Modules (SKM)

SKMs are in charge of creating and deploying data manipulation Web Services to your Service Oriented Architecture (SOA) infrastructure. SKMs are set on a Model. They define the different operations to generate for each datastore's web service. Unlike other KMs, SKMs do no generate an executable code but rather the Web Services deployment archive files. SKMs are designed to generate Java code using Oracle Data Integrator's framework for Web Services. The code is then compiled and eventually deployed on the Application Server's containers.

Guidelines for Knowledge Module Developers

The first guideline when developing your own KM is to never start from a blank page.

Oracle Data Integrator provides a large number of knowledge modules out-of-the-box. Starting from ODI version 12.2.1.2.1 many global KMs are seeded into the repository and are visible in the global KM tree in the studio UI. It is recommended that you start by reviewing the existing KMs and start from an existing KM that is close to your use case. Once an existing KM has been found, then create a new KM of the same type (XKM/LKM/IKM/CKM) and set the existing KM as the base KM in the KM editor, and then customize the new KM as desired. Alternatively, duplicate the existing KM and customize it by editing the code. It is recommended to customize the KM by extending a seeded KM, so that any updates to the seeded KM will automatically get reflected in your customized KM.

When developing your own KM, keep in mind that it is targeted to a particular stage of the integration process. As a reminder:

- LKMs are designed to load remote source data sets to the staging or target server, by loading the data into C$ staging tables, or by configuring some kind of transparent access from the target to the source or vice versa.
- IKMs apply the source flow from the staging area to the target. They start from the C$ staging tables or sources, may transform and join them into a single integration table ("I$") table, may call a CKM to perform data quality checks on this integration table, and finally write the flow data to the target
- CKMs check data quality in a datastore or a integration table ("I$") against data quality rules expressed as constraints. The rejected records are stored in the error table ("E$")
- RKMs are in charge of extracting metadata from a metadata provider to the Oracle Data Integrator repository by using the SNP_REV_xx temporary tables.
- JKMs are in charge of creating and managing the Change Data Capture infrastructure.

Be also aware of these common pitfalls:

- Avoid creating too many KMs: A typical project requires less than 5 KMs! Do not confuse KMs and procedures, and do not create one KM for each specific use case. Similar KMs can be merged into a single one and parameterized using options.
- Avoid hard-coded values, including catalog or schema names in KMs: You should instead use the substitution methods getTable(), getTargetTable(), getObjectName(), knowledge module options or others as appropriate.
- Avoid using variables in KMs: You should instead use options or flex fields to gather information from the designer.
- Writing the KM entirely in Jython, Groovy or Java: You should do that if it is the appropriate solution (for example, when sourcing from a technology that only has a Java API). SQL is easier to read, maintain and debug than Java, Groovy or Jython code.
- Using <%if%> or {# IF #} statements rather than a check box option to make code generation conditional. A check box option can be used to enable or disable generation of a KM step, and thus provides a way to conditionally generate some discrete set of code.

Other common code writing recommendations that apply to KMs:

- The code should be correctly indented.
- The generated code should also be indented in order to be readable.
- SQL keywords such as "select", "insert", etc. should be in lowercase for better readability.

2

Introduction to Component KMs

It is important to understand the concept of a component KM and the different types of component KMs available in ODI.

This chapter provides an introduction to Component KMs. It explains briefly about Component KMs and their different types.

This chapter includes the following sections:

- What is a Component KM?
- Syntax Elements of Component KMs
- Component KM — Flow Control Commands
- Global Templates
- KM Inheritance
- Groovy Variable Definition Scripts
- Structured Substitution API
- Task Control Objects
- Seeded Component KMs

What is a Component KM?

Component KM is a new, improved style of KM development, which is applicable for IKMs, LKMs, XKMs. KMs for mappings, have two different types of implementation styles: The legacy 11g-style and component-style. 11g-style KMs are designed to use the monolithic odiRef substitution API object and syntax in their template commands. Component-style KMs are designed to use the newer object-oriented substitution API objects and newer template flow control syntax in their template commands. Both styles of KM can be seen in the project and global KM tree, as IKMs, LKMs, and CKMs with a predefined set of component-style KMs called XKMs. All new LKMs, IKMs, and XKMs should be designed and coded using the new component KM style. Component KMs are new since ODI 12c and are first exposed in the ODI studio from 12.2.1.2.1 release. A component KM has the same functionality as any other KM, which includes tasks and options. But it also includes some added new functions that includes:

- An associated delegate script whose purpose is to produce an Abstract Syntax Tree (AST). The produced AST object is a tree of java class instances that describes the metadata for the mapping component, in a way that is tailored to be used to generate code for a specific language and technology.
- Source and target language fields at the KM and KM task level, similar to the existing source and target technology fields.
- Support for KM inheritance, which allows a KM to inherit tasks, options, and field values from a base KM.
- A set of flow control syntax elements to control the code generation flow for the KM task source and target commands.

- The ability to include a globally sharable code template snippet, known as a “global template”, as part of a KM task source or target command.
- A groovy-language script that is associated with each KM task, which allows new substitution variables to be defined. The newly defined substitution variables can be used in the task source and target commands.

The Component KM can be one of 4 types: IKM, LKM, XKM, and CKM. Refer to What is a Knowledge Module?, for more details on the types of component KMs.

Syntax Elements of Component KMs

There are 2 new basic syntax elements that are specific to Component KMs:

- The first main Component KM syntax element that can be used in Component KM tasks is a command syntax that looks like this: `{# command #}. The {#...#}`escape characters are somewhat similar to the `JSP-type <%...%>` escape commands that exist for all KMs, except that the escaped text is not java. The component KM specific command syntax is similar to the command syntax for Apache Velocity Template Language (VTL) syntax, except that there is an extra character due to the rigorous demands of heterogeneous code generation. Any syntax used with ODI code generation templates must be very strong so that the possibility of confusion with some actual generated text in some language/ technology combination is minimized.
- The other syntax element specific to Component KMs is the escape syntax used to de-reference substitution variables and API calls. The syntax looks like `$[variableName] or $[variable.methodName()]`.

  For Example —

  If a variable called "tableName" has been created in the groovy variable definition script, then the command could contain text like this: `CREATE TABLE $[tableName]`. When the code is generated, this would be rendered as: `CREATE TABLE MY_TABLE`. If the tableName variable evaluates to MY_TABLE for this mapping.

  An example of a method call on an object type variable would be to define command text as: `CREATE TABLE $[physicalNode.getName()]`. There is a built-in variable physicalNode that is set to the MapPhysicalNode instance of the node that this KM is assigned to. So during code generation, if the name of the target physical node is "TGT_TABLE", then this code would be rendered as: `CREATE TABLE TGT_TABLE.`

  This syntax is also similar to Apache Velocity Template Language (VTL) syntax, which uses ${variableName}. The square bracket “[“ is used instead of “{“, because the “{“ is already heavily used by java and shell script syntax, as well as other languages. The new substitution API variable de-reference syntax must not be confused with the JSP-type expression syntax like `<%=variableName%>`. The main difference is that the escaped text is not java. It only supports a variable name or one method call, not an arbitrarily complex java expression. If some complex java expression is desired, the best practice for component KMs is to define a new substitution variable in the groovy variable definition script associated with the KM task or the KM, and set it equal to the complex java expression. The groovy script does support complex java or groovy expressions. In this way, the specialized java or groovy code is kept separate from the actual template commands.

- One other important point to note about the Component KM syntax is that it only applies to the code generation execution phase. In the older JSP-type template substitution syntax which uses angle brackets, for example(`<%...%>`) there are altogether four execution phases defined. They are:
  - `code generation phase <%...%>`
  - `agent phase <?...?>`
  - `post-agent phase <$...$>`
  - `pre-execute phase <@...@>`

  These define the time phase in which the code generation and execution process occur, when the substitution is done. However, for the Component KM syntax elements, the substitution is always done in the initial code generation phase. The Component KM functionality is thus altogether a code generation functionality as there is no new agent or execution functionality. If some agent-phase or post-agent substitution is desired, for example for late password substitution, then the JSP-type escapes must still be used.

Component KM — Flow Control Commands

Listed below are the flow control commands used in component KMs:

1. **#IF**

   Syntax

   ```
   {# IF condition #} text [{# ELSIF condition #} text [{# ELSIF
   condition #} text ...]] [{# ELSE #} text] {# ENDIF #}
   ```
   Description

   Conditionally include text in the generated code. The condition can be a simple substitution variable ref or method call or combinations of simple relational condition predicates. Supported relational operators: [==, !=, <, >, !, OR, AND].

   Example

   ```
   {# INCLUDE = 'ConstantFromClauseText' #}
   {# IF $[QUERY.isConstantQuery()] #}
   {# ELSE #}FROM {#NL#}
   {# LIST #}  $[QUERY.getFromList().foreach(getText())]{# SEP #} ,{#NL#}
   {# ENDLIST #}
   {# ENDIF #}
   ```

2. **#INCLUDE**

   Syntax

   ```
   {# INCLUDE 'templateName' #}
   ```
   Description

   Includes the text of a named global shared template as part of this template text.

   Example

   ```
   {# INCLUDE = 'PreInsertList' #}
   ```

3. **#TEMPLATE**

   Syntax

```
{# TEMPLATE name='templateName' technology='technoName' #}
```

Description

Create a local overridden template, or specify a dependent template, with the specified name and technology. The technology can be **GENERIC**.

Example

```
{# TEMPLATE name='ANSIJoinText' technology='GENERIC' #}
templateText...
{# ENDTEMPLATE #}
```

4. **Substitution Variable Reference**

   Syntax

   ```
   $
   [variableName[.methodName([primitiveArg[,primitiveArg...]]).methodNam
   e(primitiveArgs)]][.foreach(methodName())]
   ```

   Description

   Substitutes the string value of an in-scope variable or method call result into the generated template text. The square brackets in bold are literal square brackets and the other square brackets are optional syntax indicators. The primitive arguments are method parameters that must have simple literal java data types such as string or int. The foreach method is a special syntax that is only allowed inside a #LIST command block, and causes the specified method to be called for each list item, to return the generated text.

   Example

   Generate the set operation between two queries that are part of a UNION ALL set operation:

   ```
   SELECT A, B FROM TAB1
   $[QUERY.getSetOperation()]
   SELECT C, D FROM TAB2
   ```

   If the currently processing QUERY object has a set operation type of **UNION ALL**, then the generated code from this command will look like this:

   ```
   SELECT A, B FROM TAB1
   UNION ALL
   SELECT C, D FROM TAB2
   ```

   For more details on the default built-in variables, see SQL Structured Substitution API Reference appendix chapter.

5. **#INDENT**

   Syntax

   ```
   {# INDENT #}
   ```

   Description

   Substitutes a set of tab or space characters into the generated code, depending on the current indent level.

   Example

```
{# INDENT #}
```

6. **#LIST**

   Syntax

   ```
   {# LIST #} listVariablesAndListText {#SEP#}separatorChars{# ENDLIST #}
   ```
   Description

   Substitutes a set of list variables and text into the generated code. The list text must include at least one list variable, and can include multiple list variables, plus random text and non-list substitution variables. The list text can include other template commands. If there are multiple list variables, the lists must be of the same size. If separator characters are specified, they will be reproduced in the generated code after each list item.

   Example

   ```
   {# LIST #} $[INSERT.getColumnList().foreach(getText())] {#SEP#},{#NL#}
   {# ENDLIST #}
   ```

7. **#FOR**

   Syntax

   ```
   {# FOR (listVar[, listVar ...]) IN ($[listItemAlias][,$
   [listItemAlias]]) SEP = 'separatorChars' #} text $[listItemAlias]
   [text $[listItemAlias]] {# ENDFOR #}
   ```
   Description

   Substitutes a set of list variables and text into the generated code. If there are multiple list variables, the lists must be of the same size. If separator characters are specified, they will be reproduced in the generated code after each list item.

   Example

   ```
   {# FOR ($[QUERY.getSelectList()],$[QUERY.getAliasList()]) IN ($[SL],$
   [AL]) SEP = ',0x000A' #} $[SL] $[QUERY.getColumnAliasSeparator()] $
   [AL] {# ENDFOR #}
   ```

8. **#INC_INDENT**

   Syntax

   ```
   {# INC_INDENT #}
   ```
   Description

   Increments the current indent count.

   Example

   ```
   {# INC_INDENT #}
   ```

9. **#DEC_INDENT**

   Syntax

   ```
   {# DEC_INDENT #}
   ```
   Description

   Decrements the current indent count.

   Example

   ```
   {# DEC_INDENT #}
   ```

10. **#NL**

Syntax

```
{#NL#}
```

Description

Substitutes a new line character into the generated code.

> **Note:**
>
> Actually the new lines in the template may not reproduced to the generated code, if template option `REPLICATE_NEWLINE` is set to false (default is true).

Example

```
Hello world{#NL#}
```

11. **#TEMPLATE_OPTIONS**

    Syntax

    ```
    {# TEMPLATE OPTIONS optName='optValue'[ optName='optValue' ...]
    ```

    Description

    Sets some named template options to a value. The options will take effect immediately following the TEMPLATE_OPTIONS command in the template.

    Example

    ```
    {# TEMPLATE_OPTIONS REPLICATE_NEWLINE='false' #}
    ```

12. **Line Comment**

    Syntax

    ```
    ## commentText
    ```

    Description

    Template comment text that will not be reproduced in the generated code.

    Example

    ```
    ## This is a comment.
    ```

13. **Multi-line Comment**

    Syntax

    ```
    #* commentText *#
    ```

    Description

    Multi-line comment text that will not be reproduced in the generated code.

    Example

    ```
    #* This is a comment. *#
    ```

Global Templates

Global templates are a type of ODI object closely related to Component KMs. They are found in the global object tree, under the Global Templates folder. A global template is basically a snippet of template text that can be reused by any Component KM. It has a

name, and an associated language and technology. Some pre-seeded global templates are supplied with ODI when it is installed, for common uses such as SQL queries and inserts, and Spark Python scripts.

- A global template is used in a KM task command by using the {# INCLUDE #} command, which specifies the template name. During code generation, the template text is substituted into the generated text, at the text position where the {#INCLUDE#} command was inserted.
- In the KM task command editor, the #INCLUDE statement can be expanded by clicking the “+” code folding button on the left-hand side of the text. When that is done, the global template text will be substituted for the #INCLUDE statement in the command text. It is permitted to have nested #INCLUDE statements, which results in nested template text substitution.
- When the code generator expands the KM task text as part of generating a session or scenario task, it will find the appropriate matching global template for each #INCLUDE statement, based on the template name specified in the #INCLUDE statement, and the technology and language of the template. It is permitted to define multiple global templates with the same name, but with different technology and language. The right one is picked by matching the execution technology and the KM task language setting with the global template technology and language setting. A specific global template instance can be picked which will disregard the execution technology and language, by specifying the language and technology in the #INCLUDE statement.

KM Inheritance

KM inheritance allows a KM to inherit tasks, options, and field values from a base KM. To use KM inheritance, the Base Component KM field must be set for a Component KM. When a base KM is set, the derived KM will inherit the following properties from the base KM:

- All KM options
- The base KM language, technology, generation type, generation style settings, as well as the base KM delegate script
- Some base KM tasks may be inherited, according to the following set of rules:
  1. For each task type (MAP_BEGIN, EX_UNIT_BEGIN, etc.), if no tasks of that type are directly owned by the derived KM, and if base tasks have not explicitly been removed, then all base tasks of that type are inherited. This rule typically applies to a newly created KM that has a base KM set.
  2. If some directly owned tasks of a specified line type have been added, then by default no base tasks of that type will be inherited, unless they have been explicitly added using the “Include tasks” button in the KM editor.
  3. Any arbitrary set of base tasks can be included in the derived KM by individually adding them using the "Include tasks" icon present in the KM editor.
  4. Any included base task can be removed by using the remove icon present in the KM editor tasks tab.
  5. Some seeded KMs may use a different type of task inclusion, that is only available internally. This involves matching tasks based on a keyword. However any KM that inherits from these KMs can include and exclude tasks

as specified above, and from that point onwards the normal task inclusion rules are followed.

Groovy Variable Definition Scripts

Each Component KM task has a source and target command template, just like all KMs. However they also have an associated groovy variable definition script which can be used to define new substitution variables, starting with the existing built-in substitution API variables. For example, a column list string can be created by looping through the SelectItem objects contained by a SqlQuery object, which in turn is contained by a SqlInsertStatement object.

In addition, there is a groovy variable definition script that is owned by the KM itself. The variables defined in the KM-level variable definition script can be reused by all the tasks in the KM. This is useful for cases where some value may be used by multiple tasks in the KM.

Both the task-level and KM-level groovy variable definition script can be edited and viewed in the KM task command editor.

Structured Substitution API

The Component KMs are the only type of KMs that have access to the structured substitution API. The structured substitution API objects are accessed by a set of built-in substitution API variables, similar to the “odiRef” variable that is available inside the <%. . .%> escape characters, for all KMs. There are two types of built-in variables. They are:

- **Built-in Public SDK Variables** — These variables are always the same regardless of the KM, and they expose the mapping public SDK objects for the component node and KM.
- **Built-in Structured Substitution API Variables** — The substitution API built-in variables are always in all-caps and represent the API objects produced by the particular IKM or LKM that is being edited. The full list of built-in substitution API variables can be obtained from the in-scope tree in the bottom right-hand corner of the KM source/target command editor.

The list of typical substitution API objects produced by a SQL IKM or LKM are:

- **`INSERT`**- The SqlInsertStatement object that represents the top-level INSERT DML statement that will load the target. It is available only for insert-type KMs.
- **`UPDATE`**- The SqlUpdateStatement object that represents the top-level update DML statement that will load the target. It is available only for update-type KMs.
- **`MERGE`**- The top-level MergeStatement object that is used to produce the merge statement that loads the target.
- **`QUERY`**- The SqlQuery object that represents the top-level extract query that will fetch the data to be loaded.
- **`TABLE`**- The top-level target Table object for KMs that are loading a target table.
- **`FROMLIST`**- The list of FromClause objects for the top-level SqlQuery object.
- **`JOIN`**- The JoinTable object that represents the current join when generating join code. It is available only inside global templates that are used by to produce join text, such as the JoinTable template.

- **ATTR**- The current source attribute when generating text for source attributes. It is available only inside global templates that are used to produce source attribute text, for example SourceMapAttribute
- **COLLIST**- The list of columns in the C$ staging table, formatted for an insert statement.
- **SUBQUERY** - The FilterSubQuery object that represents the filtering for a Filter subquery component.

The list of built-in structured substitution API variables that are available for Component KM source and target commands are:

- **physicalNode**— This is the mapping physical node object of type MapPhysicalNode, to which the Component KM is assigned. For example, for an IKM, the physicalNode built-in variable would be a reference to the node associated with a target datastore component. The physical node would have this IKM, assigned as its IKM.
- **component**— The mapping logical component that is associated with the physical node to which the Component KM is assigned.
- **connector**— The mapping connector point associated with the physical node. For LKMs assigned to an AP node, this connector point is the input connector point of the target component to which the AP node is connected. For IKMs assigned to a target, this is the datastore output connector point. For XKMs, it will be the associted output connector point for the physical node. This is helpful in some cases, for example for a splitter component there is a different physical node for each output connector, so it is helpful to know which one is associated with the node and the XKM.
- **generatorContext**— The GeneratorContext object associated with the code generator that will use the Component KM. A generator context is a container that holds named properties that are global to the code generator execution.
- **taskControl**— This is a reference to a TaskControl object, which can be used to control the number of session or scenario tasks that are generated for a single Component KM task line. This object should be used in the groovy script, since its methods do not return any string value that can be used as a template substitution string.
- **upstreamASTList**— A java.util.List is the object that contains a list of the AST substitution API objects produced by all upstream nodes from the one that this Component KM is assigned to. May contain multiple items, if the current component is a multi-input component such as a join, otherwise the list will contain only one upstream substitution API object. For example, in a SQL generation, the upstream AST object may typically be a SqlQuery object.
- **baseNode**— Only applicable to multi-connect IKMs. A reference to the AP node that is connected to the datastore target node to which the multi-connect IKM is assigned.
- **componentKM**— A reference to the owning Component KM object, usable within the template command or groovy variable definition context.
- **componentGenerator**— A ComponentGenerator instance that is used to generate code for the component to which this Component KM is assigned.
- **subtype**— The subtype value for this Component KM, or null, if the subtype is not set. The subtype is a string value that is used to determine the name of the Component KM generator delegate method that is called to produce the AST

substitutino API object for this Component KM. targetNameForLoadingTask is applicable only for IKMs and the name of the target is loaded by this IKM.

- **`collTableName`**— Applicable for LKMs only, with LKM type of PERSISTENT. Set to the name of the temporary staging table that will be created to stage the source data.

For more details on the substitution methods used in each built-in object, see SQL Structured Substitution API Reference appendix chapter,

Task Control Objects

The TaskControl objects can be used in the groovy variable definition scripts, and is accessed using the built-in variable “taskControl”. It has certain methods which can be called to control the number of task instances that are generated from this task. These methods are:

- **skipTaskGeneration()**— Calling this method will cause the code generator to skip generating the main instance of this task. Other instances of the task can still be added by calling instantiateTask().
- **instantiateTask()**— Calling this will cause the code generator to instantiate an extra instance of the task in the generated session or scenario. An arbitrary number of task instances can be generated by calling the method multiple times. A hash table containing an alternate set of bound variables for task generation can be passed as a parameter. If one of the variables in the alternate variable set has the same name as a standard built-in variable, then the alternate value will be used instead of the standard default value. Each extra instance of the task will be given a unique name, which will be the base task name plus a uniqueness suffix.

Seeded Component KMs

A set of built-in global Component XKMs, LKMs, and IKMs are provided (starting in ODI version 12.2.1.2.1). They can be viewed in the global KM tree. They are known as seeded KMs. A seeded KM cannot be deleted or edited in the UI studio. However a seeded KM can be duplicated, and the duplicate copy of the KM can be edited, if required. Also a new Component KM can be created, and a seeded KM can be set as its base KM, and thus the new KM will inherit the seeded base KM functionality, and specific functionality can be overridden as desired. This is the best practice that should be used to customize a built-in seeded KM.

3

Introduction to OdiRef Substitution API

You can obtain a general understanding of the Oracle Data Integrator OdiRef Substitution API using examples.
This chapter includes the following sections:

- Introduction to the Substitution API
- Using Substitution Methods
- Using Substitution Methods in Actions
- Working with Object Names
- Working with Lists of Tables, Columns and Expressions
- Generating the Source Select Statement
- Obtaining Other Information with the API
- Advanced Techniques for Code Generation

> **Note:**
>
> The substitution API methods are listed in Substitution API Reference.

Introduction to the Substitution API

KMs are written as templates by using the Oracle Data Integrator substitution API. The API methods are java methods that return a string value, or an object value that can be converted to a string or be passed as a parameter into a different method. Since ODI version 12.2.1.2.1, there are 2 types of substitution API objects.

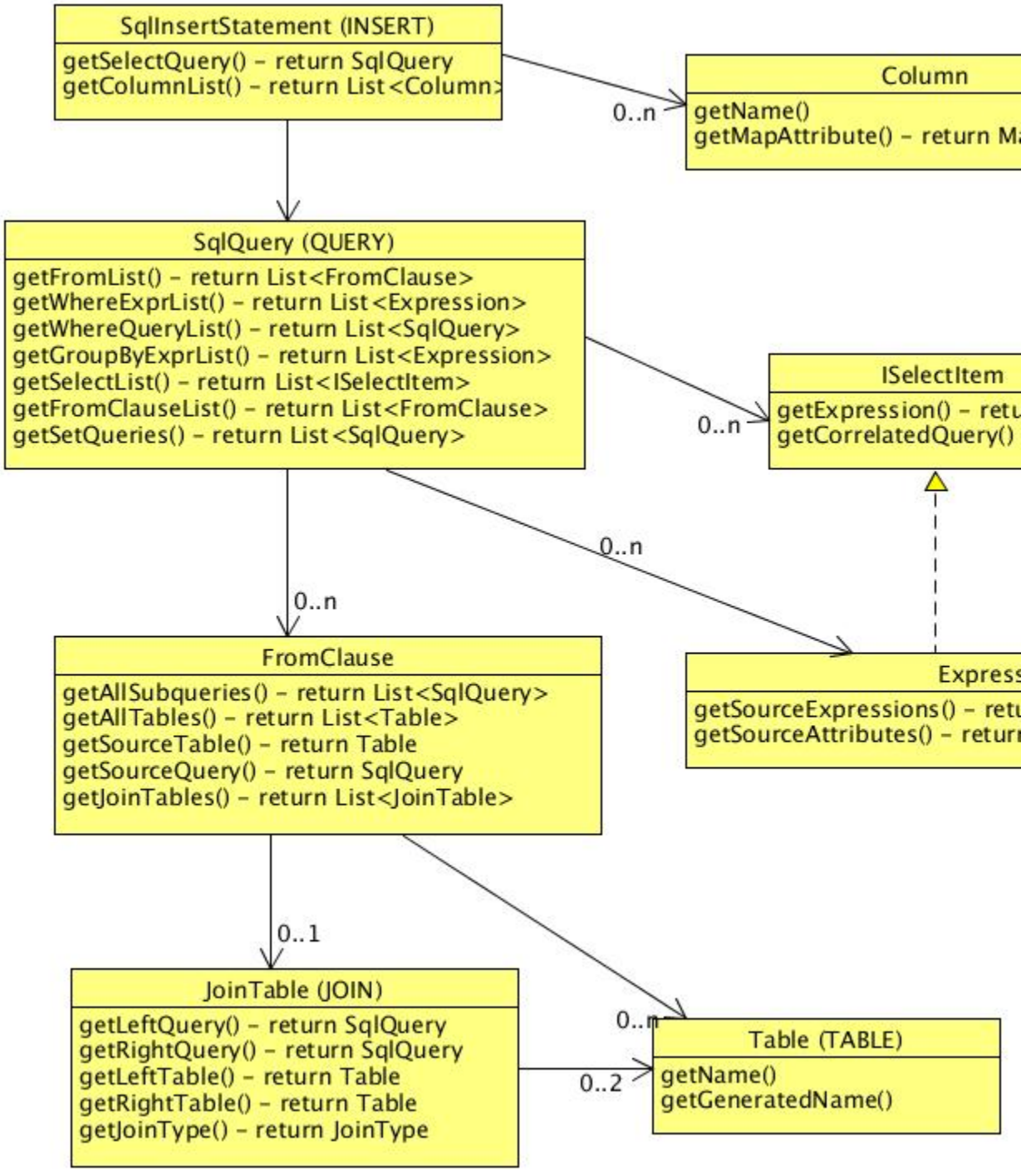
- The first type is called the Structured Substitution API. It is a structured set of objects that represent the structure of the code that will be generated. The Structured Substitution API objects are a collection of objects generally related by a tree-like structure. Navigation methods are provided to navigate from parent objects to child objects. The Structured Substitution API is available only when writing commands or global templates for Component KMs, which consist of IKM, LKM, XKM, and CKM.
- The second type of AST object is the monolithic substitution API, or odiRef, which is the only substitution API object that was available prior to ODI version 12.2.1.2.1.

Structured Substitution API

The Structured Substitution API tree has a different structure depending on the base language of the code that will be generated by the KM. The currently supported base languages are SQL, SPARK_PYTHON.

The tree structure for SQL is shown in the following diagram:

Figure 3-1 Structured Substitution API



The same method may return different values depending on the structure of the mapping logic that was used to generate the tree. The tree is generated by iterating through all the source components for a particular target in a mapping, and executing the KM delegate for each component KM.

The following example illustrates how you would write a create table statement in a KM using the Structured Substitution API.

The following code is entered in a KM or global template:

```
CREATE TABLE $[tableName] ({#LIST} $[tgtColNameList] $[tgtColDataTypeList]
{#SEP#},{#NL#} {#ENDLIST#})
```

The generated code for the PRODUCT table is:

```
CREATE TABLE db_staging.PRODUCT( PRODUCT_ID numeric(10), PRODUCT_NAME
varchar(250), FAMILY_ID numeric(4), SKU varchar(13), LAST_DATE timestamp)
```

The generated code for the CUSTOMER table is:

```
CREATE TABLE db_staging.CUSTOMER( CUST_ID numeric(10), CUST_NAME
varchar(250), ADDRESS varchar(250), CITY varchar(50), ZIP_CODE
varchar(12), COUNTRY_ID varchar(3))
```

Each element of the template is explained below:

- CREATE TABLE is just simple text that is replicated into the generated code.
- $[tableName] is a substitution API call using the groovy-based templating syntax (since 12.2.1.2.1). The name inside the $[...] escape characters can be a simple variable name of a built-in or groovy variable, or it can include a method call, for example “table.getName()”, if the “table” variable was an object with a getName() method. The tableName variable may be defined in the variable definition groovy script associated with the KM task.
- {#LIST#} is an example of the template flow control command syntax (since ODI 12.2.1.2.1). These commands are always escaped by {#...#} and can be used to control the flow of the text generation. In this case it allows a list variable to be displayed by calling “toString()” for each object in the list. For the {#LIST#} command, if a different method should be called for each list item, the “foreach()” syntax can be used, for example “columnList.foreach(getText())”. The list substitution API objects following {#LIST#} will be expanded one at a time, using the fixed text for each one.
- {#SEP#} This is another template flow control commands that is always paired with {#LIST#}. The text following this command is used as a separator between each list item.
- {#ENDLIST#} This command closes the list flow control definition.

The Monolithic Substitution API Object - odiRef

The monolithic substitution API methods belong to a single object instance named "odiRef". The same method may return different values depending on the type of KM that invokes it. That's why they are classified by type of KM.

To understand how this API works, the following example illustrates how you would write a create table statement in a KM and what it would generate depending on the datastores it would deal with:

The following code is entered in a KM:

```
CREATE TABLE <%=odiRef.getTable("L", "INT_NAME", "A")%>(<%=odiRef.getColList("",
"\t[COL_NAME] [DEST_CRE_DT]", ",\n", "", "")%>)
```

The generated code for the PRODUCT table is:

```
CREATE TABLE db_staging.I$_PRODUCT(
    P    RODUCT_ID numeric(10),    PRODUCT_NAME varchar(250),    FAMILY_ID
numeric(4),    SKU varchar(13),    LAST_DATE timestamp)
```

The generated code for the `CUSTOMER` table is:

```
CREATE TABLE db_staging.I$_CUSTOMER(    CUST_ID numeric(10),    CUST_NAME
varchar(250),    ADDRESS varchar(250),    CITY varchar(50),    ZIP_CODE
varchar(12),    COUNTRY_ID varchar(3))
```

As you can see, once executed with appropriate metadata, the KM has generated a different code for the product and customer tables.

The following topics cover some of the main substitution APIs and their use within KMs. Note that for better readability the tags "<%" and "%>" as well as the "odiRef" object reference are omitted in the examples.

Calls to odiRef substitution API methods can also be made in the groovy variable definition script for a KM task. Thus a new variable can be defined whose value is equal to the result of a odiRef call, or some combination of calls.

Using Substitution Methods

The methods that are accessible from the Knowledge Modules and from the procedures are direct calls to Oracle Data Integrator methods implemented in Java. These methods are usually used to generate some text that corresponds to the metadata stored into the Oracle Data Integrator repository.

Generic Syntax

The substitution methods are used in any text of a task of a Knowledge Module or of a procedure.

The odiRef methods can be called inside a groovy variable definition script. Also, they can be used within any KM task command text using the following syntax:

```
<%=java_expression%>
```

In this syntax:

- The `<%= %>` tags are used to output the text returned by `java_expression`. This syntax is very close to the syntax used in Java Server Pages (JSP).
- `Java expression` is any Java expression that returns a string.

The following syntax performs a call to the `getTable` method of the `odiRef` java object using three parameters. This method call returns a string. That is written after the `CREATE TABLE` text.

```
CREATE TABLE <%=odiRef.getTable("L", "INT_NAME", "A")%>
```

The Oracle Data Integrator Monolithic Substitution API is implemented in the Java class `OdiReference`, whose instance `OdiRef` is available at any time. For example, to call a method called `getFrom()`, you have to write `odiRef.getFrom()`.

> **Note:**
>
> For backward compatibility, the "**odiRef**" API can also be referred to as "**snpRef**" API. "snpRef" and "odiRef" object instances are synonyms, and the legacy syntax `snpRef.<method_name>` is still supported but deprecated.

Specific Syntax for CKM

The following syntax is used in an IKM to call the execution of a check procedure (CKM).

This syntax automatically includes all the CKM procedure commands at this point of in the processing.

```
<% @ INCLUDE (CKM_FLOW | CKM_STATIC) [DELETE_ERROR] %>
```

The options for this syntax are:

- `CKM_FLOW`: triggers a flow control, according to the CKM choices made in the Check Knowledge Module tab in the properties of the target datastore in the physical diagram of the Mapping.
- `CKM_STATIC`: Triggers a static control of the target datastore. Constraints defined for the datastore and selected as Static constraints will be checked.
- `DELETE_ERROR`: This option instructs the CKM to remove any detected errors from the validated table (flow table in case of CKM_FLOW or target table in case of CKM_STATIC). More precisely, all CKM commands will be generated, which are tagged as `Remove Errors`.

For example: the following call triggers a flow control with error deletion.

```
<% @ INCLUDE  CKM_FLOW DELETE_ERROR %>
```

Using Flexfields

Flexfields are user-defined fields enabling users to customize the properties of Oracle Data Integrator' objects. Flexfields are defined on the **Flexfield** tab of the object window and can be set for each object instance through the **Flexfield** tab of the object window.

Flexfield Access Using Groovy-based Variables and Mapping API

Using the new structured substitution API, the flex field values for a datastore can be obtained by starting with the built-in component KM variable “physicalNode”, and using the ODI public API to navigate to the value. This could be done in the groovy variable definition script, using groovy language (which can be written to look exactly like java) similar to this:

```
flexFieldValue = “”;
String ffName = “MY_FLEX_FIELD”;
IMapComponent comp = node.getLogicalComponent();
if (comp.isOfType(DatastoreComponent.COMPONENT_TYPE_NAME)) {
  DatastoreComponent datastoreComp = (DatastoreComponent)
comp.getDelegate();
```

```
  OdiDataStore datastore = (OdiDataStore)
datastoreComp.getBoundDataStore();
  Collection<IFlexFieldValue> ffValues = datastore.getFlexFieldsValues();
for (IFlexFieldValue value : ffValues) {
if (value.getName().equals(ffName)) {
   // found it
   flexFieldValue = value.getValue().toString();
    }
```

If this code is written in the groovy variable definition script, then variable “flexFieldValue” can be used in a variable reference in the template or KM command.

This code is more complex than the simple odiRef getTable or getSrcTableList call (as illustrated below). However it is also more flexible to accommodate special cases, such as retreiving all of the flex fields from a given object into an array, or retrieving flex fields from other objects besides the contextual target or source tables.

Also, the odiRef call can be used in the KM task groovy variable definition script to store the value in a temporary variable, which can then be used in the template command.

Flexfield Access Using Monolithic odiRef Substitution API

When accessing an object properties through Oracle Data Integrator' substitution methods, if you specify the flexfield **Code**, Oracle Data Integrator will substitute the **Code** by the flexfield value for the object instance.

For instance:

`<%=odiRef.getTable("L", "MY_DATASTORE_FIELD", "W")%>` will return the value of the flexfield `MY_DATASTORE_FIELD` for the current table.

`<%=odiRef.getSrcTableList("", "[MY_DATASTORE_FIELD] ", ", ", "")%>` will return the flexfield value for each of the source tables of the mapping.

It is also possible to get the value of a flexfield through the getFlexFieldValue() method.

> **Note:**
>
> Flexfields exist only for certain object types. Objects that do not have a **Flexfield** tab do not support flexfields.

Using Code Generation Tags

The following code generation tags may be used as a way to write executable java inside the template:

- **<%... %>**: This tag is evaluated during scenario generation or session creation time. It is used to substitute the metadata information in the text. For example, for the `PRODUCT` table:

  ```
  CREATE TABLE <%=odiRef.getTable("L", "INT_NAME", "A")%>
  ```

is converted into:

```
CREATE TABLE db_staging.I$_PRODUCT
```

Usage of the **<%...%>** tag is discouraged for new Component KMs (IKM/LKM/XKM/CKM), the newer Structured Substitution API and the groovy variable definition script should be used instead.

- **<?...?>**: This tag is evaluated during session execution time where the physical topology information is substituted depending upon the execution context. The session task logs are created after evaluating this tag. For example, for the target data server user `'TargetName'`:

  ```
  "<?=snpRef.getInfo("DEST_USER_NAME")?>"
  ```

  is converted into:

  ```
  'TargetName'
  ```

- **<@...@>**: This tag is evaluated after session logs are created and should be used for substitutions that you do not want to appear in the Session Task logs. It can be used for substituting clear text passwords which must not be logged in the session task logs for security reasons. For example:

  ```
  <@=snpRef.getInfo("SRC_PASS") @>
  ```

Using Substitution Methods in Actions

An action corresponds to a DDL operation (create table, drop reference, etc) used to generate a session or scenario task to implement in a database the changes performed in a data integrator model (Generate DDL operation). Each action contains several **Action Lines**, corresponding to the commands required to perform the DDL operation (for example, dropping a table requires dropping all its constraints first).

Action Lines Code

Action lines contain statements valid for the technology of the action group. Unlike procedures or knowledge module commands, these statements use a single connection (SELECT ... INSERT statements are not possible). In the style of the knowledge modules, action make use of the substitution methods to make their DDL code generic.

For example, an action line may contain the following code to drop a check constraint on a table:

```
ALTER TABLE $[tableName]
DROP CONSTRAINT $[constraintName]
```

Action Calls Method

The Action Calls methods are odiRef calls that are usable in the action lines only. Unlike other substitution methods, they are not used to generate text, but to generate actions appropriate for the context.

For example, to perform the Drop Table DDL operation, we must first drop all foreign keys referring to the table.

In the *Drop Table* action, the first action line will use the dropReferringFKs() action call method to automatically generate a *Drop Foreign Key* action for each foreign key of the current table. This call is performed by creating an action line with the following code:

```
<% odiRef.dropReferringFKs(); %>
```

The syntax for calling the action call methods is:

```
<% odiRef.method_name(); %>
```

> **Note:**
>
> The action call methods must be alone in an action line, should be called without a preceding "=" sign, and require a trailing semicolon.

The following Action Call Methods are available for Actions:

- **addAKs()**: Call the *Add Alternate Key* action for all alternate keys of the current table.
- **dropAKs()**: Call the *Drop Alternate Key* action for all alternate keys of the current table.
- **addPK()**: Call the *Add Primary Key* for the primary key of the current table.
- **dropPK()**: Call the *Drop Primary Key* for the primary key of the current table.
- **createTable()**: Call the *Create Table* action for the current table.
- **dropTable()**: Call the *Drop Table* action for the current table.
- **addFKs()**: Call the *Add Foreign Key* action for all the foreign keys of the current table.
- **dropFKs()**: Call the *Drop Foreign Key* action for all the foreign keys of the current table.
- **enableFKs()**: Call the *Enable Foreign Key* action for all the foreign keys of the current table.
- **disableFKs()**: Call the *Disable Foreign Key* action for all the foreign keys of the current table.
- **addReferringFKs():** Call the *Add Foreign Key* action for all the foreign keys pointing to the current table.
- **dropReferringFKs():** Call the *Drop Foreign Key* action for all the foreign keys pointing to the current table.
- **enableReferringFKs():** Call the *Enable Foreign Key* action for all the foreign keys pointing to the current table.
- **disableReferringFKs()**: Call the *Disable Foreign Key* action for all the foreign keys pointing to the current table.
- **addChecks()**: Call the *Add Check Constraint* action for all check constraints of the current table.
- **dropChecks()**: Call the *Drop Check Constraint* action for all check constraints of the current table.

- **addIndexes()**: Call the *Add Index* action for all the indexes of the current table.
- **dropIndexes()**: Call the *Drop Index* action for all the indexes of the current table.
- **modifyTableComment():** Call the *Modify Table Comment* for the current table.
- **AddColumnsComment():** Call the *Modify Column Comment* for all the columns of the current table.

Working with Object Names

When working in Designer, you should avoid specifying physical information such as the database name or schema name as they may change depending on the execution context. The correct physical information will be provided by Oracle Data Integrator at execution time.

The substitution API has methods that calculate the fully qualified name of an object or datastore taking into account the context at runtime. These methods are listed in the table below:

The odiRef name calculation methods can be called from the groovy variable definition script, or inside a java tags like <%...%>, inside the command text.

Qualified Name Required	Method	Usable In
Any object named OBJ_NAME	getObjectName("L", "OBJ_NAME", "D")	Anywhere
The target datastore of the current mapping.	getTable("L", "TARG_NAME", "A")	LKM, CKM, IKM, JKM
The integration (I$) table of the current mapping.	getTable("L", "INT_NAME", "A")	LKM, IKM
The loading table (C$) for the current loading phase.	getTable("L", "COLL_NAME", "A")	LKM
The error table (E$) for the datastore being checked.	getTable("L", "ERR_NAME", "A")	LKM, CKM, IKM
The datastore being checked	getTable("L", "CT_NAME", "A")	CKM
The datastore referenced by a foreign key	getTable("L", "FK_PK_TABLE_NAME", "A")	CKM

Additionally, a special static object name retrieval method is provided for the case where mapping public API is used in the groovy script, and a map physical node is available. This may be useful if a generated object name is needed for an object other than the current target.

Table 3-1 Static Object Name Retrieval Method

Qualified Name Required	Method	Usable In
Any object named OBJ_NAME	OdiRef.getOdiGeneratedAccessName("OBJ_NAME", mapPhysicalNode, "D")	Anywhere

Working with Lists of Tables, Columns and Expressions

Generating code from a list of items often requires a "while" or "for" loop. Oracle Data Integrator addresses this issue by providing a set of template flow control commands that act as iterators to which you provide a set of list variables in a template pattern, plus a separator pattern.

The main template flow control command for looping is {# LIST #}. The template patterns found between the {#LIST#} and {#ENDLIST#} commands are expanded multiple times, one for each item in the list variables that are expanded in the template pattern. There must be at least one list variable that is expanded in the template pattern inside the list construct.

So for example if a list variable was defined in groovy like this:

```
List myList = [‘a’. ‘b’, ‘c’]
```
Then add a #LIST command like this:

```
{#LIST#} The element value is $[myList] {#SEP#} {#NL#} {#ENDLIST#}
```
The resultant generated code would look like this:

```
The element value is a
The element value is b
The element value is c
```

The template pattern between {#SEP#} and {#ENDLIST#} is used as a separator between each list item expansion.

Multiple list variables can be used in the pattern, but each one must have the same number of elements.

To access mapping objects and their generated strings, the structured substitution API or mapping API may be used in the groovy variable definition script. For example the following query could be used to get the generated source column list for the built-in QUERY structured substitution API variable:

```
{# LIST #} $[QUERY.getSelectList().foreach(getText())] $
[QUERY.getColumnAliasSeparator()] $[QUERY.getAliasList()] {# SEP #},{#NL#}
{# ENDLIST #}
```
The older odiRef iterator methods are also still supported, and can be used inside the Java based <%...%> tags, or in the KM task groovy variable definition script. These methods act as "iterators" to which you provide a substitution mask or pattern and a separator and they return a single string with all patterns resolved separated by the separator.

All of them return a string and accept at least these 4 parameters:

- **Start**: a string used to start the resulting string.
- **Pattern**: a substitution mask with attributes that will be bound to the values of each item of the list.
- **Separator**: a string used to separate each substituted pattern from the following one.
- **End**: a string appended to the end of the resulting string

Some of them accept an additional parameter (the **Selector**) that acts as a filter to retrieve only part of the items of the list. For example, list only the *mapped* attribute of the target datastore of a mapping.

Some of these methods are summarized in the table below:

Method	Description	Usable In
getColList()	The most frequently-used method in Oracle Data Integrator. It returns a list of columns and expressions that need to be executed in the context where used. You can use it, for example, to generate lists like these: • Columns in a CREATE TABLE statement • Columns of the update key • Expressions for a SELECT statement in a LKM, CKM or IKM • Field definitions for a loading script This method accepts a "selector" as a 5th parameter to let you filter items as desired.	LKM, CKM, IKM, JKM, SKM
getTargetColList()	Returns the list of attributes in the target datastore. This method accepts a selector as a 5th parameter to let you filter items as desired.	LKM, CKM, IKM, JKM,SKM
getAKColList()	Returns the list of columns defined for an alternate key.	CKM, SKM
getPKColList()	Returns the list of columns in a primary key. You can alternatively use getColList with the selector parameter set to "PK" .	CKM,SKM
getFKColList()	Returns the list of referencing columns and referenced columns of the current foreign key.	CKM,SKM
getSrcTablesList()	Returns the list of source tables of a mapping. Whenever possible, use the getFrom method instead. The getFrom method is discussed below.	LKM, IKM
getFilterList()	Returns the list of filter expressions in a mapping. The getFilter method is usually more appropriate.	LKM, IKM
getJoinList()	Returns the list of join expressions in a mapping. The getJoin method is usually more appropriate.	LKM, IKM
getGrpByList()	Returns the list of expressions that should appear in the group by clause when aggregate functions are detected in the mappings of a mapping. The getGrpBy method is usually more appropriate.	LKM, IKM
getHavingList()	Returns the list of expressions that should appear in the having clause when aggregate functions are detected in the filters of a mapping. The getHaving method is usually more appropriate.	LKM, IKM
getSubscriberList()	Returns a list of subscribers.	JKM

The following section provide examples illustrating how these methods work for generating code:

Using INSERT.getTargetColList to create a table

The following example shows how to use the built-in variable INSERT, of type SqlInsertStatement, to create a table.

The following KM code:

```
create table $[odiRuntimeAccessName]
(
  $[tgtColList.call()]
)
Combined with the following groovy variable definitions in the KM task
variable definition script:
tableName = physicalNode.getBoundObjectName();
tableCmp = physicalNode.getLogicalComponent();
tableQualifier = physicalNode.getLocation() == null ? null :
physicalNode.getLocation().getName();
odiRuntimeAccessName = OdiRef.getOdiGeneratedAccessName("TARG_NAME",
physicalNode, "A");
tableAlias = component.getAlias();
tgtColList = {
  def cols = component.getAttributes();
  String result = ""
  def first = true
  for (col in cols) {
    if (!first) result += ",\n"
    result += col.getSQLAccessName(false, "") + " " +
MappingUtils.getDdlDataType(col.getBoundObject());
    first = false
  }
  return result
}
```

Generates the following statement:

```
Create table MYTABLE
(
       CUST_ID numeric(10),
   CUST_NAME varchar(250),
   ADDRESS varchar(250),
   CITY varchar(50),
   ZIP_CODE varchar(12),
   COUNTRY_ID varchar(3)
)
```

Using getTargetColList to create a table

The following example shows how to use a column list to create a table.

The following KM code:

```
Create table MYTABLE
<%=odiRef.getTargetColList("(\n", "\t[COL_NAME] [DEST_WRI_DT]", ",\n", "\n)")%>
```

Generates the following statement:

```
Create table MYTABLE
(
       CUST_ID numeric(10),
   CUST_NAME varchar(250),
   ADDRESS varchar(250),
   CITY varchar(50),
   ZIP_CODE varchar(12),
   COUNTRY_ID varchar(3)
)
```

In this example:

- **Start** is set to "(\n": The generated code will start with a parenthesis followed by a carriage return (\n).
- **Pattern** is set to "\t[COL_NAME] [DEST_WRI_DT]": The generated code will loop over every target column and generate a tab character (\t) followed by the column name ([COL_NAME]), a white space and the destination writable data type ([DEST_WRI_DT]).
- The **Separator** is set to ",\n": Each generated pattern will be separated from the next one with a comma (,) and a carriage return (\n)
- **End** is set to "\n)": The generated code will end with a carriage return (\n) followed by a parenthesis.

Using getColList in an Insert values statement

The following example shows how to use column listing to insert values into a table.

For following KM code:

```
insert into MYTABLE
(
<%=odiRef.getColList("", "[COL_NAME]", ", ", "\n", "INS AND NOT TARG")%>
<%=odiRef.getColList(",", "[COL_NAME]", ", ", "", "INS AND TARG")%>
)
Values
(
<%=odiRef.getColList("", ":[COL_NAME]", ", ", "\n", "INS AND NOT TARG")%>
<%=odiRef.getColList(", ", "[EXPRESSION]", ", ", "", "INS AND TARG")%>
)
```

Generates the following statement:

```
insert into MYTABLE
(
CUST_ID, CUST_NAME, ADDRESS, CITY, COUNTRY_ID
, ZIP_CODE, LAST_UPDATE
)
Values
(
:CUST_ID, :CUST_NAME, :ADDRESS, :CITY, :COUNTRY_ID
, 'ZZ2345', current_timestamp
)
```

In this example, the values that need to be inserted into MYTABLE are either bind variables with the same name as the target columns or constant expressions if they

are executed on the target. To obtain these 2 distinct set of items, the list is split using the Selector parameter:

- "INS AND NOT TARG": first, generate a comma-separated list of columns ([COL_NAME]) mapped to bind variables in the "value" part of the statement (:[COL_NAME]). Filter them to get only the ones that are flagged to be part of the INSERT statement and that are **not executed on the target.**
- "INS AND TARG": then generate a comma separated list of columns ([COL_NAME]) corresponding to expression ([EXPRESSION]) that are flagged to be part of the INSERT statement and that are **executed on the target**. The list should start with a comma if any items are found.

Using getSrcTableList

The following example concatenates the list of the source tables of a mapping for logging purposes.

For following KM code:

```
insert into MYLOGTABLE
(
MAPPING_NAME,
DATE_LOADED,
SOURCE_TABLES
)
values
(
'<%=odiRef.getPop("POP_NAME")%>',
current_date,
'' <%=odiRef.getSrcTablesList("|| ", "'[RES_NAME]'", " || ',' || ", "")%>
)
```

Generates the following statement:

```
insert into MYLOGTABLE
(
MAPPING_NAME,
DATE_LOADED,
SOURCE_TABLES
)
values
(
'Int. CUSTOMER',
current_date,
'' || 'SRC_CUST' || ',' || 'AGE_RANGE_FILE' || ',' || 'C$0_CUSTOMER'
)
```

In this example, getSrcTableList generates a message containing the list of resource names used as sources in the mapping to append to MYLOGTABLE. The separator used is composed of a concatenation operator (||) followed by a comma enclosed by quotes (',') followed by the same operator again. When the table list is empty, the SOURCE_TABLES column of MYLOGTABLE will be mapped to an empty string ('').

Generating the Source Select Statement

LKMs and IKMs both manipulate a source result set. For the LKM, this result set represents the pre-transformed records according to the mappings, filters and joins

that need to be executed on the source. For the IKM, however, the result set represents the transformed records matching the mappings, filters and joins executed on the staging area.

To build these result sets, you will usually use a SELECT statement in your KMs. Oracle Data Integrator has some advanced substitution methods, including getColList, that help you generate this code:

Method	Description	Usable In
getFrom()	Returns the FROM clause of a SELECT statement with the appropriate source tables, left, right and full outer joins. This method uses information from the topology to determine the SQL capabilities of the source or target technology. The FROM clause is built accordingly with the appropriate keywords (INNER, LEFT etc.) and parentheses when supported by the technology. • When used in an LKM, it returns the FROM clause as it should be executed by the source server. • When used in an IKM, it returns the FROM clause as it should be executed by the staging area server.	LKM, IKM
getFilter()	Returns filter expressions separated by an "AND" operator. • When used in an LKM, it returns the filter clause as it should be executed by the source server. • When used in an IKM, it returns the filter clause as it should be executed by the staging area server.	LKM, IKM
getJrnFilter()	Returns the special journal filter expressions for the journalized source datastore. This method should be used with the CDC framework.	LKM, IKM
getGrpBy()	Returns the GROUP BY clause when aggregation functions are detected in the mappings. The GROUP BY clause includes all mapping expressions referencing columns that do not contain aggregation functions. The list of aggregation functions are defined by the language of the technology in the topology.	LKM, IKM
getHaving()	Returns the HAVING clause when aggregation functions are detected in filters. The having clause includes all filters expressions containing aggregation functions. The list of aggregation functions are defined by the language of the technology in the topology.	LKM, IKM

To obtain the result set from any SQL RDBMS source server, you would use the following SELECT statement in your LKM:

```
select <%=odiRef.getPop("DISTINCT_ROWS")%>
<%=odiRef.getColList("", "[EXPRESSION]\t[ALIAS_SEP] [CX_COL_NAME]", ",\n\t", "", "")
%>
```

```
from <%=odiRef.getFrom()%>
where (1=1)
<%=odiRef.getFilter()%>
<%=odiRef.getJrnFilter()%>
<%=odiRef.getJoin()%>
<%=odiRef.getGrpBy()%>
<%=odiRef.getHaving()%>
```

To obtain the result set from any SQL RDBMS staging area server to build your final flow data, you would use the following SELECT statement in your IKM. Note that the getColList is filtered to retrieve only expressions that are not executed on the target and that are mapped to writable columns.

```
select <%=odiRef.getPop("DISTINCT_ROWS")%>
<%=odiRef.getColList("", "[EXPRESSION]", ",\n\t", "", "(not TRG) and REW")%>
from <%=odiRef.getFrom()%>
where (1=1)
<%=odiRef.getJoin()%>
<%=odiRef.getFilter()%>
<%=odiRef.getJrnFilter()%>
<%=odiRef.getGrpBy()%>
<%=odiRef.getHaving()%>
```

As all filters and joins start with an AND, the WHERE clause of the SELECT statement starts with a condition that is always true (1=1).

Obtaining Other Information with the API

The following methods provide additional information which may be useful:

Method	Description	Usable In
getInfo()	Returns information about the source or target server.	Any procedure or KM
getSession()	Returns information about the current running session	Any procedure or KM
getOption()	Returns the value of a particular option	Any procedure or KM
getFlexFieldValue()	Returns information about a flex field value. Not that with the "List" methods, flex field values can be specified as part of the pattern parameter.	Any procedure or KM
getJrnInfo()	Returns information about the CDC framework	JKM, LKM, IKM
getTargetTable()	Returns information about the target table of a mapping.	LKM, IKM, CKM
getModel()	Returns information about the current model during a reverse-engineering process.	RKM
getPop()	Returns information about the current mapping.	LKM, IKM

Advanced Techniques for Code Generation

The code generation in Oracle Data Integrator can interpret any Java code enclosed between "<%" and "%>" tags.

However, the best practice for new KMs developed in ODI version 12.2.1.2.1 or beyond is to keep Java or groovy code separate from the template, by adding it to the

KM task groovy variable definition script and defining a set of simple variables that can be used in the template command. For example, if some section of the template command is to be conditionally generated depending on some complex condition, the best practice would be to define a boolean variable in the groovy variable script, and then use that variable in the {#IF#} statement in the template command. In this way, the template and the code are kept separate and both are clearer.

The following examples illustrate how you can use these advanced techniques.

Using Java Variables and String Functions

The following KM Code creates a string variable and uses it in a substitution method call :

```
<%
String myTableName;
myTableName = "ABCDEF";
%>
drop table <%=odiRef.getObjectName(myTableName.toLowerCase())%>
```

Generates the following:

```
drop table SCOTT.abcdef
```

Using a KM Option to Generate Code Conditionally

The following KM code generates code depending on the OPT001 option value.

```
<%
String myOptionValue=odiRef.getOption("OPT001");
if (myOption.equals("TRUE"))
{
out.print("/* Option OPT001 is set to TRUE */");
}
else
{
%>
/* The OPT001 option is not properly set */
<%
}
%>
```

If OPT001 is set to TRUE, then the following is generated:

```
/* Option OPT001 is set to TRUE */
```

Otherwise the following is generated

```
/* The OPT001 option is not set to TRUE */
```

4
Reverse-Engineering Strategies

It is important to understand the customized reverse-engineering process and the strategies used in the Reverse-engineering Knowledge Modules for retrieving advanced metadata.
This chapter includes the following sections:

- Customized Reverse-Engineering Process
- Case Studies

Customized Reverse-Engineering Process

Oracle Data Integrator Standard Reverse-Engineering relies on the capabilities of the driver used to connect a given data server to return rich metadata describing the data strucuture.

When this metadata is not accurate, or needs to be enriched with some metadata retrieved from the data server, customized reverse-engineering can be used.

SNP_REV tables

The Oracle Data Integrator repository contains a set of metadata staging tables, called the SNP_REV tables.

These SNP_REV tables content is managed using the following tools:

- OdiReverseResetTable resets the content of these tables for a given model.
- OdiReverseGetMetadata populates these tables using a process similar to the standard JDBC reverse-engineering.
- OdiReverseSetMetadata applies the content of these staging tables to the repository tables describing the datastores, columns, constraints, etc. This action modifies the Oracle Data Integrator model.

See SNP_REV Tables Reference for a reference of the SNP_REV table, and the *Developer's Guide for Oracle Data Integrator* for more information for a reference of the reverse-engineering tools.

Customized Reverse-Engineering Strategy

Customized Reverse-Engineering strategy follows a pattern common to all RKMs.

This patterns includes the following steps:

1. Call the OdiReverseResetTable tool to reset the SNP_REV tables from previous executions.
2. Load the SNP_REV tables. This is performed using three main patterns:
    - Retrieve metadata from the metadata provider and load them into to SNP_REV tables. This is the pattern used for example in the *RKM Oracle*.

- Retreive metadata from a third party provider. This is the pattern used for example in the *RKM File (FROM EXCEL)*. Metadata is not extracted from the files described in the model but from a Micrisift Excel Excel spreadsheet that contains the description of these files.
- Pre-populate the SNP_REV tables using OdiReverseGetMetadata and then fix/enrich this metadata using queries targeting these tables.

3. Call the OdiReverseSetMetaData tool to apply the changes to the current Oracle Data Integrator model.

In an RKM, the source and target commands work are follow:

- The **Command on Target** specified with an *Undefined* technology on the *Autocommit* transaction targets the SNP_REV tables in the repository.
- The **Command on Source** specified with an *Undefined* Schema on the *Autocommit* transaction retreives data from the data-server containing the data structure to reverse-engineer. If you want to use a metadata provider (for example an Excel spreadsheet), you must specify a specific technology and logical schema.
- Calls to Tools (such as OdiReverseSetMetadata) are specified in the **Command on Target**, with the *ODI Tools* technology.

Case Studies

This section provides examples of reverse-egineering strategies.

RKM Oracle

The RKM Oracle is a typical example of a reverse-engineering process using a database dictionnary as the metadata provider.

The commands below are extracted from the RKM for Oracle and provided as examples. You can review the code of this knowledge module by editing it in Oracle Data Intagrator Studio.

Reset SNP_REV Tables

This task resets the content of the SNP_REV tables for the current model.

Command on Target (ODI Tools)

```
OdiReverseResetTable -MODEL=<%=odiRef.getModel("ID")%>
```

Get Tables

This task retreives the list of tables from the Oracle system tables and loads this content into the SNP_REV tables.

Command on Source

```
Select    t.TABLE_NAME            TABLE_NAME,    t.TABLE_NAME
RES_NAME,    replace(t.TABLE_NAME,'<%=odiRef.getModel("REV_ALIAS_LTRIM")
%>','')        TABLE_ALIAS,    substr(tc.COMMENTS,1,250)        TABLE_DESC,    'T'
TABLE_TYPE,    t.NUM_ROWS            R_COUNT,    SUBSTR(PARTITIONING_TYPE ,1,1)
PARTITIONING_TYPE,    SUBSTR(SUBPARTITIONING_TYPE,1,1) SUBPARTITIONING_TYPEFrom
```

```
ALL_TABLES    t,    ALL_TAB_COMMENTS     tc,    ALL_PART_TABLES tp
Where ...
...
```

Command on Target

```
insert into SNP_REV_TABLE(    I_MOD,    TABLE_NAME,    RES_NAME,    TABLE_ALIAS,
TABLE_TYPE,    TABLE_DESC,    IND_SHOW,    R_COUNT,    PARTITION_METH,
SUB_PARTITION_METH)values(    <%=odiRef.getModel("ID")
%>,    :TABLE_NAME,    :RES_NAME,    :TABLE_ALIAS,    'T',    :TABLE_DESC,
'1',    :R_COUNT,    :PARTITIONING_TYPE,    :SUBPARTITIONING_TYPE)
```

Get views, partitions, columns, FK, Keys and other Oracle Metadata

Subsequent commands use the same pattern to load the SNP_REV tables from the content of the Oracle system tables.

Set Metadata

This task resets the content of the SNP_REV tables for the current model.

Command on Target (ODI Tools)

```
OdiReverseSetMetaData -MODEL=<%=odiRef.getModel("ID")%>
```

5

Data Integrity Strategies

Data integrity strategies are used for performing flow and static checks. These strategies are implemented in the Check Knowledge Modules.
This chapter includes the following sections:

- Data Integrity Check Process
- Case Studies

Data Integrity Check Process

Data Integrity Check Process checks is activated in the following cases:

- When a **Static Control** is started (from Studio, or using a package) on a model, sub-model or datastore. The data in the datastores are checked against the constraints defined in the Oracle Data Integrator model.
- If a mapping is executed and a **Flow Control** is activated in the IKM. The flow data staged in the integration table (I$) is checked against the constraints of the target datastore, as defined in the model. Only those of the constraints selected in the mapping are checked.

In both those cases, a CKM is in charge of checking the data quality of data according to a predefined set of constraints. The CKM can be used either to check existing data when used in a "static control" or to check flow data when used in a "flow control". It is also in charge of removing the erroneous records from the checked table if specified.

In the case of a static control, the CKM used is defined in the model. In the case of a flow control, it is specified for the mapping.

Check Knowledge Module Overview

Standard CKMs maintain 2 different types of tables:

- A single summary table named *SNP_CHECK_TAB* for each data server, created in the work schema of the default physical schema of the data server. This table contains a summary of the errors for every table and constraint. It can be used, for example, to analyze the overall data quality of a model.
- An error table named *E$_<datastore name>* for every datastore that was checked. The error table contains the actual records rejected by data quality processes (static and flow controls) launched for this table.

A standard CKM is composed of the following steps:

- Drop and create the summary table. The DROP statement is executed only if the designer requires it for resetting the summary table. The CREATE statement is always executed but the error is tolerated if the table already exists.
- Remove the summary records from the previous run from the summary table

- Drop and create the error table. The DROP statement is executed only if the designer requires it for recreating the error table. The CREATE statement is always executed but error is tolerated if the table already exists.
- Remove rejected records from the previous run from the error table
- Reject records that violate the primary key constraint.
- Reject records that violate any alternate key constraint
- Reject records that violate any foreign key constraint
- Reject records that violate any check condition constraint
- Reject records that violate any mandatory attribute constraint
- Remove rejected records from the checked table if required
- Insert the summary of detected errors in the summary table.

CKM commands should be tagged to indicate how the code should be generated. The tags can be:

- "Primary Key": The command defines the code needed to check the primary key constraint
- "Alternate Key": The command defines the code needed to check an alternate key constraint. During code generation, Oracle Data Integrator will use this command for every alternate key
- "Join": The command defines the code needed to check a foreign key constraint. During code generation, Oracle Data Integrator will use this command for every foreign key
- "Condition": The command defines the code needed to check a condition constraint. During code generation, Oracle Data Integrator will use this command for every check condition
- "Mandatory": The command defines the code needed to check a mandatory attribute constraint. During code generation, Oracle Data Integrator will use this command for mandatory attribute
- "Remove Errors": The command defines the code needed to remove the rejected records from the checked table.

Error Tables Structures

This section describes the typical structure of the Error and Summary Tables.

Error Table Structure

The E$ error table has the list of columns described in the following table:

Columns	Description
[Columns of the checked table]	The error table contains all the attributes of the checked datastore.
ERR_TYPE	Type of error: • 'F' when the datastore is checked during flow control • 'S' when the datastore is checked using static control
ERR_MESS	Error message related to the violated constraint

Columns	Description
CHECK_DATE	Date and time when the datastore was checked
ORIGIN	Origin of the check operation. This column is set either to the datastore name or to a mapping name and ID depending on how the check was performed.
CONS_NAME	Name of the violated constraint.
CONS_TYPE	Type of the constraint: • 'PK': Primary Key • 'AK': Alternate Key • 'FK': Foreign Key • 'CK': Check condition • 'NN': Mandatory attribute

Summary Table Structure

The SNP_CHECK table has the list of columns described in the following table:

Column	Description
ODI_CATALOG_NAME	Catalog name of the checked table, where applicable
ODI_SCHEMA_NAME	Schema name of the checked table, where applicable
ODI_RESOURCE_NAME	Resource name of the checked table
ODI_FULL_RES_NAME	Fully qualified name of the checked table. For example <catalog>.<schema>.<table>
ODI_ERR_TYPE	Type of error: • 'F' when the datastore is checked during flow control • 'S' when the datastore is checked using static control
ODI_ERR_MESS	Error message
ODI_CHECK_DATE	Date and time when the datastore was checked
ODI_ORIGIN	Origin of the check operation. This column is set either to the datastore name or to a mapping name and ID depending on how the check was performed.
ODI_CONS_NAME	Name of the violated constraint.
ODI_CONS_TYPE	Type of constraint: • 'PK': Primary Key • 'AK': Alternate Key • 'FK': Foreign Key • 'CK': Check condition • 'NN': Mandatory attribute (Not Null)
ODI_ERR_COUNT	Total number of records rejected by this constraint during the check process
ODI_SESS_NO	ODI session number
ODI_PK	Unique identifier for this table, where appicable

Case Studies

This section provides examples of data integrity check strategies.

Oracle CKM

The CKM Oracle is a typical example of a data integrity check.

The commands below are extracted from the CKM for Oracle and provided as examples. You can review the code of this knowledge module by editing it in Oracle Data Integrator Studio.

Drop Check Table

This task drops the error summary table. This command runs only if the DROP_CHECK_TABLE is set to Yes, and has the *Ignore Errors* flag activated. It will not stop the CKM if the summary table is not found.

Command on Target (Oracle)

```
drop table <%=odiRef.getTable("L","CHECK_NAME","W")%> <% if (new
Integer(odiRef.getOption( "COMPATIBLE" )).intValue() >= 10 )
{ out.print( "purge" ); }; %>
```

Create Check Table

This task creates the error summary table. This command always runs and has the *Ignore Errors* flag activated. It will not stop the CKM if the summary table already exist.

Command on Target (Oracle)

```
...
create table <%=odiRef.getTable("L","CHECK_NAME","W")%>
(
    CATALOG_NAME     <%=odiRef.getDataType("DEST_VARCHAR", "100", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%> ,
    SCHEMA_NAME     <%=odiRef.getDataType("DEST_VARCHAR", "100", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%> ,
    RESOURCE_NAME     <%=odiRef.getDataType("DEST_VARCHAR", "100", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    FULL_RES_NAME     <%=odiRef.getDataType("DEST_VARCHAR", "100", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    ERR_TYPE         <%=odiRef.getDataType("DEST_VARCHAR", "1", "")%> <
%=odiRef.getInfo("DEST_DDL_NULL")%>,
    ERR_MESS         <%=odiRef.getDataType("DEST_VARCHAR", "250", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%> ,
    CHECK_DATE     <%=odiRef.getDataType("DEST_DATE", "", "")%> <
%=odiRef.getInfo("DEST_DDL_NULL")%>,
    ORIGIN         <%=odiRef.getDataType("DEST_VARCHAR", "100", "")%> <
%=odiRef.getInfo("DEST_DDL_NULL")%>,
    CONS_NAME     <%=odiRef.getDataType("DEST_VARCHAR", "35", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    CONS_TYPE         <%=odiRef.getDataType("DEST_VARCHAR", "2", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    ERR_COUNT         <%=odiRef.getDataType("DEST_NUMERIC", "10", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>
```

```
)
...
```

Create Error Table

This task creates the error (E$) table. This command always runs and has the *Ignore Errors* flag activated. It will not stop the CKM if the error table already exist.

Note the use of the *getCollist* method to add the list of attributes from the checked datastore to this table structure.

Command on Target (Oracle)

```
...
create table <%=odiRef.getTable("L","ERR_NAME", "W")%>
(
    ODI_ROW_ID         UROWID,
    ODI_ERR_TYPE         <%=odiRef.getDataType("DEST_VARCHAR", "1", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    ODI_ERR_MESS         <%=odiRef.getDataType("DEST_VARCHAR", "250", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    ODI_CHECK_DATE     <%=odiRef.getDataType("DEST_DATE", "", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    <%=odiRef.getColList("", "[COL_NAME]\t[DEST_WRI_DT] " +
odiRef.getInfo("DEST_DDL_NULL"), ",\n\t", "", "")%>,
    ODI_ORIGIN         <%=odiRef.getDataType("DEST_VARCHAR", "100", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    ODI_CONS_NAME     <%=odiRef.getDataType("DEST_VARCHAR", "35", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    ODI_CONS_TYPE         <%=odiRef.getDataType("DEST_VARCHAR", "2", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    ODI_PK             <%=odiRef.getDataType("DEST_VARCHAR", "32", "")%> PRIMARY
KEY,    ODI_SESS_NO         <%=odiRef.getDataType("DEST_VARCHAR", "19", "")%>
)
...
```

Insert PK Errors

This task inserts into the error (E$) table the errors detected while checking a primary key. This command always runs, has the **Primary Key** check box active and has **Log Counter** set to *Error* to count these records as errors.

> **Note:**
>
> When using a CKM to perform flow control from a mapping, you can define the maximum number of errors allowed. This number is compared to the total number of records returned by every command in the CKM of which the **Log Counter** is set to *Error*.

Note the use of the *getCollist* method to insert into the error table the whole record being checked and the use of the *getPK* and *getInfo* method to retrieve contextual information.

Command on Target (Oracle)

```
insert into <%=odiRef.getTable("L","ERR_NAME", "W")%>
(
    ODI_PK,
    ODI_SESS_NO,
    ODI_ROW_ID,
    ODI_ERR_TYPE,
    ODI_ERR_MESS,
    ODI_ORIGIN,
    ODI_CHECK_DATE,
    ODI_CONS_NAME,
    ODI_CONS_TYPE,
    <%=odiRef.getColList("", "[COL_NAME]", ",\n\t", "", "MAP")%>
)
select    SYS_GUID(),
    <%=odiRef.getSession("SESS_NO")%>,
    rowid,
    '<%=odiRef.getInfo("CT_ERR_TYPE")%>',
    '<%=odiRef.getPK("MESS")%>',
    '<%=odiRef.getInfo("CT_ORIGIN")%>',
    <%=odiRef.getInfo("DEST_DATE_FCT")%>,
    '<%=odiRef.getPK("KEY_NAME")%>',
    'PK',
    <%=odiRef.getColList("", odiRef.getTargetTable("TABLE_ALIAS")+".[COL_NAME]", ",\n
\t", "", "MAP")%>
from     <%=odiRef.getTable("L", "CT_NAME", "A")%> <
%=odiRef.getTargetTable("TABLE_ALIAS")%>
where     exists  (
        select     <%=odiRef.getColList("", "SUB.[COL_NAME]", ",\n\t\t\t", "", "PK")
%>
        from     <%=odiRef.getTable("L","CT_NAME","A")%> SUB
        where     <%=odiRef.getColList("", "SUB.
[COL_NAME]="+odiRef.getTargetTable("TABLE_ALIAS")+".[COL_NAME]", "\n\t\t\tand ", "",
"PK")%>
        group by     <%=odiRef.getColList("", "SUB.[COL_NAME]", ",\n\t\t\t", "",
"PK")%>        having     count(1) > 1
        )
<%=odiRef.getFilter()%>
```

Delete Errors from Controlled Table

This task removed from the controlled table (static control) or integration table (flow control) the rows detected as erroneous.

This task is always executed and has the **Remove Errors** option selected.

Command on Target (Oracle)

```
delete from    <%=odiRef.getTable("L", "CT_NAME", "A")%>  T
where     exists     (
        select     1
        from     <%=odiRef.getTable("L","ERR_NAME", "W")%> E
        where ODI_SESS_NO = <%=odiRef.getSession("SESS_NO")%>
        and T.rowid = E.ODI_ROW_ID
        )
```

Dynamically Create Non-Existing References

The following use case describes an example of customization that can be performed on top of an existing CKM.

Use Case

When loading a data warehouse, you may have records referencing data from other tables, but the referenced records do not yet exist.

Suppose, for example, that you receive daily sales transactions records that reference product SKUs. When a product does not exist in the products table, the default behavior of the standard CKM is to reject the sales transaction record into the error table instead of loading it into the data warehouse. However, to meet the requirements of your project you want to load this sales record into the data warehouse and create an empty product on the fly to ensure data consistency. The data analysts would then simply analyze the error tables and complete the missing information for products that were automatically added to the products table.

The following sequence illustrates this example:

1. The source flow data is staged by the IKM in the "I$_SALES" table to load the SALES table. The IKM calls the CKM to have it check the data quality.
2. The CKM checks every constraint including the FK_SALES_PRODUCTS foreign key defined between the target SALES table and the PRODUCTS Table. It rejects record with SALES_ID='4' in the error table as referenced product with PRODUCT_ID="P25" doesn't exist in the products table.
3. The CKM automatically inserts the missing "P25" product reference in the products table and assigns an '<*unknown*>' value to the PRODUCT_NAME. All other attributes are set to null or default values.
4. The CKM does not remove the rejected record from the source flow I$ table, as it became consistent
5. The IKM writes the flow data to the target

In the sequence above, steps 3 and 4 differ from the standard CKM and need to be customized.

Discussion

To implement such a CKM, you will notice that some information is missing in the Oracle Data Integrator default metadata. We would need the following:

- A new flexfield called REF_TAB_DEF_COL on the Reference object containing the attribute of the referenced table that must be populated with the *'<unknown>'* value (PRODUCT_NAME, in our case)
- A new column (ODI_AUTO_CREATE_REFS) in the error table to indicate whether an FK error needs to automatically create the missing reference or not. This flag will be populated while detecting the FK errors.
- A new flexfields ca lled AUTO_CREATE_REFS on the "Reference" object, that will state whether a constraint should automatically cause missing references creation. See the *Developer's Guide for Oracle Data Integrator* for more information about Flex Fields.

Now that we have all the required metadata, we can start enhancing the default CKM to meet our requirements. The steps of the CKM will therefore be (changes are highlighted in bold font):

- Drop and create the summary table.
- Remove the summary records of the previous run from the summary table
- Drop and create the error table. **Add the extra ODI_AUTO_CREATE_REFS column to the error table.**
- Remove rejected records from the previous run from the error table
- Reject records that violate the primary key constraint.
- Reject records that violate each alternate key constraint
- Reject records that violate each foreign key constraint, **and store the value of the AUTO_CREATE_REFS flexfield in the ODI_AUTO_CREATE_REFS column.**
- **For every foreign key error detected, if the ODI_AUTO_CREATE_REFS is set to "yes", insert missing references in the referenced table**.
- Reject records that violate each check condition constraint
- Reject records that violate each mandatory attribute constraint
- Remove rejected records from the checked table if required. **Do not remove records for which the constraint behavior is set to Yes**
- Insert the summary of detected errors in the summary table.

Implementation Details

The following command modifications are performed to implement the required changes to the CKM. The changes are highlighted in bold in the code.

Create Errors Table

The task is modified to create the new *ODI_AUTO_CREATE_REFS* column into the error table.

Command on Target (Oracle)

```
...
create table <%=odiRef.getTable("L","ERR_NAME", "W")%>
(
ODI_AUTO_CREATE_REFS <%=odiRef.getDataType("DEST_VARCHAR", "3", "")%>
ODI_ROW_ID         UROWID,
    ODI_ERR_TYPE         <%=odiRef.getDataType("DEST_VARCHAR", "1", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    ODI_ERR_MESS         <%=odiRef.getDataType("DEST_VARCHAR", "250", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    ODI_CHECK_DATE     <%=odiRef.getDataType("DEST_DATE", "", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    <%=odiRef.getColList("", "[COL_NAME]\t[DEST_WRI_DT] " +
odiRef.getInfo("DEST_DDL_NULL"), ",\n\t", "", "")%>,
    ODI_ORIGIN         <%=odiRef.getDataType("DEST_VARCHAR", "100", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    ODI_CONS_NAME     <%=odiRef.getDataType("DEST_VARCHAR", "35", "")%>
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    ODI_CONS_TYPE         <%=odiRef.getDataType("DEST_VARCHAR", "2", "")%>
```

```
<%=odiRef.getInfo("DEST_DDL_NULL")%>,
    ODI_PK             <%=odiRef.getDataType("DEST_VARCHAR", "32", "")%> PRIMARY KEY,
    ODI_SESS_NO         <%=odiRef.getDataType("DEST_VARCHAR", "19", "")%>
)
...
```

Insert FK Errors

The task is modified to take into account the new *ODI_AUTO_CREATE_REFS* column and load it with the content of the flexfield defined on the FK to indicate whether this constraint should automatically create missing references. Note the use of the *getFK* method to retrieve the value of the *AUTO_CREATE_REFS* flexfield.

Command on Target (Oracle)

```
...
insert into <%=odiRef.getTable("L","ERR_NAME", "W")%>
(
ODI_AUTO_CREATE_REFS,
ODI_PK,
    ODI_SESS_NO,
    ODI_ROW_ID,
    ODI_ERR_TYPE,
    ODI_ERR_MESS,
    ODI_CHECK_DATE,
    ODI_ORIGIN,
    ODI_CONS_NAME,
    ODI_CONS_TYPE,
    <%=odiRef.getColList("", "[COL_NAME]", ",\n\t", "", "MAP")%>
)
select
'<%=odiRef.getFK("AUTO_CREATE_REFS")%>',
SYS_GUID(),
    <%=odiRef.getSession("SESS_NO")%>,
    rowid,
...
```

Insert Missing References

The new task is added after the *insert FK errors* task. It has the **Join** option checked.

Note the following:

- The *getFK("AUTO_CREATE_FS")* method is used to retrieve the AUTO_CREATE_FS flexfield value that conditions the generation of the SQL statement.
- The *getFK("REF_TAB_DEF_COL")* method is used to retrieve from the flexfield the name of the attribute to set to *'<undefined>'*.
- The *getFKColList* method is used to retrieve the list of attribute participating to the foreign key and create the missing reference primary key attributes content.
- The filter made to retrieve only the records corresponding to the current checked foreign key constraint with the AUTO_CREATE_REFS flag set to Yes.

Command on Target (Oracle)

```
<% if (odiRef.getFK("AUTO_CREATE_REFS").equals("Yes")) { %>

insert into <%=odiRef.getTable("L", "FK_PK_TABLE_NAME", "A")%>
(
<%=odiRef.getFKColList("", "[PK_COL_NAME]", ",", "")%>,
<%=odiRef.getFK("REF_TAB_DEF_COL")%>
)

select distinct
<%=odiRef.getFKColList("", "[COL_NAME]", ",", "")%>,
'<UNKNOWN>'
from <%=odiRef.getTable("L","ERR_NAME", "A")%>
where
CONS_NAME = '<%=odiRef.getFK("FK_NAME")%>'
And CONS_TYPE = 'FK'
And ORIGIN = '<%=odiRef.getInfo("CT_ORIGIN")%>'
And AUTO_CREATE_REFS = 'Yes'
<%}%>
```

Delete Errors from Controlled Table

This task is modified to avoid deleting the foreign key records for which a reference have been created. These can remain in the controlled table.

Command on Target (Oracle)

```
delete from    <%=odiRef.getTable("L", "CT_NAME", "A")%>  T
where     exists     (
        select     1
        from     <%=odiRef.getTable("L","ERR_NAME", "W")%> E
        where ODI_SESS_NO = <%=odiRef.getSession("SESS_NO")%>
        and T.rowid = E.ODI_ROW_ID
and E.AUTO_CREATE_REFS <> 'Yes'
)
```

6

Loading Strategies

Loading strategies are used for loading data into the staging area. These strategies are implemented in the Loading Knowledge Modules.
This chapter includes the following sections:

- Loading Process
- Case Studies

Loading Process

A loading process is required when source data needs to be loaded into the staging area. This loading is needed when some transformation take place in the staging area and the source schema is not located in the same server as the staging area. The staging area is the target of the loading phase.

Loading Process Overview

A typical loading process works in the following way:

1. A temporary *loading table* is dropped (if it exists) and then created in the staging area.
2. Data is loaded from the source into this loading table using a *loading method*.

   Action 1 and 2 are repeated for all the source data that needs to be moved to the staging area.

   The data is used in the integration phase to load the integration table.
3. After the integration phase, before the mapping completes, the temporary loading table is dropped.

Loading Table Structure

The loading process creates in the staging area a loading table. This loading table is typically prefixed with a `C$`.

A loading table represents a *execution unit* and not a *source datastore.* There is no direct mapping between the source datastore and the loading table. Execution units appear in the physical diagram of the mapping editor.

The following cases illustrate the notion of execution unit:

- If a source CUSTOMER table has only 2 attributes CUST_NAME, CUST_ID used in mapping and joins on the staging area, then the loading table will only contain an image of these two attributes. Attributes not needed for the rest of the integration flow do not appear in the loading table.
- If a CUSTOMER table is filtered on CUST_AGE on the source, and CUST_AGE is not used afterward, then the loading table will not include CUST_AGE. The

loading process will process the filter in the source data server, and the loading table will contain the filtered records.

- If two tables CUSTOMER and SALES_REPS are combined using a join on the source and the resulting execution unit is used in transformations taking place in the staging area, the loading table will contain the combined attributes from CUSTOMER and SALES_REPS.
- If **all** the attributes of a source datastore are mapped and this datastore is not joined on the source, then the execution unit is the whole source datastore. In that case, the loading table is the exact image of the source datastore. This is the case for source technologies with no transformation capabilities such as File.

Loading Method

The loading method is the key to optimal performance when loading data from a source to the staging area. There are several loading methods, which can be grouped in the following categories:

- Loading Using the Agent
- Loading File Using Loaders
- Loading Using Unload/Load
- Loading Using RDBMS-Specific Strategies

Loading Using the Agent

The run-time agent can read a result set using JDBC on a source server and write this result set using JDBC to the loading table in the staging area. To use this method, the knowledge module needs to include a command with a SELECT on the source with a corresponding INSERT on the target.

This method may not be suited for large volumes as data is read row-by-row in arrays, using the array fetch feature, and written row-by-row, using the batch update feature.

Loading File Using Loaders

When the mapping contains a flat file as a source, you may want to use a strategy that leverages the most efficient loading utility available for the staging area technology, rather than the standard LKM File to SQL that uses the ODI built-in driver for files. Most RDBMSs have fast loading utilities to load flat files into tables, such as Oracle's SQL*Loader, Microsoft SQL Server bcp, Teradata FastLoad or MultiLoad.

Such LKM will load the source file into the staging area, and all transformations will take place in the staging area afterward.

A typical LKM using a loading utility will include the following sequence of steps:

1. Drop and create the loading table in the staging area
2. Generate the script required by the loading utility to load the file to the loading table.
3. Execute the appropriate operating system command to start the load and check its return code.
4. Possibly analyze any log files produced by the utility for error handling.

5. Drop the loading table once the integration phase has completed.

Loading Using Unload/Load

When the source result set is on a remote database server, an alternate solution to using the agent to transfer the data is to unload it to a file and then load that file into the staging area.

This is usually the most efficient method when dealing with large volumes across heterogeneous technologies. For example, you can unload data from a Microsoft SQL Server source using bcp and load this data into an Oracle staging area using SQL*Loader.

The steps of LKMs that follow this strategy are often as follows:

1. Drop and create the loading table in the staging area
2. Unload the data from the source to a temporary flat file using either a source database unload utility (such as Microsoft SQL Server bcp or DB2 unload) or the built-in OdiSqlUnload tool.
3. Generate the script required by the loading utility to load the temporary file to the loading table.
4. Execute the appropriate operating system command to start the load and check its return code.
5. Possibly analyze any log files produced by the utility for error handling.
6. Drop the loading table once the integration KM has terminated, and drop the temporary file.

When using an unload/load strategy, data needs to be staged twice: once in the temporary file and a second time in the loading table, resulting in extra disk space usage and potential efficiency issues. A more efficient alternative would be to use pipelines between the "unload" and the "load" utility. Unfortunately, not all the operating systems support file-based pipelines (FIFOs).

Loading Using RDBMS-Specific Strategies

Certain RDBMSs have a mechanism for transferring data across servers. For example:

- Oracle: database links
- Microsoft SQL Server: linked servers
- IBM DB2 400: DRDA file transfer

Other databases implement specific mechanisms for loading files into a table, such as Oracle's External Table feature.

These loading strategies are implemented into specific KM that create the appropriate objects (views, dblinks, etc.) and implement the appropriate commands for using these features.

Case Studies

This section provides example of loading strategies.

LKM SQL to SQL

The LKM SQL to SQL is a typical example of the loading phase using the agent.

The commands below are extracted from this KM and are provided as examples. You can review the code of this knowledge module by editing it in Oracle Data Integrator Studio.

Drop Work Table

This task drops the loading table. This command is always executed and has the *Ignore Errors* flag activated. It will not stop the LKM if the loading table is not found.

Command on Target

```
drop table <%=snpRef.getTable("L", "COLL_NAME", "A")%>
```

Create Work Table

This task drops the loading table. This command is always executed.

Note the use of the property *COLL_NAME* of the *getTable* method that returns the name of the loading table.

Command on Target

```
create table <%=snpRef.getTable("L", "COLL_NAME", "A")%>(    <
%=snpRef.getColList("", "[CX_COL_NAME]\t[DEST_WRI_DT] " +
snpRef.getInfo("DEST_DDL_NULL"), ",\n\t", "","")%>)
```

Load Data

This task reads data on the source connection and loads it into the loading table. This command is always executed.

> **Note:**
>
> The loading phase is always using auto commit, as ODI temporary tables do not contain unrecoverable data.

Command on Source

Note the use of the *getFilter*, *getJoin*, *getFrom*, etc. methods. These methods are shortcuts that return contextual expressions. For example, *getFilter* returns all the filter expressions executed on the source. Note also the use of the *EXPRESSION* property of *getColList*, that will return the source attributes and the expressions executed on the source. These expressions and source attributes are aliases after *CX_COL_NAME*, which is the name of their corresponding attribute in the loading table.

This select statement will cause the correct transformation (mappings, joins, filters, etc.) to be executed by the source engine.

```
select    <%=snpRef.getPop("DISTINCT_ROWS")%>    <%=snpRef.getColList("",
"[EXPRESSION]\t[ALIAS_SEP] [CX_COL_NAME]", ",\n\t", "", "")%>from    <
%=snpRef.getFrom()%>where    (1=1)<%=snpRef.getFilter()%><%=snpRef.getJrnFilter()%><
%=snpRef.getJoin()%><%=snpRef.getGrpBy()%><%=snpRef.getHaving()%>
```

Command on Target

Note here the use of the binding using `:[CX_COL_NAME]`. The *CX_COL_NAME* binded value will match the alias on the source attribute.

```
insert into <%=snpRef.getTable("L", "COLL_NAME", "A")%>(    <%=snpRef.getColList("",
"[CX_COL_NAME]", ",\n\t", "","")%>)values(    <%=snpRef.getColList("", ":
[CX_COL_NAME]", ",\n\t", "","")%>)
```

Drop Work Table

This task drops the loading table. This command is executed if the DELETE_TEMPORARY_OBJECTS knowledge module option is selected. This option will allow to preserve the loading table for debugging.

Command on Target

```
drop table <%=snpRef.getTable("L", "COLL_NAME", "A")%>
```

7

Integration Strategies

Integration strategies define the steps required in the integration process. These strategies are implemented in the Integration Knowledge Modules.
This chapter includes the following sections:

- Integration Process
- Case Studies

Integration Process

An integration process is always needed in a mapping. This process integrates data from the source or loading tables into the target datastore, using a temporary integration table.

An integration process uses an integration strategy which defines the steps required in the integration process. Example of integration strategies are:

- *Append*: Optionally delete all records in the target datastore and insert all the flow into the target.
- *Control Append*: Optionally delete all records in the target datastore and insert all the flow into the target. This strategy includes an optional flow control.
- *Incremental Update*: Optionally delete all records in the target datastore. Identify new and existing records by comparing the flow with the target, then insert new records and update existing records in the target. This strategy includes an optional flow control.
- *Slowly Changing Dimension*: Implement a Type 2 Slowly Changing Dimension, identifying fields that require a simple update in the target record when change, fields that require to historize the previous record state.

This phase may involve one single server, when the staging area and the target are located in the same data server, on two servers when the staging area and target are on different servers.

Integration Process Overview

The integration process depends strongly on the strategy being used.

The following elements are used in the integration process:

- An *integration table* (also known as the *flow table*) is sometimes needed to stage data after all staging area transformations are made. This loading table is named after the target table, prefixed with I$. This integration table is the image of the target table with extra fields required for the strategy to be implemented. The data in this table is flagged, transformed or checked before being integrated into the target table.

- The source and/or loading tables (created by the LKM). The integration process loads data from these tables into the integration table or directly into the target tables.
- Check Knowledge Module. The IKM may initiate a flow check phase to check the data in the integration table against some of the constraints of the target table. Invalid data is removed from the integration table (*removed from the flow*).
- *Mapping metadata*, such as Insert, Update, UD1, etc., or *model metadata* such as the Slowly Changing Dimension behavior are used at integration phase to parameterize attribute-level behavior in the integration strategies.

A typical integration process works in the following way:

1. Create a temporary integration table if needed. For example, an update flag taking value I or U to identify which of the rows are to be inserted or updated.
2. Load data from the source and loading tables into this integration table, executing those of the transformations (joins, filters, mapping) specified on the staging area.
3. Perform some transformation on the integration table to implement the integration strategy. For example, compare the content of the integration table with the target table to set the update flag.
4. Modify the content Load data from the integration table into the target table.

Integration Strategies

The following sections explain some of the integration strategies used in Oracle Data Integrator. They are grouped into two families:

- Strategies with Staging Area on the Target
- Strategies with the Staging Area Different from the Target.

Strategies with Staging Area on the Target

These strategies are used when the staging area schema is located in the same data server as the target table schema. In this configuration, complex integration strategies can take place

Append

This strategy simply inserts the incoming data flow into the target datastore, possibly deleting the content of the target beforehand.

This integration strategy includes the following steps:

1. Delete (or truncate) all records from the target table. This step usually depends on a KM option.
2. Transform and insert data from sources located on the same server and from loading tables in the staging area. When dealing with remote source data, LKMs will have already prepared loading tables. Sources on the same server can be read directly. The integration operation will be a direct INSERT/SELECT statement leveraging containing all the transformations performed on the staging area in the SELECT clause and on all the transformation on the target in the INSERT clause.

3. Commit the Transaction. The operations performed on the target should be done within a transaction and committed after they are all complete. Note that committing is typically triggered by a KM option called *COMMIT*.

The same integration strategy can be obtained by using the *Control Append* strategy and not choosing to activate flow control.

Control Append

In the Append strategy, flow data is simply inserted in the target table without any flow control. This approach can be improved by adding extra steps that will store the flow data in an integration table ("I$"), then call the CKM to isolate erroneous records in the error table ("E$").

This integration strategy includes the following steps:

1. Drop (if it exists) and create the integration table in the staging area. This is created with the same attributes as the target table so that it can be passed to the CKM for flow control.
2. Insert data in the loading table from the sources and loading tables using a single INSERT/SELECT statement similar to the one loading the target in the append strategy.
3. Call the CKM for flow control. The CKM will evaluate every constraint defined for the target table on the integration table data. It will create an error table and insert the erroneous records into this table. It will also remove erroneous records from the integration table.

   After the CKM completes, the integration table will only contain valid records. Inserting them in the target table can then be done safely.
4. Remove all records from the target table. This step can be made dependent on an option value set by the designer of the mapping.
5. Append the records from the integration table to the target table in a single INSERT/SELECT statement.
6. Commit the transaction.
7. Drop the temporary integration table.

Error Recycling

In some cases, it is useful to recycle errors from previous runs so that they are added to the flow and applied again to the target. This method can be useful for example when receiving daily sales transactions that reference product IDs that may not exist. Suppose that a sales record is rejected in the error table because the referenced product ID does not exist in the product table. This happens during the first run of the mapping. In the meantime the missing product ID is created by the data administrator. Therefore the rejected record becomes valid and should be re-applied to the target during the next execution of the mapping.

This mechanism implements IKMs by an extra task that inserts all the rejected records of the previous executions of this mapping from the error table into integration table. This operation is made prior to calling the CKM to check the data quality, and is conditioned by a KM option usually called *RECYCLE_ERRORS*.

Incremental Update

The Incremental Update strategy is used to integrate data in the target table by comparing the records of the flow with existing records in the target according to a set of attributes called the "update key". Records that have the same update key are updated when their associated data is not the same. Those that don't yet exist in the target are inserted. This strategy is often used for dimension tables when there is no need to keep track of the records that have changed.

The challenge with such IKMs is to use set-oriented SQL based programming to perform all operations rather than using a row-by-row approach that often leads to performance issues. The most common method to build such strategies often relies on the integration table ("I$") which stores the transformed execution units. This method is described below:

1. Drop (if it exists) and create the integration table in the staging area. This is created with the same attributes as the target table so that it can be passed to the CKM for flow control. It also contains an `IND_UPDATE` attribute that is used to flag the records that should be inserted ("I") and those that should be updated ("U").
2. Transform and insert data in the loading table from the sources and loading tables using a single INSERT/SELECT statement. The `IND_UPDATE` attribute is set by default to "I".
3. Recycle the rejected records from the previous run to the integration table if the *RECYCLE_ERROR KM* option is selected.
4. Call the CKM for flow control. The CKM will evaluate every constraint defined for the target table on the integration table data. It will create an error table and insert the erroneous records into this table. It will also remove erroneous records from the integration table.
5. Update the integration table to set the `IND_UPDATE` flag to "U" for all the records that have the same update key values as the target ones. Therefore, records that already exist in the target will have a "U" flag. This step is usually an UPDATE/SELECT statement.
6. Update the integration table again to set the `IND_UPDATE` attribute to "N" for all records that are already flagged as "U" and for which the attribute values are exactly the same as the target ones. As these flow records match exactly the target records, they don't need to be used to update the target data.

   After this step, the integration table is ready for applying the changes to the target as it contains records that are flagged:

   - "I": these records should be inserted into the target.
   - "U": these records should be used to update the target.
   - "N": these records already exist in the target and should be ignored.
7. Update the target with records from the integration table that are flagged "U". Note that the update statement is typically executed prior to the INSERT statement to minimize the volume of data manipulated.
8. Insert records in the integration table that are flagged "I" into the target.
9. Commit the transaction.
10. Drop the temporary integration table.

Optimization

This approach can be optimized depending on the underlying database. The following examples illustrate such optimizations:

- With Teradata, it may be more efficient to use a left outer join between the flow data and the target table to populate the integration table with the `IND_UPDATE` attribute already set properly.
- With Oracle, it may be more efficient in some cases to use a MERGE INTO statement on the target table instead of an UPDATE then INSERT.

Update Key

The update key should always be unique. In most cases, the primary key will be used as an update key. The primary key cannot be used, however, when it is automatically calculated using an increment such as an identity attribute, a rank function, or a sequence. In this case an update key based on attributes present in the source must be used.

Comparing Nulls

When comparing data values to determine what should not be updated, the join between the integration table and the target table is expressed on each attribute as follows:

<target_table>.AttributeN = <loading_table>.AttributeN or (<target_table> is null and <loading_table>.AttributeN is null)

This is done to allow comparison between null values, so that a null value matches another null value. A more elegant way of writing it would be to use the coalesce function. Therefore the WHERE predicate could be written this way:

<%=odiRef.getColList("","coalesce(" + odiRef.getTable("L", "INT_NAME", "A") + ".[COL_NAME], 0) = coalesce(T.[COL_NAME], 0)", " \nand\t", "", "((UPD and !TRG) and !UK) ")%>

Attribute-Level Insert/Update Behavior

Attributes updated by the UPDATE statement are not the same as the ones used in the INSERT statement. The UPDATE statement uses selector "UPD and not UK" to filter only those attributes mappings that are marked as "Update" in the mapping and that do not belong to the update key. The INSERT statement uses selector "INS" to retrieve the attribute mappings that are marked as "insert" in the mapping.

Transaction

It is important that the UPDATE and the INSERT statements on the target belong to the same transaction. Should any of them fail, no data will be inserted or updated in the target.

Slowly Changing Dimensions

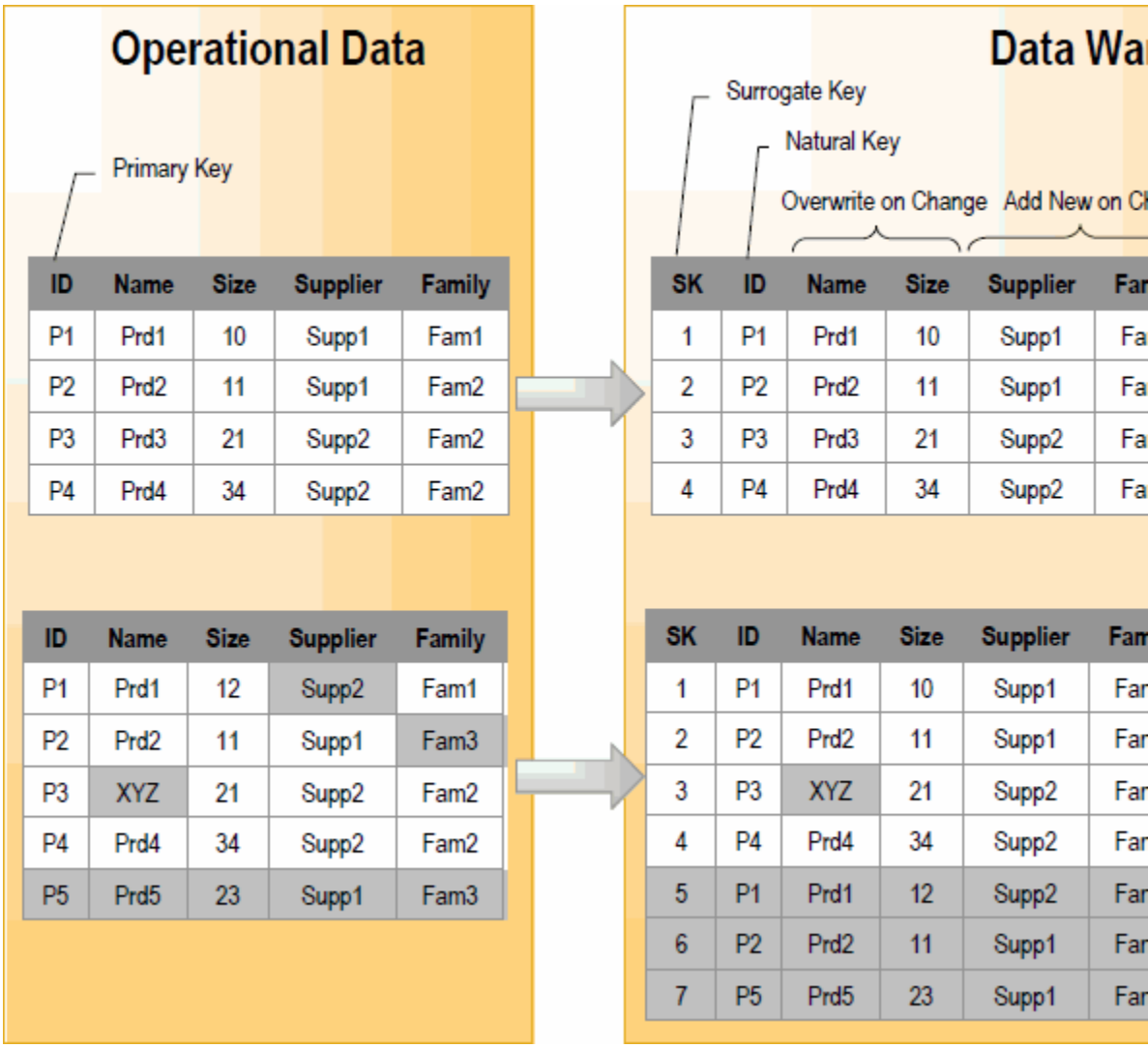
Type 2 Slowly Changing Dimension (SCD) is a strategy used for loading data warehouses. It is often used for loading dimension tables, in order to keep track of changes on specific attributes. A typical slowly changing dimension table would contain the flowing attributes:

- A *surrogate key*. This is usually a numeric attribute containing an automatically-generated number (using an identity attribute, a rank function or a sequence).
- A *natural key*. This is the list of attributes that represent the primary key of the operational system.
- Attributes that one must *overwrite on change*.
- Attributes that require to *add row on change*.
- A *starting timestamp* attribute indicating when the record was created in the data warehouse
- An *ending timestamp* attribute indicating when the record became obsolete (closing date)
- A *current record flag* indicating whether the record is the actual one (1) or an old one (0)

The following example illustrate the Slowly Changing Dimension behavior.

In the operational system, a product is defined by its ID that acts as a primary key. Every product has a name, a size, a supplier and a family. In the Data Warehouse a new version of this product is stored whenever the supplier or the family is updated in the operational system.

Figure 7-1 Type 2 Slow Changing Dimensions Example



In this example, the product dimension is first initialized in the Data Warehouse on March 12, 2006. All the records are inserted and are assigned a calculated surrogate key as well as a fake ending date set to January 1, 2400. As these records represent the current state of the operational system, their current record flag is set to 1. After the first load, the following changes happen in the operational system:

1. The supplier is updated for product P1
2. The family is updated for product P2
3. The name is updated for product P3
4. Product P5 is added

These updates have the following impact on the data warehouse dimension:

- The update of the supplier of P1 is translated into the creation of a new current record (Surrogate Key 5) and the closing of the previous record (Surrogate Key 1)

- The update of the family of P2 is translated into the creation of a new current record (Surrogate Key 6) and the closing of the previous record (Surrogate Key 2)
- The update of the name of P3 simply updates the target record with Surrogate Key 3
- The new product P5 is translated into the creation of a new current record (Surrogate Key 7).

To create a Knowledge Module that implements this behavior, it is necessary to know which attributes act as a surrogate key, a natural key, a start date etc. Oracle Data Integrator stores this information in **Slowly Changing Dimension Behavior** field in the **Description** tab for every attribute in the model.

When populating such a datastore in a mapping, the IKM has access to this metadata using the *SCD_xx* selectors on the *getColList()* substitution method.

The way Oracle Data Integrator implements Type 2 Slowly Changing Dimensions is described below:

1. Drop (if it exists) and create the integration table in the staging area.
2. Insert the flow data in the integration table using only mappings that apply to the *natural key*, *overwrite on change* and *add row on change* attributes. Set the *starting timestamp* to the current date and the *ending timestamp* to a constant.
3. Recycle previous rejected records
4. Call the CKM to perform a data quality check on the flow
5. Flag the records in the integration table to 'U' when the *natural key* and the *add row on change* columns have not changed compared to the current records of the target.
6. Update the target with the columns flagged *overwrite on change* by using the integration table content filtered on the 'U' flag.
7. Close old records - those for which the natural key exists in the integration table, and set their *current record flag* to 0 and their *ending timestamp* to the current date
8. Insert the new changing records with their *current record flag* set to 1
9. Drop the integration table.

Again, this approach can be adapted. There may be some cases where the SQL produced requires further tuning and optimization.

Strategies with the Staging Area Different from the Target

These strategies are used when the staging area cannot be located on the same data server as the target datastore. This configuration is mainly used for data servers with no transformation capabilities (Files, for example). In this configuration, only simple integration strategies are possible

File to Server Append

There are some cases when the source is a single file that can be loaded directly into the target table using the most efficient method. By default, Oracle Data Integrator suggests to locate the staging area on the target server, use a LKM to stage the source file in a loading table and then use an IKM to integrate the loaded data to the target table.

If the source data is not transformed, the loading phase is not necessary.

In this situation you would use an IKM that directly loads the file data to the target: This requires setting the staging area on the source file logical schema. By doing this, Oracle Data Integrator will automatically suggest to use a "Multi-Connection" IKM that moves data between a remote staging area and the target.

Such an IKM would use a loader, and include the following steps:

1. Generate the appropriate load utility script
2. Run the loader utility

An example of such KM is the IKM File to Teradata (TTU).

Server to Server Append

When using a staging area different from the target and when setting this staging area to an RDBMS, it is possible to use an IKM that moves the transformed data from the staging area to the remote target. This type of IKM is similar to a LKM and follows the same rules.

The steps when using the agent are usually:

1. Delete (or truncate) all records from the target table. This step usually depends on a KM option.
2. Insert the data from the staging area to the target. This step has a SELECT statement in the "Command on Source" tab that will be executed on the staging area. The INSERT statement is written using bind variables in the "Command on Target" tab and will be executed for every batch on the target table.

   The IKM SQL to SQL Append is a typical example of such KM.

   Variation of this strategy use loaders or database specific methods for loading data from the staging area to the target instead of the agent.

Server to File or JMS Append

When the target datastore is a file or JMS queue or topic the staging area is set on a different location than the target. Therefore, if you want to target a file or queue datastore you will have to use a "Multi-Connection" IKM that will integrate the transformed data from your staging area to this target. The method to perform this data movement depends on the target technology. For example, it is possible to use the agent or specific features of the target (such as a Java API)

Typical steps of such an IKM will include:

- Reset the target file or queue made dependent on an option
- Unload the data from the staging area to the file or queue

Case Studies

This section provides example of integration strategies and customizations.

Simple Replace or Append

The simplest strategy for integrating data in an existing target table, provided that all source data is already in the staging area is to replace and insert the records in the target. Therefore, the simplest IKM would be composed of 2 steps:

- Remove all records from the target table. This step can be made dependent on an option set by the designer of the mapping.
- Transform and insert source records from all data sets. When dealing with remote source data, LKMs will have already prepared loading tables with pre-transformed result sets. If the mapping uses source data sets on the same server as the target (and the staging area as well), they will be joined to the other loading tables. Therefore the integration operation will be a straight INSERT/SELECT statement leveraging all the transformation power of the target Teradata box.

The following example gives you the details of these steps:

Delete Target Table

This task deletes the data from the target table. This command runs in a transaction and is not committed. It is executed if the DELETE_ALL Knowledge Module option is selected.

Command on Target

```
delete from <%=odiRef.getTable("L","INT_NAME","A")%>
```

Insert New Rows

This task insert rows from the staging table into the target table. This command runs in the same transaction as all operations made on the target and is not committed. A final Commit transaction command triggers the commit on the target.

Note that this commands selects the data from the different data sets defined for the mapping. Using a for loop, it goes through all the data sets, generates for each data set a SELECT query. These queries are merged using set-based operations (UNION, INTERSECT, etc.) and the resulting data flow is inserted into the target table.

Command on Target

```
insert into    <%=odiRef.getTable("L","TARG_NAME","A")%> (     <
%=odiRef.getColList("", "[COL_NAME]", ",\n\t", "", "((INS and !TRG) and REW)")%>
<%=odiRef.getColList(",", "[COL_NAME]", ",\n\t", "", "((INS and TRG) and REW)")%> )
select    <%=odiRef.getColList("", "[COL_NAME]", ",\n\t", "", "((INS and !TRG) and
REW)")%>     <%=odiRef.getColList(",", "[EXPRESSION]", ",\n\t", "", "((INS and TRG)
and REW)")%> FROM (    <%for (int i=0; i < odiRef.getDataSetCount(); i++){%><
%=odiRef.getDataSet(i, "Operator")%>select     <%=odiRef.getPop("DISTINCT_ROWS")
%>    <%=odiRef.getColList(i,"", "[EXPRESSION] [COL_NAME]", ",\n\t", "", "((INS and !
TRG) and REW)")%> from    <%=odiRef.getFrom(i)%>where    <% if (odiRef.getDataSet(i,
"HAS_JRN").equals("1")) { %>    JRN_FLAG <> 'D    '<%} else {%>    (1=1)    <% } %><
%=odiRef.getJoin(i)%><%=odiRef.getFilter(i)%><%=odiRef.getJrnFilter(i)%><
%=odiRef.getGrpBy(i)%><%=odiRef.getHaving(i)%><%}%>)
```

Backup the Target Table Before Loading

A project requirements is to backup every data warehouse table prior to loading the current data. This can help restoring the data warehouse to its previous state in case of a major problem. The backup tables are called like the data table with a "_BCK" suffix.

A first solution to this requirement would be to develop mappings that would duplicate data from every target datastore to its corresponding backup one. These mappings would be triggered prior to the ones that would populate the data warehouse. Unfortunately, this solution would lead to significant development and maintenance effort as it requires the creation of an additional mapping for every target datastore. The number of mappings to develop and maintain would be at least doubled!

A simple solution would be to implement this behavior in the IKM used to populate the target datastores. This would be done using a single CREATE AS SELECT statement that creates and populates to the backup table right before modifying the target. Therefore, the backup operation becomes automatic and the developers would no longer need to worry about it.

This example shows how this behavior could be implemented in the IKM Oracle Incremental Update.

Before the Update Existing Rows and Insert New Rows tasks that modify the target, the following tasks are added.

Drop Backup Table

This task drops the backup table.

Command on Target

```
Drop table <%=odiRef.getTable("L","TARG_NAME","A")%>_BCK
```

Create Backup Table

This task creates and populates the backup table.

Command on Target

```
Create table <%=odiRef.getTable("L","TARG_NAME","A")%>_BCK asselect <
%=odiRef.getTargetColList("", "[COL_NAME]", ",", "")%>from <
%=odiRef.getTable("L","TARG_NAME","A")%>
```

Tracking Records for Regulatory Compliance

Some data warehousing projects could require keeping track of every insert or update operation done to target tables for regulatory compliance. This could help business analysts understand what happened to their data during a certain period of time.

Even if you can achieve this behavior by using the slowly changing dimension Knowledge Modules, it can also be done by simply creating a copy of the flow data before applying it to the target table.

Suppose that every target table has a corresponding tracking table with a "_RGG" suffix with all the data columns plus some additional regulatory compliance columns such as:

- The Job Id
- The Job Name
- Date and time of the operation
- The type of operation ("Insert" or "Update")

You would populate this table directly from the integration table after applying the inserts and updates to the target, and before the end of the IKM.

For example, in the case of the Oracle Incremental Update IKM, you would add the following tasks just after the Update Existing Rows and Insert New Rows tasks that modify the target.

Load Tracking Records

This task loads data in the tracking table.

Command on Target

```
insert into <%=odiRef.getTable("L","TARG_NAME","A")
%>_RGC(JOBID,JOBNAME,OPERATIONDATE,OPERATIONTYPE,<%=odiRef.getColList("",
"[COL_NAME]", ",\n\t", "")%>)select <%=odiRef.getSession("SESS_NO")%> /* JOBID */,<
%=odiRef.getSession("SESS_NAME")%> /* JOBNAME */,Current_timestamp /* OPERATIONDATE
*/,Case when IND_UPDATE = 'I' then 'Insert' else 'Update' end /* OPERATIONTYPE */,<
%=odiRef.getColList("", "[COL_NAME]", ",\n\t", "")%>from <
%=odiRef.getTable("L","INT_NAME","A")%>where IND_UPDATE <> 'N'
```

This customization could be extended of course by creating automatically the tracking table using the IKM if it does not exist yet.

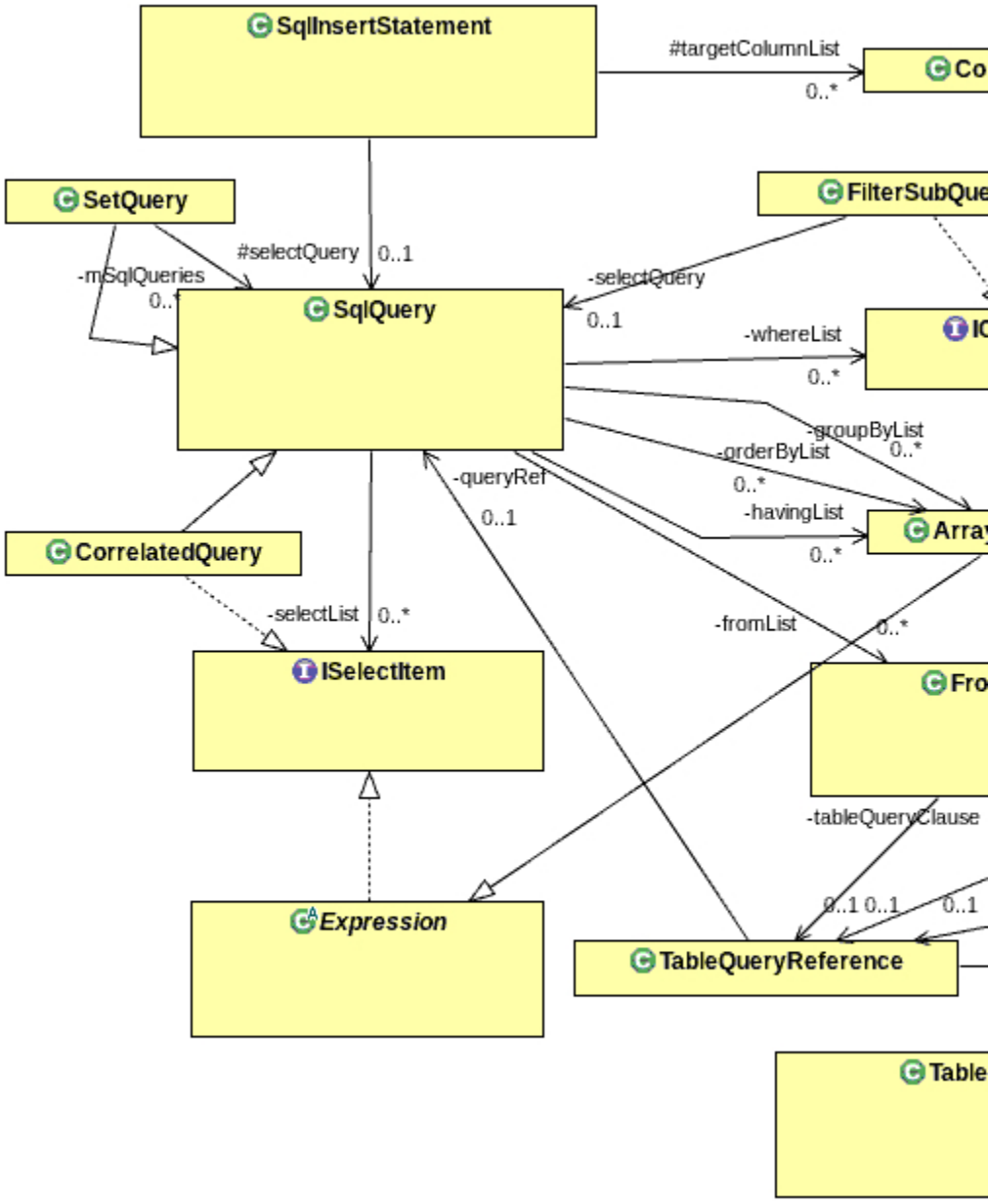
A

SQL Structured Substitution API Reference

You can review the commonly used structured substitution API calls and their details in this section.

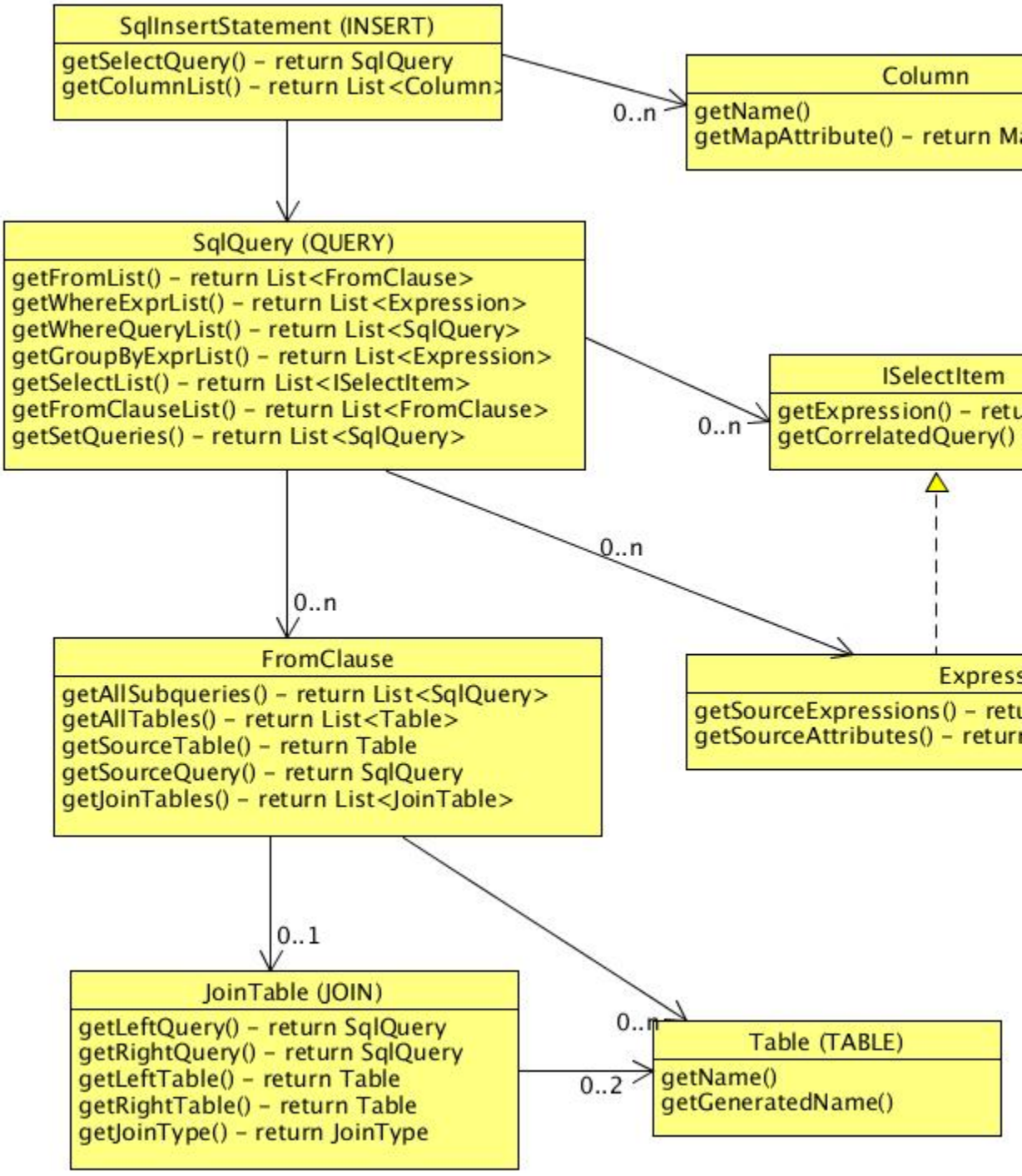
For a full reference for the structured substitution API, see *Java Substitution API Reference for Oracle Data Integrator*.

Figure A-1 SQL Structured Substitution API object UML Diagram



A simplified version of this drawing is as follows:

Figure A-2 Simplified Version of SQL Structured Substitution API object



Built-in variable names

The following built-in variables are used in the code examples:

- `INSERT (SqlInsertStatement)` — The top-level insert statement object produced by a target IKM.
- `QUERY (SqlQuery)` — The top-level source query used to extract the data to be loaded to the target or staging table.
- `ATTR (MapAttribute)`— The current source attribute that is in scope when processing the template (if any).
- `physicalNode (MapPhysicalNode)`— The physical mapping node that the KM is assigned to.
- `component (IMapComponent)` — The logical mapping component corresponding to the physical node that the KM is assigned to.

Commonly Used Method List

The commonly used method list includes the following:

- SqlInsertStatement.getColumnList()
- SqlInsertStatement.getQuery()
- SqlQuery.getSubqueries()
- SqlInsertStatement.getTargetTable()
- SqlQuery.getFromList()
- SqlQuery.getSelectList()
- FromClause.getJoinTable()
- FromClause.getSourceTables()
- FromClause.getTableQuery()
- ArrayExpression.getTemplate()
- ArrayExpression.getChildMap ()

SqlInsertStatement.getColumnList()

Usage

```
public List<Column>getColumnList()
```

Description

This method is used to get a list of the target column objects for the insert statement. Each column contains information about the name, datatype, and size of the target column. Also the query select item that is used to load this column can be determined.

Example 1

A test task is set up in an IKM that has IKM Oracle Insert as a base KM.

KM task-local groovy variable definition script:

```
def colList = INSERT.getColumnList()
colListStr = ''

for (Column col : colList) {
```

```
  if (colListStr.length() != 0) colListStr += ",\n"
  colListStr += col.getTable().getQualifier() + '.' +
col.getTable().getName()
  colListStr += " /* Will be loaded from " + (col.getSourceSelectItem()
== null ? "unknown" : col.getSourceSelectItem()) + " */"
}
```

KM target command text:

```
Generated column list string = $[colListStr]
```

Generated Code:

```
Generated column list string =
COMPKM_TEST_TGT_SCHEMA.Stock_Dim /* Will be loaded from
STOCK_SRC."Stock_Name" */,
COMPKM_TEST_TGT_SCHEMA.Stock_Dim /* Will be loaded from
STOCK_SRC."Stock_Symbol" */,
COMPKM_TEST_TGT_SCHEMA.Stock_Dim /* Will be loaded from
STOCK_SRC."Stock_Type" */,
COMPKM_TEST_TGT_SCHEMA.Stock_Dim /* Will be loaded from
STOCK_SRC."Industry_Type" */,
COMPKM_TEST_TGT_SCHEMA.Stock_Dim /* Will be loaded from
STOCK_SRC."SP_Rating" */,
COMPKM_TEST_TGT_SCHEMA.Stock_Dim /* Will be loaded from
STOCK_SRC."Company_Name" */,
COMPKM_TEST_TGT_SCHEMA.Stock_Dim /* Will be loaded from
STOCK_SRC."Registered_Address" */,
COMPKM_TEST_TGT_SCHEMA.Stock_Dim /* Will be loaded from
STOCK_SRC."Registered_City" */,
COMPKM_TEST_TGT_SCHEMA.Stock_Dim /* Will be loaded from
STOCK_SRC."Registered_State" */,
COMPKM_TEST_TGT_SCHEMA.Stock_Dim /* Will be loaded from
STOCK_SRC."Postal_Code" */,
COMPKM_TEST_TGT_SCHEMA.Stock_Dim /* Will be loaded from
STOCK_SRC."Registered_County" */,
COMPKM_TEST_TGT_SCHEMA.Stock_Dim /* Will be loaded from
STOCK_SRC."FaceValue" */
```

Example 2:

To set up for the example, a new Flex Field object is set up for “Attribute” objects in the Security navigator under the “Objects” accordion. The new Flex Field is called “ATTR_SUFFIX”. Also the source datastore model has a non-default value set for 3 of its attributes. The values are “_KEY1”, “_KEY2”, and “_KEY3”.

Also a new boolean KM option called “ADD_SUFFIXES” is added to test KM, and the value of the new option is set to true for the KM instance that is assigned to the target node in the test mapping. A test task is set up in an IKM that has IKM Oracle Insert as a base KM.

KM task-local groovy variable definition script:

```
def colList = INSERT.getColumnList()
colListStr = ''
addSuffixes = physicalNode.getKMOptionValueBoolean("ADD_SUFFIXES")
```

```
for (Column col : colList) {
  if (colListStr.length() != 0) colListStr += ",\n"
  attrs = col.getSourceSelectItem().getSourceAttributes()
  String suffix = "";
  if (addSuffixes && attrs != null && attrs.size() > 0) {
    suffix = attrs.get(0).getFlexFieldValue("ATTR_SUFFIX")
  }
  colListStr += col.getTable().getQualifier() + '.' +
col.getTable().getName() + "." + '\"' + col.getUnquotedName() + suffix +
'\"'
}
```

KM target command text:

```
Column List string with suffixes from source flex fields: $[colListStr]
```

Generated code:

```
Column List string with suffixes from source flex fields:
COMPKM_TEST_TGT_SCHEMA.Stock_Dim."Stock_Name",
COMPKM_TEST_TGT_SCHEMA.Stock_Dim."Stock_Symbol_CUSTOM_KEY2",
COMPKM_TEST_TGT_SCHEMA.Stock_Dim."Stock_Type",
COMPKM_TEST_TGT_SCHEMA.Stock_Dim."Industry_Type_CUSTOM_KEY3",
COMPKM_TEST_TGT_SCHEMA.Stock_Dim."SP_Rating",
COMPKM_TEST_TGT_SCHEMA.Stock_Dim."Company_Name_CUSTOM_KEY1",
COMPKM_TEST_TGT_SCHEMA.Stock_Dim."Registered_Address",
COMPKM_TEST_TGT_SCHEMA.Stock_Dim."Registered_City",
COMPKM_TEST_TGT_SCHEMA.Stock_Dim."Registered_State",
COMPKM_TEST_TGT_SCHEMA.Stock_Dim."Postal_Code",
COMPKM_TEST_TGT_SCHEMA.Stock_Dim."Registered_County",
COMPKM_TEST_TGT_SCHEMA.Stock_Dim."FaceValue"
```

SqlInsertStatement.getQuery()

Usage

```
public SqlQuery getQuery()
```

Description

This method is used to get the main source query object from the target IKM or LKM API object. The `SqlQuery`object contains all metadata necessary to construct a SQL query. A query may be recursively defined, so that the `FromClause`object owned by the query object may contain other `SqlQuery` objects that represent subqueries of the top-level query.

Example

The return value of the `getQuery() method`on the top level `INSERT`object for a SQL Insert KM should be the same as the value of the built-in `QUERY`variable. A simple test for that is to create a task like this:

KM task-local groovy variable definition script:

```
sourceQuery = INSERT.getQuery() queryEqualsString =
(sourceQuery.equals(QUERY) ? "equal to" : "not equal to")
```

KM target command:
The return value from INSERT.getQuery() is $[queryEqualsString] to the built-in QUERY variable.

Generated Code:

```
-- The first subquery is:
SELECT
  EMP.EMP_NO AS EMP_NO ,
  EMP.LAST_NAME AS LAST_NAME ,
  EMP.FIRST_NAME AS FIRST_NAME ,
  EMP.DEPT_ID AS DEPT_ID
FROM /* Top-level from clause */
  ODI_SRC.EMP@NEXTGEN_TEST_ORACLE_SRC EMP
GROUP BY
  EMP.EMP_NO,EMP.LAST_NAME,EMP.FIRST_NAME,EMP.DEPT_ID
-- The source mapping physical node for the subquery is JOIN1
```

SqlQuery.getSubqueries ()

Usage

```
public List<SqlQuery>getSubqueries ()
```

Description

This method is used to get the set of subqueries that are defined by a query. This method returns only the first level subqueries. Each subquery returned may also contain other subqueries, that can be retrieved using the same method

Example

The example retrieves the subqueries if found, and displays the subquery text of the first subquery.

KM task-local groovy variable definition script:

```
subqueries = QUERY.getSubqueries()
subquery = null;
if (subqueries != null && subqueries.size() > 0) {
  subquery = QUERY.getSubqueries().get(0)
} else {
  odiRef.warn("No subquery found")
}
println("In task groovy, subquery is " + subquery)
subquerySourceNodeName = (subquery == null ? "unknown" :
subquery.getMapPhysicalNode().getName())
println("In task groovy, subquerySourceNodeName is" +
subquerySourceNodeName)
```

KM target command:
The first subquery is: `{#IF ($[subquery] != null) #} $[subquery.getText()] {#ELSE#} not found {# ENDIF #}`. The source mapping physical node for the subquery is `$[subquerySourceNodeName]`

Generated Code:

```
-- The first subquery is:
SELECT
  EMP.EMP_NO AS EMP_NO ,
  EMP.LAST_NAME AS LAST_NAME ,
  EMP.FIRST_NAME AS FIRST_NAME ,
  EMP.DEPT_ID AS DEPT_ID
FROM /* Top-level from clause */
  ODI_SRC.EMP@NEXTGEN_TEST_ORACLE_SRC EMP
GROUP BY
  EMP.EMP_NO,EMP.LAST_NAME,EMP.FIRST_NAME,EMP.DEPT_ID
-- The source mapping physical node for the subquery is JOIN1
```

SqlInsertStatement.getTargetTable ()

Usage

```
public Table getTargetTable() ()
```

Description

This method is used to get the substitution API object that represents a target table. The return type is **Table**, which provides methods to get the name and characteristics of the target table.

Example

The example generates a `SQL DDL CREATE`statement to create the table.

KM task-local groovy variable definition script:

```
table = INSERT.getTargetTable()
tableName = table.getCreationName()
tableQualifier = physicalNode.getLocation() == null ? null :
physicalNode.getLocation().getName();
odiRuntimeAccessName = OdiRef.getOdiGeneratedAccessName("TARG_NAME",
physicalNode, "A");
tableAlias = component.getAlias();
tgtColList = {
  def cols = component.getAttributes();
  String result = ""
  def first = true
  for (col in cols) {
    if (!first) result += ",\n"
    result += col.getSQLAccessName(false, "") + " " +
MappingUtils.getDdlDataType(col.getBoundObject());
    first = false
  }
  return result
}
```

KM target command:

```
create table $[odiRuntimeAccessName]
(
  $[tgtColList.call()]
)
```

Generated Code:

```
create table COMPKM_TEST_TGT_SCHEMA."Stock_Dim"
(
  "Stock_Key_PK" NUMBER(30),
"Split_Key" NUMBER(30),
"Stock_Name" VARCHAR2(50),
"Stock_Symbol" VARCHAR2(50),
"Stock_Type" VARCHAR2(50),
"Industry_Type" VARCHAR2(50),
"SP_Rating" VARCHAR2(50),
"Company_Name" VARCHAR2(50),
"Registered_Address" VARCHAR2(50),
"Registered_City" VARCHAR2(50),
"Registered_State" VARCHAR2(50),
"Postal_Code" VARCHAR2(50),
"Registered_County" VARCHAR2(50),
"FaceValue" NUMBER(30)
)
```

SqlQuery.getFromList ()

Usage

```
public List<FromClause> getFromList()
```

Description

This method is used to get a list of the `FROM`clause structures that represent the `FROM`clauses of the SQL query object. Each individual FROM clause represents some source table or inline view. There are basically 3 types of FROM clause:

- a simple table reference
- a subquery reference
- an ANSI JoinTable reference

If simple tables or subqueries are used without an ANSI join table, then the WHERE clause must provide the joining relationship between the tables. If the JoinTable is used, it will include an ON clause. The ON clause is accessed though a method `JoinTable.getPredicate()`or `JoinTable.getPredicateText()`. Both the subquery case and the JoinTable case can have nested queries, which represent regular FROM list of subqueries, or a ANSI joined subquery sources.

Example

The example gets the main FROM clause objects and derives a list of all the source tables using the `FromClause.getSourceTables()` call.

KM task-local groovy variable definition script:

```
sourceTables = QUERY.getFromList().get(0).getSourceTables()
sourceTableNames = ''
for (sourceTable in sourceTables) {
  if (sourceTableNames.length() > 0) sourceTableNames += ", ";
  sourceTableNames += sourceTable.getName();
}
```

KM target command:
The source tables are: `$[sourceTableNames]`

Generated Code
The source tables are: `EMP, DEPT`

SqlQuery.getSelectList ()

Usage

```
public List<ISelectItem> getSelectList()
```

Description

This method is used to get the list of select items present in the SQL query object. Each item is represented by an interface instance of IselectItem. The implementations of ISelectItem are ArrayExpression, StringExpression, and CorrelatedSubquery, The type can be determined using the java or groovy “instanceof” call. The ArrayExpression represents an expression owned by a mapping attribute, which is possibly a complex expression with referenced sub-expressions. The StringExpression represents a simple string expression. The CorrelatedQuery object represents a correlated query, also called as a scalar subquery, which is a subquery that returns a column and a row, that can be used as a query select item.

Example

The example prints out the type and text for each select item.

KM task-local groovy variable definition script:

```
selectList = QUERY.getSelectList()
selectListString = ''
index = 0;
for (item in selectList) {
  if (selectListString.length() > 0) selectListString += ",\n"
  selectListString += sprintf('item %1$d: type=%2$s text=%3$s', index++,
item.getClass().getName(), item.toString())
}
```

KM target command:

```
Select list string is:{#NL#} $[selectListString]
```

Generated Code:

```
Select list string is:
item 0: type=oracle.odi.mapping.generation.ArrayExpression
text=EMP_1.EMP_NO,
item 1: type=oracle.odi.mapping.generation.ArrayExpression
text=EMP_1.LAST_NAME,
item 2: type=oracle.odi.mapping.generation.ArrayExpression
text=EMP_1.FIRST_NAME,
item 3: type=oracle.odi.mapping.generation.ArrayExpression
text=DEPT.DEPT_NAME
```

FromClause.getJoinTable ()

Usage

```
public JoinTable getJoinTable ()
```

Description

This method is used to get the ANSI Join Table object from a FROM clause object, if the FROM clause object represents an ANSI join. The JoinTable object is a holder for the left and right join sources, which can be either simple tables or other join tables. It also holds the join type (inner, left outer, right outer, etc.), and the join condition expression.

Example

The example prints out the join type, right and left sources, and ON clause for the join table, if any.

KM task-local groovy variable definition script:

```
joinTable = QUERY.getFromList().get(0).getJoinTable()
joinTableStr = ''
if (joinTable != null) {
  joinTableStr = sprintf('type=%1$s\nleft text=%2$s\nright text=%3$s\njoin
condition=%4$s',
    joinTable.getJoinType(), joinTable.getLeftText(),
joinTable.getRightText(), joinTable.getPredicateText())
} else {
  joinTableStr = 'No join table found'
}
```

KM target command:
Join table information: `$[joinTableStr]`

Generated Code:

```
Join table information:
type=INNER
left text=(
```

```
SELECT
  EMP.EMP_NO AS EMP_NO ,
  EMP.LAST_NAME AS LAST_NAME ,
  EMP.FIRST_NAME AS FIRST_NAME ,
  EMP.DEPT_ID AS DEPT_ID
FROM
  ODI_SRC.EMP@NEXTGEN_TEST_ORACLE_SRC EMP
GROUP BY
  EMP.EMP_NO,EMP.LAST_NAME,EMP.FIRST_NAME,EMP.DEPT_ID
  ) EMP_1
right text=ODI_SRC.DEPT@NEXTGEN_TEST_ORACLE_SRC DEPT
join condition=EMP_1.DEPT_ID = DEPT.DEPT_ID
```

FromClause.getSourceTables ()

Usage

```
public List<Table> getSourceTables ()
```

Description

This method is used to get a list of all the simple source tables that are included in the FROM clause object. It does not include Join tables or subquery references.

Example

The below example provides the table name and logical schema location for each simple source table in the mapping.

KM task-local groovy variable definition script:

```
fromClause = QUERY.getFromList().get(0)
sourceTables = fromClause.getSourceTables()
sourceTableList = '';
context = physicalNode.getContext();
for (sourceTable in sourceTables) {
  sourceTableLocation =
sourceTable.getBoundDatastore().getModel().getObjectLocation(context);
  sourceTableList += sprintf('Table name=%1$s, logical schema=%2$s\n',
sourceTable.getName(), sourceTableLocation.getLogicalSchema().getName())
}
```

KM target command:

```
Source table list: $[sourceTableList]
```

Generated Code:
Source table list:

```
Table name=EMP, logical schema=NEXTGEN_TEST_ORACLE_SRC
Table name=DEPT, logical schema=NEXTGEN_TEST_ORACLE_SRC
```

FromClause.getTableQuery ()

This method **FromClause.getTableQuery ()** includes the following methods:

- JoinTable.getLeftTableQueryRef ()
- FromClause.getRightTableQueryRef ()

Usage

```
public TableQueryReference getTableQuery ()
public TableQueryReference getLeftTableQueryRef ()
public TableQueryReference getRightTableQueryRef ()
```

Description

These methods are used to get the table query object for a FROM clause or from a JoinTable object that contains a table query. A table query is a holder for a subquery object or a simple table. Depending on the KM that is used, the TableQuery may be contained by the FROM clause itself, or on the right or left side of a JoinTable object.

Example

The example finds whether the first FROM clause has a JoinTable, and if so, gets the subquery from the left-hand side of the join table, if there is a subquery on the left side.

KM task-local groovy variable definition script:

```
fromClause = QUERY.getFromList().get(0)
fromClauseHasJoinTable = (fromClause.getJoinTable() == null ? "does not
have" : "has") + " a join table"
tableQueryRef =
QUERY.getFromList().get(0).getJoinTable().getLeftTableQueryRef()
query = null
subqueryText = null
if (tableQueryRef != null) {  // Not every FROM clause has a table query
object, so protect against null.
  query = tableQueryRef.getQuery()
  if (query != null) {
    subqueryText = query.getText()
  }
}
```

KM target command:

```
From clause $[fromClauseHasJoinTable]
{#IF $[subqueryText] != null #}
subquery text:
$[subqueryText]
{# ELSE #}
No subquery text found.
{# ENDIF #}
```

Generated Code:
From clause has a join table subquery text:

```
SELECT
  EMP.EMP_NO AS EMP_NO ,
  EMP.LAST_NAME AS LAST_NAME ,
  EMP.FIRST_NAME AS FIRST_NAME ,
  EMP.DEPT_ID AS DEPT_ID
FROM
  ODI_SRC.EMP@NEXTGEN_TEST_ORACLE_SRC EMP
GROUP BY
  EMP.EMP_NO,EMP.LAST_NAME,EMP.FIRST_NAME,EMP.DEPT_ID
```

ArrayExpression.getTemplate()

Usage

```
public String getTemplate ()
```

Description

This method gets the code generation template for an ArrayExpression object. An ArrayExpression is a special code generation expression object that can handle nested expressions. For example, if an ODI mapping has multiple expression components connected one after the other, and the expressions for each one reference the expression attributes of the previous expression component, then there are nested expressions in the final query. For example, suppose the first expression EXPR has an attribute EMPSAL whose expression is “EMP.SAL + 100”, and then the next expression component has an expression like “EXPR.EMPSAL – 50”. In that case the final expression used in the extract query would be “(EMP.SAL + 100) – 50”. The ArrayExpression object handles this by having a top-level template, which has the template references to child objects in the template text. The template references in the text looks like this: “@{R0}”. This refers to a child expression whose key in the child hash table is “R0”. Each child object could be a simple String expression, or another ArrayExpression for multiple levels of nesting, or a source attribute. The getTemplate() method returns the textual template used to produce the ArrayExpression text.

Example

The example loops through all the select list items in the source query, finds the ones that are implemented as ArrayExpression objects, and displays the full text and the template text.

KM task-local groovy variable definition script:

```
selectList = QUERY.getSelectList()
arrayExprListString = ''
for (selectItem in selectList) {
  ArrayExpression arrayExpr = selectItem.getArrayExpression()
  if (arrayExpr != null) {
    if (arrayExprListString.length() != 0) arrayExprListString += '\n';
    arrayExprListString += sprintf('text=%1$s, template=%2$s',
arrayExpr.getText(), arrayExpr.getTemplate())
```

```
  }
}
```

KM target command:

Here is the list of ArrayExpression templates:`$[arrayExprListString]`

Generated Code:
Here is the list of ArrayExpression templates:

```
text=(EMP.EMP_NO + 100)*2, template=(@{R0} + 100)*2
text=EMP.LAST_NAME, template=@{R0}
text=EMP.FIRST_NAME, template=@{R0}
text=(EMP.FIRST_NAME || EMP.LAST_NAME), template=@{R0}
text=DEPT.DEPT_NAME, template=@{R0}
```

ArrayExpression.getChildMap()

Usage

```
public Map<String,Object> getChildMap ()
```

Description

This method gets a hash map that contains the child objects that are owned by this ArrayExpression object. The hash key is the matching key used in the ArrayExpression template, as described in the previous method.

Example

The example loops through all the select list items in the source query, finds the ones that are implemented as ArrayExpression objects, and displays the full text and the template text.

KM task-local groovy variable definition script:

```
selectList = QUERY.getSelectList()
arrayExprListString = ''
for (selectItem in selectList) {
  ArrayExpression arrayExpr = selectItem.getArrayExpression()
  if (arrayExpr != null) {
    if (arrayExprListString.length() != 0) arrayExprListString += '\n';
    arrayExprListString += sprintf('ArrayExpression text=%1$s, template=
%2$s', arrayExpr.getText(), arrayExpr.getTemplate())
    childMap = arrayExpr.getChildMap()
    for (childKey in childMap.keySet()) {
      arrayExprListString += sprintf('\n\tChild item: key=%1$s, object=
%2$s', childKey, childMap.get(childKey).toString())
    }
  }
}
```

KM target command:
Here is the ArrayExpression list with child objects:`$[arrayExprListString]`

Generated Code:
Here is the ArrayExpression list with child objects:

```
ArrayExpression text=(EMP.EMP_NO + 100)*2, template=(@{R0} + 100)*2
    Child item: key=R0, object=EMP.EMP_NO
ArrayExpression text=EMP.LAST_NAME, template=@{R0}
    Child item: key=R0, object=EMP.LAST_NAME
ArrayExpression text=EMP.FIRST_NAME, template=@{R0}
    Child item: key=R0, object=EMP.FIRST_NAME
ArrayExpression text=(EMP.FIRST_NAME || EMP.LAST_NAME), template=@{R0}
    Child item: key=R0, object=EMP.FIRST_NAME || EMP.LAST_NAME
ArrayExpression text=DEPT.DEPT_NAME, template=@{R0}
    Child item: key=R0, object=DEPT.DEPT_NAME
```

B

Substitution API Reference

It is important to have a good understanding of the available Oracle Data Integrator odiRef API and its usage.
See Introduction to OdiRef Substitution API for introductory information about using this API.

This appendix includes the following sections:

- Substitution Methods List
- Substitution Methods Reference

Substitution Methods List

The substitution are listed below depending on the type of knowledge module into which they can be used. The Global Methods list lists the methods that can be used in any situation.

Refer to the description of a given method itself for more information about its behavior in a given knowledge module or action.

This section contains the following topics:

- Global Methods
- Journalizing Knowledge Modules
- Loading Knowledge Modules
- Check Knowledge Modules
- Integration Knowledge Modules
- Reverse-Engineering Knowledge Modules
- Service Knowledge Modules
- Actions

Global Methods

The following methods can be used in all knowledge module and actions:

- getCatalogName() Method
- getCatalogNameDefaultPSchema() Method
- getColDefaultValue() Method
- getContext() Method
- getDataType() Method
- getFlexFieldValue() Method
- getInfo() Method

- getJDBCConnection() Method
- getJDBCConnectionFromLSchema() Method
- getNbInsert(), getNbUpdate(), getNbDelete(), getNbErrors() and getNbRows() Methods
- getObjectName() Method
- getObjectNameDefaultPSchema() Method
- getOdiGeneratedAccessName() Method
- getOdiInstance() Method
- getOption() Method
- getPackage() Method
- getPrevStepLog() Method
- getQuotedString() Method
- getSchemaName() Method
- getSchemaNameDefaultPSchema() Method
- getSession() Method
- getSessionVarList() Method
- getStep() Method
- getSysDate() Method
- setNbInsert(), setNbUpdate(), setNbDelete(), setNbErrors() and setNbRows() Methods
- setTaskName() Method

Journalizing Knowledge Modules

In addition to the methods in the Global Methods list, the following methods can be used specifically in Journalizing Knowledge Modules (JKM):

- getColList() Method
- getJrnFilter() Method
- getJrnInfo() Method
- getOggModelInfo() Method
- getOggProcessInfo() Method
- getSubscriberList() Method
- getTable() Method

Loading Knowledge Modules

In addition to the methods from in the Global Methods list, the following methods can be used specifically in Loading Knowledge Modules (LKM):

- getColList() Method
- getDataSet() Method

- getDataSetCount() Method
- getFilter() Method
- getFilterList() Method
- getFrom() Method
- getGrpBy() Method
- getGrpByList() Method
- getHaving() Method
- getHavingList() Method
- getJoin() Method
- getJoinList() Method
- getJrnFilter() Method
- getJrnInfo() Method
- getPop() Method
- getSrcColList() Method
- getSrcTablesList() Method
- getTable() Method
- getTargetColList() Method
- getTableName() Method
- getTargetTable() Method
- getTemporaryIndex() Method
- getTemporaryIndexColList() Method
- setTableName() Method

Check Knowledge Modules

In addition to the methods from in theGlobal Methods list, the following methods can be used specifically in Check Knowledge Modules (CKM):

- getAK() Method
- getAKColList() Method
- getCK() Method
- getColList() Method
- getFK() Method
- getFKColList() Method
- getNotNullCol() Method
- getPK() Method
- getPKColList() Method
- getPop() Method
- getTable() Method

- getTargetColList() Method
- getTargetTable() Method

Integration Knowledge Modules

In addition to the methods from in the Global Methodslist, the following methods can be used specifically in Integration Knowledge Modules IKM):

- getColList() Method
- getDataSet() Method
- getDataSetCount() Method
- getFilter() Method
- getFilterList() Method
- getFrom() Method
- getGrpBy() Method
- getGrpByList() Method
- getHaving() Method
- getHavingList() Method
- getJoin() Method
- getJoinList() Method
- getJrnFilter() Method
- getJrnInfo() Method
- getPop() Method
- getSrcColList() Method
- getSrcTablesList() Method
- getTable() Method
- getTableName() Method
- getTargetColList() Method
- getTargetTable() Method
- getTemporaryIndex() Method
- getTemporaryIndexColList() Method
- setTableName() Method

Reverse-Engineering Knowledge Modules

In addition to the methods from in the Global Methodslist, the following methods can be used specifically in Reverse-engineering Knowledge Modules (RKM):

- getModel() Method

Service Knowledge Modules

In addition to the methods from in the Global Methodslist, the following methods can be used specifically in Service Knowledge Modules (SKM):

- hasPK() Method
- nextAK() Method
- nextCond() Method
- nextFK() Method

Actions

In addition to the methods from in the Global Methodslist, the following methods can be used specifically in Actions.

- getAK() Method
- getAKColList() Method
- getCK() Method
- getColList() Method
- getColumn() Method
- getFK() Method
- getFKColList() Method
- getIndex() Method
- getIndexColList() Method
- getNewColComment() Method
- getNewTableComment() Method
- getPK() Method
- getPKColList() Method
- getTable() Method
- getTargetTable() Method
- isColAttrChanged() Method

Substitution Methods Reference

This section provides an alphabetical list of the substitution methods. Each method is detailed with usage, description, parameters and example code.

getAK() Method

Use to return information about an alternate key.

Usage

```
public java.lang.String getAK(java.lang.String pPropertyName)
```

Description

This method returns information relative to the alternate key of a datastore during a check procedure. It is only accessible from a Check Knowledge Module if the current task is tagged "alternate key".

In an action, this method returns information related to the alternate key currently handled by the DDL command.

Parameters

Parameter	Type	Description
pPropertyName	String	String containing the name of the requested property.

The following table lists the different possible values for pPropertyName.

Parameter Values	Description
ID	Internal number of the AK constraint. This parameter is deprecated, and included for 11*g* compatibility only. The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode.
GUID	GUID of the Alternate Key
KEY_NAME	Name of the alternate key
MESS	Error message relative to the constraint of the alternate key
FULL_NAME	Full name of the AK generated with the local object mask.
<flexfield code>	Value of the flexfield for this AK.

Examples

```
The alternate key of my table is named: <%=odiRef.getAK("KEY_NAME")%>
```

getAKColList() Method

Use to return information about the attributes of an alternate key.

Usage

```
public java.lang.String getAKColList( java.lang.String pStart,
java.lang.String pPattern,java.lang.String pEnd)
java.lang.String pSeparator,
java.lang.String pEnd)
```

Alternative syntax:

```
public java.lang.String getAKColList(
java.lang.String pPattern,
java.lang.String pSeparator)
```

Description

Returns a list of attributes and expressions for the alternate key currently checked.

The pPattern parameter is interpreted and then repeated for each element of the list. It is separated from its predecessor by the pSeparator parameter. The generated string starts with pStart and ends with pEnd. If no element is selected, pStart and pEnd are omitted and an empty string is returned.

This list contains an element for each attribute of the current alternate key. It is accessible from a Check Knowledge Module if the current task is tagged as an "alternate key".

In an action, this method returns the list of the attributes of the alternate key handled by the DDL command, ordered by their position in the key.

In the alternative syntax, any parameters not set are set to an empty string.

Parameters

Parameters	Type	Description
pStart	String	This sequence marks the beginning of the string to generate.
pPattern	String	The pattern is repeated for each occurrence in the list. The list of attributes that can be used in a pattern is detailed in the Pattern Attributes List below. Each attribute occurrence in the pattern sequence is replaced with its value. The attributes must be between brackets. ([and]) Example «My string [COL_NAME] is an attribute»
pSeparator	String	This parameter separates each pattern from its predecessor.
pEnd	String	This sequence marks the end of the string to generate.

Pattern Attributes List

The following table lists the different values of the parameters as well as their associated description.

Parameter Value	Description
Parameter value	Description
I_COL	Attribute internal identifier
COL_NAME	Name of the key attribute
COL_HEADING	Header of the key attribute
COL_DESC	Attribute description
POS	Position of the attribute
LONGC	Length (Precision) of the attribute
SCALE	Scale of the attribute
FILE_POS	Beginning position of the attribute (fixed file)
BYTES	Number of physical bytes of the attribute
FILE_END_POS	End of the attribute (FILE_POS + BYTES)
IND_WRITE	Write right flag of the attribute
COL_MANDATORY	Mandatory character of the attribute: • 0: null authorized • 1: non null

Parameter Value	Description
CHECK_FLOW	Flow control flag of the attribute: • 0: do not check • 1: check
CHECK_STAT	Static control flag of the attribute: • 0: do not check • 1: check
COL_FORMAT	Logical format of the attribute
COL_DEC_SEP	Decimal symbol for the attribute
REC_CODE_LIST	List of the record codes retained for the attribute
COL_NULL_IF_ERR	Processing flag for the attribute: • 0: Reject • 1: Set active trace to null • 2: Set inactive trace to null
DEF_VALUE	Default value for the attribute
EXPRESSION	Not used
CX_COL_NAME	Not used
ALIAS_SEP	Grouping symbol used for the alias (from the technology)
SOURCE_DT	Code of the attribute's datatype.
SOURCE_CRE_DT	Create table syntax for the attribute's datatype.
SOURCE_WRI_DT	Create table syntax for the attribute's writable datatype.
DEST_DT	Code of the attribute's datatype converted to a datatype on the target technology.
DEST_CRE_DT	Create table syntax for the attribute's datatype converted to a datatype on the target technology.
DEST_WRI_DT	Create table syntax for the attribute's writable datatype converted to a datatype on the target technology.
SCD_COL_TYPE	Behavior defined for the Slowly Changing Dimensions for this attribute in the data model.
<flexfield code>	Flexfield value for the current attribute.

Examples

If the CUSTOMER table has an alternate key AK_CUSTOMER (CUST_ID, CUST_NAME) and you want to generate the following code:

```
create table T_AK_CUSTOMER
(CUST_ID numeric(10) not null, CUST_NAME varchar(50) not null)
```

You can use the following code:

```
create table T_<%=odiRef.getAK("KEY_NAME")%>
<%=odiRef.getAKColList("(", "[COL_NAME] [DEST_CRE_DT] not null", ", ", ")")%>
```

Explanation: the getAKColList function will be used to generate the `(CUST_ID numeric(10) not null, CUST_NAME varchar(50) not null)` part, which starts and stops with a parenthesis and repeats the pattern (attribute, a data type, and not null) separated by commas for each attribute of the alternate key. Thus

- the first parameter **"("** of the function indicates that we want to start the string with the string "("
- the second parameter **"[COL_NAME] [DEST_CRE_DT] not null"** indicates that we want to repeat this pattern for each attribute of the alternate key. The keywords [COL_NAME] and [DEST_CRE_DT] reference valid keywords of the Pattern Attributes List table
- the third parameter **", "** indicates that we want to separate interpreted occurrences of the pattern with the string ", "
- the fourth parameter **")"** of the function indicates that we want to end the string with the string ")"

getAllTargetColList() Method

Use to return information about all attributes of the target table of a mapping, including active and non-active attributes. Active attributes are those having an active mapping.

This method has the same usage and parameters as the getTargetTable() Method. See getTargetColList() Method for more details.

getCatalogName() Method

Use to return a catalog name from the topology.

Usage

```
public java.lang.String getCatalogName(
 java.lang.String pLogicalSchemaName,
java.lang.String pLocation)

public java.lang.String getCatalogName(
 java.lang.String pLogicalSchemaName,
java.lang.String pContextCode,
pContextCode, java.lang.String pLocation)

public java.lang.String getCatalogName(
java.lang.String pLocation)

public java.lang.String getCatalogName()
```

Description

Allows you to retrieve the name of a physical data catalog or work catalog, from its logical schema.

If the first syntax is used, the returned catalog name matches the current context.

If the second syntax is used, the returned catalog name is that of the context specified in the pContextCode parameter.

The third syntax returns the name of the data catalog (D) or work catalog (W) for the current logical schema in the current context.

The fourth syntax returns the name of the data catalog (D) for the current logical schema in the current context.

Parameters

Parameter	Type	Description
pLogicalSchemaName	String	Name of the logical schema
pContextCode	String	Code of the enforced context of the schema
pLocation	String	The valid values are: • W: Returns the work catalog of the physical schema that corresponds to the tuple (context, logical schema) • D: Returns the data catalog of the physical schema that corresponds to the tuple (context, logical schema)

Examples

If you have defined the physical schema `Pluton.db_odi.dbo`

Property	Value
Data catalog:	db_odi
Data schema:	dbo
Work catalog:	tempdb
Work schema:	temp_owner

that you have associated with this physical schema: MSSQL_ODI in the context CTX_DEV

The Call To	Returns
<%=odiRef.getCatalogName("MSSQL_ODI", "CTX_DEV", "W")%>	tempdb
<%=odiRef.getCatalogName("MSSQL_ODI", "CTX_DEV", "D")%>	db_odi

getCatalogNameDefaultPSchema() Method

Use to return a catalog name for the default physical schema from the topology.

Usage

```
public java.lang.String getCatalogNameDefaultPSchema(
java.lang.String pLogicalSchemaName,
java.lang.String pLocation)

public java.lang.String getCatalogNameDefaultPSchema(
java.lang.String pLogicalSchemaName,
java.lang.String pContextCode,
java.lang.String pLocation)

public java.lang.String getCatalogNameDefaultPSchema(
java.lang.String pLocation)

public java.lang.String getCatalogNameDefaultPSchema()
```

Description

Allows you to retrieve the name of the **default** physical data catalog or work catalog for the data server to which is associated the physical schema corresponding to the tuple (logical schema, context). If no context is specified, the current context is used. If no logical schema name is specified, then the current logical schema is used. If no pLocation is specified, then the data catalog is returned.

Parameters

Parameter	Type	Description
pLogicalSchemaName	String	Name of the logical schema
pContextCode	String	Code of the enforced context of the schema
pLocation	String	The valid values are: • W: Returns the work catalog of the default physical schema associate to the data server to which the physical schema corresponding to the tuple (context, logical schema) is also attached. • D: Returns the data catalog of the physical schema corresponding to the tuple (context, logical schema)

Examples

If you have defined the physical schema `Pluton.db_odi.dbo`

Property	Value
Data catalog:	db_odi
Data schema:	dbo
Work catalog:	tempdb
Work schema:	temp_odi
Default Schema	Yes

that you have associated with this physical schema: MSSQL_ODI in the context CTX_DEV, and Pluton.db_doc.doc

Property	Value
Data catalog:	db_doc
Data schema:	doc
Work catalog:	tempdb
Work schema:	temp_doc
Default Schema	No

that you have associated with this physical schema: MSSQL_DOC in the context CTX_DEV.

The Call To	Returns
<%=odiRef.getCatalogNameDefaultPSchema("MSSQL_DOC", "CTX_DEV", "W")%>	tempdb
<%=odiRef.getCatalogNameDefaultPSchema("MSSQL_DOC", "CTX_DEV", "D")%>	db_odi

getCK() Method

Use to return information about a condition.

Usage

```
public java.lang.String getCK(java.lang.String pPropertyName)
```

Description

This method returns information relative to a condition of a datastore during a check procedure. It is accessible from a Check Knowledge Module only if the current task is tagged as "condition".

In an action, this method returns information related to the check constraint currently handled by the DDL command.

Parameters

Parameter	Type	Description
pPropertyName	String	Current string containing the name of the requested property.

The following table lists the different values accepted by pPropertyName:

Parameter Value	Description
ID	Internal number of the check constraintThis parameter is deprecated, and included for 11*g* compatibility only. The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode.
GUID	GUID of the check.
COND_ALIAS	Alias of the table used in the SQL statement
COND_NAME	Name of the condition
COND_TYPE	Type of the condition
COND_SQL	SQL statement of the condition
MESS	Error message relative to the check constraint
FULL_NAME	Full name of the check constraint generated with the local object mask.
COND_SQL_DDL	SQL statement of the condition with no table alias.
<flexfield code>	Flexfield value for this check constraint.

Examples

```
The current condition is called: <%=snpRep.getCK("COND_NAME")%>

insert into MY_ERROR_TABLE
select *
from MY_CHECKED_TABLE
where (not (<%=odiRef.getCK("COND_SQL")%>))
```

getColDefaultValue() Method

Use to return the default value of a mapped attribute.

Usage

```
public java.lang.String getColDefaultValue()
```

Description

Returns the default value of the target attribute of the mapping.

This method can be used in a mapping expression without the <%%> tags. This method call will insert in the generate code the default value set in the attribute definition. Depending on the attribute type, this value should be protected with quotes.

Parameters

None.

Examples

```
The default value of my target attribute is '+ 'odiRef.getColDefaultValue()'
```

getColList() Method

Use to return properties for each attribute from a filtered list of attributes. The properties are organized according to a string pattern.

Usage

```
public java.lang.String getColList(
java.lang.int pDSIndex,
java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd,
java.lang.String pSelector)
```

Alternative syntaxes:

```
public java.lang.String getColList(
java.lang.int pDSIndex,
java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd)
```

```
public java.lang.String getColList(
java.lang.int pDSIndex,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pSelector)

public java.lang.String getColList(
java.lang.int pDSIndex,
java.lang.String pPattern,
java.lang.String pSeparator)
```

Description

Returns a list of attributes and expressions for a given data set. The attributes list depends on the phase during which this method is called.

In IKMs only, the pDSIndex parameter identifies which of the data sets is taken into account by this command.

> **Note:**
>
> The pDSIndex parameter can be omitted when this method is used in an LKM. It can be also omitted for IKMs. In this case, the data set taken into account is the first one.

The pPattern parameter is interpreted and then repeated for each element of the list (selected according to pSelector parameter) and separated from its predecessor with the parameter pSeparator. The generated string begins with pStart and ends with pEnd. If no element is selected, pStart and pEnd are omitted and an empty string is returned.

In the alternative syntax, any parameters not set are set to an empty string.

> **Note:**
>
> - This method automatically generates lookups with no specific code required.
> - When an attribute name from a source exceeds the maximum allowed length of an attribute name for the target technology, it is automatically truncated.

Loading (LKM)

All active mapping expressions that are executed in the current execution unit, as well as all the attributes from the current execution unit used in the mapping, filters and joins expressions executed in the staging area appear in this list. The list is sorted by POS, FILE_POS.

If there is a journalized datastore in the source of the mapping, the three journalizing pseudo attributes `JRN_FLAG`, `JRN_DATE`, and `JRN_SUBSCRIBER` are added as attributes of the journalized source datastore.

Integration (IKM)

All current active mapping expressions in the current mapping appear in the list.

The list contains one element for each attribute that is loaded in the target table of the current mapping. The list is sorted by POS, FILE_POS, except when the target table is temporary. In this case it is not sorted.

If there is a journalized datastore in the source of the mapping, and it is located in the staging area, the three journalizing pseudo attributes `JRN_FLG`, `JRN_DATE`,and `JRN_SUBSCRIBER` are added as attributes of the journalized source datastore.

Check (CKM)

All the attributes of the target table (with static or flow control) appear in this list.

To distinguish attributes mapped in the current mapping, you must use the `MAP` selector.

Actions

All the attributes of the table handles by the DDL command appear in this list.

In the case of modified, added or deleted attributes, the NEW and OLD selectors are used to retrieve either the new version or the old version of the modified attribute being processed by the DDL command. The list is sorted by POS, FILE_POS when the table loaded is not temporary.

Parameters

Parameter	Type	Description
pDSIndex	Int	Index identifying which of the data sets is taken into account by this command.
pStart	String	This sequence marks the beginning of the string to generate.
pPattern	String	The pattern is repeated for each occurrence in the list. The list of the attributes usable in a pattern is detailed in the Pattern Attributes List below. Each occurrence of the attributes in the pattern string is replaced by its value. Attributes must be between brackets ([and]) Example «My string [COL_NAME] is an attribute»
pSeparator	String	This parameter separates each pattern from its predecessor.
pEnd	String	This sequence marks the end of the string to generate.
pSelector	String	String that designates a Boolean expression that allows to filter the elements of the initial list with the following format: <SELECTOR> <Operator> <SELECTOR> etc. Parenthesis are authorized. Authorized operators: 1. No: NOT or! 2. Or: OR or || 3. And: AND or && Example: (INS AND UPD) OR TRG The description of valid selectors is provided below.

Pattern Attributes List

The following table lists different parameters values as well as their associated description.

Parameter Value	Description
I_COL	Internal identifier of the attribute
COL_NAME	Name of the attribute
COL_HEADING	Header of the attribute
COL_DESC	Description of the attribute
POS	Position of the attribute
LONGC	Attribute length (Precision)
SCALE	Scale of the attribute
FILE_POS	Beginning (index) of the attribute
BYTES	Number of physical bytes in the attribute
FILE_END_POS	End of the attribute (FILE_POS + BYTES)
IND_WRITE	Write right flag of the attribute
COL_MANDATORY	Mandatory character of the attribute. Valid values are: • 0: null authorized • 1: not null
CHECK_FLOW	Flow control flag of the attribute. Valid values are: • 0: do not check • 1: check
CHECK_STAT	Static control flag of the attribute. Valid values are: • 0: do not check • 1: check
COL_FORMAT	Logical format of the attribute
COL_DEC_SEP	Decimal symbol of the attribute
REC_CODE_LIST	List of the record codes retained in the attribute
COL_NULL_IF_ERR	Processing flag of the attribute. Valid values are: • 0: Reject • 1: Set to null active trace • 2: Set to null inactive trace
DEF_VALUE	Default value of the attribute
EXPRESSION	Text of the expression executed on the source (expression as typed in the attribute mapping or attribute name making an expression executed on the staging area).
CX_COL_NAME	Computed name of the attribute used as a container for the current expression on the staging area
ALIAS_SEP	Separator used for the alias (from the technology)
SOURCE_DT	Code of the attribute's datatype.
SOURCE_CRE_DT	Create table syntax for the attribute's datatype.
SOURCE_WRI_DT	Create table syntax for the attribute's writable datatype.
DEST_DT	Code of the attribute's datatype converted to a datatype on the target technology.

Parameter Value	Description
DEST_CRE_DT	Create table syntax for the attribute's datatype converted to a datatype on the target technology.
DEST_WRI_DT	Create table syntax for the attribute's writable datatype converted to a datatype on the target technology.
SCD_COL_TYPE	Behavior defined for the Slowly Changing Dimensions for this attribute in the data model.
MANDATORY_CLAUSE	Returns `NOT NULL` is the attribute is mandatory. Otherwise, returns the null keyword for the technology.
DEFAULT_CLAUSE	Returns `DEFAULT <default value>` if any default value exists. Otherwise, returns and empty string.
JDBC_TYPE	Data Services - JDBC Type of the attribute returned by the driver.
<flexfield code>	Flexfield value for the current attribute.

Selectors Description

Parameter Value	Description
INS	• LKM: Not applicable (*) • IKM: Only for mapping expressions marked with insertion • CKM: Not applicable
UPD	• LKM: Not applicable (*) • IKM: Only for mapping expressions marked with update • CKM: Not applicable
TRG	• LKM: Not applicable (*) • IKM: Only for mapping expressions executed on the target • CKM: Not applicable
NULL	• LKM: Not applicable (*) • IKM: All mapping expressions loading not nullable attributes • CKM: All target attributes that do not accept null values
PK	• LKM: Not applicable (*) • IKM: All mapping expressions loading the primary key attributes • CKM: All the target attributes that are part of the primary key
UK	• LKM: Not applicable (*) • IKM: All the mapping expressions loading the update key attribute chosen for the current mapping • CKM: Not applicable
REW	• LKM: Not applicable (*) • IKM: All the mapping expressions loading the attributes with read only flag not selected • CKM: All the target attributes with read only flag not selected
UD1	• LKM: Not applicable (*) • IKM: All mapping expressions loading the attributes marked UD1 • CKM: Not applicable
UD2	• LKM: Not applicable (*) • IKM: All mapping expressions loading the attributes marked UD2 • CKM: Not applicable

Parameter Value	Description
UD3	• LKM: Not applicable (*) • IKM: All mapping expressions loading the attributes marked UD3 • CKM: Not applicable
UD4	• LKM: Not applicable (*) • IKM: All mapping expressions loading the attributes marked UD4 • CKM: Not applicable
UD5	• LKM: Not applicable (*) • IKM: All mapping expressions loading the attributes marked UD5 • CKM: Not applicable
MAP	• LKM: Not applicable • IKM: Not applicable • CKM: Flow control: All attributes of the target table loaded with expressions in the current mapping Static control: All attributes of the target table
SCD_SK	LKM, CKM, IKM: All attributes marked SCD Behavior: Surrogate Key in the data model definition.
SCD_NK	LKM, CKM, IKM: All attributes marked SCD Behavior: Natural Key in the data model definition.
SCD_UPD	LKM, CKM, IKM: All attributes marked SCD Behavior: Overwrite on Change in the data model definition.
SCD_INS	LKM, CKM, IKM: All attributes marked SCD Behavior: Add Row on Change in the data model definition.
SCD_FLAG	LKM, CKM, IKM: All attributes marked SCD Behavior: Current Record Flag in the data model definition.
SCD_START	LKM, CKM, IKM: All attributes marked SCD Behavior: Starting Timestamp in the data model definition.
SCD_END	LKM, CKM, IKM: All attributes marked SCD Behavior: Ending Timestamp in the data model definition.
NEW	Actions: the attribute added to a table, the new version of the modified attribute of a table.
OLD	Actions: The attribute dropped from a table, the old version of the modified attribute of a table.
WS_INS	SKM: The attribute is flagged as allowing INSERT using Data Services.
WS_UPD	SKM: The attribute is flagged as allowing UDATE using Data Services.
WS_SEL	SKM: The attribute is flagged as allowing SELECT using Data Services.

Note:

Using certain selectors in an LKM - indicated in the previous table with an * - is possible but not recommended. Only attributes mapped on the source in the mapping are returned. As a consequence, the result could be incorrect depending on the mapping. For example, for the UK selector, the attributes of the key that are not mapped or that are not executed on the source will not be returned with the selector.

Examples

If the CUSTOMER table contains the attributes (CUST_ID, CUST_NAME, AGE) and we want to generate the following code:

```
create table CUSTOMER (CUST_ID numeric(10) null,
CUST_NAME varchar(50) null, AGE numeric(3) null)
```

The following code is sufficient:

```
create table CUSTOMER
<%=odiRef.getColList("(", "[COL_NAME] [SOURCE_CRE_DT] null", ", ", ")", "")%>
```

Explanation: the getColList function will be used to generate (CUST_ID numeric(10) null, CUST_NAME varchar(50) null, AGE numeric(3) null). It will start and end with a parenthesis and repeat a pattern (attribute, data type, and null) separated by commas for each attribute. Thus,

- the first character **"("** of the function indicates that we want to start the string with the string "("
- the second parameter **"[COL_NAME] [SOURCE_CRE_DT] null"** indicates that we want to repeat this pattern for each attribute. The keywords [COL_NAME] and [SOURCE_CRE_DT] are references to valid keywords of the table Pattern Attribute List
- the third parameter **", "** indicates that we want to separate the interpreted occurrences of the pattern with the string ", ".
- the fourth parameter **")"** of the function indicates that we want to end the string with the string ")"
- the last parameter **""** indicates that we want to repeat the pattern for each attribute (with no selection)

getColumn() Method

Use to return information about a specific attribute handled by an action.

Usage

```
public java.lang.String getColumn(
java.lang.String pPattern,
java.lang.String pSelector)

public java.lang.String getColumn(
java.lang.String pPattern)
```

Description

In an action, returns information on an attribute being handled by the action.

Parameters

Parameters	Type	Description
pPattern	String	Pattern of values rendered for the attribute. The list of the attributes usable in a pattern is detailed in the Pattern Attributes List below. Each occurrence of the attributes in the pattern string is replaced by its value. Attributes must be between brackets ([and]) Example «My string [COL_NAME] is an attribute»
pSelector	String	The Selector may take one of the following value: • NEW: returns the new version of the modified attribute or the new attribute. • OLD: returns the old version of the modified attribute or the dropped attribute. If the selector is omitted, it is set to OLD for all *drop* actions. Otherwise, it is set to NEW.

Pattern Attributes List

The following table lists different parameters values as well as their associated description.

Parameter Value	Description
I_COL	Internal identifier of the attribute
COL_NAME	Name of the attribute
COL_HEADING	Header of the attribute
COL_DESC	Description of the attribute
POS	Position of the attribute
LONGC	Attribute length (Precision)
SCALE	Scale of the attribute
FILE_POS	Beginning (index) of the attribute
BYTES	Number of physical bytes in the attribute
FILE_END_POS	End of the attribute (FILE_POS + BYTES)
IND_WRITE	Write right flag of the attribute
COL_MANDATORY	Mandatory character of the attribute. Valid values are: • 0: null authorized • 1: not null
CHECK_FLOW	Flow control flag of the attribute. Valid values are: • 0: do not check • 1: check
CHECK_STAT	Static control flag of the attribute. Valid values are: • 0: do not check • 1: check
COL_FORMAT	Logical format of the attribute
COL_DEC_SEP	Decimal symbol of the attribute
REC_CODE_LIST	List of the record codes retained in the attribute

Parameter Value	Description
COL_NULL_IF_ERR	Processing flag of the attribute. Valid values are: • 0: Reject • 1: Set to null active trace • 2: Set to null inactive trace
DEF_VALUE	Default value of the attribute
EXPRESSION	Text of the expression executed on the source (expression as typed in the mapping or attribute name making an expression executed on the staging area).
CX_COL_NAME	Computed name of the attribute used as a container for the current expression on the staging area
ALIAS_SEP	Separator used for the alias (from the technology)
SOURCE_DT	Code of the attribute's datatype.
SOURCE_CRE_DT	Create table syntax for the attribute's datatype.
SOURCE_WRI_DT	Create table syntax for the attribute's writable datatype.
DEST_DT	Code of the attribute's datatype converted to a datatype on the target technology.
DEST_CRE_DT	Create table syntax for the attribute's datatype converted to a datatype on the target technology.
DEST_WRI_DT	Create table syntax for the attribute's writable datatype converted to a datatype on the target technology.
SCD_COL_TYPE	Behavior defined for the Slowly Changing Dimensions for this attribute in the data model.
MANDATORY_CLAUSE	Returns `NOT NULL` if the attribute is mandatory. Otherwise, returns the null keyword for the technology.
DEFAULT_CLAUSE	Returns `DEFAULT <default value>` if any default value exists. Otherwise, returns and empty string.
<flexfield code>	Flexfield value for the current attribute.

getContext() Method

Use to return information about the current context.

Usage

```
public java.lang.String getContext(java.lang.String pPropertyName)
```

Description

This method returns information about to the current execution context.

Parameters

Parameter	Type	Description
pPropertyName	String	String containing the name of the requested property.

The following table lists the different possible values for pPropertyName.

Parameter Value	Description
ID	Internal ID of the context. This parameter is deprecated, and included for 11*g* compatibility only. The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode.
GLOBAL_ID	GUID of the context.
CTX_NAME	Name of the context.
CTX_CODE	Code of the context.
CTX_DEFAULT	Returns 1 for the default context, 0 for the other contexts.
<flexfield code>	Flexfield value for this reference.

Examples

```
Current Context = <%=getContext("CTX_NAME")%>
```

getDataSet() Method

Use to return information about a given data set of a mapping.

Usage

```
public java.lang.String getDataSet(
java.lang.Int pDSIndex,
java.lang.String pPropertyName)
```

Description

Retrieves information about a given data set of a mapping.

In IKMs only, the pDSIndex parameter identifies which of the data sets is taken into account by this command.

Parameters

Parameter	Type	Description
pDSIndex	Int	Index identifying which of the data sets is taken into account by this command.

The following table lists the different possible values for pPropertyName.

Parameter Value	Description
OPERATOR	Operator that applies to the selected data set. For the first data set, an empty value is returned.
NAME	Data set Name.
HAS_JRN	Returns "1" if the data set one journalized datastore, "0" otherwise.

Examples

```
<%for (int i=0; i < odiRef.getDataSetCount(); i++){%><%=odiRef.getDataSet(i,
"Operator")%>select     <%=odiRef.getPop("DISTINCT_ROWS")%>    <
%=odiRef.getColList(i,"", "[EXPRESSION] [COL_NAME]", ",\n\t", "", "((INS and !TRG)
```

```
and REW")%> from    <%=odiRef.getFrom(i)%>where    <% if (odiRef.getDataSet(i,
"HAS_JRN").equals("1")) { %>    JRN_FLAG <> 'D    '<%} else {%>    (1=1)    <% } %><
%=odiRef.getJoin(i)%><%=odiRef.getFilter(i)%><%=odiRef.getJrnFilter(i)%><
%=odiRef.getGrpBy(i)%><%=odiRef.getHaving(i)%>
<%}%>
```

getDataSetCount() Method

Use to return the number of data sets of a mapping.

Usage

```
public java.lang.Int getDataSetCount()
```

Description

Returns the number of data sets of a mapping.

Parameters

None

Examples

```
<%for (int i=0; i < odiRef.getDataSetCount(); i++){%><%=odiRef.getDataSet(i,
"Operator")%>select     <%=odiRef.getPop("DISTINCT_ROWS")%>    <
%=odiRef.getColList(i,"", "[EXPRESSION] [COL_NAME]", ",\n\t", "", "((INS and !TRG)
and REW)")%> from    <%=odiRef.getFrom(i)%>where    <% if (odiRef.getDataSet(i,
"HAS_JRN").equals("1")) { %>    JRN_FLAG <> 'D    '<%} else {%>    (1=1)    <% } %><
%=odiRef.getJoin(i)%><%=odiRef.getFilter(i)%><%=odiRef.getJrnFilter(i)%><
%=odiRef.getGrpBy(i)%><%=odiRef.getHaving(i)%>
<%}%>
```

getDataType() Method

Use to return the syntax creating an attribute of a given datatype.

Usage

```
public java.lang.String getDataType(
java.lang.String pDataTypeName,
java.lang.String pDataTypeLength,
java.lang.String pDataTypePrecision)
```

Description

Returns the creation syntax of the following SQL data types: varchar, numeric or date according to the parameters associated to the source or target technology.

Parameters

Parameters	Type	Description
Parameter	Type	Description
pDataTypeName	String	Name of the data type as listed in the table below
pDataTypeLength	String	Length of the data type
pDataTypePrecision	String	Precision of the data type

The following table lists all possible values for pDataTypeName.

Parameter Value	Description
SRC_VARCHAR	Returns the syntax to the source data type varchar
SRC_NUMERIC	Returns the syntax to the source data type numeric
SRC_DATE	Returns the syntax to the source data type date
DEST_VARCHAR	Returns the syntax to the target data type varchar
DEST_NUMERIC	Returns the syntax to the target data type numeric
DEST_DATE	Returns the syntax to the target data type date

Examples

Given the following syntax for these technologies:

Technology	Varchar	Numeric	Date
Oracle	varchar2(%L)	number(%L,%P)	date
Microsoft SQL Server	varchar(%L)	numeric(%L,%P)	datetime
Microsoft Access	Text(%L)	double	datetime

Here are some examples of call to getDataType:

Call	Oracle	SQL Server	Access
`<%=odiRef.getDataType("DEST_VARCHAR", "10", "")%>`	varchar2(10)	varchar(10)	Text(10)
`<%=odiRef.getDataType("DEST_VARCHAR", "10", "5")%>`	varchar2(10)	varchar(10)	Text(10)
`<%=odiRef.getDataType("DEST_NUMERIC", "10", "")%>`	number(10)	numeric(10)	double
`<%=odiRef.getDataType("DEST_NUMERIC", "10", "2")%>`	number(10,2)	numeric(10,2)	double
`<%=odiRef.getDataType("DEST_NUMERIC", "", "")%>`	number	numeric	double
`<%=odiRef.getDataType("DEST_DATE", "", "")%>`	date	datetime	datetime
`<%=odiRef.getDataType("DEST_DATE", "10", "2")%>`	date	datetime	datetime

getFilter() Method

Use to return the entire WHERE clause section generated for the filters of a mapping.

Usage

```
public java.lang.String getFilter(java.lang.Int pDSIndex)
```

Description

Returns the SQL filters sequence (on the source while loading, on the staging area while integrating) for a given data set.

In IKMs only, the pDSIndex parameter identifies which of the data sets is taken into account by this command.

> **Note:**
>
> The pDSIndex parameter can be omitted when this method is used in an LKM. It can be also omitted for IKMs. In this case, the data set taken into account is the first one.

Parameters

Parameter	Type	Description
pDSIndex	Int	Index identifying which of the data sets is taken into account by this command.

None

Examples

```
insert into <%=odiRef.getTable("L", "COLL_NAME", "W")%>
select <%=odiRef.getColList("", "[EXPRESSION]", ", ", "", "INS=1")%>
from <%=odiRef.getFrom()%>
where (1=1)
<%=odiRef.getJoin()%>
<%=odiRef.getFilter()%>
<%=odiRef.getGrpBy()%>
<%=odiRef.getHaving()%>
```

getFilterList() Method

Use to return properties for each filter of a mapping. The properties are organized according to a string pattern.

Usage

```
public java.lang.String getFilterList(
java.lang.Int pDSIndex,
java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd)
```

Alternative syntax:

```
public java.lang.String getFilterList(
java.lang.Int pDSIndex,
java.lang.String pPattern,
java.lang.String pSeparator)
```

Description

Returns a list of occurrences of the SQL filters of a given data set of a mapping.

In IKMs only, the pDSIndex parameter identifies which of the data sets is taken into account by this command.

> **Note:**
>
> The pDSIndex parameter can be omitted when this method is used in an LKM. It can be also omitted for IKMs. In this case, the data set taken into account is the first one.

The parameter pPattern is interpreted and repeated for each element of the list and separated from its predecessor with parameter pSeparator. The generated string begins with pStart and ends with pEnd. If no element is selected, pStart and pEnd are omitted and an empty string is returned.

This list contains an element for each filter expression executed on the source or target (depending on the Knowledge Module in use).

In the alternative syntax, any parameters not set are set to an empty string.

Parameters

Parameter	Type	Description
pDSIndex	Int	Index identifying which of the data sets is taken into account by this command.
pStart	String	This sequence marks the beginning of the string to generate.
pPattern	String	The pattern will be repeated for each occurrence of the list. The list of possible in a list is available in the Pattern Attributes List below. Each attribute occurrence in the pattern string is substituted with its value. Attributes must be between brackets ([and]) Example «My string [COL_NAME] is an attribute»
pSeparator	String	This parameter is used to separate a pattern from its predecessor.
pEnd	String	This sequence marks the end of the string to generate.

Pattern Attributes List

The following table lists the different values of the parameters as well as the associated description.

Parameter Value	Description
ID	Filter internal identifier.

Parameter Value	Description
EXPRESSION	Text of the filter expression.

Examples

```
insert into <%=odiRef.getTable("L", "COLL_NAME", "W")%>
select <%=odiRef.getColList("", "[EXPRESSION]", ", ", "", "INS=1")%>
from <%=odiRef.getFrom()%>
where (1=1)
<%=odiRef.getJoin()%>
<%=odiRef.getFilterList("and ","([EXPRESSION])"," and ","")%>
<%=odiRef.getGrpBy()%>
<%=odiRef.getHaving()%>
```

Explanation: the getFilterList function will be used to generate the filter of the SELECT clause that must begin with "and" and repeats the pattern (expression of each filter) separated with "and" for each filter. Thus

- The first parameter **"and"** of the function indicates that we want to start the string with the string "and"
- the second parameter **"([EXPRESSION])"** indicates that we want to repeat this pattern for each filter. The keywords [EXPRESSION] references a valid keyword of the table Pattern Attribute List
- the third parameter **" and "** indicates that we want to separate each interpreted occurrence of the pattern with the string "and ".
- the fourth parameter **""** of the function indicates that we want to end the string with no specific character.

getFK() Method

Use to return information about a foreign key.

Usage

```
public java.lang.String getFK(java.lang.String pPropertyName)
```

Description

This method returns information relative to the foreign key (or join or reference) of a datastore during a check procedure. It is accessible from a Knowledge Module only if the current task is tagged as a "reference".

In an action, this method returns information related to the foreign key currently handled by the DDL command.

Parameters

Parameter	Type	Description
pPropertyName	String	String containing the name of the requested property.

The following table lists the different possible values for pPropertyName.

Parameter Value	Description
ID	Internal number of the reference constraint. This parameter is deprecated, and included for 11*g* compatibility only. The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode.
GUID	GUID of the foreign key.
FK_NAME	Name of the reference constraint.
FK_TYPE	Type of the reference constraint.
FK_ALIAS	Alias of the reference table (only used in case of a complex expression)
PK_ALIAS	Alias of the referenced table (only used in case of a complex expression)
ID_TABLE_PK	Internal number of the referenced table.
PK_I_MOD	Number of the referenced model.
PK_CATALOG	Catalog of the referenced table in the current context.
PK_SCHEMA	Physical schema of the referenced table in the current context.
PK_TABLE_NAME	Name of the referenced table.
COMPLEX_SQL	Complex SQL statement of the join clause (if appropriate).
MESS	Error message of the reference constraint
FULL_NAME	Full name of the foreign key generated with the local object mask.
<flexfield code>	Flexfield value for this reference.

Examples

```
The current reference key of my table is called: <%=odiRef.getFK("FK_NAME")%>. It
references the table <%=odiRef.getFK("PK_TABLE_NAME")%> that is in the schema <
%=odiRef.getFK("PK_SCHEMA")%>
```

getFKColList() Method

Use to return information about the attributes of a foreign key.

Usage

```
public java.lang.String getFKColList(java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd)
```

Alternative syntax:

```
public java.lang.String getFKColList(
java.lang.String pPattern,
java.lang.String pSeparator)
```

Description

Returns a list of attributes part of a reference constraint (foreign key).

The parameter pPattern in interpreted and repeated for each element of the list, and separated from its predecessor with the parameter pSeparator. The generated string

begins with pStart and ends with pEnd. If no element is selected, pStart and pEnd are omitted and an empty string is returned.

This list contains one element for each attribute of the current foreign key. It is accessible from a Check Knowledge Module only if the current task is tagged as a "reference".

In an action, this method returns the list of the attributes of the foreign key handled by the DDL command, ordered by their position in the key.

In the alternative syntax, any parameters not set are set to an empty string.

Parameters

Parameter	Type	Description
Parameter	Type	Description
pStart	String	This parameter marks the beginning of the string to generate.
pPattern	String	The pattern is repeated for each occurrence in the list. The list of possible attributes in a pattern is detailed in the Pattern Attributes List below. Each attribute occurrence in the pattern string is substituted with its value. The attributes must be between brackets ([and]) Example «My string [COL_NAME] is an attribute»
pSeparator	String	This parameter separates each pattern from its predecessor.
pEnd	String	This parameter marks the end of the string to generate.

Pattern Attributes List

The following table lists the different values of the parameters as well as the associated description.

Parameter Value	Description
I_COL	Attribute internal identifier
COL_NAME	Name of the attribute of the key
COL_HEADING	Header of the attribute of the key
COL_DESC	Description of the attribute of the key
POS	Position of the attribute of the key
LONGC	Length (Precision) of the attribute of the key
SCALE	Scale of the attribute of the key
FILE_POS	Beginning (index) of the attribute
BYTES	Number of physical octets of the attribute
FILE_END_POS	End of the attribute (FILE_POS + BYTES)
IND_WRITE	Write right flag of the attribute
COL_MANDATORY	Mandatory character of the attribute. Valid values are: • 0: not authorized • 1: not null
CHECK_FLOW	Flow control flag of the attribute. Valid values are: • 0: do not check • 1: check

Parameter Value	Description
CHECK_STAT	Static control flag of the attribute. Valid values are: • 0: do not check • 1: check
COL_FORMAT	Logical format of the attribute
COL_DEC_SEP	Decimal symbol for the attribute
REC_CODE_LIST	List of the record codes for the attribute
COL_NULL_IF_ERR	Attribute processing flag. Valid values are: • 0: Reject • 1: Set active trace to null • 2: Set inactive trace to null
DEF_VALUE	Default value of the attribute
EXPRESSION	Not used
CX_COL_NAME	Not used
ALIAS_SEP	Separator used for the alias (from the technology)
SOURCE_DT	Code of the attribute's datatype.
SOURCE_CRE_DT	Create table syntax for the attribute's datatype.
SOURCE_WRI_DT	Create table syntax for the attribute's writable datatype.
DEST_DT	Code of the attribute's datatype converted to a datatype on the target technology.
DEST_CRE_DT	Create table syntax for the attribute's datatype converted to a datatype on the target technology.
DEST_WRI_DT	Create table syntax for the attribute's writable datatype converted to a datatype on the target technology.
PK_I_COL	Internal identifier of the referenced attribute
PK_COL_NAME	Name of the referenced key attribute
PK_COL_HEADING	Header of the referenced key attribute
PK_COL_DESC	Description of the referenced key attribute
PK_POS	Position of the referenced attribute
PK_LONGC	Length of the referenced attribute
PK_SCALE	Precision of the referenced attribute
PK_FILE_POS	Beginning (index) of the referenced attribute
PK_BYTES	Number of physical octets of the referenced attribute
PK_FILE_END_POS	End of the referenced attribute (FILE_POS + BYTES)
PK_IND_WRITE	Write right flag of the referenced attribute
PK_COL_MANDATORY	Mandatory character of the referenced attribute. Valid values are: • 0: null authorized • 1: not null
PK_CHECK_FLOW	Flow control flag of the referenced attribute. Valid values are: • 0: do not check • 1: check
PK_CHECK_STAT	Static control flag of the referenced attribute. Valid values are: • 0: do not check • 1: check

Parameter Value	Description
PK_COL_FORMAT	Logical format of the referenced attribute
PK_COL_DEC_SEP	Decimal separator for the referenced attribute
PK_REC_CODE_LIST	List of record codes retained for the referenced attribute
PK_COL_NULL_IF_ERR	Processing flag of the referenced attribute. Valid values are: • 0: Reject • 1: Set active trace to null • 2: Set inactive trace to null
PK_DEF_VALUE	Default value of the referenced attribute
SCD_COL_TYPE	Behavior defined for the Slowly Changing Dimensions for this attribute in the data model.
<flexfield code>	Flexfield value for the current attribute of the referencing table.

Examples

If the CUSTOMER table references the CITY table on CUSTOMER.COUNTRY_ID = CITY.ID_COUNT and CUSTOMER.CITY_ID = CITY.ID_CIT

the clause:

```
(CUS.COUNTRY_ID = CITY.ID_COUNT and CUS.CITY_ID = CITY.ID_CIT)
```

can also be written:

```
<%=odiRef.getFKColList("(", "CUS.[COL_NAME] = CITY.[PK_COL_NAME]", " and
", ")" )%>
```

Explanation: the getFKColList function will be used to loop on each attribute of the foreign key to generate the clause that begins and ends with a parenthesis and that repeats a pattern separated by **and** for each attribute in the foreign key. Thus

- The first parameter **"("** of the function indicates that we want to begin the string with "("
- The second parameter **"CUS.[COL_NAME] = CITY.[PK_COL_NAME]"** indicates that we want to repeat this pattern for each attribute of the foreign key. The keywords [COL_NAME] and [PK_COL_NAME] reference valid keywords in the table Pattern Attributes List
- The third parameter**" and "** indicates that we want to separate the occurrences of the pattern with the string " and ".
- The fourth parameter **")"** of the function indicates that we want to end the string with ")".

getFlexFieldValue() Method

Use to return the value of a flexfield.

Usage

```
public java.lang.String getFlexFieldValue(java.lang.String pI_Instance,
java.lang.String pI_Object, java.lang.String pFlexFieldCode)
```

Description

This method returns the value of an Object Instance's Flexfield.

Parameters

Parameter	Type	Description
pI_Instance	String	**Internal Identifier** of the Object Instance, as it appears in the version tab of the object instance window.
pI_Object	String	**Internal Identifier** of the Object type, as it appears in the version tab of the **object** window for the object type.
pPropertyName	String	Flexfield Code which value should be returned.

Examples

```
<%=odiRef.getFlexFieldValue("32001","2400","MY_DATASTORE_FIELD")%>
```

Returns the value of the flexfield MY_DATASTORE_FIELD, for the object instance of type datastore (Internal ID for datastores is 2400), with the internal ID 32001.

getFormattedName() Method

Use to construct a name with text, and ODI prefixes.

Usage

```
public java.lang.String getFormattedName(java.lang.String pName)

public java.lang.String getFormattedName(java.lang.String pName,java.lang.String
pTechnology)
```

Description

Use to construct a name that is based on some text, ODI prefixes, and is valid for an optional technology. The text can contain the prefixes available for getObjectName() Method, e.g. %INT_PRF, %COL_PRF, %ERR_PRF, %IDX_PRF along with %UNIQUE_STEP_TAG or %UNIQUE_SESSION_TAG. The latter tags will be expanded if unique names are enabled. Calls to this API within the same execution context are guaranteed to return the same unique name provided that the same parameters are passed to the call.

Parameters

Parameter	Type	Description
pName	String	Name that is used as the initial key, and can contain other ODI prefixes.
pTechnology	String	An optional technology that the returned name will be validated. For, e.g. name length.

Examples

```
<%=odiRef.getFormattedName("%COL_PRFMY_TABLE%UNIQUE_STEP_TAG_AE", "ORACLE")%>
might result in
C$_MY_TAB7wDiBe80vBog1auacS1xB _AE

<?=getFormattedName( "<%=getTableName("COLL_SHORT_NAME")%>.ctl", "FILE" )%>"
might result in:-
C$_0DEFAULT.ctl
or, if unique names are enabled
C_0DEFAULTAhbxZoeJ2zznXYpnDzhkm.ctl

C$_0
```

getFrom() Method

Use to return the SQL FROM clause in the given context.

Usage

```
public java.lang.String getFrom(java.lang.Int pDSIndex)
```

Description

Allows the retrieval of the SQL string of the **FROM** in the source **SELECT** clause for a given data set. The **FROM** statement is built from tables and joins (and according to the SQL capabilities of the technologies) that are used in this data set.

For a technology that supports ISO outer joins and parenthesis, getFrom() could return a string such as:

```
((CUSTOMER as CUS inner join CITY as CIT on (CUS.CITY_ID = CIT.CITY_ID))
left outer join SALES_PERSON as SP on (CUS.SALES_ID = SP.SALE_ID))
```

In IKMs only, the pDSIndex parameter identifies which of the data sets is taken into account by this command.

> **Note:**
>
> The pDSIndex parameter can be omitted when this method is used in an LKM. It can be also omitted for IKMs. In this case, the data set taken into account is the first one.

If there is a journalized datastore in source of the mapping, the source table in the clause is replaced by the data view linked to the journalized source datastore.

If one of the source datastores is a temporary datastore with the Use Temporary Mapping as Derived Table (Sub-Select) box selected then a sub-select statement will be generated for this temporary source by the getFrom method.

If partitioning is used on source datastores, this method automatically adds the partitioning clauses when returning the object names.

Note that this method automatically generates lookups with no specific code required.

Parameters

Parameter	Type	Description
pDSIndex	Int	Index identifying which of the data sets is taken into account by this command.

Examples

```
insert into <%=odiRef.getTable("L", "COLL_NAME", "W")%>
select <%=odiRef.getColList("", "[EXPRESSION]", ", ", "", "INS=1")%>
from <%=odiRef.getFrom()%>
where (1=1)
<%=odiRef.getJoin()%>
<%=odiRef.getFilter()%>
<%=odiRef.getGrpBy()%>
<%=odiRef.getHaving()%>
```

getGrpBy() Method

Use to return the entire SQL GROUP BY clause in the given context.

Usage

```
public java.lang.String getGrpBy(java.lang.Int pDSIndex)
```

Description

Allows you to retrieve the SQL GROUP BY string (on the "source" during the loading phase, on the staging area during the integration phase) for a given data set. This statement is automatically computed from the aggregation transformations detected in the mapping expressions.

In IKMs only, the pDSIndex parameter identifies which of the data sets is taken into account by this command.

> **Note:**
>
> The pDSIndex parameter can be omitted when this method is used in an LKM. It can be also omitted for IKMs. In this case, the data set taken into account is the first one.

Parameters

Parameter	Type	Description
pDSIndex	Int	Index identifying which of the data sets is taken into account by this command.

Examples

```
insert into <%=odiRef.getTable("L", "COLL_NAME", "W")%>
select <%=odiRef.getColList("", "[EXPRESSION]", ", ", "", "INS=1")%>
from <%=odiRef.getFrom()%>
```

```
where (1=1)
<%=odiRef.getJoin()%>
<%=odiRef.getFilter()%>
<%=odiRef.getGrpBy()%>
<%=odiRef.getHaving()%>
```

getGrpByList() Method

Use to return properties for each GROUP BY clause for a given data set in a mapping. The properties are organized according to a string pattern.

Usage

```
public java.lang.String getGrpByList(
java.lang.Int pDSIndex,
java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd)
```

Alternative syntax:

```
public java.lang.String getGrpByList(
java.lang.Int pDSIndex,
java.lang.String pPattern,
java.lang.String pSeparator)
```

Description

Returns a list of occurrences of SQL GROUP BY for a given data set of a mapping.

In IKMs only, the pDSIndex parameter identifies which of the data sets is taken into account by this command.

> **Note:**
>
> The pDSIndex parameter can be omitted when this method is used in an LKM. It can be also omitted for IKMs. In this case, the data set taken into account is the first one.

The pPattern parameter is interpreted, then repeated for each element of the list and separated from its predecessor with the pSeparator parameter. The generated string begins with pStart and ends with pEnd. If no element is selected, pStart and pEnd are omitted and an empty string is returned.

This list contains an element for each GROUP BY statement on the source or target (according to the Knowledge Module that used it).

In the alternative syntax, any parameters not set are set to an empty string.

Parameters

Parameter	Type	Description
pDSIndex	Int	Index identifying which of the data sets is taken into account by this command.

Parameter	Type	Description
pStart	String	This parameter marks the beginning of the string to generate.
pPattern	String	The pattern is repeated for each occurrence in the list. The list of possible attributes in a pattern is detailed in the Pattern Attributes List below. Each attribute occurrence in the pattern string is substituted with its value. The attributes must be between brackets ([and]) Example «My string [COL_NAME] is an attribute»
pSeparator	String	This parameter is used to separate each pattern from its predecessor.
pEnd	String	This parameter marks the end of the string to be generated.

Pattern Attributes List

The following table lists the different values of the parameters as well as their associated description.

Parameter Value	Description
ID	Internal identifier of the clause
EXPRESSION	Text of the grouping statement

Examples

```
insert into <%=odiRef.getTable("L", "COLL_NAME", "W")%>
select <%=getColList("", "[EXPRESSION]", ", ", "", "INS=1")%>
from <%=odiRef.getFrom()%>
where (1=1)
<%=odiRef.getJoin()%>
<%=odiRef.getFilter()%>
<%=odiRef.getGrpByList("group by ", "[EXPRESSION]", " , ", "")%>
<%=odiRef.getHaving()%>
```

Explanation: the getGrpByList function will be used to generate the **group by** clause of the **select** order that must start with "group by" and that repeats a pattern (each grouping expression) separated by commas for each expression.

- The first parameter **"group by"** of the function indicates that we want to start the string with "group by"
- The second parameter **"[EXPRESSION]"** indicates that we want to repeat this pattern for each group by expression. The keyword [EXPRESSION] references a valid keyword of the table Pattern Attributes List
- The third parameter **", "** indicates that we want to separate the interpreted occurrences of the pattern with a comma.
- The fourth parameter **""** of the function indicates that we want to end the string with no specific character

getHaving() Method

Use to return the entire SQL HAVING clause in the given context.

Usage

```
public java.lang.String getHaving(java.lang.Int pDSIndex)
```

Description

Allows the retrieval of the SQL statement HAVING (on the source during loading, on the staging area during integration) for a given data set. This statement is automatically computed from the filter expressions containing detected aggregation functions.

In IKMs only, the pDSIndex parameter identifies which of the data sets is taken into account by this command.

> **Note:**
>
> The pDSIndex parameter can be omitted when this method is used in an LKM. It can be also omitted for IKMs. In this case, the data set taken into account is the first one.

Parameters

Parameter	Type	Description
pDSIndex	Int	Index identifying which of the data sets is taken into account by this command.

Examples

```
insert into <%=odiRef.getTable(
"L", "COLL_NAME", "W")%>
select <%=odiRef.getColList("", "[EXPRESSION]", ", ", "", "INS=1")%>
from <%=odiRef.getFrom()%>
where (1=1)
 <%=odiRef.getJoin()%>
<%=odiRef.getFilter()%>
<%=odiRef.getGrpBy()%>
<%=odiRef.getHaving()%>
```

getHavingList() Method

Use to return properties for each HAVING clause of a mapping. The properties are organized according to a string pattern.

Usage

```
public java.lang.String getHavingList(
java.lang.Int pDSIndex,
java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd)
```

Alternative syntax:

```
public java.lang.String getHavingList(
java.lang.Int pDSIndex,
java.lang.String pPattern,
java.lang.String pSeparator)
```

Description

Returns a list of the occurrences of SQL HAVING of a given data set in a mapping.

In IKMs only, the pDSIndex parameter identifies which of the data sets is taken into account by this command.

> **Note:**
>
> The pDSIndex parameter can be omitted when this method is used in an LKM. It can be also omitted for IKMs. In this case, the data set taken into account is the first one.

The parameter pPattern is interpreted and repeated for each element of the list, and separated from its predecessor with the parameter pSeparator. The generated string begins with pStart and ends with pEnd. If no element is selected, pStart and pEnd are omitted and an empty string is returned.

This list contains one element for each HAVING expression to execute on the source or target (depends on the Knowledge module that uses it).

In the alternative syntax, any parameters not set are set to an empty string.

Parameters

Parameters	Type	Description
pDSIndex	Int	Index identifying which of the data sets is taken into account by this command.
pStart	String	This parameter marks the beginning of the string to generate.
pPattern	String	The pattern is repeated for each occurrence in the list. The list of authorized attributes in a pattern is detailed in the Pattern Attributes List below. Each attribute occurrence in the pattern string is substituted with its value. The attributes must be between brackets ([and]) Example «My string [COL_NAME] is an attribute»
pSeparator	String	This parameter separates each pattern from its predecessor.
pEnd	String	This parameter marks the end of the string to generate.

Pattern Attributes List

The following table lists the different values of the parameters as well as the associated description.

Parameter Value	Description
Parameter value	Description

Parameter Value	Description
ID	Internal identifier of the clause
EXPRESSION	Text of the having expression

Examples

```
insert into <%=odiRef.getTable("L", "COLL_NAME", "W")%>
select <%=getColList("", "[EXPRESSION]", ", ", "", "INS=1")%>
from <%=odiRef.getFrom()%>
where (1=1)
<%=odiRef.getJoin()%>
<%=odiRef.getFilter()%>
<%=odiRef.getGrpByList("group by ", "[EXPRESSION]", " , ", "")%>
<%=odiRef.getHavingList("having ", "([EXPRESSION])", " and ", "")%>
```

Explanation: The getHavingList function will be used to generate the having clause of the select order that must start with "having" and that repeats a pattern (each aggregated filtered expression) separated by "and" for each expression.

- The first parameter **"having "** of the function indicates that we want to start the string with "having"
- The second parameter **"([EXPRESSION])"** indicates that we want to repeat this pattern for each aggregated filter. The keyword [EXPRESSION] references a valid keyword of the table Pattern Attributes List
- The third parameter**" and "** indicates that we want to separate each interpreted occurrence of the pattern with the string " and ".
- The fourth parameter **""** of the function indicates that we want to end the string with no specific character

getIndex() Method

Use to return information about a specific index handled by an action.

Usage

```
public java.lang.String getIndex(java.lang.String pPropertyName)
```

Description

In an action, this method returns information related to the index currently handled by the DDL command.

Parameters

Parameter	Type	Description
pPropertyName	String	String containing the name of the requested property.

The following table lists the different possible values for pPropertyName.

Parameter Value	Description
ID	Internal number of the index.
KEY_NAME	Name of the index
FULL_NAME	Full name of the index generated with the local object mask.
<flexfield code>	Value of the flexfield for this index.

getIndexColList() Method

Use to return information about the attributes of an index handled by an action.

Usage

```
public java.lang.String getIndexColList(java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd)
```

Description

In an action, this method returns the list of the attributes of the index handled by the DDL command, ordered by their position in the index.

The pPattern parameter is interpreted and then repeated for each element of the list. It is separated from its predecessor by the pSeparator parameter. The generated string starts with pStart and ends with pEnd. If no element is selected, pStart and pEnd are omitted and an empty string is returned.

This list contains an element for each attribute of the current index.

Parameters

Parameters	Type	Description
pStart	String	This sequence marks the beginning of the string to generate.
pPattern	String	The pattern is repeated for each occurrence in the list. The list of attributes that can be used in a pattern is detailed in the Pattern Attributes List below. Each attribute occurrence in the pattern sequence is replaced with its value. The attributes must be between brackets. ([and]) Example «My string [COL_NAME] is an attribute»
pSeparator	String	This parameter separates each pattern from its predecessor.
pEnd	String	This sequence marks the end of the string to generate.

Pattern Attributes List

The following table lists the different values of the parameters as well as their associated description.

Parameter Value	Description
I_COL	Attribute internal identifier

Parameter Value	Description
COL_NAME	Name of the index attribute
COL_HEADING	Header of the index attribute
COL_DESC	Attribute description
POS	Position of the attribute
LONGC	Length (Precision) of the attribute
SCALE	Scale of the attribute
FILE_POS	Beginning position of the attribute (fixed file)
BYTES	Number of physical bytes of the attribute
FILE_END_POS	End of the attribute (FILE_POS + BYTES)
IND_WRITE	Write right flag of the attribute
COL_MANDATORY	Mandatory character of the attribute. Valid values are: • 0: null authorized • 1: non null
CHECK_FLOW	Flow control flag for of the attribute. Valid values are: • 0: do not check • 1: check
CHECK_STAT	Static control flag of the attribute. Valid values are: • 0: do not check • 1: check
COL_FORMAT	Logical format of the attribute
COL_DEC_SEP	Decimal symbol for the attribute
REC_CODE_LIST	List of the record codes retained for the attribute
COL_NULL_IF_ERR	Processing flag for the attribute. Valid values are: • 0: Reject • 1: Set active trace to null • 2: Set inactive trace to null
DEF_VALUE	Default value for the attribute
EXPRESSION	Not used
CX_COL_NAME	Not used
ALIAS_SEP	Grouping symbol used for the alias (from the technology)
SOURCE_DT	Code of the attribute's datatype.
SOURCE_CRE_DT	Create table syntax for the attribute's datatype.
SOURCE_WRI_DT	Create table syntax for the attribute's writable datatype.
DEST_DT	Code of the attribute's datatype converted to a datatype on the target technology.
DEST_CRE_DT	Create table syntax for the attribute's datatype converted to a datatype on the target technology.
DEST_WRI_DT	Create table syntax for the attribute's writable datatype converted to a datatype on the target technology.
SCD_COL_TYPE	Behavior defined for the Slowly Changing Dimensions for this attribute in the data model.
<flexfield code>	Flexfield value for the current attribute.

getInfo() Method

Use to return information about the current task.

Usage

```
public java.lang.String getInfo(java.lang.String pPropertyName)
```

Description

This method returns information about the current task. The list of available information is described in the pPropertyName values table.

Parameters

Parameter	Type	Description
pPropertyName	String	String containing the name of the requested property.

The following table lists the different values possible for pPropertyName:

Parameter Value	Description
ERR_NAME	Name of the error table
I_SRC_SET	Numeric ID of the current execution unit if the current task is in the context of an LKM. This parameter is deprecated, and included for 11g compatibility only. The ID property is valid if the repository is in 11g compatibility mode, but an error message will be returned if the repository is in 12c mode. GUID_SRC_SET is the replacement
GUID_SRC_SET	Globally unique ID of the current Execution Unit if the task belongs to a Loading Knowledge Module
SRC_SET_NAME	Name of the current execution unit if the current task belongs to a Loading Knowledge Module
COLL_NAME	Name of the collection table used to stage data during loading
INT_NAME	Name of the integration table
TARG_NAME	Name of the target table
SRC_CATALOG	Name of the source catalog, derived from the logical schema and context
SRC_SCHEMA	Name of the physical source schema, derived from the logical schema and context
SRC_WORK_CATALOG	Name of the physical source work catalog, derived from the logical schema and context
SRC_WORK_SCHEMA	Name of the physical source work schema, derived from the logical schema and context
DEST_CATALOG	Name of the physical target catalog, derived from the logical schema and context
DEST_SCHEMA	Name of the physical target schema, derived from the logical schema and context
DEST_WORK_CATALOG	Name of the physical target work catalog, derived from the logical schema and context

Parameter Value	Description
DEST_WORK_SCHEMA	Name of the physical target work schema, derived from the logical schema and context
SRC_TECHNO_NAME	Name of the source technology
SRC_CON_NAME	Name of the source connection
SRC_DSERV_NAME	Name of the data server of the source machine
SRC_CONNECT_TYPE	Connection type of the source machine
SRC_IND_JNDI	JNDI URL flag
SRC_JAVA_DRIVER	Name of the JDBC driver of the source connection
SRC_JAVA_URL	JDBC URL of the source connection
SRC_JNDI_AUTHENT	JNDI authentication type
SRC_JNDI_PROTO	JNDI source protocol
SRC_JNDI_FACTORY	JNDI source Factory
SRC_JNDI_URL	Source JNDI URL
SRC_JNDI_RESSOURCE	Accessed source JNDI resource
SRC_JNDI_USER	User name for JNDI authentication on the source.
SRC_JNDI_ENCODED_PASS	Encrypted password for JNDI authentication on the source.
SRC_USER_NAME	User name of the source connection
SRC_ENCODED_PASS	Encrypted password of the source connection
SRC_FETCH_ARRAY	Size of the source array fetch
SRC_BATCH_UPDATE	Size of the source batch update
SRC_EXE_CHANNEL	Execution channel of the source connection
SRC_COL_ALIAS_WORD	Term used to separated the attributes from their aliases for the source technology
SRC_TAB_ALIAS_WORD	Term used to separated the tables from their aliases for the source technology
SRC_DATE_FCT	Function returning the current date for the source technology
SRC_DDL_NULL	Returns the definition used for the keyword NULL during the creation of a table on the source
SRC_MAX_COL_NAME_LEN	Maximum number of characters for the attribute name on the source technology
SRC_MAX_TAB_NAME_LEN	Maximum number of characters for the table name on the source technology
SRC_REM_OBJ_PATTERN	Substitution model for a remote object on the source technology.
SRC_LOC_OBJ_PATTERN	Substitution model for a local object name on the source technology.
DEST_TECHNO_NAME	Name of the target technology
DEST_CON_NAME	Name of the target connection
DEST_DSERV_NAME	Name of the data server of the target machine
DEST_CONNECT_TYPE	Connection type of the target machine
DEST_IND_JNDI	Target JNDI URL flag
DEST_JAVA_DRIVER	Name of the JDBC driver of the target connection

Parameter Value	Description
DEST_JAVA_URL	JDBC URL of the target connection
DEST_JNDI_AUTHENT	JNDI authentication type of the target
DEST_JNDI_PROTO	JNDI target protocol
DEST_JNDI_FACTORY	JNDI target Factory
DEST_JNDI_URL	JNDI URL of the target
DEST_JNDI_RESSOURCE	Target JNDI resource that is accessed
DEST_JNDI_USER	User name for JNDI authentication on the target.
DEST_JNDI_ENCODED_PASS	Encrypted password for JNDI authentication on the target.
DEST_USER_NAME	Name of the user for the target connection
DEST_ENCODED_PASS	Encrypted password for the target connection
DEST_FETCH_ARRAY	Size of the target array fetch
DEST_BATCH_UPDATE	Size of the target batch update
DEST_EXE_CHANNEL	Execution channel of the target connection
DEST_COL_ALIAS_WORD	Term used to separate the attributes from their aliases on the target technology
DEST_TAB_ALIAS_WORD	Term used to separate the tables from their aliases on the target technology
DEST_DATE_FCT	Function returning the current date on the target technology
DEST_DDL_NULL	Function returning the definition used for the keyword NULL during the creation on a table on the target
DEST_MAX_COL_NAME_LEN	Maximum number of characters of the attribute in the target technology
DEST_MAX_TAB_NAME_LEN	Maximum number of characters of the table name on the target technology
DEST_REM_OBJ_PATTERN	Substitution model for a remote object on the target technology
DEST_LOC_OBJ_PATTERN	Substitution model for a local object name on the target technology
CT_ERR_TYPE	Error type (F: Flow, S: Static). Applies only in the case of a Check Knowledge Module
CT_ERR_ID	Internal error table ID. This parameter is deprecated, and included for 11g compatibility only. The ID property is valid if the repository is in 11g compatibility mode. CT_ERR_GUID must be used with version 12c
CT_ERR_GUID	Globally unique ID of the error table
CT_ORIGIN	Name of a table for static control, or name of a mapping prefixed with the project code
JRN_NAME	Journalized datastore name
JRN_VIEW	Name of the view associated with the journalized datastore
JRN_DATA_VIEW	Name of the data view associated with the journalized datastore
JRN_TRIGGER	Name of the trigger associated with the journalized datastore
JRN_ITRIGGER	Name of the insert trigger associated with the journalized datastore

Parameter Value	Description
JRN_UTRIGGER	Name of the update trigger associated with the journalized datastore
JRN_DTRIGGER	Name of the delete trigger associated with the journalized datastore
SUBSCRIBER_TABLE	Name of the subscriber table
CDC_SET_TABLE	Name of the CDC set table
CDC_TABLE_TABLE	Name of the datastore that contains the list of tables associated with sets
CDC_SUBS_TABLE	Name of the datastore that contains the list of subscribers that are subscribed to sets
CDC_OBJECTS_TABLE	Name of the datastore that contains the list of the objects added to sets
SRC_DEF_CATALOG	Name of the catalog of the source physical schema, based on the current context
SRC_DEF_SCHEMA	Default schema for the source data server
SRC_DEFW_CATALOG	Default work catalog for the source data server
SRC_DEFW_SCHEMA	Default work schema for the source data server
DEST_DEF_CATALOG	Default catalog for the target data server
DEST_DEF_SCHEMA	Default schema for the target data server
DEST_DEFW_CATALOG	Default work catalog for the target data server
DEST_DEFW_SCHEMA	Default work schema for the target data server
SRC_LSCHEMA_NAME	Source logical schema name
DEST_LSCHEMA_NAME	Target logical schema name
SRC_I_CONNECT	Numeric ID of the source connection, based on the current context. This parameter is deprecated, and included for 11g compatibility only. The ID property is valid if the repository is in 11g compatibility mode, but an error message will be returned if the repository is in 12c mode. SRC_CONNECT_GUID is the 12c replacement
SRC_CONNECT_GUID	Globally unique ID of the source connection
SRC_I_PSCHEMA	Numeric ID of the source physical schema, based on the current context. This parameter is deprecated, and included for 11g compatibility only. The ID property is valid if the repository is in 11g compatibility mode, but an error message will be returned if the repository is in 12c mode. SRC_PSCHEMA_GUID is the 12c replacement
SRC_PSCHEMA_GUID	Globally unique ID of the source physical schema, based on the current context
SRC_I_LSCHEMA	Numeric ID of the source logical schema. This parameter is deprecated, and included for 11g compatibility only. The ID property is valid if the repository is in 11g compatibility mode, but an error message will be returned if the repository is in 12c mode. SRC_LSCHEMA_GUID is the 12c replacement
SRC_LSCHEMA_GUID	Globally unique ID of the source logical schema

Parameter Value	Description
SRC_I_TECHNO	Numeric ID of the source technology. This parameter is deprecated, and included for 11g compatibility only. The ID property is valid if the repository is in 11g compatibility mode, but an error message will be returned if the repository is in 12c mode. SRC_TECHNO_GUID is the 12c replacement
SRC_TECHNO_GUID	Globally unique ID of the source technology
DEST_I_CONNECT	Numeric ID of the target connection, based on the current context. This parameter is deprecated, and included for 11g compatibility only. The ID property is valid if the repository is in 11g compatibility mode, but an error message will be returned if the repository is in 12c mode. DEST_CONNECT_GUID is the 12c replacement
DEST_CONNECT_GUID	Globally unique ID of the target connection
DEST_I_PSCHEMA	Numeric ID of the target physical schema, based on the current context. This parameter is deprecated, and included for 11g compatibility only. The ID property is valid if the repository is in 11g compatibility mode, but an error message will be returned if the repository is in 12c mode. DEST_PSCHEMA_GUID is the 12c replacement
DEST_PSCHEMA_GUID	Globally unique ID of the target physical schema, based on the current context
DEST_I_LSCHEMA	Numeric ID of the target logical schema. This parameter is deprecated, and included for 11g compatibility only. The ID property is valid if the repository is in 11g compatibility mode, but an error message will be returned if the repository is in 12c mode. DEST_LSCHEMA_GUID is the 12c replacement
DEST_LSCHEMA_GUID	Globally unique ID of the target logical schema
DEST_I_TECHNO	Numeric ID of the target technology. This parameter is deprecated, and included for 11g compatibility only. The ID property is valid if the repository is in 11g compatibility mode, but an error message will be returned if the repository is in 12c mode. DEST_TECHNO_GUID is the 12c replacement
DEST_TECHNO_GUID	Globally unique ID of the target technology
UNIQUE_STEP_TAG	Tag used to make names unique in the scope of the current Step
UNIQUE_SESSION_TAG	Tag used to make names unique in the scope of the current Session
IS_CONCURRENT	Returns 1 if the current task is using unique names for the temporary objects
SRC_SET_GUID	GUID of the current Execution Unit if the task belongs to a Loading Knowledge Module
ODI_MAJOR_VERSION	The major product version for the current ODI installation. For example, if your current release is 12.1.3.0.0, returns **12**
SRC_PASS	Returns clear text password to source data server connection
DEST_PASS	Returns clear text password to target data server connection

Examples

```
The current source condition is: <%=odiRef.getInfo("SRC_CON_NAME")%>  on server: <
%=odiRef.getInfo("SRC_DSERV_NAME")%>
```

getJDBCConnection() Method

Use to return the source or target JDBC connection.

Usage

```
java.sql.Connection getJDBCConnection(
java.lang.String pPropertyName)
```

Description

This method returns the source or target JDBC connection for the current task.

> **Note:**
>
> - This method does not return a string, but a JDBC connection object. This object may be used in your Java code within the task.
> - It is recommended to close the JDBC connections acquired using this method once you are done with the connection. This will improve the concurrency if your KM is used in ODI mappings.

Parameters

Parameter	Type	Description
pPropertyName	String	Name of connection to be returned.

The following table lists the different values possible for pPropertyName:

Parameter Value	Description
SRC	Source connection for the current task.
DEST	Target connection for the current task.
WORKREP	Work Repository connection.

Examples

Gets the source connection and creates a statement for this connection.

```
java.sql.Connection sourceConnection = odiRef.getJDBCConnection("SRC");
java.sql.Statement s = sourceConnection.createStatement();
```

getJDBCConnection("WORKREP")

getJDBCConnection("WORKREP") is a restricted API.

Master Repository connection holds security data. To control who gets direct JDBC access to Master Repository, this API will return a valid connection under any of the following conditions:

- Master and work repositories are in different schemas.
- Master and work repositories are in the same schema and you have the specific privilege called "Create JDBC Connection" which is a newly introduced privilege on Master Repository object.

If these conditions are not met then odiRef.getJDBCConnection("WORKREP") will throw following error:

ODI-14179: For security reason you cannot use odiRef.getJDBCConnection ("WORKREP") since your work repository and master repository use the same database schema.

If you require direct JDBC access to work repository connection during scenario execution, please ask your Oracle Data Integrator Administrator to grant you <Create JDBC Connection> permission on Master Repository object from Oracle Data Integrator Studio Security Explorer and then try again. Please note that the <Create JDBC Connection> permission is located under Master Repository object in the Objects section from Security Explorer.

getJDBCConnectionFromLSchema() Method

Use to return a JDBC connection for a given logical schema.

Usage

```
public java.lang.String getJDBCConnectionFromLSchema(
java.lang.String pLogicalSchemaName,
java.lang.String pContextName)

public java.lang.String getJDBCConnectionFromLSchema(
java.lang.String pLogicalSchemaName)
```

Description

Returns a JDBC connection for a given logical schema. The pLogicalSchemaName identifies the logical schema.

The first syntax resolves the logical schema in the context provided in the pContextName parameter.

The second syntax resolves the logical schema in the current context.

Parameters

Parameter	Type	Description
pLogicalSchemaName	String	Name of the forced logical schema of the object.
pContextName	String	Forced context of the object

> **Note:**
>
> - This method does not return a string, but a JDBC connection object. This object may be used in your Java code within the task.
> - It is recommended to close the JDBC connections acquired using this method once you are done with the connection. This will improve the concurrency if your KM is used in ODI mappings.

getJoin() Method

Use to return the entire WHERE clause section generated for the joins of a mapping.

Usage

```
public java.lang.String getJoin(java.lang.Int pDSIndex)
```

Description

Retrieves the SQL join string (on the source during the loading, on the staging area during the integration) for a given data set of a mapping.

In IKMs only, the pDSIndex parameter identifies which of the data sets is taken into account by this command.

> **Note:**
>
> The pDSIndex parameter can be omitted when this method is used in an LKM. It can be also omitted for IKMs. In this case, the data set taken into account is the first one.

Parameters

Parameter	Type	Description
pDSIndex	Int	Index identifying which of the data sets is taken into account by this command.

Examples

```
insert into <%=odiRef.getTable("L", "COLL_NAME", "W")%>
select <%=odiRef.getColList("", "[EXPRESSION]", ", ", "", "INS=1")%>
from <%=odiRef.getFrom()%>
where (1=1)
<%=odiRef.getJoin()%>
<%=odiRef.getFilter()%>
<%=odiRef.getGrpBy()%>
<%=odiRef.getHaving()%>
```

getJoinList() Method

Use to return properties for each join of a mapping. The properties are organized according to a string pattern.

Usage

```
public java.lang.String getJoinList(
java.lang.Int pDSIndex,
java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd)
```

Alternative syntax:

```
public java.lang.String getJoinList(
java.lang.Int pDSIndex,
java.lang.String pPattern,
java.lang.String pSeparator)
```

Description

Returns a list of the occurrences of the SQL joins in a given data set of a mapping for the WHERE clause.

In IKMs only, the pDSIndex parameter identifies which of the data sets is taken into account by this command.

> **Note:**
>
> The pDSIndex parameter can be omitted when this method is used in an LKM. It can be also omitted for IKMs. In this case, the data set taken into account is the first one.

The pPattern parameter is interpreted and then repeated for each element in the list and separated from its predecessor with the parameter pSeparator. The generated string begins with pStart and ends up with pEnd.

In the alternative syntax, any parameters not set are set to an empty string.

Parameters

Parameter	Type	Description
pDSIndex	Int	Index identifying which of the data sets is taken into account by this command.
pStart	String	This parameter marks the beginning of the string to generate.

Parameter	Type	Description
pPattern	String	The pattern is repeated for each occurrence in the list. The list of authorized attributes in a pattern is detailed in the Pattern Attributes List below. Each attribute occurrence in the pattern string is substituted with its value. The attributes must be between brackets ([and]) Example My string [COL_NAME] is an attribute»
pSeparator	String	This parameter separates each pattern from its predecessor.
pEnd	String	This parameter marks the end of the string to generate.

Pattern Attributes List

The following table lists the different values of the parameters as well as the associated description.

Parameter Value	Description
ID	Internal identifier of the join
EXPRESSION	Text of the join expression

Examples

```
insert into <%=odiRef.getTable("L", "COLL_NAME", "W")%>
select <%=odiRef.getColList("", "[EXPRESSION]", ", ", "", "INS=1")%>
from <%=odiRef.getFrom()%>
where (1=1)
<%=odiRef.getJoinList("and ","([EXPRESSION])"," and ","")%>
<%=odiRef.getFilterList("and ","([EXPRESSION])"," and ","")%>
<%=odiRef.getGrpBy()%>
<%=odiRef.getHaving()%>
```

Explanation: the getJoinList function will be used to generate join expressions to put in the WHERE part of the SELECT statement that must start with "and" and that repeats a pattern (the expression of each join) separated by " and " for each join. Thus:

- The first parameter **"and"** of the function indicates that we want to start the string with "and"
- The second parameter **"([EXPRESSION])"** indicates that we want to repeat this pattern for each join. The keyword [EXPRESSION] references a valid keyword of the table Pattern Attributes List
- The third parameter **" and "** indicates that we want to separate each interpreted occurrence of the pattern with " and " (note the spaces before and after "and")
- The fourth parameter **""** of the function indicates that we want to end the string with no specific character

getJrnFilter() Method

Use to return the journalizing filter of a mapping.

Usage

```
public java.lang.String getJrnFilter(java.lang.Int pDSIndex)
```

Description

Returns the SQL Journalizing filter for a given data set in the current mapping. If the journalized table in the source, this method can be used during the loading phase. If the journalized table in the staging area, this method can be used while integrating.

In IKMs only, the pDSIndex parameter identifies which of the data sets is taken into account by this command.

> **Note:**
>
> The pDSIndex parameter can be omitted when this method is used in an LKM. It can be also omitted for IKMs. In this case, the data set taken into account is the first one.

Parameters

Parameter	Type	Description
pDSIndex	Int	Index identifying which of the data sets is taken into account by this command.

Examples

```
<%=odiRef.getJrnFilter()%>
```

getJrnInfo() Method

Use to return journalizing information about a datastore.

Usage

```
public java.lang.String getJrnInfo(java.lang.String pPropertyName)
```

Description

Returns information about a datastore's journalizing for a JKM while journalizing a model or datastore, or for a LKM or IKM in a mapping.

> **Note:**
>
> Journalizing information is only available when the code is generated in ODI Studio. The same odiRef.getInfo() call returns an empty string if it is evaluated in the agent (when the call is wrapped inside <? ... ?> or <@ ... @>), because the metadata about journalizing is not available anymore in the runtime repository.

Parameters

Parameter	Type	Description
pPropertyName	String	String containing the name of the requested property.

The following table lists the different values possible for pPropertyName:

Parameter Value	Description
FULL_TABLE_NAME	Full name of the journalized datastore.
JRN_FULL_NAME	Full name of the journal datastore.
JRN_FULL_VIEW	Full name of the view linked to the journalized datastore.
JRN_FULL_DATA_VIEW	Full name of the data view linked to the journalized datastore.
JRN_FULL_TRIGGER	Full name of the trigger linked to the journalized datastore.
JRN_FULL_ITRIGGER	Full name of the Insert trigger linked to the journalized datastore.
JRN_FULL_UTRIGGER	Full name of the Update trigger linked to the journalized datastore.
JRN_FULL_DTRIGGER	Full name of the Delete trigger linked to the journalized datastore.
SNP_JRN_SUBSCRIBER	Name of the subscriber table in the work schema.
JRN_NAME	Name of the journalized datastore.
JRN_VIEW	Name of the view linked to the journalized datastore.
JRN_DATA_VIEW	Name of the data view linked to the journalized datastore.
JRN_TRIGGER	Name of the trigger linked to the journalized datastore.
JRN_ITRIGGER	Name of the Insert trigger linked to the journalized datastore.
JRN_UTRIGGER	Name of the Update trigger linked to the journalized datastore.
JRN_DTRIGGER	Name of the Delete trigger linked to the journalized datastore.
SUBSCRIBER	Name of the subscriber.
JRN_COD_MOD	Code of the journalized data model.
JRN_METHOD	Journalizing Mode (consistent or simple).
CDC_SET_TABLE	Full name of the table containing list of CDC sets.
CDC_TABLE_TABLE	Full name of the table containing the list of tables journalized through CDC sets.
CDC_SUBS_TABLE	Full name of the table containing the list of subscribers to CDC sets.
CDC_OBJECTS_TABLE	Full name of the table containing the journalizing parameters and objects.

Examples

```
The table being journalized is <%=odiRef.getJrnInfo("FULL_TABLE_NAME")%>
```

getLoadPlanInstance() Method

Use to return the Load Plan instance information.

Usage

```
public java.lang.String getLoadPlanInstance (java.lang.String pPropertyName)
```

Description

This method returns the current execution instance information for a Load Plan.

Parameters

Parameter	Type	Description
pPropertyName	String	String that contains the name of the requested property.

The following table lists the possible values for pPropertyName:

Parameter Value	Description
BATCH_ID	Description
BATCH_GUID	Internal number of the reference constraint. This parameter is deprecated, and included for 11*g* compatibility only. The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode.
RESTART_ATTEMPTS	GUID of the foreign key.
LOAD_PLAN_NAME	Name of the reference constraint.
START_DATE	Type of the reference constraint.

Examples

The current Load Plan `<%=odiRef.getLoadPlanInstance("LOAD_PLAN_NAME")%>` started execution at `<%=odiRef.getLoadPlanInstance("START_DATE")%>`

getModel() Method

Use to return information about a model.

Usage

```
public java.lang.String getModel(java.lang.String pPropertyName)
```

Description

This method returns information on the current data model during the processing of a personalized reverse engineering. The list of available data is described in the pPropertyName values table.

> **Note:**
>
> This method may be used on the source connection (data server being reverse-engineered) as well as on the target connection (repository). On the target connection, only the properties independent from the context can be specified (for example, the schema and catalog names cannot be used).

Parameters

Parameter	Type	Description
pPropertyName	String	String that contains the name of the requested property

The following table lists the possible values for pPropertyName:

Parameter Value	Description
ID	Internal identifier of the current model
GLOBAL_ID	GUID of the foreign key
MOD_NAME	Name of the current model
LSCHEMA_NAME	Name of the logical schema of the current model
MOD_TEXT	Description of the current model
REV_TYPE	Reverse engineering type: S for standard reverse, C for customize
REV_UPDATE	Update flag of the model
REV_INSERT	Insert flag for the model
REV_OBJ_PATT	Mask for the objects to reverse
REV_OBJ_TYPE	List of object types to reverse-engineer for this model. This is a semicolon separated list of object types codes. Valid codes are: • T: Table • V: View • Q: Queue • SY: System table • AT: Table alias • SY: Synonym
TECH_INT_NAME	Internal name of the technology of the current model
LAGENT_NAME	Name of the logical execution agent for the reverse engineering
REV_CONTEXT	Execution context of the reverse engineering
REV_ALIAS_LTRIM	Characters to be suppressed for the alias generation
CKM	Check Knowledge Module
RKM	Reverse-engineering Knowledge Module
SCHEMA_NAME	Physical Name of the data schema in the current reverse context
WSCHEMA_NAME	Physical Name of the work schema in the current reverse context
CATALOG_NAME	Physical Name of the data catalog in the current reverse context
WCATALOG_NAME	Physical Name of the work catalog in the current reverse context
<flexfield code>	Value of the flexfield for the current model

Examples

Retrieve the list of tables that are part of the mask of objects to reverse:

```
select TABLE_NAME,
         RES_NAME,
     replace(TABLE_NAME, '<%=odiRef.getModel("REV_ALIAS_LTRIM")%>' , '')
          ALIAS,
```

```
          TABLE_DESC
from MY_TABLES
where
TABLE_NAME like '<%=odiRef.getModel("REV_OBJ_PATT")%>'
```

getNbInsert(), getNbUpdate(), getNbDelete(), getNbErrors() and getNbRows() Methods

Use to get the number of inserted, updated, deleted or erroneous rows for the current task.

Usage

```
public java.lang.Long getNbInsert()

public java.lang.Long getNbUpdate()

public java.lang.Long getNbDelete()

public java.lang.Long getNbErrors()

public java.lang.Long getNbRows()
```

Description

These methods get for the current task the values for:

- the number of rows inserted (getNbInsert)
- the number of rows updated (getNbUpdate)
- the number of rows deleted (getNbDelete)
- the number of rows in error (getNbErrors)
- total number of rows handled during this task (getNbRows)

These numbers can be set independently from the real number of lines processed using the setNbInsert(), setNbUpdate(), setNbDelete(), setNbErrors() and setNbRows() Methods.

Examples

In the Jython example below, we set the number of inserted rows to the constant value of 50, and copy this value in the number of errors.

```
InsertNumber=50

odiRef.setNbInsert(InsertNumber)

odiRef.setNbErrors(odiRef.getNbInsert())
```

getNewColComment() Method

Use to return the new comment for a specific attribute handled by an action.

Usage

```
public java.lang.String getNewColComment()
```

Description

In an action, this method returns the new comment for the attribute being handled by the DDL command, in a *Modify column comment action*.

getNewTableComment() Method

Use to return the new comment for a specific table handled by an action.

Usage

```
public java.lang.String getNewTableComment()
```

Description

In an action, this method returns the new comment for the table being handled by the DDL command, in a *Modify table comment action*.

getNotNullCol() Method

Use to return information about an attribute that is checked for not null.

Usage

```
public java.lang.String getNotNullCol(java.lang.String pPropertyName)
```

Description

This method returns information relative to a not null attribute of a datastore during a check procedure. It is accessible from a Check Knowledge Module if the current task is tagged as "mandatory".

Parameters

Parameter	Type	Description
Parameter	Type	Description
pPropertyName	String	String that contains the name of the requested property.

The following table lists the different possible values for pPropertyName:

Parameter Value	Description
ID	Internal identifier for the current attribute. This The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode.
GLOBAL_ID	GUID for the current attribute.
COL_NAME	Name of the Not null attribute.
MESS	Standard error message.
<flexfield code>	Flexfield value for the current not null attribute.

Examples

```
insert into...
select *
from ...
<%=odiRef.getNotNullCol("COL_NAME")%> is null
```

getObjectName() Method

Use to return the fully qualified named of an object.

Usage

```
public java.lang.String getObjectName(
java.lang.String pMode,
java.lang.String pObjectName,
java.lang.String pLocation)

public java.lang.String getObjectName(
java.lang.String pMode,
java.lang.String pObjectName,
java.lang.String pLogicalSchemaName,
java.lang.String pLocation)

public java.lang.String getObjectName(
java.lang.String pMode,
java.lang.String pObjectName,
java.lang.String pLogicalSchemaName,
java.lang.String pContextName,
java.lang.String pLocation)

public java.lang.String getObjectName(
java.lang.String pObjectName,
java.lang.String pLocation)

public java.lang.String getObjectName(
java.lang.String pObjectName)

public java.lang.String getObjectName(java.lang.String pMode,java.lang.String
pObjectName,java.lang.String pLogicalSchemaName,java.lang.String
pContextName,java.lang.String pLocation,
java.lang.String pPartitionType,
java.lang.String pPartitionName)
```

Description

Returns the fully qualified name of a physical object, including its catalog and schema. The pMode parameter indicates the substitution mask to use.

> **Note:**
>
> The getObjectName methods truncates automatically object names to the maximum object length allowed for the technology. In versions before ODI 11*g*, object names were not truncated. To prevent object name truncation and reproduce the 10*g* behavior, add in the properties tab of the data server a property called *OBJECT_NAME_LENGTH_CHECK_OLD* and set its value to `true`.

The first syntax builds the object name according to the current logical schema in the current context.

The second syntax builds the name of the object according to the logical schema indicated in the pLogicalSchemaName parameter in the current context.

The third syntax builds the name from the logical schema and the context indicated in the pLogicalSchemaName and pContextName parameters.

The fourth syntax builds the object name according to the current logical schema in the current context, with the local object mask (pMode = "L").

The fifth syntax is equivalent to the fourth with pLocation = "D".

The last syntax is equivalent to the third syntax but qualifies the object name specifically on a given partition, using the pPartitionType and pPartitionName parameters.

Parameters

Parameter	Type	Description
pMode	String	"L" use the local object mask to build the complete path of the object. "R" use the remote object mask to build the complete path of the object. Note: When using the remote object mask, getObjectName always resolved the object name using the default physical schema of the remote server.
pObjectName	String	Every string that represents a valid resource name (table or file). This object name may be prefixed by a prefix code that will be replaced at run-time by the appropriate temporary object prefix defined for the physical schema.
pLogicalSchemaName	String	Name of the forced logical schema of the object.
pContextName	String	Forced context of the object
pLocation	String	The valid values are: • W: Returns the complete name of the object in the physical catalog and the "work" physical schema that corresponds to the specified tuple (context, logical schema) • D: Returns the complete name of the object in the physical catalog and the data physical schema that corresponds to the specified tuple (context, logical schema)

Parameter	Type	Description
pPartitionType	String	Specify whether to qualify the object name for a specific partition or subpartition. The valid values are: • P: Qualify object for the partition provided in pPartitionName • S: Qualify object for the subpartition provided in pPartitionName
pPartitionName	String	Name of the partition of subpartition to qualify the object name.

Prefixes

It is possible to prefix the resource name specified in the pObjectName parameter by a prefix code to generate an Oracle Data Integrator temporary object name (Error or Integration table, journalizing trigger, etc.).

The list of prefixes are given in the table below.

Prefix	Description
Prefix	Description
%INT_PRF	Prefix for integration tables (default value is "I$_").
%COL_PRF	Prefix for Loading tables (default value is "C$_").
%ERR_PRF	Prefix for error tables (default value is "E$_").
%JRN_PRF_TAB	Prefix for journalizing tables (default value is "J$_").
%INT_PRF_VIE	Prefix for journalizing view (default value is "JV$_").
%JRN_PRF_TRG	Prefix for journalizing triggers (default value is "T$_").
%IDX_PRF	Prefix for temporary indexes (default value is "IX$_").
%UNIQUE_STEP_TAG	Prefix used to inform the final phase of code generation that unique names are enabled for temporary objects.
%UNIQUE_SESSION_TAG	Prefix used to inform the final phase of code generation that unique names are enabled for temporary objects.

> **Note:**
>
> Temporary objects are usually created in the work physical schema. Therefore, pLocation should be set to "W" when using a prefix to create or access a temporary object.

Examples

You have defined a physical schema as shown below.

Property	Value
Data catalog:	db_odi
Data schema:	dbo
Work catalog:	tempdb
Work schema:	temp_owner

You have associated this physical schema to the logical schema MSSQL_ODI in the context CTX_DEV.

A Call To	Returns
`<%=odiRef.getObjectName("L", "EMP", "MSSQL_ODI", "CTX_DEV", "W")%>`	`tempdb.temp_owner.EMP`
`<%=odiRef.getObjectName("L", "EMP", "MSSQL_ODI", "CTX_DEV", "D")%>`	`db_odi.dbo.EMP`
`<%=odiRef.getObjectName("R", "%ERR_PRFEMP", "MSSQL_ODI", "CTX_DEV", "W")%>`	`MyServer.tempdb.temp_owner.E$_EMP`
`<%=odiRef.getObjectName("R", "EMP", "MSSQL_ODI", "CTX_DEV", "D")%>`	`MyServer.db_odi.dbo.EMP`

getObjectNameDefaultPSchema() Method

Use to return the fully qualified named of an object in the default physical schema for the data server.

Usage

```
public java.lang.String getObjectNameDefaultPSchema(
java.lang.String pMode,
java.lang.String pObjectName,
java.lang.String pLocation)

public java.lang.String getObjectNameDefaultPSchema(
java.lang.String pMode,
java.lang.String pObjectName,
java.lang.String pLogicalSchemaName,
java.lang.String pLocation)

public java.lang.String getObjectNameDefaultPSchema(
java.lang.String pMode,
java.lang.String pObjectName,
java.lang.String pLogicalSchemaName,
java.lang.String pContextName,
java.lang.String pLocation)

public java.lang.String getObjectNameDefaultPSchema(
java.lang.String pObjectName,
java.lang.String pLocation)

public java.lang.String getObjectNameDefaultPSchema(
java.lang.String pObjectName)

public java.lang.String getObjectNameDefaultPSchema(java.lang.String
pMode,java.lang.String pObjectName,java.lang.String
pLogicalSchemaName,java.lang.String pContextName,java.lang.String pLocation,
java.lang.String pPartitionType,
java.lang.String pPartitionName)
```

Description

The method is similar to the getObjectName method. However, the object name is computed for the default physical schema of the data server to which the physical

schema is attached. In getObjectName, the object name is computed for the physical schema itself.

For more information, see getObjectName() Method.

getObjectShortName() Method

Use to return the short name of an object.

Usage

```
public java.lang.String getObjectShortName(
java.lang.String pMode,
java.lang.String pObjectName,
java.lang.String pLocation)

public java.lang.String getObjectShortName(
java.lang.String pMode,
java.lang.String pObjectName,
java.lang.String pLogicalSchemaName,
java.lang.String pLocation)

public java.lang.String getObjectShortName(
java.lang.String pMode,
java.lang.String pObjectName,
java.lang.String pLogicalSchemaName,
java.lang.String pContextName,
java.lang.String pLocation)
```

Description

Returns the object name without the schema and catalog prefix, but adds delimiters if necessary.

The pMode parameter indicates the substitution mask to use.

Parameters

Parameter	Type	Description
pMode	String	"L" use the local object mask to build the complete path of the object. "R" use the remote object mask to build the complete path of the object. Note: When using the remote object mask, getObjectShortName always resolves the object name using the default physical schema of the remote server.
pObjectName	String	Every string that represents a valid resource name (table or file). This object name may be prefixed by a prefix code that will be replaced at run-time by the appropriate temporary object prefix defined for the physical schema.
pLogicalSchemaName	String	Name of the forced logical schema of the object.
pContextName	String	Forced context of the object

Parameter	Type	Description
pLocation	String	The valid values are: • W: Returns the complete name of the object in the physical catalog and the "work" physical schema that corresponds to the specified tuple (context, logical schema) • D: Returns the complete name of the object in the physical catalog and the data physical schema that corresponds to the specified tuple (context, logical schema)

Prefixes

The text can contain the prefixes available for getObjectName() Method, e.g. %INT_PRF, %COL_PRF, %ERR_PRF, %IDX_PRF and so on.

For example, if the logical schema is pointing to Oracle SCOTT schema:

```
<%= odiRef.getObjectShortName("L", "%COL_PRFEMP", "D") %>
```

returns

```
C$EMP
```

Examples

If the local work schema is Oracle technology:

```
<%= odiRef.getObjectShortName("L", "ABC", "W") %>
```

produces `ABC` in the generated code, while

```
<%= odiRef.getObjectShortName("L", "abc", "W") %>
```

produces `"abc"` in the generated code (with double quotes).

getOdiGeneratedAccessName() Method

Use to return the ODI runtime execution phase access name for an object.

Usage

```
public static java.lang.String getOdiGeneratedAccessName(
java.lang.String pProperty,
MapPhysicalNode pPhysNode,
java.lang.String pSchemaLoc)
```

Description

Allows the retrieval of the ODI runtime execution phase access name for an object. The design time name is interpreted by the 11g-compatible beanshell/java parser, and the OdiRef calls are executed by the upgraded OdiRef object. An example of a design time name would be :

```
<%=odiRef.getTable("L","COLL_NAME","W")%>
```

> **Note:**
>
> The getOdiGeneratedAccessName() method is called from “OdiRef”, which means that it is a static method that can be called from any context. It can also be called from “odiRef”, if odiRef is in scope for the current context.

Parameters

Parameter	Type	Description
pProperty	String	The ODI getTable substitution API property.
pPhysNode	MapPhysicalNode (which is an ODI class. The full path is “oracle.odi.domain.mapping.physical.MapPhysicalNode”.)	The physical node associated with the object.
pSchemaLoc	String	The schema location for the object. The valid values are: • D: ‘D’ means Schema. This schema contains the source and target tables. Oracle Data Integrator can get data from source tables and insert/update data into target tables. • W: ‘W’ means Work Schema. Oracle Data integrator can create and manipulate temporary tables in the work schema. These temporary tables can associate to the source and target tables in Schema.

Examples

```
<%=OdiRef.getOdiGeneratedAccessName("COLL_NAME", physicalNode, "W")%>
```

Returns the name of the loading table in Work Schema.

```
<%=OdiRef.getOdiGeneratedAccessName("COLL_NAME", physicalNode, "D")%>
```

Returns the name of the loading table in Schema.

getOdiInstance() Method

Use to return the current session instance of a connection to an ODI master / work repositories couple.

Usage

```
public oracle.odi.core.OdiInstance getOdiInstance(java.lang.String pPropertyName)
```

Description

Returns the current session instance of a connection to an ODI master / work repositories couple.

An OdiInstance is the central class in ODI Core Infrastructure, providing low level infrastructure services required by ODI consumers needing read / write access to an ODI master / work repositories couple. This method can be used in Jython or Groovy in ODI procedures or knowledge modules. Users are responsible for closing the instance.

getOggModelInfo() Method

Use to retrieve the property values associated with the GoldenGate Journalized Model.

Usage

```
public String getOggModelInfo(String Property) throws SnpsSimpleMessageException
```

Description

This method retrieves the property values associated with GoldenGate Journalized Model which were added for ODI-OGG Integration JKM/Tools.

Parameters

Parameter	Type	Description
Property	String	String that contains the property type of the GoldenGate Journalized Model.

The following table lists the different values possible for Property:

Parameter Value	Description
EXTRACT_LSCHEMA	Extract process logical schema associated with a model.
INIT_EXTRACT_LSCHEMA	Initial Extract process logical schema associated with a model.
REPLICAT_LSCHEMA	Replicat process logical schema associated with a model.
INIT_REPLICAT_LSCHEMA	Initial Replicat process logical schema associated with a model.
SRC_LSCHEMA	Logical schema name of the model's schema.
SRC_DB_USER	User name of source model's DB.
SRC_DB_PASS	Password of source model's DB.

Examples

Extract process logical schema associated with the GoldenGate Journalized model is

```
<%=odiRef.getOggModelInfo("EXTRACT_LSCHEMA")%>
```

Initial extract process logical schema associated with the JRN Model is

```
<%=odiRef.getOggModelInfo("INIT_EXTRACT_LSCHEMA")%>
```

Replicat process logical schema associated with a OGG JRN model is

```
<%=odiRef.getOggModelInfo("REPLICAT_LSCHEMA")%>
```

Initial Replicat process logical schema associated with the JRN Model is

```
<%=odiRef.getOggModelInfo("INIT_REPLICAT_LSCHEMA")%>
```

Logical schema name of the JRN model is

```
<%=odiRef.getOggModelInfo("SRC_LSCHEMA")%>
```

getOggProcessInfo() Method

Use to retrieve the value of the property associated with a process.

Usage

```
public String getOggProcessInfo(String LogicalSchemaName, String Property) throws
SnpsSimpleMessageException
```

Description

This method retrieves the value of the property associated with a process added for ODI-OGG Integration JKM/Tools.

Parameters

Parameter	Type	Description
LogicalSchema	String	String that contains the Logical Schema Name associated with a process added for the ODI-OGG Integration JKM/Tools.
Property	String	String that contains the property type to retrieve value from the OGG process.

The following table describes the different values of the parameters.

Property	Description
NAME	Name of the process.
LTRAIL_FILE_PATH	Trail file path.
DISCARD_FILE_PATH	Discard file path.
DEF_FILE_PATH	Definition file path.
RTRAIL_FILE_PATH	Remote trail file path.
TRAIL_FILE_SIZE	Trail file size.

Examples

Name of the OGG process is

```
<%=odiRef.getProcessInfo("NAME")%>
```

Trail file path of the above OGG process is

```
<%=odiRef.getProcessInfo("LTRAIL_FILE_PATH")%>
```

Discard file path of the above OGG process is

```
<%=odiRef.getProcessInfo("DISCARD_FILE_PATH")%>
```

Definition file path of the above OGG process is

```
<%=odiRef.getProcessInfo("DEF_FILE_PATH")%>
```

Remote trail path of the above OGG process is

```
<%=odiRef.getProcessInfo("RTRAIL_FILE_PATH")%>
```

Trail file size of the above OGG process is

```
<%=odiRef.getProcessInfo("TRAIL_FILE_SIZE")%>
```

getOption() Method

Use to return the value of a KM or procedure option.

Usage

```
public java.lang.String getOption(java.lang.String pOptionName)
public java.lang.String getUserExit(java.lang.String pOptionName)
```

Description

Returns the value of a KM or procedure option.

The getUserExit syntax is deprecated and is only kept for compatibility reasons.

Parameters

Parameter	Type	Description
pOptionName	String	String that contains the name of the requested option.

Examples

```
The value of my MY_OPTION_1 option is <%=odiRef.getOption("MY_OPTION_1")%>
```

getPackage() Method

Use to return information about the current package.

Usage

```
public java.lang.String getPackage(java.lang.String pPropertyName)
```

Description

This method returns information about the current package. The list of available properties is described in the pPropertyName values table.

Parameters

Parameters	Type	Description
pPropertyName	String	String that contains the name of the requested property.

The following table lists the different possible values for pPropertyName:

Parameter Value	Description
I_PACKAGE	Internal ID of the package. The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode.
PACKAGE_GUID	GUID of the package.
PACKAGE_NAME	Name of the package
<flexfield code>	Value of the flexfield for this package.

Examples

```
Package <%=odiRef.getPackage("PACKAGE_NAME")%> is running.
```

getParentLoadPlanStepInstance() Method

Use to return the parent Load Plan step instance of this session.

Usage

```
public java.lang.String getParentLoadPlanStepInstance(java.lang.String pPropertyName)
```

Description

This method returns the step execution instance information of the parent of the current step for a Load Plan instance. It will return an empty string if the parent step is the root step.

Parameters

Parameter	Type	Description
pPropertyName	String	String that contains the name of the requested property.

The following table lists the different possible values for pPropertyName.

Parameter Value	Description
BATCH_ID	Load Plan instance identifier (also Instance ID). Every time a Load Plan is started, a new Load Plan instance with a unique identifier is created.

Parameter Value	Description
RESTART_ATTEMPTS	Number of execution attempts of this Load Plan parent step instance. It starts at 1 when the Load Plan parent step instance is first started, and is incremented each time the Load Plan parent step instance is restarted.
STEP_NAME	Name of the Load Plan parent step
STEP_TYPE	Type of the Load Plan parent step
START_DATE	Starting date and time of the parent step instance of the current step of the current Load Plan instance run.

Examples

Step `<%=odiRef.getParentLoadPlanStepInstance("STEP_NAME")%>` has been executed `<%=odiRef.getParentLoadPlanStepInstance("RESTART_ATTEMPTS")%>` times

getPK() Method

Use to return information about a primary key.

Usage

```
public java.lang.String getPK(java.lang.String pPropertyName)
```

Description

This method returns information relative to the primary key of a datastore during a check procedure.

In an action, this method returns information related to the primary key currently handled by the DDL command.

Parameters

Parameter	Type	Description
pPropertyName	String	String that contains the name of the requested property.

The following table lists the different possible values for pPropertyName.

Parameter Value	Description
ID	Internal number of the PK constraint. This parameter is deprecated, and included for 11*g* compatibility only. The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode.
PACKAGE_GUID	GUID of the primary key.
KEY_NAME	Name of the primary key
MESS	Error message relative to the primary key constraint.
FULL_NAME	Full name of the PK generated with the local object mask.
<flexfield code>	Flexfield value for the primary key.

Examples

```
The primary key of my table is called: <%=odiRef.getPK("KEY_NAME")%>
```

getPKColList() Method

Use to return information about the attributes of a primary key.

Usage

```
public java.lang.String getPKColList( java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd)
```

Description

Returns a list of attributes and expressions for the primary key being checked.

The pPattern parameter is interpreted and then repeated for each element of the list. It is separated from its predecessor by the pSeparator parameter. The generated string starts with pStart and ends with pEnd. If no element is selected, pStart and pEnd are omitted and an empty string is returned.

This list contains an element for each attribute of the current primary key. It is accessible from a Check Knowledge Module if the current task is tagged as an "primary key".

In an action, this method returns the list of the attributes of the primary key handled by the DDL command, ordered by their position in the key.

Parameters

Parameter	Type	Description
pStart	String	This sequence marks the beginning of the string to generate.
pPattern	String	The pattern is repeated for each occurrence in the list. The list of attributes that can be used in a pattern is detailed in the Pattern Attributes List below. Each attribute occurrence in the pattern sequence is replaced with its value. The attributes must be between brackets. ([and]) Example «My string [COL_NAME] is an attribute»
pSeparator	String	This parameter separates each pattern from its predecessor.
pEnd	String	This sequence marks the end of the string to generate.

Pattern Attributes List

The following table lists the different values of the parameters as well as their associated description.

Parameter Value	Description
I_COL	Attribute internal identifier
COL_NAME	Name of the key attribute
COL_HEADING	Header of the key attribute
COL_DESC	Attribute description
POS	Position of the attribute
LONGC	Length (Precision) of the attribute
SCALE	Scale of the attribute
FILE_POS	Beginning position of the attribute (fixed file)
BYTES	Number of physical bytes of the attribute
FILE_END_POS	End of the attribute (FILE_POS + BYTES)
IND_WRITE	Write right flag of the attribute
COL_MANDATORY	Mandatory character of the attribute. Valid values are: • 0: null authorized • 1: not null
CHECK_FLOW	Flow control flag for of the attribute. Valid values are: • 0: do not check • 1: check
CHECK_STAT	Static control flag of the attribute. Valid values are: • 0: do not check • 1: check
COL_FORMAT	Logical format of the attribute
COL_DEC_SEP	Decimal symbol for the attribute
REC_CODE_LIST	List of the record codes retained for the attribute
COL_NULL_IF_ERR	Processing flag for the attribute. Valid values are: • 0: Reject • 1: Set active trace to null • 2: Set inactive trace to null
DEF_VALUE	Default value for the attribute
EXPRESSION	Not used
CX_COL_NAME	Not used
ALIAS_SEP	Grouping symbol used for the alias (from the technology)
SOURCE_DT	Code of the attribute's datatype.
SOURCE_CRE_DT	Create table syntax for the attribute's datatype.
SOURCE_WRI_DT	Create table syntax for the attribute's writable datatype.
DEST_DT	Code of the attribute's datatype converted to a datatype on the target technology.
DEST_CRE_DT	Create table syntax for the attribute's datatype converted to a datatype on the target technology.
DEST_WRI_DT	Create table syntax for the attribute's writable datatype converted to a datatype on the target technology.
SCD_COL_TYPE	Behavior defined for the Slowly Changing Dimensions for this attribute in the data model.
<flexfield code>	Flexfield value for the current attribute.

Examples

If the CUSTOMER table has an primary key PK_CUSTOMER (CUST_ID, CUST_NAME) and you want to generate the following code:

```
create table T_PK_CUSTOMER (CUST_ID numeric(10) not null, CUST_NAME
varchar(50) not null)
```

You can use the following code:

```
create table T_<%=odiRef.getPK("KEY_NAME")%>
<%=odiRef.getPKColList("(", "[COL_NAME] [DEST_CRE_DT] not null", ", ", ")")%>
```

Explanation: the getPKColList function will be used to generate the `(CUST_ID numeric(10) not null, CUST_NAME varchar(50) not null)` part, which starts and stops with a parenthesis and repeats the pattern (attribute, a data type, and not null) separated by commas for each attribute of the primary key. Thus

- the first parameter **"("** of the function indicates that we want to start the string with the string "("
- the second parameter **"[COL_NAME] [DEST_CRE_DT] not null"** indicates that we want to repeat this pattern for each attribute of the primary key. The keywords [COL_NAME] and [DEST_CRE_DT] reference valid keywords of the Pattern Attributes List table
- the third parameter **", "** indicates that we want to separate interpreted occurrences of the pattern with the string ", "
- the forth parameter **")"** of the function indicates that we want to end the string with the string ")"

getPop() Method

Use to return information about a mapping.

Usage

```
public java.lang.String getPop(java.lang.String pPropertyName)
```

Description

This method returns information about the current mapping. The list of available information is described in the pPropertyName values table.

Parameters

Parameter	Type	Description
pPropertyName	String	String that contains the name of the requested property.

The following table lists the different possible values for pPropertyName:

Parameter Value	Description
I_POP	Internal number of the mapping.
FOLDER	Name of the folder of the mapping.

Parameter Value	Description
POP_NAME	Name of the mapping.
IND_WORK_TARG	Position flag of the staging area.
LSCHEMA_NAME	Name of the logical schema which is the staging area of the mapping.
DESCRIPTION	Description of the mapping.
WSTAGE	Flag indicating the nature of the target datastore: • E - target datastore is an existing table (not a temporary table). • N - target datastore is a temporary table in the data schema. • W - target datastore is a temporary table in the work schema.
TABLE_NAME	Name of the target table.
KEY_NAME	Name of the update key.
DISTINCT_ROWS	Flag for doubles suppression.
OPT_CTX	Name of the optimization context of the mapping.
TARG_CTX	Name of the execution context of the mapping.
MAX_ERR	Maximum number of accepted errors.
MAX_ERR_PRCT	Error indicator in percentage.
IKM	Name of the Integration Knowledge Module used in this mapping.
LKM	Name of the Loading Knowledge Module specified to load data from the staging area to the target if a single-technology IKM is selected for the staging area.
CKM	Name of the Check Knowledge Module used in this mapping.
HAS_JRN	Returns 1 if there is a journalized table in source of the mapping, 0 otherwise.
PARTITION_NAME	Name of the partition or subpartition selected for the target datastore. If no partition is selected, returns an empty string.
PARTITION_TYPE	Type of the partition or subpartition selected for the target datastore. If no partition is selected, returns an empty string. • P: Partition • S: Subpartition
<flexfield code>	Flexfield value for the mapping.
IS_CONCURRENT	Returns 1 if unique names are being used for the temporary objects, 0 otherwise.

Examples

```
The current mapping is: <%=odiRef.getPop("POP_NAME")%> and runs on the logical
schema: <%=odiRef.getInfo("L_SCHEMA_NAME")%>
```

getPrevStepLog() Method

Use to return information about the previous step executed in the package.

Usage

```
public java.lang.String getPrevStepLog(java.lang.String pPropertyName)
```

Description

Returns information about the most recently executed step in a package. The information requested is specified through the pPropertyName parameter. If there is no previous step (for example, if the getPrevStepLog step is executed from outside a package), the exception "No previous step" is raised.

Parameters

Parameter	Type	Description
pPropertyName	String	String that contains the name of the requested property about the previous step. See the list of valid properties below.

The following table lists the different possible values for pPropertyName:

Parameter Value	Description
SESS_NO	The number of the session. This parameter is deprecated, and included for 11*g* compatibility only. The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode.
SESS_GUID	GUID of the session.
NNO	The number of the step within a package. The first step executed is 0.
STEP_NAME	The name of the step.
STEP_TYPE	A code indicating the type of step. The following values may be returned: • F: Mapping • VD: Variable declaration • VS: Set/Increment variable • VE: Evaluate variable • V: Refresh variable • T: Procedure • OE: OS command • SE: ODI Tool • RM: Reverse-engineer model • CM: Check model • CS: Check sub-model • CD: Check datastore • JM: Journalize model • JD: Journalize datastore
CONTEXT_NAME	The name of the context in which the step was executed.
MAX_ERR	The maximum number or percentage of errors tolerated.
MAX_ERR_PRCT	Returns 1 if the maximum number of errors is expressed as a percentage, 0 otherwise.
RUN_COUNT	The number of times this step has been executed.
BEGIN	The date and time that the step began.
END	The date and time that the step terminated.
DURATION	Time the step took to execute in seconds.

Parameter Value	Description
STATUS	Returns the one-letter code indicating the status with which the previous step terminated. The state R (Running) is never returned. • D: Done (success) • E: Error • Q: Queued • W: Waiting • M: Warning
RC	Return code. 0 indicates no error.
MESSAGE	Error message returned by previous step, if any. Blank string if no error.
INSERT_COUNT	Number of rows inserted by the step.
DELETE_COUNT	Number of rows deleted by the step.
UPDATE_COUNT	Number of rows updated by the step.
ERROR_COUNT	Number of erroneous rows detected by the step, for quality control steps.

Examples

```
Previous step '<%=odiRef.getPrevStepLog("STEP_NAME")%>' executed
in '<%=odiRef.getPrevStepLog("DURATION")%>' seconds.
```

getQuotedString() Method

Use to return a quoted string.

Usage

```
public java.lang.String getQuotedString(java.lang.String pString)
```

Description

This method returns a string surrounded with quotes. It preserves quotes and escape characters such as \n, \t that may appear in the string.

This method is useful to protect a string passed as a value in Java, Groovy or Jython code.

Parameters

Parameter	Type	Description
Parameter	Type	Description
pString	String	String that to be protected with quotes.

Examples

In the following Java code, the getQuotedString method is used to generate a valid string value.

```
String condSqlOK = <%=odiRef.getQuotedString(odiRef.getCK("MESS"))%>;
String condSqlKO = <%=odiRef.getCK("MESS")%>;
```

If the message for the condition is "*Error:\n Zero is not a valid value*", the generated code is as shown below. Without the getQuotedString, the code is incorrect, as the \n is not preserved and becomes a carriage return.

```
String condSqlOK = "Error:\n Zero is not a valid value";
String condSqlKO = "Error:
Zero is not a valid value";
```

getSchemaName() Method

Use to return a schema name from the topology.

Usage

```
public java.lang.String getSchemaName(
java.lang.String pLogicalSchemaName,
java.lang.String pLocation)

public java.lang.String getSchemaName(
java.lang.String pLogicalSchemaName,
java.lang.String pContextCode,
java.lang.String pLocation)

public java.lang.String getSchemaName( java.lang.String pLocation)


public java.lang.String getSchemaName()
```

Description

Retrieves the physical name of a data schema or work schema from its logical schema.

If the first syntax is used, the returned schema corresponds to the current context.

If the second syntax is used, the returned schema corresponds to context specified in the pContextCode parameter.

The third syntax returns the name of the data schema (D) or work schema (W) for the current logical schema in the current context.

The fourth syntax returns the name of the data schema (D) for the current logical schema in the current context.

Parameters

Parameter	Type	Description
pLogicalSchemaName	String	Name of the logical schema of the schema
pContextCode	String	Forced context of the schema
pLocation	String	The valid values are: • D: Returns the data schema of the physical schema that corresponds to the tuple (context, logical schema) • W: Returns the work schema of the physical schema that corresponds to the tuple (context, logical schema)

Examples

If you have defined the physical schema: Pluton.db_odi.dbo

Property	Value
Data catalog:	db_odi
Data schema:	dbo
Work catalog:	tempdb
Work schema:	temp_owner

and you have associated this physical schema to the logical schema: MSSQL_ODI in the context CTX_DEV

The Call To	Returns
`<%=odiRef.getSchemaName("MSSQL_ODI", "CTX_DEV", "W")%>`	`temp_owner`
`<%=odiRef.getSchemaName("MSSQL_ODI", "CTX_DEV", "D")%>`	`dbo`

getSchemaNameDefaultPSchema() Method

Use to return a catalog name for the default physical schema from the topology.

Usage

```
public java.lang.String getSchemaNameDefaultPSchema(
java.lang.String pLogicalSchemaName,
java.lang.String pLocation)

public java.lang.String getSchemaNameDefaultPSchema(
java.lang.String pLogicalSchemaName,
java.lang.String pContextCode,
java.lang.String pLocation)

public java.lang.String getSchemaNameDefaultPSchema(
java.lang.String pLocation)

public java.lang.String getSchemaNameDefaultPSchema(
```

Description

Allows you to retrieve the name of the **default** physical data schema or work schema for the data server to which is associated the physical schema corresponding to the tuple (logical schema, context). If no context is specified, the current context is used. If no logical schema name is specified, then the current logical schema is used. If no pLocation is specified, then the data schema is returned.

Parameters

Parameter	Type	Description
pLogicalSchemaName	String	Name of the logical schema
pContextCode	String	Code of the enforced context of the schema

Parameter	Type	Description
pLocation	String	The valid values are: • D: Returns the data schema of the physical schema corresponding to the tuple (context, logical schema) • W: Returns the work schema of the default physical schema associate to the data server to which the physical schema corresponding to the tuple (context, logical schema) is also attached.

Examples

If you have defined the physical schemas: `Pluton.db_odi.dbo`

Property	Value
Data catalog:	db_odi
Data schema:	dbo
Work catalog:	tempdb
Work schema:	temp_odi
Default Schema	Yes

that you have associated with this physical schema: `MSSQL_ODI` in the context `CTX_DEV`, and `Pluton.db_doc.doc`

Property	Value
Data catalog:	db_doc
Data schema:	doc
Work catalog:	tempdb
Work schema:	temp_doc
Default Schema	No

that you have associated with this physical schema: MSSQL_DOC in the context CTX_DEV

The Call To	Returns
`<%=odiRef.getSchemaNameDefaultPSchema("MSSQL_DOC", "CTX_DEV", "W")%>`	`temp_odi`
`<%=odiRef.getSchemaNameDefaultPSchema("MSSQL_DOC", "CTX_DEV", "D")%>`	`dbo`

getSession() Method

Use to return information about the current session.

Usage

```
public java.lang.String getSession(java.lang.String pPropertyName)
```

Description

This method returns information about the current session. The list of available properties is described in the pPropertyName values table.

Parameters

Parameters	Type	Description
pPropertyName	String	String that contains the name of the requested property.

The following table lists the different possible values for pPropertyName:

Parameter Value	Description
SESS_NO	Internal number of the session. This parameter is deprecated, and included for 11*g* compatibility only. The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode.
SESS_GUID	GUID of the session.
SESS_NAME	Name of the session
SCEN_NAME	Name of the scenario
SCEN_VERSION	Current scenario version
CONTEXT_NAME	Name of the execution context
CONTEXT_CODE	Code of the execution context
AGENT_NAME	Name of the physical agent in charge of the execution
SESS_BEG	Date and time of the beginning of the session
USER_NAME	ODI User running the session.

Examples

```
The current session is: <%=odiRef.getSession("SESS_NAME")%>
```

getSessionVarList() Method

Reserved for future use.

Usage

```
public java.lang.String getSessionVarList( java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd,
java.lang.String pSelector)
```

Description

Reserved for future use.

Parameters

Reserved for future use.

Examples

Reserved for future use.

getSrcColList() Method

Use to return properties for each attribute from a filtered list of source attributes involved in a loading or integration phase. The properties are organized according to a string pattern.

Usage

```
public java.lang.String getSrcColList(
java.lang.Int pDSIndex,
java.lang.String pStart,
java.lang.String pUnMappedPattern,
java.lang.String pMappedPattern,
java.lang.String pSeparator,
java.lang.String pEnd)

public java.lang.String getSrcColList(
java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd)

public java.lang.String getSrcColList(
java.lang.String pStart,
java.lang.String pUnMappedPattern,
java.lang.String pMappedPattern,
java.lang.String pSeparator,
java.lang.String pEnd)

public java.lang.String getSrcColList(
int dsIndex,
java.lang.String pStart,
java.lang.String pUnMappedPattern,
java.lang.String pMappedPattern,
java.lang.String pSeparator,
java.lang.String pEnd)
```

Description

This method available in LKMs and IKMs, returns properties for a list of attributes in a given data set. This list includes all the attributes of the sources processed by the LKM (from the source) or the IKM (from the staging area). The list is sorted by the attribute position in the source tables.

In IKMs only, the pDSIndex parameter identifies which of the data sets is taken into account by this command.

> **Note:**
>
> The pDSIndex parameter can be omitted when this method is used in an LKM. It can be also omitted for IKMs. In this case, the data set taken into account is the first one.

The properties displayed depend on whether the attribute is mapped or not. If the attribute is mapped, the properties returned are defined in the `pMappedPattern` pattern. If the attribute is not mapped, the properties returned are defined in the `pUnMappedPattern` pattern.

The attributes usable in a pattern are detailed in "Pattern Attributes List". Each occurrence of the attributes in the pattern string is replaced by its value. Attributes must be between brackets ([and]). Example: "My string [COL_NAME] is an attribute".

The `pMappedPattern` or `pUnMappedPattern` parameter is interpreted and then repeated for each element of the list. Patterns are separated with `pSeparator`. The generated string begins with `pStart` and ends with `pEnd`.

If `pPattern` parameter is used in the variant `getSrcColList(String pStart, String pPattern, String pSeparator, String pEnd)`, this indicates that the same `pPattern` value is used as argument for both `pUnMappedPattern` and `pMappedPattern` parameters to call the variant `getSrcColList(String pStart, String pUnMappedPattern, String pMappedPattern,String pSeparator, String pEnd)`.

If there is a journalized datastore in the source of the mapping, the three journalizing pseudo attributes `JRN_FLG`, `JRN_DATE` and `JRN_SUBSCRIBER` are added as attributes of the journalized source datastore.

Parameters

Parameter	Type	Description
dsIndex	Int	Index identifying which of the data sets is taken into account by this command.
pStart	String	This sequence marks the beginning of the string to generate.
pPattern	String	The value of pPattern is used as an argument for both pUnMappedPattern and pMappedPattern.
pUnMappedPattern	String	The pattern is repeated for each occurrence in the list if the attribute is not mapped.
pMappedPattern	String	The pattern is repeated for each occurrence in the list, if the attribute is mapped.
pSeparator	String	This parameter separates patterns.
pEnd	String	This sequence marks the end of the string to generate.

Pattern Attributes List

The following table lists different parameters values as well as their associated description.

Parameter Value	Description
I_COL	Internal identifier of the attribute
COL_NAME	Name of the attribute
ALIAS_NAME	Name of the attribute. Unlike COL_NAME, the attribute name without the optional technology delimiters is returned. These delimiters appear when the attribute name contains for instance spaces.
COL_HEADING	Header of the attribute
COL_DESC	Description of the attribute
POS	Position of the attribute
LONGC	Attribute length (Precision)
SCALE	Scale of the attribute
FILE_POS	Beginning (index) of the attribute
BYTES	Number of physical bytes in the attribute
FILE_END_POS	End of the attribute (FILE_POS + BYTES)
IND_WRITE	Write right flag of the attribute
COL_MANDATORY	Mandatory character of the attribute. Valid values are: (0: null authorized, 1: not null) • 0: null authorized • 1: not null
CHECK_FLOW	Flow control flag of the attribute. Valid values are: (0: do not check, 1: check) • 0: do not check • 1: check
CHECK_STAT	Static control flag of the attribute. Valid values are: (0: do not check, 1: check) • 0: do not check • 1: check
COL_FORMAT	Logical format of the attribute
COL_DEC_SEP	Decimal symbol of the attribute
REC_CODE_LIST	List of the record codes retained in the attribute
COL_NULL_IF_ERR	Processing flag of the attribute. Valid values are: • 0: Reject • 1: Set to null active trace • 2: Set to null inactive trace
DEF_VALUE	Default value of the attribute
EXPRESSION	Text of the expression (as typed in the mapping field) executed on the source (LKM) or the staging area (IKM). If the attribute is not mapped, this parameter returns an empty string.
CX_COL_NAME	Not supported.
ALIAS_SEP	Separator used for the alias (from the technology)
SOURCE_DT	Code of the attribute's datatype.
SOURCE_CRE_DT	Create table syntax for the attribute's datatype.
SOURCE_WRI_DT	Create table syntax for the attribute's writable datatype.

Parameter Value	Description
DEST_DT	Code of the attribute's datatype converted to a datatype on the target (IKM) or staging area (LKM) technology.
DEST_CRE_DT	Create table syntax for the attribute's datatype converted to a datatype on the target technology.
DEST_WRI_DT	Create table syntax for the attribute's writable datatype converted to a datatype on the target technology.
SCD_COL_TYPE	Behavior defined for the Slowly Changing Dimensions for this attribute in the data model.
MANDATORY_CLAUSE	Returns `NOT NULL` if the attribute is mandatory. Otherwise, returns the null keyword for the technology.
DEFAULT_CLAUSE	Returns `DEFAULT <default value>` if any default value exists. Otherwise, returns and empty string.
<flexfield code>	Flexfield value for the current attribute.
POP_ALIAS	Alias of the datastore used in the mapping.

Examples

To create a table similar to a source file:

```
create table <%=odiRef.getTable("L","COLL_NAME", "D")%>_F
(
<%=odiRef.getSrcColList("","[COL_NAME] [DEST_CRE_DT]","[COL_NAME]
[DEST_CRE_DT]",",\n","")%>
)
```

getSrcTablesList() Method

Use to return properties for each source table of a mapping. The properties are organized according to a string pattern.

Usage

```
public java.lang.String getSrcTablesList(
java.lang.Int pDSIndex,
java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd)
```

Alternative syntax:

```
public java.lang.String getSrcTablesList(
java.lang.Int pDSIndex,
java.lang.String pPattern,
java.lang.String pSeparator)
```

Description

Returns a list of source tables of a given data set in a mapping. This method can be used to build a FROM clause in a SELECT order. However, it is advised to use the getFrom() method instead.

In IKMs only, the pDSIndex parameter identifies which of the data sets is taken into account by this command.

> **Note:**
>
> The pDSIndex parameter can be omitted when this method is used in an LKM. It can be also omitted for IKMs. In this case, the data set taken into account is the first one.

The pPattern pattern is interpreted and then repeated for each element of the list and separated from its predecessor with the parameter pSeparator. The generated string begins with pStart and ends with pEnd. If no element is selected, pStart and pEnd are omitted and an empty string is returned.

In the alternative syntax, any parameters not set are set to an empty string.

Parameters

Parameters	Type	Description
pDSIndex	Int	Index identifying which of the data sets is taken into account by this command.
pStart	String	This parameter marks the beginning of the string to generate.
pPattern	String	The pattern is repeated for each occurrence in the list. The list of possible attributes in a pattern is detailed in the Pattern Attributes List below. Each attribute occurrence in the pattern string is substituted with its value. The attributes must be between brackets ([and]) Example «My string [COL_NAME] is an attribute»
pSeparator	String	This parameter separates each pattern from its predecessor.
pEnd	String	This parameter marks the end of the string to generate.

Pattern Attributes List

The following table lists the different values of the parameters as well as the associated description.

Attribute	Description
I_TABLE	Internal identifier of the current source table if available. This parameter is deprecated, and included for 11*g* compatibility only. The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode.
TABLE_GUID	GUID of the source table if available.
MODEL_NAME	Name of the model of the current source table, if available.
SUB_MODEL_NAME	Name of the sub-model of the current source table, if available
TECHNO_NAME	Name of the technology of the source datastore
LSCHEMA_NAME	Logical schema of the source table

Attribute	Description
TABLE_NAME	Logical name of the source datastore
RES_NAME	Physical access name of the resource (file name or JMS queue, physical name of the table, etc.). If there is a journalized datastore in source of the mapping, the source table is the clause is replaced by the data view linked to the journalized source datastore.
CATALOG	Catalog of the source datastore (resolved at runtime)
WORK_CATALOG	Work catalog of the source datastore
SCHEMA	Schema of the source datastore (resolved at runtime)
WORK_SCHEMA	Work schema of the source datastore
TABLE_ALIAS	Alias of the datastore as it appears in the tables list, if available
POP_TAB_ALIAS	Alias of the datastore as it appears in the current mapping, if available.
TABLE_TYPE	Type of the datastore, if available: `Q` = Queue, `S` = Synonym, `T` = Table, `V` = View.
DESCRIPTION	Description of the source datastore, if available.
R_COUNT	Number of records of the source datastore, if available.
FILE_FORMAT	File format, if available: `D` = Delimited, `F` = Fixed.
FILE_SEP_FIELD	File field separator in character text (for example, tab character).
XFILE_SEP_FIELD	File field separator in escaped text (for example, tab character). Line feed and carriage return is escaped to `\r` and `\n`, while unicode characters are escaped to `\uXXXX`.
SFILE_SEP_FIELD	File field separator in hexadecimal (for example, 09 for the tab character). The return string can be in two hexadecimal digits or four hexadecimal digits, and it is two hexadecimal digits while the higher byte of the field separator is 0.
FILE_ENC_FIELD	Text delimiter as shown in the datastore editor (two character maximum).
FILE_SEP_ROW	File record separator in character text.
XFILE_SEP_ROW	File record separator in escape text. Line feed and carriage return is escaped to `\r` and `\n`, while unicode characters are escaped to `\uXXXX`.
SFILE_SEP_ROW	File record separator in hexadecimal. Line feed and carriage return is escaped to `\r` and `\n`, while unicode characters are escaped to `\uXXXX`.
FILE_FIRST_ROW	Number of header lines to ignore, if available.
FILE_DEC_SEP	Default decimal separator for the datastore, if available.
METADATA	Description in ODI format of the metadata of the current resource, if available.
OLAP_TYPE	OLAP type of the datatstore: `DH` = Slowly Changing Dimension, `DI` = Dimension, `FA` = Fact Table, <empty> = Undefined.
IND_JRN	Flag indicating whether the datastore is included in CDC: `1` = Yes, `0` = No.
JRN_ORDER	Order of the datastore in the CDC set for consistent journalizing.
PARTITION_NAME	Name of the partition or subpartition selected for the source datastore. If no partition is selected, returns an empty string.

Attribute	Description
PARTITION_TYPE	Type of the partition or subpartition selected for the source datastore. If no partition is selected, returns an empty string. • P: Partition • S: Subpartition
<flexfield code>	Flexfield value for the current table.

Examples

```
insert into <%=odiRef.getTable("L", "COLL_NAME", "W")%>
select <%=odiRef.getColList("", "[EXPRESSION]", ", ", "", "INS=1")%>
from <%=odiRef.getSrcTablesList("", "[CATALOG].[SCHEMA].[TABLE_NAME] AS
[POP_TAB_ALIAS]", ", ", "")%>
where (1=1)
<%=odiRef.getJoinList("and ","([EXPRESSION])"," and ","")%>
<%=odiRef.getFilterList("and ","([EXPRESSION])"," and ","")%>
<%=odiRef.getGrpBy()%>
<%=odiRef.getHaving()%>
```

Explanation: the getSrcTablesList function will be used to generate the FROM clause of the SELECT STATEMENT that repeats the pattern (CATALOG.SCHEMA.TABLE_NAME as POP_TAB_ALIAS) separated by commas for each table in source.

- The first parameter **""** of the function indicates that we want do not want to start the string with any specific character.
- The second parameter **"[CATALOG].[SCHEMA].[TABLE_NAME] as [POP_TAB_ALIAS]"** indicates that we want to repeat this pattern for each source table. The keywords [CATALOG], [SCHEMA], [TABLE_NAME] and [POP_TAB_ALIAS] reference valid keywords of the table Pattern Attributes List
- The third parameter**", "** indicates that we want to separate each interpreted occurrence of the pattern with the string ", "
- The fourth parameter **""** of the function indicates that we want to end the string with no specific character

getStep() Method

Use to return information about the current step.

Usage

```
public java.lang.String getStep(java.lang.String pPropertyName)
```

Description

This method returns information about the current step. The list of available information is described in the pPropertyName values table.

Parameters

Parameter	Type	Description
pPropertyName	String	String that contains the name of the requested property.

The following table lists the possible values for pPropertyName:

Parameter Value	Description
SESS_NO	Number of the session to which the step belongs. This parameter is deprecated, and included for 11*g* compatibility only. The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode.
SESS_GUID	GUID of the session.
NNO	Number of the step in the session
NB_RUN	Number of execution attempts
STEP_NAME	Step name
STEP_TYPE	Step type
CONTEXT_NAME	Name of the execution context
VAR_INCR	Step variable increment
VAR_OP	Operator used to compare the variable
VAR_VALUE	Forced value of the variable
OK_EXIT_CODE	Exit code in case of success
OK_EXIT	End the package in case of success
OK_NEXT_STEP	Next step in case of success.
OK_NEXT_STEP_NAME	Name of the next step in case of success
KO_RETRY	Number of retry attempts in case of failure.
KO_RETRY_INTERV	Interval between each attempt in case of failure
KO_EXIT_CODE	Exit code in case of failure.
KO_EXIT	End the package in case of failure.
KO_NEXT_STEP	Next step in case of failure.
KO_NEXT_STEP_NAME	Name of the next step in case of failure

Examples

```
The current step is: <%=odiRef.getStep("STEP_NAME")%>
```

getSubscriberList() Method

Use to return properties for each of the subscribers of a journalized table. The properties are organized according to a string pattern.

Usage

```
public java.lang.String getSubscriberList( java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd)
```

Alternative syntax:

```
public java.lang.String getSubscriberList(
java.lang.String pPattern,
java.lang.String pSeparator,
```

Description

Returns a list of subscribers for a journalized table. The pPattern parameter is interpreted and then repeated for each element of the list, and separated from its predecessor with the parameter pSeparator. The generated string begins with pStart and ends with pEnd. If no element is selected, pStart and pEnd are omitted and an empty string is returned.

In the alternative syntax, any parameters not set are set to an empty string.

Parameters

Parameter	Type	Description
pStart	String	This sequence marks the beginning of the string to generate.
pPattern	String	The pattern is repeated for each occurrence in the list. The list of the attributes usable in a pattern is detailed in the Pattern Attributes List below. Each occurrence of the attributes in the pattern string is replaced by its value. Attributes must be between brackets ([and]) Example «My name is [SUBSCRIBER]»
pSeparator	String	This parameter separates each pattern from its predecessor.
pEnd	String	This sequence marks the end of the string to generate.

Pattern Attributes List

The following table lists different parameters values as well as their associated description.

Parameter Value	Description
SUBSCRIBER	Name of the Subscriber

Examples

```
Here is list of Subscribers: <%=odiRef.getSubscriberList("\nBegin List\n", "-
[SUBSCRIBER]", "\n", "\nEnd of List\n")%>
```

getSysDate() Method

Use to return the system date of the machine running the session in a given format.

Usage

```
public java.lang.String getSysDate()

public java.lang.String getSysDate(pDateFormat)
```

Description

This method returns the system date of the machine running the session.

Parameters

Parameter	Type	Description
pDateFormat	String	Date format used to return the system date. This pattern should follow the Java Date and Time pattern.

Examples

```
Current year is: <%=odiRef.getSysDate("y")%>
```

getTable() Method

Use to return the fully qualified named of a table. This table may be a source or target table, or one of the temporary or infrastructure table handled by Oracle Data Integrator.

Usage

```
public java.lang.String getTable(
java.lang.String pMode,
java.lang.String pProperty,
java.lang.String pLocation)

public java.lang.String getTable(
java.lang.String pProperty,
java.lang.String pLocation)

public java.lang.String getTable(
java.lang.String pProperty)
```

Description

Allows the retrieval of the fully qualified name of temporary and permanent tables handled by Oracle Data Integrator.

Parameters

Parameters	Type	Description
pMode	String	"L": Uses the local object mask to build the complete path of the object. This value is used when pMode is not specified. "R": Uses the object mask to build the complete path of the object "A" Automatic: Defines automatically the adequate mask to use.

Parameters	Type	Description
pProperty	String	Parameter that indicates the name of the table to be built. The list of possible values is: • ID: Datastore identifier. This parameter is deprecated, and included for 11*g* compatibility only. The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode. • GLOBAL_ID: GUID of the target table. • TARG_NAME: Full name of the target datastore. In actions, this parameter returns the name of the current table handled by the DDL command. If partitioning is used on the target datastore of a mapping, this property automatically includes the partitioning clause in the datastore name. • COLL_NAME: Full name of the loading datastore. • INT_NAME: Full name of the integration datastore. • ERR_NAME: Full name of the error datastore. • CHECK_NAME: Name of the error summary datastore. • CT_NAME: Full name of the checked datastore. • FK_PK_TABLE_NAME: Full name of the datastore referenced by a foreign key. • JRN_NAME: Full name of the journalized datastore. • JRN_VIEW: Full name of the view linked to the journalized datastore. • JRN_DATA_VIEW: Full name of the data view linked to the journalized datastore. • JRN_TRIGGER: Full name of the trigger linked to the journalized datastore. • JRN_ITRIGGER: Full name of the Insert trigger linked to the journalized datastore. • JRN _UTRIGGER: Full name of the Update trigger linked to the journalized datastore. • JRN_DTRIGGER: Full name of the Delete trigger linked to the journalized datastore. • SUBSCRIBER_TABLE: Full name of the datastore containing the subscribers list. • CDC_SET_TABLE: Full name of the table containing list of CDC sets. • CDC_TABLE_TABLE: Full name of the table containing the list of tables journalized through CDC sets. • CDC_SUBS_TABLE: Full name of the table containing the list of subscribers to CDC sets. • CDC_OBJECTS_TABLE: Full name of the table containing the journalizing parameters and objects. • <flexfield_code>: Flexfield value for the current target table.
pLocation	String	W: Returns the full name of the object in the physical catalog and the physical work schema that corresponds to the current tuple (context, logical schema) D: Returns the full name of the object in the physical catalog and the physical data schema that corresponds to the current tuple (context, logical schema) A: Lets Oracle Data Integrator determine the default location of the object. This value is used if pLocation is not specified.

Examples

If you have defined a physical schema called Pluton.db_odi.dbo as shown below:

Property	Value
Data catalog:	db_odi
Data schema:	dbo
Work catalog:	tempdb
Work schema:	temp_owner
Local Mask:	%CATALOG.%SCHEMA.%OBJECT
Remote mask:	%DSERVER:%CATALOG.%SCHEMA.%OBJECT
Loading prefix:	CZ_
Error prefix:	ERR_
Integration prefix:	I$_

You have associated this physical schema to the logical schema called MSSQL_ODI in the context CTX_DEV and your working with a table is named CUSTOMER.

A Call To	Returns
`<%=odiRef.getTable("L", "COLL_NAME", "W") %>`	`tempdb.temp_owner.CZ_0CUSTOMER`
`<%=odiRef.getTable("R", "COLL_NAME", "D") %>`	`MyServer:db_odi.dbo.CZ_0CUSTOMER`
`<%=odiRef.getTable("L", "INT_NAME", "W")%>`	`tempdb.temp_owner.I$_CUSTOMER`
`<%=odiRef.getTable("R", "ERR_NAME", "D")%>`	`MyServer:db_odi.dbo.ERR_CUSTOMER`

getTargetColList() Method

Use to return information about the active attributes of the target table of a mapping. Active attributes are those having an active mapping. To return information about all attributes of the target table, including active and non-active attributes, use the getAllTargetColList() Method.

Usage

```
public java.lang.String getTargetColList( java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd,
java.lang.String pSelector)
```

Alternative syntaxes:

```
public java.lang.String getTargetColList( java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd)
```

```
public java.lang.String getTargetColList( java.lang.String pPattern,
java.lang.String pSeparator)
```

Description

Provides a list of attributes for the mapping's target table.

The pPattern parameter is interpreted and then repeated for each element of the list (selected according to pSelector parameter) and separated from its predecessor with the parameter pSeparator. The generated string begins with pStart and ends with pEnd. If no element is selected, pStart and pEnd are omitted and an empty string is returned.

In the alternative syntaxes, any parameters not set are set to an empty string.

Parameters

Parameters	Type	Description
pStart	String	This sequence marks the beginning of the string to generate.
pPattern	String	The pattern is repeated for each occurrence in the list. The list of the attributes usable in a pattern is detailed in the Pattern Attributes List below. Each occurrence of the attributes in the pattern string is replaced by its value. Attributes must be between brackets ([and]) Example «My string [COL_NAME] is an attribute of the target»
pSeparator	String	This parameter separates each pattern from its predecessor.
pEnd	String	This sequence marks the end of the string to generate.
pSelector	String	String that designates a Boolean expression that allows to filter the elements of the initial list with the following format: <SELECTOR> <Operator> <SELECTOR> etc. Parenthesis are authorized. Authorized operators: 1. No: NOT or! 2. Or: OR or || 3. And: AND or && Example: (INS AND UPD) OR TRG The description of valid selectors is provided below.

Pattern Attributes List

The following table lists different parameters values as well as their associated description.

Parameter Value	Description
I_COL	Internal identifier of the attribute
COL_NAME	Name of the attribute
COL_HEADING	Header of the attribute
COL_DESC	Description of the attribute
POS	Position of the attribute

Parameter Value	Description
LONGC	Attribute length (Precision)
SCALE	Scale of the attribute
FILE_POS	Beginning (index) of the attribute
BYTES	Number of physical bytes in the attribute
FILE_END_POS	End of the attribute (FILE_POS + BYTES)
IND_WRITE	Write right flag of the attribute
COL_MANDATORY	Mandatory character of the attribute. Valid values are: • 0: null authorized • 1: not null
CHECK_FLOW	Flow control flag of the attribute. Valid values are: (0: do not check, 1: check) • 0: do not check • 1: check
CHECK_STAT	Static control flag of the attribute. Valid values are: (0: do not check, 1: check) • 0: do not check • 1: check
COL_FORMAT	Logical format of the attribute
COL_DEC_SEP	Decimal symbol of the attribute
REC_CODE_LIST	List of the record codes retained in the attribute
COL_NULL_IF_ERR	Processing flag of the attribute. Valid values are: (0 = Reject, 1 = Set to null active trace, 2= set to null inactive trace) • 0: Reject • 1: Set to null active trace • 2: Set to null inactive trace
DEF_VALUE	Default value of the attribute
ALIAS_SEP	Separator used for the alias (from the technology)
SOURCE_DT	Code of the attribute's datatype.
SOURCE_CRE_DT	Create table syntax for the attribute's datatype.
SOURCE_WRI_DT	Create table syntax for the attribute's writable datatype.
DEST_DT	Code of the attribute's datatype converted to a datatype on the target technology.
DEST_CRE_DT	Create table syntax for the attribute's datatype converted to a datatype on the target technology.
DEST_WRI_DT	Create table syntax for the attribute's writable datatype converted to a datatype on the target technology.
SCD_COL_TYPE	Behavior defined for the Slowly Changing Dimensions for this attribute in the data model.
MANDATORY_CLAUSE	Returns `NOT NULL` is the attribute is mandatory. Otherwise, returns the null keyword for the technology.
DEFAULT_CLAUSE	Returns `DEFAULT <default value>` if any default value exists. Otherwise, returns and empty string.
JDBC_TYPE	Data Services - JDBC Type of the attribute returned by the driver.
<flexfield code>	Flexfield value for the current attribute.

Selectors Description

Parameter Value	Description
INS	• LKM: Not applicable • IKM: Only for mapping expressions marked with insertion • CKM: Not applicable
UPD	• LKM: Not applicable • IKM: Only for the mapping expressions marked with update • CKM: Non applicable
TRG	• LKM: Not applicable • IKM: Only for the mapping expressions executed on the target • CKM: Mapping expressions executed on the target.
NULL	• LKM: Not applicable • IKM: All mapping expressions loading not nullable attributes • CKM: All target attributes that do not accept null values
PK	• LKM: Not applicable • IKM: All mapping expressions loading the primary key attributes • CKM: All the target attributes that are part of the primary key
UK	• LKM: Not applicable. • IKM: All the mapping expressions loading the update key attribute chosen for the current mapping. • CKM: Not applicable.
REW	• LKM: Not applicable. • IKM: All the mapping expressions loading the attributes with read only flag not selected. • CKM: All the target attributes with read only flag not selected.
MAP	• LKM: Not applicable • IKM: Not applicable • CKM: Flow control: All attributes of the target table loaded with expressions in the current mapping. Static control: All attributes of the target table.
SCD_SK	LKM, CKM, IKM: All attributes marked SCD Behavior: Surrogate Key in the data model definition.
SCD_NK	LKM, CKM, IKM: All attributes marked SCD Behavior: Natural Key in the data model definition.
SCD_UPD	LKM, CKM, IKM: All attributes marked SCD Behavior: Overwrite on Change in the data model definition.
SCD_INS	LKM, CKM, IKM: All attributes marked SCD Behavior: Add Row on Change in the data model definition.
SCD_FLAG	LKM, CKM, IKM: All attributes marked SCD Behavior: Current Record Flag in the data model definition.
SCD_START	LKM, CKM, IKM: All attributes marked SCD Behavior: Starting Timestamp in the data model definition.
SCD_END	LKM, CKM, IKM: All attributes marked SCD Behavior: Ending Timestamp in the data model definition.
WS_INS	SKM: The attribute is flagged as allowing INSERT using Data Services.
WS_UPD	SKM: The attribute is flagged as allowing UDATE using Data Services.
WS_SEL	SKM: The attribute is flagged as allowing SELECT using Data Services.

Examples

```
create table TARGET_COPY <%=odiRef.getTargetColList("(", "[COL_NAME] [DEST_DT]
null", ", ", ")", "")%>
```

getTableName() Method

Use to return an unsolved string which indicates the name and type of the table.

Usage

```
public java.lang.String getTableName(
java.lang.String pProperty)
```

Description

This method returns an unsolved string which has a prefix indicating the type of table. The rest of the string indicates the name of the table.

Parameters

Parameters	Type	Description
pProperty	String	Parameter that indicates the name of the table to retrieve. The list of possible values is: • INT_SHORT_NAME: Name of the integration table. • COLL_SHORT_NAME: Name of the loading table. • CT_SHORT_NAME: Name of the integration table. If the mapping uses flow control, returns the same value as INT_SHORT_NAME. If the mapping uses static control, returns the target table name <table name>. • ERR_SHORT_NAME: Name of the error table.

Examples

```
<%=odiRef.getObjectName("L", odiRef.getTableName("COLL_SHORT_NAME"), "W")%>
<%=odiRef.getObjectShortName("L", odiRef.getTableName("INT_SHORT_NAME"), "W")%>
```

getTargetTable() Method

Use to return information about the target table of a mapping.

Usage

```
public java.lang.String getTargetTable(java.lang.String pPropertyName)
```

Description

This method returns information about the current target table. The list of available data is described in the pPropertyName values table.

In an action, this method returns information on the table being processed by the DDL command.

Parameters

Parameter	Type	Description
pPropertyName	String	String that contains the name of the requested property.

The following table lists the possible values for pPropertyName:

Parameter Value	Description
I_TABLE	Internal identifier of the datastore. This parameter is deprecated, and included for 11*g* compatibility only. The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode.
TABLE_GUID	GUID of the target table.
MODEL_NAME	Name of the model of the current datastore.
SUB_MODEL_NAME	Name of the sub-model of the current datastore.
TECHNO_NAME	Name of the target technology.
LSCHEMA_NAME	Name of the target logical schema.
TABLE_NAME	Name of the target datastore.
RES_NAME	Physical name of the target resource.
CATALOG	Catalog name.
WORK_CATALOG	Name of the work catalog.
SCHEMA	Schema name
WORK_SCHEMA	Name of the work schema.
TABLE_ALIAS	Alias of the current datastore.
TABLE_TYPE	Type of the datastore.
DESCRIPTION	Description of the current mapping.
TABLE_DESC	Description of the current mapping's target datastore. For a DDL command, description of the current table.
R_COUNT	Number of lines of the current datastore.
FILE_FORMAT	Format of the current datastore (file)
FILE_SEP_FIELD	Field separator (file)
XFILE_SEP_FIELD	Hexadecimal field separator (file)
SFILE_SEP_FIELD	Field separator string (file)
FILE_ENC_FIELD	Field beginning and ending character (file)
FILE_SEP_ROW	Record separator (file)
XFILE_SEP_ROW	Hexadecimal record separator (file)
SFILE_SEP_ROW	Record separator string (file)
FILE_FIRST_ROW	Number of lines to ignore at the beginning of the file (file)
FILE_DEC_SEP	Decimal symbol (file)
METADATA_DESC	Description of the metadata of the datastore (file)
OLAP_TYPE	OLAP type specified in the datastore definition
IND_JRN	Flag indicating that the datastore is including in CDC.
JRN_ORDER	Order of the datastore in the CDC set for consistent journalizing.

Parameter Value	Description
WS_NAME	Data Services - Name of the Web service generated for this datastore's model.
WS_NAMESPACE	Data Services - XML namespace of the web Service.
WS_JAVA_PACKAGE	Data Services - Java package generated for the web Service.
WS_ENTITY_NAME	Data Services - Entity name used for this datastore in the web service.
WS_DATA_SOURCE	Data Services - Datasource specified for this datastore's web service.
PARTITION_NAME	Name of the partition or subpartition selected for the target datastore. If no partition is selected, returns an empty string.
PARTITION_TYPE	Type of the partition or subpartition selected for the target datastore. If no partition is selected, returns an empty string. • P: Partition • S: Subpartition
<flexfield code>	Flexfield value for the current table.

Examples

```
The current table is: <%=odiRef.getTargetTable("RES_NAME")%>
```

getTemporaryIndex() Method

Use to return information about a temporary index defined for optimizing a join or a filter in a mapping.

Usage

```
public java.lang.String getTemporaryIndex(java.lang.String pPropertyName)
```

Description

This method returns information relative to a temporary index being created or dropped by a mapping.

It can be used in a Loading or Integration Knowledge Module task if the Create Temporary Index option is set to On Source or On Target for this task.

Parameters

Parameter	Type	Description
pPropertyName	String	String containing the name of the requested property.

The following table lists the different possible values for pPropertyName.

Parameter Value	Description
IDX_NAME	Name of the index. This name is computed and prefixed with the temporary index prefix defined for the physical schema.

Parameter Value	Description
FULL_IDX_NAME	Fully qualified name of the index. On the target tab, this name is qualified to create the index in the work schema of the staging area. On the source tab, this name is qualified to create the index in the source default work schema (LKM) or in the work schema of the staging area (IKM).
COLL_NAME	Fully qualified name of the loading table for an LKM. This property does not apply to IKMs.
CATALOG	Catalog containing the table to be indexed.
SCHEMA	Schema containing the table to be indexed.
WORK_CATALOG	Work catalog for the table to be indexed.
WORK_SCHEMA	Work schema for the table to be indexed.
DEF_CATALOG	Default catalog containing the table to be indexed.
DEF_SCHEMA	Default schema containing the table to be indexed.
DEF_WORK_CATALOG	Default work catalog for the table to be indexed.
DEF_WORK_SCHEMA	Default work schema for the table to be indexed.
DEF_WORK_SCHEMA	Default work schema for the table to be indexed.
LSCHEMA_NAME	Logical schema of the table to be indexed.
TABLE_NAME	Name of the table to be indexed.
FULL_TABLE_NAME	Fully qualified name of the table to be indexed.
INDEX_TYPE_CODE	Code representing the index type.
INDEX_TYPE_CLAUSE	Clause for creating an index of this type.
POP_TYPE_CLAUSE	Type of the clause for which the index is generated: • J: Join. • F: Filter.
EXPRESSION	Expression of the join or filer clause. Use for debug purposes.

Examples

```
Create <%=odiRef.getTemporaryIndex (" [INDEX_TYPE_CLAUSE] index [FULL_IDX_NAME] on
[FULL_TABLE_NAME] " )%><%=odiRef.getTemporaryIndexColList("(", "[COL_NAME]", ", ",
")")%>
```

getTemporaryIndexColList() Method

Use to return information about the columns of a temporary index for a mapping.

Usage

```
public java.lang.String getTemporaryIndexColList(java.lang.String pStart,
java.lang.String pPattern,
java.lang.String pSeparator,
java.lang.String pEnd)
```

Description

Returns a list of columns of a temporary index.

The parameter pPattern is interpreted and repeated for each element of the list, and separated from its predecessor with the parameter pSeparator. The generated string begins with pStart and ends with pEnd. If no element is selected, pStart and pEnd are omitted and an empty string is returned.

This list contains one element for each column of the temporary index.

It can be used in a Loading or Integration Knowledge Module task if the Create Temporary Index option is set to On Source or On Target for this task.

Parameters

Parameter	Type	Description
Parameter	Type	Description
pStart	String	This parameter marks the beginning of the string to generate.
pPattern	String	The pattern is repeated for each occurrence in the list. The list of possible attributes in a pattern is detailed in the Pattern Attributes List below. Each attribute occurrence in the pattern string is substituted with its value. The attributes must be between brackets ([and]) Example «My string [COL_NAME] is an attribute»
pSeparator	String	This parameter separates each pattern from its predecessor.
pEnd	String	This parameter marks the end of the string to generate.

Pattern Attributes List

The following table lists the different values of the parameters as well as the associated description.

Parameter Value	Description
CX_COL_NAME	Computed name of the attribute used as a container for the current expression on the staging area
COL_NAME	Name of the attribute participating to the index.
POS	Position of the first occurrence of this attribute in the join or filter clause this index optimizes.

Examples

```
Create <%=odiRef.getTemporaryIndex (" [INDEX_TYPE_CLAUSE] index [FULL_IDX_NAME] on
[FULL_TABLE_NAME] " )%><%=odiRef.getTemporaryIndexColList("(", "[COL_NAME]", ", ",
")")%>
```

getUser() Method

Use to return information about the user running the current session.

Usage

```
public java.lang.String getUser(java.lang.String pPropertyName)
```

Description

This method returns information about the user executing the current session. The list of available properties is described in the pPropertyName values table.

Parameters

Parameter	Type	Description
pPropertyName	String	String that contains the name of the requested property.

The following table lists the different possible values for pPropertyName:

Parameter Value	Description
Parameter Value	Description
I_USER	User identifier. This parameter is deprecated, and included for 11*g* compatibility only. The ID property works if the repository is in 11*g* compatibility mode, but an error message will be returned if the repository is in 12*c* mode.
USER_GUID	GUID of the user.
USER_NAME	User name
IS_SUPERVISOR	Boolean flag indicating if the user is supervisor (1) or not (0).

Examples

```
This execution is performed by <%=odiRef.getUser("USER_NAME")%>
```

getVersion() Method

Use to return the current version of ODI.

Usage

```
public java.lang.String getVersion()
```

Description

This method returns the full version number for the running ODI installation.

Examples

The KM text:

```
This execution is performed in <%=odiRef.getVersion()%>
```

would return:

```
This execution is performed in 12.1.3.0.0
```

hasPK() Method

Use to return whether if the current datastore has a primary key.

Usage

```
public java.lang.Boolean hasPK()
```

Description

This method returns a boolean. The returned value is true if the datastore for which a web service is being generated has a primary key.

This method can only be used in SKMs.

Examples

```
<% if (odiRef.hasPK()) { %>

         There is a PK :

          <%=odiRef.getPK("KEY_NAME")%> : <%=odiRef.getPKColList("{",
           "\u0022[COL_NAME]\u0022", ", ", "}")%>

<% } else {%>

         There is NO PK.

<% } %>
```

isColAttrChanged() Method

Use to return whether a column attribute or comment is changed.

Usage

```
public java.lang.Boolean
isColAttrChanged(java.lang.String pPropertyName)
```

Description

This method is usable in a column action for altering a column attribute or comment. It returns a boolean indicating if the column attribute passed as a parameter has changed.

Parameters

Parameter	Type	Description
pPropertyName	String	Attribute code (see below).

The following table lists the different possible values for pPropertyName

Parameter Value	Description
DATATYPE	Column datatype, length or precision change.

Parameter Value	Description
LENGTH	Column length change (for example, VARCHAR(10) changes to VARCHAR(12)).
PRECISION	Column precision change (for example, DECIMAL(10,3) changes to DECIMAL(10,4)).
COMMENT	Column comment change.
NULL_TO_NOTNULL	Column nullable attribute change from NULL to NOT NULL.
NOTNULL_TO_NULL	Column nullable attribute change from NOT NULL to NULL.
NULL	Column nullable attribute change.
DEFAULT	Column default value change.

Examples

```
<% if (odiRef.IsColAttrChanged("DEFAULT") ) { %>
          /* Column default attribute has changed. */
<% } %>
```

isVersionCompatible() Method

Use to check if the current version of ODI is compatible with the provided version. Version VER1 is compatible with version VER2 if VER1 > VER2 (for example, 12.1.3.0.0 > 11.1.1.7.0).

Usage

```
public boolean isVersionCompatible(java.lang.String compatibleVersion)
```

Description

This method returns true if the given version is compatible with the current version of the product. Version VER1 is compatible with version VER2 if VER1 > VER2 (for example, 12.1.3.0.0 > 11.1.1.7.0).

Examples

The KM text:

```
This version is compatible to 11.1.1.7.0: <
%=odiRef.isVersionCompatible("11.1.1.7.0") %>
```

would return:

```
This version is compatible to 11.1.1.7.0: true
```

nextAK() Method

Use to move to the next alternate key for a datastore.

Usage

```
public java.lang.Boolean nextAK()
```

Description

This method moves to the next alternate key (AK) of the datastore for which a Web service is being generated.

When first called, this method returns true and positions the current AK to the first AK of the datastore. If there is no AK for the datastore, it returns false.

Subsequent calls position the current AK to the next AKs of the datastore, and return true. If the is no next AK, the method returns false.

This method can be used only in SKMs.

Examples

In the example below, we iterate of all the AKs of the datastore. In each iteration of the while loop, the `getAK` and `getAKColList` methods return information on the various AKs of the datastore.

```
<% while (odiRef.nextAK()) { %>
         <%=odiRef.getAK("KEY_NAME")%>
    Columns <%=odiRef.getAKColList("{", "\u0022[COL_NAME]\u0022", ",
 ", "}")%>
         Message : <%=odiRef.getAK("MESS")%>
<% } %>
```

nextCond() Method

Use to move to the next condition for a datastore.

Usage

```
public java.lang.Boolean nextCond()
```

Description

This method moves to the next condition (check constraint) of the datastore for which a Web service is being generated.

When first called, this method returns true and positions the current condition to the first condition of the datastore. If there is no condition for the datastore, it returns false.

Subsequent calls position the current condition to the next conditions of the datastore, and return true. If the is no next condition, the method returns false.

This method can be used only in SKMs.

Examples

In the example below, we iterate of all the conditions of the datastore. In each iteration of the while loop, the getCK method return information on the various conditions of the datastore.

```
<% while (odiRef.nextCond()) { %>
        <%=odiRef.getCK("COND_NAME")%>
                 SQL :<%=odiRef.getCK("COND_SQL")%>
                 MESS :<%=odiRef.getCK("MESS")%>
<% } %>
```

nextFK() Method

Use to move to the next foreign key for a datastore.

Usage

```
public java.lang.Boolean nextFK()
```

Description

This method moves to the next foreign key (FK) of the datastore for which a Web service is being generated.

When first called, this method returns true and positions the current FK to the first FK of the datastore. If there is no FK for the datastore, it returns false.

Subsequent calls position the current FK to the next FKs of the datastore, and return true. If the is no next FK, the method returns false.

This method can be used only in SKMs.

Examples

In the example below, we iterate of all the FKs of the datastore. In each iteration of the while loop, the `getFK` and `getFKColList` methods return information on the various FKs of the datastore.

```
<% while (odiRef.nextFK()) { %>
        FK : <%=odiRef.getFK("FK_NAME")%>
                Referenced Table : <%=odiRef.getFK("PK_TABLE_NAME")%>
                Columns <%=odiRef.getFKColList("{", "\u0022[COL_NAME]\u0022", ",
 ", "}")%>
                Message : <%=odiRef.getFK("MESS")%>
<% } %>
```

setNbInsert(), setNbUpdate(), setNbDelete(), setNbErrors() and setNbRows() Methods

Use to set the number of inserted, updated, deleted or erroneous rows for the current task.

Usage

```
public java.lang.Void setNbInsert(public java.lang.Long)

public java.lang.Void setNbUpdate(public java.lang.Long)

public java.lang.Void setNbDelete(public java.lang.Long)

public java.lang.Void setNbErrors(public java.lang.Long)

public java.lang.Void setNbRows(public java.lang.Long)
```

Description

These methods set for the current task report the values for:

- the number of rows inserted (setNbInsert)
- the number of rows updated (setNbUpdate)
- the number of rows deleted (setNbDelete)
- the number of rows in error (setNbErrors)
- total number of rows handled during this task (setNbRows)

These numbers can be set independently from the real number of lines processed.

> **Note:**
>
> This method can be used only within scripting engine commands, such as in Jython code, and should not be enclosed in <%%> tags.

Examples

In the Jython example below, we set the number of inserted rows to the constant value of 50, and the number of erroneous rows to a value coming from an ODI variable called `#DEMO.NbErrors`.

```
InsertNumber=50

odiRef.setNbInsert(InsertNumber)

ErrorNumber=#DEMO.NbErrors

odiRef.setNbErrors(ErrorNumber)
```

setTableName() Method

Use to set the name of the loading or integration table.

Usage

```
public java.lang.Void setTableName(
java.lang.String pProperty,
java.lang.String pTableName)
```

Description

This method sets the name of temporary table used for loading or integration. this name can be any value.

When using the method, the loading or integration table name is no longer generated by ODI and does not follow the standard naming convention (for example, a loading table will not be prefixed with a C$ prefix). Yet, other methods using this table name will return the newly set value.

The fist parameter pProperty indicates the temporary table name to set. The second parameter can be any valid table name.

Parameters

Parameters	Type	Description
pProperty	String	Parameter that indicates the table name to set. The list of possible values is: • INT_SHORT_NAME: Name of the integration table. • COLL_SHORT_NAME: Name of the loading table.
pTableName	String	New name for the temporary table.

Examples

```
<% odiRef.setTableName("COLL_SHORT_NAME", "C" + getInfo("I_SRC_SET")) %>

<% odiRef.setTableName("COLL_SHORT_NAME", odiRef.getOption("Flow # ") +
odiRef.getTable("ID")) %>
```

setTaskName() Method

Use to set the name of a session task in a Knowledge Module, Procedure, or action.

Usage

```
public java.lang.String setTaskName(
java.lang.String taskName)
```

Description

This method sets the name of a task to the `taskName` value. This value is set at run-time. This method is available in all Knowledge Modules, procedures, and actions (Global Methods).

Parameters

Parameters	Type	Description
taskName	String	Parameter that indicates the task name to set. If this vlaue is empty, the task remains the one defined in the Knowledge Module or Procedure task.

Examples

```
<$=odiRef.setTaskName("Create Error Table " + "<%=odiRef.getTable("L","ERR_NAME","W")
%>") $>
<$=odiRef.setTaskName("Insert Error for " + "<%=odiRef.getFK("FK_NAME")%>") $>
<$=odiRef.setTaskName("Loading " + "<%=odiRef.getTable("L", "COLL_NAME", "W")%>" + "
from " + "<%=odiRef.getSrcTablesList("", "RES_NAME", ",", ".")%>" ) $>
```

C

SNP_REV Tables Reference

The Oracle Data Integrator SNP_REV tables are stored in a design-time repository and are used as staging tables for model metadata.
Customized Reverse-engineering processes load these tables before integrating their content into the repository tables describing the models.

See Reverse-Engineering Strategies for more information.

This appendix includes the following sections:

- SNP_REV_SUB_MODEL
- SNP_REV_TABLE
- SNP_REV_COL
- SNP_REV_KEY
- SNP_REV_KEY_COL
- SNP_REV_JOIN
- SNP_REV_JOIN_COL
- SNP_REV_COND

SNP_REV_SUB_MODEL

SNP_REV_SUB_MODEL describes the sub-models hierarchy to reverse-engineer.

Column	Type	Mandatory	Description
I_MOD	numeric(10)	Yes	Model ID
SMOD_CODE	varchar(35)	Yes	Sub-model code
SMOD_NAME	varchar(400)	No	Sub-model name
SMOD_PARENT_CODE	varchar(35)	No	Parent sub-model code
IND_INTEGRATION	varchar(1)	No	Deprecated.
TABLE_NAME_PATTERN	varchar(35)	No	Automatic assignment mask used to distribute datastores in this sub-model
REV_APPY_PATTERN	varchar(1)	No	Datastores distribution rule: • 0: No distribution • 1: Automatic distribution of all datastores not already in a sub-model • 2: Automatic distribution of all datastores
REV_PATTERN_ORDER	varchar(10)	No	Order into which the pattern is applied.

SNP_REV_TABLE

SNP_REV_TABLE describes the datastores (tables, views, etc.) to reverse-engineer.

Column	Type	Mandatory	Description
I_MOD	numeric(10)	Yes	Model ID
TABLE_NAME	varchar(128)	Yes	Datastore name
RES_NAME	varchar(400)	No	Resource Name: Physical table or file name.
TABLE_ALIAS	varchar(128)	No	Default datastore alias
TABLE_TYPE	varchar(2)	No	Datastore type: • T: Table or File • V: View • Q: Queue • AT: Table Alias • SY: Synonym • ST: System Table
TABLE_DESC	varchar(250)	No	Datastore description
IND_SHOW	varchar(1)	No	Datastore visibility: • 0: Hidden • 1: Displayed
R_COUNT	numeric(10)	No	Estimated row count
FILE_FORMAT	varchar(1)	No	Record format (applies only to files and JMS messages): • D: Delimited file • F: Fixed length file
FILE_SEP_FIELD	varchar(24)	No	Field separator (only applies to files and JMS messages)
FILE_ENC_FIELD	varchar(2)	No	Text delimiter (only applies to files and JMS messages)
FILE_SEP_ROW	varchar(24)	No	Record separator (only applies to files and JMS messages)
FILE_FIRST_ROW	numeric(10)	No	Number of header records to skip (only applies to files and JMS messages)
FILE_DEC_SEP	varchar(1)	No	Default decimal separator for numeric fields of the file (only applies to files and JMS messages)
SMOD_CODE	varchar(35)	No	Code of the sub-model containing this datastore. If null, the datastore is in the main model.
OLAP_TYPE	varchar(2)	No	OLAP Type: • DH : Slowly Changing Dimension • DI : Dimension • FA : Fact Table
WS_NAME	varchar(400)	No	Data service name.
WS_ENTITY_NAME	varchar(400)	No	Data service entity name.

Column	Type	Mandatory	Description
SUB_PARTITION_METH	varchar(1)	No	Partitioning method: • H: Hash • R: Range • L: List
PARTITION_METH	varchar(1)	No	Subpartitioning method: • H: Hash • R: Range • L: List

SNP_REV_COL

SNP_REV_COL lists the datastore attributes to reverse-engineer.

Column	Type	Mandatory	Description
I_MOD	numeric(10)	Yes	Model ID
TABLE_NAME	varchar(128)	Yes	Datastore name
COL_NAME	varchar(128)	Yes	Attribute name
COL_HEADING	varchar(128)	No	Short description of the attribute
COL_DESC	varchar(250)	No	Long description of the attribute
DT_DRIVER	varchar(35)	No	Data type of the attribute. This data type should match the data type code as defined in Oracle Data Integrator Topology for this technology
POS	numeric(10)	No	Position of the attribute (not used for fixed length attributes of files)
LONGC	numeric(10)	No	Logical length of the attribute (precision for numeric)
SCALEC	numeric(10)	No	Logical scale of the attribute
FILE_POS	numeric(10)	No	Starting position of the attribute (used only for fixed length files)
BYTES	numeric(10)	No	Number of physical bytes to read from file (not used for table attributes)
IND_WRITE	varchar(1)	No	1/0 to indicate whether the attribute is writable.
COL_MANDATORY	varchar(1)	No	1/0 to indicate whether the attribute is mandatory.
CHECK_FLOW	varchar(1)	No	1/0 to indicate whether to include the mandatory constraint check by default in the static control.
CHECK_STAT	varchar(1)	No	1/0 to indicate whether to include the mandatory constraint check by default in the static control.
COL_FORMAT	varchar(35)	No	Attribute format. Typically this field applies only to files and JMS messages to define the date format.
COL_DEC_SEP	varchar(1)	No	Decimal separator for the attribute (applies only to files and JMS messages)

Column	Type	Mandatory	Description
REC_CODE_LIST	varchar(250)	No	Record code to filter multiple record files (applies only to files and JMS messages)
COL_NULL_IF_ERR	varchar(1)	No	Indicate behavior in case of error with this attribute: • 0: Reject Error • 1: Null if error (inactive trace) • 2: Null if error (active trace)
DEF_VALUE	varchar(100)	No	Default value for this attribute.
SCD_COL_TYPE	varchar(2)	No	Slowly Changing Dimension type: • CR: Current Record Flag • ET: Ending Timestamp • IR: Add Row on Change • NK: Natural Key • OC: Overwrite on Change • SK: Surrogate Key • ST: Starting Timestamp
IND_WS_SELECT	varchar(2)	No	0/1 to indicate whether this attribute is selectable using data services
IND_WS_UPDATE	varchar(2)	No	0/1 to indicate whether this attribute is updatable using data services
IND_WS_INSERT	varchar(2)	No	0/1 to indicate whether data can be inserted into this attribute using data services

SNP_REV_KEY

SNP_REV_KEY describes the datastore primary keys, alternate keys and indexes to reverse-engineer.

Column	Type	Mandatory	Description
I_MOD	numeric(10)	Yes	Model ID
TABLE_NAME	varchar(128)	Yes	Name of the datastore containing this constraint
KEY_NAME	varchar(128)	Yes	Key or index name
CONS_TYPE	varchar(2)	Yes	Key type: • PK: Primary key • AK: Alternate key • I: Index
IND_ACTIVE	varchar(1)	No	0/1 to indicate whether this constraint is active.
CHECK_FLOW	varchar(1)	No	1/0 to indicate whether to include this constraint check by default in the flow control.
CHECK_STAT	varchar(1)	No	1/0 to indicate whether to include this constraint check by default in the static control.

SNP_REV_KEY_COL

SNP_REV_KEY_COL lists the attributes participating to the primary keys, alternate keys and indexes to reverse-engineer.

Column	Type	Mandatory	Description
I_MOD	numeric(10)	Yes	Model ID
TABLE_NAME	varchar(128)	Yes	Name of the datastore containing this constraint
KEY_NAME	varchar(128)	Yes	Key or index name
COL_NAME	varchar(128)	Yes	Name of the attribute in the key or index
POS	numeric(10)	No	Position of the attribute in the key

SNP_REV_JOIN

SNP_REV_JOIN describes the datastore references (foreign keys) to reverse-engineer.

Column	Type	Mandatory	Description
I_MOD	numeric(10)	Yes	Model ID
FK_NAME	varchar(128)	Yes	Reference (foreign key) name
TABLE_NAME	varchar(128)	Yes	Name of the referencing table
FK_TYPE	varchar(1)	No	Reference type: • D: Database reference • U: User-defined reference • C: Complex user reference
PK_CATALOG	varchar(128)	No	Catalog of the referenced table (if different from the catalog of the referencing table)
PK_SCHEMA	varchar(128)	No	Schema of the referenced table (if different from the schema of the referencing table)
PK_TABLE_NAME	varchar(128)	No	Name of the referenced table
IND_ACTIVE	varchar(1)	No	0/1 to indicate whether this constraint is active.
CHECK_FLOW	varchar(1)	No	1/0 to indicate whether to include this constraint check by default in the flow control.
CHECK_STAT	varchar(1)	No	1/0 to indicate whether to include this constraint check by default in the static control.
DEFER	varchar(1)	No	Deferred constraint: • D : Deferrable • I : Immediate • N: Not Deferrable Not that this field is not used.

Column	Type	Mandatory	Description
UPD_RULE	varchar(1)	No	On Update behavior: • C: Cascade • N: No Action • R : Restrict • S : Set Null
DEL_RULE	varchar(1)	No	On Delete behavior: • C: Cascade • N: No Action • R : Restrict • S : Set Null

SNP_REV_JOIN_COL

SNP_REV_JOIN_COL lists the matching attributes participating to the references (foreign keys) to reverse-engineer.

Column	Type	Mandatory	Description
I_MOD	numeric(10)	Yes	Model ID
FK_NAME	varchar(128)	Yes	Reference (foreign key) name
FK_COL_NAME	varchar(128)	Yes	Name of the attribute in the referencing table
FK_TABLE_NAME	varchar(128)	No	Name of the referencing table
PK_COL_NAME	varchar(128)	Yes	Name of the attribute in the referenced table
PK_TABLE_NAME	varchar(128)	No	Name of the referenced table
POS	numeric(10)	No	Position of the attribute in the reference

SNP_REV_COND

SNP_REV_COND describes the datastore condition and filters to reverse-engineer.

Column	Type	Mandatory	Description
I_MOD	numeric(10)	Yes	Model ID
TABLE_NAME	varchar(128)	Yes	Name of the datastore containing this constraint
COND_NAME	varchar(128)	Yes	Condition or check constraint name
COND_TYPE	varchar(1)	Yes	Condition type: • C: Oracle Data Integrator condition • D: Database condition • F: Filter
COND_SQL	varchar(250)	No	SQL expression for applying this condition or filter
COND_MESS	varchar(250)	No	Error message for this condition

Column	Type	Mandatory	Description
IND_ACTIVE	varchar(1)	No	0/1 to indicate whether this constraint is active.
CHECK_FLOW	varchar(1)	No	1/0 to indicate whether to include this constraint check by default in the flow control.
CHECK_STAT	varchar(1)	No	1/0 to indicate whether to include this constraint check by default in the static control.