Oracle Financial Services Data Integration Hub

User Manual

8.0.6.0.0

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TABLE OF CONTENTS

PREFACE 8

Audience 8

Prerequisites 8

Acronyms 8

Glossary of Icons 8

Related Information Sources 9

1 INTRODUCTION TO DATA INTEGRATION HUB 10

1.1 Overview of Data Integration Hub (DIH) 10

1.2 Benefits of DIH 11

1.3 Summary of Chapters 11

2 DATA FLOW IN DIH 13

2.1 DIH Dataflow Diagram 13

2.2 Data Flow Environment without DIH 14

2.3 Data Flow Environment with DIH 15

3 LOGGING INTO DIH AND COMMON FUNCTIONALITIES 16

3.1 Logging into DIH 16

3.2 Common functionalities 17

4 SETTING UP THE PLATFORM 18

4.1 Settings 18

4.1.1 Editing the Mandatory Settings 19

4.1.2 Editing the Optional Settings 20

5 APPLICATION DATA INTERFACE 23

5.1 Refreshing Application Data Interface 24

5.1.1 Model Changes abstracted for ETL process by DIH 27

5.1.2 Model Changes with impact on ETL process 28

5.1.3 Data Model Validation Messages 29

5.2 Viewing Application Data Interface 30

5.3 Refreshing Target Datastore 33

5.4 Command Line Utilities 36

5.4.1 Prerequisites 36

5.4.2 Invoking the Command Line Utilities 36

6 PARAMETERS 38

6.1 Fields and their descriptions 39

6.2 Defining a Parameter 40
6.3 Modifying and Viewing a Parameter 40
6.4 Deleting a Parameter 41
6.5 Unpublishing a Parameter 41
6.6 Dependency 41
6.7 Search and Filter 41
6.8 Parameters in EDD Definition 43
6.9 Parameters in Connector 44

7 EXTERNAL DATA STORE 45

7.1 Fields and their descriptions 46
7.2 Creating an External Data Store 49
7.3 Modifying and Viewing an External Data Store 51
7.4 Deleting an External Data Store 51
7.5 Unpublishing an External Data Store 52
7.6 Dependency 52
7.7 Search and Filter 52

8 EXTERNAL DATA DESCRIPTOR 53

8.1 Fields and their descriptions 54
8.1.1 Data tab 54
8.1.2 Control tab 55
8.1.3 Transformation Tab 58
8.2 Creating an External Data Descriptor 58
8.3 Modifying and Viewing an External Data Descriptor 61
8.4 Deleting an External Data Descriptor 62
8.5 Unpublishing an External Data Descriptor 62
8.6 Dependency 62
8.7 Search and Filter 62

9 CONNECTORS 64

9.1 Understanding the Summary Screen 64
9.2 Connector Properties 66
9.3 Creating a Connector - Standard View 68
9.3.1 Field and Descriptions 68
9.3.2 Creating a Connector for Loading Data into Staging 70
9.3.3 Creating a Connector for Extracting Data from Staging 77
9.3.4 Creating a Connector for Loading Data into Results 83
9.3.5 Creating a Connector for Extracting Data from Results 88
9.4 Creating a Connector - Dataflow View 97

9.4.1 Icons and Description 97
9.4.2 Creating a Connector for Loading Data into OFSAA 98
9.4.3 Creating a Connector for Extracting Data from OFSAA 101
9.4.4 Understanding the Components 104
9.5 Modifying and Viewing a Connector for Standard and Data Flow View 121
9.6 Copying a Connector 121
9.7 Deleting a Connector 122
9.8 Search and Filter 122
10 PUBLISHING DIH METADATA 123
10.1 Batch Publishing and Unpublishing for Connectors 123
10.2 Publish and Unpublish 124
11 OBJECT MIGRATION 127
11.1 Performing Object Migration 127
11.2 Exporting Objects from Source Environment 127
11.3 Importing Objects from Target Environment 129
12 EXECUTING DIH METADATA 130
13 EXECUTION HISTORY 132
13.1 Viewing the Execution History of a Connector 132
14 METADATA BROWSER 134
14.1 Connector 134
14.2 External Data Descriptor 135
14.3 Application Data Interface 135
APPENDIX A: FAQ - USE CASES 136

Preface

Audience

Following are the intended audience for the DIH user guide:

- **ETL Developers:** The ETL Developers from the IT Department of the financial services institution, who do the data sourcing.
- **Business Analysts:** The business analysts from the IT Department of the financial services institution, who do the mapping of the tables.

Prerequisites

- OFSAA application should be installed for the staging tables. This can be installed before or after DIH.
- Oracle Data Integrator (ODI) must be installed.

Acronyms

Acronym	Description
DIH	Data Integration Hub
UI	User Interface
ODI	Oracle Data Integrator
ADI	Application Data Interface
KM	Knowledge Module
EDD	External Data Descriptor
Apps	Application
EDS	External Data Source
OLH	Oracle Loader for Hadoop

Glossary of Icons

This manual may refer to all or some of the following icons.

Icons	Description
	To create a function
	To Delete a function
	To view Dependencies

Icons	Description
	To copy a function
 or 	To refresh a function
	To start a function
	To return to a summary screen
	To download a file
	To add a Join
	To remove a Join
	To auto-map source and target
	To filter the items
	To search for an item in Source and Target list
	To import mapping excel
	To export mappings to excel

Related Information Sources

Along with this user manual, you can also refer to the following documents in the OHC documentation library:

- Oracle Financial Services Analytical Application-OBP Interface User Guide Release 8.0.6.0.0
- Oracle Financial Services Analytical Application-DRM Interface User Guide Release 8.0.6.0.0
- Oracle Financial Services Analytical Application-FCUBS Interface User Guide Release 8.0.5.0.0
- Oracle Financial Services Analytical Application-FAH Interface 8.0.5.0.0
- Oracle Financial Services Data Integration Installation Manual Release 8.0.6.0.0

1 Introduction to Data Integration Hub

This chapter provides an overview to Data Integration Hub (DIH), its benefits, and the structure of remaining chapters in the user guide.

This chapter covers the following topics:

- Overview of Data Integration Hub
- Benefits of DIH
- Summary of Chapters

1.1 Overview of Data Integration Hub (DIH)

Data Integration Hub (DIH) enables to load the data from the source systems to the OFSAA staging tables, through logical interfaces, known as Application Data Interfaces (ADI). Additionally, it enables extraction of data from the OFSAA system to downstream systems such as file, and Oracle Database. DIH provides a set of User Interfaces (UI), which is used to define and maintain External Data Descriptors (EDD), Application Data Interfaces, and also map the EDDs and ADIs through Connectors. The mappings can be one to one, one to many, many-to-many and many to one.

The source systems that supply data include, the core banking systems, rating systems, modeling systems, and so on. In the absence of DIH, the data from the source systems are extracted, transformed, and loaded (ETL process) to the physical tables in Oracle Database. With DIH, the ETL activity is not replaced; but DIH serves as an abstract, logical layer to the physical tables in Oracle Database. In the logical layer, the entity and attribute names are mentioned in Business terms in English. In the physical layer, the table and column names are mentioned in technical terms.

The process is explained using the following example:

Let an attribute name in the logical layer be, Customer Account Number. The equivalent column name in the physical layer is `V_Account_Number`. Using the Connectors in DIH, the logical layer in ADI and physical layer in EDD are mapped. That is, in this case, Customer Account Number is mapped to `V_Account_Number`. The advantage of having DIH is, when the physical name of a column in an OFSAA table changes in the future, the financial institution need not change their data extracts. This also results in saving time, effort, and money for the migration activity.

Another major functionality of DIH is the support for Big Data. DIH supports source data in formats like HDFS and Hive. Additionally, it supports DB2, Sybase, SQL Server and Teradata.

1.2 Benefits of DIH

The benefits of DIH are as follows:

- Provides a level of abstraction and insulates upstream ETL processes from staging model changes.
- Support of Big Data.
- Provides a simplified mapping screen for loading data into OFSAA staging/result through an abstract layer.
- Removes ETL technicalities by prepackaging and predefining ODI parameters based on different use cases.
- Download Specification is a system managed meta object for upstream data mapping.
- Process/execution optimization for OFSAA data and known use cases. For example, in a direct one-to-one mapping, there will not be any hopping.
- Hosts pre-defined integration with Oracle Products that play role of data providers to Analytical Applications.
- Helps in getting lineage right from source data to staging till results.

1.3 Summary of Chapters

This user guide provides information on mapping of an External Data Descriptor (EDD) with Application Data Interface (ADI). It begins with information on how a Parameter is defined, how a Source System is defined in DIH, how an EDD and ADI are set, and how they are connected. The metadata is then published to ODI. The execution part does not happen in DIH as it depends on batches that are scheduled in the Financial Services Institutions. However, details about that are mentioned in the last chapter.

The guide has the following chapters:

- **Data Flow in DIH:** This chapter explains the flow of data in DIH.
- **Logging into DIH and common functionalities:** This chapter explains how to login to DIH and common functions such as modifying, viewing and deleting, using Parameter as an example.
- **Setting up Platform and Parameters:** This chapter explains how to configure and edit the platform and parameters.
- **Defining Source Systems:** This chapter explains how to define the External Data Store information.
- **External Data Descriptor:** This chapter explains how to define the source table/file, and adding the different components
- **ADI:** This chapter explains how to configure the ADI for viewing an OFSAA Data Interface
- **Connectors:** This chapter explains how to map one or more EDDs to ADI and how to create and view a connector

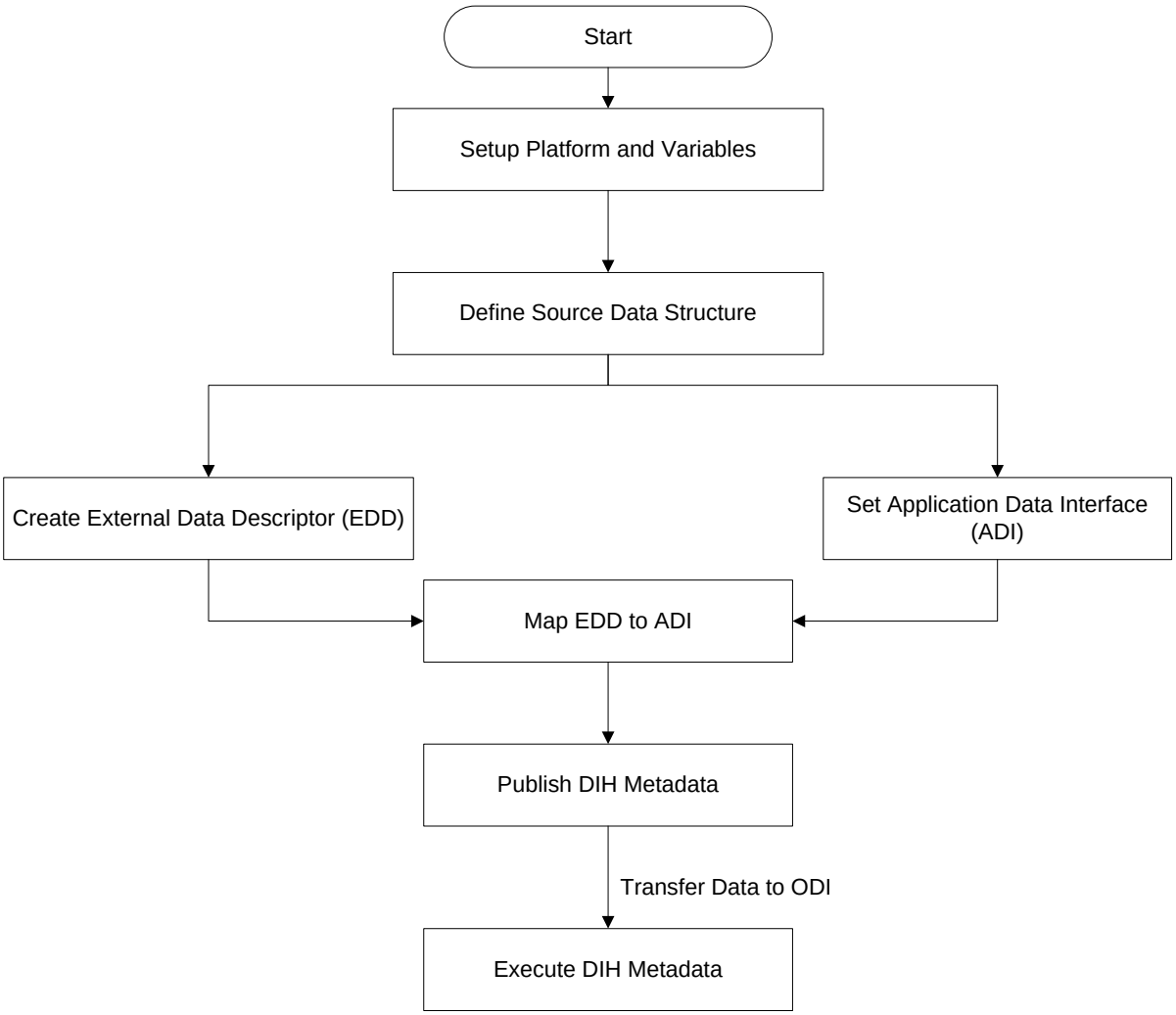
- **Publishing DIH Metadata:** This chapter explains how the DIH metadata is transferred to Oracle Data Integrator (ODI).
- Object Migration: This chapter explains as to how to perform an Object Migration.
- **Executing DIH Metadata:** This chapter explains as to how after publishing, the scheduled batches are executed.
- **Execution History:** This chapter provides information about the execution history.
- **Metadata Browser:** This chapter details the metadata browser.

2 Data Flow in DIH

This chapter provides high-level information of the data flow used in DIH.

2.1 DIH Dataflow Diagram

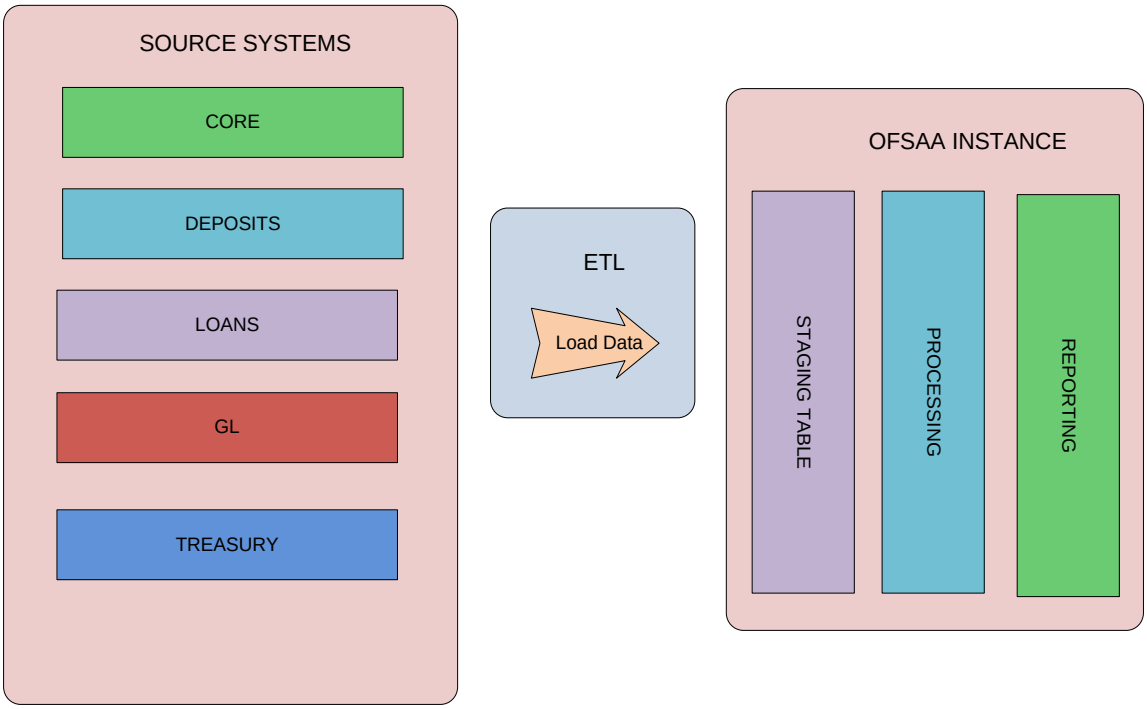
The following is the DIH data flow diagram:



For mapping between the EDD and ADI, you need to define the parameter placeholder (optional), set up the source, define the EDD, and then connect the EDD and ADI. ADI is auto seeded from the OFSA Applications data models that are installed.

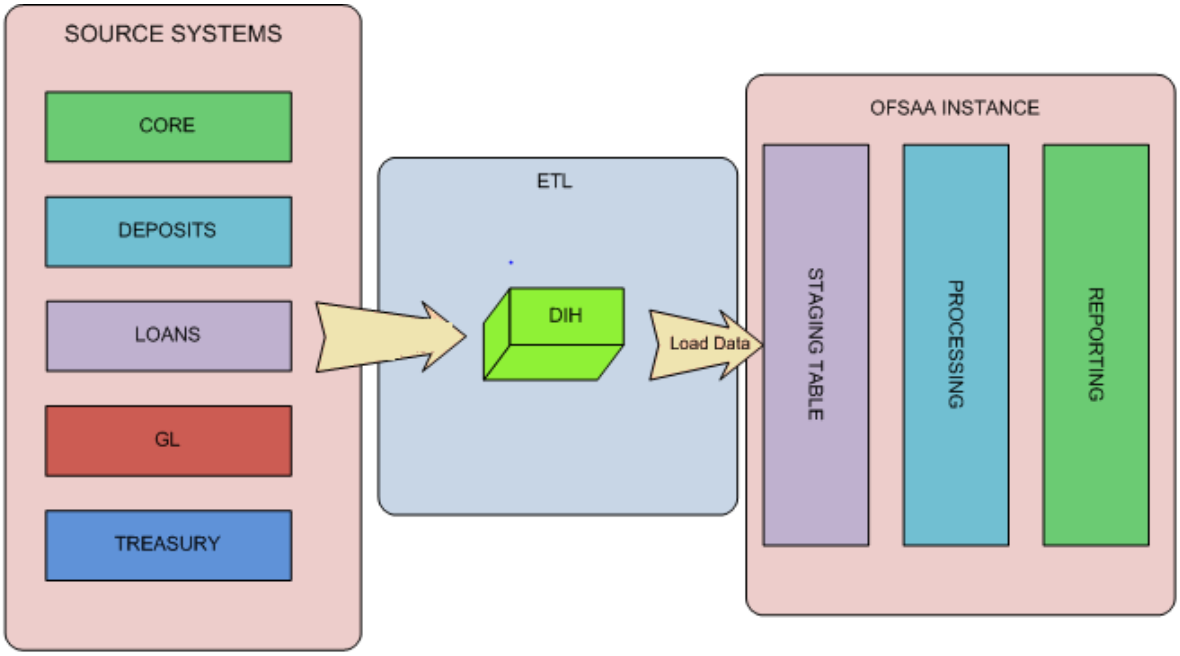
2.2 Data Flow Environment without DIH

In this data flow environment diagram without DIH, the data is loaded from the source systems, to the server in which OFSA Applications are installed (OFSAA Instance). In the OFSAA Instance, data is loaded into the staging table.



2.3 Data Flow Environment with DIH

The DIH is then used to pull data directly from the source tables, to the OFSAA staging tables.

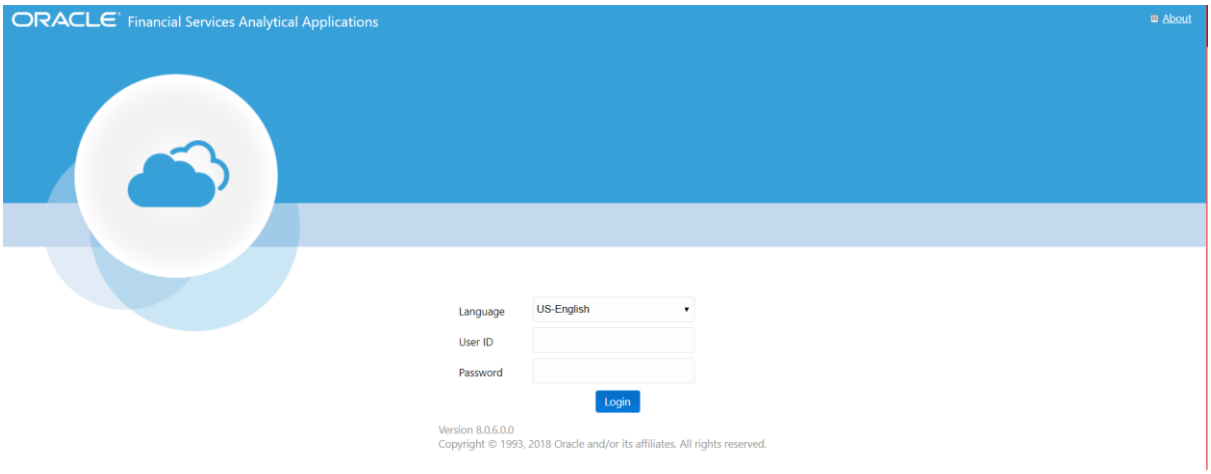


3 Logging into DIH and Common Functionalities

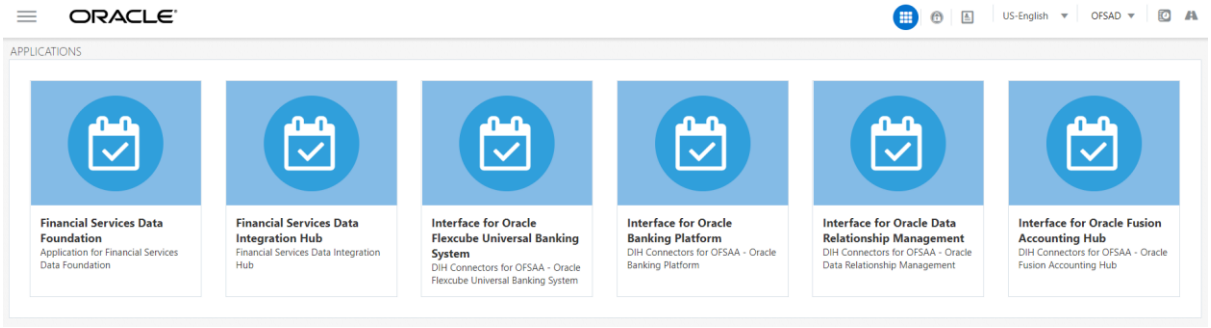
In this chapter, details on how to log into the DIH application are explained. There are a few common functionalities, which are used in different modules of DIH. To avoid repetition, these functionalities are explained under Common Functionalities section, taking Parameter as an example.

3.1 Logging into DIH

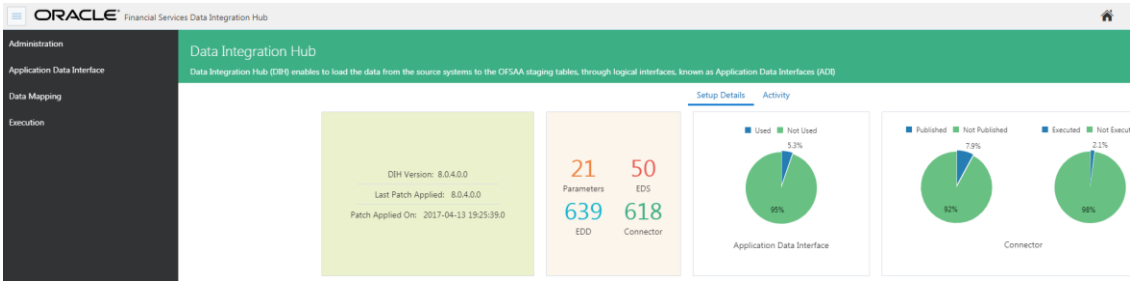
Access the DIH application using the login credentials (User ID and password). The built-in security system ensures that you are permitted to access the window and actions based on the authorization only.



After logging into the application, select Financial Services Data Integration Hub.



The DIH window appears:



Click  in the DIH home. The DIH has the below four sub links:

- Administration
- Application Data Interface
- Data Mapping
- Execution

The DIH home page displays the summary of the setup details and the activity details.

3.2 Common functionalities

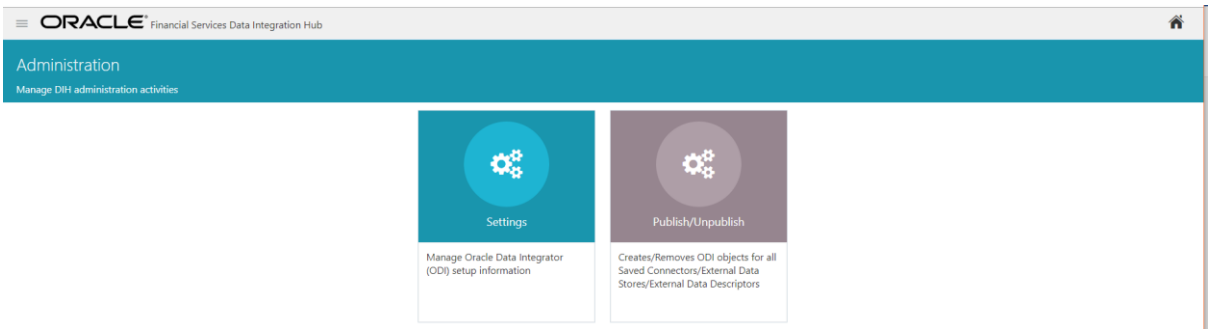
You can modify, view, delete, and find dependencies of a Parameter, Source, EDD, ADI, and Connectors. Following sections explains how this is done, taking the example of a parameter.

4 Setting up the Platform

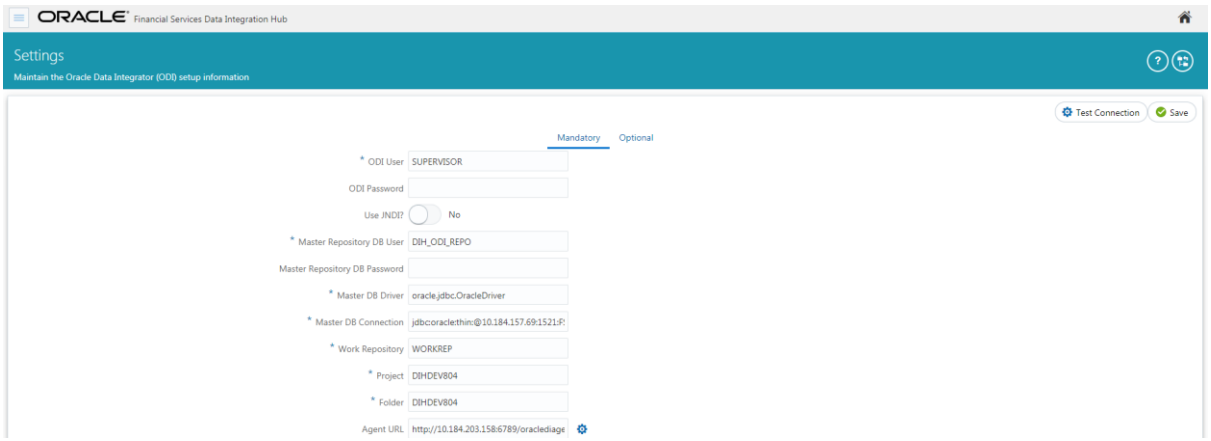
Setting up the platform is the initial activity in DIH. The **Settings** option allows in maintaining the Oracle Data Integrator (ODI) setup information and application variables.

4.1 Settings

1. Click  icon in the DIH home screen to navigate to the Administration window.



2. Click **Settings** .The Settings window appears. This window captures the ODI set up information.



NOTE: Only the DIH administrator is authorized to edit this field.

4.1.1 Editing the Mandatory Settings

While editing the Settings, the fields that are displayed are explained as follows.

4.1.1.1 Fields and their descriptions

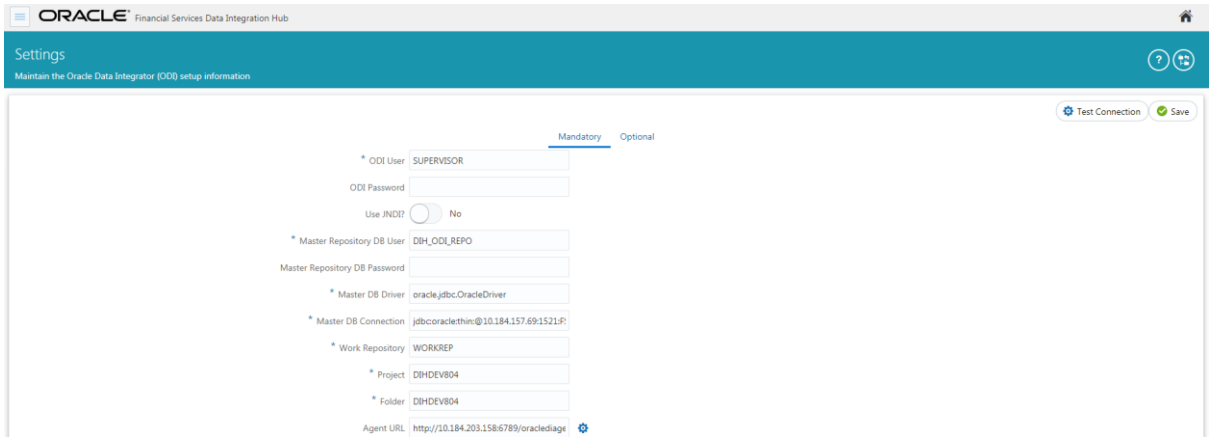
Serial No.	Fields	Description
1	ODI User	The ODI supervisor user name you defined when creating the master repository or an ODI user name you defined in the Security Navigator after having created in the master repository.
2	ODI Password	The ODI supervisor password you defined when creating the master repository or an ODI user password you defined in the Security Navigator after having created the master repository.
3	Use JNDI	If Yes, enter the Master Repository JNDI. If No, enter Master Repository DB User, Master Repository DB Password, Master DB Driver and Master DB Connection.
4	Master Repository DB User	Database user ID/login of the schema (database, library) that contains the ODI master repository.
5	Master Repository DB Password	Master Repository DB user password.
6	Master DB Driver	Specifies the driver required to connect to the RDBMS supporting the master repository created from the dropdown list. The default value is oracle.jdbc.OracleDriver. It need not be changed if it is on Oracle database.
7	Master DB Connection	The URL used to establish the JDBC connection to the database hosting the repository. The format is jdbc:oracle:thin:@<Hostname/IP Address>:<Port Number>:<Service Name>
8	Master Repository JNDI	JNDI name for ODI Master Repository
9	Work Repository	The name of the work repository that has been created previously (Example: *WorkRep1*).
10	Project	Enter the Project Name created in ODI.
11	Folder	Enter the folder name under the project created in ODI. All the packages are created under this location.

Serial No.	Fields	Description
12	Agent URL	Specify the agent URL where the ODI agent is running. This is used to execute a DIH connector from OFSAAI batch/RRF. This is not needed to do data mapping. The format is http://<Hostname/IP Address where ODI agent is running>:<PORT Number>/<Agent Context Name>

4.1.1.2 Procedure to Edit the Mandatory Settings

To edit the mandatory settings, perform the following steps:

1. You can edit the ODI User details in the following window.



2. Enter the field details as explained in Fields and their Description section.
3. To test the connection to the ODI repository, click 

.
4. Enter the details and click **Save**.

4.1.2 Editing the Optional Settings

While editing the Settings, under optional tab the fields that are displayed are explained as follows.

NOTE: The following properties need not to be specified, if they are already available as environment variable where ODI agent is running.

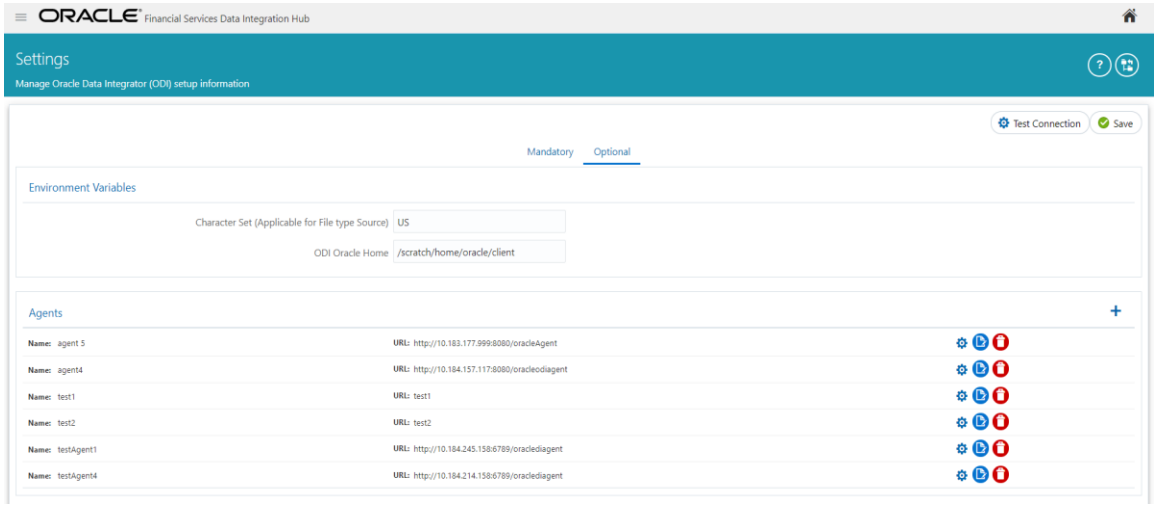
4.1.2.1 Fields and their descriptions

Serial No.	Fields	Description
1	Character Set (Applicable for File type Source)	This field is applicable if the source system is of type File. You must specify the character set when you are using SQL loader for data loading.
2	ODI Oracle Home	This field is applicable if the source system is of type File. You must specify the Oracle Home path where the ODI agent is located.

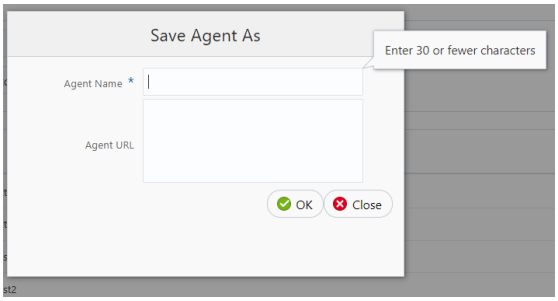
4.1.2.2 Procedure to Edit the Optional Settings

To edit the optional settings, perform the following steps:

1. You can edit the optional ODI details in the following window.



2. Enter the field details explained in Fields and their descriptions section.
3. Click Add + icon to add multiple rows for each agent. The Save Agent As window appears.



4. Enter the Agent Name and URL and click OK.

NOTE: It is mandatory to enter the agent name.

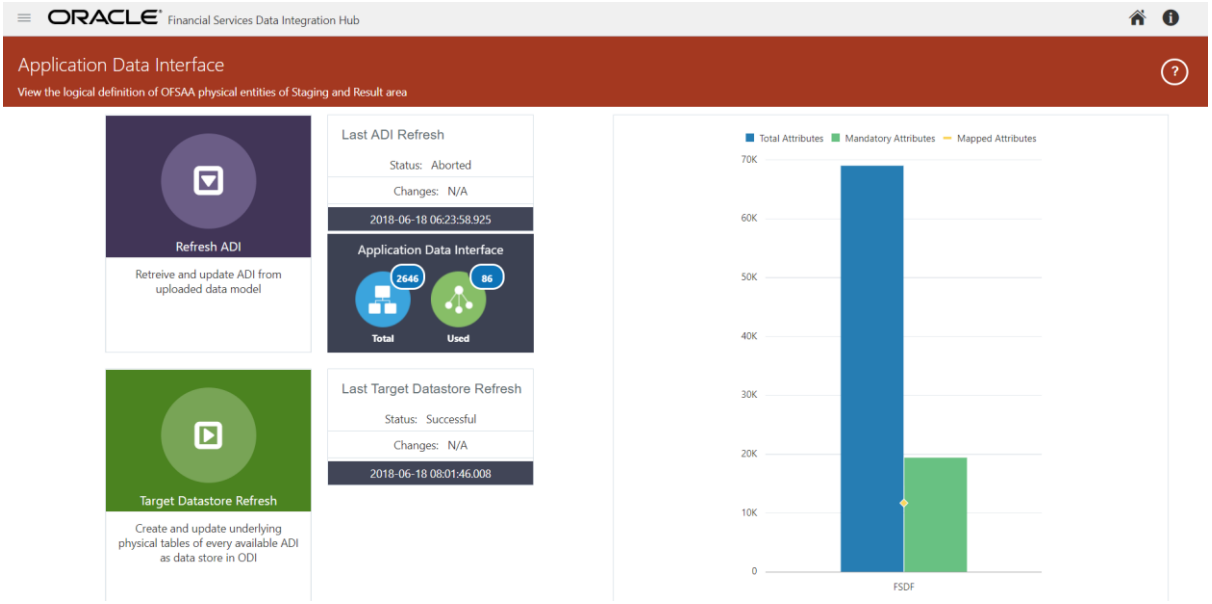
5. Click Edit  icon to modify the saved agent.
6. Click Delete  icon to delete the agent.
7. Enter the details and click Save.

5 Application Data Interface

Application Data Interface (ADI) data comes pre-seeded based on the application that is installed.

Application Data Interface enables to view the logical definition of OFSAA physical entities of staging and Result area. This can be viewed by selecting application and its subtype.

Click  icon in the DIH home screen to navigate to the Application Data Interface window.



The Application Data Interface summary displays the following:

- **Refresh ADI**: The Last ADI Refresh which details the last refresh performed, execution date, status and the changes.
- **Number of ADIs**: The total number of ADIs which are present and used.
- **Target Datastore Refresh**: The Last Target Data Store Refresh, which details the last refresh, performed, execution date, status and the changes.

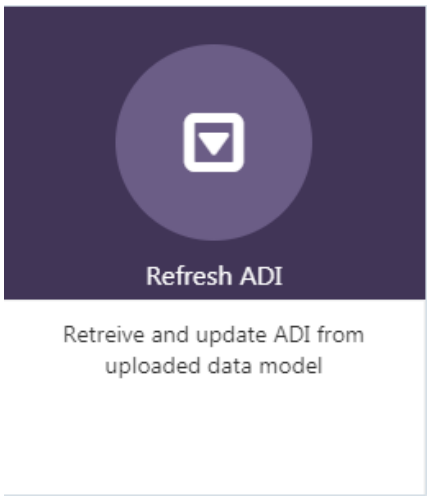
The summary screen also displays the graph of total attributes, mandatory attributes and the mapped attributes.

5.1 Refreshing Application Data Interface

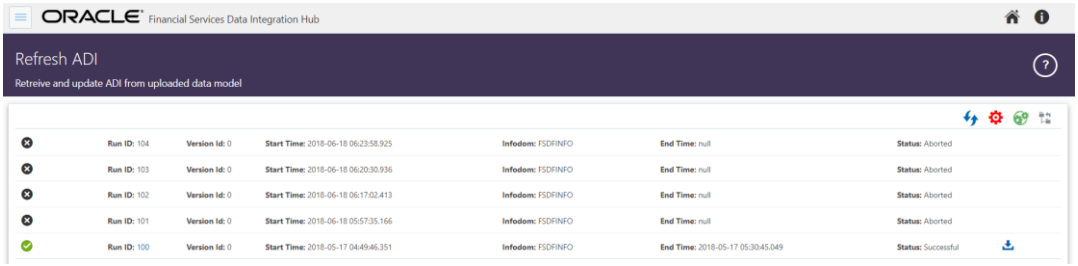
The Refresh ADI creates ADIs by reading the uploaded data model in the setup. It works for incremental changes also. If there is any change in data model from the previous one, then ADI refresh compares the existing ADI with updated model and accommodates the changes either by adding new ADI or adding new attribute and so on.

To refresh the ADI list, perform the following steps:

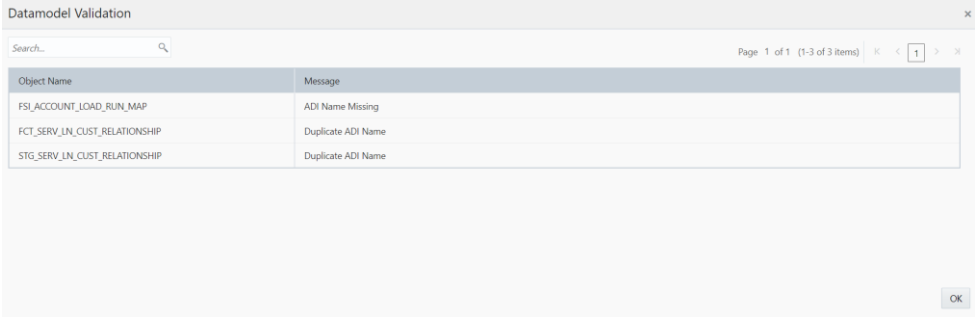
1. Click the Refresh ADI on Application Data Interface screen.



The Refresh Application Data Interface summary appears:



2. Click  icon on the right hand side of the window for Datamodel Validation. The Datamodel Validation window appears. This validates and identifies the issues in values specified by the user defined properties for physical/logical view in the OFSAA Data Model. Once executed, the utility log errors/issues are identified.



3. You can search for an Object name or Message. On validation, you receive a message. Refer Data Model Validation Messages table for information on each message.
4. Verify the information and click OK.
5. Click icon on the right hand side of the window to start the refresh of ADIs.

   The ongoing ADI refresh appears as follows:

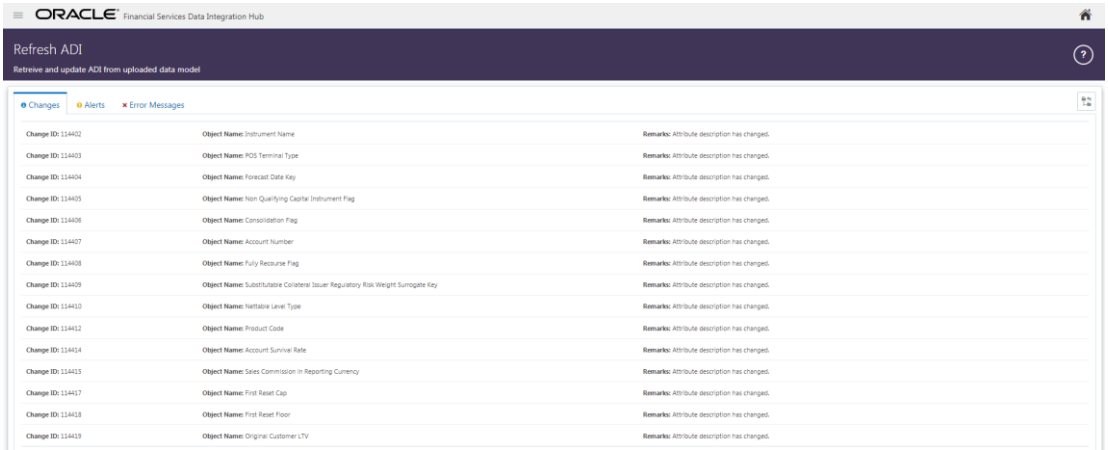
6. On successful invocation of ADI refresh, a message appears.

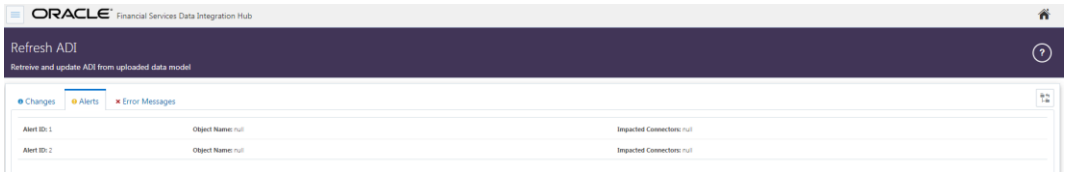
7. In case you need a detailed running log, click icon to download the log.

   A zip file is downloaded containing the detailed log for the execution.
8. To view the log details, extract the log file from the zip folder.
9. You can check the status:

   - Failed
   - Successful
   - Aborted
   - Warning
   - Not Applicable

10. Click the Run ID Run ID: link on the Refresh ADI screen. This displays the Changes, Alerts and Error Messages. Under the changes tab, you can view all the details that are made as part of ADI Refresh.





NOTE:

1. At any given time, click the refresh icon to check the status if it is complete or still in progress.
2. Click button to return to the Application Data Interface dashboard.

5.1.1 Model Changes abstracted for ETL process by DIH

Scenario	Description
When only logical name of an attribute is changed	ADI refresh updates the logical name in DIH repository. Post ADI refresh, no action is expected from user, changes are reflected automatically in connector/ADI.
When only description of an attribute is changed	ADI refresh updates the description in DIH repository. Post ADI refresh, no action is expected from user, changes are reflected automatically in connector/ADI.
When only domain of an attribute is changed	ADI refresh updates the domain in DIH repository. Post ADI refresh, no action is expected from user, changes are reflected automatically in connector/ADI.
When both logical name and domain of an attribute are changed	ADI refresh updates the logical name and domain in DIH repository. Post ADI refresh, no action is expected from user, changes are reflected automatically in connector/ADI.
When physical name of an attribute is changed	ADI refresh updates the physical name in DIH repository. Post ADI refresh, user needs to perform refresh target data store, and publish and unpublish a connector for changes to be reflected in ODI.
When data type of an attribute is changed	ADI refresh updates the data type in DIH repository. Post ADI refresh, user needs to perform refresh target data store, and publish and unpublish a connector for changes to be reflected in ODI.
When precision/scale of an attribute is changed	ADI refresh updates the precision/scale in DIH repository. Post ADI refresh, user needs to perform refresh target data store, and publish and unpublish a connector for changes to be reflected in ODI.
When both physical name and logical name of the attributes are changed	ADI refresh notifies an alert. User needs to unmap the attributes in all affected connectors (printed in the ADI refresh log), then user needs to trigger ADI refresh and redo the

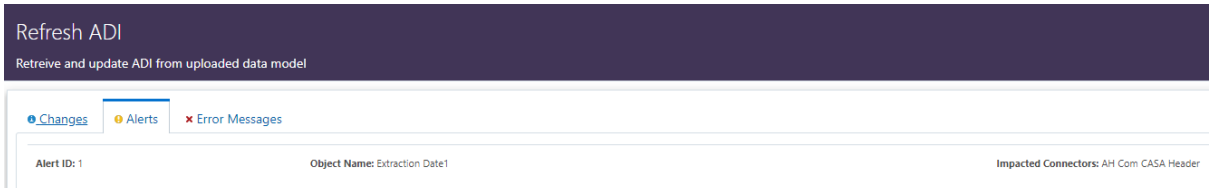
Scenario	Description
	mapping in the affected connectors. Post this, user needs to perform refresh target data store, and publish and unpublish a connector for changes to be reflected in ODI.

5.1.2 Model Changes with impact on ETL process

The following model changes will have an impact for connectors during ADI refresh.

- Column used in connector mapping are dropped from table.
- Table used in connector are dropped.

The ADI refresh process displays status as Impact Identified. The affected connectors and the respective used objects (which are dropped in the model) are list under the Alerts tab as displayed in the below image.



Message	Action
Table being dropped is already used in the connector	Unpublish and remove the ADI from the connector.
Column being dropped is already used in the connector	Unpublish and remove the attribute references from the connector. • In case of Insert type connector, remove attribute reference from mapping and truncate filter expression. • In case of Extract type connector, remove attribute reference from filter, join, look up, derived column, mapping and aggregation components.

5.1.3 Data Model Validation Messages

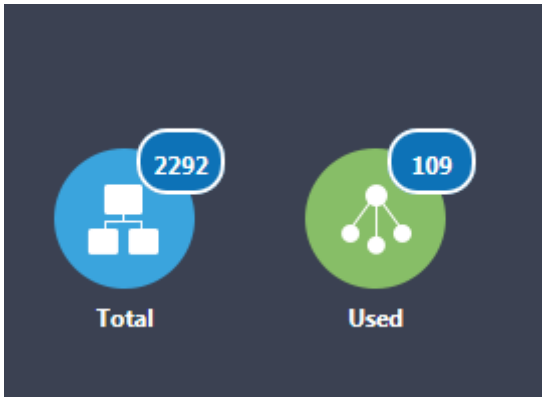
Message	Reason	Resolution
Table Classification Missing	User defined Property “OFSAA Data Interface Class” is not specified in logical view of the table in OFSA Data Model.	Specify the value for User Defined Properties in the OFSA Data Model in ERWIN
Sub Type Name Missing	User defined Property “OFSAA Data Interface Sub-Type” is not specified in logical view of the table in OFSA Data Model	Specify the value for User Defined Properties in the OFSA Data Model in ERWIN
Duplicate ADI Name	User defined Property “OFSAA Data Interface Name” must be different for the specified tables.	Specify unique value for OFSAA Data Interface Name UDP in the OFSA Data Model in ERWIN
No enabled Application mapped	The Application user defined properties for all columns of table does not have the value as “DL-MAN” or “DL-OPT”	The value for application user defined properties must be set to mentioned value.
ADI Name Missing	User defined Property “OFSAA Data Interface Name” is mandatory and is not specified in logical view of the table in OFSA Data Model	Specify the value for User Defined Properties in the OFSA Data Model in ERWIN
Invalid Table Classification	User defined Property “OFSAA Data Interface Class” can have the value as R ,S or D only	Specify correct value for mentioned user defined property
Invalid Subtype Name	User defined Property “OFSAA Data Interface Sub-Type” is specified when there is no subType for ADI	OFSAA Data Interface Sub-Type UDP is applicable when there are multiple subtypes for given ADI. Please leave it blank or same as ADI name otherwise.

5.2 Viewing Application Data Interface

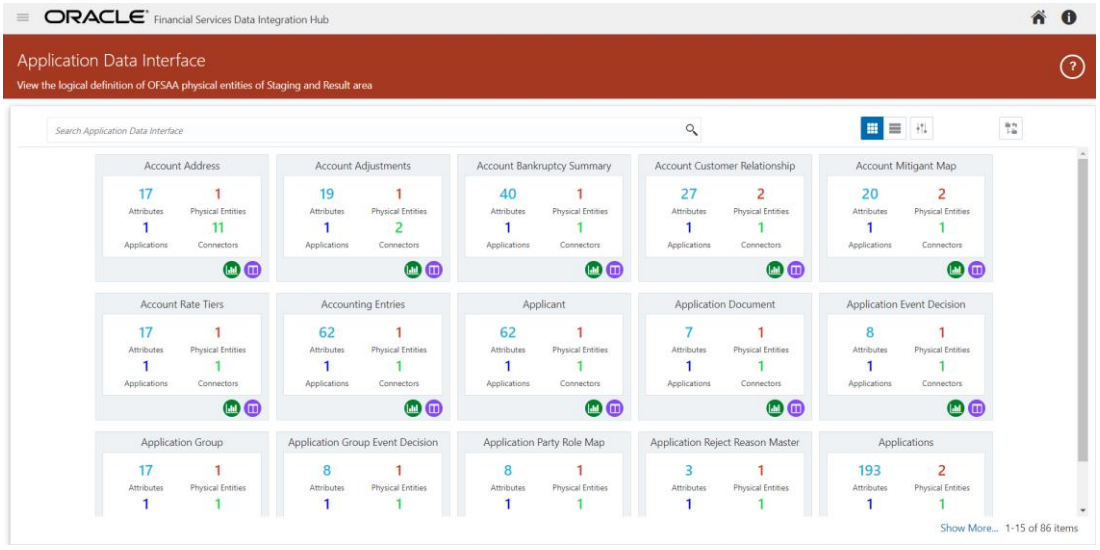
This tile displays the total number of ADIs that are available in the set up and the number of used ADIs in connectors.

To view the total number of ADIs that are present and used, perform the following steps:

1. Click Total or Used icon on the Application Data Interface.



The Application Data Interface summary screen appears:



2. Click  to view the Mapping Report for that particular ADI.
3. You can view the summary details of all the ADIs that are present or used in either Card view  or List view  .

NOTE: Click  button to return to the Application Data Interface dashboard.

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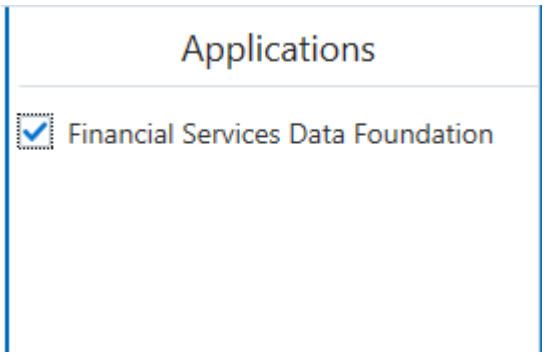
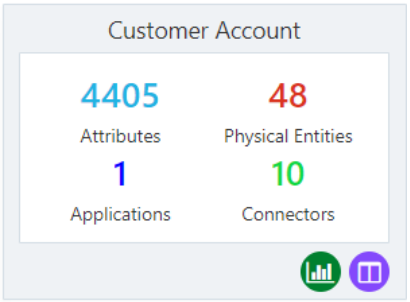
4. The Search bar helps you to find the required information. You can enter the nearest matching keywords to search, and filter the results by entering information on the search box. You can search for an ADI name using either the name or description.
5. Click  to filter the ADI. The RHS displays the applications you can select to filter.



6. Select the required application and the summary screen displays the filtered ADIs.
7. Click  to view the Attributes for that particular ADI on the summary screen. For each ADI, you can view the following details, number of attributes, number of physical entities, number of applications and the number of connectors defined on that ADI.



8. Depending on the ADI selected, there may or may not be additional subtype filters. Such as, for Transactions: Customer Account, there is a Product Class list as subtype filters available. You can choose one or more Product class to filter the attributes listed below.
9. The selected ADI details are displayed. There are two views for each ADI:
    - Logical View: The Logical view shows all the attributes and its associated description with additional information. For example, if the attribute is mandatory or not for the selected application, its domain and LOV (List of values) that are possible for the particular attribute.
    - Physical View: The Physical view shows the underlying physical table name of the selected ADI. On selecting the physical table name, it shows the mapping between the logical attribute name and its corresponding physical column name.

    At any given time, you can switch between logical and physical view.

NOTE: Click  button to return to the Application Data Interface Summary.

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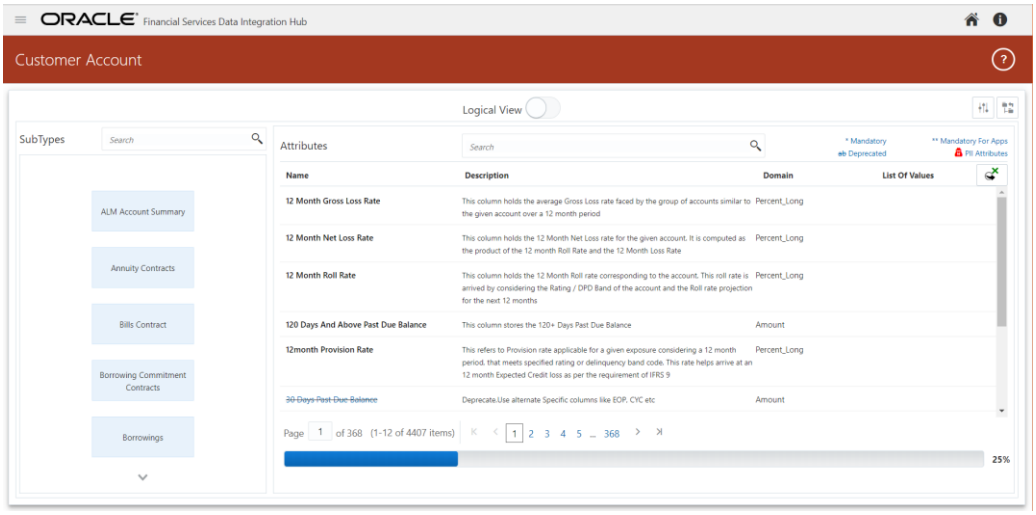
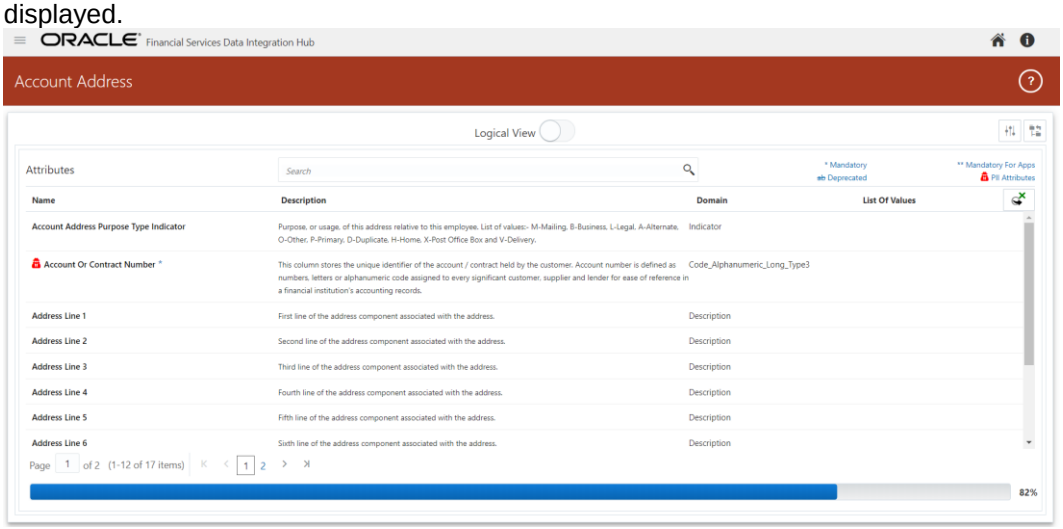
10. In the Logical View, you can see the list of attributes, with their logical name, description about the attribute, domain of the specific attribute and the list of values.

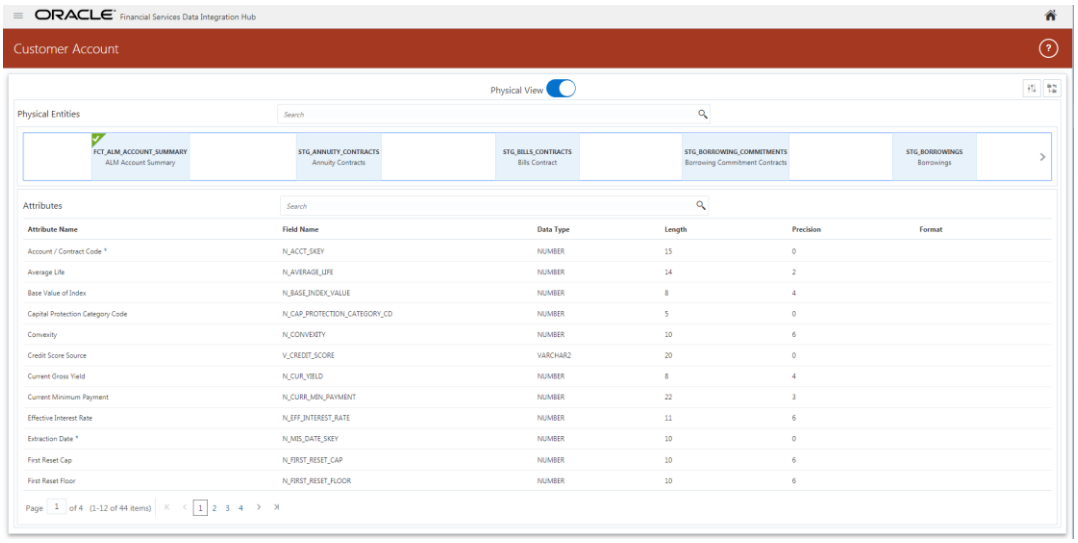


11. For example, in case of ADI with subtype such as Customer Account, the physical table name is based on the Subtype. Hence, one or more physical table names may appear.
12. For example, in case of ADI with subtype such as Account Address, PII Attributes are displayed.



13. In the Logical View, you can search for an attribute name or description.
14. The following displays the mapping progress in percentage. It displays the number of attributes which are mapped.

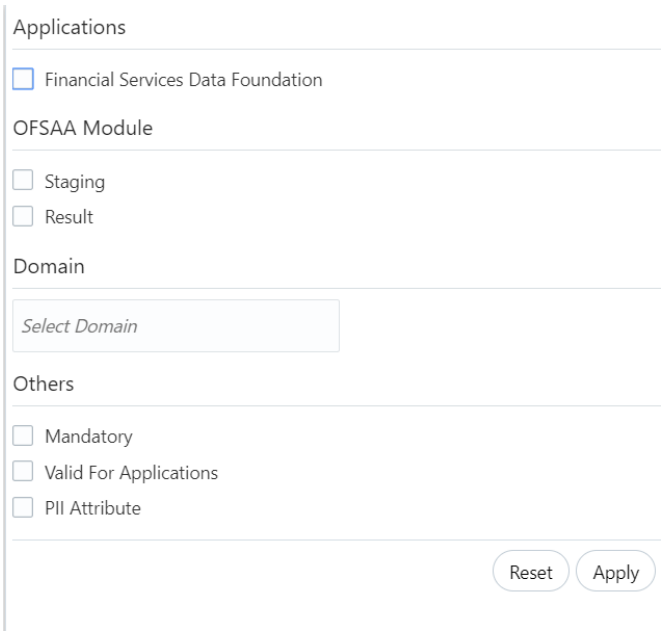
15. In Physical view, click the table name. You can view the attribute name, field name, data type, length, precision and .format.



16. In the Physical View, you can search with either an attribute name or physical column name.

17. In both logical and physical view, you can click the filter  icon.

    A filter drawer appears on the LHS.



18. You can now filter with the following options: Applications, OFSAA Module, Domain or Others. These options are applicable for both physical and logical view.

19. Select the required filter option and then click Apply.

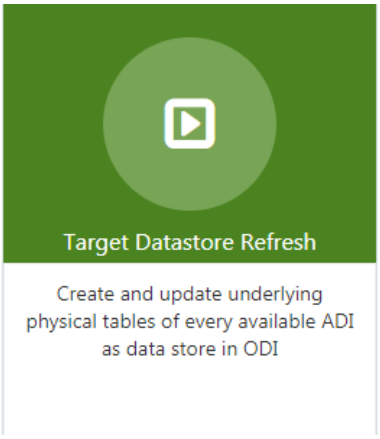
5.3 Refreshing Target Datastore

It represents underlying physical tables of every available ADI as data store in ODI. This process also works on incremental way.

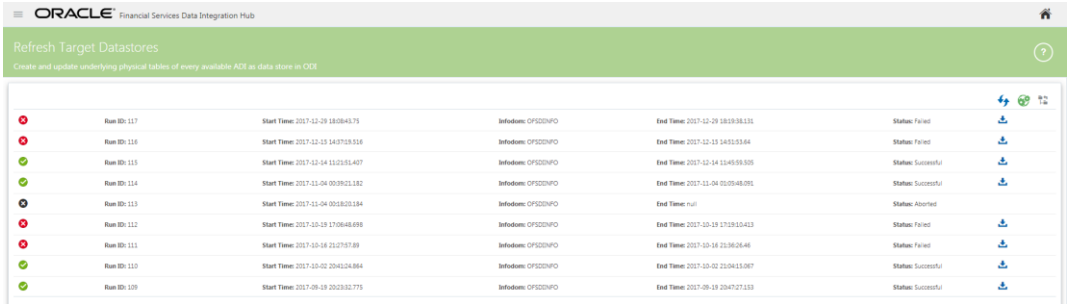
Post data model upload, if the changes are to be made available in DIH, then first perform **Refresh ADI**. Once Refresh ADI is done, perform **Refresh Target Datastore**.

To refresh the Target Datastore list, perform the following steps:

1. Click Target Datastore Refresh on Application Data Interface screen.

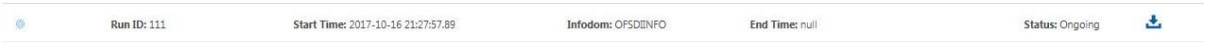


   The Refresh Target Datastore Interface summary appears:

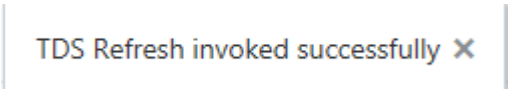


2. Click  icon on the right hand side of the window to start the refresh of Target Datastore.

   The ongoing Target Datastore.refresh appears as follows:



3. On successful invocation of TDS refresh, a message appears.



4. In case you need a detailed running log, click  icon to download the log.

   A zip file is downloaded containing the detailed log for the execution.

5. To view the log details, extract the log file from the zip folder.

NOTE:

1. At any given time, click the refresh  icon to check the status if it is complete or still in progress.
2. Click  button to return to the Application Data Interface dashboard.

NOTE: This is not a day to day activity.

5.4 Command Line Utilities

Using the command line utility, you can invoke both Refresh Application Data Interface and Refresh Target Datastore process.

5.4.1 Prerequisites

- You must have access and execute permission to the following directory:

  `$FIC_HOME/ficdb/bin`

- If secured protocol is enabled for accessing OFSAA application then "`CURL_CA_BUNDLE`" environment variable must be set where application is installed. The variable points to the path where CA certificate is available that is generated during application deployment.

  For example: `CURL_CA_BUNDLE=/usr/share/ssl/certs/ca-bundle.crt`.

5.4.2 Invoking the Command Line Utilities

To invoke the command line utility for refreshing ADI and Target Datastore, perform the following steps:

1. Once the prerequisites are met, navigate to `$FIC_HOME/ficdb/bin` path and execute `RefreshADI.sh` and then `RefreshDS.sh`.

   This expects two mandatory parameters:

   a. Information Domain name where DIH is installed. This should be mandatorily mentioned in uppercase.

   b. OFSAA Login ID which can be specified in either lower or uppercase.

2. For example, refer the following screens.

   a. For **Refreshing Application Data Interface**, use the following command:

   `./RefreshADI.sh <INFODOM_NAME> <OFSAA_USER>`

```
/scratch/dihodi/DIHHOME/ficdb/bin>./RefreshADI.sh OFSDIINFO OFSAD
F
infodomNameOFSDIINFO
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
  0     0    0     0    0     0      0      0 --:--:--  0:00:08 --:--:--     0
```

   b. For **Refreshing Target Datastore**, use the following command:

   `./RefreshDS.sh <INFODOM_NAME> <OFSAA_USER>`

```
/scratch/dihodi/DIHHOME/ficdb/bin>./RefreshDS.sh OFSDIINFO OFSAD
F
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
  0     0    0     0    0     0      0      0 --:--:--  0:00:04 --:--:--     0
```

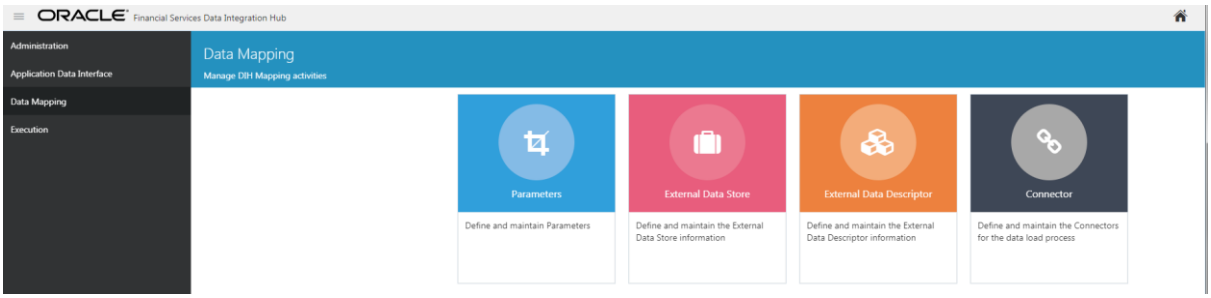
NOTE:

- If the webserver is of type Websphere, you may get an error message in the console as Refresh Target Datastore as fail. However, the process would still be ongoing. You can verify this from the application screen. In this case, you can ignore the message in the command prompt and proceed.
- If the webserver is of type Weblogic, you may encounter an error "curl: (35) SSL connect error". In this case, you should invoke the process from application screen and proceed.

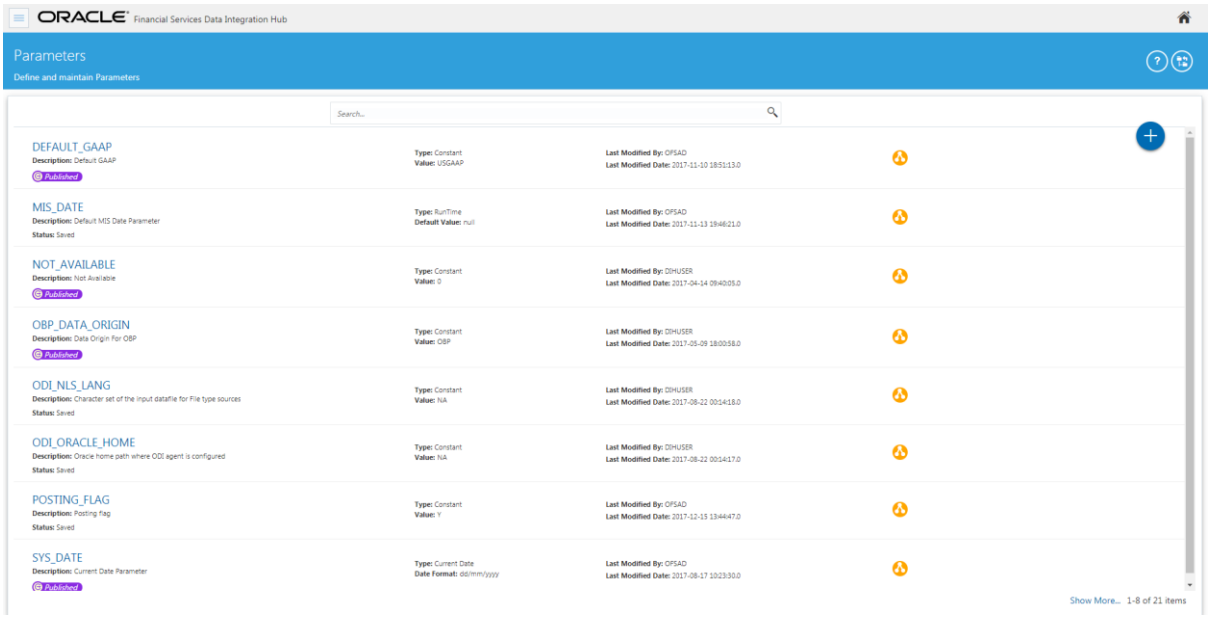
6 Parameters

Parameters are place holders and constant values that have different uses in DIH.

1. Click  icon in the DIH home screen to navigate to the **Data Mapping** window.
2. Click **Parameters**.



The Parameters Summary appears.

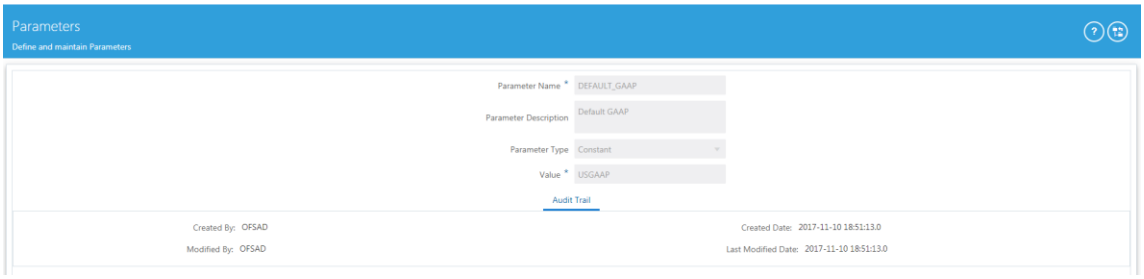


This chapter includes the following sections:

- Fields and Descriptions
- Defining a Parameter
- Modifying and Viewing a Parameter
- Deleting a Parameter
- Unpublishing a Parameter
- Dependency
- Search and Filter
- Parameter in EDD Definition
- Parameters in Connector

6.1 Fields and their descriptions

Fields displayed in Parameters screen are explained in the following table.

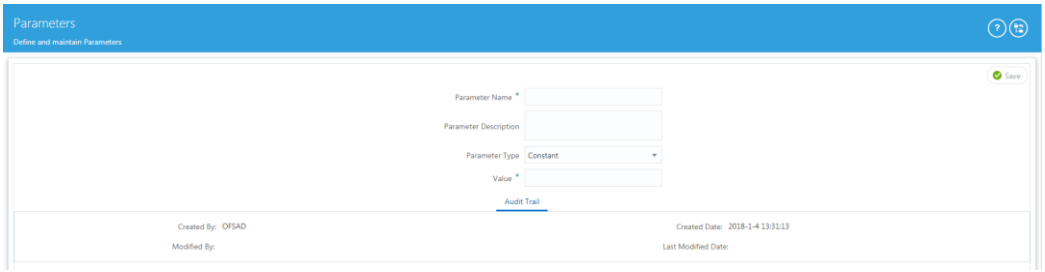


Fields	Description
Fields marked in red asterisk(*) are mandatory	
Parameter Name	The name for the placeholder that you want to define. For example, MISDATE, which can be used as a placeholder for Date.
Parameter Description	The description for the parameter you want to define. In this example, the description can be, “MISDATE can be used to substitute the date values for each day, dynamically, in mmddyyyy format.”
Parameter Type	There are 3 parameter data types: ▪ Constant: Constant data type is selected, for substituting a constant value. ▪ RunTime: RunTime data type is selected for substituting a value dynamically, in run time. In the example that is used here, MISDATE can be selected as Run Time, because, it is used to make a substitution, dynamically. ▪ CurrDate: CurrDate data type is selected for substituting a value as Current System Date.
Value	Only for constant types. Holds the actual value that of the parameter

6.2 Defining a Parameter

To define a new Parameter, perform the following steps:

1. Click the Add button on the Parameters Summary. The Parameters screen appears.



2. Enter the Parameter Name and description.

   Example: Parameter Name: MISDATE

3. Select the Parameter Type (Constant/Runtime/Current Date) from the drop down list.
4. Enter the Value/ Default Value/ Date Format in its respective field.

   The fields are explained as tabulated in the Fields and their Description section

5. Enter the above details and click **Save** to save the changes made.

NOTE: Click button to return to the Parameters Summary.

The *Audit Trail* section at the bottom of the screen displays the information of the parameter created.

6.3 Modifying and Viewing a Parameter

You can edit or view an existing Parameter, other than the Parameters which are in published status.

NOTE: You cannot edit the parameter if the parameter is in published state.

To edit or view a parameter, perform the following steps:

1. To edit or view a Parameter, you can select the required parameter from the Parameters Summary.
2. The details of the selected Parameter is displayed. You can modify or view the details.
3. Only the Parameter description, Parameter Type and the Value / Default Value / Date Format can be edited on this screen. Update the required details.
4. Click **Save** to save the changes made.

NOTE: Click button to return to the Parameters Summary.

6.4 Deleting a Parameter

To delete an existing parameter, perform the following steps:

1. On the Parameters Summary, click Delete  button. A confirmation dialogue appears.
2. Click **Yes**. The Parameter details are deleted.

NOTE:

The Delete button is enabled only in the following cases:

a. If the parameter is not in published state.

b. If it is not used by any higher object, for example: Connector/EDD.

c. If it is pre-seeded.

6.5 Unpublishing a Parameter

You can unpublish a parameter only when all the following conditions are met:

1. The parameter is in published state.
2. All the higher objects using the parameter are in unpublished state, for example: Connector/EDD.

To unpublish a parameter, perform the following steps:

1. Select the required parameter from the parameter summary. The details of the selected parameters are displayed.
2. Click Unpublish.

NOTE:

Parameters get published automatically by the system whenever the higher objects (EDD/Connector) which are using it, are published.

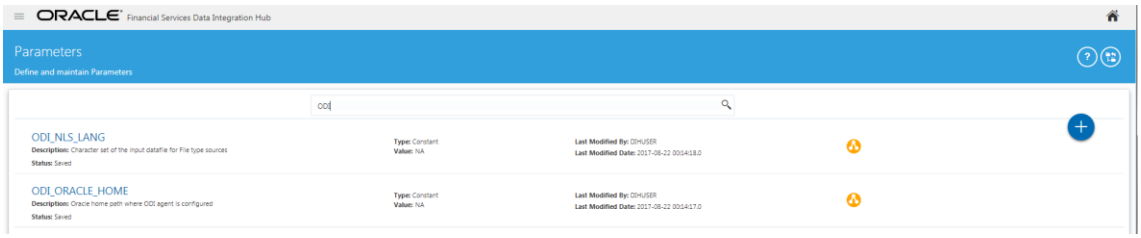
6.6 Dependency

As the name suggests, on clicking the Dependency icon  , it lists where the entire parent Parameter has dependency.

6.7 Search and Filter

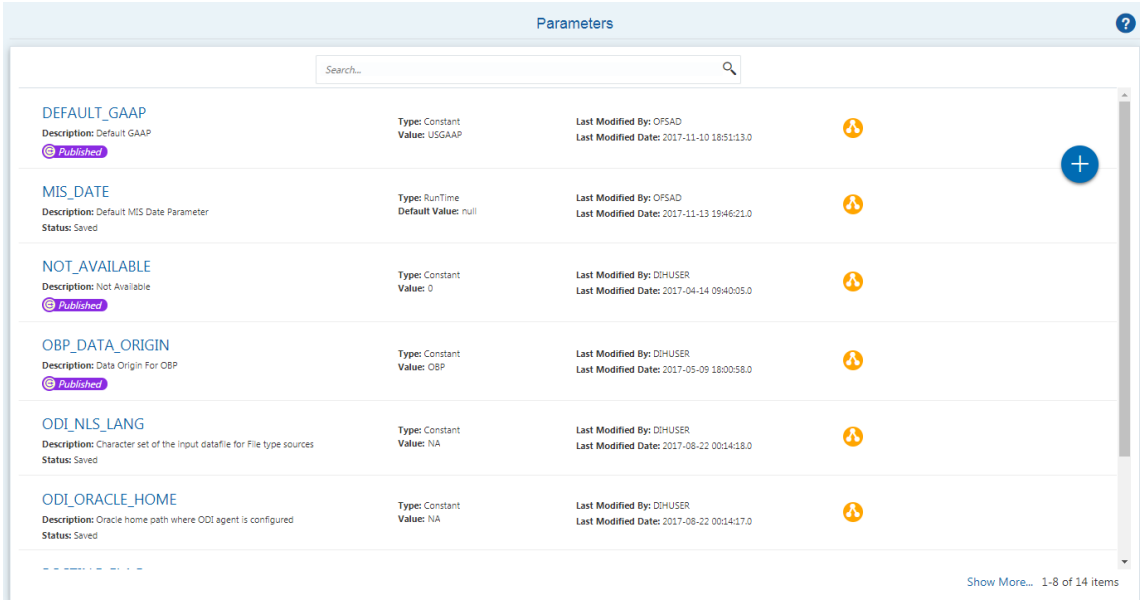
The Search and Filter option in the user interface helps you to find the required information. You can enter the nearest matching keywords to search, and filter the results by entering information on the search box. You can search for a parameter using either the name, description, status or type.

For example, enter the Parameter key word as ‘ODI’ in the search box. The entire Parameter name with ODI is listed.


ORACLE Financial Services Data Integration Hub
Parameters
Define and maintain Parameters
ODI
ODI_NLS_LANG
Description: Character set of the input datafile for File type sources
Status: Saved
Type: Constant
Value: NA
Last Modified By: DIHUSER
Last Modified Date: 2017-08-22 00:14:18.0
ODI_ORACLE_HOME
Description: Oracle home path where ODI agent is configured
Status: Saved
Type: Constant
Value: NA
Last Modified By: DIHUSER
Last Modified Date: 2017-08-22 00:14:17.0

6.8 Parameters in EDD Definition

While defining an EDD, parameter can be used as a place holder in a data filename.



For example:

Consider a table with 2 columns, such as Account number and Balance.

Account Number	Balance
A1	1000
A2	1000
A3	1000
A1	1000
A2	1500
A3	1500

In the above example, a customer has 3 accounts (A1, A2 and A3).

The customer has deposited different amounts on January 1st and 2nd 2014. The csv data files can be created for those two dates as follows:

- The account transaction for January 1st 2014 is saved as

  td_contracts_/01012014/.csv

- The account transaction for January 2nd 2014 is saved as

  td_contracts_/01022014/.csv

If a parameter, MISDATE is defined as a runtime, this can be used as a place holder that substitutes date in mmddyyyy format. That is, the data filename can be mentioned as td_contracts_%#MISDATE%.csv. When this file is called, it substitutes the date in the file name, dynamically, in the run time.

Parameters Data Types need not always be RunTime. They can be Constants or values like Current Date, which can also be used to substitute a value in a data filename.

6.9 Parameters in Connector

Parameters are used while defining the mapping, between EDD to ADI. While mapping the ADI to EDD, the fields or columns within the ADI needs to be mapped to the fields in EDD. If there are no corresponding extracts in EDD, parameters can be used to identify the default values for certain ADI elements. Also, parameters can be used while defining derived columns during mapping.

For Example: If you want to use the Runtime MIS date as parameter then, it needs to be converted to a date first. So, the expression would be following.

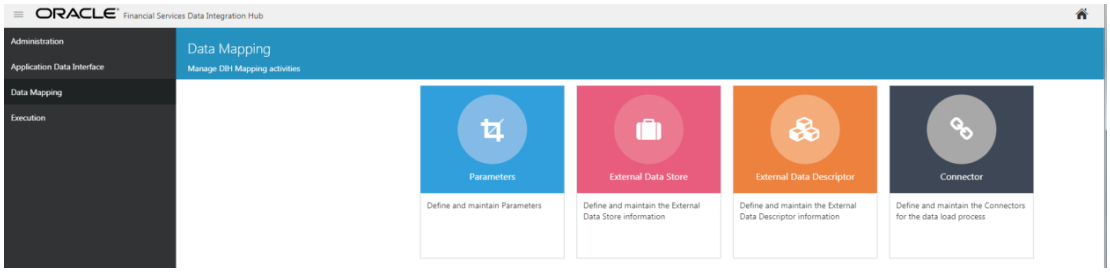
To_char(to_date(#DIHDEV.MIS_DATE,'dd-MON-YYYY'),'MM')

NOTE: Runtime batch MIS date will be in string format. It needs to be converted to DATE. The date format used here should be a valid SQL date format.

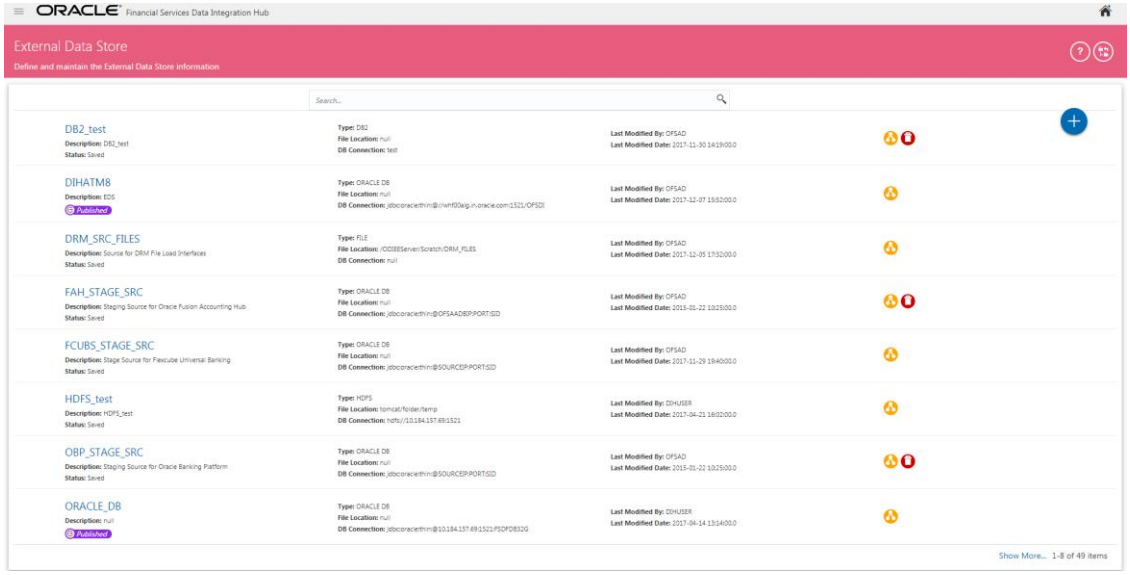
7 External Data Store

This option enables to define the External Data Store (EDS) information. DIH supports Oracle database, XML, EBCDIC, Flat file data sources, DB2, SQL server, Sybase, Teradata, and Big data sources such as HDFS and Hive.

1. Click  icon in the DIH home screen to navigate to the **Data Mapping** window.
2. Click **External Data Store**.



The External Data Store Summary appears.



3. In the **Source Systems** section of the External Data Store Summary, you can define, edit, and delete a source.
4. You can make use of the Search option to search for a specific Source.

This chapter has the following sections:

- Fields and Descriptions
- Creating an External Data Store
- Modifying and Viewing an External Data Store
- Deleting an External Data Store
- Unpublishing an External Data Store
- Dependency

- Search and Filter

7.1 Fields and their descriptions

Fields	Description
Fields marked in red asterisk(*) are mandatory	
Source Name	Is the name of the Source we are going to create. Example: USG_FILE_SRC. This must be in uppercase.
Source Description	A description for the Source is to be mentioned. Example: The landing zone where all the required files will be arrived for loading data into OFSAA.
Source Type	The available options are: ▪ EBCDIC: Extended Binary Coded Decimal Interchange Code (EBCDIC) File is a binary code for alphabetic and numeric characters. ▪ FILE: American Standard Code for Information Interchange (ASCII) File is a character-encoding scheme. ▪ HDFS: Hadoop Distributed File System (HDFS) is an open source and fundamentally a new way of storing and processing data. It enables distributed processing of huge amounts of data across industry-standard servers that both store and process the data, and can scale without any limits HDFS is Big Data in a raw format. ▪ HIVE: **Hive** provides a mechanism to project structure onto the data in Hadoop. Big data in tabulated format. On selecting this option, all the HIVE type files are displayed. ▪ ORACLE DB: An **Oracle database (DB)** is a collection of data treated as a unit. The purpose of a database is to store and retrieve related information. On selecting this option, all the ORACLE DB type files are displayed. ▪ XML: Extensible Markup Language (**XML**) is a markup language that defines a set of rules for encoding documents. ▪ DB2: IBM DB2 is a family of database server products. These products support the relational model. ▪ SQL Server: Microsoft SQL Server is a relational database management system. It is a software product with the primary function of storing and retrieving data as requested by other software applications which may run either on the same computer or on another computer across a network. ▪ Sybase: Sybase produces software to manage and analyze information in relational databases. ▪ Teradata: Teradata Corporation provides analytic data platforms, applications and related services. Its products enable users to consolidate data from different sources and make the data available for analysis. With respect to the above example, select the Source Type as File.

Fields	Description
Fields marked in red asterisk(*) are mandatory	
	Note: For Db2/SQL Server/Teradata/Sybase to work as source for DIH, Jar files with the following JDBC driver classes should be copied into the following paths: **1. <FIC**_HOME>/ficweb/webroot/WEB-INF/lib **2. <ODI_HOME>/odi/agent/lib** ▪ DB2: com.ibm.db2.jcc.DB2Driver ▪ SQL Server: com.microsoft.sqlserver.jdbc.SQLServerDriver ▪ Teradata: com.ncr.teradata.TeraDriver ▪ Sybase: com.sybase.jdbc3.jdbc.SybDriver These are third party libraries. Therefore, the names of the files may change for each version. Refer to the documentation of these databases, for the exact name of the file which contains these drivers. This field changes depending on the Source type you select. For example: If the Source type is selected as **File,** the next field is **File Location.** In this field, you need to mention the location of the file. In case source file is encrypted, • Choose Encryption at Rest option and enter the Encryption Key File Path • DIH must have access to the source file landing area. Example: /landingzone/inputfiles If the Source type is selected as **HDFS**, in addition to **File Location**, the following field appears: **HDFS JDBC URL:** In this field, you need to mention the URL of the DB. Example: hdfs://<Host>:<Port> If the Source type is selected as **HIVE**, the following field appears: **JDBC URL:** In this field, you need to mention the URL of the DB. Example: jdbc:hive://<Host>:<Port>/<Schema> For a Hive type EDS with Kerberos enabled, Conf File Path and Conf File Path fields accepts up to 1000 characters. **Kerberos:** In this field, in case you select Yes, Conf File Path and Key Tab Path must be entered. If you select No, enter User ID and Password if applicable. **Note** : The keytab file must be generated with the principal name as 'ofsaa' If the Source type is selected as **ORACLE DB**, the following fields appear: **URL**: In this field you need to mention the URL of the DB **Note**: The JDBC URL of the DB should be defined using the service name of the DB Instance. For example: jdbc:oracle:thin:@//<hostname>:<port>/<servicename>

Fields	Description
Fields marked in red asterisk(*) are mandatory	
	User ID: Enter the User ID **Note**: Only the tables that are a part of this Schema can be defined in the External Data Descriptor Page. **Password** : Enter a password **Schema:** Enter the Schema name in upper case **Encryption in Transit:** Choose this option in case you want the data to be encrypted while reading from source. If the Source type is selected as **SQL Server**, the following Fields appear. **URL**: In this field, you need to mention the URL of the DB **Note**: The JDBC URL of the DB should be defined. For example: jdbc:sqlserver://<hostname>\SQLExpress
Location	**User ID**: Enter the User ID **Password**: Enter password. **Schema**: Enter the Schema name **Note**: Only the tables that are a part of this Schema can be defined in the External Data Descriptor Page. If the Source type is selected as **Sybase**, the following Fields appear **URL**: In this field, you need to mention the URL of the DB **Note**: The JDBC URL of the DB should be defined. For example: jdbc:sybase:Tds:<hostname>:<port> **User ID**: Enter the User ID **Password :** Enter password **Schema:** Enter the Schema name **Note**: Only the tables that are a part of this Schema can be defined in the External Data Descriptor Page. If the Source type is selected as **Teradata**, the following Fields appear **URL** : where you need to mention the URL of the DB **Note**: The JDBC URL of the DB should be defined. For example: jdbc:teradata://<hostname> **User ID**: Enter the User ID **Password :** Enter password **Schema:** Enter the Schema name **Note**: Only the tables that are a part of this Schema can be defined in the External Data Descriptor Page.

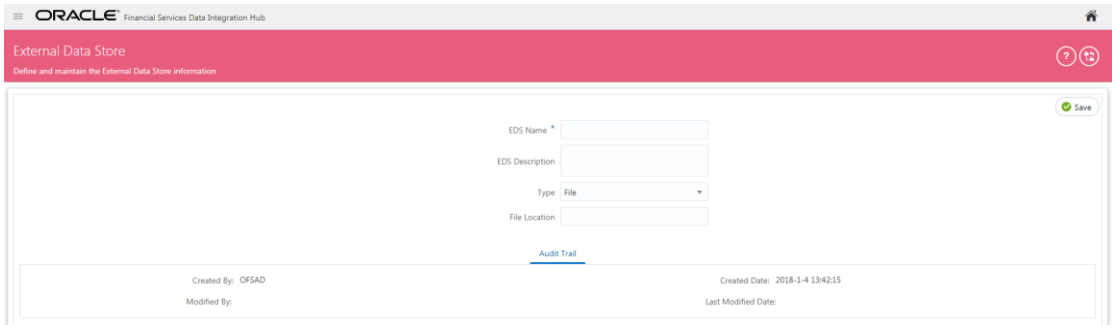
Fields	Description
Fields marked in red asterisk(*) are mandatory	
	If the Source type is selected as **DB2**, the following Fields appear **URL**: In this field, you need to mention the URL of the DB **Note**: The JDBC URL of the DB should be defined. For example: jdbc:db2://<hostname>[:<port>]/<database> **User ID**: Enter the User ID **Password:** Enter password **Database:** Enter the database name **Note**: Only the tables that are a part of this database can be defined in the External Data Descriptor Page.

7.2 Creating an External Data Store

While creating a Source, the fields that are displayed are explained as follows.

To create a new source from External Data Store Summary, perform the following steps:

1. Click Add button on the External Data Store Summary. The External Data Store screen appears.



2. Enter the EDS Name. Example: USG_FILE_SRC and enter a description for the same.
3. Select the Type from the drop down list. Example: File.
4. The rest of the fields will change as per the option selected for Type. If Source Type is selected as File, The File Location field needs to me mentioned.

   The fields are explained as tabulated in the Fields and their Description section.
5. Click “Test Connection” to test the connection details (User ID/ Password) for the database types **DB2, HIVE, Oracle DB, SQL Server, Sybase,** and **Teradata.**
6. Enter the above details and click **Save**.

NOTE: Click button to return to the External Data Store Summary.

The *Audit Trail* section at the bottom of the screen displays the information of the source created.

7.3 Modifying and Viewing an External Data Store

To edit and view an external data store, perform the following steps:

1. To edit or view an EDS, you can select the required EDS from the EDS parameter summary.

   NOTE: You can edit an existing EDS, other than the EDSs which are in published status.

2. The details of the selected EDS is displayed. You can modify or view the details.
3. EDS Name and EDS Type cannot be edited. Update the other required details.
4. Click **Save** to save the changes made.

NOTE: Click  button to return to the Parameters Summary.

7.4 Deleting an External Data Store

To delete an existing EDS, perform the following steps:

1. On the EDS Summary, click Delete  button. A confirmation dialogue appears.
2. Click **Yes**. The EDS details are deleted.

NOTE:

The Delete button is enabled only in the following cases:

1. If the EDS is not in published state,
2. If it is not used by any object.

7.5 Unpublishing an External Data Store

You can unpublish an EDS only when all the following conditions are met:

1. The EDS is in published state.
2. All the higher objects using the EDS are in unpublished state, for example: Connector/EDD.

To unpublish an EDS, perform the following steps:

1. Select the required EDS from the EDS summary. The details of the selected EDS are displayed.
2. Click Unpublish.

NOTE:

EDS gets published automatically by the system whenever the higher objects (EDD/Connector) which are using it, are published.

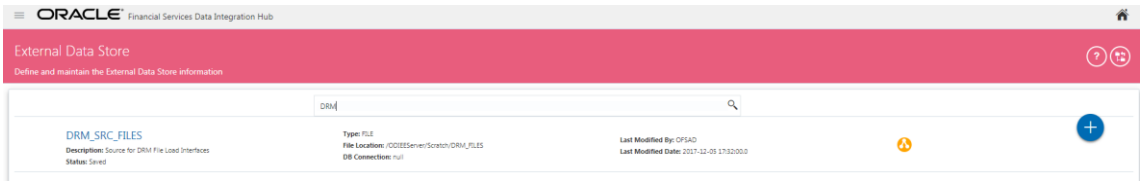
7.6 Dependency

As the name suggests, on clicking the Dependency icon  , it lists where the entire parent EDS has dependency. That is, you cannot delete a child file without deleting the parent file.

7.7 Search and Filter

The Search and Filter option in the user interface helps you to find the required information. You can enter the nearest matching keywords to search, and filter the results by entering information on the search box. You can search for a parameter using either the name, description, status or type.

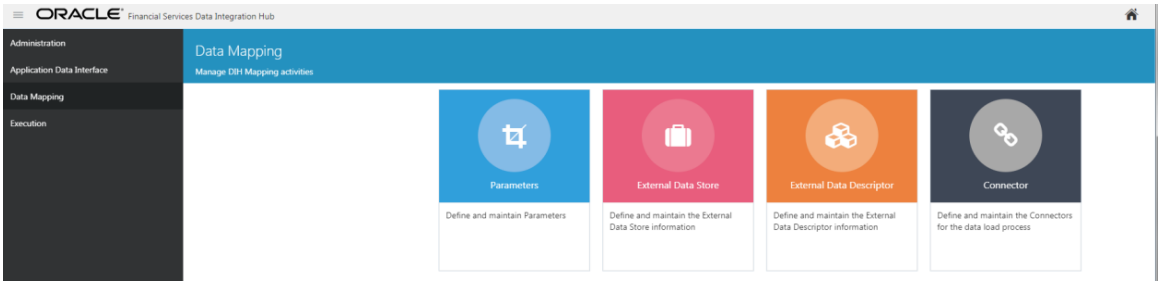
For example, enter the Parameter key word as ‘DRM in the search box. All the EDS names with DRM are listed.



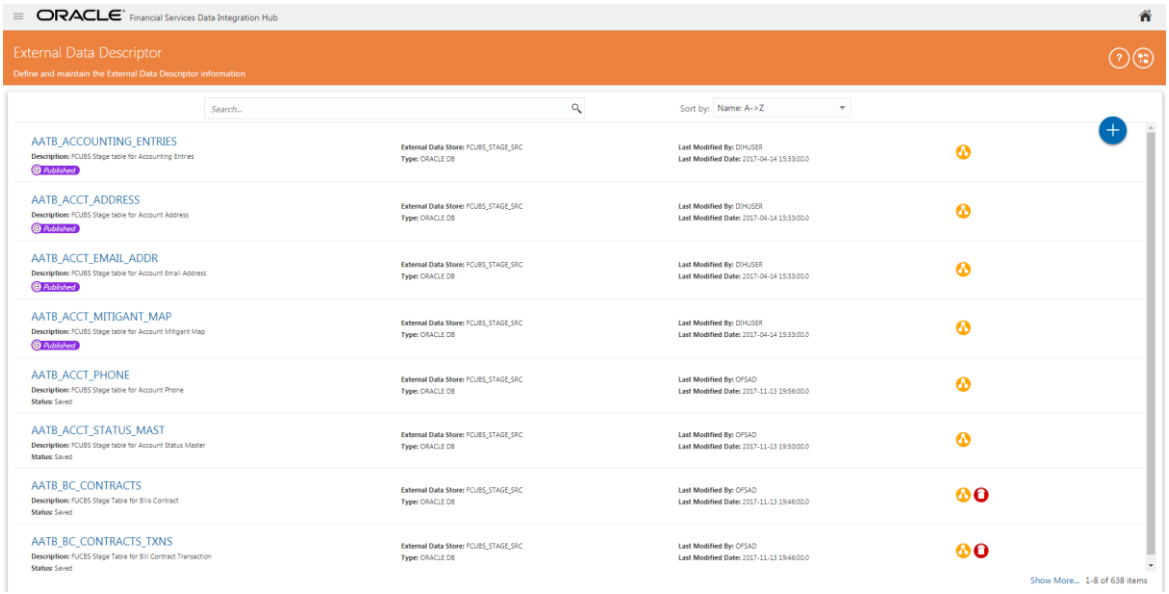
8 External Data Descriptor

The External Data Descriptor (EDD) allows defining or registering external source data structures in DIH. The EDD definition can be used for loading and extracting data into/from OFSAA. The control tab is not used for extraction. It is only used when reconciliation is required while loading data into OFSAA.

1. Click Menu  icon in the DIH home screen to navigate to the **Data Mapping** window.
2. Click **External Data Descriptor**.



The External Data Descriptor Summary appears.



This chapter has the following sections:

- Fields and Descriptions
- Creating an EDD
- Modifying and Viewing an EDD
- Deleting an EDD
- Unpublishing an External Data Descriptor
- Dependency
- Search and Filter

8.1 Fields and their descriptions

8.1.1 Data tab

Fields	Description
Fields marked in red asterisk(*) are mandatory	
Data File Name	You can add multiple data files to an EDD. For example, You need to add Term Deposits Contracts data file. There are Term Deposits Contracts data files for Retail as well as Corporate accounts. Therefore, to get both these details, you first add the Term Deposits Contracts data file for Retail accounts, say, td_contracts%#MISDATE%_1.csv and as the next record, add Term Deposits Contracts data file for Corporate accounts. Example: td_contracts%#MISDATE%_1.csv
Record Delimiter	The records are stored differently in different operating systems. The options available are: ▪ MS-DOS ▪ Unix ▪ No Record Delimiter ▪ Other With respect to the example, select Unix.
File Format	There are 2 options: ▪ Fixed Length: The file will have records and columns with a fixed length. Each column will have a predetermined and unchanging size, set when the record layout is designed, and the sum of the column sizes will add up to the record size. ▪ Delimited: There will be a separation of the records and columns using a delimiter character like comma, semicolon, hyphen and so on. With respect to the above example, select *Delimited.*
Text Qualifier	It's a character that identifies a text. This is used when some characters exists within a text. Generally, double quotes are used, prefixed and suffixed with a text. This is optional.
Skip Number Of Records	The number of records to be skipped is to be mentioned. The records are skipped from the top. Generally, this is to skip the Headers.
Decimal Separator	This mentions up to which decimal digit you want to view the result in.

Fields	Description
Fields marked in red asterisk(*) are mandatory	
Read from template	A template contains all the values and is in Excel file format. If the template is not available, you need to create it manually by clicking the Add button, under Source Data Elements tab. If the template is available, you can browse for the template. Refer to the File EDD Template. You can also drop the template in the area " Drop template here or click to select ".
Select Template (*.xls,*.xlsx,*.csv Files Only	You can click Browse and select the required template.
Data Elements	
Name	Name of the field in EDD. Example: Field name in a file or column name in a table. Note: Field name of XML type should not be more than 25 characters and for others should not be more than 30 characters.
Type	This shows the Data type of the field. Example: String, Number, EBCDIC and so on.
Length	This is applicable only for EBCDIC format. This is the length of EBCDIC data type. In case of file, it is length only.
Precision	It is to specify the decimal point. Example: 10.3.
Format	It is the format to specify the date format. Example: YYYY-MM-DD. The format should be in capitals.
Record Type Code	This identifies the Record type in a file where Header, Trailer and Data are of different record length and type. The values can be any string available in the text file. This value is only possible for the first field in a file. Example: The values can be DATA; CTRL to specify it is a control record.

8.1.2 Control tab

Fields	Description
Fields marked in red asterisk(*) are mandatory	
When Separate File is selected as Yes.	
File Name	Specify the name of the file.

Fields	Description
Fields marked in red asterisk(*) are mandatory	
File Format	There are 2 options: ▪ Fixed Length: The file will have records and columns with a fixed length. Each column will have a predetermined and unchanging size, set when the record layout is designed, and the sum of the column sizes will add up to the record size. ▪ Delimited: There will be a separation of the records and columns using a delimiter character like comma, semicolon, hyphen and so on. With respect to the above example, select *Delimited.*
Column Delimiter	If the File Format is selected as Fixed Length, the Column Delimiter would by default be Other. If the File format is selected as Delimited, the following options are available in the drop down list. ▪ Other ▪ Space ▪ Semicolon ▪ Comma ▪ Tab With respect to the above example, select *Comma.*
Record Type Code	Used to uniquely identify a record within a file. Many times, Bank provides file having data and control record within same file. In that case, in order to distinguish between data record and control record, the first field is Record Type. It has a specific value to identify that. Here, specify the value that identifies the Data. Values can be 'DATA' and so on. For Control record, the value is specified under control tab. Only the first field of a file is used for Record Type.
Record Delimitter	The records are stored differently in different operating systems. The options available are: ▪ MS-DOS ▪ Unix ▪ No Record Delimiter ▪ Other With respect to the example, select Unix.
Skip number of records	The number of records to be skipped is to be mentioned. The records are skipped from the top. Generally, this is to skip the Headers.

Fields	Description
Fields marked in red asterisk(*) are mandatory	
Text Qualifier	It's a character that identifies a text. This is used when some characters exists within a text. Generally, double quotes are used, prefixed and suffixed with a text. This is optional.
Decimal separator	This mentions up to which decimal digit you want to view the result in.
Record Type Length	This is applicable only for Control records that are of Fixed length. The length of the record type value to pick up the correct record. For example, if control record is "DATATotal Records400" .and DATA is the Record type, the length is '4'.
Control Name Length	Based on the above example, Control name is "Total Records". Hence, the Control Name Length is '13'.
Control Value Length	Based on the above example, the Control value is 400. Hence, the length of the control Value is '3'
Controls	
Name	Specify the name of the file.
Count	Select either Aggregation Method or Count
When Separate File is selected as No.	
Record Type Length	This is applicable only for Control records that are of Fixed length. The length of the record type value to pick up the correct record. For example, if control record is "DATATotal Records400" .and DATA is the Record type, the length is '4'.
Record Type Code	Used to uniquely identify a record within a file. Many times, Bank provides file having data and control record within same file. In that case, in order to distinguish between data record and control record, the first field is Record Type. It has a specific value to identify that. Here, specify the value that identifies the Data. Values can be 'DATA' and so on. For Control record, the value is specified under control tab. Only the first field of a file is used for Record Type.
Control Value Length	Based on the above example, the Control value is 400. Hence, the length of the control Value is '3'
Control Name Length	Based on the above example, Control name is "Total Records". Hence, the Control Name Length is '13'.
Controls	
Name	Specify the name of the file.
Count	Select either Aggregation Method or Count

8.1.3 Transformation Tab

Fields	Description
Fields marked in red asterisk(*) are mandatory	
Transformation Type	This is a drop-down listing different types of transformation supported. Currently, only Aggregation is supported.
If the Transformation Type is selected as **None**:	
Derived Data Elements	
Name	Name of the derived field in EDD. Note: Field name should not be more than 30 characters.
Type	This shows the Data type of the field. Example: Varchar2, Number, Date, and so on.
Expression	On selecting 'Add option', the Specify Expression window appears. Here, you can select the required Entities, Functions and Operators. That is, you can write your own expression. Enter the field name and click OK. Now the newly created field name will be listed.
If the Transformation Type is selected as **Aggregation**:	
Derived Data Elements	
Name	Name of the derived field in EDD. Note: Field name should not be more than 30 characters.
Type	This shows the Data type of the field. Example: Varchar2, Number, Date, and so on.
Expression	On selecting 'Add option', the Specify Expression window appears. Here, you can select the required Entities, Functions and Operators. That is, you can write your own expression. Enter the field name and click OK. Now the newly created field name will be listed.
Aggregation Properties	
Group By	This is available when Aggregation is selected.
Having	This is available when Aggregation is selected.

8.2 Creating an External Data Descriptor

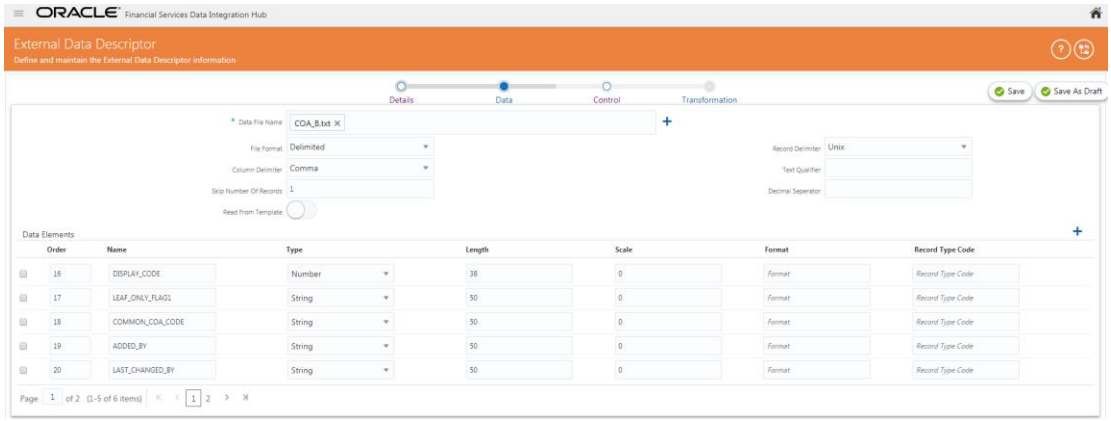
To create a new EDD from the *External Data Descriptor* window, perform the following steps:

1. Click the Add  button from the tool bar. The *External Data Descriptor Specifications* window appears.

2. In the External Data Store Name section, select Data Source from the drop down list. The Data Source is the Source you had created. In this example it is, *DRM_SRC_FILES*. The values in creating an external data store example are used. The description comes up automatically.

NOTE:

- The fields in the External Data Descriptor Specification Details section changes as per the Source Code selected.
- For HDFS data, the working date format is `yyyy-MM-dd`.
- For Hive table, the working date format is `dd-MON-yyyy`.
- For Sybase source database, date data type is not supported. It has to be timestamp.
- For file extract, SDI date format is not supported. By default it produces timestamp. If a particular format is required then derived column has to be defined with specific format in connector.



3. In the *External Data Descriptor Specification Details* tab, enter the Name and description.

   For example:

   Name: DRM_FILE_SRC. This must be in uppercase.

   Description: Term deposit data from USG source on daily basis.

   In the Source Data tab, enter the Data File Name. To add more files to the existing EDD, click the + symbol against the Data File Name field.

   Example: `td_contracts%#MISDATE%_1.csv`

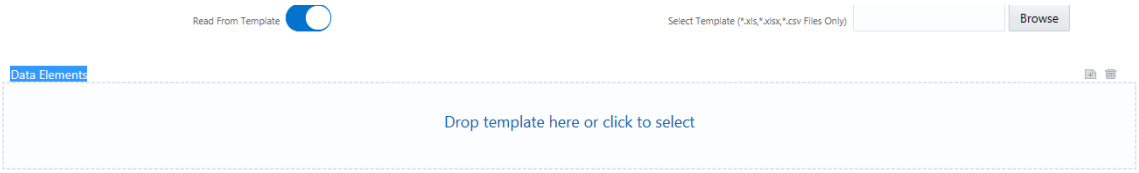
   `td_contracts%#MISDATE%_2.csv`

4. Select the File Format, Record Delimiter, and Column Delimiter from the drop down list.

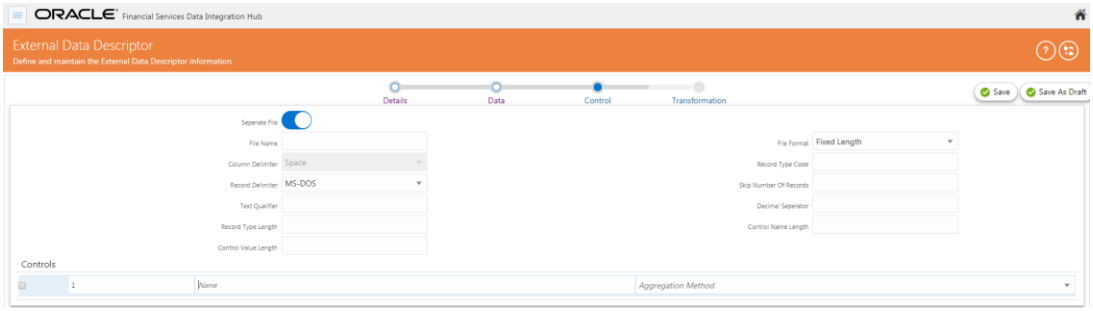
5. Enter the Text Qualifier, Skip number of Records, and Decimal Separator fields.

6. For the ‘Read from Template’ option, on selecting **Yes**, you can browse the required template (only in .xls and .xlsx format) or drop the template / click select in the Data Elements filed and upload it.

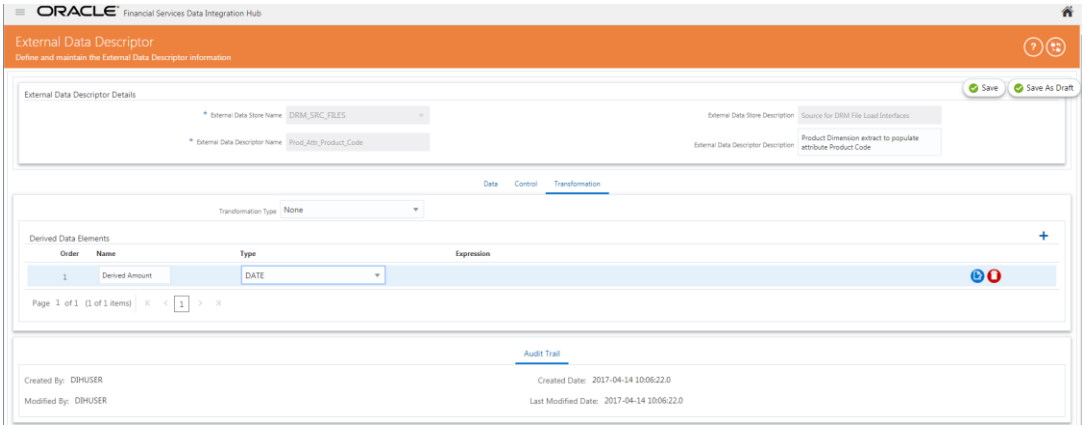
   The fields are explained as tabulated in the Fields and their Description section.



7. If data needs to be reconciled post loading, then control has to be defined for the EDD by clicking on Control Tab. In this version, only Number of records control is possible.



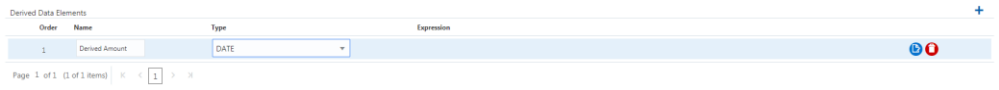
8. To transform the EDD, click the *Transformation* tab.



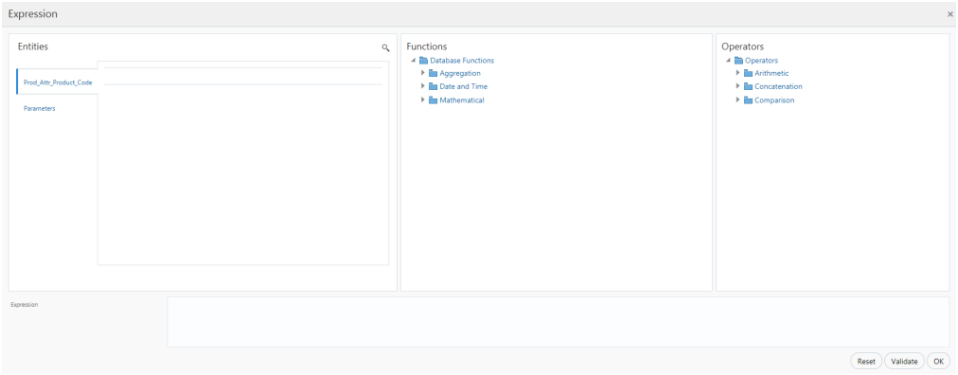
9. You can add derivation to few data elements of the EDD.

   a. Create derived data elements by clicking **Add** + button.

   b. To edit the derived data element, click Edit button.



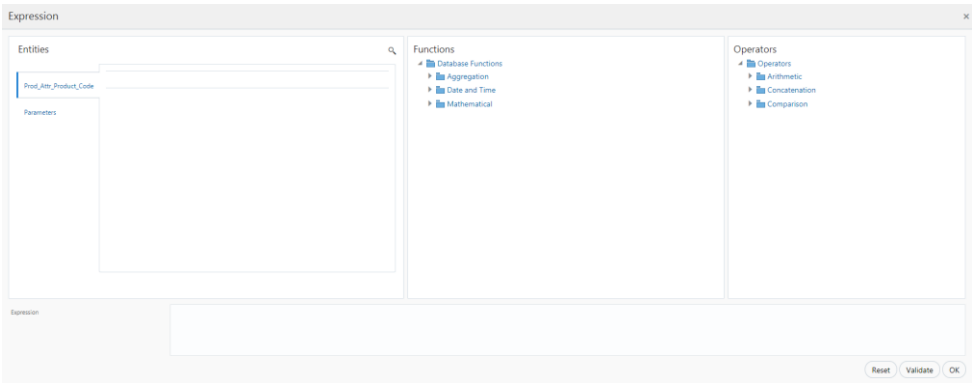
   c. This will launch *Expression* window. Expression can be specified using the data elements defined in the *Data* tab and functions.



d. To delete the derived data element and click Delete button.

10. Click the *Transformation* tab and select the Transformation Type.

    a. Select Aggregation, and click Edit button to view *Expression* Window.



    b. Specify the Group by clause and Having expression, if applicable.

    c. Define Derived Data Elements for field to be aggregated under previous tab.

NOTE: You can click button to refresh the data elements.

11. Click **Save**.

8.3 Modifying and Viewing an External Data Descriptor

You can edit or view an existing EDD, other than the EDDs which are in published status.

NOTE: You cannot edit the EDD if the EDD is in published state.

To edit or view an EDD, perform the following steps:

1. Select the required EDD from the EDD Summary.
2. The details of the selected EDD is displayed. You can modify or view the details.
3. Update the required details.
4. Click **Save** to save the changes made.
5. Click **Save as Draft** in case you wish to save it and update it later. The status shows as draft.

Note: Click  button to return to the Parameters Summary.

8.4 Deleting an External Data Descriptor

This option only checks the higher order object. That is, if the order has dependency, you cannot delete unless the dependency is removed.

For example, assume EDD is used in Connector. Then, unless the Connector is deleted, the used EDD cannot be deleted.

To delete an existing EDD, perform the following steps:

1. On the EDD Summary, click Delete  button. A confirmation dialogue appears
2. Click **Yes**. The EDD details are deleted.

NOTE:

The Delete button is enabled only in the following cases:

a. If the EDD is not in published state,

b. If it is not used by any object.

8.5 Unpublishing an External Data Descriptor

You can unpublish an EDD only when all the following conditions are met:

1. The EDD is in published state.
2. All the connectors using the EDD are in unpublished state.

To unpublish an EDD, perform the following steps:

1. Select the required EDD from the EDD summary. The details of the selected EDD are displayed.
2. Click Unpublish.

NOTE:

EDD gets published automatically by the system whenever the higher objects (Connector) which are using it, are published.

8.6 Dependency

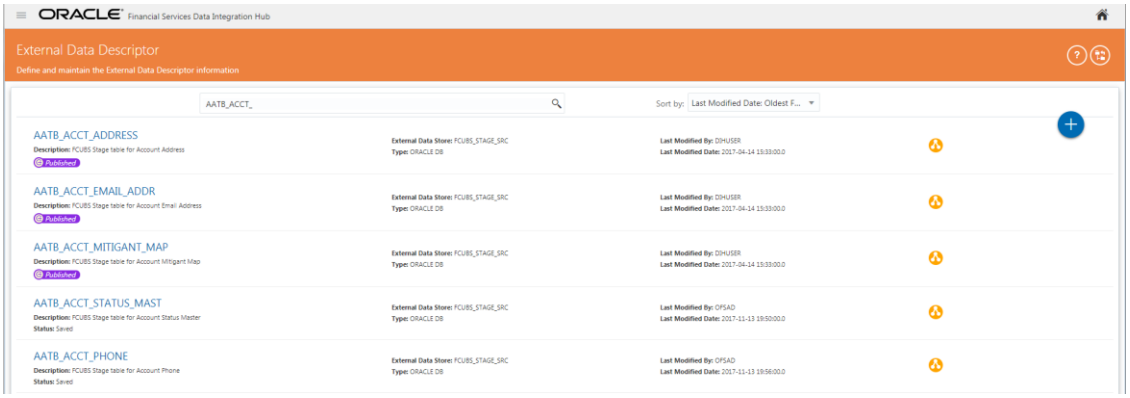
As the name suggests, on clicking the Dependency icon  , it lists where the entire parent EDD has dependency.

8.7 Search and Filter

The Search and Filter option in the user interface helps you to find the required information. You can enter the nearest matching keywords to search, and filter the results by entering

information on the search box. You can search for an EDD using either the name, description, status or type.

For example, enter EDD key word as ‘AATB_ACCT’ in the search box. The entire EDD name with AATB_ACCT is listed.



9 Connectors

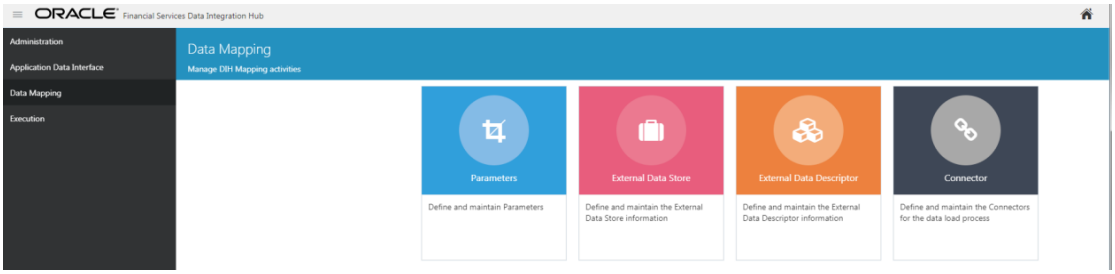
Connector allows mapping one or more External Data Descriptor with Application Data Interface. It allows mapping of one or more ADI with EDD as well, in case of extract type connector.

There are pre-built Connectors for Oracle applications such as, Flexcube, Oracle Banking Platform, and so on. For other applications you need to define Connectors for your EDDs.

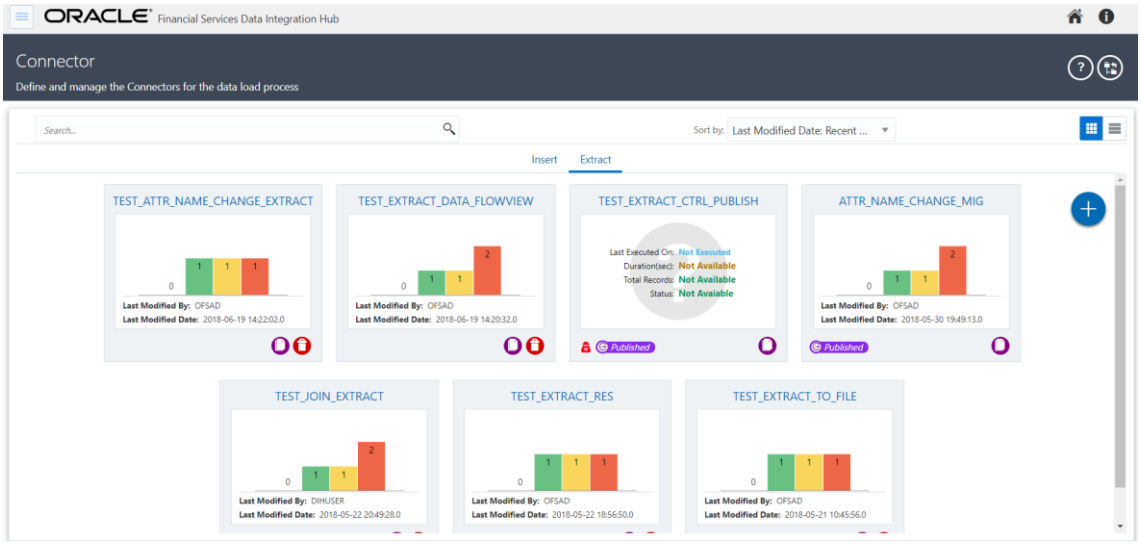
9.1 Understanding the Summary Screen

To understand the summary screen, perform the following steps:

1. Click  icon in the DIH home screen to navigate to the **Data Mapping** window.

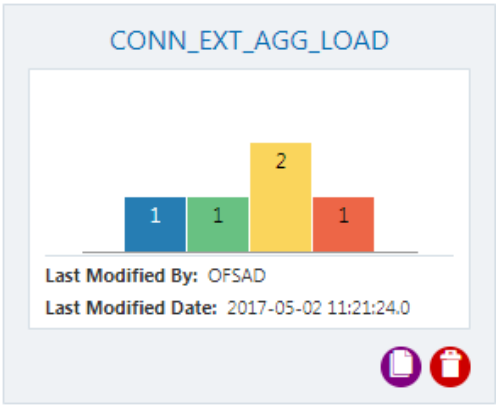


2. Click **Connector**. The Connector window appears.



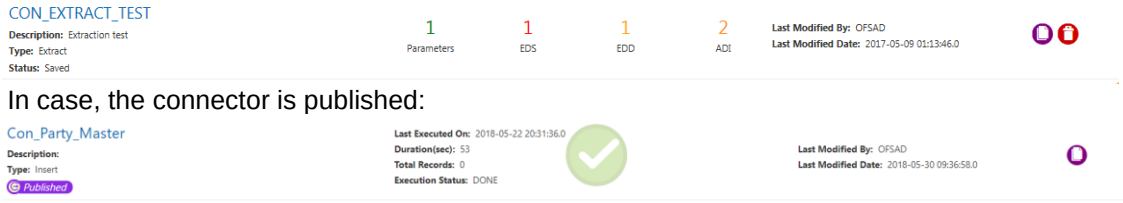
3. The summary screen list down all the connectors that are defined in the set up. It displays all the insert and extract type connector details. It gives the information about the number of parameters, EDS, EDDs, and ADI used in a specific connector.

4. Click  to view the connectors in card view. It gives the information about the number of parameters, EDS, EDDs, and ADI used in a specific connector.



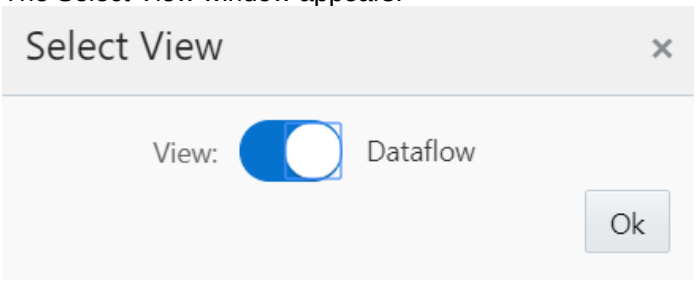
In case, the connector is published:

5. Click  to view the connectors in list view.



In case, the connector is published:

6. Click  button to create a connector in either Standard View or Dataflow View.
The Select View window appears.



7. Select Standard or Dataflow view and click Ok. The New Connector window appears.

9.2 Connector Properties

The properties by default have some values. For every connector, it needs to be reviewed. Generally, no change is required.

Fields	Description
Fields marked in red asterisk(*) are mandatory	
Loading mechanism	This option is only applicable for ASCII file source type EDD. This has two options: • External Table • SQLLDR **Note**: If the loading mechanism is selected as External Table, the file should be located in the same place as the database server. In case target database type is HDFS, only external table option is enabled. In case target database type is Oracle, provide CREATE DIRECTORY role to the atomic schema. And the path/folder used in the directory should be having read, write permission.
DIRECT	Direct path load of SQLLDR. Values can be True and False. By default, it is set as TRUE. Only applicable for ASCII/Text File source type EDD.
Parallel	Parallel option. True means the loading happens with parallel option and False means it happens in sequential way.
Degree of Parallel	Decides the degree of parallelism.
No: of Errors	Shows the number of errors allowed for the SQLLDR and External Table to proceed. By default it is 0. That means single record fails the job fails.
Maximum Discard	Discarded records allowed for SQLLDR. This needs to be set to a very high number when using multiple subtypes under an ADI. That means it is multiple targets.
ODI FOLDER	By default the value is same as whatever is set under Settings page. The value decides under which folder in ODI repository, the connector will be published. If user needs to have a different folder name than whatever is already set in the settings page, then this value has to be edited before publish.
XML date Format	In this field, you can define the format of the XML Date. Example: MMDDYYYY.
Avoid Partition Exchange	It has 2 values ‘Yes’ and ‘No’. By default it is set as ‘No’. The parameter decides if the user wants to avoid Partition Exchange option or not. The partition exchange is used if the target table has partition and the connector execution goes via temp table. Sometimes because of some unknown reason, if the connector execution fails due to partition exchange option, then user has an opportunity to avoid partition exchange by selecting “Yes” in the drop down list.

Fields	Description
Do you want to use Data Pump?	There are two values 'Yes' and 'No'. By default it is set as 'Yes'. If the value is 'Yes', it indicates that the Oracle Database source is loaded into OFSAA using the Data Pump method. Alternatively, the standard way of using DBLink method is followed. **Note**: Provide the following access is required for data pump option. - Grant create any directory to Source schema - Grant create any directory to target schema - Grant execute on DBMS_FILE_TRANSFER to target schema - Grant execute on utl_file to source schema
Source and Target in Same Environment?	This parameter is used only if Data Pump is used. If the value is 'Yes' then file transfer step is not performed during loading. Alternatively, it will transfer file from source to target folder using DBLink.
Source Dump Location	Specify a folder/path that is accessible by Source Oracle Database to create the dump file.
Target Dump Location	Specify a folder/path that is accessible by Target Oracle Database to read the dump file.
Number of Splits for Dump File	Specify a number to transfer the files in parallel chunks. For example, three, indicates that dump file will be split in three and transferred separately. This is to improve performance of file transfer.
Effective Dated Key for Result Area?	This parameter is used for loading data into the result area. It decides whether it will perform lookup into dimension for latest record, or effective dated record. To get the latest record, it appends f_latest_record_indicator ='Y' and for effective dated it appends mis_date between d_record_start_date and d_record_end_date. The default value is **No**. That indicates that it will append f_latest_record_indicator='Y'. Note: For extraction data or any date attribute, effective dating does not work. If this parameter is selected as "Yes" and any date field needs to be loaded into Extraction date or any other date field, then do not rely on surrogate key generation. Use derived column and enter the value in the format "YYYYMMDD" as a number.
Do you want to use DBLink?	This parameter is used to specify the source database connection method. There are two values 'Yes' and 'No'. By default it is set as 'No' If the value is 'Yes', it indicates connection source database will be created using DBLink method If the value is 'No' , it indicates connection to source database will be created using JDBC url
Hive Date Format	This parameter is used to specify the date format for date columns in Hive source. the default value will be 'yyyy-MM-dd'

Fields	Description
Do you want to use Big Data SQL?	This parameter is used to specify loading mechanism from HIVE source. If you have selected Yes, Oracle Big Data SQL is used. **Note**: The following are the pre-requisites for the above method: • The Oracle Big Data SQL is installed and configured on Oracle Big Data Appliance and Database (OFSAA) machines. • In OFSAA database a directory named DEFAULT_DIR is created. • The folder/system path specified for the above directory must be accessible to database (OFSAA). For more details refer: https://docs.oracle.com/bigdata/bda45/BDSUG/installing.htm#BDSUG-GUID-5CDA332E-8CB8-42CC-8922-09295E22B0E5 If you have selected No, Oracle Loader for Hadoop is used. **Note**: The following are the pre-requisites for the above method: • Oracle Loader of Hadoop connectors are installed and configured in the source system. • ODI agent is also configured for OLH. For more details refer: https://docs.oracle.com/cd/E72987_01/odi/odi-big-data/setup.htm#ODIBD117

9.3 Creating a Connector - Standard View

This section includes the following sections:

- Field and Descriptions
- Creating a Connector for Loading Data into Staging
- Creating a Connector for Extracting Data from Staging
- Creating a Connector for Loading Data into Results
- Creating a Connector for Extracting Data from Results

9.3.1 Field and Descriptions

To create a connector the following information should be decided at the beginning. Based on the options the connector functionality varies.

9.3.1.1 Definition tab

Fields	Description
Fields marked in red asterisk(*) are mandatory	
Which operation should this connector perform on OFSAA?	This option decides whether the connector will load data into OFSAA or extract data out of OFSAA. This field has two options: • Insert Data – Select this option when connector should load data into OFSAA. This is the default option. • Extract data – Select this option when the connector needs to extract data.
On which OFSAA module should this operation be performed?	This field has two options: • Staging – When data needs to be loaded or extracted into/from the staging area. • Results – When data needs to be loaded or extracted into/from the Result area.
For which application (if any) should this connector be mapped?	This is an optional choice to filter source/targets at the beginning.
For which External Data stores (if any) should the connector be mapped?	This is an optional choice to filter source/targets at the beginning.

9.3.1.2 Connector Details tab

Fields	Description
Fields marked in red asterisk(*) are mandatory	
Connector Name	The name of the Connector to be created. Example: USG File Connector 1
Connector Description	A description for the Connector is to be mentioned.

9.3.1.3 Target tab

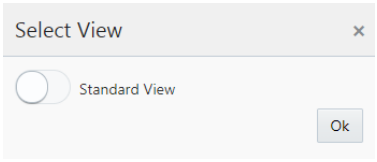
Fields	Description
Fields marked in red asterisk(*) are mandatory	
Application	Select the application from the drop down list. Example: FSDF

Fields	Description
Fields marked in red asterisk(*) are mandatory	
Application Data Interface	Select the Application Data Interface from the drop down list. Example: Customer Account
Sub Type	Select the Product Class from the drop down list. Example: Term Deposit

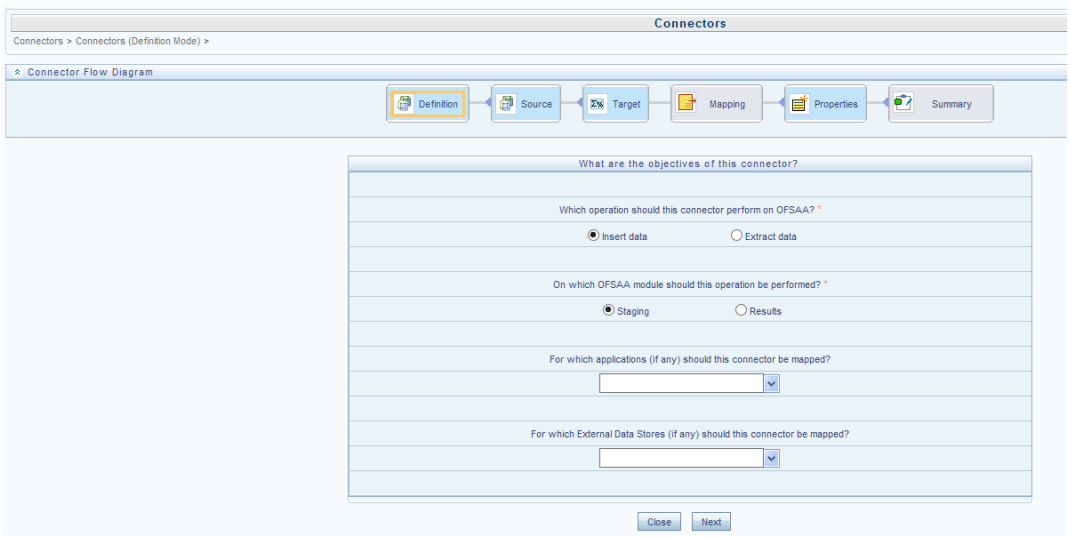
9.3.2 Creating a Connector for Loading Data into Staging

To create a Connector for loading data into staging, perform the following steps:

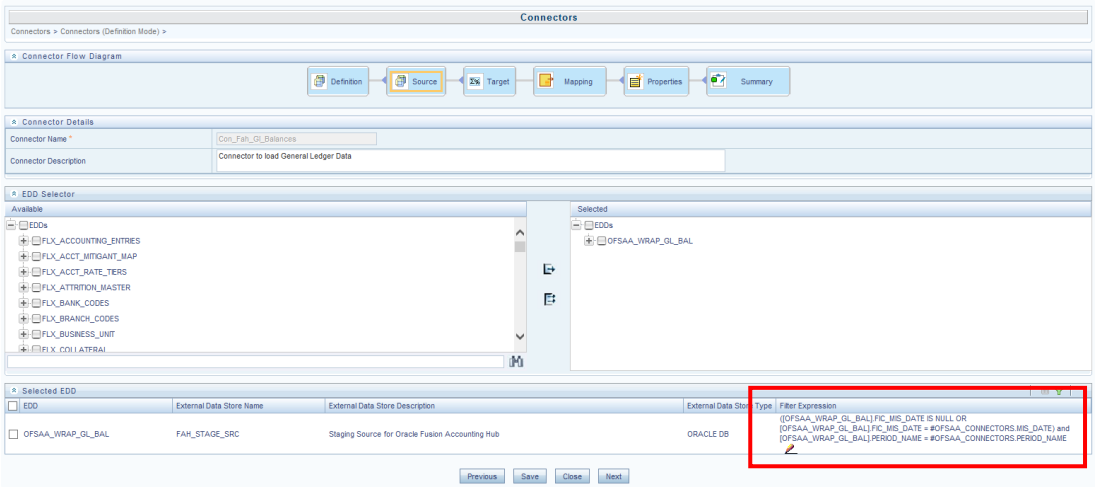
1. On the Connectors Summary window, click Add button. The Select View window appears.



2. Choose Standard View and click Ok**.** The Connectors Definition window appears.
3. The Definition tab provides the option to load and extract data. The options **Insert data** and **Staging** are selected by default.
4. Click **Next**.



5. The ‘Source’ block of the flow chart is selected and the respective fields are displayed by default.



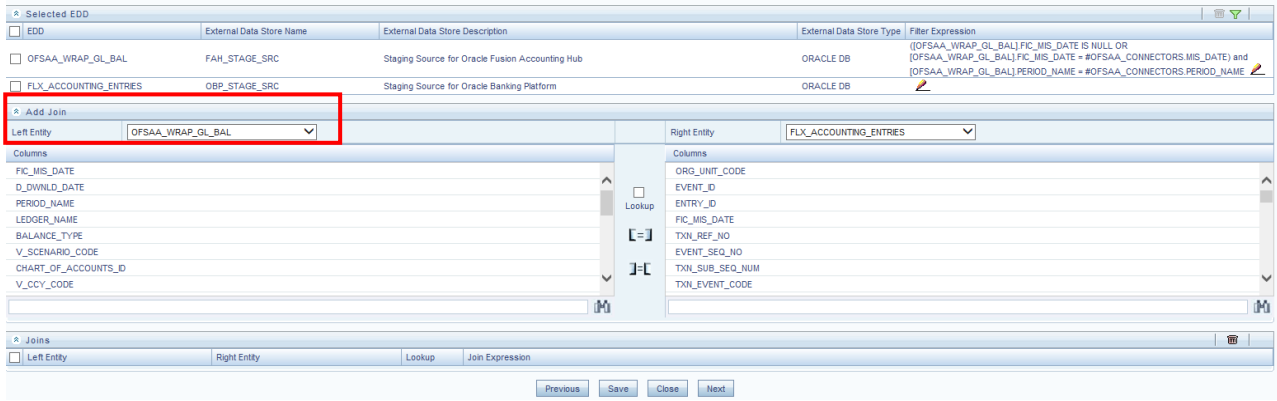
NOTE: When the Insert data option is selected, the EDD becomes source and ADI becomes target. Similarly, if Extract Data option is selected, then ADI becomes source and EDD becomes target.

6. Enter the Connector Name and description. The Fields and details are explained as tabulated in "Fields and their descriptions" section.

7. Under the **EDD Selector** section, the available EDD's are listed. Select the required EDD in order to map it. The selected EDD's are displayed in the 'Source' section as displayed in the above figure.

8. In case multiple EDDs are selected, **Add Join** section appears below with selected EDDs appearing on the left and right side. Select the fields from the Left and right side, and join the fields. If LOOKUP is required, then check the lookup checkbox has during the mapping.

NOTE: If Lookup option is checked, then the join would be left outer join. Else it would be inner join.



9. To edit the filter expression, click  icon. The *Specify Expression* window appears. Select/key in the required expression and click **OK**.

NOTE:

- You do not need to add 'WHERE' clause for the filter.
- For File data loading, use filter expression of Number type along with single quotes. For example: N_DRAWN_AMOUNT ='40000'.
- For Date field refer To_CHAR function for comparison.
- Parameters can also be used in filter expression. Date format must be a valid SQL date format.

  For Example:

```
[EDD_GL_DATA].[EXTRACTION_DATE] = TO_DATE(#DIHDEV.MIS_DATE,'dd-MM-yyyy')
```

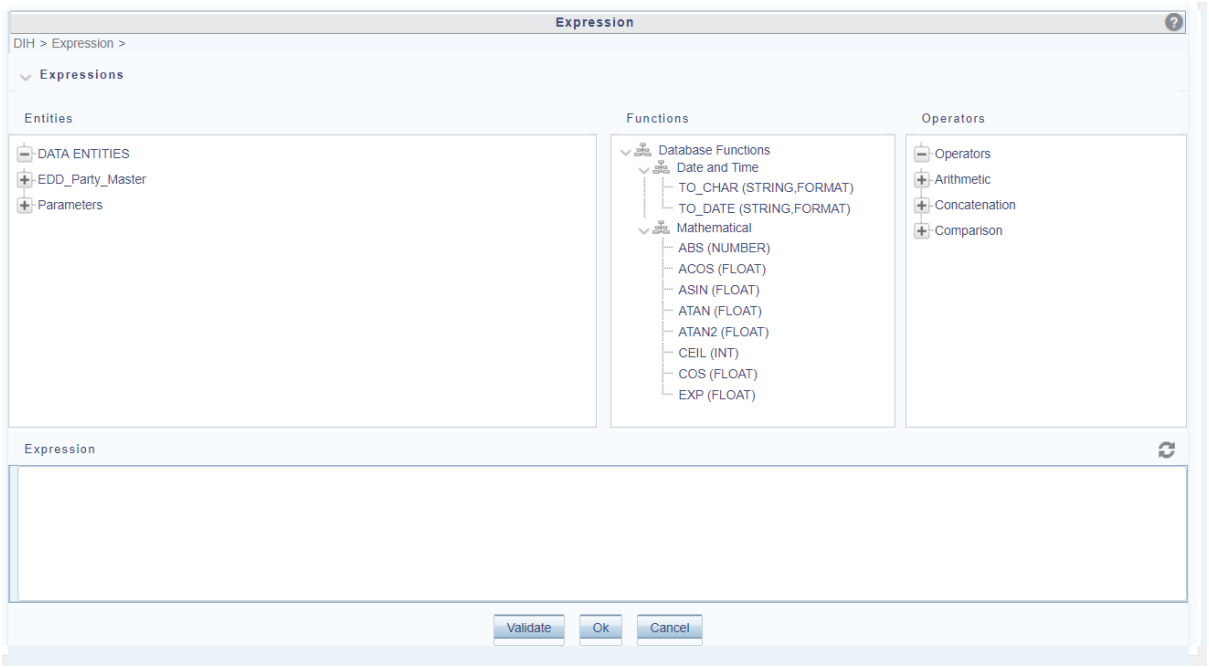
10. If Source type is Hive, the filter expressions must conform to the following restrictions:
    - Expression must be valid HiveQL
    - Does not include Oracle built in or user defined functions
    - Does not include Sub queries
    - Includes Hive built in functions only
    - Parameters can also be used in filter expression. MISDATE can also be passed dynamically so that it is loaded from Batch Execution Screen. The date format specified must be valid Hive Date format i.e. yyyy-MM-DD

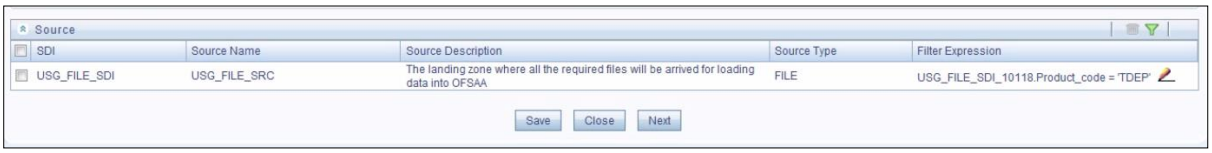
      For Example:

      Filter Expression in Connector:-`[EDD_GL_DATA].[EXTRACTION_DATE] = #DIHDEV.MIS_DATE`

      MISDATE Parameter in Batch:

      `MISDATE=$MISDATE:yyyy-MM-dd`



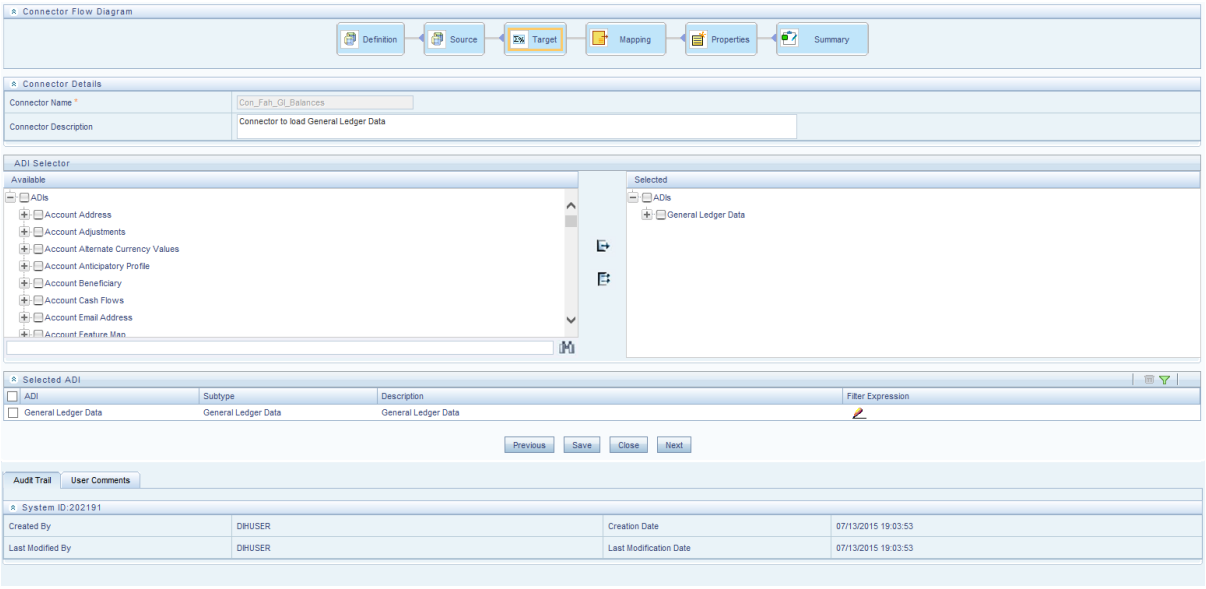


11. Click **Next.** The ‘Target’ block appears.

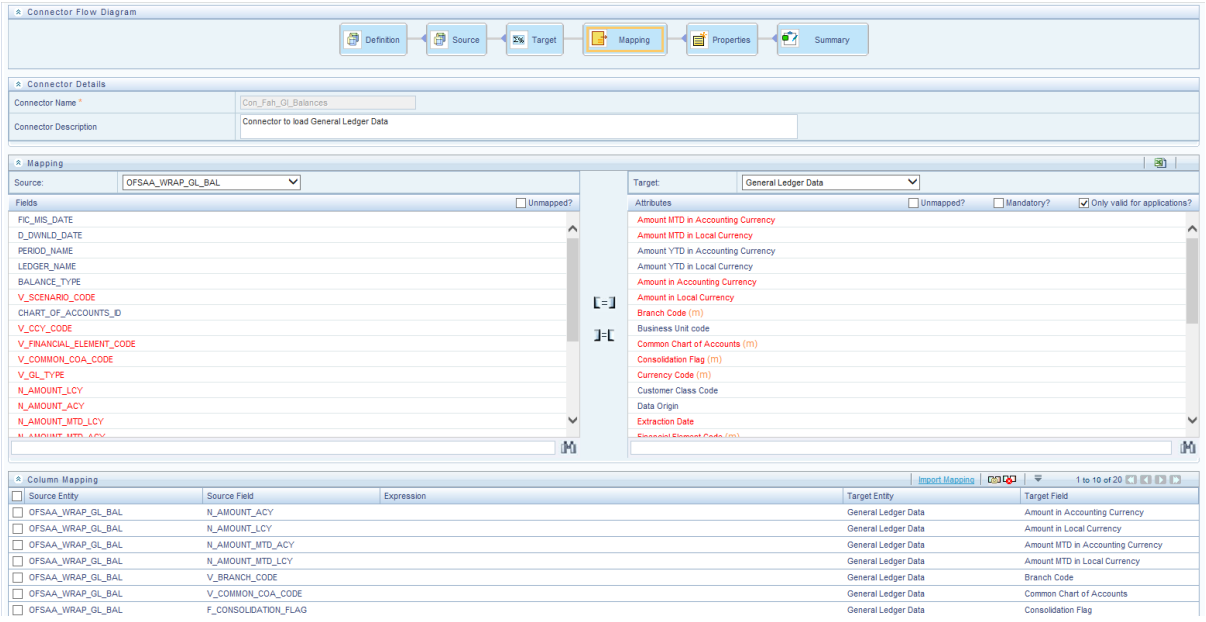
12. Select Application Data Interface from the available list in the left panel. Import that to right side of the panel. The **Selected ADI** grid shows the selected ADIs along with filter expression. The filter on target can be applied by clicking the filter expression. The Fields and details are explained as tabulated in “Fields and their descriptions” section.

NOTE: If multiple sub types/ADI is selected, then the filter expression is necessary to direct required data into the correct entity/table.

This is required to identify which record goes into which target. It will be an expression such as <EDDNAME>.<Field Name> = ‘TD’ under Term deposit and <EDDNAME>.<Field Name> = ‘CARDS’ under Cards.



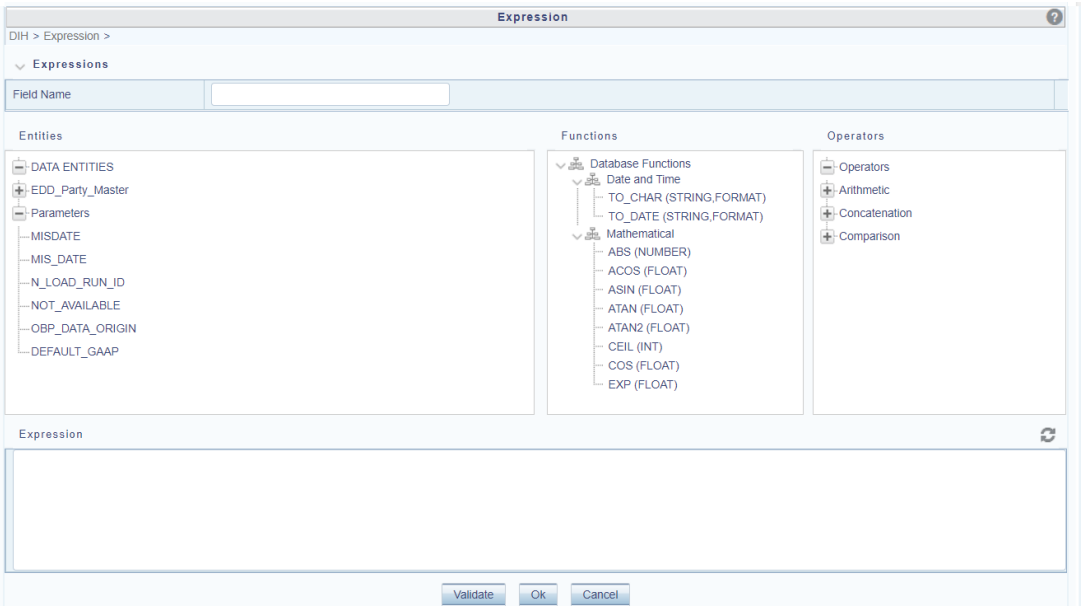
13. Click the **Mapping** block in the flow chart, to map the EDD's. For details on Auto-mapping refer to section Auto-mapping.



14. Select the EDD from the drop down list. For details on drop-down options for EDD refer to section Options in Mapping EDD.

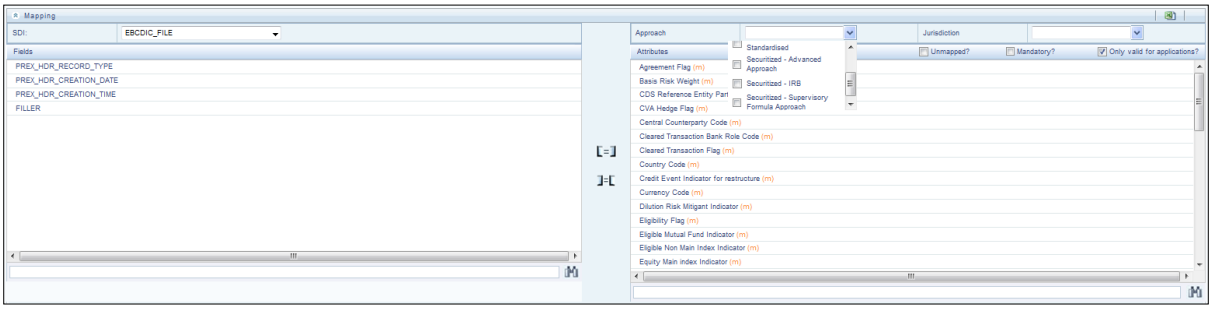
15. Select the 'Mandatory' option to populate the mandatory Attributes to be mapped.

NOTE: On selecting 'Derived Column' option as EDD from the drop down list, you can add an expression.

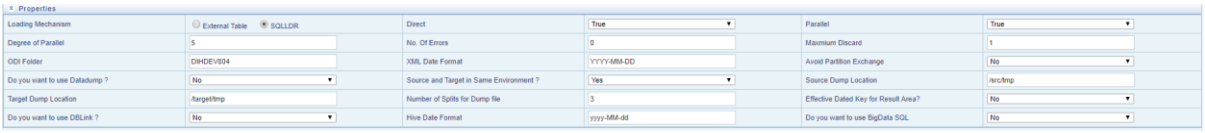


All the mapped attributes are listed under the 'Column Mapping' sector. For details on the options in the Mapping grid such as Auto-mapping, Export to Excel and so on; refer to section Fields in Mapping.

NOTE: If the application is chosen as BASEL, while mapping, you can select the type of approach (such as, IRB or Advanced Approach) and the Jurisdiction (BIS, BRAZIL, China, India and so on) for filtering.

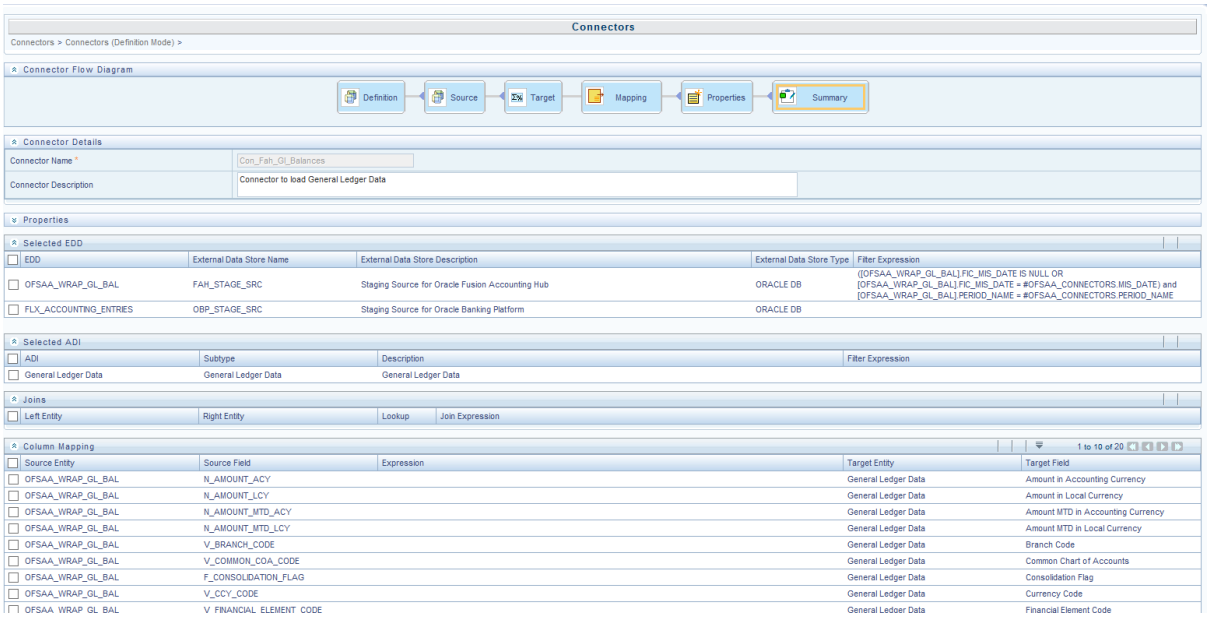


16. Click the **Properties** block in the flow chart. The Properties related fields and the Connector details appear automatically.



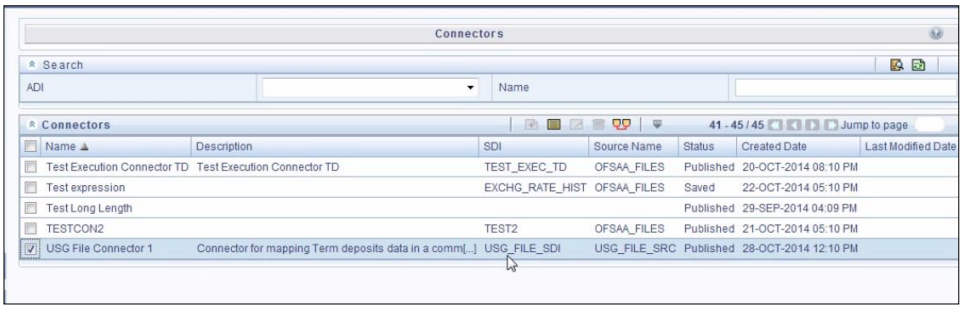
17. Select the Loading Mechanism. Select the Direct and Parallel option from the drop down list. Key in the value for Degree of Parallel, No: of Errors, Maximum Discard, ODI Folder, XML Date Format, Do you want to use Data Pump?, Source and Target in Same Environment?, Avoid Partition Exchange, Source Dump Location, Target Dump Location, Number of Splits for Dump File, Hive Date Format, Effective Dated Key for Result Area? and Do you want to use DBLink?. The Fields and details are explained as tabulated in "Fields and their descriptions" section.

18. Click the **Summary** block in the flow chart to view the summary of all sections.



19. Click **Publish**. This converts DIH metadata into ODI objects.

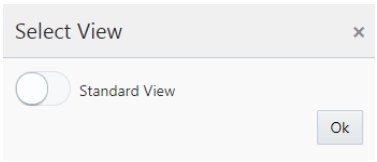
The Audit Trail section at the bottom of the window displays the information of the source created. The User comments section facilitates you to add or update additional information as comments.



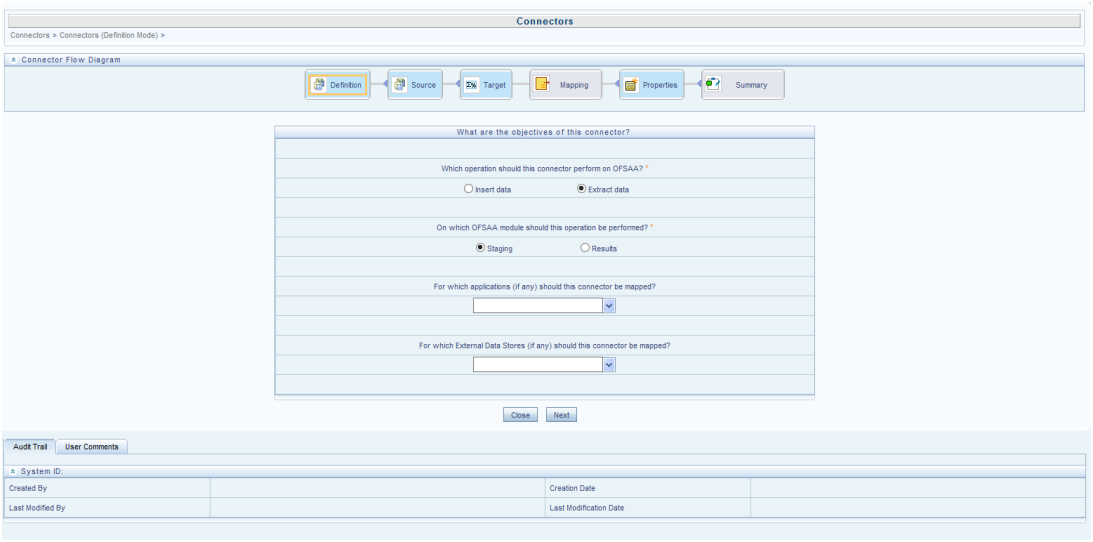
9.3.3 Creating a Connector for Extracting Data from Staging

To create a Connector for extracting data from staging, perform the following steps:

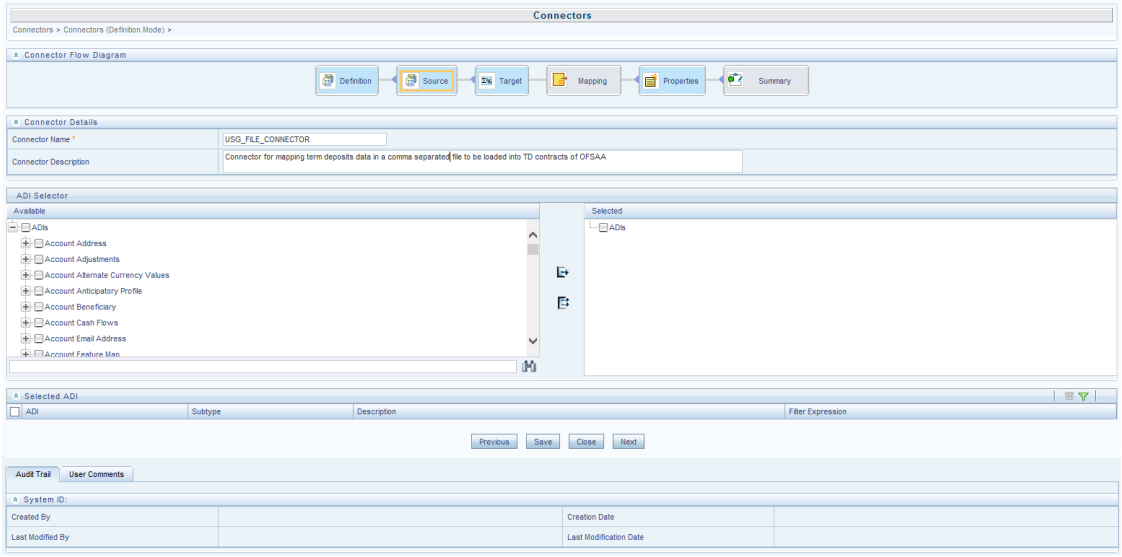
1. On the Connectors Summary window, click Add button. The Select View window appears.



2. Choose Standard View and click Ok**.** The Connectors Definition window appears.
3. The Definition tab provides the option to load and extract data. The **Extract data** option enables you to extract the data from the OFSAA system. Additionally, you have the option to select whether the loading/extracting should be performed in the **Staging** or **Results** area. Click **Next**.
4. Select Extract data and Staging.



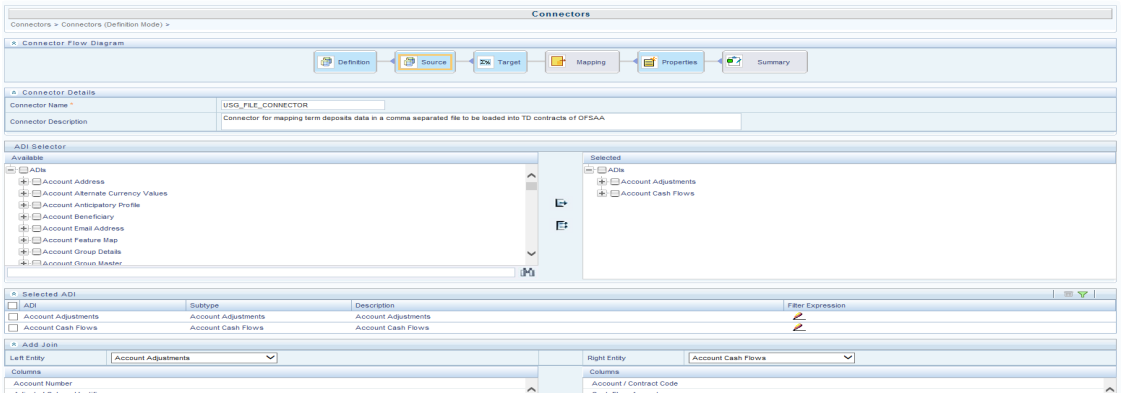
5. Click **Next.** The **Source** block appears.



NOTE: When the Extract data option is selected, the ADI becomes the source and EDD becomes target. Only ADIs relevant to staging area are displayed.

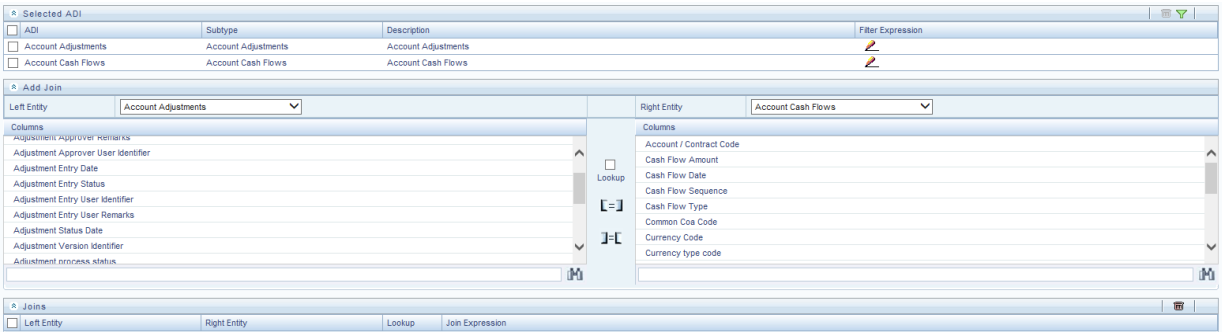
6. Enter the **Connector Name** and **Connector Description**. The Fields and details are explained as tabulated in "Fields and their descriptions" section.

7. Under the **ADI Selector** section, the available ADI's are listed. Select the required ADI in order to map it. The selected ADI's are displayed in the **Source** grid.



8. If multiple ADIs are selected, **Add Join** section appears below with selected EDDs appearing on the left and right side. Select the fields from the Left and right side, and join the fields. If LOOKUP is required, then check the lookup checkbox has during the mapping.

NOTE: If Lookup option is checked, then the join would be left outer join. Else it would be inner join.



9. To edit the filter expression, click  icon. The *Specify Expression* window appears. Select/key in the required expression and click **OK**.

NOTE:

- You do not need to add 'WHERE' clause for the filter.
- For File data loading, use filter expression of Number type along with single quotes. For example: N_DRAWN_AMOUNT ='40000'.
- For Date field refer To_CHAR function for comparison.
- Parameters can also be used in filter expression. Date format must be a valid SQL date format.

  For Example:

```
[EDD_GL_DATA].[EXTRACTION_DATE]                                    =
TO_DATE(#DIHDEV.MIS_DATE,'dd-MM-yyyy')
```

10. If Source type is Hive, the filter expressions must conform to the following restrictions:

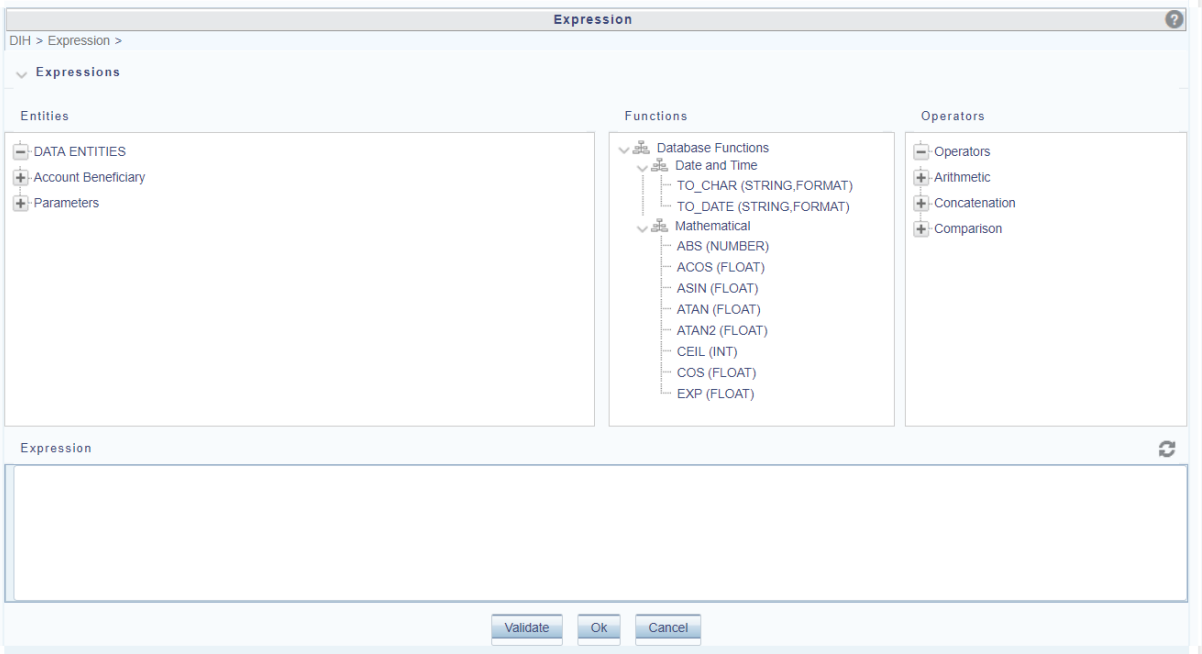
- Expression must be valid HiveQL
- Does not include Oracle built in or user defined functions
- Does not include Sub queries
- Includes Hive built in functions only
- Parameters can also be used in filter expression. MISDATE can also be passed dynamically so that it is loaded from Batch Execution Screen. The date format specified must be valid Hive Date format i.e. yyyy-MM-DD

  For Example:

  Filter Expression in Connector:-`[EDD_GL_DATA].[EXTRACTION_DATE] = #DIHDEV.MIS_DATE`

  MISDATE Parameter in Batch:

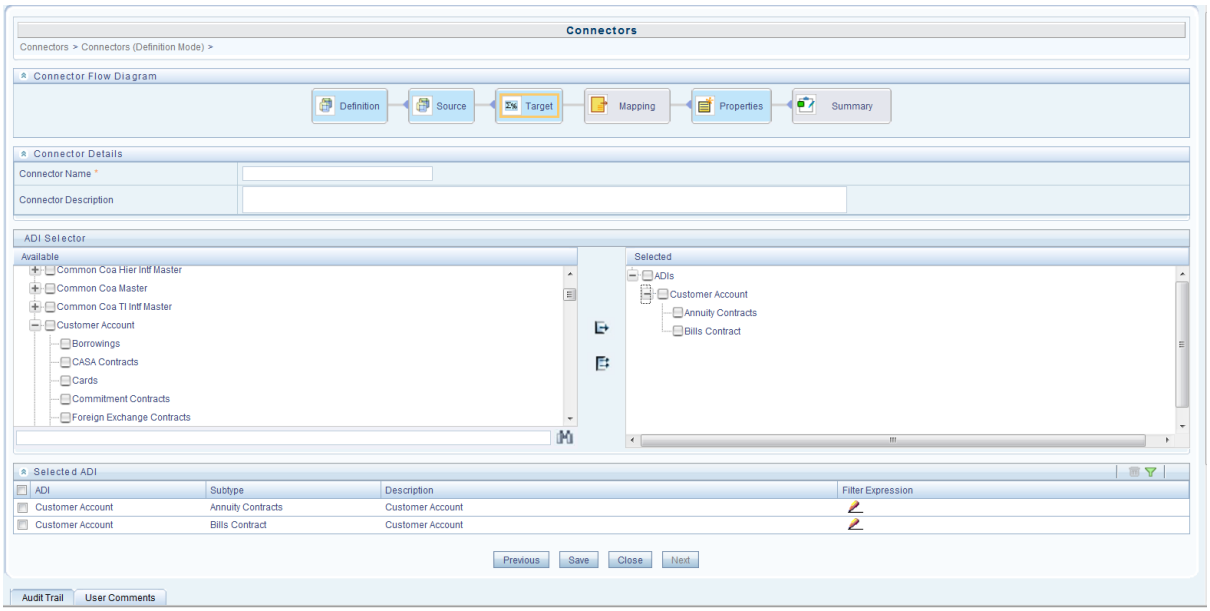
  `MISDATE=$MISDATE:yyyy-MM-dd`



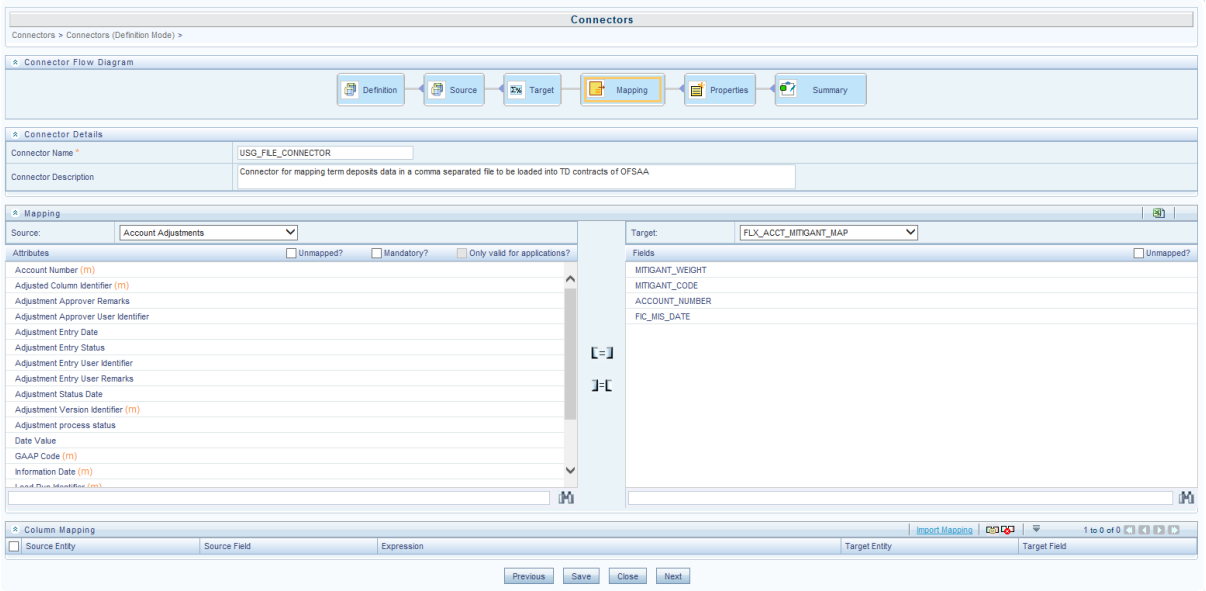
11. Click **Next.** The 'Target' block (in Flow chart) appears.

12. Select External Data Descriptor from available list shows left panel. Move that to right side on selected panel. The Selected EDD grid shows the selected EDDs along with the filter expression. The filter on target can be applied by clicking the filter expression. The Fields and details are explained as tabulated in "Fields and their descriptions" section.

NOTE: For extract type of connector, only one EDD should be selected. It does not support multiple EDD.

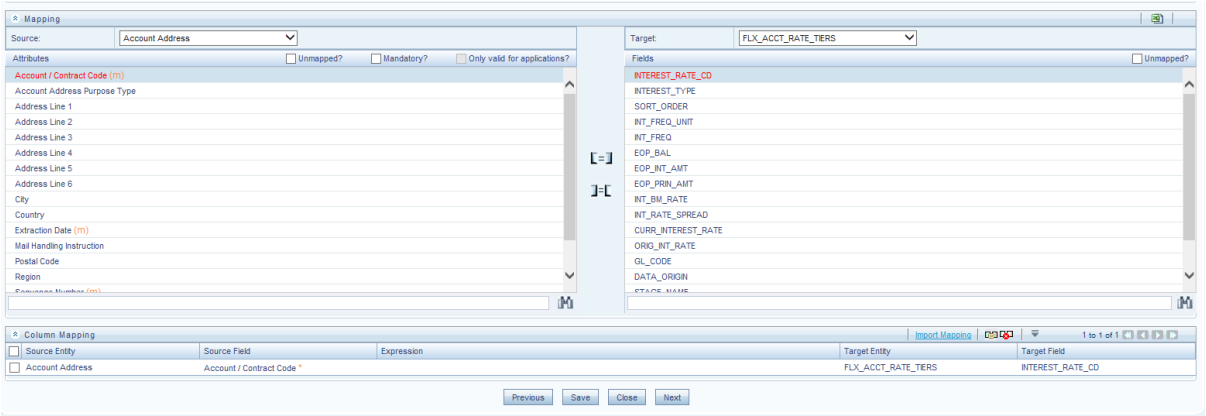


13. Click the **Mapping** block in the flow chart, to map the EDD's. For details on Auto-mapping refer to section Auto-mapping.



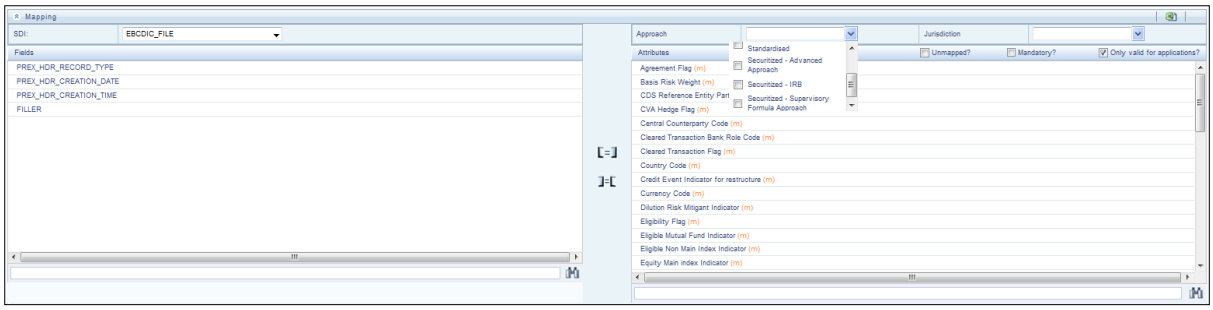
14. Select the ADI from the drop down list. There are 3 options in the drop down list. For details on options for ADI refer to section Options in Mapping ADI.

NOTE: For extract connector, mandatory attributes are not applicable. There is no validation of mandatory attributes during publish. Mandatory indicator (*) against an attribute for ADI is for reference only. All the mapped attributes is listed under the 'Column Mapping' sector.



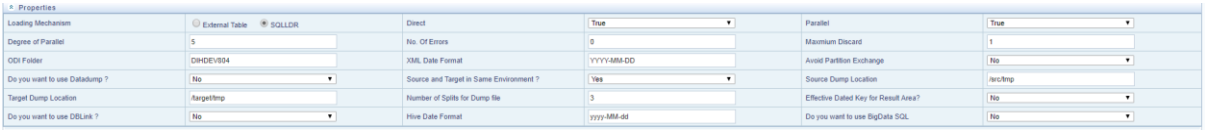
15. Select the 'Mandatory' option to populate the mandatory Attributes to be mapped. All the mapped attributes are listed under the 'Column Mapping' sector. For details on the options in the Mapping grid such as Auto-mapping, Export to Excel and so on refer to section Fields in Mapping.

NOTE: If the application is chosen as BASEL, while mapping, you can select the type of approach (such as, IRB or Advanced Approach) and the Jurisdiction (BIS, BRAZIL, China, India and so on) for filtering.



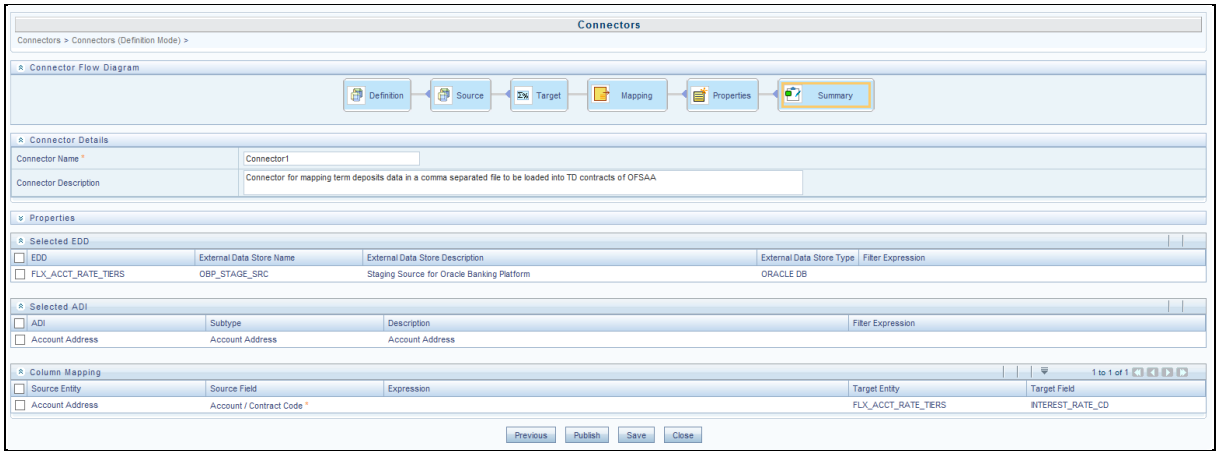
16. Click the **Properties** block in the flow chart.

The Properties related fields appear. The Connector details appear automatically.



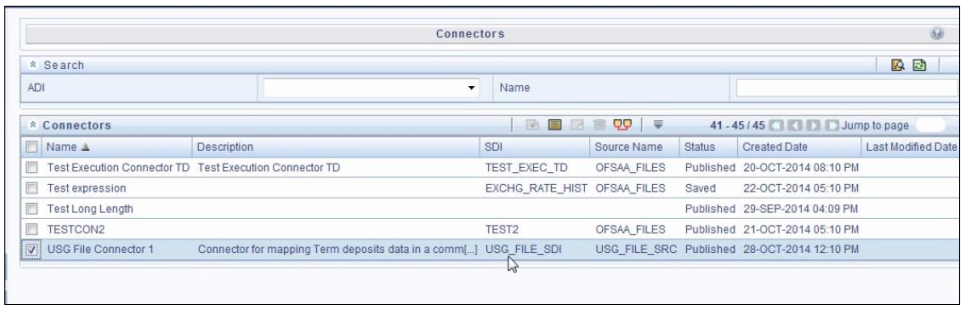
17. No action is required in properties section. Proceed to the summary tab.

18. Click the **Summary** block in the flow chart to view the summary of all sections.



19. Click **Publish**. This converts DIH metadata into ODI objects.

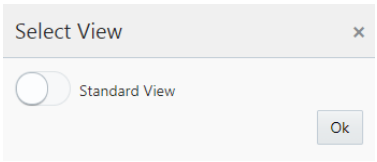
The Audit Trail section at the bottom of the window displays the information of the source created. The User comments section facilitates you to add or update additional information as comments.



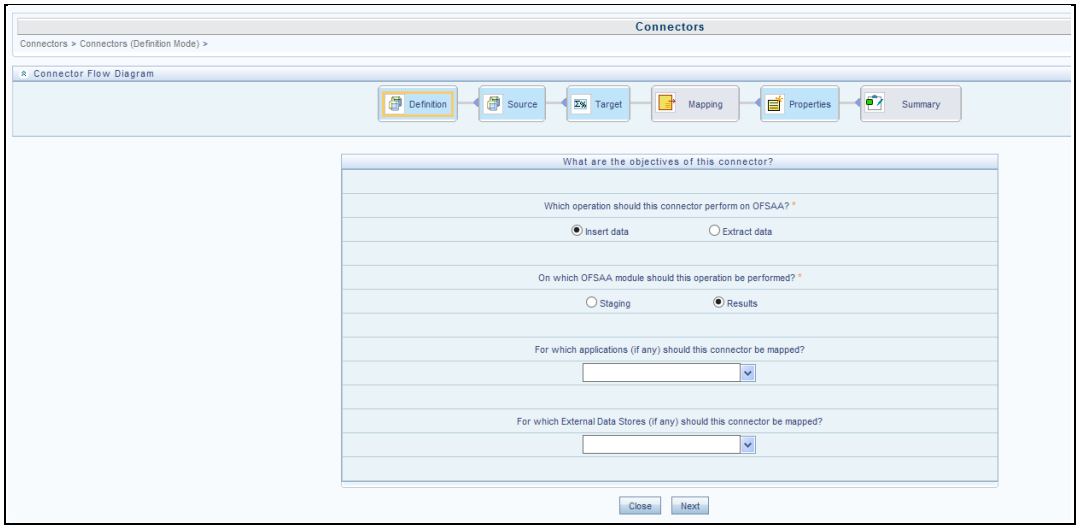
9.3.4 Creating a Connector for Loading Data into Results

To create a Connector for extracting data from staging, perform the following steps:

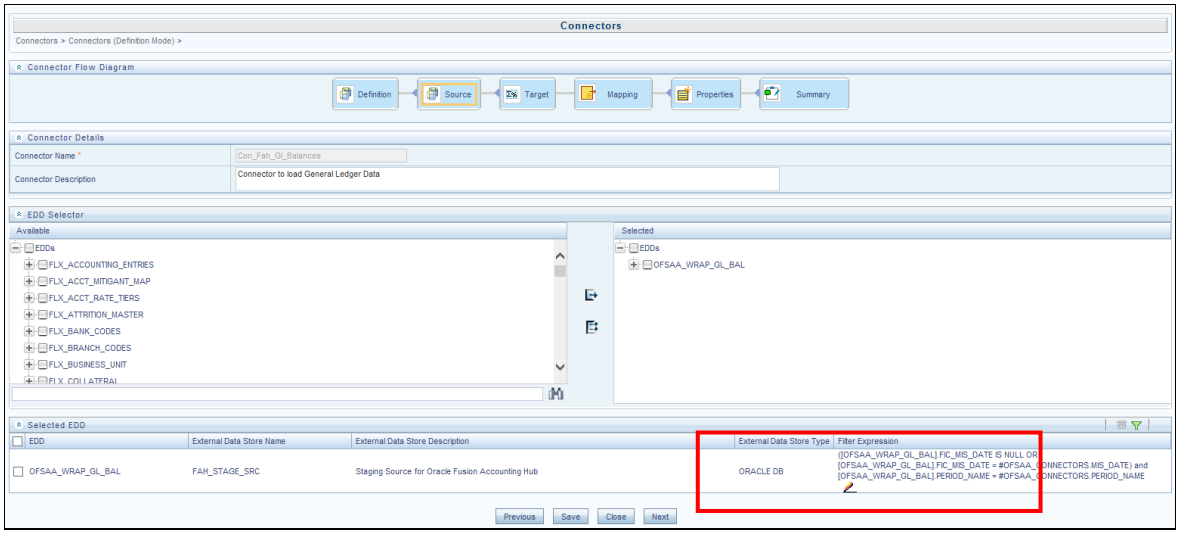
1. On the Connectors Summary window, click Add button. The Select View window appears.



2. Choose Standard View and click Ok**.** The Connectors Definition window appears.
3. The Definition tab provides the option to load and extract data. Select **Insert Data** and **Results**. Click **Next**.



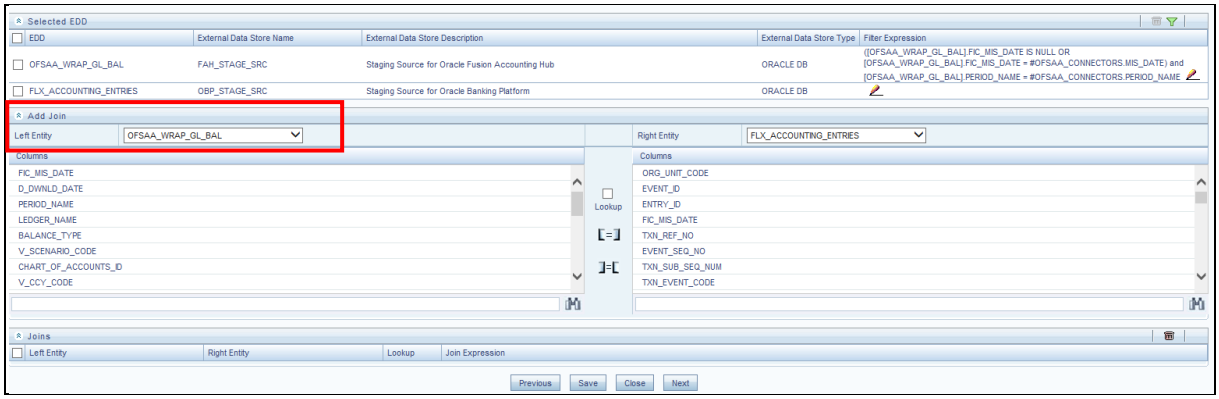
4. The **Source** block appears by default, and the respective fields are displayed.



NOTE: When the Insert data option is selected, the EDD becomes source and ADI becomes target. Similarly, if Extract Data option is selected, then ADI becomes source and EDD becomes target.

5. Enter the Connector Name and description. The Fields and details are explained as tabulated in "Fields and their descriptions" section.
6. Under the 'EDD Selector' section, the available EDD's are listed. Select the required EDD in order to map it. The selected EDD's are displayed in the 'Source' section.
7. In case of multiple EDDs selected. **Add Join** section appears below with selected EDDs appearing on the left and right side. Select the fields from the Left and right side, and join the fields. If LOOKUP is required, then check the lookup checkbox has during the mapping.

NOTE: If Lookup option is checked, then the join would be left outer join. Else it would be inner join.



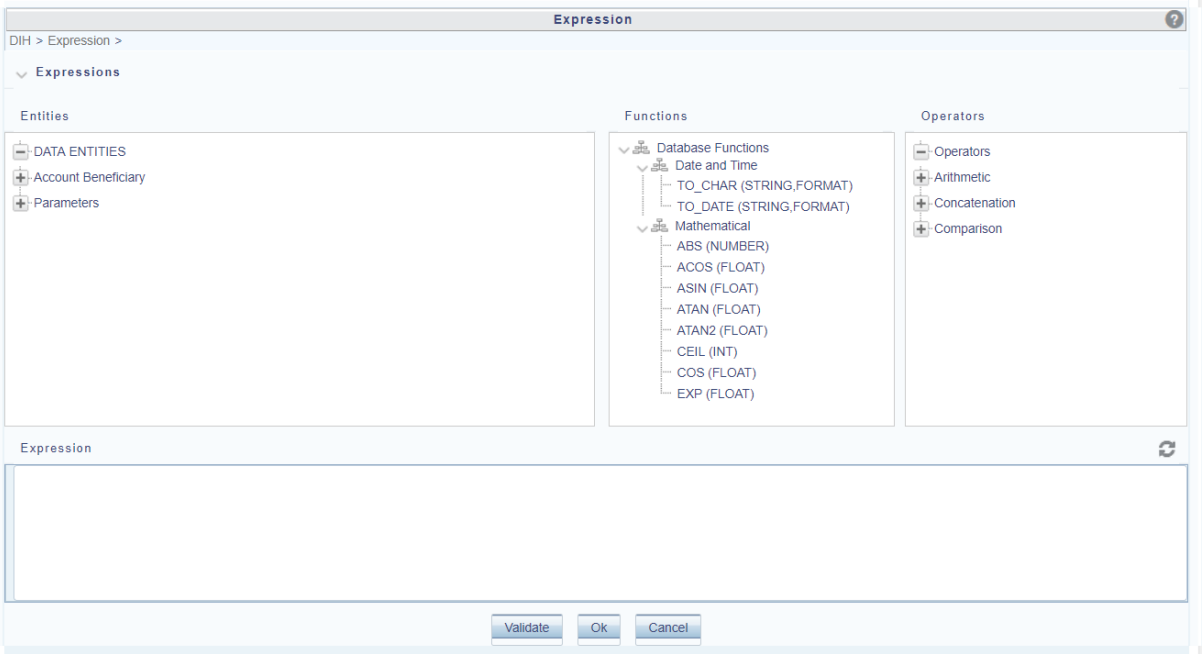
8. To edit the filter expression, click  icon. The *Specify Expression* window appears. Select/key in the required expression and click **OK**.

NOTE:

- You do not need to add 'WHERE' clause for the filter.
- For File data loading, use filter expression of Number type along with single quotes. For example: N_DRAWN_AMOUNT ='40000'.
- For Date field refer To_CHAR function for comparison.
- Parameters can also be used in filter expression. Date format must be a valid SQL date format.

For Example:

```
[EDD_GL_DATA].[EXTRACTION_DATE]                                    =
TO_DATE(#DIHDEV.MIS_DATE,'dd-MM-yyyy')
```



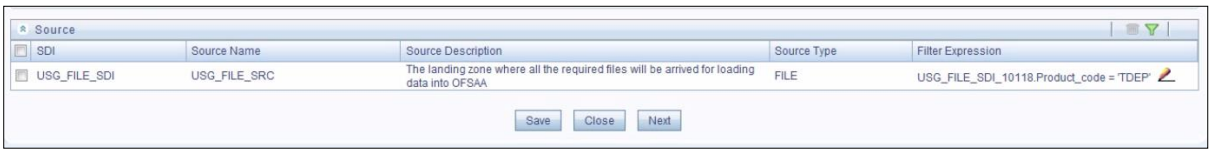
9. If Source type is Hive, the filter expressions must conform to the following restrictions:
    - Expression must be valid HiveQL
    - Does not include Oracle built in or user defined functions
    - Does not include Sub queries
    - Includes Hive built in functions only
    - Parameters can also be used in filter expression. MISDATE can also be passed dynamically so that it is loaded from Batch Execution Screen. The date format specified must be valid Hive Date format i.e. yyyy-MM-DD

    For Example:

    Filter Expression in Connector:-`[EDD_GL_DATA].[EXTRACTION_DATE] = #DIHDEV.MIS_DATE`

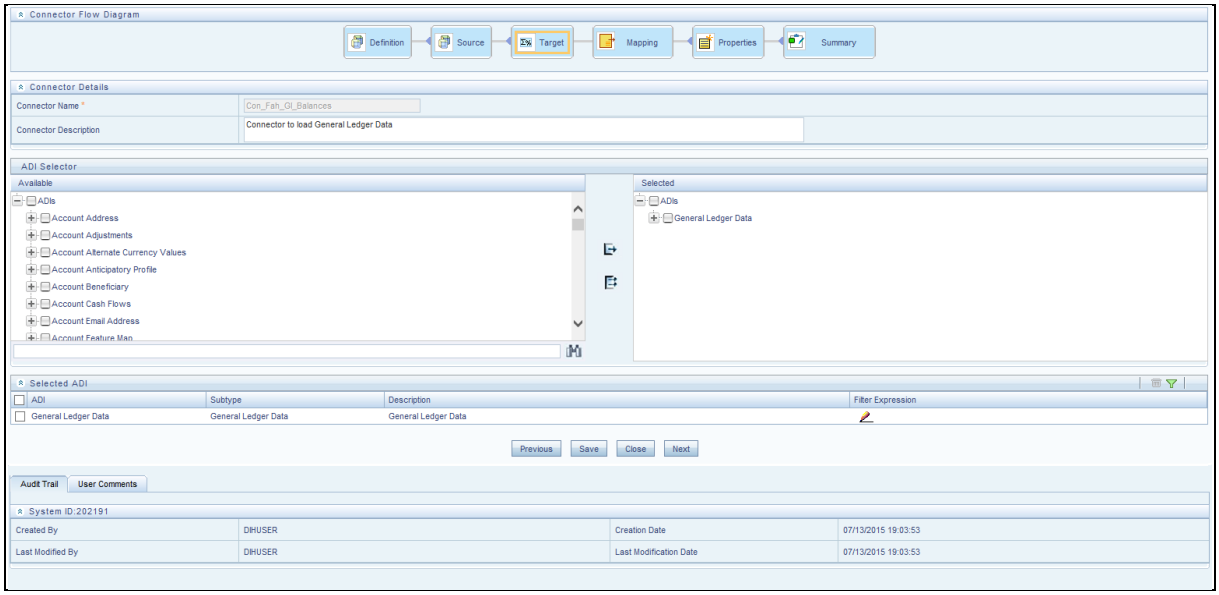
    MISDATE Parameter in Batch:

    `MISDATE=$MISDATE:yyyy-MM-dd`

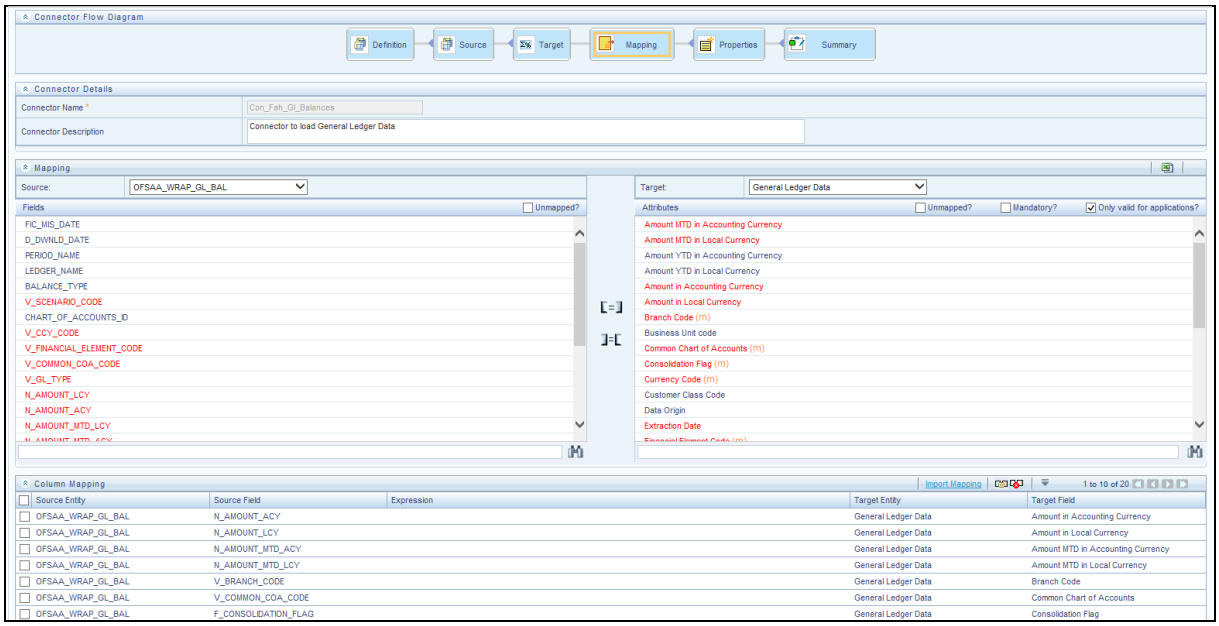


10. Click **Next.** The ‘Target’ block appears.
11. Select Application Data Interface from available list shows left panel. Move that to right side on selected panel. Below grid shows the selected ADIs along with filter expression. The filter on target can be applied by clicking the filter expression. The Fields and details are explained as tabulated in “Fields and their descriptions” section.

NOTE: In case multiple sub types/ADI are selected, the filter expression is necessary to direct required data into right entity/table. If no filter expression chosen then all the records are loaded into all the ADI/subtypes entities/tables. This is required to identify which record goes into which target. It will be an expression such as <EDDNAME>.<Field Name> = 'TD' under Term deposit and <EDDNAME>.<Field Name> = 'CARDS' under Cards.



12. Click the **Mapping** block in the flow chart, in order to map the EDD's. For details on Auto-mapping refer to section Auto-mapping.

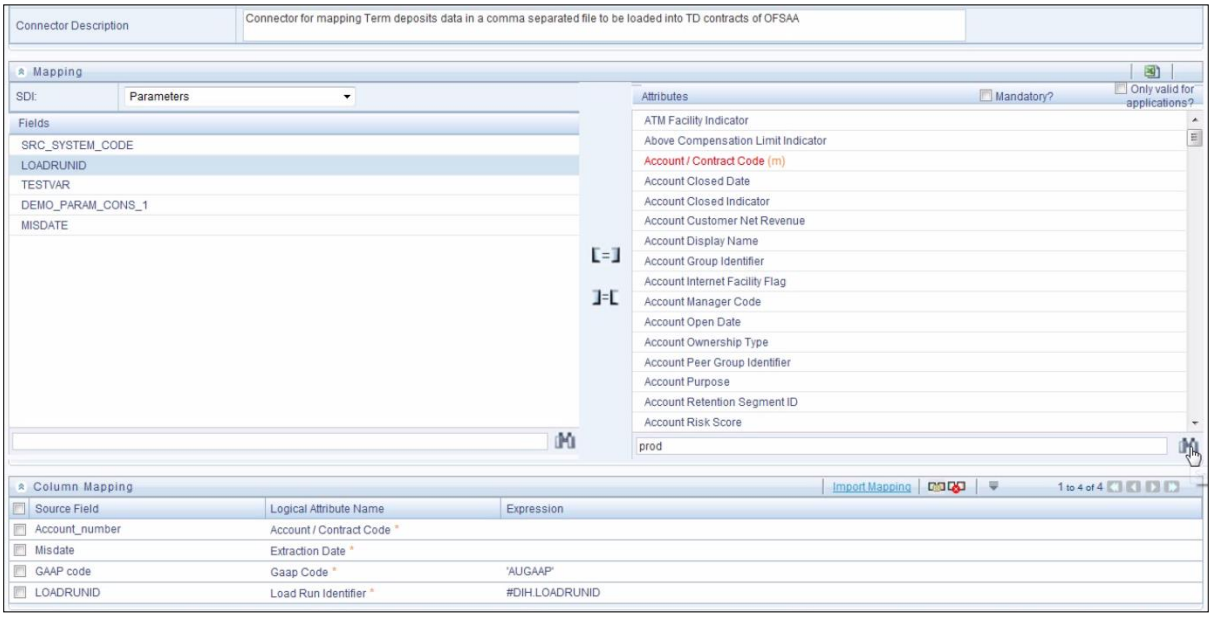


13. Select the EDD from the drop down list. For details on drop-down options for EDD refer to section Options in Mapping EDD.

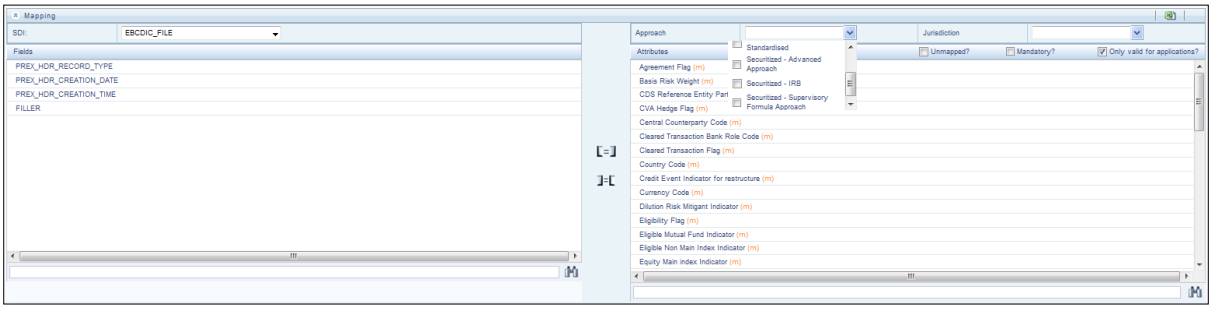
14. Select the ‘Mandatory’ option to populate the mandatory Attributes to be mapped.

NOTE: On selecting ‘Derived Column’ option as EDD from the drop down list, you can add an expression.

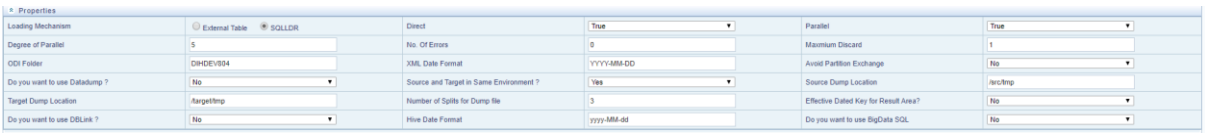
All the mapped attributes are listed under the ‘Column Mapping’ sector. For details on the options in the Mapping grid such as Auto-mapping, Export to Excel and so on; refer to section Fields in Mapping.



NOTE: If the application is chosen as BASEL, while mapping, you can select the type of approach (such as, IRB or Advanced Approach) and the Jurisdiction (BIS, BRAZIL, China, India and so on) for filtering.



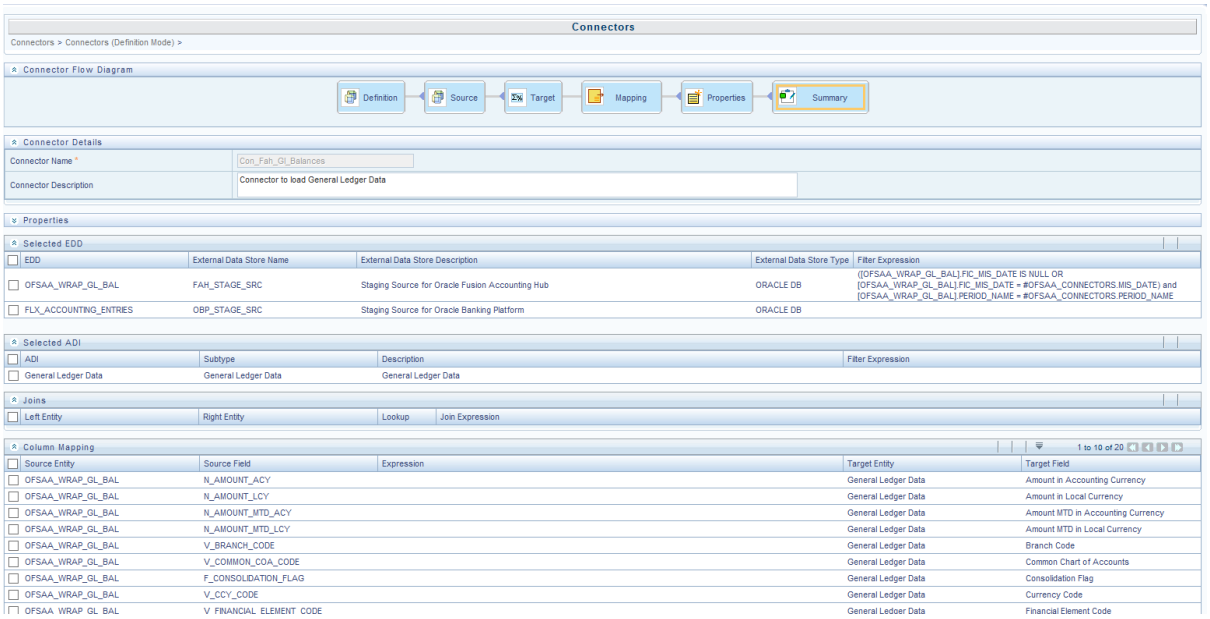
15. Click the **Properties** block in the flow chart. The Properties related fields come up. The Connector details come up automatically.



16. Select the Loading Mechanism. Select the Direct and Parallel option from the drop down list. Key in the value for Degree of Parallel, No: of Errors, Maximum Discard, ODI Folder, XML Date Format, Do you want to use Data Pump?, Source and Target in Same Environment?, Avoid Partition Exchange, Source Dump Location, Target

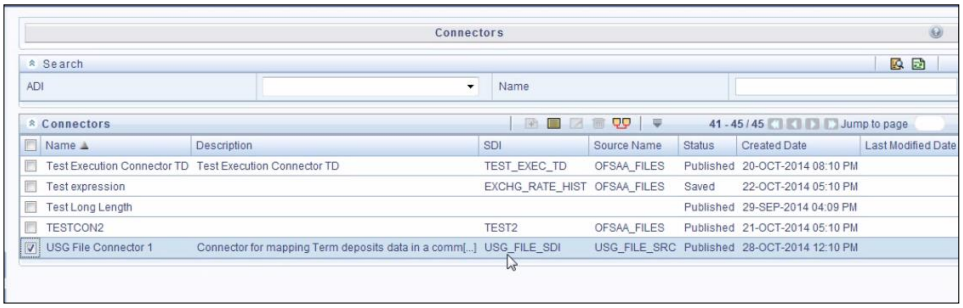
Dump Location, and Number of Splits for Dump File, Effective Dated Key for Result Area?. The Fields and details are explained as tabulated in "Fields and their descriptions" section.

17. Click the **Summary** block in the flow chart to view the summary of all sections.



18. Click **Publish**. This converts DIH metadata into ODI objects.

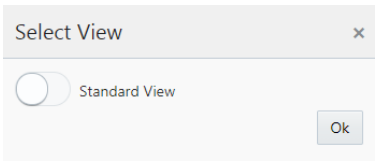
The Audit Trail section at the bottom of the window displays the information of the source created. The User comments section facilitates you to add or update additional information as comments.



9.3.5 Creating a Connector for Extracting Data from Results

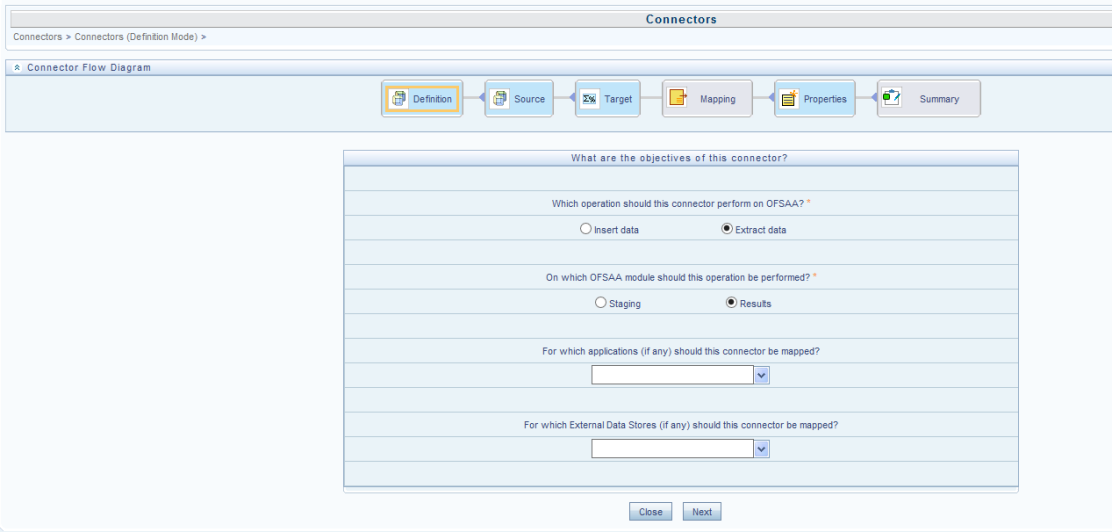
To create a Connector for extracting data from results, perform the following steps:

1. On the Connectors Summary window, click Add  button. The Select View window appears.

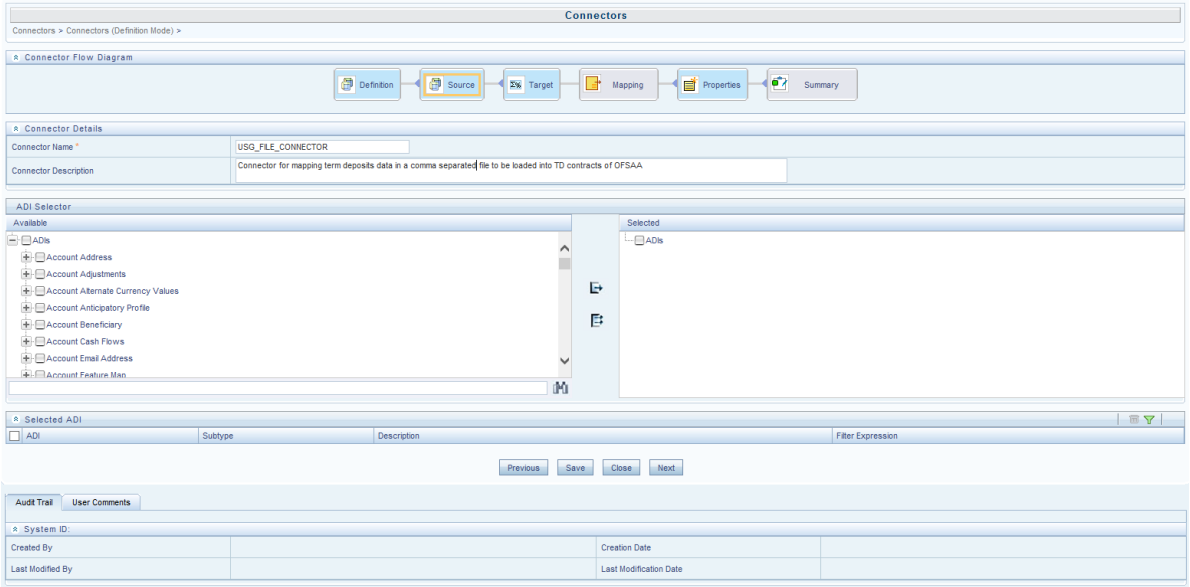


2. Choose Standard View and click Ok**.** The Connectors Definition window appears.

3. The Definition tab provides the option to load and extract data. Select Extract data and Results. Click **Next**.



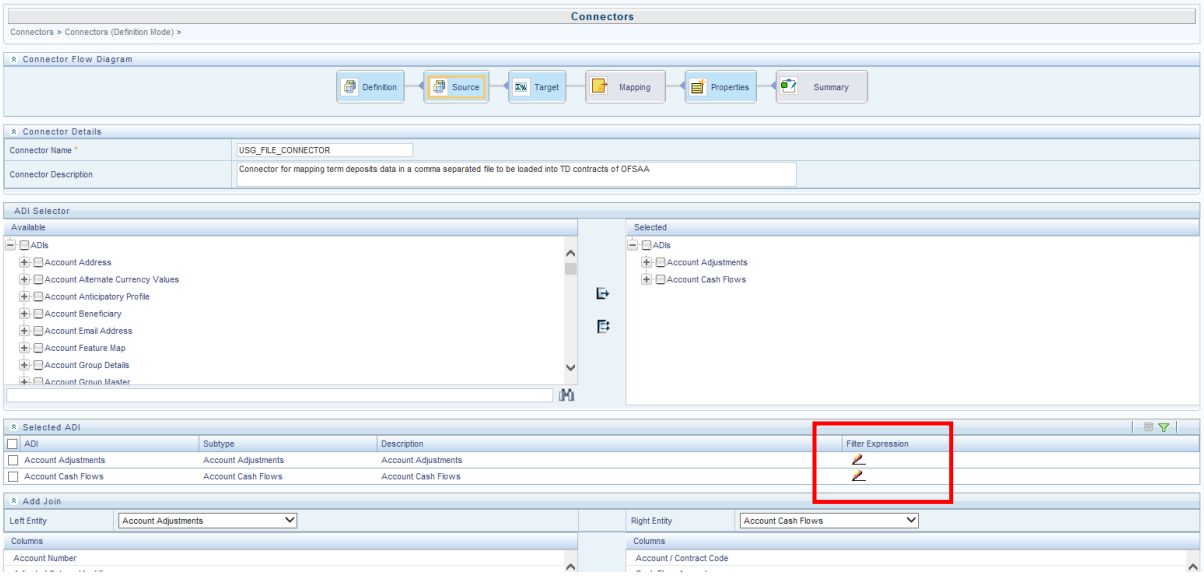
4. Click **Next.** The ‘Source’ block appears.



5. If Extract data option is selected, the ADI becomes source and EDD becomes target. Only staging relevant ADIs appear there.

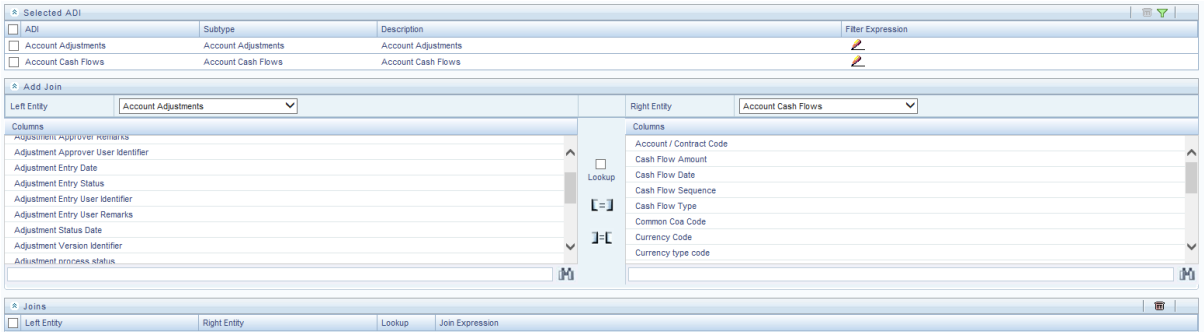
6. Enter the Connector Name and description. The Fields and details are explained as tabulated in “Fields and their descriptions” section.

7. Under the ‘ADI Selector’ section, the available ADI’s are listed. Select the required ADI in order to map it. The selected ADI’s are displayed in the ‘Source’ section.

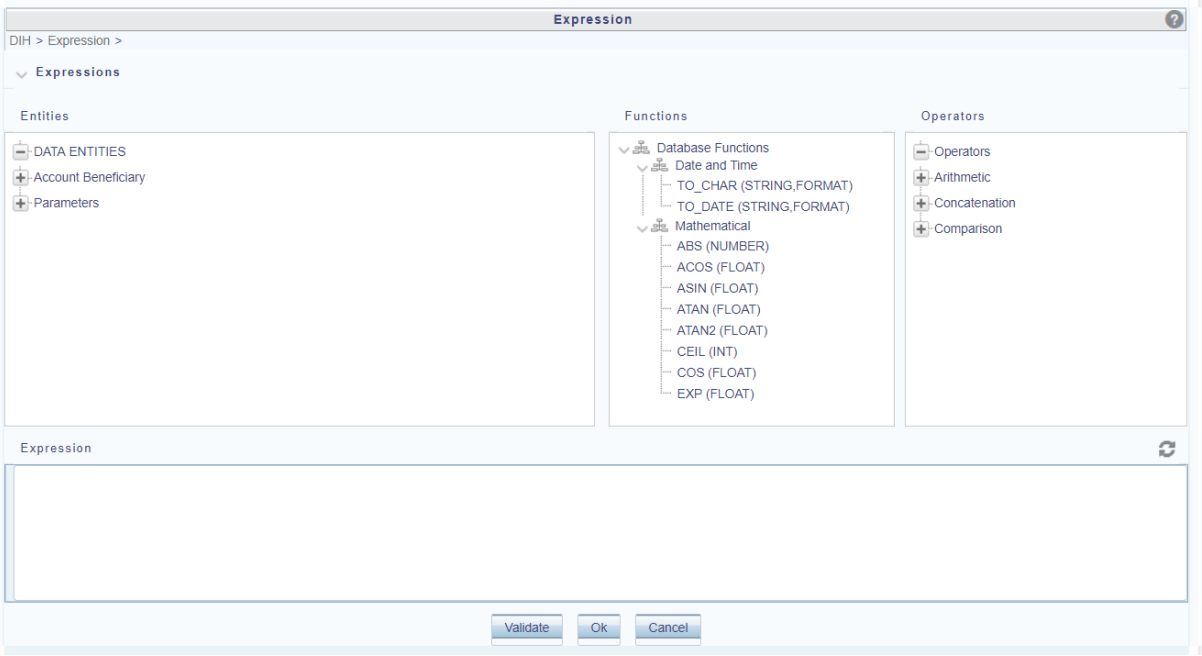


8. In case of multiple ADIs selected, **Add Join** section appears below with selected EDDs appearing on the left and right side. Select the fields from the Left and right side, and join the fields. If LOOKUP is required, then check the lookup checkbox has during the mapping.

NOTE: If Lookup option is checked, then the join would be left outer join. Else it would be inner join. For few ADIs/Subtypes, there are known relationship so joins in case of multiple ADIs occurs automatically.



9. To edit the filter expression, click  icon. The *Specify Expression* window appears. Select/key in the required expression and click **OK**.



NOTE:

- You do not need to add 'WHERE' clause for the filter.
- For File data loading, use filter expression of Number type along with single quotes. Example: N_DRAWN_AMOUNT ='40000'.
- For Date field refer To_CHAR function for comparison. Parameters can also be used in filter expression. Date format must be a valid SQL date format.

  For Example:

```
[EDD_GL_DATA].[EXTRACTION_DATE] =
TO_DATE(#DIHDEV.MIS_DATE,'dd-MM-yyyy')
```

10. If Source type is Hive, the filter expressions must conform to the following restrictions:
    - Expression must be valid HiveQL
    - Does not include Oracle built in or user defined functions
    - Does not include Sub queries
    - Includes Hive built in functions only
    - Parameters can also be used in filter expression. MISDATE can also be passed dynamically so that it is loaded from Batch Execution Screen. The date format specified must be valid Hive Date format i.e. yyyy-MM-DD

    For Example:

    Filter Expression in Connector:-`[EDD_GL_DATA].[EXTRACTION_DATE] = #DIHDEV.MIS_DATE`

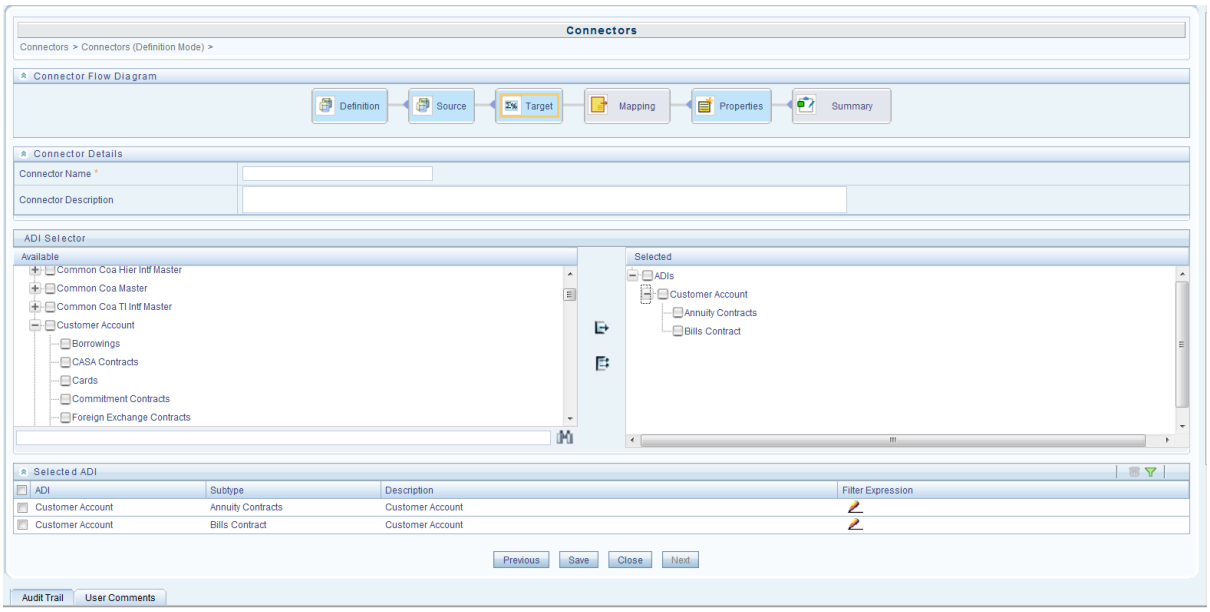
    MISDATE Parameter in Batch:

```
MISDATE=$MISDATE:yyyy-MM-dd
```

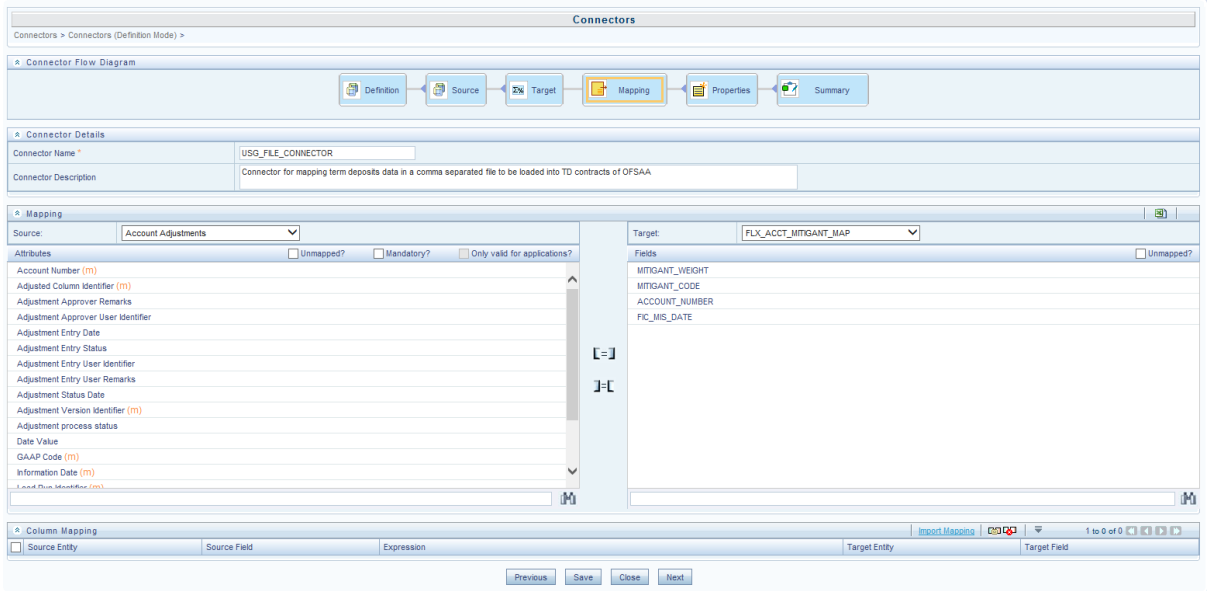
11. Click **Next. T**he 'Target' block appears.

12. Select External Data Descriptor from available list shows left panel. Move that to right side on selected panel. Below grid shows the selected EDDs along with filter expression. The filter on target can be applied by clicking the filter expression. The Fields and details are explained as tabulated in "Fields and their descriptions" section.

NOTE: For extract type connector, only one EDD should be selected. Multiple EDD is not supported.

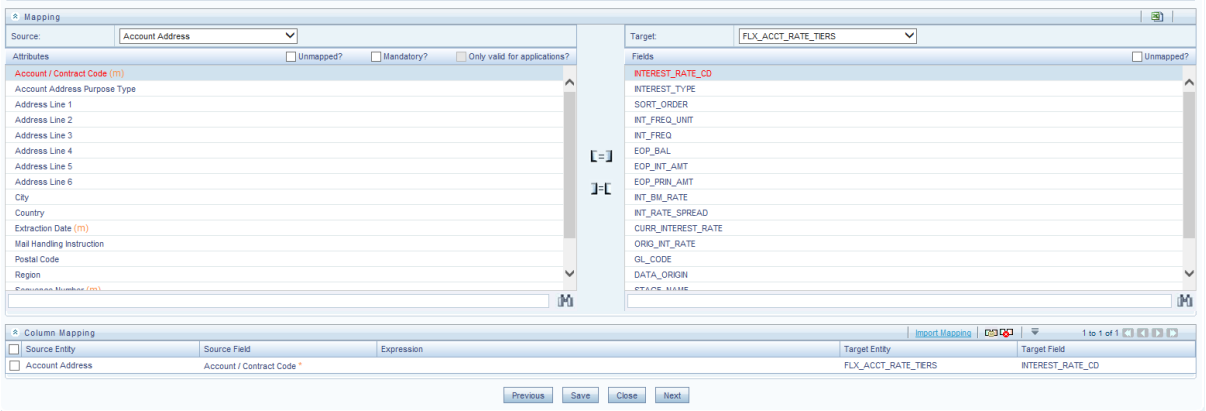


13. Click the **Mapping** block in the flow chart, in order to map the EDD's. For details on Auto-mapping refer to section Auto-mapping.



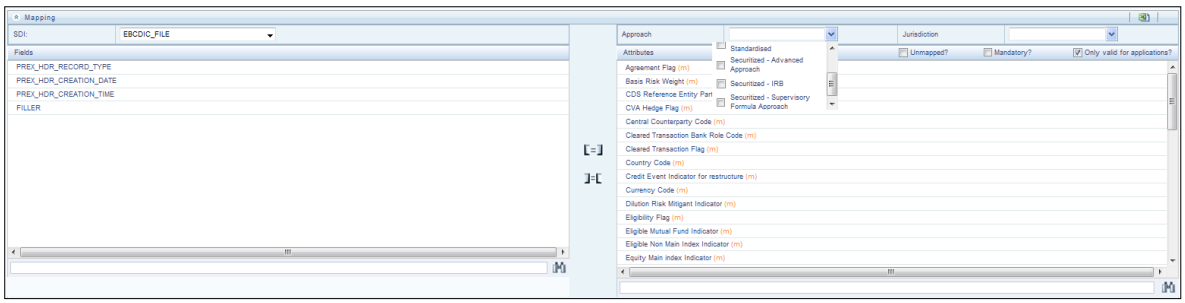
14. Select the ADI from the drop down list. For details on options for ADI refer to section Options in Mapping ADI.

NOTE: For extract connector, mandatory attributes are not applicable. There is no validation of mandatory attributes during publish. Mandatory indicator (*) against an attribute for ADI is for reference only.

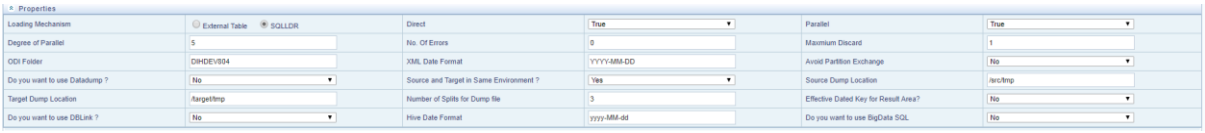


15. Select the ‘Mandatory’ option to populate the mandatory Attributes to be mapped. All the mapped attributes are listed under the ‘Column Mapping’ sector. For details on the options in the Mapping grid such as Auto-mapping, Export to Excel and so on refer to section Field in Mapping.

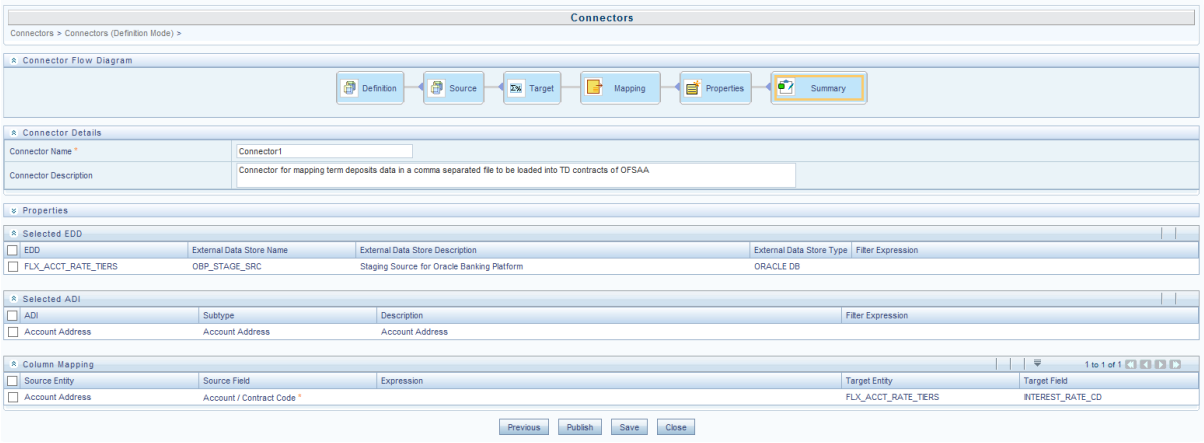
NOTE: If the application is chosen as BASEL, while mapping, you can select the type of approach (such as, IRB or Advanced Approach) and the Jurisdiction (BIS, BRAZIL, China, India and so on) for filtering.



16. Click the **Properties** block in the flow chart. The Properties related fields, and the Connector details appear automatically.

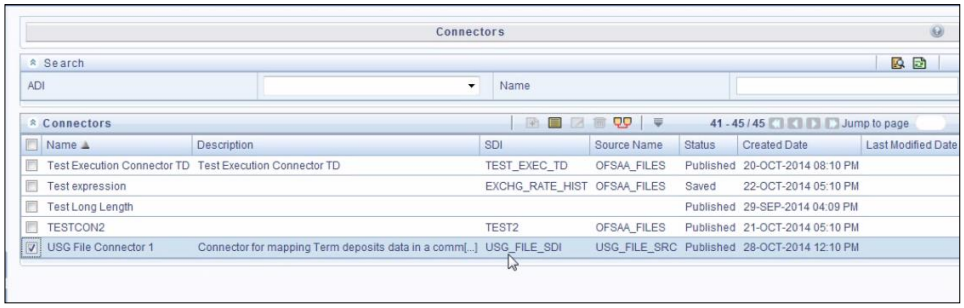


17. No action is required in properties section. Directly proceed to summary tab.
18. Click the **Summary** block in the flow chart to view the summary of all sections.



19. Click **Publish**. This converts DIH metadata into ODI objects.

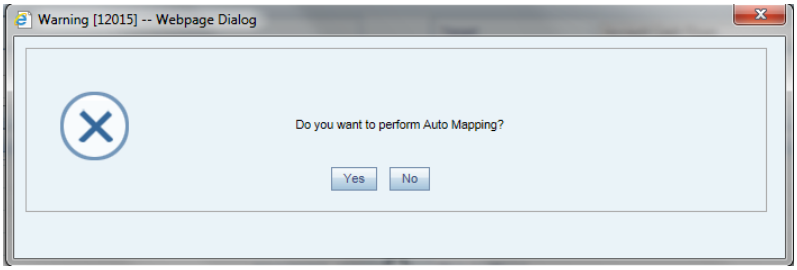
The Audit Trail section at the bottom of the window displays the information of the source created. The User comments section facilitates you to add or update additional information as comments.



9.3.5.1 Auto-mapping

The Mapping section appears, with an dialog box providing an option for Auto Mapping. Click **Yes** to proceed with Auto Mapping. Alternatively, click **No**, to perform Auto Mapping later or perform mapping manually.

The list of Fields and Attributes are listed.

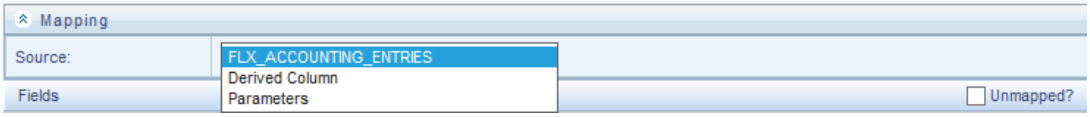


9.3.5.2 Options in Mapping EDD

In the Mapping grid of the Mapping block, when you click on the EDD drop-down, there are three options:

- **Defined EDD**: In this option, the defined EDD is listed in the Fields column which can be mapped to the required ADI.

- **Derived Column**: On selecting **Derived Column**, under the Fields column, you have 'Add Expression' option. On selecting 'Add option', the *Specify Expression* window appears. Here, you can select the required **Entities**, **Functions** and **Operators.** That is, you can write your own expression. Enter the field name and click **OK.** Now the newly created field name will be listed along with the 'Add Option'. Select the created filed and map it with the respective attributes.
- **Parameter**: On selecting Parameter, you can substitute it with the EDD. The respective parameters are listed in the fields' column. Map the fields and attributes.

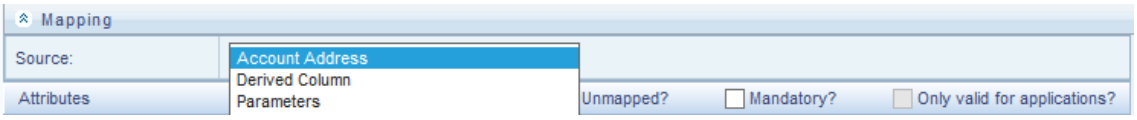


Example: USG_FILE_EDD. The Fields of the selected EDD is listed.

9.3.5.3 Options in Mapping ADI

In the Mapping grid of the Mapping block, when you click on the ADI drop-down, there are three options:

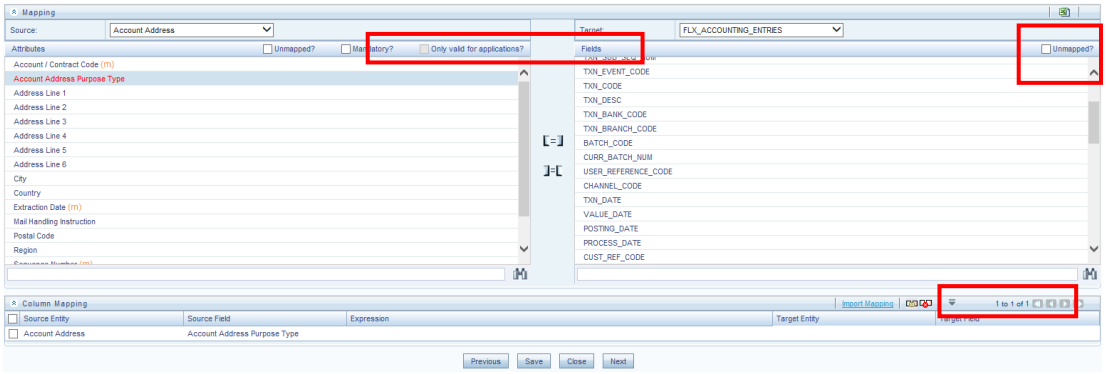
- Defined ADI: In this option, the attributes of the selected ADI which can be mapped to the required EDD.
- Derived Column: On selecting **Derived Column**, under the Fields column, you have 'Add Expression' option. On selecting 'Add option', the *Specify Expression* window appears. Here, you can select the required **Entities**, **Functions** and **Operators.** That is, you can write your own expression. Enter the field name and click **OK.** Now the newly created field name will be listed along with the 'Add Option'. Select the created filed and map it with the respective attributes.
- Parameter: On selecting Parameter, you can substitute it with the ADI. The respective parameters are defined can be mapped to a field on target.



Example: Customer Account. The Fields of the selected ADI is listed.

9.3.5.4 Fields in Mapping

The Mapping and Column Mapping grid in the Mapping block provides options, such as Auto-mapping, Export to Excel and so on, as explained below.



- You can view the unmapped fields and attributes by selecting the “Unmapped” checkbox. The mapped fields are displayed in red. You can also search for an attribute or field by keying the required word in the search option and clicking  icon.
- You can view the mandatory attributes by selecting the “Mandatory” checkbox.
- Only valid for applications, and is not applicable for extract.
- For data loading into Result area, DIH internally converts code/string values into surrogate keys/numbers by looking up into corresponding dimension table. This happens during publish. The lookup happens either on latest record or on the effective dated. It is decided by the parameter “Effective Dated Key for Result Area?”. Therefore, in the result area loading, a data type mismatch warning might appear. You can ignore the warning.
- There is automap button on the “Column Mapping” section next to “Import Mapping”. On clicking it, it maps Fields of the selected EDD on the left to attributes on the target based on name. And it puts underscore “_” in the space between words and tries to match. It tries to match with physical column name of the attribute as well. The user should review the mapping and delete if not correct. The ‘Delete mapping” button is also next to automap button.
- The Export to Excel  icon, helps in moving the mappings to an excel sheet. The excel sheet has the following columns:
    - EDD
    - Source Column
    - Target Attribute
    - Mandatory
    - Applicable for Applications

    The export process dumps all the source columns and target attributes for the current selection along with whatever is already mapped. You can alter or do the mapping by changing the source/EDD and Target columns in the Excel.

Click “Import Mapping” button on the “column Mapping” section, and select excel mapping. The import process does the mapping if the mapping is valid or the same target attribute is not already mapped.

If EDD is not mentioned in the excel (manually created), then import mapping option enables you to map left and right attributes based on their name irrespective of EDD name. This enables the user to perform reference mapping. This indicates that is once mapping is established between the source fields and target attributes, on any connector with any EDD the same mapping can be used.

9.4 Creating a Connector - Dataflow View

Connector allows mapping one or more External Data Descriptor with Application Data Interface. It allows mapping of one or more ADI with EDD as well, in case of extract type connector.

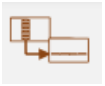
There are pre-built Connectors for Oracle applications such as, Flexcube, Oracle Banking Platform, and so on. For other applications you need to define Connectors for your EDDs.

This section includes the following sections:

9.4.1 Icons and Description

To create a connector you must understand each of the icons at the beginning. While creating a Connector, the icons that are displayed are explained as follows:

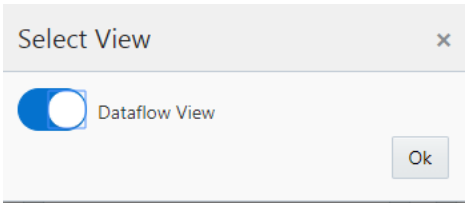
Icon	Description
	Click this icon to view the list of all External Data Descriptors created in the setup. You can drag the desired EDD on the canvas.
	Click this icon to view the list of all ADIs created in the setup. You can drag the desired ADI on the canvas.
	Click this icon to open the mapping window. You can map the source column to target column in the window.
	This component is used for defining join between two entities. Click this icon to open the window where you can define the join condition between two entities.
	This component is used for defining filter a given entity. Click this icon to open the window where you can define the filter condition.
	This component is used for defining look up condition. Click this icon to open the window where you can define the join condition between two entities.

Icon	Description
	This component is used for defining Derived column. Click this icon to open the window where you can define an expression, which can be mapped to the target column.
	This component is used for Transpose (Rows to Columns) for a given entity. Click this icon to open the window where you can define the pivot data element and the new columns, which will be transposed from multiple rows of source entity.
	This component is used for Transpose (Columns to rows) for a given entity. Click this icon to open the window where you can define the unpivot data element and new rows which will be transposed from columns of source entity.
	This component is used for defining group by and having clause for Aggregation. Click this icon to open the window where you can define a group by and having clause for aggregation of the source entity.
	Click this button to remove all the nodes added into the canvas.
	This appears on the connector window when the connector is published and is opened in view mode. The connector is not editable.
	This appears on the connector window when the connector is not published. The connector is editable.

9.4.2 Creating a Connector for Loading Data into OFSAA

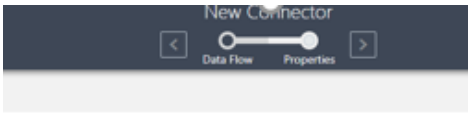
To create a Connector for loading data into OFSAA perform the following steps:

1. On the Connectors Summary window, click Insert tab.
2. Click Add  button. The Select View window appears.

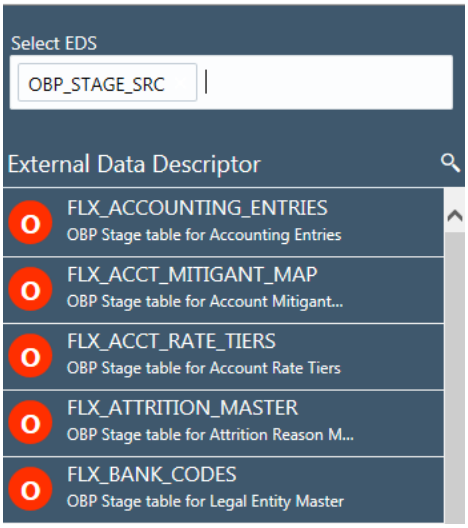


3. Choose Dataflow View and click Ok**.** The New Connectors Definition window appears.

To define a connector, you must have source with EDD and a target, which is ADI.



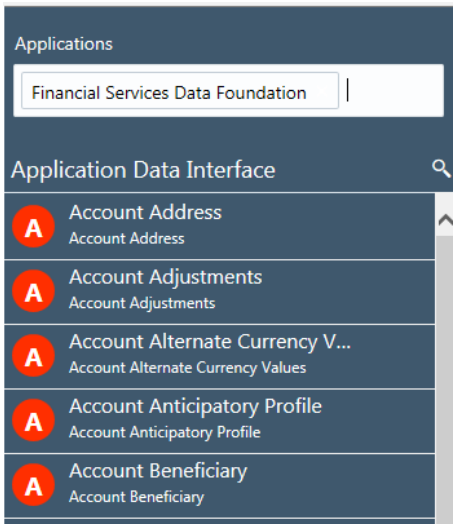
3. Click Source to select the required EDDs.
4. Here, you can filter your selection based on the EDS selected. The EDD node's color depend on the source system type.



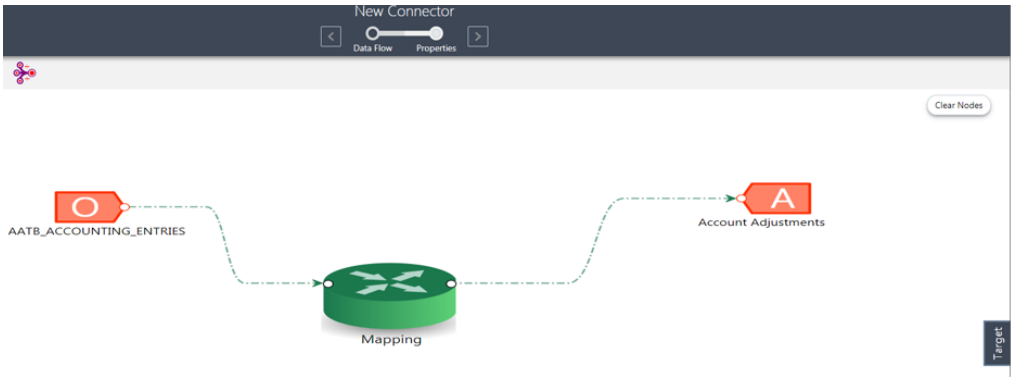
For example:

- File types are in blue.
- Oracle types are in red.
- HDFS types are in orange.

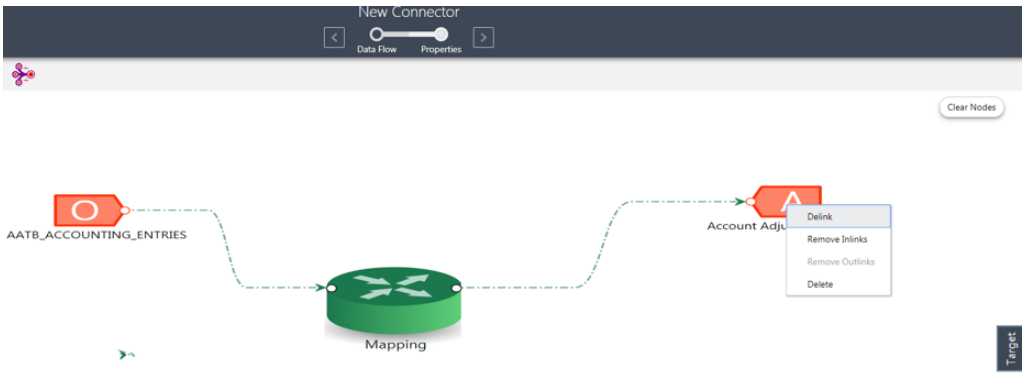
5. In case you select 'OBP_STAGE_SRC' as the EDS, it displays the EDDs for that particular EDS selected.
6. Click the search  icon to search for a particular EDD. You can select multiple EDS.
7. Select the required EDD and drag it to the canvas.
8. Click Target. Here you can filter ADIs based on the application selected.



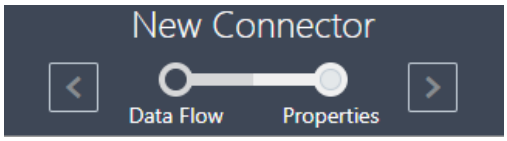
9. Click the search  icon to search for a particular ADI.
10. Select the required ADI. Drag it to the canvas and then link the input and output nodes.
11. Click the input white circle. The anchor symbol appears. Drag and drop the line to link it to the required component.



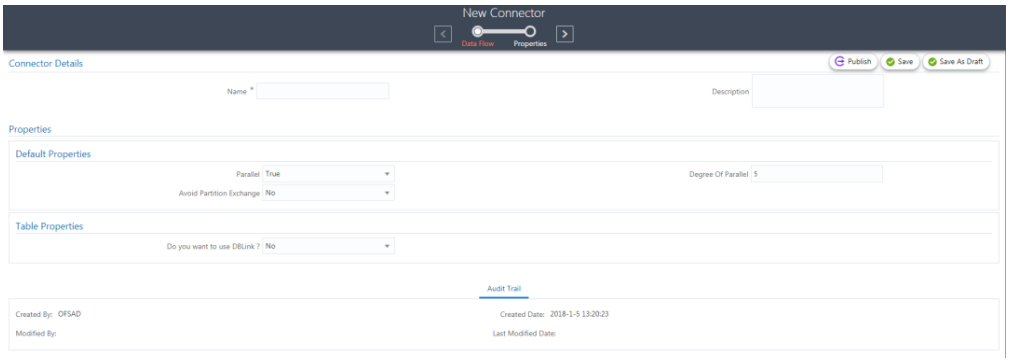
12. At any given time, you can right-click the node to either delink or remove inlinks / outlink or delete a node.



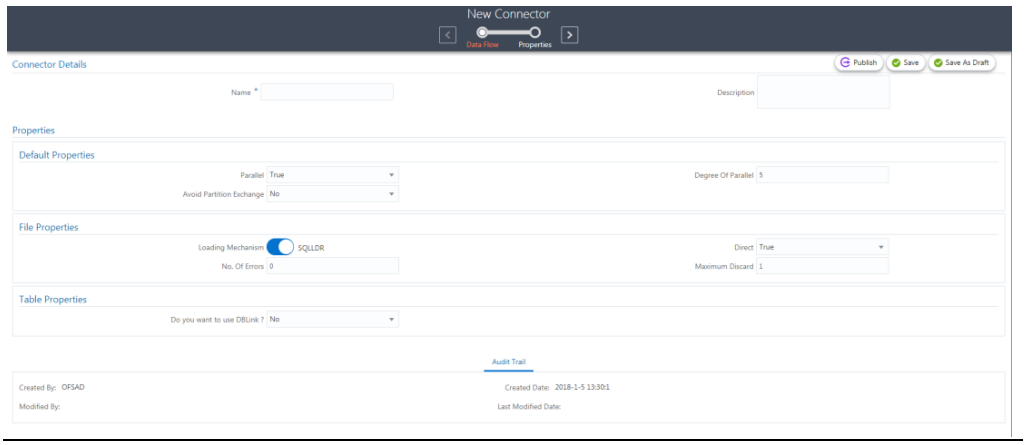
13. To edit or view the properties, on the Connector window, click  .



14. Enter the name and description for the connector.
15. In case you select a table type, enter the table properties.



16. In case you select a file type, enter the file properties.

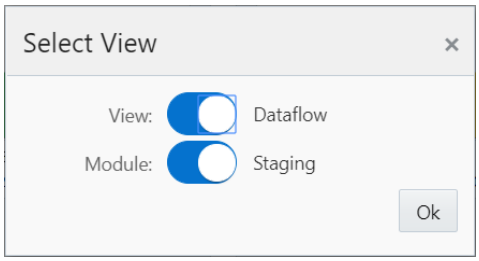


NOTE: Refer section Connector Properties section for more details on the properties.

9.4.3 Creating a Connector for Extracting Data from OFSAA

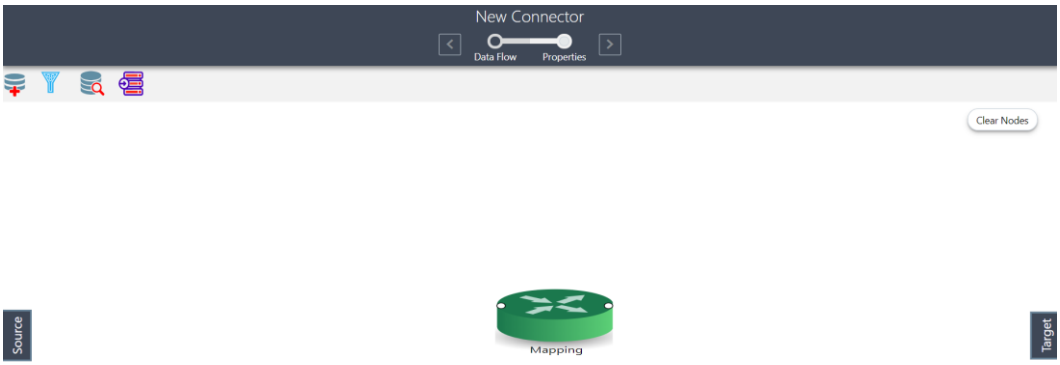
To create a Connector for extracting data from OFSAA perform the following steps:

1. On the Connectors Summary window, click Extract tab.
2. Click Add  button. The Select View window appears.

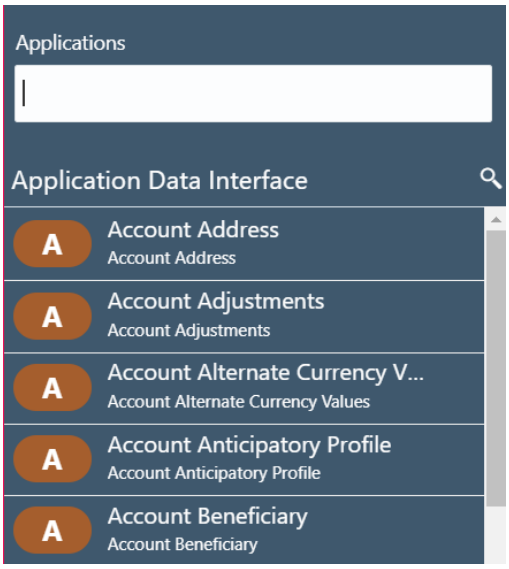


3. Choose Dataflow View and select the module you want to extract data from and click Ok**.** The New Connectors Definition window appears.

To define a connector, you must have source with EDD and a target, which is ADI.



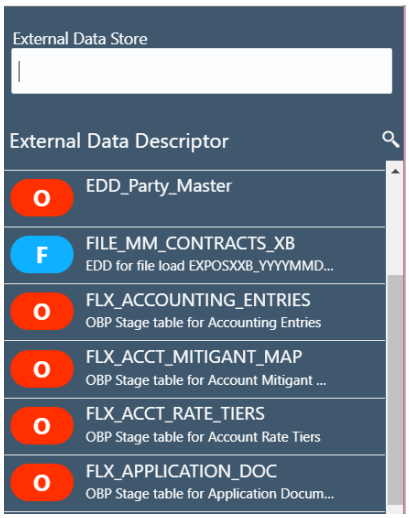
4. Click Source to select the required ADIs.
5. Here, you can filter your selection based on the ADI selected. The ADI node's color depend on the source system type.
6. Click the search  icon to search for a particular ADI.
7. Select the required ADI. Drag it to the canvas and then link the input and output nodes.



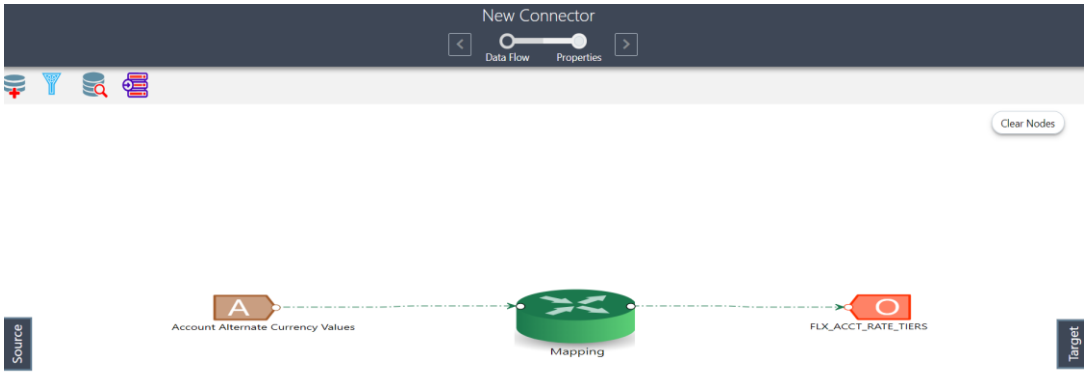
For example:

- File types are in blue.
- Oracle types are in red.
- HIVE types are in brown.

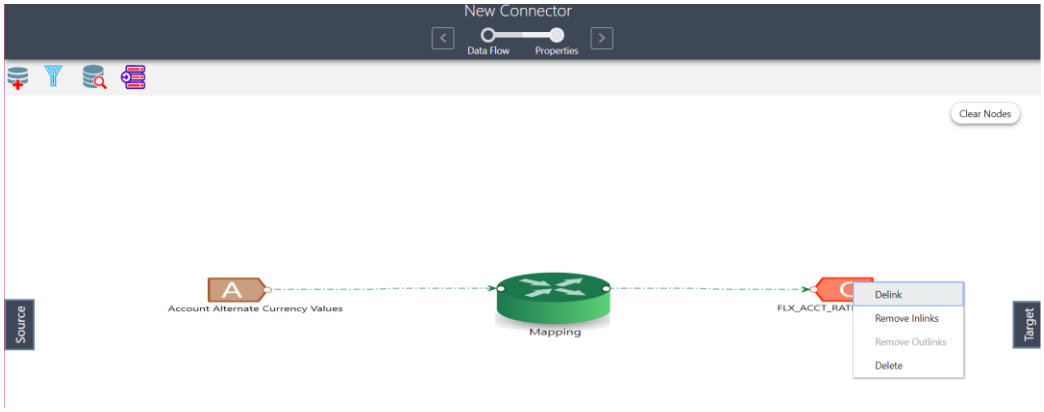
8. Click Target. Here you can filter EDS based on the application selected.



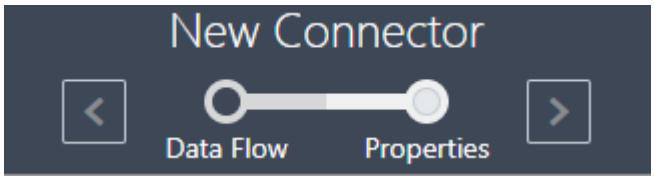
9. In case you select ‘OBP_STAGE_SRC’ as the EDS, it displays the EDDs for that particular EDS selected.
10. Click the search  icon to search for a particular EDD. You can select multiple EDS.
11. Select the required EDD and drag it to the canvas.
12. Click the input white circle. The anchor symbol appears. Drag and drop the line to link it to the required component.



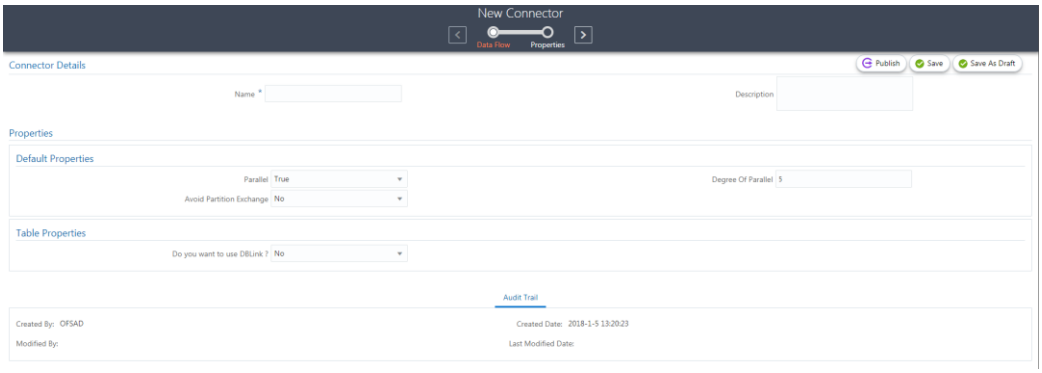
13. At any given time, you can right-click the node to either delink or remove inlinks / outlink or delete a node.



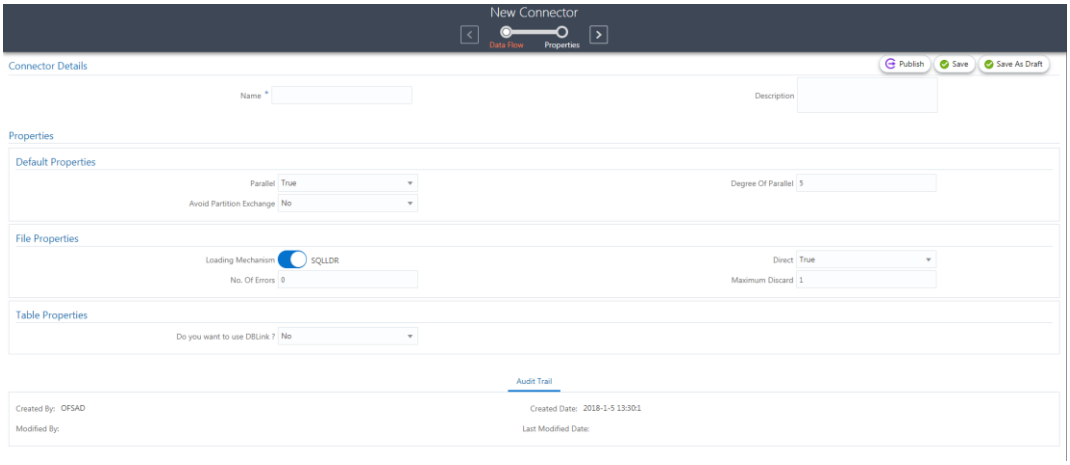
14. To edit or view the properties, on the Connector window, click  .



15. Enter the name and description for the connector.
16. In case you select a table type, enter the table properties.



17. In case you select a file type, enter the file properties.



NOTE: Refer section Connector Properties section for more details on the properties.

9.4.4 Understanding the Components

This section includes the following sections:

- Using Filter for an EDD
- Using Join for an EDD

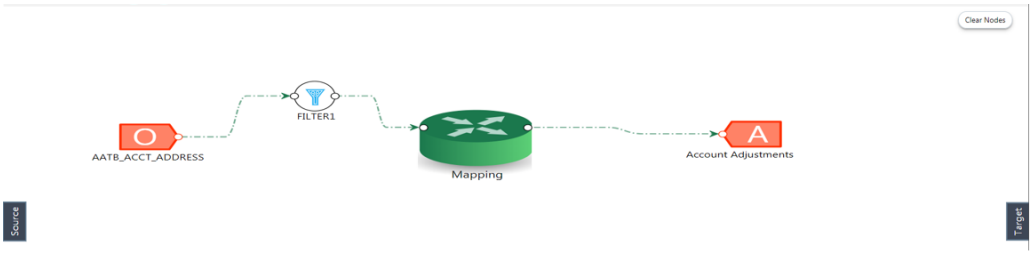
- Using Lookup for an EDD
- Using Aggregation for an EDD
- Using Transpose (Rows to Columns) for an EDD
- Using Transpose (Columns to Rows) for an EDD
- Using Derived Column
- Using Mapping

9.4.4.1 Using Filter for an EDD

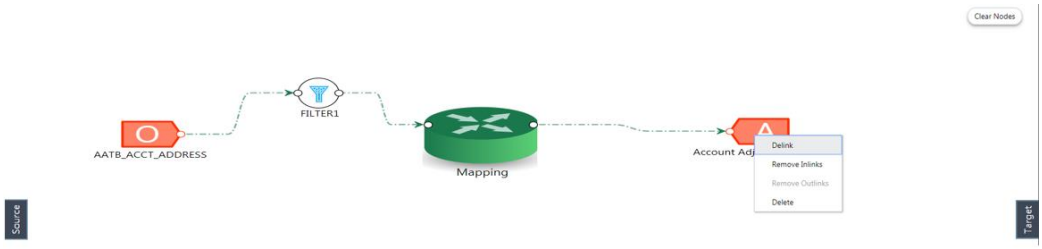
To use the filter component, perform the following steps:

1. Drag and drop the Filter  component on the canvas to define a filter on an EDD.
2. It accepts input only from an EDD and it can have only one output.
3. In case you have multiple EDDs selected, and you want to have filter for more than one EDD, then you must select as many number of filters, connect to the respective EDD, and then define their expressions.

   For example, to add filter to three EDDs, drag three filters.

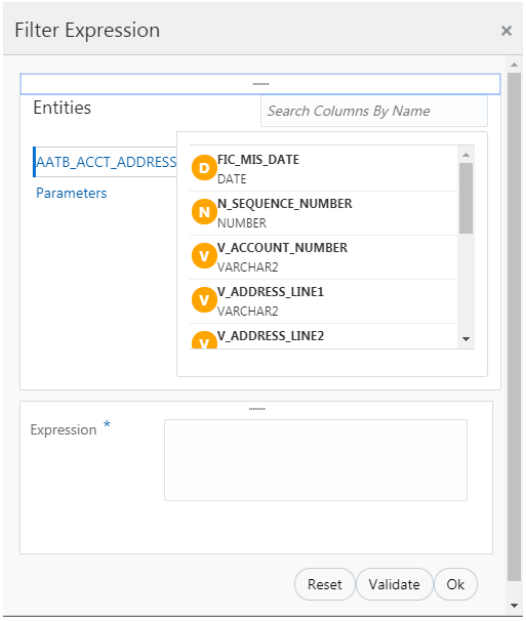


4. At any given time, right-click the filter component to either delink or remove inlinks / outlinks or delete the filter component.



5. Double-click filter component. The Filter Expression window appears:

   The selected EDD and parameters are displayed in the filter expression screen.



6. Specify the required filter expression using columns and parameters.
7. Click Validate in case you wish to verify the correctness of the SQL expression.
8. Click **OK.**

NOTE:

- You do not need to add 'WHERE' clause for the filter.
- For File data loading, use filter expression of Number type along with single quotes. For example: N_DRAWN_AMOUNT ='40000'.
- For Date field refer To_CHAR function for comparison.
- Parameters can also be used in filter expression. Date format must be a valid SQL date format.

  For Example:

```
[EDD_GL_DATA].[EXTRACTION_DATE] = TO_DATE(#DIHDEV.MIS_DATE,'dd-MM-yyyy')
```

---

9. If Source type is Hive, the filter expressions must conform to the following restrictions:
    - Expression must be valid HiveQL
    - Does not include Oracle built in or user defined functions
    - Does not include Sub queries
    - Includes Hive built in functions only
    - Parameters can also be used in filter expression. MISDATE can also be passed dynamically so that it is loaded from Batch Execution Screen. The date format specified must be valid Hive Date format i.e. yyyy-MM-DD

For Example:

Filter Expression in Connector:-`[EDD_GL_DATA].[EXTRACTION_DATE] = #DIHDEV.MIS_DATE`

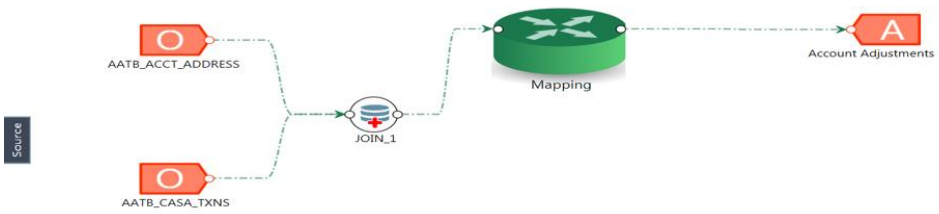
MISDATE Parameter in Batch:

```
MISDATE=$MISDATE:yyyy-MM-dd
```

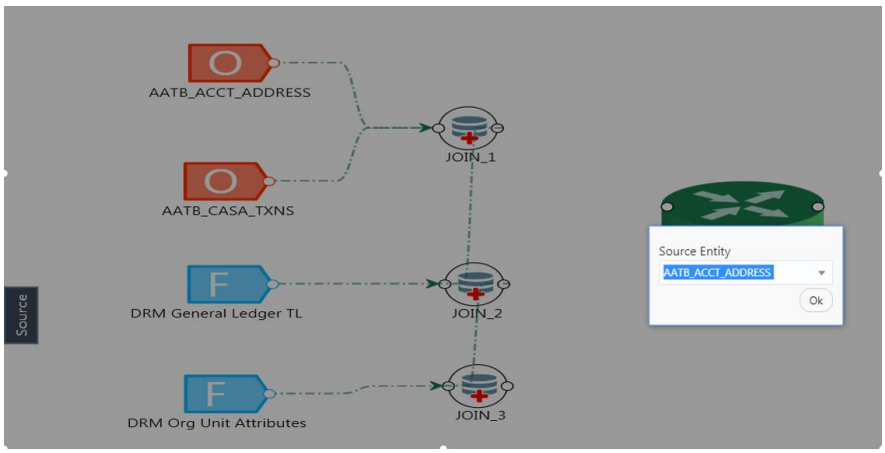
9.4.4.2 Using Join for an EDD

To use the join component, perform the following steps:

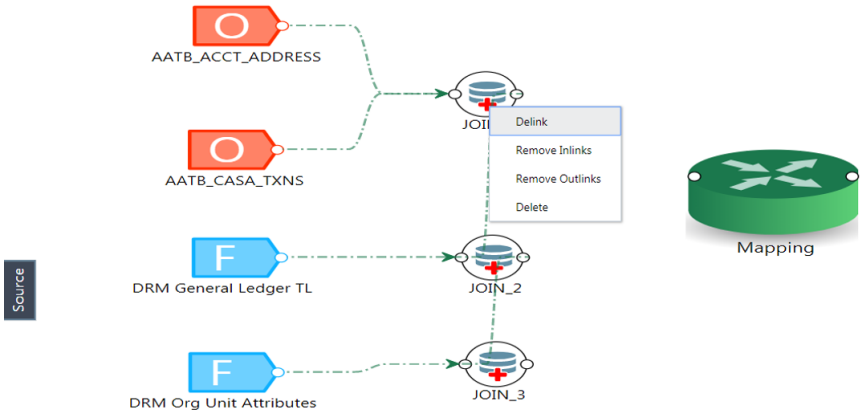
1. Drag and drop the Join  component on the connector window to link multiple EDDs.
2. The Join component accepts input from two EDDs.



3. To join more than two EDDs, drag another join component. Link the output of the first join to the input of the second join and then connect the other EDDs. You can repeat this for multiple EDDs. Select the Source Entity and click Ok.

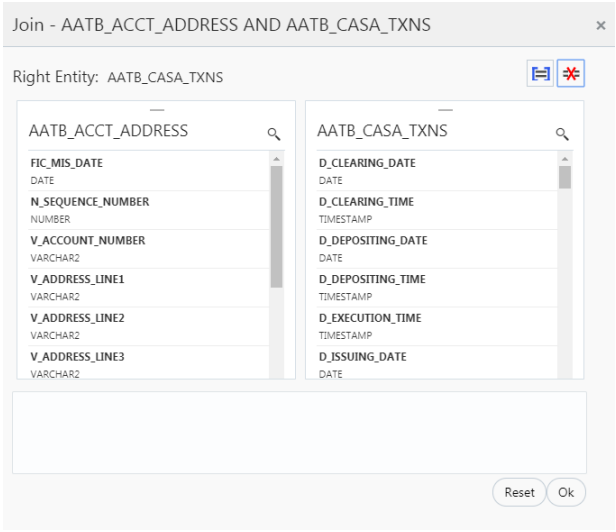


4. At any given time, right-click the join component to either delink or remove inlinks / outlinks or delete a join component.



5. Double-click the join component to define a join condition. The Join window appears:

   Here you see the selected EDDs in the left and right tab.



6. You can drag and reorder the left and right tab to choose the right/left entity in a join condition.

7. To join entities, select column from left and right tab and click Add Join  icon. This displays the joined entities. You can join multiple entities.

```
[AATB_ACCT_ADDRESS].[V_ACCOUNT_NUMBER]=[AATB_CASA].[D_ACCT_OPEN_DATE] AND
[AATB_ACCT_ADDRESS].[V_ADDRESS_LINE2]=[AATB_CASA].[D_ACCT_CLOSED_DATE] AND
[AATB_ACCT_ADDRESS].[V_ACCOUNT_NUMBER]=[AATB_CASA].[D_BILLING_CYCLE_DATE]
```

8. To remove two joined conditions, select two columns from left and right tab and click Remove Join  icon. The joined condition is removed from the list.

9. Click Reset in case you wish to reset all the joined condition.

10. Click Ok once you are completed.

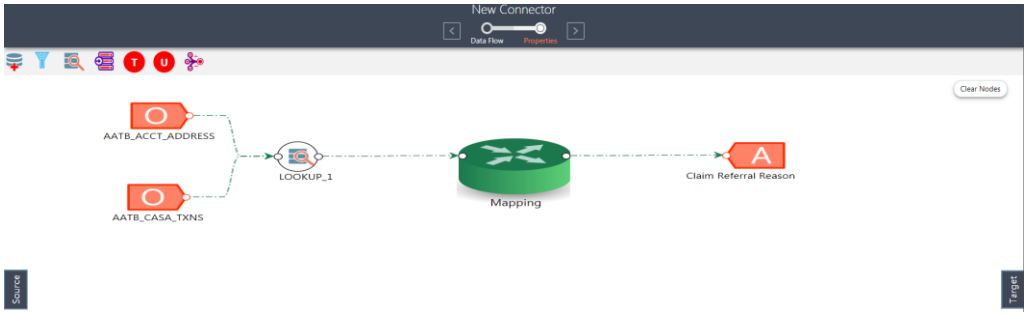
NOTE: This creates an inner join between the connected EDDs.

9.4.4.3 Using Lookup for an EDD

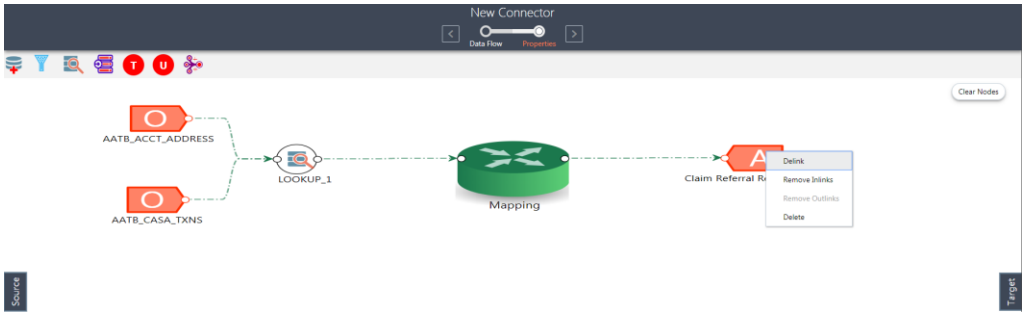
To use the lookup component, perform the following steps:

1. Drag and drop the Lookup  component on the canvas to to define a lookup on an EDD.
2. You can lookup two EDDs and then map it to the target.

NOTE: You can lookup a maximum of two input nodes.

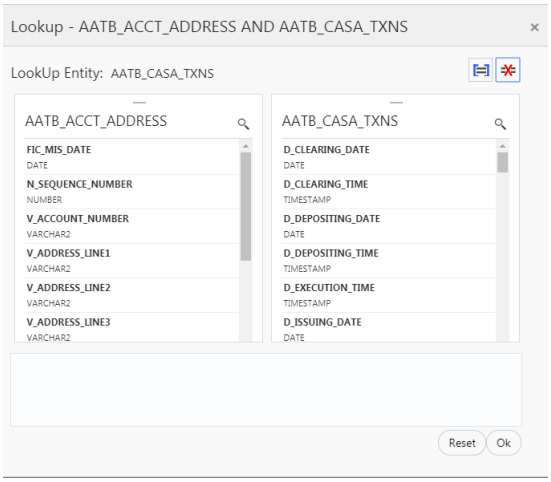


3. At any given time, right-click the lookup component to either delink or remove inlinks / outlinks or delete a lookup component.



4. Double-click the lookup component to define a lookup condition. The Lookup window appears:

   Here you see the selected EDDs in the left and right tab.



5. The entities that are on the right side on the window are the look up entity. You can change the lookup entity by moving edit tab to the right.

6. To lookup entities, select two entities from left and right tab and click Add Join  icon. This displays the lookup entities.

   [AATB_ACCT_ADDRESS].[V_ACCOUNT_NUMBER]=[AATB_CASA_TXNS].[D_CLEARING_TIME]

7. To remove a lookup conditions, select two columns from left and right tab and click Remove Join  icon. The lookup condition is removed from the list.

8. Click Reset in case you wish to reset all the lookup condition.

9. Click Ok once you are completed.

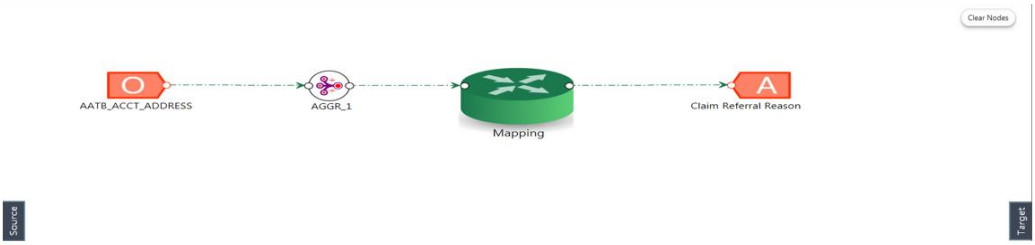
NOTE: This creates a left outer join between the connected EDDs.

9.4.4.4 Using Aggregation for an EDD

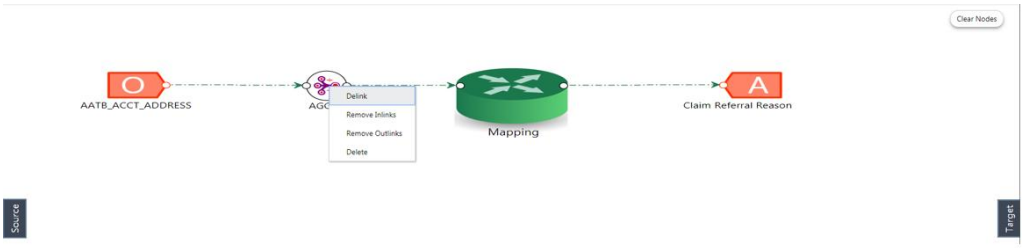
To use the aggregation component, perform the following steps:

1. Drag and drop the aggregation  component on the canvas to define an aggregation on an EDD.
2. It accepts input only from an EDD and it can have only one output.
3. In case you have multiple EDDs to be aggregated then you must select as many number of aggregation components, connect to the respective EDD, and then define their group by and having clauses.

   For example, to add aggregation to three EDDs, drag three aggregation components.

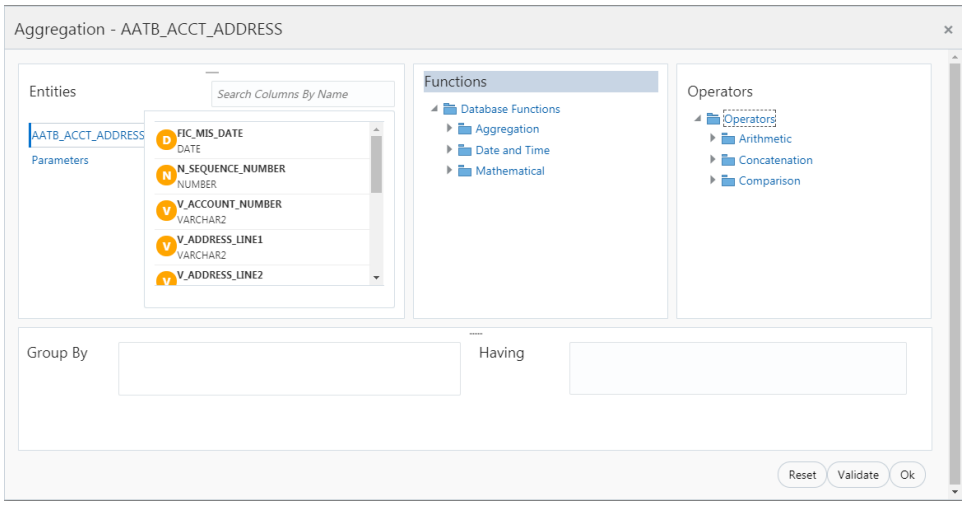


4. At any given time, right-click the aggregation component to either delink or remove inlinks / outlinks or delete aggregation component.



5. Double-click the aggregation component to define an aggregation condition. The Aggregation window appears:

   Here you see the selected EDD under the entity tab.



6. Select the group by columns and specify expression for the having clause.
7. Click Reset in case you wish to reset all the aggregation condition.
8. Click Validate in case you wish to verify the correctness of the SQL expression.
9. Click Ok once you are completed.

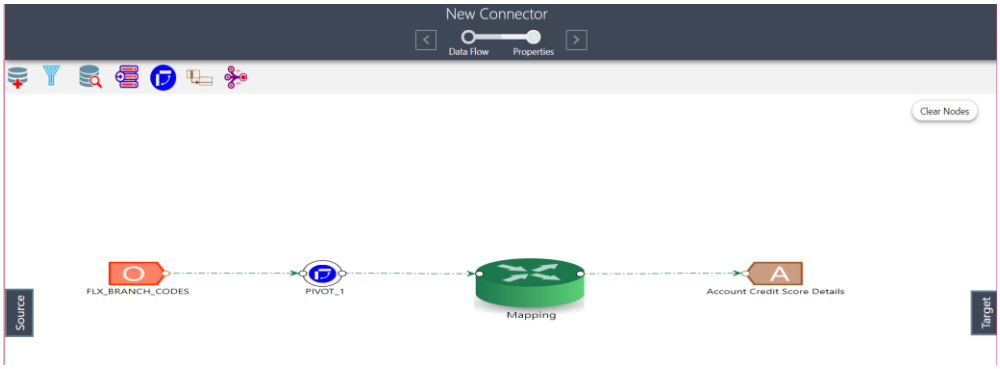
9.4.4.5 Using Transpose (Rows to Columns) for an EDD

To use the Transpose (Rows to Columns) component, perform the following steps:

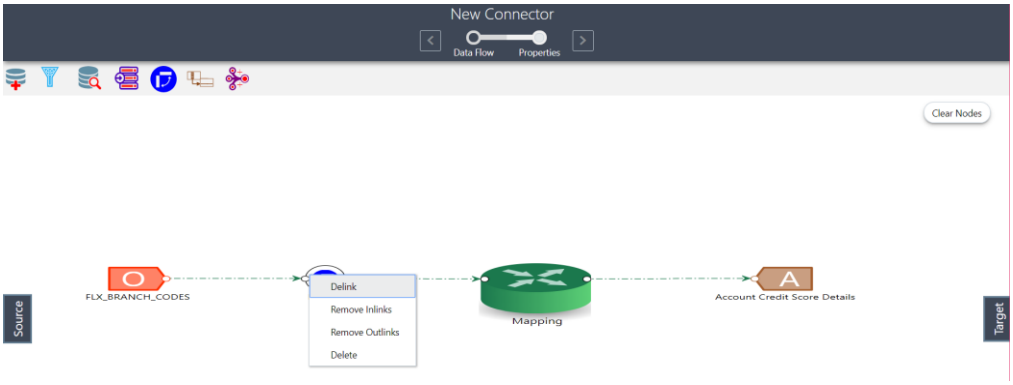
1. Drag and drop the Transpose (Rows to Columns)  component on the canvas to define a Transpose (Rows to Columns) component on an EDD.
2. It accepts input only from an EDD and it can have only one output.
3. In case you have multiple EDDs selected, and you want to have Transpose (Rows to Columns) component for more than one EDD, then you must select as many number of Transpose (Rows to Columns) components, connect to the respective EDD, and then define their expressions.

NOTE:

- The output can be connected to Join, Lookup and Mapping.
- For example, to add Transpose (Rows to Columns) component to three EDDs, drag three Transpose (Rows to Columns) components.

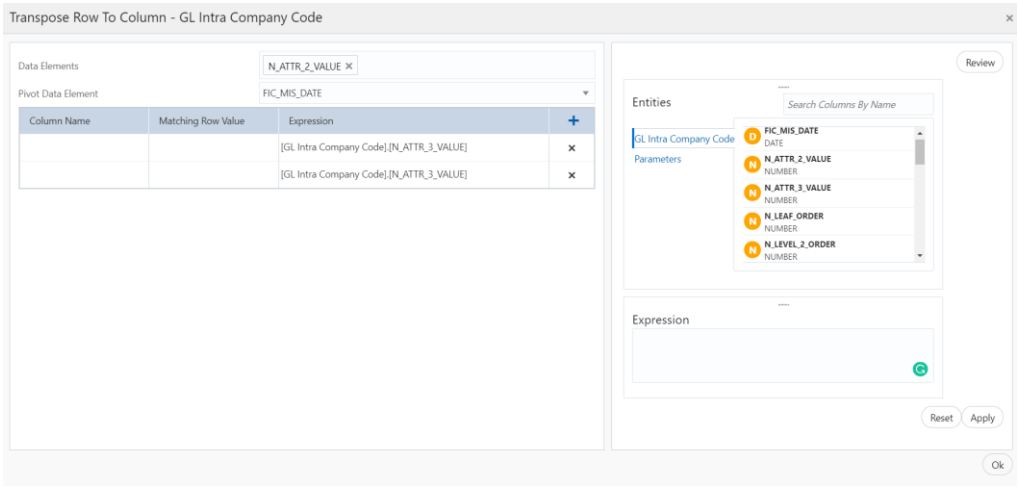


4. At any given time, right-click the Transpose (Rows to Columns) component to either delink or remove inlinks / outlinks or delete a Transpose (Rows to Columns) component.



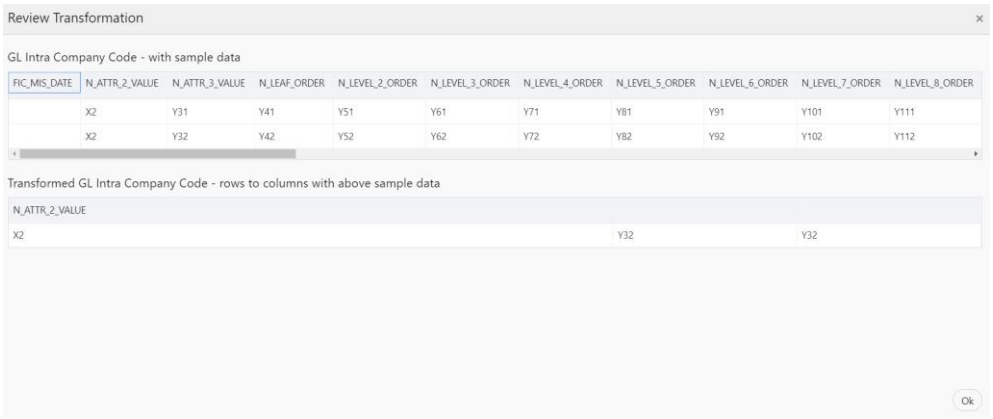
5. Double-click the component to transpose the entity rows into columns. The Transpose Row to Column window appears.

   Here you see the selected EDD and parameters.



6. Specify the pivot data element to transpose rows into columns.

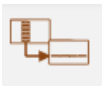
7. Specify the Row Value – Transposed Column – Expression combination. Ensure to have a minimum of two combinations.
8. Click Review to review the transformation. The Review Transformation window appears displaying the sample of the transformation data.



9. Click Ok.

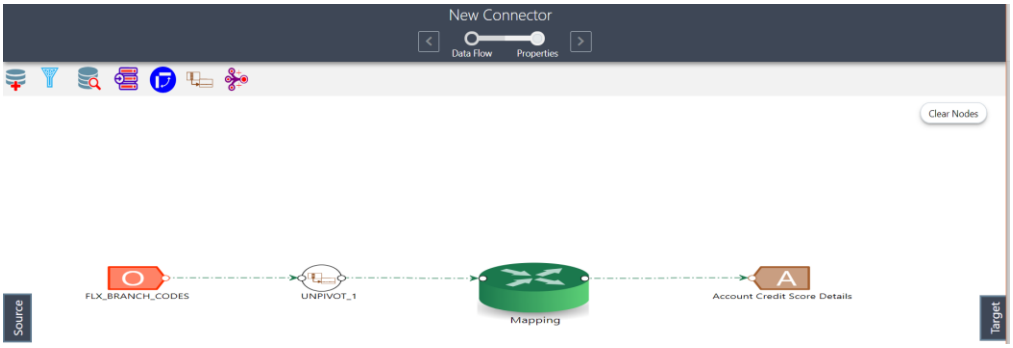
9.4.4.6 Using Transpose (Columns to Rows) for an EDD

To use the Transpose (Columns to Rows) component, perform the following steps:

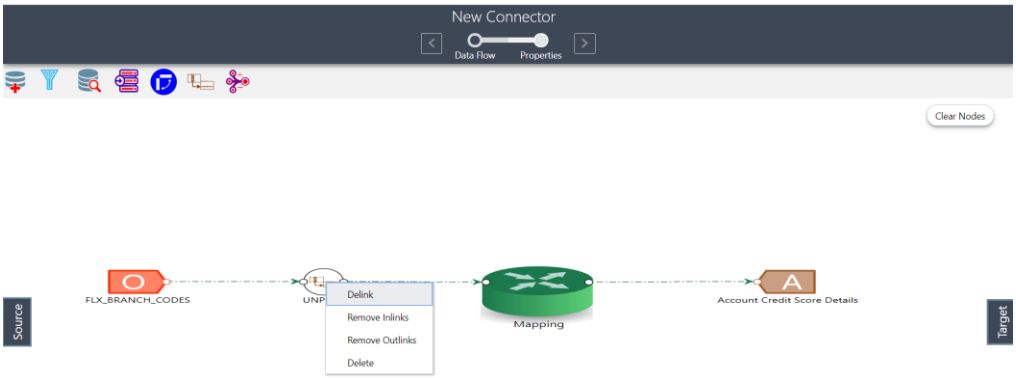
1. Drag and drop the Transpose (Columns to Rows)  component on the connector window to define a Transpose (Columns to Rows) component on an EDD.
2. It accepts input only from an EDD and it can have only one output.
3. In case you have multiple EDDs selected, and you want to have Transpose (Columns to Rows) component for more than one EDD, then you must select as many number of Transpose (Columns to Rows) components, connect to the respective EDD, and then define their expressions.

NOTE: The output can be connected to Join, Lookup and Mapping.

For example, to add Transpose (Columns to Rows) component to three EDDs, drag three Transpose (Columns to Rows) components.

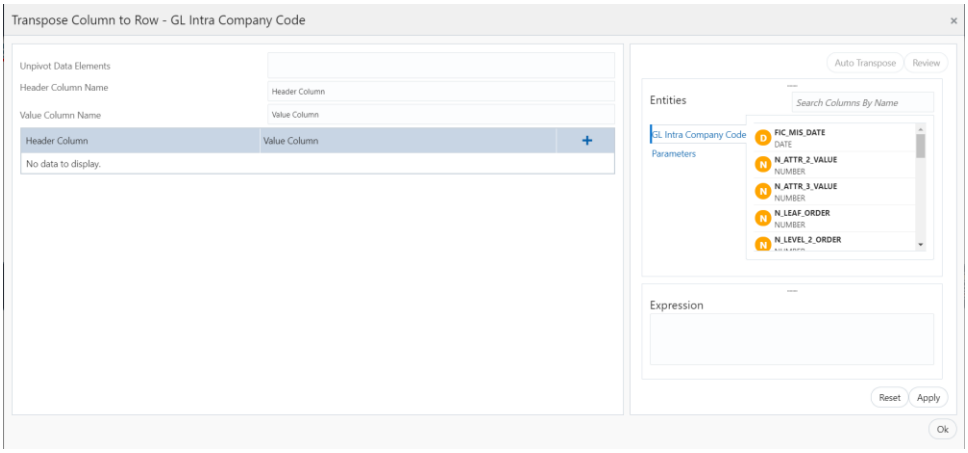


4. At any given time, right-click the Transpose (Columns to Rows) component to either delink or remove inlinks / outlinks or delete a Transpose (Columns to Rows) component.

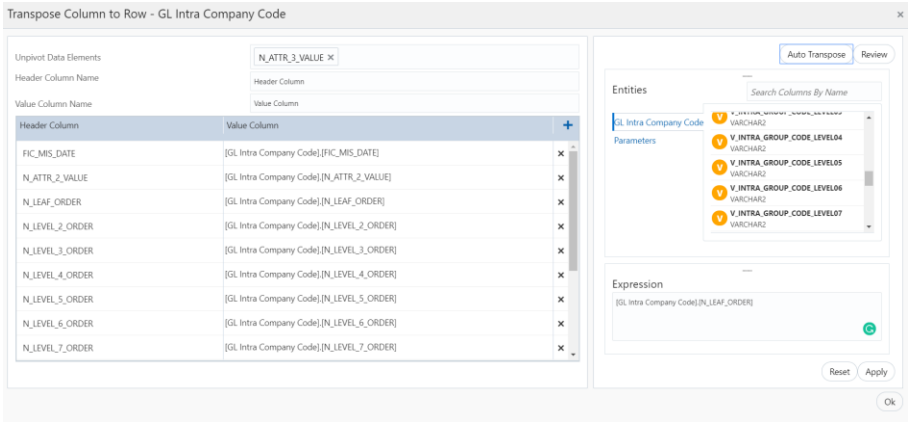


5. Double-click the component to transpose the entity columns into rows. The Transpose Column to Row window appears.

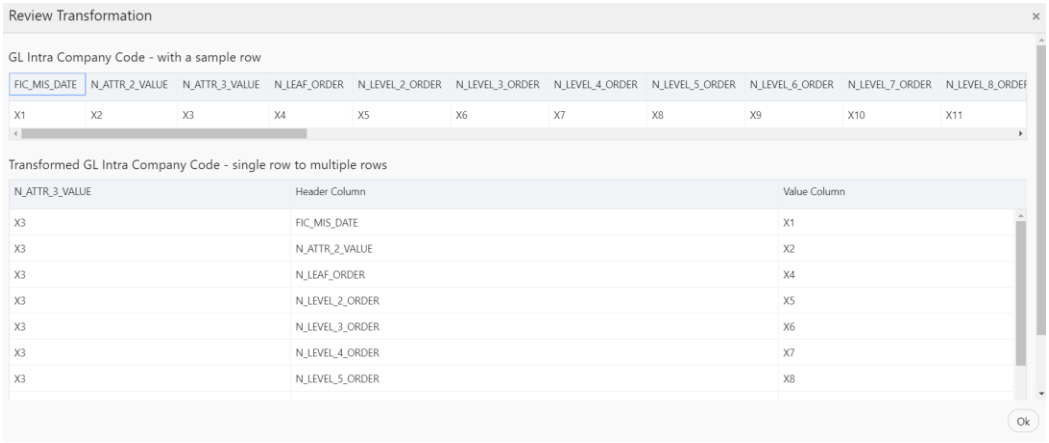
   Here you see the selected EDD and its parameters.



6. Specify the Unpivot Data Element to transpose columns into rows.
7. Specify the Header Column Name and Value Column Name.
8. Specify the Column Value (Header column) and Expression Pair (Value column) for each transposed rows. Ensure to have a minimum of two pairs.
9. After specifying the Unpivot Data Elements, click Auto Transpose. This will transpose columns into rows based on the unpivot data elements selected.



10. You can also click  to drag and drop the columns.
11. Click Review to review the transformation. The Review Transformation window appears displaying the sample of the transformation data.



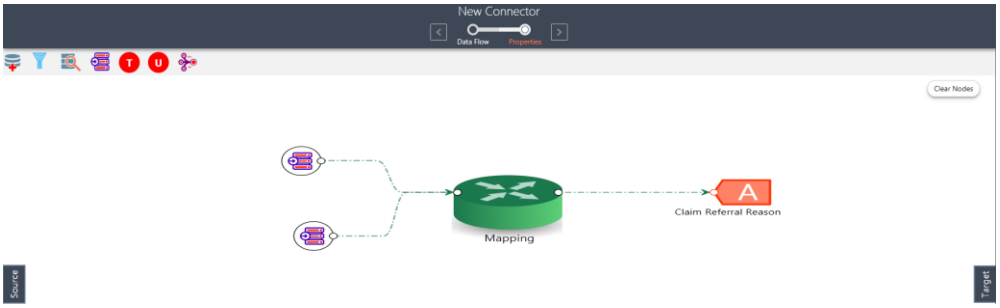
12. Click Ok.

9.4.4.7 Using Derived Column

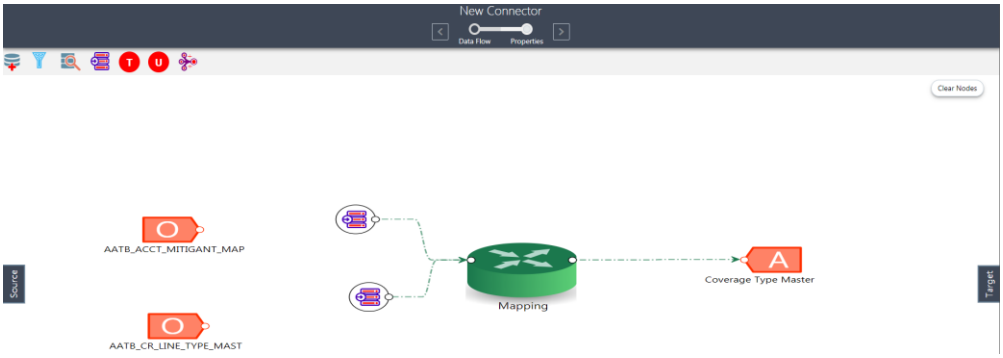
To use the Derived Column component, perform the following steps:

1. Drag and drop one more Derived Column  component on the canvas.
2. Connect the Derived Column to the mapping.

NOTE: The output must be connected to the mapping.

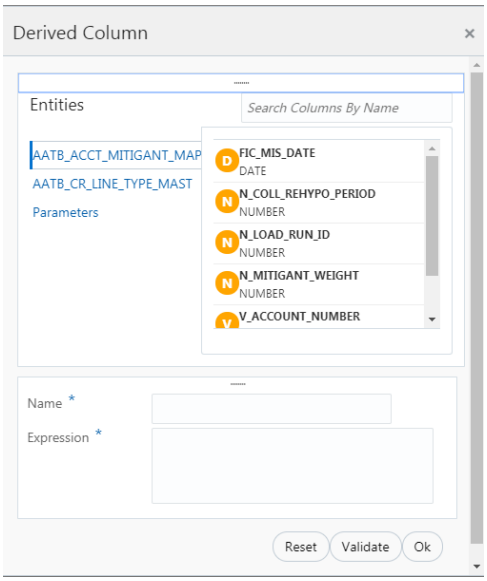


3. At any given time, right-click the expression component to either delink or remove outlinks or delete an expression component.



4. To define the expression, double-click the Derived Column component. The Derived Expression window for Derived Column appears:

   Here you see the selected EDDs in the left tab.



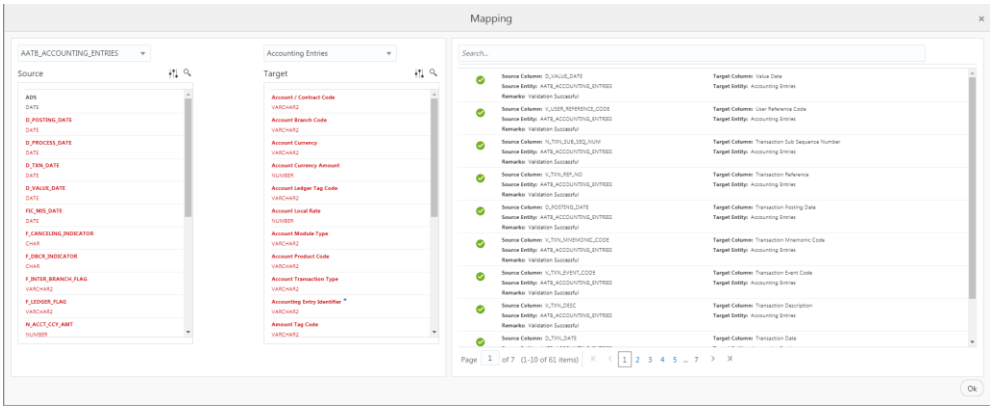
5. Specify the name and expression for the Derived Column. Ensure to limit the name to 30 characters.
6. Click Validate in case you wish to verify the correctness of the SQL expression.
7. Click Ok.

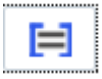
9.4.4.8 Using Mapping

1. Double-click Mapping component. The Mapping window appears.

   NOTE: The input and output for the mapping component must be connected before specifying the mappings.

2. The mapping window displays the EDDs and ADIs and their respective data / derived data elements.



3. Click a Data Element under Source, Attribute under Target and then click Map  icon. On the RHS column mapping is displayed.
4. The following are the validations done for the mapping
   a. Data Type Validation

b. Data Length Validation

c. Data Precession Validation

5. In case validation is successful, it displays Successful icon  next to the mapping.

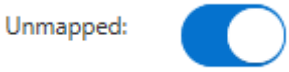
6. In case any of the above (step 4) validation fails, it displays Warning  icon next to the mapping.

7. At any given time, you can select Unmap  icon to unmap the source and target.

8. Click Auto-Map  icon to auto map a source and target.

NOTE: Auto-mapping is done by matching logical / physical column name of both source or target.

9. In the Source column, click  filter icon. Enable it to view the unmapped items.



NOTE: The mapped columns are displayed in red.

10. In the Target column, click the  filter icon. Enable it to view the unmapped, mandatory and valid for applications.

11. Under the target column, you can hover on each item to see the details. It provides the description, length and scale information.

12. Click Search  icon to search for a column name under Source or Target column list.

13. Click Delete  to delete all the mappings. You can also delete individual mappings by selecting the cross symbol next to the column mapping.

14. Click Import Mapping  icon to import mapping excel. Choose a mapping excel from the file browser.

15. Click Export Mapping  icon to export the mapping information. This downloads an excel file.

16. Click Search  icon to search for a column mapping. You can search for an item based on source column name, target column name, source or target entity or a remark.

9.5 Modifying and Viewing a Connector for Standard and Data Flow View

To edit or view a connector, you can perform the following steps:

1. To edit or view a connector, you can select the required connector from the connector summary.

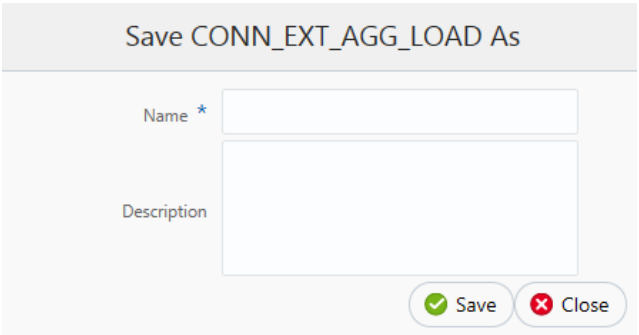
   NOTE: You can edit an existing connector, other than the connectors, which are in published status. To edit a connector, which is in publish status, you must first un-publish it and then open it.

2. The connectors created with Standard or Data Flow View opens in their respective view mode.
3. The details of the selected connector is displayed. You can modify or view the details.
4. Connector Name cannot be edited. Update the other required details.
5. Click **Save** to save the changes made.
6. For published connector, if you wish to make any changes click 'Unpublish'. The 'Unpublish' option clears ODI metadata that has been created during publish. Update the required changes and then click Publish. The updated changes are synced in ODI.

9.6 Copying a Connector

To copy an existing Connector, perform the following steps:

1. Click Copy  button for the required connector. A Save As dialog box appears.



   Depending on the view in which the original connector is created, the copied connector will have the same view.

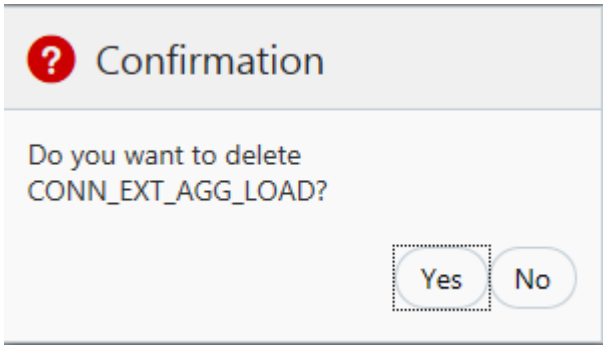
2. Enter the name and description.

3. Click Save. The Connector details are saved with a new specified connector name. The existing connector remains unmodified.

9.7 Deleting a Connector

To delete an existing Connector, perform the following steps:

1. Click Delete button for the required connector. A confirmation dialogue appears.

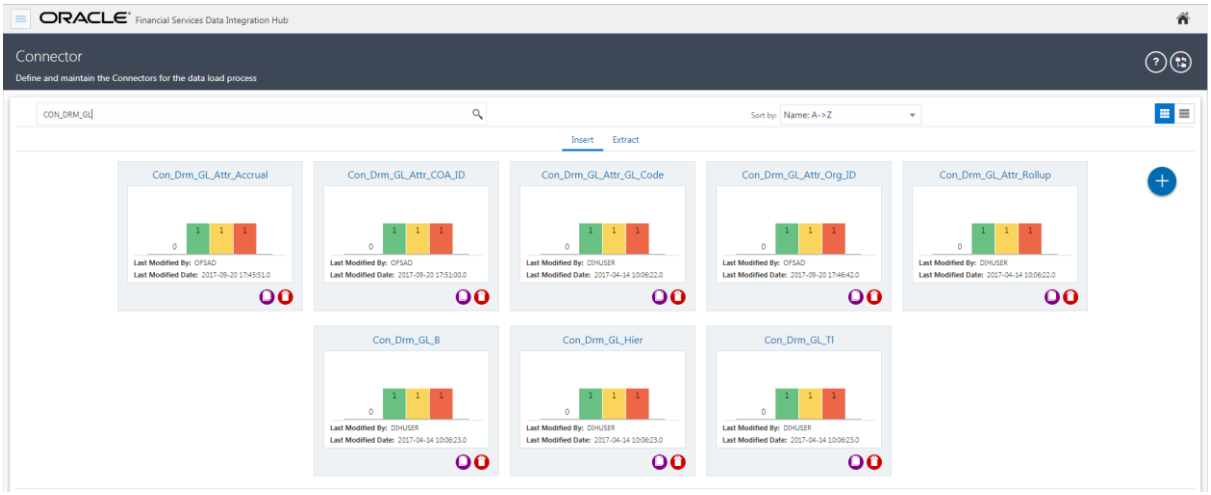


2. Click Yes to delete a connector. The Connector is deleted. In case you do not wish to delete click No.

9.8 Search and Filter

The Search and Filter option in the user interface helps you to find the required information. You can enter the nearest matching keyword to search, and filter the results by entering information on the search box. You can search for a connector with either the name, description, or status of the connector.

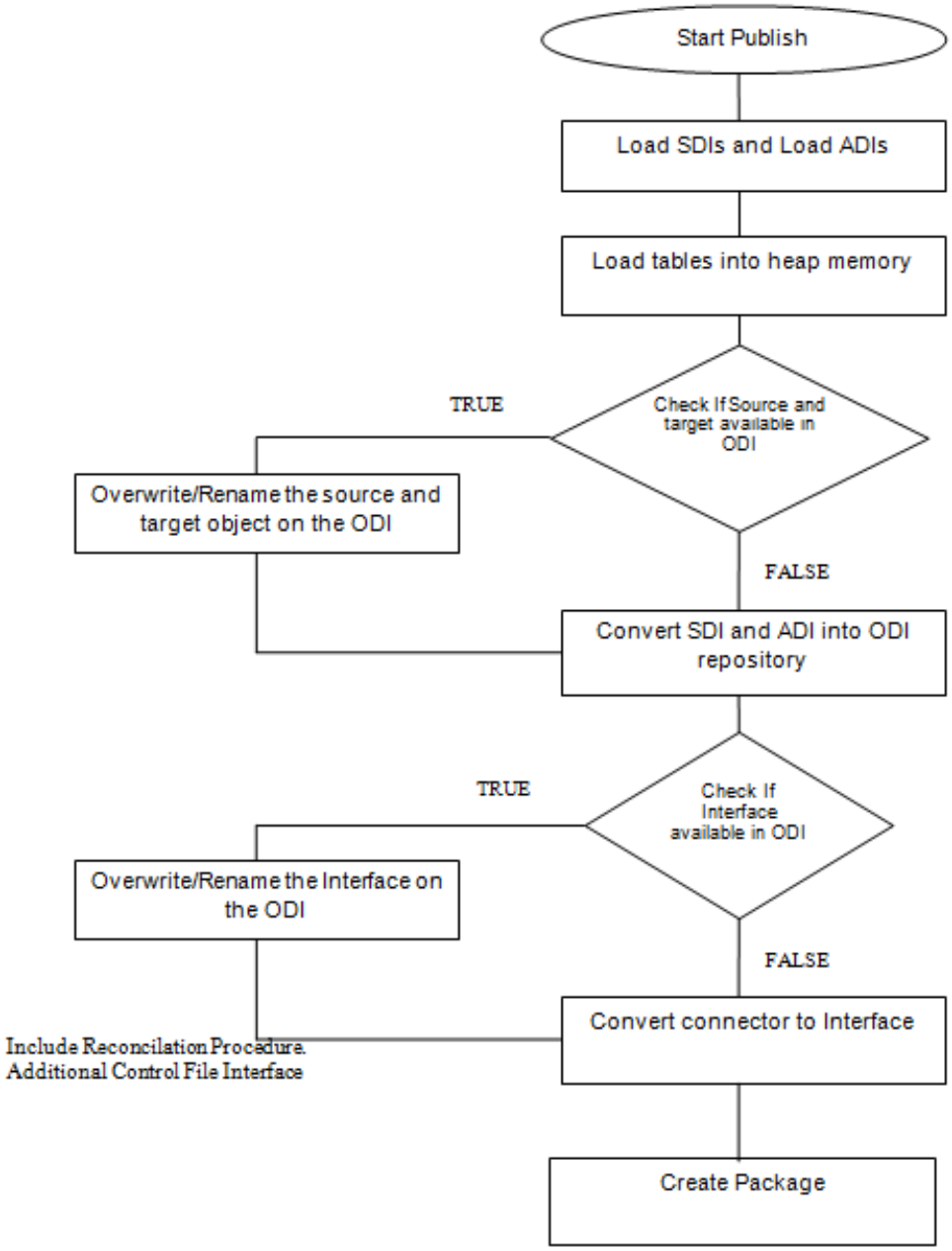
For example, enter the key word as ‘CON_DRM_GL’ in the search box. All the connector names with 'CON_DRM_GL’ are listed.



You can sort the list by connector name or modified date (ascending or descending order).

10 Publishing DIH Metadata

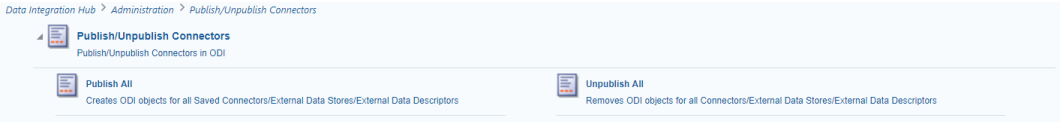
Publishing is a process of transferring the DIH metadata to Oracle Data Integrator (ODI). It converts the DIH metadata into ODI metadata by creating required ODI objects such as DataServer, Logical/Physical Schema, Datastores, Interface, Package and Scenario. You cannot edit any DIH object after publishing. In order to edit, you need to unpublish, make the necessary changes and then re- Publish.



10.1 Batch Publishing and Unpublishing for Connectors

You can batch publish/unpublish all the connectors/EDDs/EDSs to ODI at any given point.

Click the **Administration** option from the LHS menu and select **Publish/Unpublish Connectors** option. Click **Publish All** to publish all the connectors. Click **Unpublish All** to unpublish all the connectors.

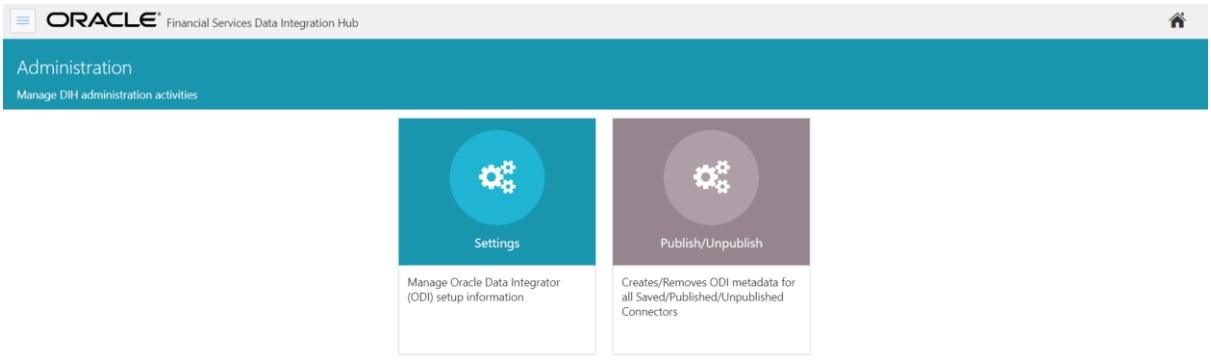


10.2 Publish and Unpublish

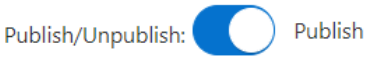
You can batch publish/unpublish the selected connectors/EDDs/EDSs to ODI at any given point.

To publish, perform the following steps:

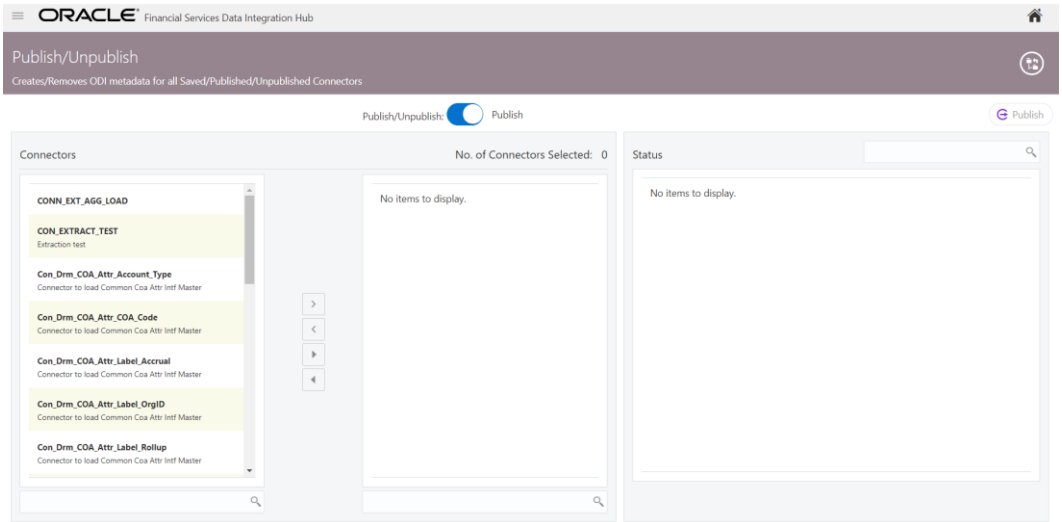
1. Click  icon in the DIH home screen to navigate to the Administration window.



2. Click **Publish/Unpublish**. The Publish/Unpublish window appears.

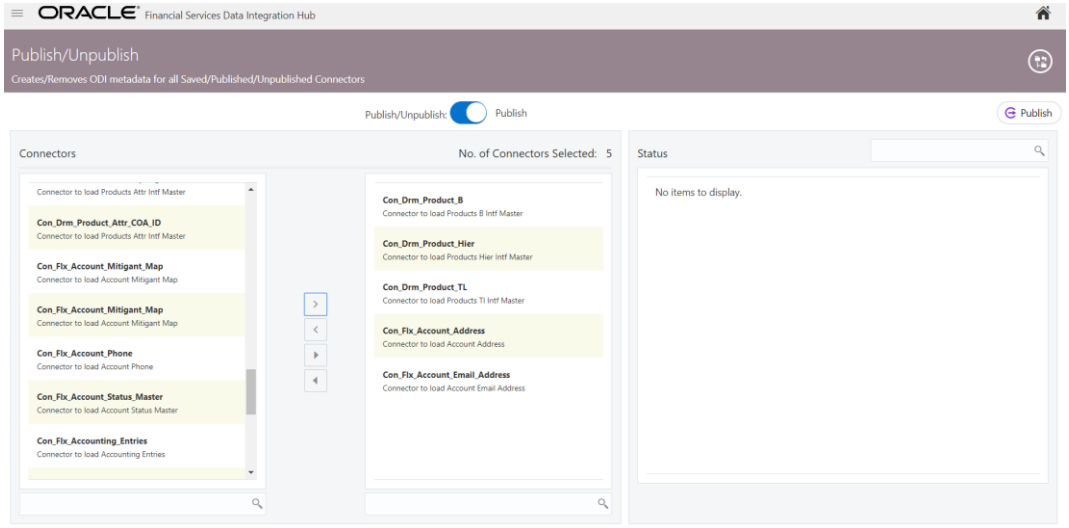
3. When you select the option as Publish, 

all the saved and unpublished connectors are displayed.



4. Double-click the connectors or press Ctrl to select multiple connectors and click to move it to the next column.

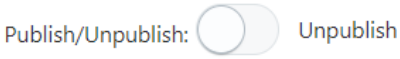
Note: To deselect a connector click .



5. Click to select all the connectors.

Note: To deselect all the connectors click .

6. Click Publish after the items are selected. The status of the published connects are displayed. You can view the connectors which are successfully connected or failed under Status field.

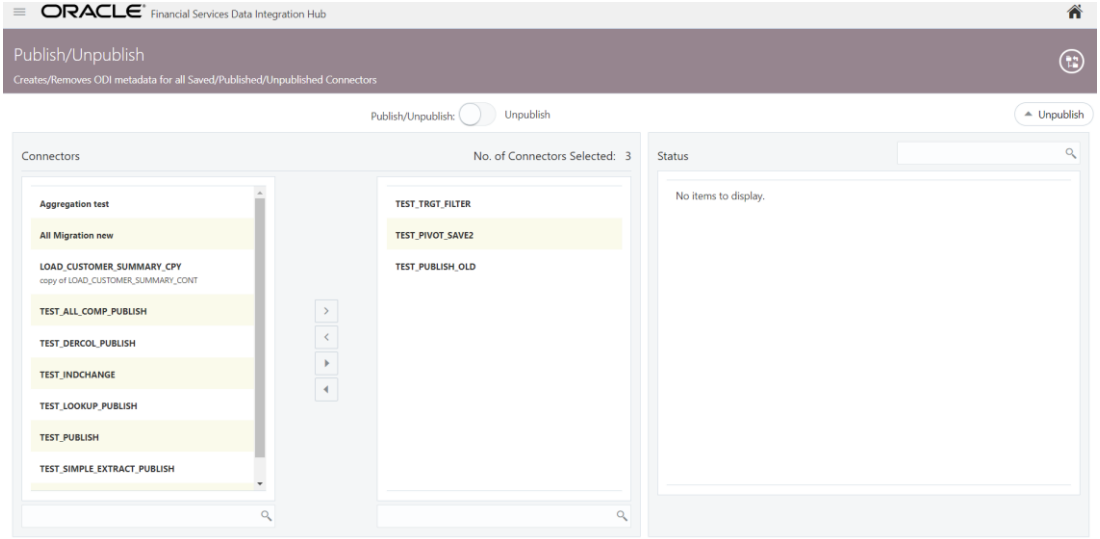
7. When you select the option as Publish/Unpublish,  all the published connectors are displayed.

8. Double-click the connectors or press Ctrl to select multiple connectors and click to move it to the next column.

Note: To deselect a connector click  .

9. Click to select all the connectors.

Note: To deselect all the connectors click  .



10. Click Unpublish after the items are selected. The status of the selected connectors are displayed. You can view the connectors which are successfully published/unpublished or failed under Status section.

11. Search  the connector to check the status of the publish/unpublished process.

11 Object Migration

This chapter has the following sections:

- Performing Object Migration
- Exporting Object from Source Environment
- Importing Object into Target Environment

11.1 Performing Object Migration

Offline Object Migration is a two step process:

- Exporting Objects from Source Environment
- Importing Objects into Target Environment

For both of these steps, refer sample file **OBJECTMIGRATION.xml**, which is also present at `$MIGRATION_HOME/conf/` in the OFSAAI setup.

Assumptions and Pre-requisites for this process are listed as follows:

- Both Source and Target environment should be on the same data model version.
- Ensure that the source and target are at same DIH application level as well as at same model level before migrating objects from source to target.
- ADI refresh to be completed before this process.
- ODI settings are correctly specified in target environment prior to import of objects.
- Target data store refresh is also performed and successful.
- If exported object already exists in the target environment or an object with same name already exists in target environment then it will be overwritten with new definition details.

NOTE: If exported Parameter already exists in target Environment, they will not be overwritten unless the new definition is of different Parameter Type. If exported EDS already exist in target Environment, they will not be overwritten unless the new definition is of different EDS Type.

- Any exported object, if already exists in target or an object with same name already exists in target then that object and all its dependent objects must be in unpublished state for migration to go through successfully.

NOTE: Dependent objects for a Connector are EDS, EDD and Parameter. Dependent objects for EDD are EDS and Parameter. Parameter and EDS do not have dependent objects.

11.2 Exporting Objects from Source Environment

Follow the below procedure to export object from source environment.

1. Replace placeholders of UserId, Infodom with Source UserId & Infodom.

2. For `$Folder` put segment name for the infodom provided above. Mention locale as ‘en_US’.
3. `$FILE_NAME`: Specify the file name which is created under "metadata/archive" folder. For example, mention ‘rules’ in place of `$FILE_NAME` and you get **rules.dmp** in archive folder.

   Fail On error: Fail on any error occurs while restoring metadata. Mention ‘Y’ for Yes and ‘N’ for No.

   OVERWRITE: If Metadata exist in the system then Overwrite while restoring metadata. Mention ‘Y’ for Yes and ‘N’ for No.

   In Mode tag: mention EXPORT.

   For **FAILONERROR** and **OVERWRITE**, it’s recommended to mention ‘Y’.
4. In OBJECT tag, mention “*” for Code property, to export all definitions. Else, for each definitions put equal number of OBJECT tag with map ID and version number in comma separated format.

   Type: Use following for definitions:

   - 70 for Parameter Definitions
   - 71 for EDS Definition
   - 72 for EDD Definition
   - 74 for Connector Definition

   Object codes can be derived from the following tables:

   - For object code of Connector: CONT_ID against the CONT_CODE in FSI_CONNETCOR_B
   - For object code of EDD: de_id against de_code in fsi_data_entity_b
   - For object code of EDS: ds_id against ds_code in fsi_ds_b
   - For object code of Parameter: var_id against var_code in fsi_var
5. The format for All OBJECTS tag is:

   ```
   <OBJECTS TargetFolder="DIHUSERS"><OBJECT Code="*" Type="73" /></OBJECTS>
   ```
6. For three definitions, OBJECTS tag is:

   ```
   <OBJECTS TargetFolder="DIHUSERS">
   <OBJECT Code="123221" Type="73" />
   <OBJECT Code="321331" Type="73" />
   <OBJECT Code="131213" Type="73" />
   </OBJECTS>
   ```
7. Execute `$MIGRATION_HOME/bin/ObjectMigration.sh` after providing executable permissions.
8. A file `$FILE_NAME.dmp` (rules.dmp) is created in `$MIGRATION_HOME/metadata/archive`

Move this file to `$MIGRATION_HOME/metadata/restore` folder. You can copy the file in the Target environment by creating "**restore**" folder under "**metadata**" directory (if not available).

9. Exporting definitions from Source environment is done successfully.

11.3 Importing Objects from Target Environment

Follow the below procedure to import object to target environment.

1. Repeat 1-3 steps as followed in export mode.

   In Mode tag: mention IMPORT.

2. In OBJECT CODE property, mention “312321”.

   Note: Everything that is exported is imported. You cannot choose only certain definitions to move.

3. Format for OBJECTS Tag is:

   ```
   <OBJECTS TargetFolder="DIHUSERS">
   <OBJECT Code="312321" Type="73" /></OBJECTS>
   ```

4. Execute `$MIGRATION_HOME/bin/ObjectMigration.sh` after providing executable permissions.

5. Check **DIH.log** for logs. It provides details such as, number of definitions that have successfully moved and other errors. Importing objects to target environment is done successfully.

12 Executing DIH Metadata

A published DIH Connector can be executed in the following two methods:

- **External Schedule:** Execution is performed with the same connector name and same as ODI package/Scenario name.
- **From OFSAA Batch**: Creates a typical OFSAA Batch and executes it. For more information, refer to the AAI User Guide in OHC documentation library. The component is DIH Connector. You can select all the published connectors during task creation. DIH Connectors can be configured in Run Rules Framework (RRF) also with the same component.

NOTE:

- This can be done only on a published connector and not a saved connector.
- Currently, there is a limitation of passing parameter in Run Rule Framework for DIH connectors. Batch framework can be used in case runtime parameter needs to be passed.

- If the connector contains any Runtime parameters, they can be set in the Variables input field of the Task Definition Screen.

  Example: `MISDATE='10-Jan-2015'`

  Note:

  - In case of an upgrade, all the existing batches continues to perform as is without any update.
  - In case you edit the existing task in a batch then it is mandatory to select an agent.

- If there are multiple parameters, they can be passed by separating them with a comma.

  Example: `MISDATE='10-Jan-2015', BATCHID=22015`

- MISDATE and BATCH ID can also be passed dynamically so that it is loaded from Batch Execution Screen as follows:

  Example: `MISDATE=$MISDATE:dd-MM-yyyy, BATCHID=$BATCHID`

  In the above example, the date format appended to MISDATE has to conform to Simple Date Format. If no date format is specified, the default date format used is yyyymmdd.

- If variables are being used as part of connector mappings or filter expressions, they should be passed within single quotes as follows:

  Example: `MISDATE='$MISDATE:dd-MM-yyyy', BATCHID='$BATCHID'`

- If the date format is expected in dd-MON-yyyy format, then in Batch Task it has to be specified in the following format. Note the difference in month format in the following example:

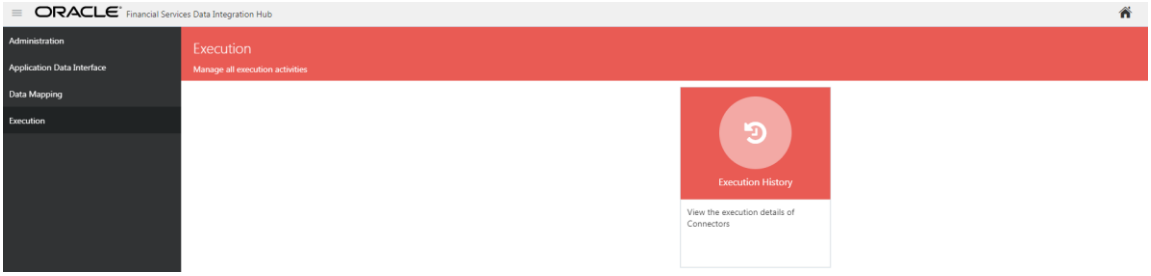
  Example: `MISDATE='$MISDATE:dd-MMM-yyyy'`

- If parameter is used in connector filter expression for an EDD of source type Hive, date format is expected in yyyy-MM-dd format.

  Example: `MISDATE='$MISDATE:yyyy-MM-dd'`

13 Execution History

Execution History option, provides the status of the DIH Connector executions, number of records loaded, and error messages if any.



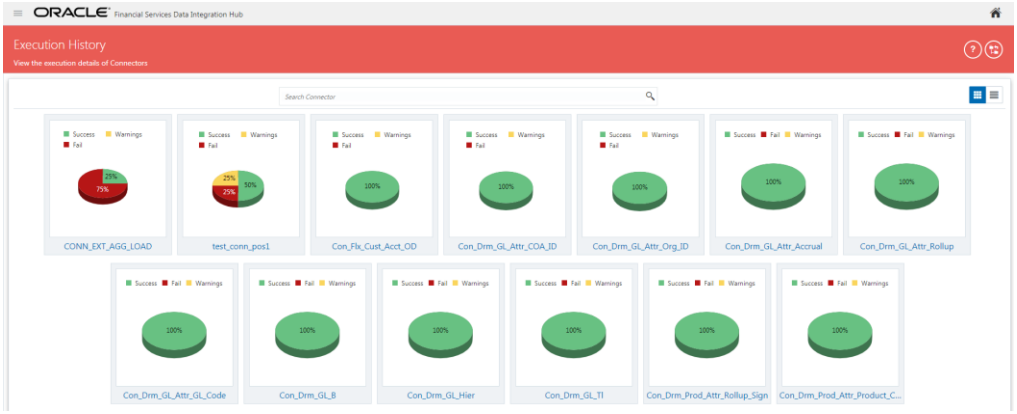
13.1 Viewing the Execution History of a Connector

Click  icon in the DIH home screen to navigate to the **Execution** window.

Click Execution History. The Execution History window appears.

To view the Execution Histories of a Connector, perform the following steps:

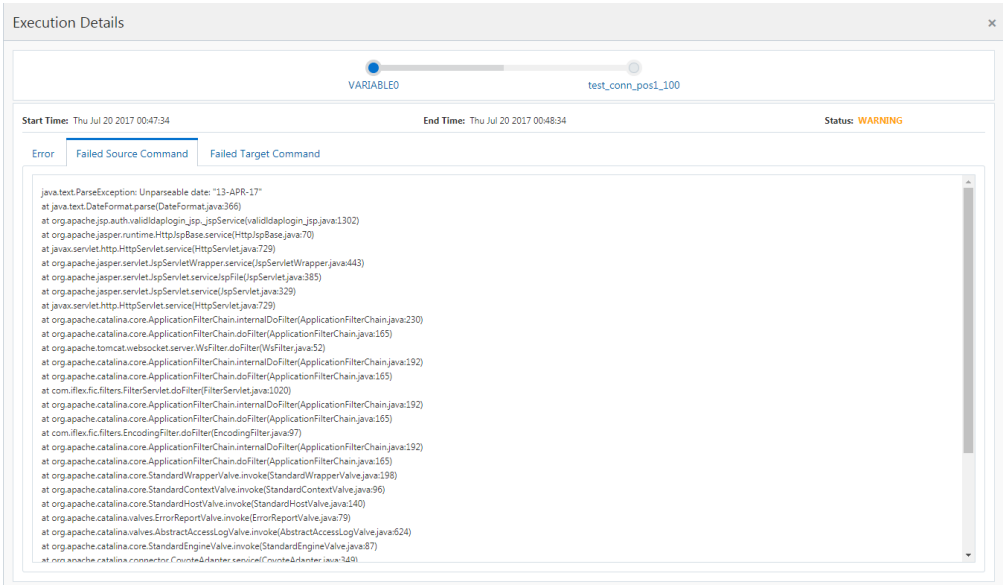
1. Click **Execution History**. The Execution History summary window appears.



2. You can view the summary details of all the connectors that are executed in either Card view  or List view  .
3. The Search bar helps you to find the connector for which you can view the executions. You can enter the nearest matching keywords to search, and filter the results by entering information on the search box. You can search for a connector using either the name or description.
4. Click the required Connector. This screen displays the list of executions for the selected connector with the latest displayed on the top.

Here you can view the number of records loaded, duration, start time, end time and the status of execution.

5. Click the row; the details about the execution are displayed. The error details, failed source command and failed target command are displayed.



6. In case you wish to see the detailed execution, report click 

the link under status.

A zip file is downloaded containing the detailed log for the execution.

7. To view the log details, extract the log file from the zip folder.

14 Metadata Browser

The DIH metadata/objects available in the Meta Data Browser (MDB) are:

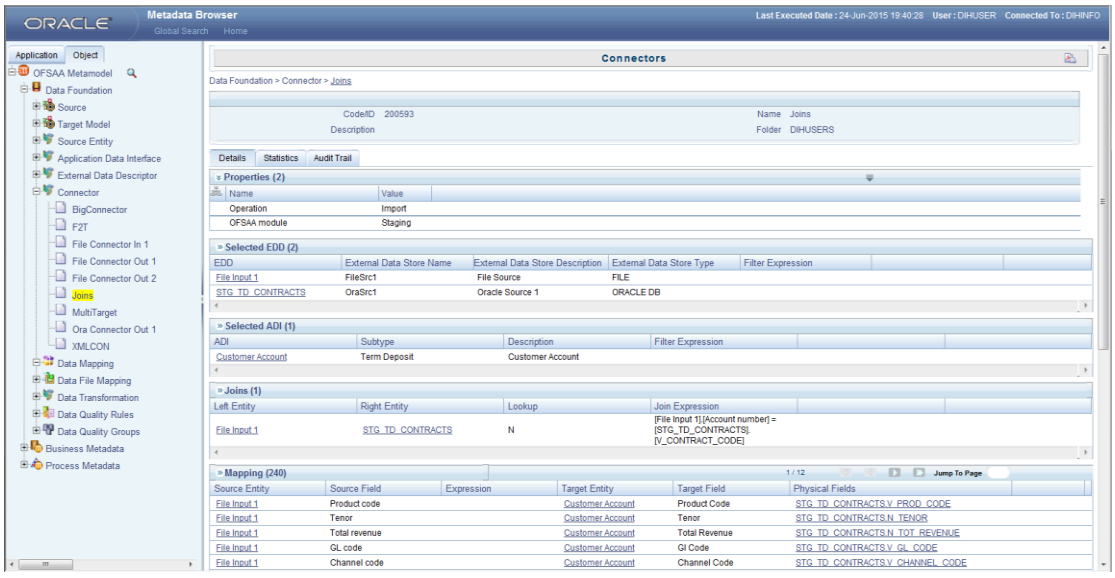
- Connector
- Application Data Interface
- External Data Descriptor

14.1 Connector

The connector link lists down the individual connectors.

When you click a connector name, it displays the definition of that connector.

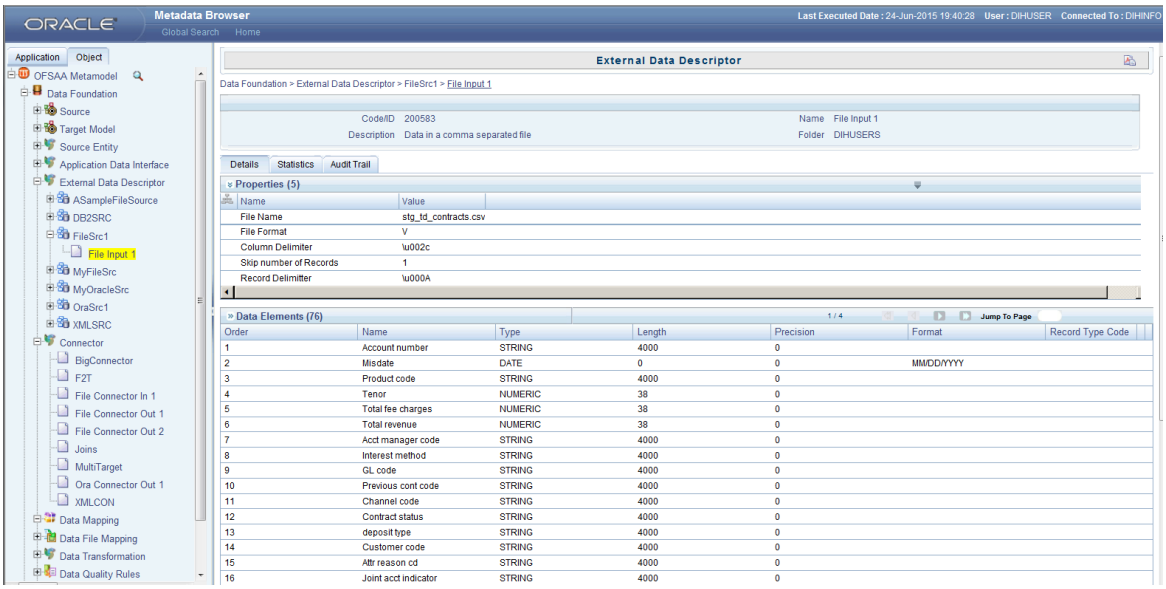
- The name and description of the connector is displayed at the top.
- The **Selected EDD** grid which shows the EDD associated with the connector.
- The **Selected ADI** grid shows ADI for the connector.
- The **Joins** grid shows the join expression between EDDs if applicable.
- The **Mapping** grid shows mapping of the Left field with the Right attributes. Additionally, it displays the underlying physical columns.
- The **Depends On** grid shows EDD and ADI used in the connector.
- Click **Export to PDF** icon to generate PDF report for the Connector. The report will also contain all used EDDs and ADI details.



14.2 External Data Descriptor

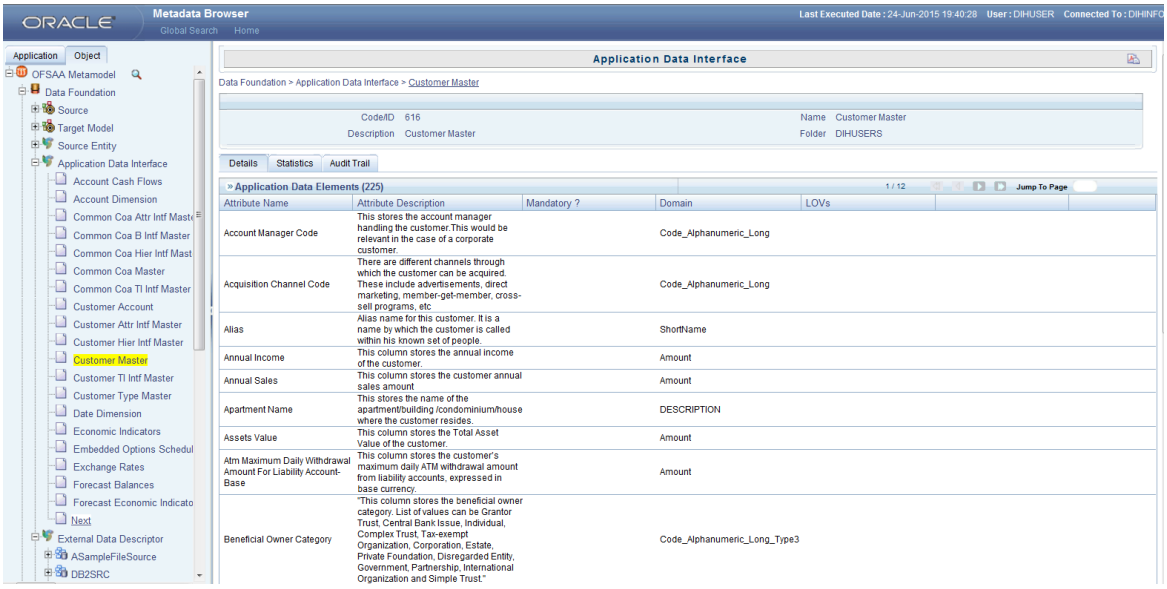
The **External Data Descriptor** window lists all the available External Data Store. Under each EDS it has all EDDs. When you click a particular EDD, it shows the definition of the EDD, with the name and Description displayed at the top.

- The **Properties** sections shows properties such as file name, file format and so on.
- The **Data Element** sections show all the fields that are part of this EDD.
- Click **Export to PDF** icon to generate PDF report for the EDD.



14.3 Application Data Interface

The **Application Data Interface** window shows all the attributes along with descriptions of the List of Values (LOVs). Click **Export to PDF** icon to generate PDF report for the ADI.



Appendix A: FAQ - Use Cases

Loading Data from One File into Staging

To load data from one file to Staging, follow the below steps:

1. Create an EDS of the type **File**.
2. Create EDD by selecting the pre-defined EDS. Provide all required information while creating the EDD. If post loading reconciliation is required then go to Control tab and provide a control record.
3. Create a Connector for loading data into staging. If SQLLDR option is enabled, then the file with ODI agent running should be available. If External Table option is selected, then file has to be available in target database server.
4. Publish the Connector.
5. Execute the Connector.

Loading Data from Two Files Joined into Staging

To load data from two files which are joined, to Staging, follow the below steps:

1. Create EDS of type **File**.
2. Create two EDD by selecting the pre-defined EDS. Provide all required information while creating EDD. If post loading reconciliation is required then go to Control tab and provide a control record.
3. Create connector for loading data into staging. Select both the EDDs and establish a join in source tab. If SQLLDR option is enabled, then the file with ODI agent running should be available. If External Table option is selected, then file has to be available in target database server.
4. Publish the Connector.
5. Execute the Connector.

Loading Data into Staging from File and Performing Lookup into a Table

To load data from a file, to Staging, and perform lookup into a table, follow the below steps:

1. Create one EDS of type **File** and another EDS of type **Database**.
2. Create two EDD by selecting the predefined EDS. Provide all required information while creating the EDD. If post loading reconciliation is required then go to Control tab and provide a control record. Post loading reconciliation is only applicable for file type Data Loading.
3. Create a Connector for loading data into staging. Select both the EDDs and establish a join and click **Lookup**. If SQLLDR option is enabled, then the file with ODI agent running should be available. If External Table option is selected, then file has to be available in target database server.
4. Publish the Connector.

5. Execute the Connector.

Loading Data into Staging from an XML File

To load data to Staging from an XML file, follow the below steps:

1. Create an EDS of type **XML**.
2. Create EDD by selecting the predefined EDS. Provide all required information while creating the EDD. To get the XML structure, use XSD file. If post loading reconciliation is required then go to Control tab and provide a control record. The control record should be in a separate file.
3. Create a Connector for loading data into staging.
4. Publish the Connector.
5. Execute the Connector.

Loading Data into Staging from EBCDIC

To load data to Staging from EBCDIC, follow the below steps:

1. Create an EDS of type EBCDIC.
2. Create EDD by selecting the predefined EDS. Provide all required information while creating the EDD. To define the EBCDIC structure, use Cobol Copy book file. If post loading reconciliation is required then go to Control tab and provide a control record. The control record should be in a separate file.
3. Create a Connector for loading data into staging.
4. Publish the Connector.
5. Execute the Connector.

Loading Data from File into Multiple ADI/Subtypes

To load data from File into multiple ADI/Subtypes, follow the below steps:

1. Create an EDS of type **File**.
2. Create EDD by selecting the predefined EDS. Provide all required information while creating the EDD. To define the file structure, you can use Excel template. If post loading reconciliation is required then go to Control tab and provide a control record.
3. Create a Connector for loading data into staging. Select multiple ADIs/Subtypes. Set filter against each ADI/Subtype selected to identify which record goes where.
4. Publish the Connector.
5. Execute the Connector.

Loading Data into Results from File

To load data into Results from File, follow the below steps:

1. Create an EDS of type **File**.

2. Create EDD by selecting the predefined EDS. Provide all required information while creating the EDD. To define the File structure, you can use Excel template for defining the columns. If post loading reconciliation is required then go to Control tab and provide a control record. The control record has to be in a separate file.
3. Create a Connector for loading data into results. Select EDD and ADI (appears only relevant for Result area). During mapping, code values that are available in file should be mapped to the attributes (that are internally number columns). While loading it converts the code value to surrogate key by performing a lookup in the related dimension table. Dimension data should be populated before this loading occurs using SCD process.
4. Publish the Connector.
5. Execute the Connector.

Loading Data from HIVE

The following Jars needs to be copied to /ficweb/WEB-INF/lib:

1. commons-logging-1.1.3.jar
2. guava-15.0.jar
3. hadoop-auth-2.6.0-cdh5.8.0.jar
4. hadoop-auth.jar
5. hadoop-common-2.6.0-cdh5.8.0.jar
6. hadoop-common.jar
7. hive-common-1.1.0-cdh5.8.0.jar
8. hive-jdbc-1.1.0-cdh5.8.0.jar
9. hive-metastore-1.1.0-cdh5.8.0.jar
10. hive-service-1.1.0-cdh5.8.0.jar
11. HiveJDBC4.jar
12. httpclient-4.3.jar
13. httpcore-4.3.jar
14. libthrift-0.9.0.jar
15. slf4j-api-1.7.5.jar

To update the driver to be used for connecting to Hive Data Store, the required driver must be updated in DIH repository.

- Login to atomic schema.
- Update the “DRIVER” column for DSTYP_ID=6 in FSI_DS_TYPE_B table.

For example, to connect to Cloudera Hive server with JDBC 4.0 data standards, specify “com.cloudera.hive.jdbc4.HS2Driver” as driver. Refer Cloudera document for more details about Cloudera JDBC drivers.

NOTE: Contact support for more information.

Extracting Data from Staging into File

To extract data from Staging into File, follow the below steps:

1. Create an EDS of type **File**.

2. Create EDD by selecting the predefined EDS. Provide all required information while creating the EDD. To define the File structure, you can use Excel template for defining the columns. If post loading reconciliation is required then go to Control tab and provide a control record. The control record has to be in a separate file.
3. Create Connector for extracting data from staging. ADI becomes source and EDD becomes target. File structure will be according to EDD.
4. Publish the Connector.
5. Execute the Connector.

Extracting Data from Result into File

To extract data from Results into File, follow the below steps:

2. Create an EDS of type **File**.
2. Create EDD by selecting the predefined external data store. Provide all required information while creating the EDD. To define the File structure, you can use Excel template for defining the columns. If post loading reconciliation is required then go to Control tab and provide a control record. The control record should be in a separate file.
3. Create a Connector for extracting data from results. ADI becomes source and EDD becomes target. File structure will be according to EDD. During extract internal surrogate keys get converted into code values by performing looking up into dimension table.
4. Publish the Connector.
5. Execute the Connector.

OFSAA out of the box dimension tables as lookup entity

Out of the box dimension tables will be used in the following scenarios:

- Loading Data into results
- Extracting data from results

While defining mapping, if results ADI surrogate key column is mapped, then corresponding dimension table will be used as lookup.

For Example:

- Loading data into results

Example: If N_Product_Skey of Common Account Summary ADI is mapped to an EDD product code column, then DIM_PRODUCT Table is used as lookup for getting the N_Product_Skey value and V_PROD_CODE will be used in the join expression. The EDD does a left outer join with the DIM_PRODUCT.

- Extracting Data from Results

Example: If N_Product_Skey of Common Account Summary ADI is mapped to an EDD product code column, then DIM_Product Table is used as lookup for getting the V_PROD_CODE value and N_Product_Skey will be used in the join expression. The Common Account Summary lookup does a left outer join with DIM_PRODUCT.

NOTE: The lookup is established identifying the Surrogate key relationship between Results ADI and Dimension table automatically. User need not define the lookup in the connector.

How do I connect to External Source Server such as Db2/SQL Server/Teradata/Sybase?

The source server which is required by JDBC driver is made available in DIH.
Navigate to $FIC_WEB_HOME/webroot/WEB-INF/lib and copy the JDBC driver.

When a Flat file source to Target Table connector (F2T) execution fails with the following error:

For delimited files all source columns between the first in file and the last mapped, need to be mapped on staging! No gaps allowed.'
Perform the following steps to resolve it:

1. Open the ODI studio. In Designer tab navigate to <Project_name> -> Knowledge Modules -> Loading.
2. Open the KM - LKM MultiFiles to Oracle (SQLLDR).
3. In Tasks tab, make the 'Validate KM options and mapping loc flag' as Conditional Execute.
4. Save the KM.
5. Un-publish the connector and publish it again.
6. Execute the connector.

Oracle Financial Services Data Integration Hub User Manual

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