Oracle Financial Services Data Integration with Unity

User Guide

Release 8.1.1.0.0

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Oracle Financial Services Data Integration with Unity

Document Control

Version Number	Revision Date	Change Log
Version 01	March 2021	Created the document with instructions for the usage of the Oracle Financial Services Data Integration with Unity Release 8.1.1.0.0
Version 02	June 2021	As part of 8.1.1.1.0 release, • Updated sections Inbound and Outbound to include new UI changes. • Added a new section Creating External Data Descriptor and Connectors for Custom Data Flow.

Table of Contents

1 About the Guide

This user guide provides instructions, details, and guidance to users of Oracle Financial Services Data Integration with Unity.

1.1 Scope of the Guide

This user guide explains the features and functions of Oracle Financial Services Data Integration with Unity. Setup and configuration of the system, pre-packaged business or functional content, technical integration aspects, and guidelines on the usage of the system are explained in detail.

Note that, this user guide refers to steps that must be performed in Unity. See Unity Help Centre for more details.

1.2 Intended Audience

This manual is intended for the following audience:

- **Technologists**: Technical specialists who deal with setup and configuration of the interface between Data Foundation and Accounting Hub Cloud Service, and those responsible for the care and maintenance of the OFSAA instance.
- **Business Users**: Functional specialists who deal with actuarial sciences, risk management, accounting, or a combination of these, seeking to understand details of the interface between Data Foundation and Accounting Hub Cloud Service.

1.3 Prerequisites

- See Data Integration Installation Guide for details on OFSAA components, Oracle applications, and the environment that constitute technical prerequisites to deploy and use FS Data Integration with Unity.
- User credentials set up by an authorized user are required before you can access the application through its user interface.

1.4 Related Information Sources

Along with this user guide, you can also see the following documents in OHC Documentation Library:

- Oracle Financial Services Data Integration User Guide
- Oracle Financial Services Data Integration Application Pack Installation Guide
- Oracle Financial Services Analytical Applications Infrastructure User Guide
- Oracle Financial Services Analytical Applications Infrastructure Pack Installation Guide

1.5 Abbreviations

The following table defines the abbreviations used in this guide.

Table 1: Abbreviations

Acronym	Description
Unity	Oracle Unity
DIH	Data Integration Hub
UI	User Interface
UCM	Universal Content Manager

1.6 Reference Documents

Additional reference material will be listed here, as necessary.

2 Introduction

2.1 About Financial Service Analytical Applications

OFSAA is a suite of applications covering risk, performance, financial crime, compliance, customer insight, and regulatory reporting functions. These applications are built on common technology infrastructure, works off a singular data model that has unified structures for non-redundant acquisition, hosting, and processing of data, and renders rich information output that can be analyzed across a conformed set of perspectives. Sophisticated processing engines underlying the suite facilitates modular deployment and are controlled by comprehensive, user-configurable metadata. See Oracle Financial Services Analytical Applications portal for additional details.

2.2 About Unity

Unity allows its subscribers to combine customer data from online, offline, and third-party sources to create a single, dynamic, real-time view of each customer. Oracle Unity Customer Data Platform also supports the application of machine learning to prescribe the best next action within any existing business process. It supports a host of functions including unified customer profile, profile enrichment, smart segmentation, customer analytics, and rendering of personalized customer experience.

It is part of the Oracle Advertising and Customer Experience suite of services and is in use at several institutions across the globe.

2.3 Application Objectives

Core objectives of Financial Services Data Integration with Unity are as follows:

- Leverage information from advertising, behavioral intelligence, marketing, and campaigns, collated through CDP for analytical processing and usage.
- Leverage quantified financial services information and metrics for front-office functions, as above.
- Leverage factory-integrated environment for customer engagement.
- Provide accurate, verifiable, actionable Next Best Action or Next Best Offer information.

These objectives are achieved with these core considerations:

- Integration through standard APIs.
- Seeded content for financial services.
- User-configurable extensions.
- Intelligent coverage for PII, non-nullable and mandatory.
- Broader integration with Oracle Customer Experience ecosystem.

The rest of this guide expands on how the stated objectives can be met.

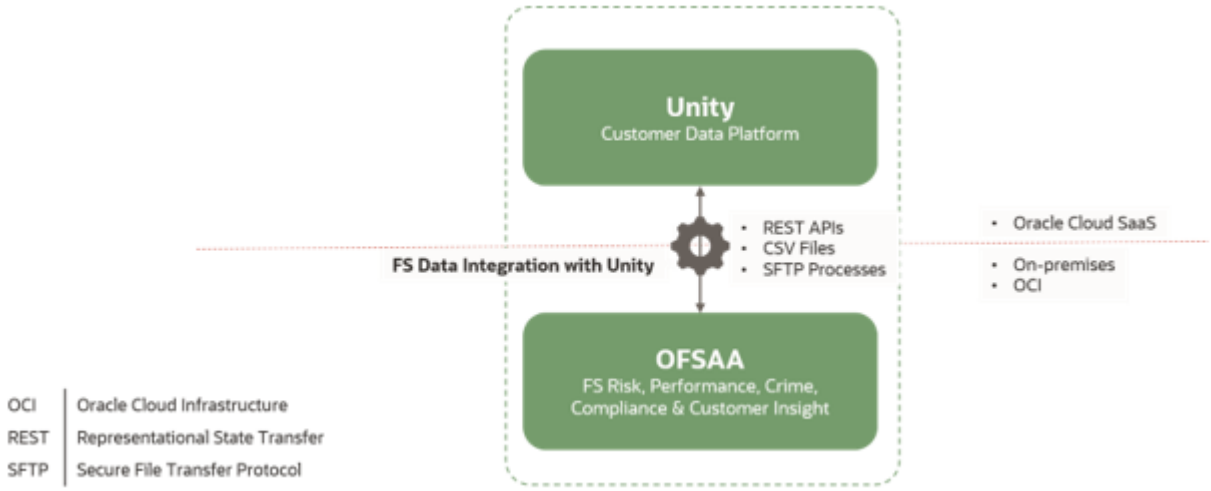
2.4 About Oracle Financial Services Data Integration with Unity

Unity identifies and exchanges data assets for customers or parties, party accounts, products, relationships, and transactions between OFSAA and Unity, Oracle's enterprise customer data platform. This includes customer or party, behavioral intelligence, advertising, marketing, and campaign information, alongside quantified financial metrics and related information. Such financial metrics primarily include retail customer performance and related analytics. The information set provided by Oracle out of the box may also be extended in use by institutions to fit their individual needs.

2.5 FS Data Integration with Unity Architecture

The following schematic represents the architecture of integration between OFSAA and Unity. Such integration relies on Unity's REST Application Programming Interfaces (APIs), Comma Separated Value files (CSV), and Secure File Transfer Protocol (SFTP) for the transport of files between the two environments. This user guide provides the details of the steps involved and specific mechanisms in play at each step.

Figure 1: OFSAA – Unity Product Integration Architecture



The following is a summary of the flow of data between the two systems:

1. OFSAA collates and hosts data on customers, customer accounts, products, account balance, and related risk, performance, crime, compliance, and customer insight information. Note that, the nature and detail of data hosted by OFSAA depend on the OFSAA application(s) deployed in your instance.
2. Unity collates and hosts detailed customer data covering advertising, marketing, campaigns, and behavioral intelligence. This data is processed or enriched to maintain Master Profiles and related information.
3. OFSAA registers structures necessary for data exchange with Unity.
4. Unity shares the master profile and other data with OFSAA.

   a. This is handled through CSV files transported between the systems through SFTP.

5. OFSAA enriches data so obtained with models specific to financial services, including Next Best Offer and Product Propensity.
6. OFSAA shares enriched data with Unity.
   a. This is handled through CSV files transported between the systems through SFTP.

FS Data Integration with Unity provides the mechanism for the exchange of data structures and data along with tools for configuring or managing such flow, the details of which are available in the following sections.

2.6 Sequence of Integration Processes

The process sequence to establish data exchange between OFSAA and Unity through FS Data Integration with Unity is listed as follows:

- Setup OFSAA details in Unity and Unity details in OFSAA
- Choose entities and attributes for exchange with Unity in OFSAA
- Publish entities and attributes structure to Unity in OFSAA
- Execute batches in OFSAA to export requisite data to files
- Transport files from OFSAA to Unity via SFTP
- Setup file ingestion in Unity
- Execute file ingestion in Unity
- Setup data export in Unity
- Execute data export in Unity
- Transport files from OFSAA to Unity via SFTP
- Execute batches in OFSAA to ingest requisite files

Only the execute and transport steps in the list above are operational tasks that must be repeated periodically. Others are one-time setup tasks or executed on changes, as detailed in the tabulation as follows:

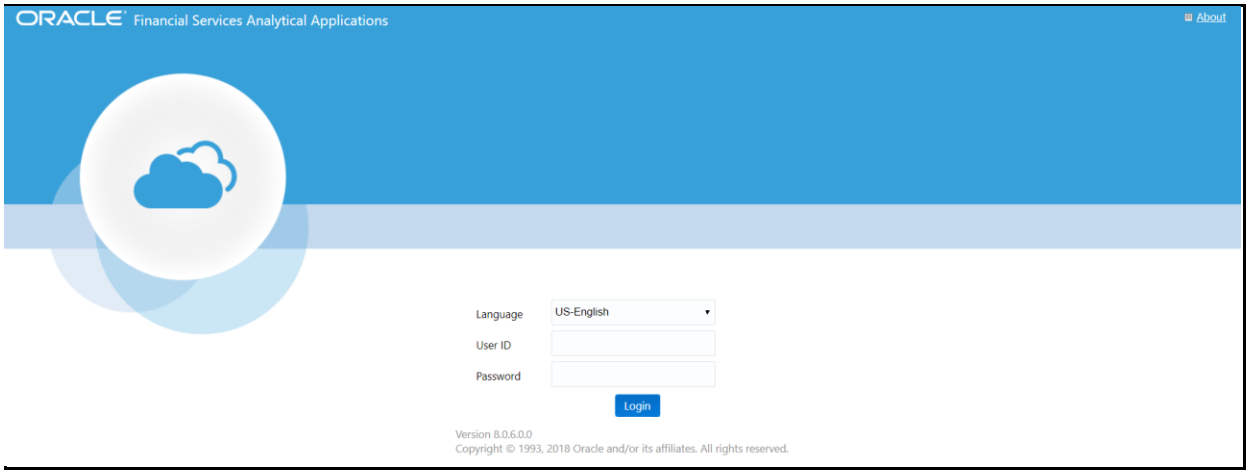
Table 2: Integration Steps

Sl no.	Process / Task	Type
1	Define 'Sources' in Unity	Setup Once
2	Define 'Unity – Setup' in OFSAA	Setup Once
3	'Refresh Data Interface' in OFSAA	Setup Once Repeat on data model refresh
4	'Choose Data Interface' in OFSAA – 'Inbound' and 'Outbound'	Setup Once Repeat on data model refresh or when changes are needed
5	'Review and Publish to Unity' in OFSAA	
6	'Generate Connectors' in OFSAA	
7	Execute automatically generated Batches in OFSAA	Operational – as needed, periodically
8	Move files via SFTP to Unity	Operational – as needed, periodically
9	Define 'Data Feeds' of 'Ingest Job' type in Unity corresponding to the files and 'Start'. Note: You may also set the Job to 'Recurring' and define a schedule for automated execution or notification.	Setup Once Repeat when additional files are required
10	Monitor Jobs of 'Job Type' 'Ingest' via 'Jobs' in Unity corresponding to the files.	Operational – as needed, periodically
11	Execute 'System – Data warehouse' job via 'Jobs' in Unity	Operational – as needed, periodically
12	Execute 'System – Identity Resolution Pipeline' job via Jobs in Unity	Operational – as needed, periodically
13	Define 'Data Feeds' of 'Export Job' type in Unity corresponding to the 'Inbound' 'Data Interfaces' in task 4, above, and 'Start'. Note: You may also set the Job to 'Recurring' and define a schedule for automated execution or notification.	Setup Once Repeat when additional files are required
14	Monitor Jobs of 'Job Type' 'Export' via 'Jobs' in Unity corresponding to the files	Operational – as needed, periodically
15	Move files via SFTP to OFSAA	Operational – as needed, periodically
16	Execute automatically generated Batches corresponding to 'Inbound' 'Data Interfaces' in OFSAA	Operational – as needed, periodically

3 Accessing your OFSAA Instance

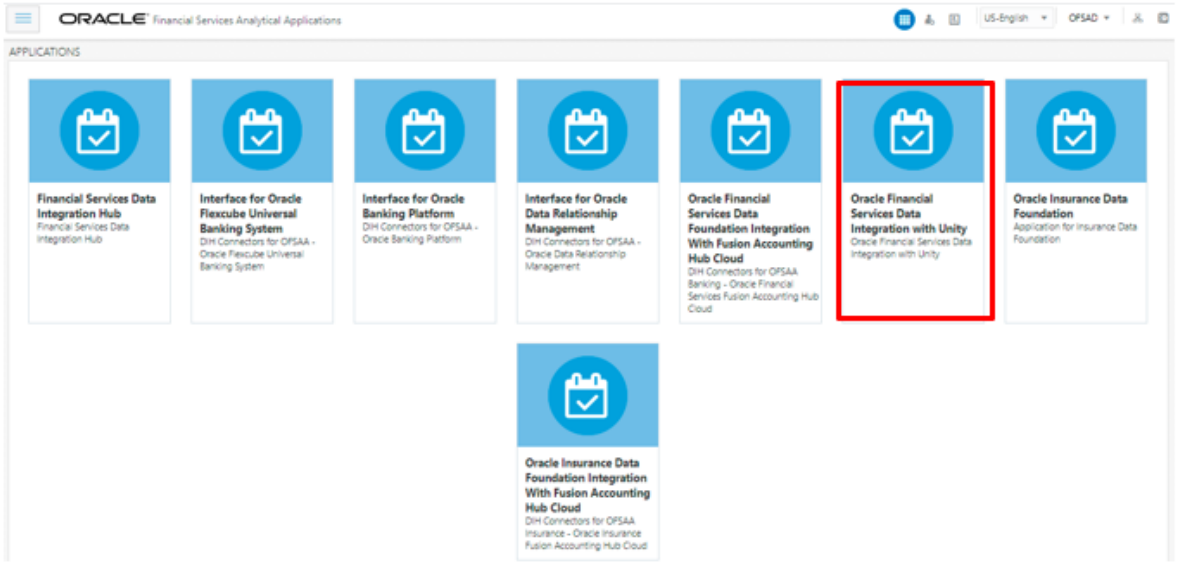
Access your OFSAA instance through its URL. See OFSAA Analytical Applications Infrastructure User Guide for details on how OFSAA instances must be configured. The URL is available from your System Administrators. Authenticate yourself with your login credentials (User ID and Password) through the OFSAA user login window, as follows:

Figure 2: Unity - OFSAA Interface Login Window



After logging into the application, select **Oracle Financial Services Data Integration with Unity**.

Figure 3: Applications Window



NOTE You must be mapped to any one of the Unities user groups.

4 Setting Up and Using FS Data Integration with Unity

This section helps to set up and use the FS Data Integration with Unity.

4.1 Setting up Unity for Integration with OFSAA

4.1.1 Setup Sources

You must create 'Sources' in Oracle Unity so that customers and other related data, including information exchanged with OFSAA, can be imported into the data model. These Sources provide all the details required so that Oracle Unity can run ingest jobs and import data.

For more information on how this is performed, see Unity documentation.

You must define Type as 'Secure FTP', selected from the drop-down list.

Ensure that name chosen against the 'Name' field is the same as that which is recorded in OFSAA under the 'Unity – Setup' screen, described later in this guide. The name chosen in Unity must be captured in this screen under 'Constants' - 'Data Source'.

See section Setting up Unity Tenancy details within OFSAA for details on Unity.

4.1.2 Setup Data Feeds

Data feeds are tasks to transfer data into and out of Oracle Unity. You can use the Data feeds page to manage such data transfers. See Unity documentation for details on setting up and managing data feeds. You must setup Ingest and Export job types corresponding to the set of data being exchanged with OFSAA. You can choose to have these configured for scheduled or on-demand execution, as is appropriate. See Unity documentation for details in this regard.

4.2 Setting up OFSAA for Integration with Unity

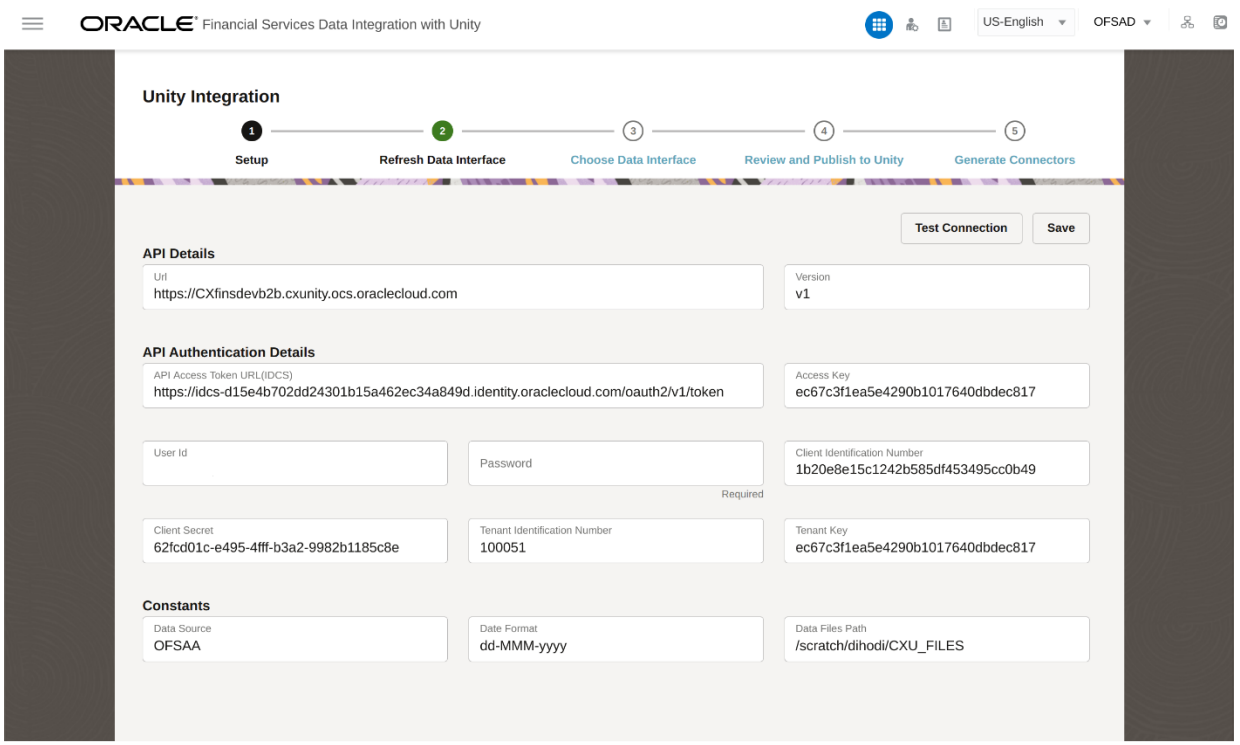
4.2.1 Capture Unity Tenancy Details

For OFSAA to connect to your Unity tenancy, a set of information must be captured, verified, and saved. This section details the steps involved in the process.

1. Log into OFSAA and select **Oracle Financial Services Data Integration with Unity.**
2. **From the Navigation List, select Configuration**.

   The Unity settings window is displayed.

   Figure 4: OFSAA – Unity Settings Window



3. Enter the required information in the Setup window.

> **NOTE**
>
> - The information captured here must be entered exactly as provided to you by administrators of your Unity tenancy.
> - The information captured is case sensitive and must not include any spaces.
> - Password must be captured every time you make changes in this screen, for additional safety with user credentials.

b. API Details:

— **URL**

Enter the URL assigned to you as part of your Oracle Cloud Unity subscription here. This information is specific to your tenancy on Oracle Cloud and subscription to Cloud Unity instance.

— **Version**

Enter the version number for your Unity tenancy.

c. API Authentication Details:

— **API Access Token URL**

Enter API Access Token URL details.

— **Access Key**

Enter the Access Key details.

- **User ID**

  Enter User Identification assigned to you for Unity instance here.

- **Password**

  Enter the password for your Unity instance here. In case you are editing any other field, ensure to enter the password and save the details. If not, an error message is displayed each time you make changes that the password is required.

- **Client Identification Number**

  Enter the client identification number details

- **Client Secret**

  Enter the client's secret details.

- **Tenant Identification Number**

  Enter the tenant identification number details

- **Tenant Key**

  Enter the tenant key details.

d. Constants:

- **Data Source**

  Enter the Data Source name. This is a one-time activity.

  Note that, the data source name must match Name as captured while defining Sources in Unity corresponding to OFSAA. See section Capture Unity Tenancy Details.

- **Date Format**

  This is the format in which OFSAA exports and ingest all attributes of type 'date'. The date format captured here must be as is expected by Unity for all date-attributes.

- **Data Files Path**

  Enter the Data File Path location where the file that is generated at the end of an outbound cycle is placed.

e. Click **Test Connection**, to check if the connection is established with the Unity application.

f. Click **Save** to save all the setup details.

4.2.2 Refresh Data Interface

Before Data Integration with Unity can be used, it needs to refresh its metadata on the data model available or deployed with your OFSAA instance. This step allows the system to do that and must be done under the following situations:

- You are using the system for the very first time after installation and data model upload or application installation.
- You have made changes to the data model and uploaded it to OFSAA.

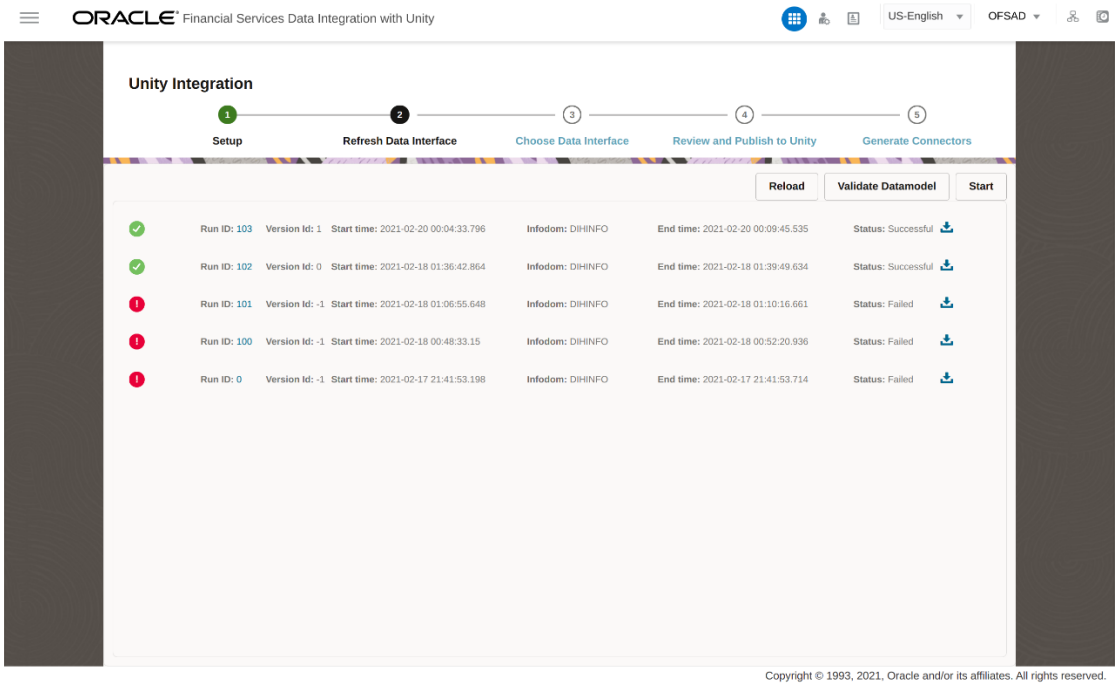
> **NOTE** On first use, further functions of the application are only available for use once this step is completed. On changes to the data model, this step must be completed before they are reflected in the application for use.

To refresh the Data Interface, follow these steps:

1. Log into the application and select **Oracle Financial Services Data Integration with Unity.**
2. From the Navigation List, select **Configuration**.

   The Unity window is displayed.
3. Select **Refresh Data Interface**.

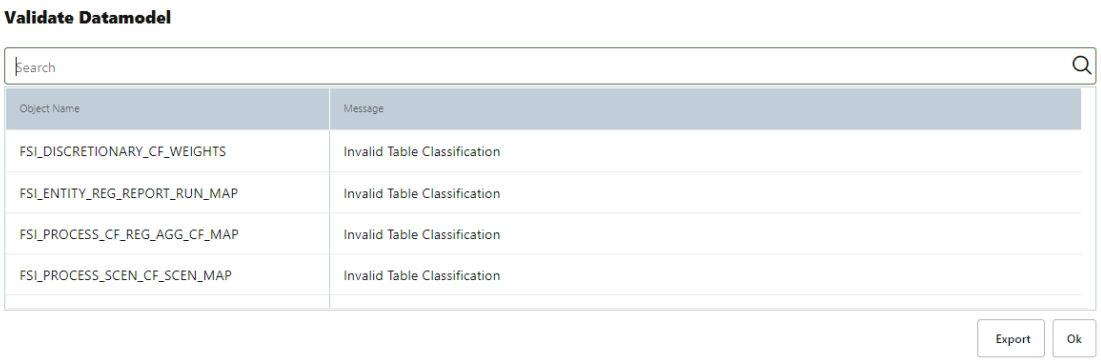
Figure 5: Refresh Data Interface



4. Click **Validate Datamodel** before you start the refresh.

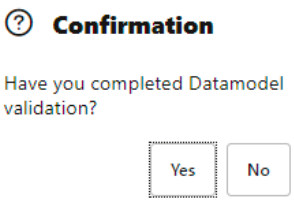
   The Validate Datamodel window is displayed.

   Figure 6: **Validate Datamodel**



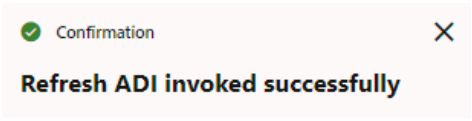
5. Search for the required Object Name and click **Export**, if you wish to download the Datamodel validation details.
6. Click **Ok** to proceed.
7. Click **Start** to start the refresh of the Data Interface.

   A confirmation dialog box is displayed.



8. Click **Yes**. The ongoing Data Interface is displayed.

   On successful invocation of TDS refresh, a message is displayed.



9. If you need a detailed running log, click  download the log.
10. A zip file is downloaded containing the detailed log for the execution.
11. To view the log details, extract the log file from the zip folder.

> **NOTE** At any given time, click **Reload** to check if the execution is complete or still in progress.

> **NOTE** This is not a day-to-day activity.

4.2.3 Choose Data Interface

OFSAA Data Interfaces are logical abstractions of its underlying data model, designed to facilitate data exchange via commonly understood business terms, avoiding the need for end-users to directly handle physical entities and attributes, or the complexities there. This step allows you to choose the Data Interfaces and in turn, attributes they contain, for ingestion from (Inbound) or export to (Outbound) your Unity tenancy.

4.2.3.1 Inbound

Inbound Data Interfaces represent data that you expect to receive from Unity and ingest into OFSAA. The following Inbound Data Interfaces are configured for use in the application as standard, available out of the box are as follows:

- Master Customer
- Party Address
- Party Address Map
- Party Asset Details
- Party Education Master
- Party Email Address
- Party Employment Details
- Party Expense Details
- Party Financials
- Party Identification Documents
- Party Income Details
- Party Liability Details
- Party Other Names
- Party Phone Map
- Party Rating Details
- Party Relationship Types
- Party Relationships
- Party Role Map
- Party Shareholding Percent
- Party Source Details
- Party Types
- Web Log Analytics Event Master

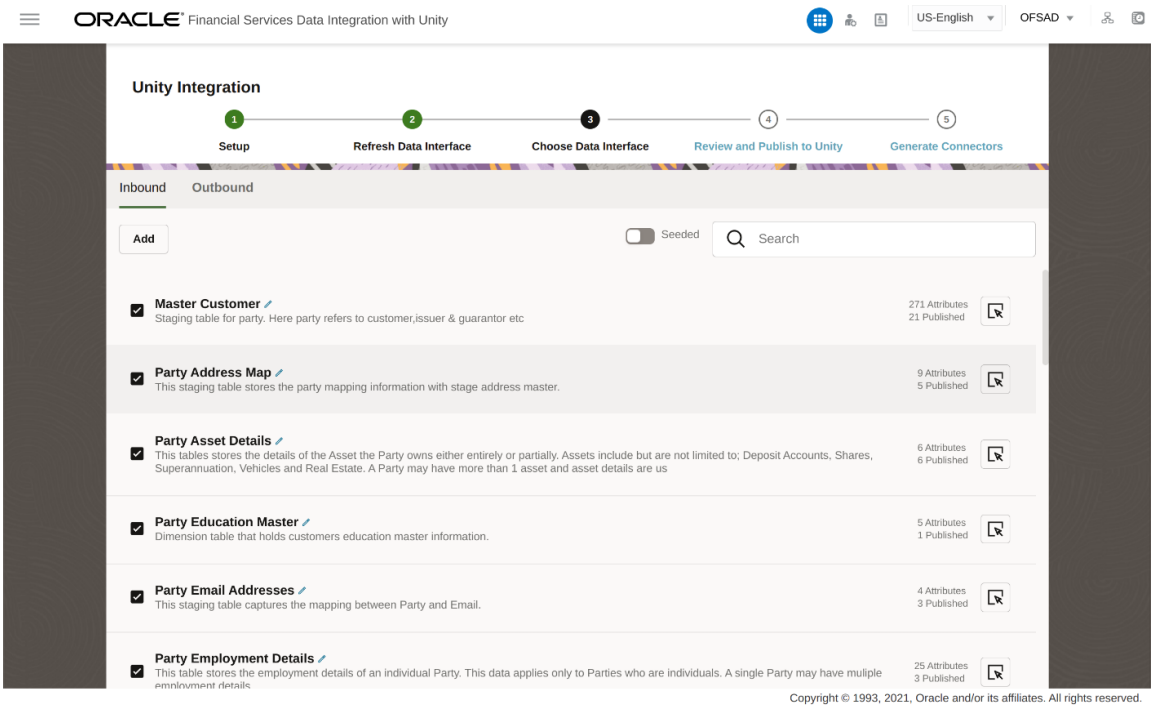
To modify this set of Inbound Data Interfaces, perform the following steps:

1. Log into the application and select **Oracle Financial Services Data Integration with Unity.**
2. From the Navigation List, select **Configuration**.

   The Unity window is displayed
3. Select **Choose Data Interface**.
4. Click **Inbound**.

   The user interface shows the list of Data Interfaces or entities that you expect to receive from Unity and ingest into OFSAA. If you are using the application for the first time, the list of entities displays those that Oracle configures for ingestion (or 'seeds') out of the box, as listed previously.

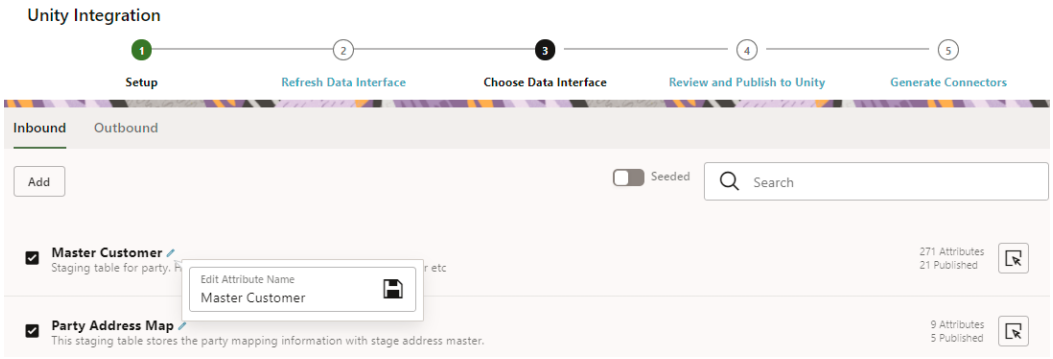
   Figure 7: **Data Interface**



5. Click  to edit the Label assigned to any Data Interface.

> **NOTE** Data Interfaces 'Master Customer' and 'Party Source Details' are specifically present for integration with Unity and must be maintained as is. Further, no attribute that is already indicated as selected out of the box for these Data Interfaces must be manually de-selected. You may read about the choice of attributes within Data Interfaces for inclusion or exclusion in the following section.

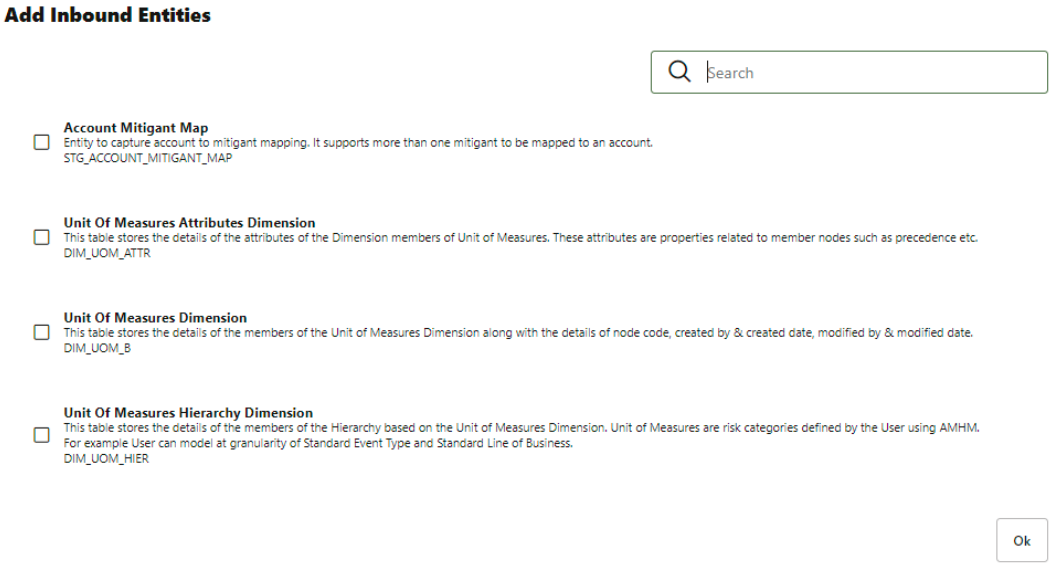
Figure 8: Edit Attribute Name



6. Click 

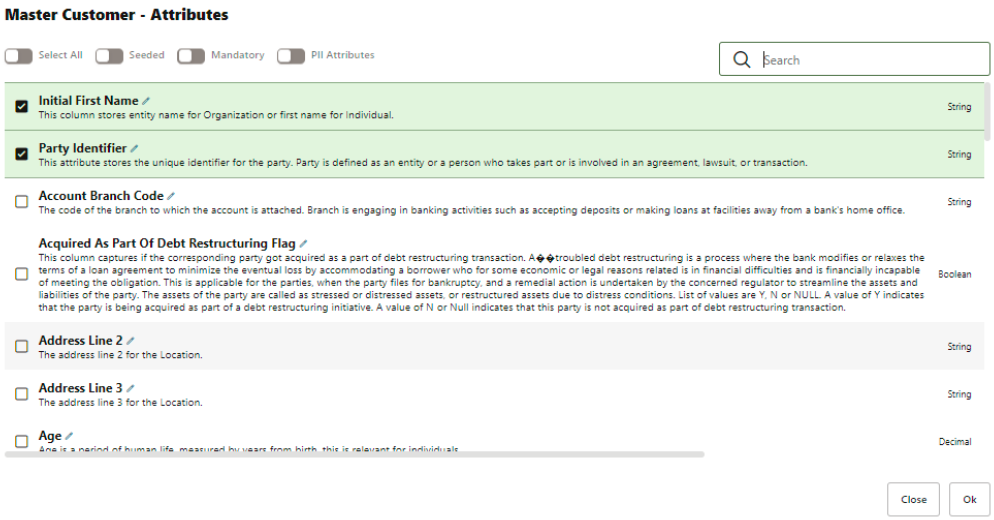
to view or sort the list with only the Seeded list of Data Interfaces.
7. You can also search for Data Interfaces in the Search field.
8. Click **Add**, if you wish to add more Inbound Data Interfaces. Only the Data Interfaces available from the underlying OFSAA Data Model, post-Refresh Data Interface, are displayed here.

Figure 9: Add Inbound Entities



9. Click  to view the list of attributes available with any Data Interface.
10. This interface allows you to view the list of attributes available, chosen for data exchange with Unity and the data types associated with them, assigned by the underlying Data Model.

Figure 10: Attributes

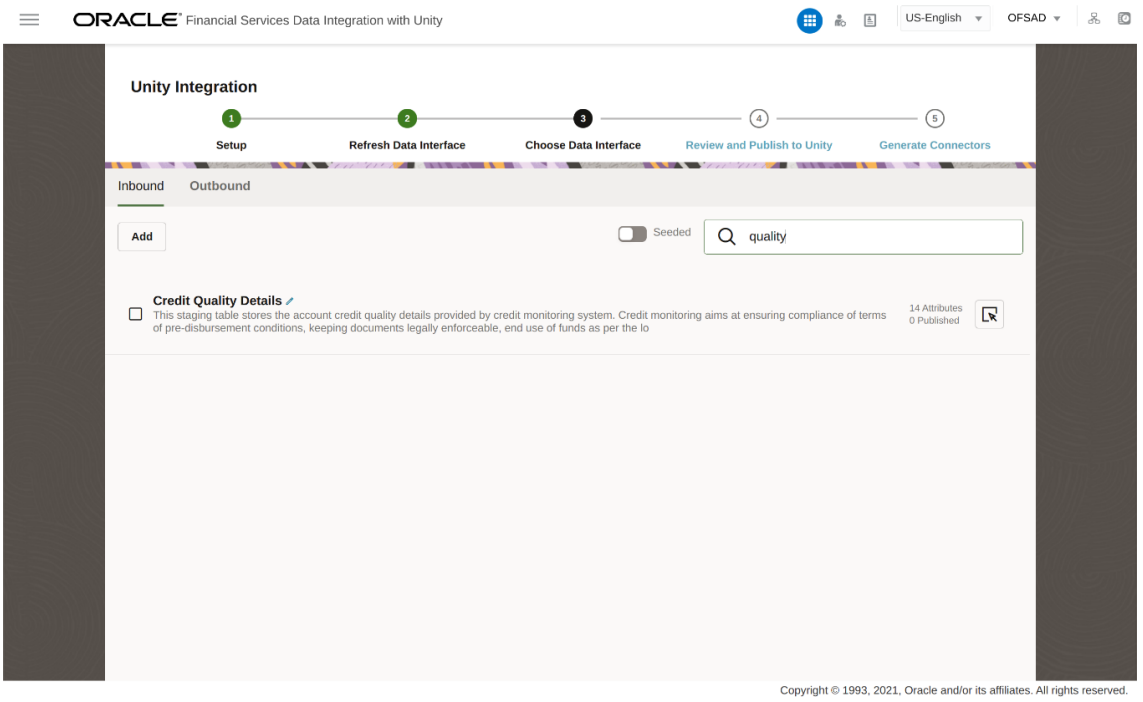


Here, it is possible to view or sort the list with only the Seeded, Mandatory, or the PII Attributes. Personally Identifiable Information (PII) attributes are marked as such by the underlying OFSAA data model and are treated by OFSAA under the auspices of General Data Protection Regulation (GDPR). For more details in this regard, see Oracle Financial Services Data Foundation or Insurance Data Foundation documentation.

> **NOTE** For Inbound Data Interfaces, Mandatory attributes are automatically selected by the application even if you do not. This is to ensure that missing mandatory attributes do not cause errors upon data ingestion into OFSAA.

You can also search for the required attribute in the Search field.

Figure 11: Search



11. Click **Close** if you do not wish to make any modifications.
12. Click **Ok** after the attributes are selected.
13. To review and publish the list of attributes, see the section Review and Publish to Unity.

4.2.3.2 Outbound

Outbound Data Interfaces provide data from OFSAA to Unity. The following Outbound Data Interfaces are configured as standard, out of the box.

- Financial Account Summary
- Party Financial Metrics
- Transaction Summary

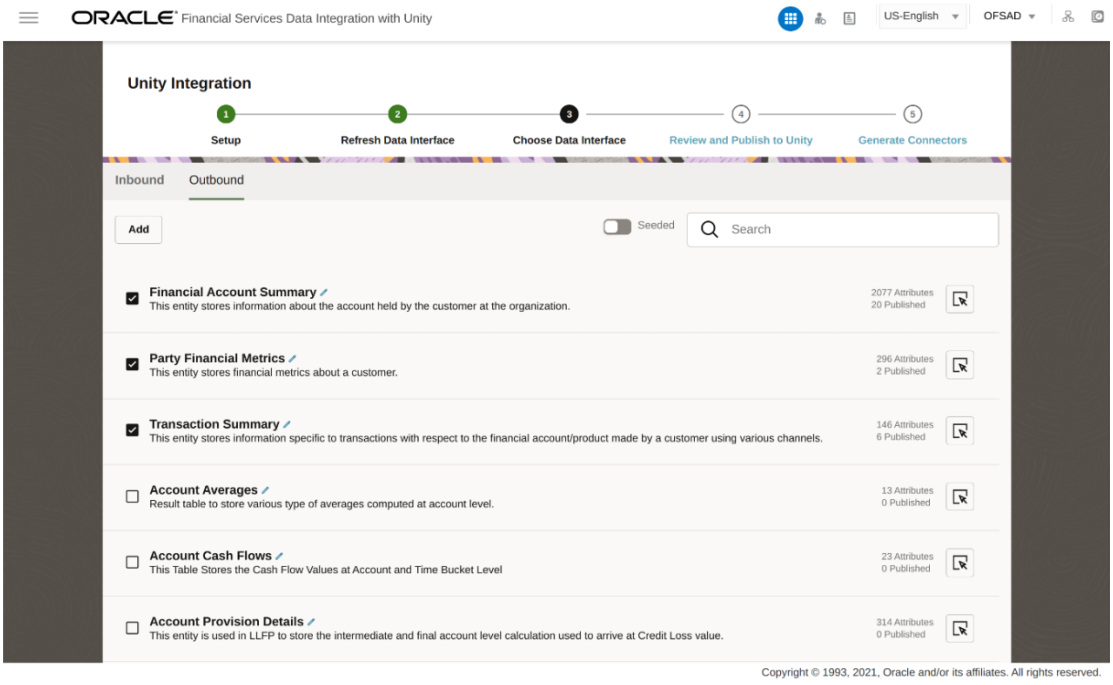
To manage Outbound Data Interfaces, follow these steps:

1. Log into the application and select **Oracle Financial Services Data Integration with Unity.**
2. From the Navigation List, select **Configuration**.

   The Unity Integration user interface is displayed.
3. Select **Choose Data Interface**.
4. Click **Outbound**.

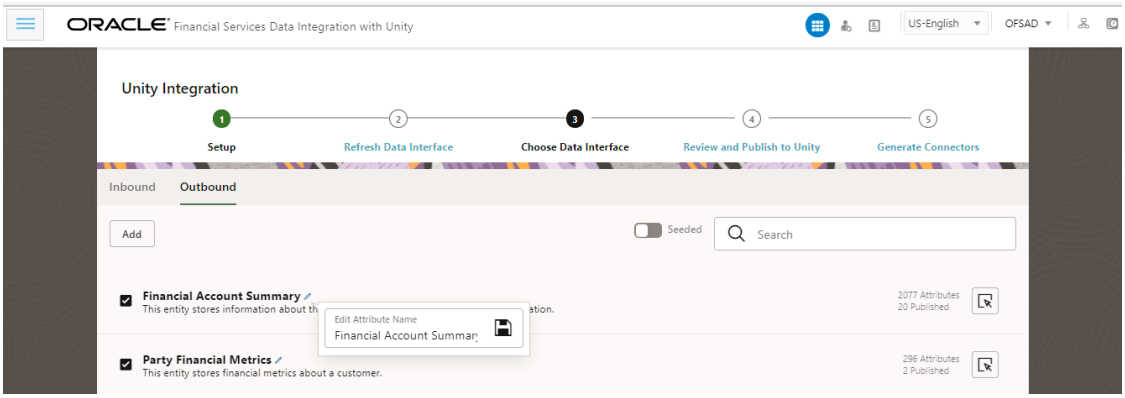
   Data from these Data Interfaces (and their chosen attributes, detailed in the section below) is extracted into files and sent to your Unity tenancy for ingestion. The user interface shows information in line with what is available for Inbound Data Interfaces, above.

Figure 12: Data Interface



5. Click  to edit the Attribute Name.

Figure 13: Edit Attribute Name



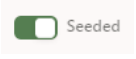
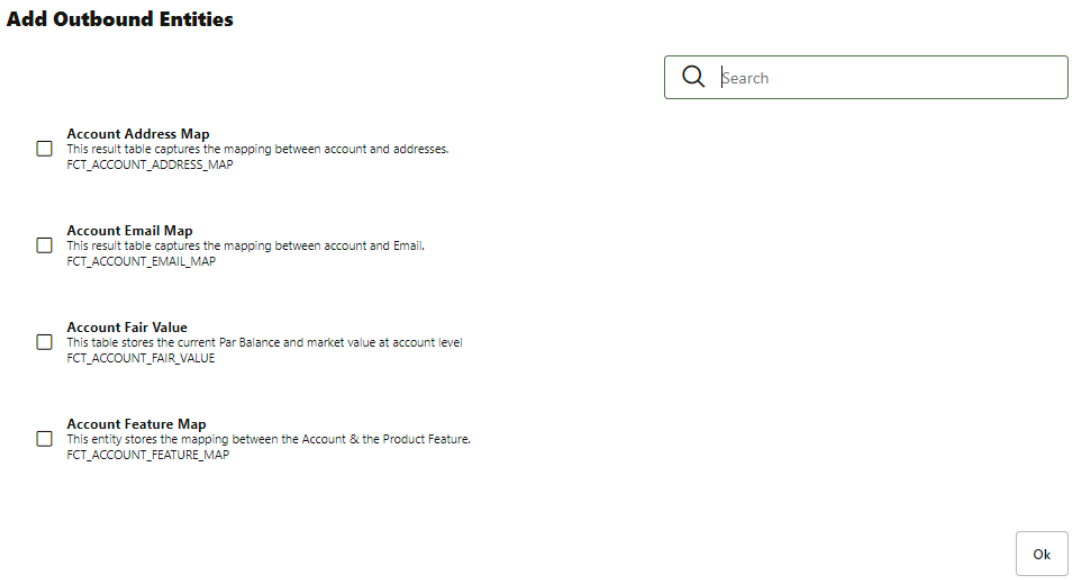
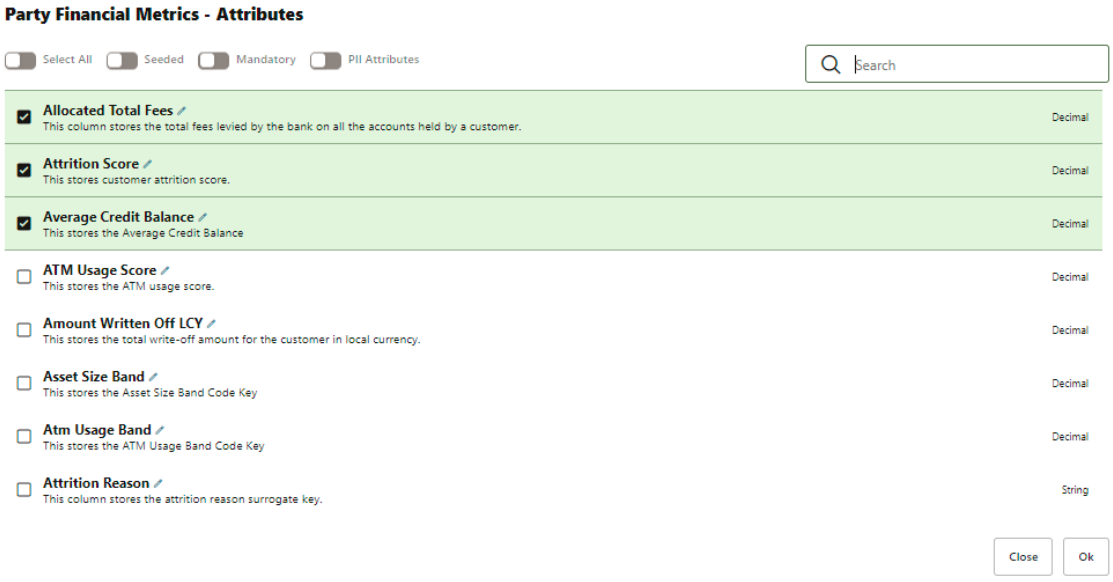
6. Click  to view or sort the list with only the Seeded data.
7. You can also search for the required Outbound Data Interfaces in the Search field.
8. Click **Add**, if you wish to add more Outbound Data Interfaces. Only those Data Interfaces available in the underlying OFSAA data model are displayed for use.

Figure 14: Add Outbound Entities



9. Click  to view the attribute details available in the entity.
10. This interface allows you to view the list of attributes available, chosen for data exchange with Unity and the data types associated with them, assigned by the underlying Data Model.

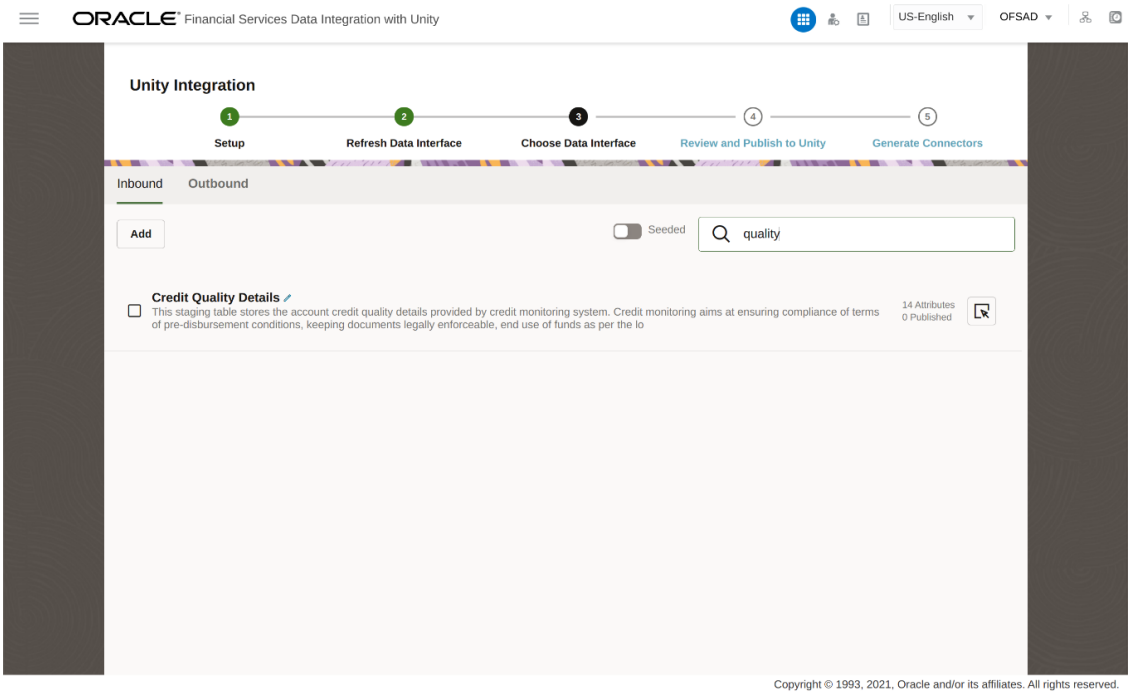
Figure 15: Attributes



Here, it is possible to view or sort the list with only the Seeded, Mandatory, or the Personally Identifiable Information (PII) Attributes. The PII attributes are marked as such by the underlying OFSAA Data Model and are treated by OFSAA under the auspices of General Data Protection Regulation (GDPR). For more information in this regard, see Oracle Financial Services Data Foundation or Insurance Data Foundation documentation.

11. You can also search for the required attributes in the Search field.

Figure 16: Search



12. Click **Close** if you do not wish to make any modifications.
13. Click **Ok** after the attributes are selected.
14. To review and publish the attributes, see the section Review and Publish to Unity.

4.2.4 Review and Publish to Unity

You must review and publish the Data Interfaces and Attributes thereof you have chosen or which are configured out of the box in the following situations: (a) On using the application for the first time, and (b) When you have made changes to the list of Inbound or Outbound Data Interfaces or their Attributes. This step also sends the definition of data structures so chosen (or changes thereof) to your Unity tenancy. To manage review and publishing to Unity, perform the following steps:

1. Log into the application and select **Oracle Financial Services Data Integration with Unity.**
2. From the Navigation List, select **Configuration**.

   The Unity Integration user interface is displayed.

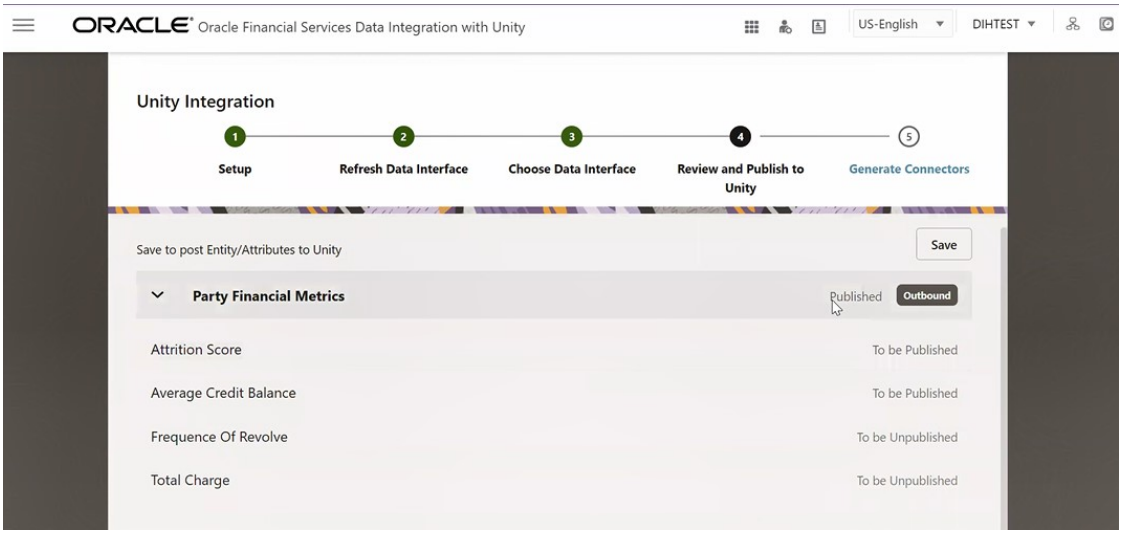
   NOTE Ensure that the checkboxes against the Data Interfaces you require for Inbound or Outbound purposes are ☑ checked or selected, as displayed in the user interface. Unless selected, the application does not include the Data Interface or its attributes to this step from Choose Data Interface step detailed in the previous section.

3. Select **Review and Publish to Unity.**

   The Inbound or Outbound Data Interfaces chosen or modified in Choose Data Interface step are listed here. The user interface shows the publishing status for Data Interfaces and their attributes. For example in following figure, Party Financial Metrics is an Outbound Data Interface which is currently in Published status, with two of its Attributes marked for addition (indicated by the To be Published status

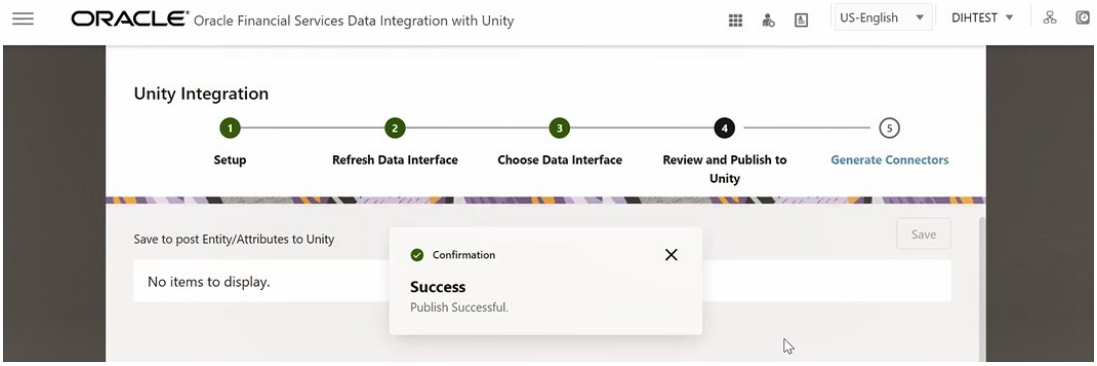
against them) and another two attributes marked for exclusion (indicated by the To be Unpublished status against them).

Figure 17: Review and Publish to Unity



4. Click **Save**. This sends the definition of data structures chosen (or changes thereof) to your Unity tenancy.

   A confirmation message is displayed with the status of the publishing attempt. In case there is an issue connecting to your Unity tenancy or completing the process, an error message is displayed. Ensure to verify connectivity from the Setup screen or the application's error logs for details on underlying issue(s) and resolution steps.



> **NOTE** On first use or if there are the addition of Attributes to Data Interfaces 'Master Customer' or 'Party Source Details,' the application also publishes corresponding Promotion Rules. 'Promotion' is a task in Unity to merge attribute values of source records and promote optimal value to the master record attribute. This task is a part of ID resolution. For details on Promotion Rules, see Unity Documentation.

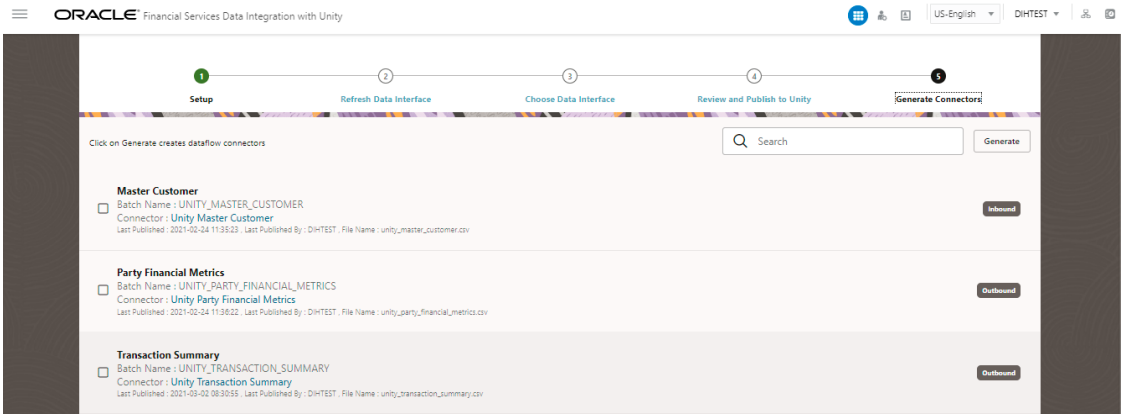
5. After the Review and Publish to Unity step is completed, you can view the selected Data Interfaces and their attributes in your Unity tenancy under Data Model as Data Objects. Ensure that 'Publish Changes' is performed in Unity after Data Objects are verified. Some changes that are published cannot be reversed, updated, or deleted in Unity. Make sure you review and confirm all changes before publishing. For more information in this regard, see Unity Documentation. Generate Connectors.

After Data Interfaces and their Attributes are published, you may generate Connectors in the 'Data Integration with Unity' application. Connectors are structures built and managed by the application to facilitate mapping of Inbound and Outbound OFSAA Data Interfaces and their Attributes with the files used for data exchange with Unity. This step also automatically defines and registers a Batch and associated Task in OFSAA Batch Management for each Data Interface, for on-demand or scheduled execution. Perform the following steps to generate Connectors:

1. Log into the application and select **Oracle Financial Services Data Integration with Unity**.
2. From the Navigation List, select **Configuration**.

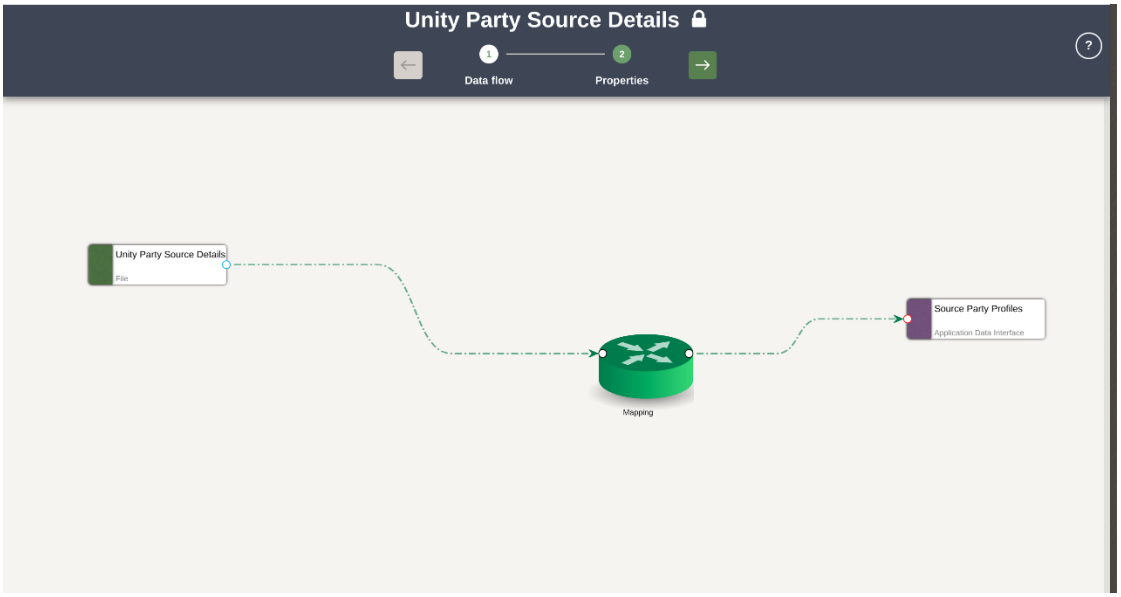
   Unity Integration user interface is displayed.
3. Select **Generate Connectors**.

   Figure 18: Generate Connectors



   The user interface shows the list of Data Interfaces chosen, the pattern of the Batch name it creates in OFSAA Batch Management, the name of the Connector that is prepared, audit information for each Data Interface, and designation of whether each Data Interface is Inbound or Outbound.
4. Click the Connector name to view its definition and associated mapping. For more information on Connectors and how mapping information may be accessed, see Data Integration User Guide. Changes to data flow, mapping, and properties for Connectors automatically defined by the application, are not permitted.

Figure 19: Connector Data Flow



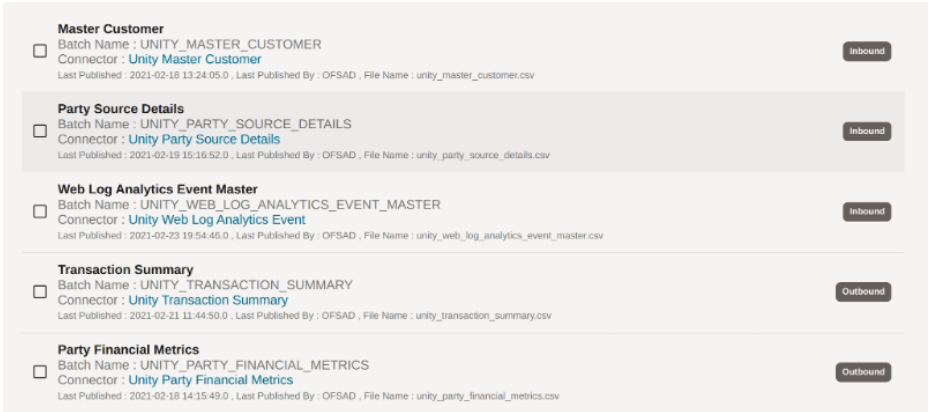
5. Select the required Data Interfaces and click **Generate**. This creates required Connectors for use in mapping files used for data exchange with Data Interfaces and their Attributes. For each Data Interface chosen, the application creates a Batch with a Task for execution purposes through OFSAA Batch Management.

6. Note that, the Batches and Connectors automatically defined by the application expects names of files for ingestion in a pattern that follows lower (Connector name) +date. Here, the date is set or expected in the format as defined in Unity Integration – Setup user interface, detailed previously.

   For example, for Master Customer, Inbound Data Interface as in the following figure the file name expected for MIS Date 30th of March 2021 is "unity_master_customer_2021-03-30.csv".

   The application follows the same pattern for Outbound Data Interfaces.

   For example, for Transaction Summary, Outbound Data Interface as in the following figure the file name expected for MIS Date 30th of March 2021 is "unity_transaction_summary_2021-03-30.csv".



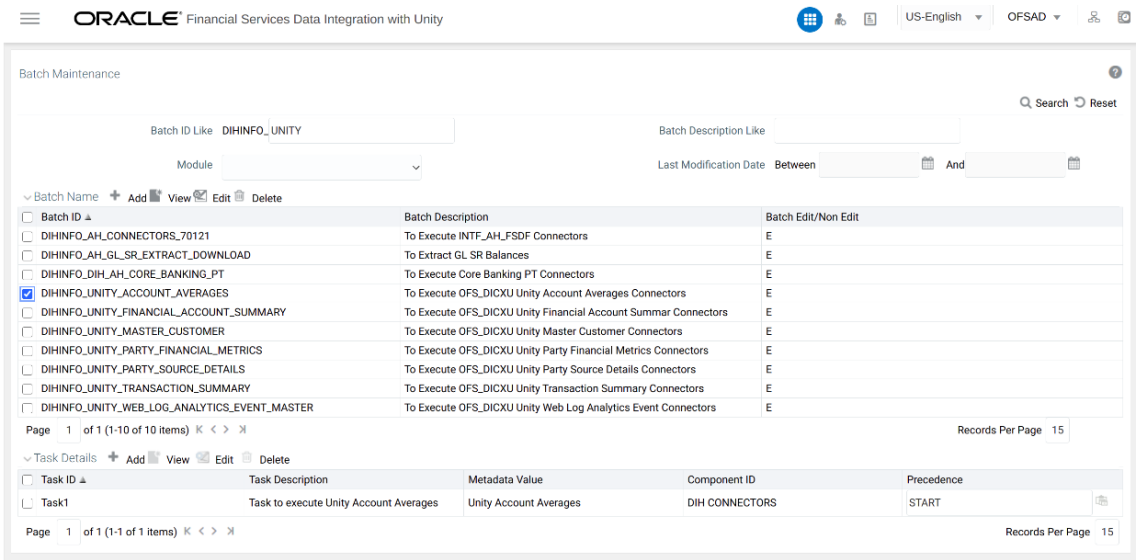
4.3 Executing Data Exchange with Unity

After completing the steps in the previous sections, execute the following steps to export and ingest data from OFSAA:

> **NOTE** Files that are generated from your Unity tenancy may have a naming pattern with the date and time stamp appended. For example, 'cxu_master_customer_2021-03-30-12-06-39-568_0'.
>
> In such a case, the files must be renamed removing the timestamp portion, to match OFSAA's expected naming pattern, as detailed in the previous sections, before executing data exchange tasks detailed below. For example, the file in the previous example must be renamed to 'cxu_master_customer_2021-03-30'.

1. To review batches created automatically for ingestion and extract, from the **Oracle Financial Services Data Integration with Unity** navigation list window, select **Orchestration**, and then select **Batch Maintenance**.
2. Navigate to **Batch Orchestration** and search for auto-generated batches with Batch ID following the pattern <<INFODOM>>_UNITY, where <<INFODOM>> is the Information Domain used with Data Integration with Unity application. For more details on Information Domain, see OFSAA Analytical Applications Infrastructure User Guide.

Figure 20: Batch Maintenance Window



NOTE It has been observed that when OFSAA is deployed with WebLogic, not all batches are automatically created unless Connection Pool is configured with a specific Statement Cache Size. This is a Known Issue. Perform the following steps to avoid the issue:

1. Log in to the WebLogic server admin console.
2. Navigate to Console and select Services and then select Data Sources.
3. Select Atomic Schema.DS and then select Connection Pool.
4. Update Statement-Cache-Size value to 0.
5. Restart the WebLogic server and redeploy connectors from the AHC Refresh Interface window.

3. Select Batch corresponding to Data Interface you wish to ingest or extract.

   The automatically defined Task is listed in the **Task Details** section, under the Batch list.

4. To execute batches, navigate to **Batch Execution**, search for Batch IDs following the pattern in step (2) in this list, specify **MIS Date**, and select **Execute**.

5. For more information on executing Connectors, see the Data Integration User Guide. You can also see the OFSAA Analytical Applications Infrastructure User Guide for details on batch execution, runtime parameters, and monitoring.

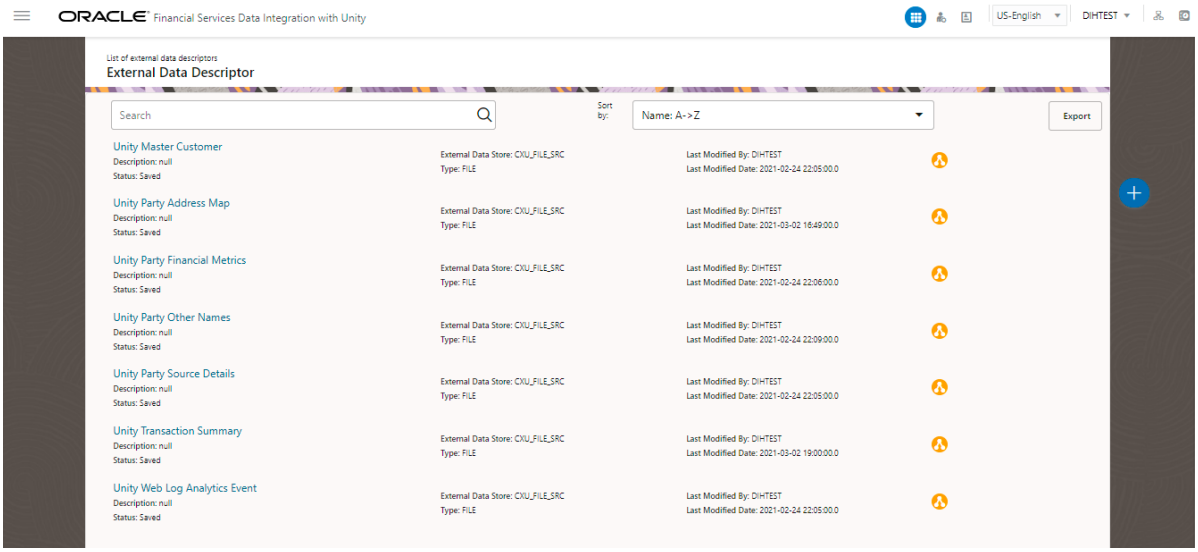
5 Creating Custom Data Flow

Custom Data Flow can be created by defining External Data Descriptor and Connectors.

5.1 External Data Descriptor

You can view the summary of External Data Descriptor generated through integration setup process

Figure 21: External Data Descriptor Window



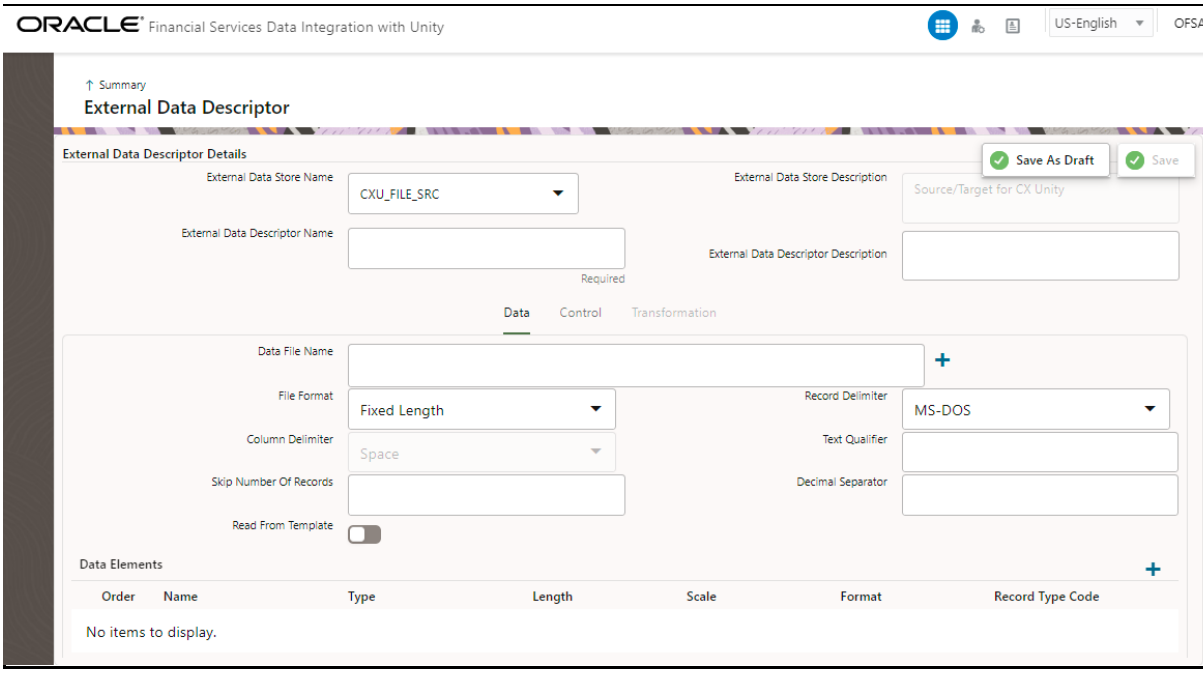
5.1.1 Defining an External Data Descriptor

To define a new External Data Descriptor, follow these steps:

1. From the **Oracle Financial Services Data Integration with Unity** navigation list window, select Data Mapping, and then select External Data Descriptor.
2. Click Add  . The **External Data Descriptor** new window is displayed.
3. 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 **Error! Reference source not found.** example are used. The description comes up automatically.

> **NOTE** The fields in the External Data Descriptor Specification Details section change as per the Source Code selected.
>
> For HDFS data, the working date format is YYYY-MM-DD.
>
> For the Hive table, the working date format is YYYY-MM-DD.
>
> For the Sybase source database, the date data type is not supported. It must be a timestamp.

Figure 22: External Data Descriptor Data Tab

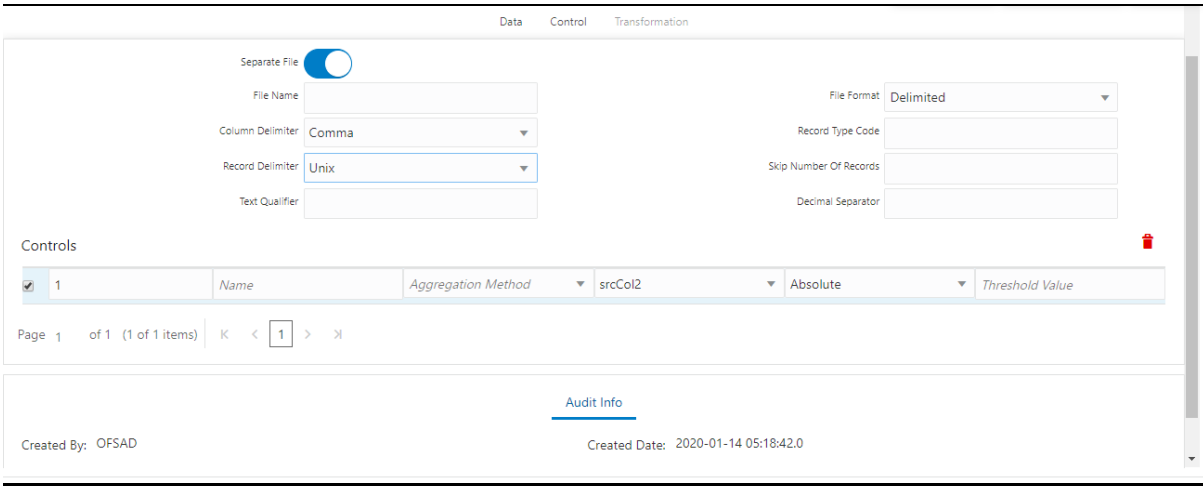


4. Click **Reload/Refresh** to reload/refresh the data elements.
5. Enter the values in the fields as described in the Fields and their Description section.

Figure 23: Read From Template

6. If data needs to be reconciled post-loading, then click the **Control** tab. In this version, only the Number of Records controls is possible.

Figure 24: External Data Descriptor Controls Tab



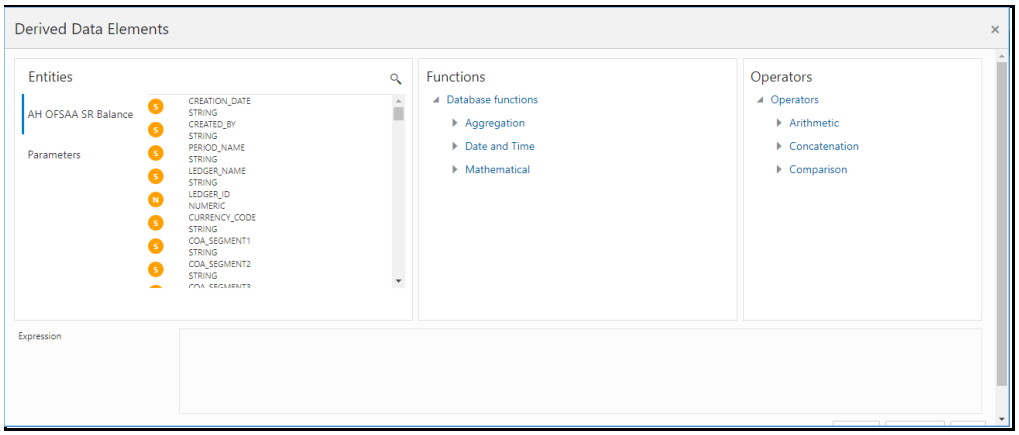
7. To transform the **EDD**, click the **Transformation** tab.
8. You can add derivation to data elements of the EDD.

   a. Click **Add** to create derived data elements.

   b. To edit the derived data element, click **Edit**. The **Expression** window is displayed.

   c. The expression can be specified using the data elements defined in the Data tab and functions.

Figure 25: Derived Data Elements Window



   d. To delete the derived data element, click **Delete**.

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

   e. Select **Aggregation** and click **Edit** to view **Expression Window**.

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

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

> **NOTE** It is applicable only in the case of DB2, Oracle, Sybase, My SQL, and Hive.

10. Click **Save**.

5.1.2 External Data Descriptor Fields

The following sections describe the fields in the External Data Descriptor window.

5.1.2.1 Data Tab

The following table describes the fields in the Data tab.

Table 3: Fields in 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 the 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, such as 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 For example, select Unix.
File Format	There are two options: • **Fixed Length**: The file has records and columns with a fixed length. Each column has a predetermined and unchanging size, set when the record layout is designed, and the sum of the column sizes add up to the record size. • **Delimited**: There is a separation of the records and columns using a delimiter character like a comma, semicolon, hyphen, and so on. For example, select Delimited.
Text Qualifier	A character that identifies a text. This is used when some characters exist within a text. Generally, double quotes are used, prefixed, and suffixed with text. This is optional.
Skip Number Of Records	Provide the number of records to be skipped. The records are skipped from the top. Generally, this is used to skip Headers.
Decimal Separator	This mentions up to which decimal digit you want to view the result.

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 must create it manually by clicking Add +, under the Source Data Elements tab. If the template is available, you can browse for the template. See 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	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**: The Field name of XML type must not be more than 25 characters and for others must 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 the EBCDIC format. This is the length of the EBCDIC data type. In the case of a file, it is length only.
Precision	This is used to specify the decimal point. **Example**: 10.3.
Format	Specify the format for columns of type date here. If left blank, a default format of DD/MM/YYYY is assumed and used. **NOTE**: • The default format is fixed and does not change with database or system language settings. • For data ingestion, enter the format in which date fields are provided. • For data extraction, enter the format in which extracted date fields must be recorded. For example, in the file extract, to represent the date, 31st January 2020, as "31/01/2020", specify the format as DD/MM/YYYY for the date columns.
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.

5.1.2.2 Control Tab

In the Control tab, DIH enables you to:

1. Reconcile between source data received and data loaded into OFSAA, using the control information available from the source system. This feature is used to implement record count validation or amount reconciliation from a source file. It also allows specifying a threshold for validation. The specified threshold is

compared with the difference (record count or amount) to perform the validation. Only in case, the difference is more than the threshold value the execution fails. A detailed report on control information from both source and the final data loaded along with threshold breach is available in Execution History.

2. The threshold can be absolute or percentage value. The connector execution process considers the threshold type while performing reconciliation.
3. Generate control information for File extracts from OFSAA. Specifying control for extract EDDs generates control details, based on the configuration in the EDD. Both record count and amount value (sum, average, max, and so on) for specific columns are recorded into the control file.

> **NOTE** This option is applicable only for File type EDDs (ASCII and EBCDIC).

The following fields must be configured to achieve this functionality.

Table 4: Fields in 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.
File Format	There are two options: • **Fixed Length**: The file has records and columns with a fixed length. Each column has a predetermined and unchanging size, set when the record layout is designed, and the sum of the column sizes add up to the record size. • **Delimited**: There is a separation of the records and columns using a delimiter character like a comma, semicolon, hyphen, and so on. In the previous 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 In the previous example, select **Comma**.
Record Type Code	Used to uniquely identify a record within a file. A Financial Institution sometimes provides files that have data and control records within the same file. In that case, 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 the Control record, the value is specified under the Control tab. Only the first field of a file is used for Record Type.

Fields	Description Fields marked in red asterisk(*) are mandatory
Record Delimiter	The records are stored differently in different operating systems. The following options are available: • MS-DOS • Unix • No Record Delimiter • Other For example, select Unix.
Skip number of records	Provide the number of records to be skipped. The records are skipped from the top. Generally, this is used to skip Headers.
Text Qualifier	A character that identifies a text. This is used when some characters exist within a text. Generally, double quotes are used, prefixed, and suffixed with text. This is optional.
Decimal separator	Specify up to which decimal digit you want to view the result.
Record Type Length	The length of the record type value to pick up the correct record. For example, if the control record is "DATATotal Records400" and DATA is the Record type, the length is '4'. This is applicable only for Control records that are of Fixed length.
Control Name Length	Based on the previous example, the Control name is "Total Records". Hence, the Control Name Length is '13'.
Control Value Length	Based on the previous example, the Control value is 400. Hence, the length of the control value is '3'.
When **Separate File** is selected as **No**.	
Record Type Code	Used to uniquely identify a record within a file. A Financial Institution sometimes provides files that have data and control records within the same file. In that case, 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 the Control record, the value is specified under the Control tab. Only the first field of a file is used for Record Type.
Control Value Length	Based on the previous example, the Control value is 400. Hence, the length of the control value is '3'
Control Name Length	Based on the previous example, the Control name is "Total Records". Hence, the Control Name Length is '13'.
Controls	
Control Name	Specify the name of the control.
Aggregation Method	Select either **Aggregation Method** or **Count**. The supported aggregation methods are as follows: • Min • Max • Average • Sum

Fields	Description Fields marked in red asterisk(*) are mandatory
Aggregation Column Name	Select the column on which the aggregation method is applied. NOTE: For count, no column needs to be selected.
Threshold Type	This field is optional. There are two selections of threshold, percentage, or absolute. If the percentage is selected, the reconciliation difference in percent is matched against this threshold value. If absolute is selected, the absolute percent difference is matched against this threshold value.
Threshold Value	Specify the difference value in percent or absolute.

5.1.2.3 Transformation Tab

The following table describes the fields in the Transformation tab.

Table 5: Fields in Transformation Tab

Fields	Description Fields marked in red asterisk(*) are mandatory
Transformation Type	A drop-down listing different types of transformation supported. Currently, the only Aggregation is supported.
If the T**ransformation Type** is selected as **None**:	
Derived Data Elements	
Name	Name of the derived field in EDD. **NOTE**: Field names must not be more than 30 characters.
Type	Shows the Data type of the field. **Example**: Varchar2, Number, Date, and so on.
Expression	When you select the 'Add option', the Specify Expression window is displayed. Here, you can select the required Entities, Functions, and Operators. That is, you can write your expression. Enter the field name and click OK. Now the newly created field name is listed.
If the **Transformation Type** is selected as **Aggregation**:	
Derived Data Elements	
Name	Name of the derived field in EDD. Note: Field names must not be more than 30 characters.

Fields	Description Fields marked in red asterisk(*) are mandatory
Type	This shows the Data type of the field. Example: Varchar2, Number, Date, and so on.
Expression	When you select the 'Add option', the Specify Expression window is displayed. Here, you can select the required Entities, Functions, and Operators. That is, you can write your expression. Enter the field name and click OK. Now the newly created field name is listed.
Aggregation Properties	
Group By	This is available when Aggregation is selected.
Having	This is available when Aggregation is selected.

5.1.3 Modifying and Viewing an External Data Descriptor

You can edit or view an existing EDD, other than EDDs in Published status.

> **NOTE** You cannot edit EDDs in Published status.

To edit or view an EDD, follow these steps:

1. Select the required EDD from the EDD Summary.
2. The details of the selected EDD are 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** to save and update later. The status shows as Draft.

5.1.4 Deleting an External Data Descriptor

This option only checks the higher-order object. That is, if the order has a dependency, you cannot delete it 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, follow these steps:

1. On the **EDD Summary**, click **Delete**  . A confirmation dialog box is displayed.
2. Click **Yes**. The EDD details are deleted.

> **NOTE** Delete is enabled only in the following cases:
>
> If the EDD is not in Published status.
>
> If the EDD is not used by any object.

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

- The EDD is in Published status.

- All the connectors using the EDD are unpublished.

To unpublish an EDD, follow these steps:

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

> **NOTE** The EDD gets published automatically by the system whenever the higher objects (Connector) using it are published.

5.1.5 Dependency

Clicking **Dependency**  lists where the entire parent EDD has a dependency.

5.1.6 Search and Filter

The Search and Filter option in the UI 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 the EDD keyword as 'AATB_ACCT' in the search box. The entire EDD name with AATB_ACCT is listed.

5.1.7 Parameters in EDD Definition

While defining an EDD, the parameter can be used as a placeholder in a data filename.

For example:

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

Table 6: Example showing Account Number and Balance

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

In this example, a customer has three 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

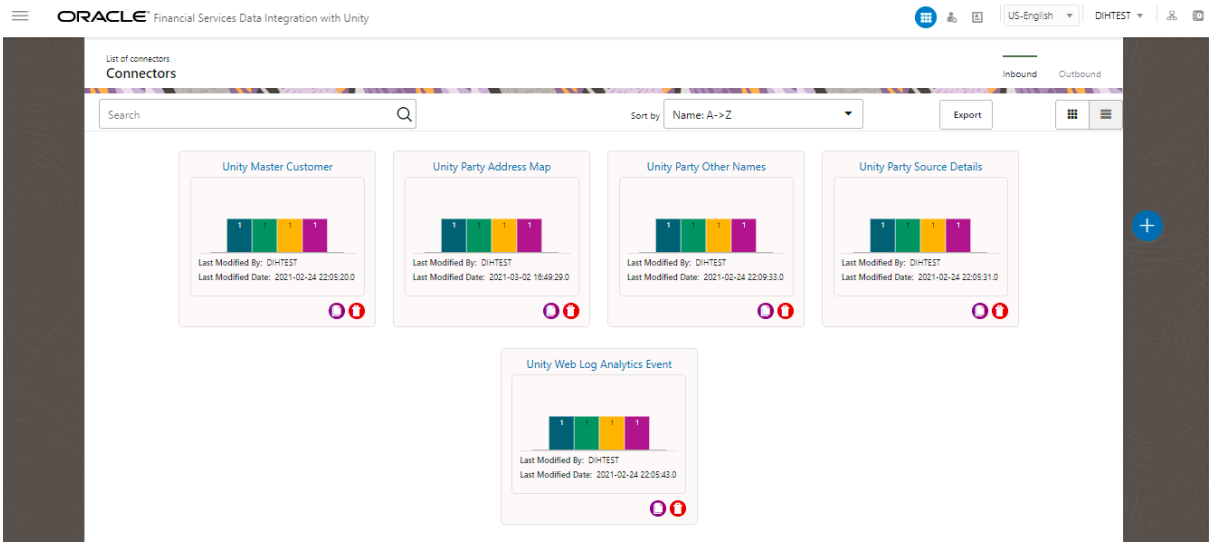
If a parameter, MISDATE, is defined as a runtime, this can be used as a placeholder that substitutes date in mmddyyyy format. That is, the data filename can be mentioned as td_contracts_%#MISDATE%.csv. When this file is called, it substitutes the date in the file name, dynamically, in the runtime.

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.

5.2 Connectors

You can view the summary of Connectors generated through integration setup process and also extend to create connectors and properties for custom data flow.

Figure 26: Connectors Window



5.2.1 Creating Connectors

The 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 the 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.

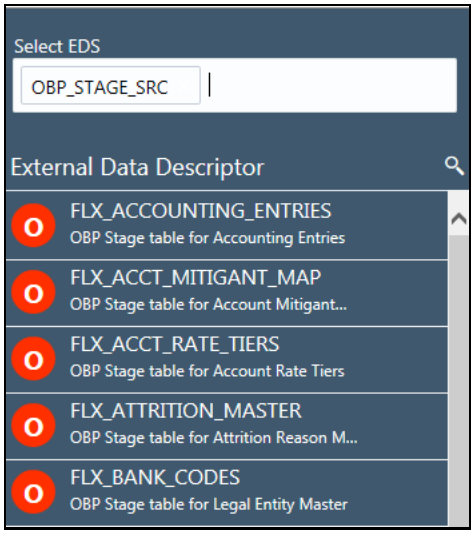
5.2.1.1 Loading Data into OFSAA

To create a Connector for loading data into OFSAA, follow these steps:

1. From the **Oracle Financial Services Data Integration with Unity** navigation list window, select **Data Mapping**, and then select **Connectors**.
2. On the **Connector Summary** window, click  .
3. The **New Connectors Definition** window is displayed.

4. To define a connector, you must have a source with EDD and a target, which is ADI.
5. Click **Source** to select the required EDDs. Here, you can filter your selection based on the EDS selected. The EDD node's color depends on the source system type.

Figure 27: Connectors - Source

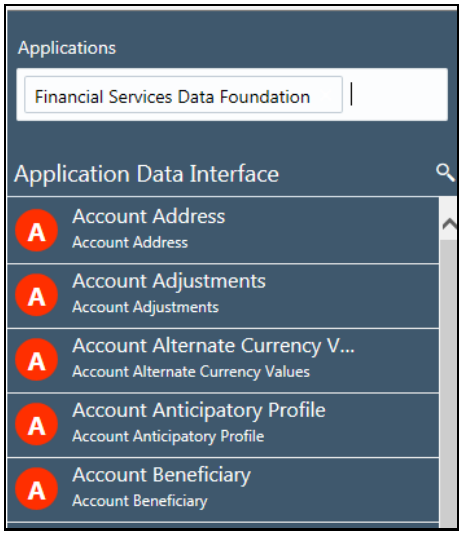


For example:

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

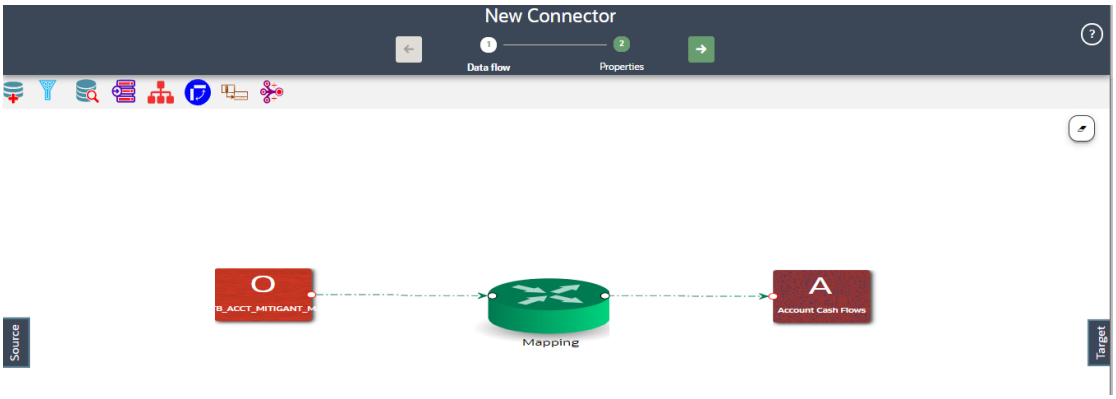
6. If you select 'OBP_STAGE_SRC' as the EDS, it displays the EDDs for that particular EDS selected.
7. Click **Search**  to search for a particular EDD. You can select multiple EDS.
8. Select the required EDD and drag it to the canvas.
9. Click **Target**. Here you can filter ADIs based on the application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

Figure 28: Connectors - Target



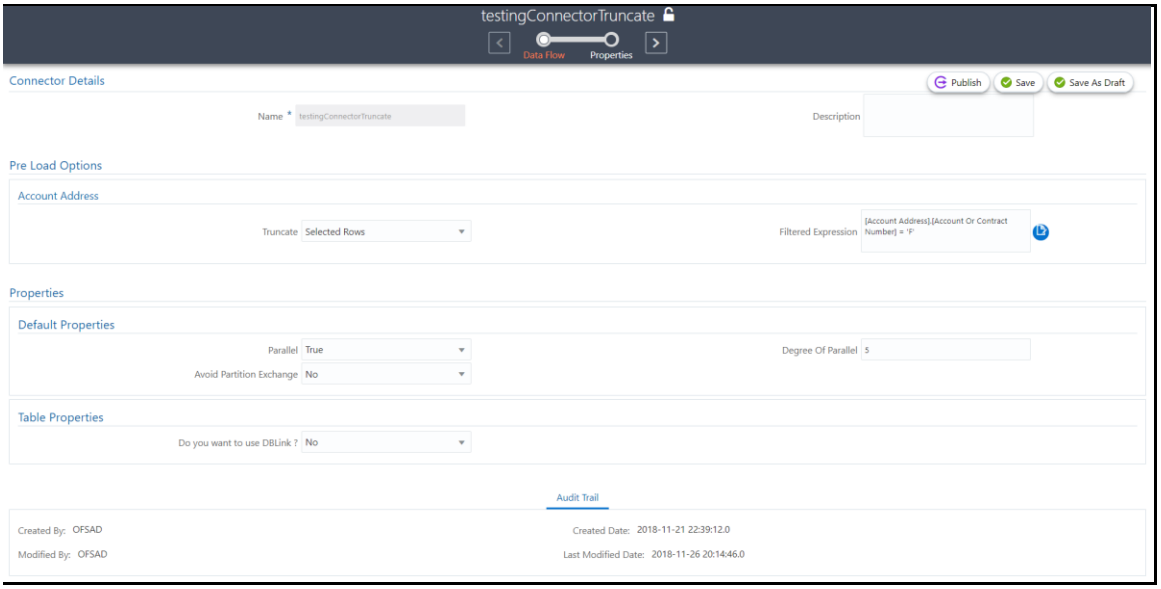
10. Click **Search** to search for a particular ADI.
11. Select the required ADI. Drag it to the canvas and then link the input and output nodes.
12. Click the input white circle. The anchor symbol is displayed. Drag and drop the line to link it to the required component.

Figure 29: New Connector Window



13. At any given time, you can right-click the node to either delink or remove links/outline or delete a node.
14. To edit or view the properties, on the **Connector** window, click  .
15. In **Connector Details**, enter the name and description for the connector.

Figure 30: Connector Details Window



16. In **Pre Load Options,** select the truncate option to be defined in the target. To remove data from the table as per the truncate option specified, select **Truncate**.
    - Select **No**, if you do not wish to truncate the table before loading.
    - If you select **Partial Truncate**, provide the Partition Name. The parameter name can be provided here. If you want to truncate a partition, the Partial Truncate option must be selected. Specify the partition to be truncated before load.

> **NOTE** For multi-target loads, the truncate type must be the same for all targets. However, truncate expression may vary.

    - Select **Full Truncate** to fully truncate. Here no expression is required. If you want to truncate the entire table, the Full Truncate option must be selected.
    - Select **Selected Rows** to truncate on the selected expressions. If you remove specific rows, the selected rows option must be selected. Specify the filter condition for the rows to be deleted. Specific rows are removed from the table before load.

> **NOTE** If OFSAA is hosted on a Big Data environment, then the Truncate with **Selected Rows** option is not supported.

        — Click **Edit** to filter the selected rows.

        — Select the required entity and click **Validate**. This validates the expression.

        — Click **Ok** once the expressions are selected.

    In the image, truncate details are selected for Account Address.

17. In **Properties**, select the Default Properties, File Properties, and Table Properties if you have selected a default type or file type or a table type respectively.

NOTE See the Connector Properties section for more information on the properties.

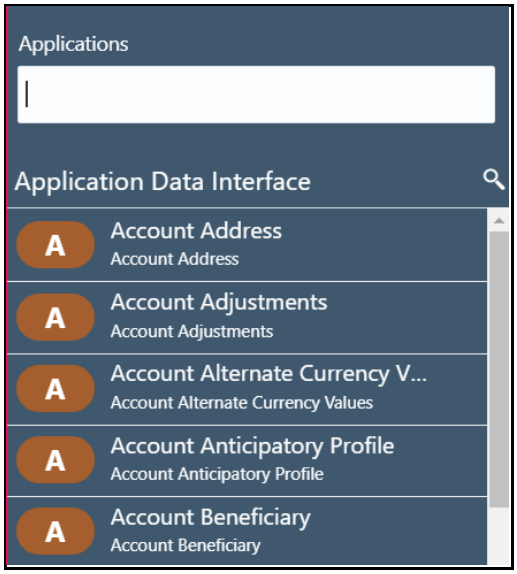
5.2.1.2 Extracting Data from OFSAA

To create a Connector for extracting data from OFSAA, follow these steps:

1. From the **Oracle Financial Services Data Integration with Unity** navigation list window, select **Data Mapping**, and then select **Connectors**.
2. On the **Connector Summary** window, click  .

   The **New Connectors Definition** window is displayed.
3. To define a connector, you must have a 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 depends on the source system type.
6. Click Search  to search for a particular ADI.
7. Select the required ADI. Drag it to the canvas and then link the input and output nodes.

Figure 31: Connectors - Source

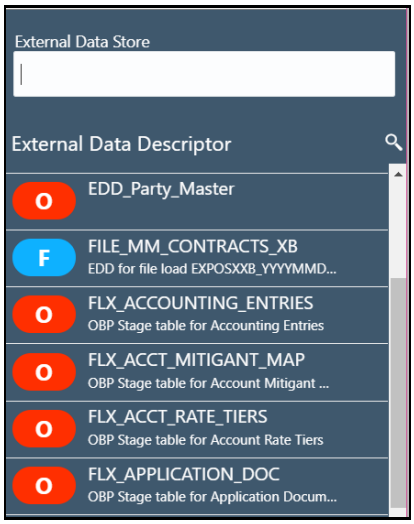


For example:

- The 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.

Figure 32: Connectors - Target



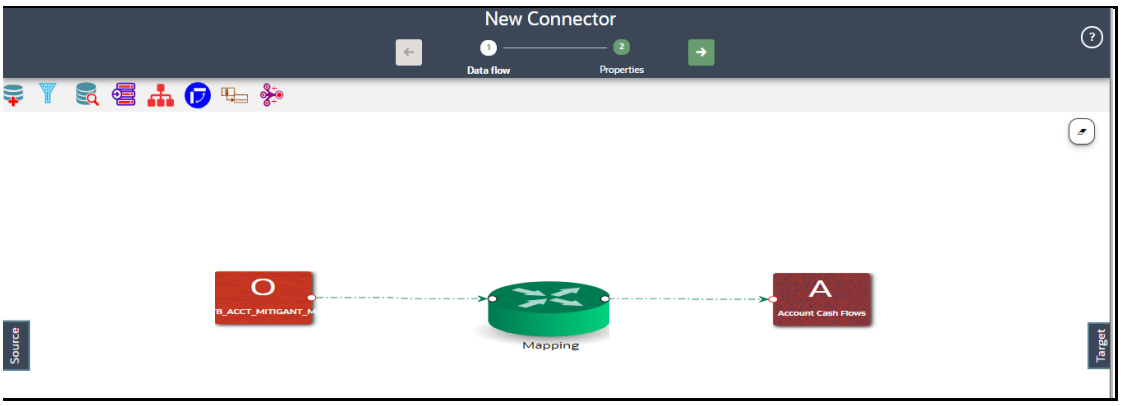
9. If you select 'OBP_STAGE_SRC' as the EDS, it displays the EDDs for that particular EDS selected.

10. Click Search  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 is displayed. Drag and drop the line to link it to the required component.

Figure 33: New Connector Window

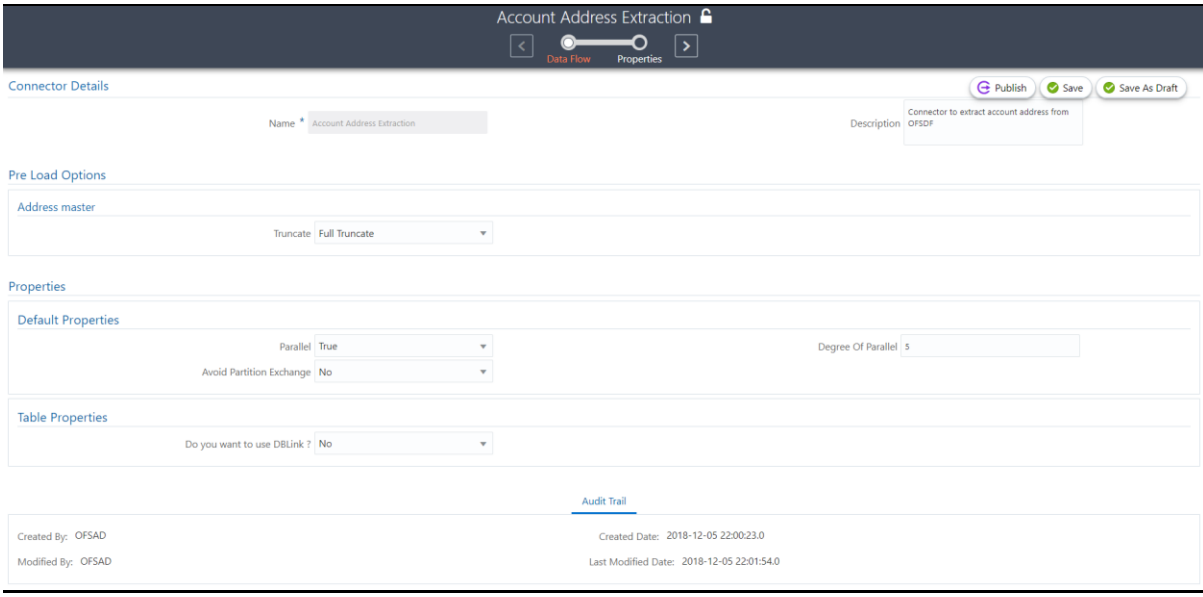


13. At any given time, you can right-click the node to either delink or remove inlinks / outlink or delete a node.

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

15. In **Connector Details**, enter the name and description for the connector.

Figure 34: Connector Details Window



16. In Pre Load Options, select the truncate option to be defined in the target. When you select Truncate it removes data from the table as per the truncate option specified.

    - Select **No**, if you do not wish to truncate the table before loading.
    - If you select **Partial Truncate**, provide the Partition Name. The parameter name can be provided here. If you want to truncate a partition, the Partial Truncate option must be selected. Specify the partition to be truncated before load.
    - Select **Full Truncate** to fully truncate. Here no expression is required. If you want to truncate the entire table, the Full Truncate option must be selected.
    - Select **Selected Rows** to truncate on the selected expressions. If you remove specific rows, the Selected Rows option must be selected. Specify the filter condition for the rows to be deleted. Specific rows are removed from the table before load.

    > **NOTE** If data is extracted into a Big Data environment, then the Truncate with Selected Rows option is not supported.

    — Click **Edit** to filter the selected rows.

    — Select the required entity and click **Validate**. This validates the expression.

    — Click **Ok** once the expressions are selected.

    In this image, truncate details are selected for the Account Address.

17. In **Properties**, select the Default Properties, File Properties, and Table Properties in case you have selected a default type or file type or a table type respectively.

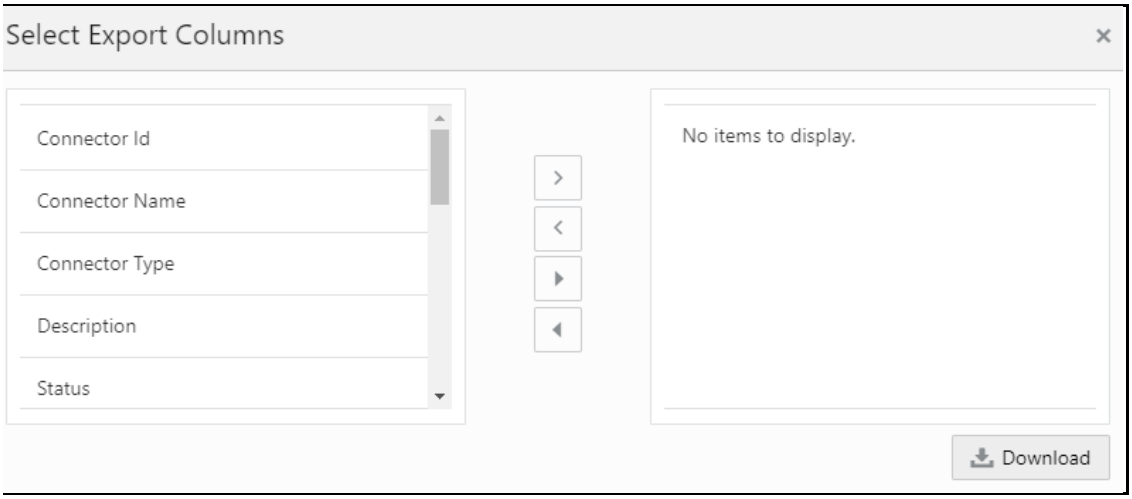
    > **NOTE** See the Connector Properties section for more information on the properties.

5.2.2 Managing Existing Connectors

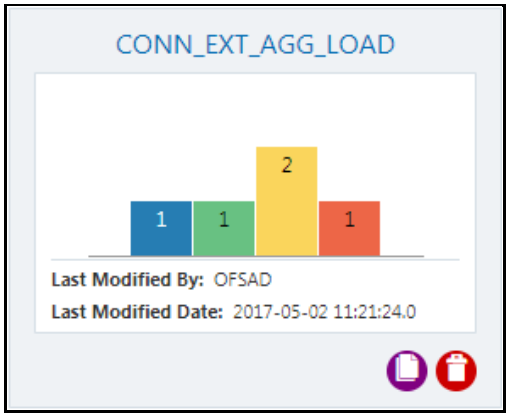
To manage existing connectors, follow these steps:

1. The Connectors window lists all connectors that are defined in the setup. It displays the entire insert, process, and extract type connector details. It gives information about the number of parameters, EDS, EDDs, and ADI used in a specific connector.
2. Click **Export**. The **Select Export Columns** window is displayed.

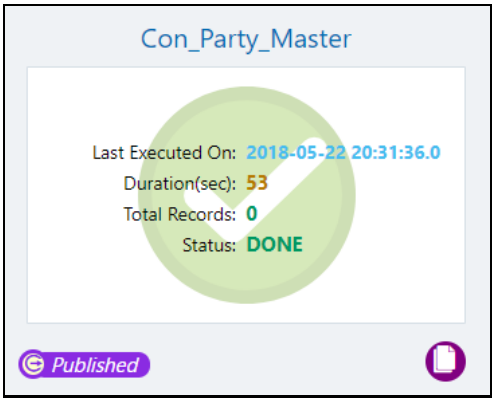
Figure 35: Select Export Columns



3. Select the required ID and click Download. The list of connectors is exported to an Excel sheet with Connector IDs and Connector Name. This lists both insert and extract type connector details.
4. Click  to view the connectors in the card view. It gives information about the number of parameters, EDS, EDDs, and ADI used in a specific connector.



In case, the connector is published:



5. Click the Navigation icon . The **Connectors** are displayed in the list view.

In case, the connector is published:

5.2.3 Understanding the Components

5.2.3.1 Using Filter

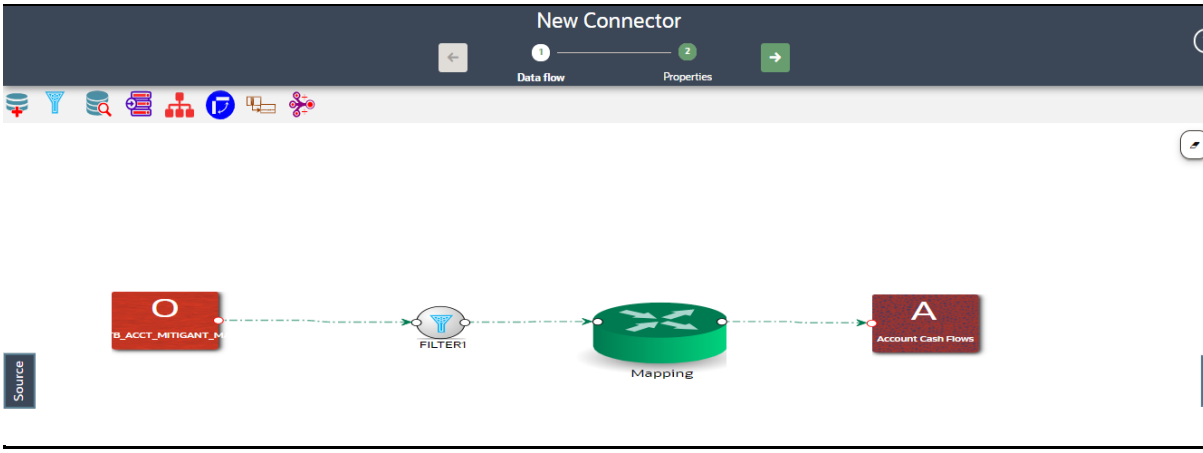
To use the filter component, follow these steps:

1. Drag and drop the **Filter** component on the canvas to define a filter on an entity. For example, EDD (insert connector) / ADI (Process and Extract Connector).

   Alternatively, you can navigate to the component using the Tab key and use key board shortcut Ctrl C (Copy) and Ctrl V (Paste) to copy and paste the component on the canvas. To position the component, select the component and use arrow keys on the keyboard to reorder.

2. It accepts input only from an entity and it can have only one output.
3. If you have multiple entities selected, and you want to have a filter for more than one entity, then you must select as many numbers of filters, connect to the respective entity, and then define their expressions.
4. For example, to add a filter to three entities, drag three filters.

Figure 36: Filter New Connector Window



5. At any given time, right-click the filter component to either delink or remove inlinks / outlinks or delete the filter component.
6. Double-click filter component. The **Filter Expression** window is displayed.
7. The selected entities and parameters are displayed in the **Filter Expression** window.
8. Specify the required filter expression using columns and parameters.
9. Click **Validate** to verify the correctness of the SQL expression.
10. Click **OK**.

NOTE You do not need to add the 'WHERE' clause for the filter.

6. For File data loading, use the filter expression of the Number type along with single quotes. For example: N_DRAWN_AMOUNT ='40000'.
7. For the Date field, see To_CHAR function for comparison.
8. Parameters can also be used in the filter expression. The date format must be a valid SQL date format.

For **Example**:

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

11. If the Source type is Hive, the filter expressions must conform to the following restrictions:
    - Must be valid HiveQL
    - Does not include Oracle built-in or user-defined functions
    - Does not include Subqueries
    - Includes Hive built-in functions only
    - Parameters can also be used in the filter expression. MISDATE can also be passed dynamically so that it is loaded from the Batch Execution window. 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

5.2.3.2 Using Join

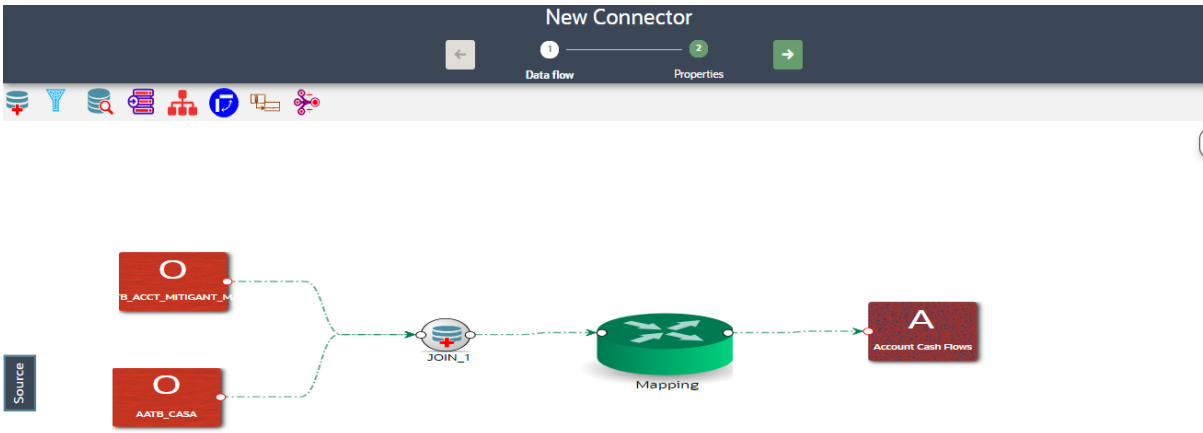
To use the join component, follow these steps:

1. Drag and drop the **Join**  component on the connector window to link multiple entities. For example, EDDs (insert connector) / ADIs (Process and Extract Connector).

   Alternatively, you can navigate to the component using the Tab key and use key board shortcut Ctrl C (Copy) and Ctrl V (Paste) to copy and paste the component on the canvas. To position the component, select the component and use arrow keys on the keyboard to reorder.

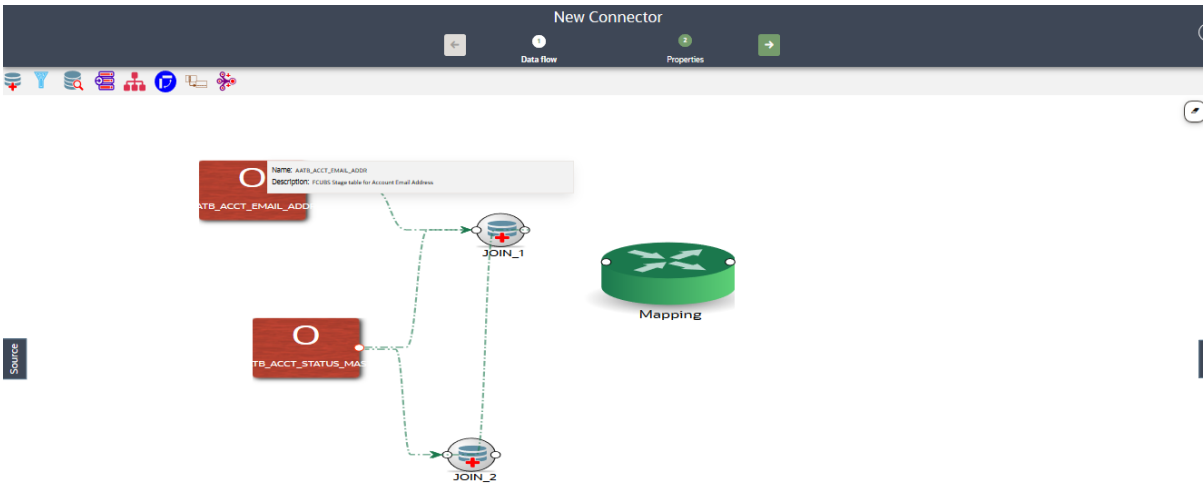
2. The Join component accepts input from two entities.

Figure 37: Join New Connector Window



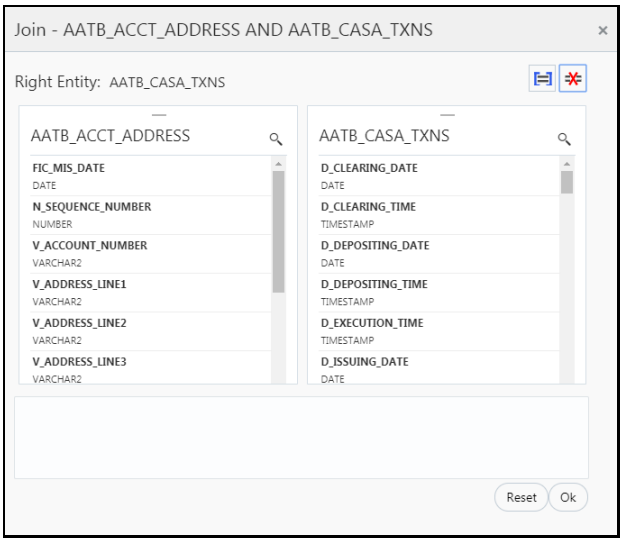
3. To join more than two entities, drag another join component. Link the output of the first join to the input of the second join and then connect the other entities. You can repeat this for multiple entities. Select the Source Entity and click **Ok**.

Figure 38: Multiple Join Entities



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 is displayed:
6. Here you see the selected entities in the left and right tab.

Figure 39: Join Window



7. You can drag and reorder the left and right tab to choose the right/left entity in a join condition.
8. To join entities, the select column from the left and right tab and click **Add Join**  . 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]
```

9. To remove two joined conditions, select two columns from the left and right tab, and click **Remove Join**  . The joined condition is removed from the list.
10. Click **Reset** to reset all the joined conditions.
11. Click **Ok**.

> **NOTE** This creates an inner join between the connected EDDs.

5.2.3.3 Using Lookup

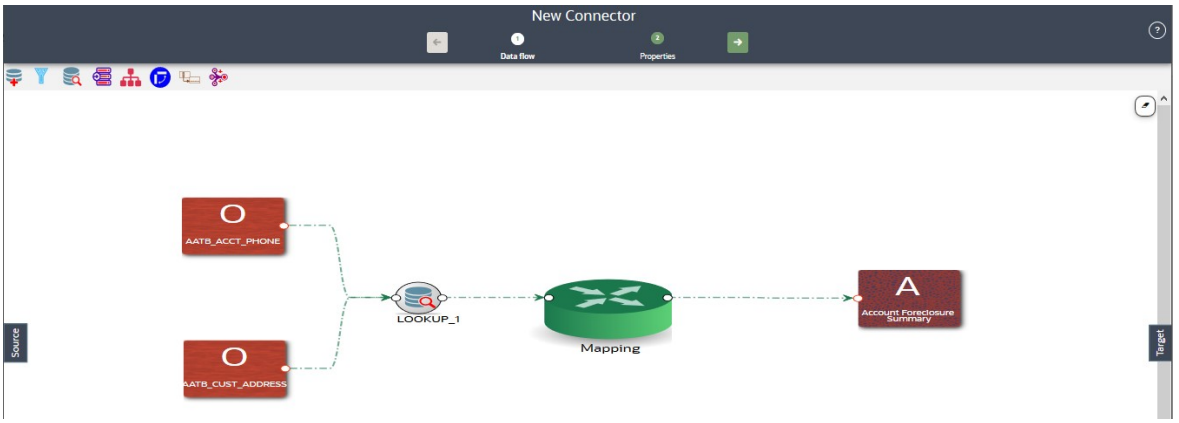
To use the lookup component, follow these steps:

1. Drag and drop the **Lookup**  component on the canvas to define a filter on an entity. For example, EDD (insert connector) / ADI (Process and Extract Connector).

   Alternatively, you can navigate to the component using the Tab key and use key board shortcut Ctrl C (Copy) and Ctrl V (Paste) to copy and paste the component on the canvas. To position the component, select the component and use arrow keys on the keyboard to reorder.
2. You can lookup values from an entity using this component.

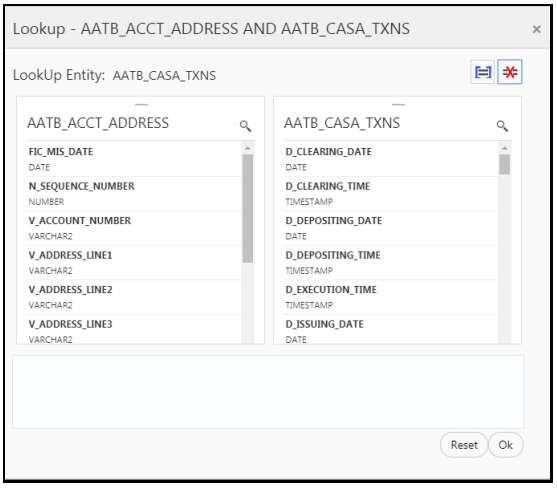
> **NOTE** The lookup component accepts input from two entities. One from Value Entity and the other one from the Lookup Entity.

Figure 40: Lookup New Connector Window



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 is displayed:
5. Here you see the connected entities in the left and right tab.

Figure 41: Lookup Window



6. The entity that is on the right side of the window is the lookup entity. You can change the lookup entity by moving it to the right side. The "LookUp Entity" field displays the entity specified for lookup.
7. To specify lookup condition, select data elements from left and right entities and click Add Join . Lookup condition is displayed as follows:

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

8. To remove a lookup condition, select data elements from left and right entities and click Remove Join . The lookup condition is removed from the list.
9. Click **Reset** to reset the lookup condition.
10. Click **Ok**.

> **NOTE** This creates a left outer join between the connected entities.

5.2.3.4 Using Aggregation for an EDD

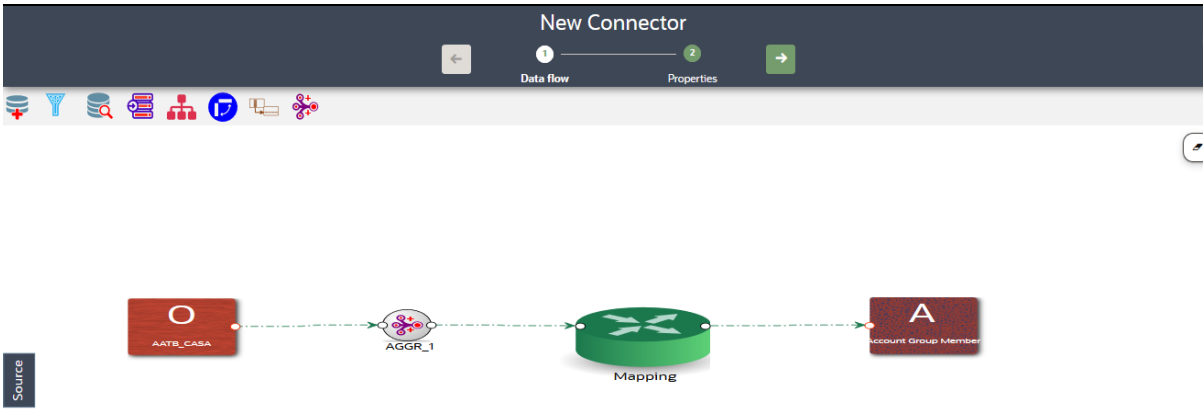
To use the aggregation component, follow these steps:

1. Drag and drop the **Aggregation** component on the canvas to define an aggregation on an EDD.

   Alternatively, you can navigate to the component using the Tab key and use key board shortcut Ctrl C (Copy) and Ctrl V (Paste) to copy and paste the component on the canvas. To position the component, select the component and use arrow keys on the keyboard to reorder.
2. It accepts input only from an EDD and it can have only one output.
3. If you have multiple EDDs to be aggregated then you must select as many numbers of aggregation components, connect to the respective EDD, and then define their group by and having clauses.

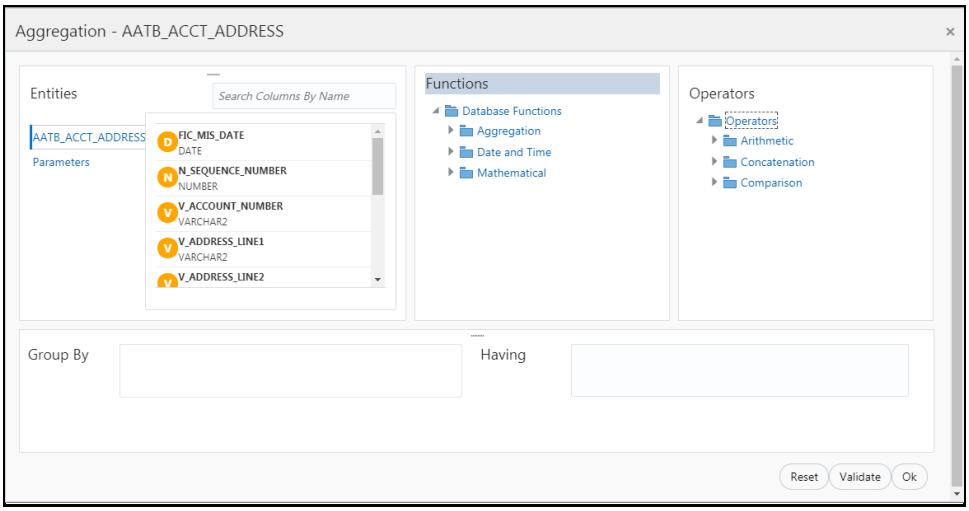
4. For example, to add aggregation to three EDDs, drag three aggregation components.

Figure 42: Aggregation for an EDD New Connector Window



5. At any given time, right-click the aggregation component to either delink or remove inlinks / outlinks or delete the aggregation component.
6. Double-click the aggregation component to define an aggregation condition. The Aggregation window is displayed:
7. Here you see the selected EDD under the entity tab.

Figure 43: Aggregation Window



8. Select the group by columns and specify an expression for the having clause.
9. Click **Reset** to reset all the aggregation conditions.
10. Click **Validate** to verify the correctness of the SQL expression.
11. Click **Ok**.

5.2.3.5 Using Aggregation for Entire Dataset

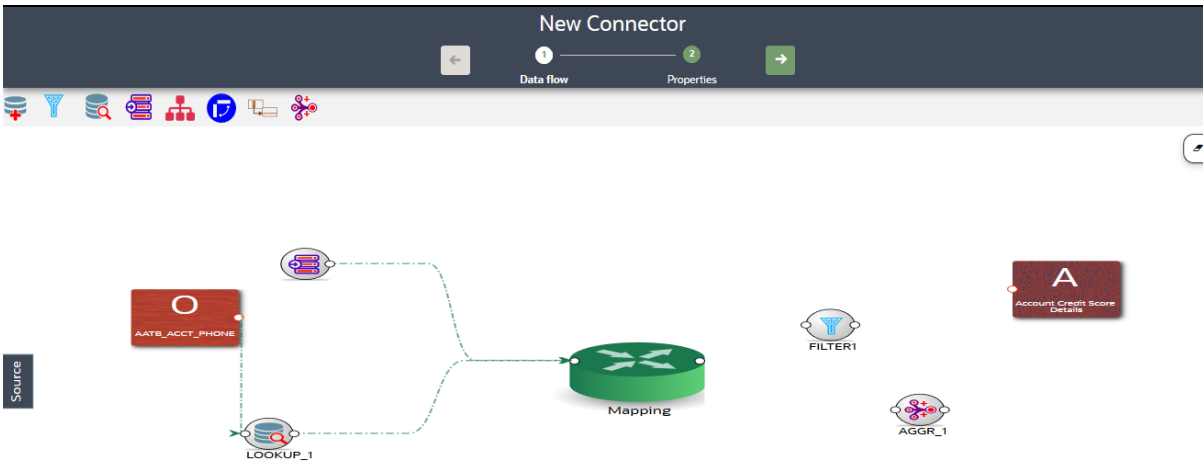
To use the aggregation component, follow these steps:

1. Drag and drop the **Aggregation**  component on the canvas to define an aggregation on the entire dataset.

   Alternatively, you can navigate to the component using the Tab key and use key board shortcut Ctrl C (Copy) and Ctrl V (Paste) to copy and paste the component on the canvas. To position the component, select the component and use arrow keys on the keyboard to reorder.

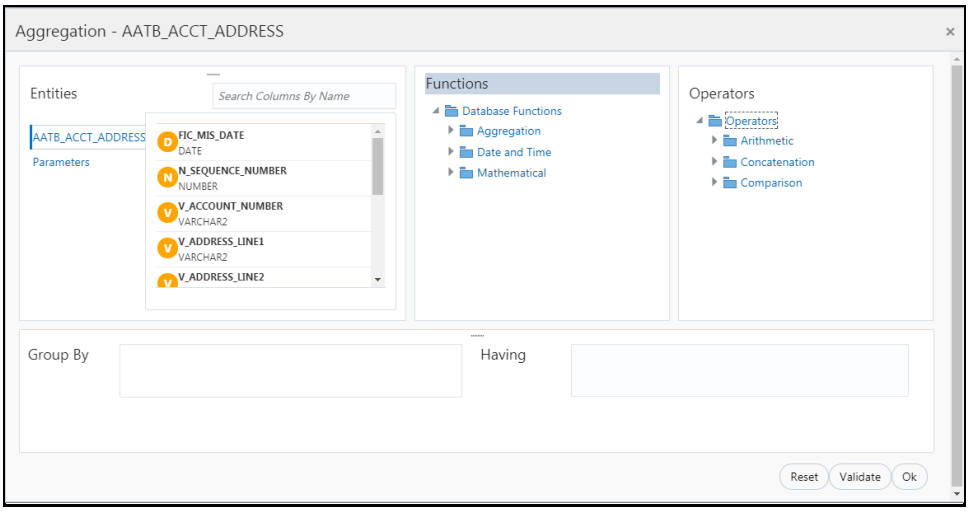
2. It accepts input only from the mapping component or filter that is connected to the mapping component.

Figure 44: Aggregation for Entire Dataset New Connector Window



3. At any given time, right-click the aggregation component to either delink or remove inlinks / outlinks or delete the aggregation component.
4. Double-click the aggregation component to define an aggregation condition. The Aggregation window is displayed:
5. Here you see the selected EDD under the entity tab.

Figure 45: Aggregation Window



6. Select the group by columns and specify an expression for the having clause.
7. Click **Reset** to reset all the aggregation conditions.
8. Click **Validate** to verify the correctness of the SQL expression.
9. Click **Ok.**

5.2.3.6 Using Transpose (Rows to Columns) for an EDD

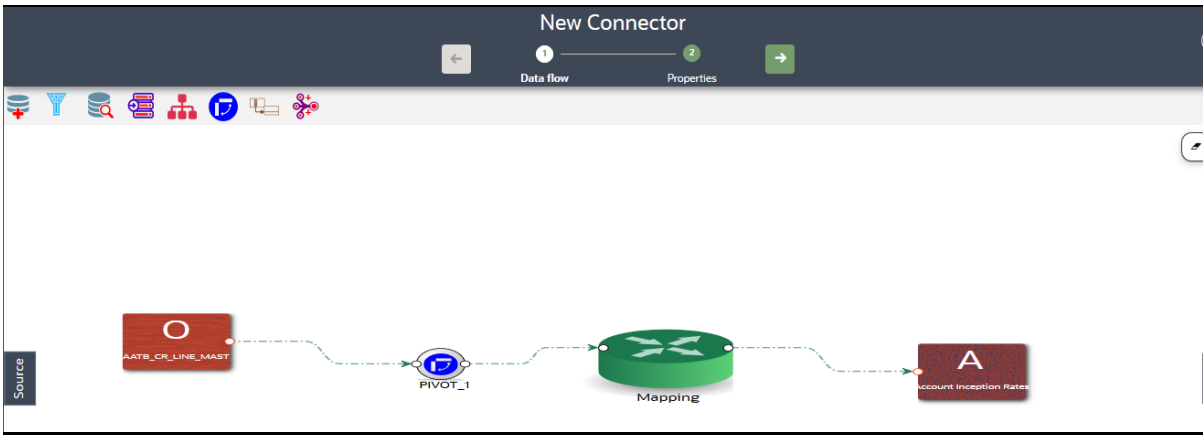
To use the Transpose (Rows to Columns) component, follow these steps:

1. Drag and drop the **Transpose** (Rows to Columns)  component on the canvas to define a Transpose (Rows to Columns) component on an EDD.

   Alternatively, you can navigate to the component using the Tab key and use key board shortcut Ctrl C (Copy) and Ctrl V (Paste) to copy and paste the component on the canvas. To position the component, select the component and use arrow keys on the keyboard to reorder.
2. It accepts input only from an EDD and it can have only one output.
3. If you have multiple EDDs selected, and you want to have a Transpose (Rows to Columns) component for more than one EDD, then you must select as many numbers 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 the Transpose (Rows to Columns) component to three EDDs, drag three Transpose (Rows to Columns) components.

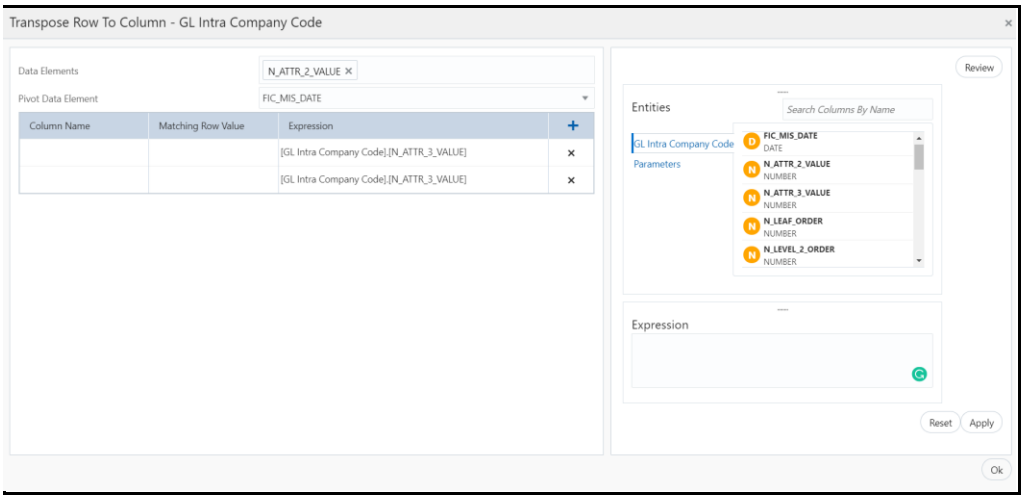
Figure 46: Transpose (Rows to Columns) for an EDD New Connector Window



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 is displayed.

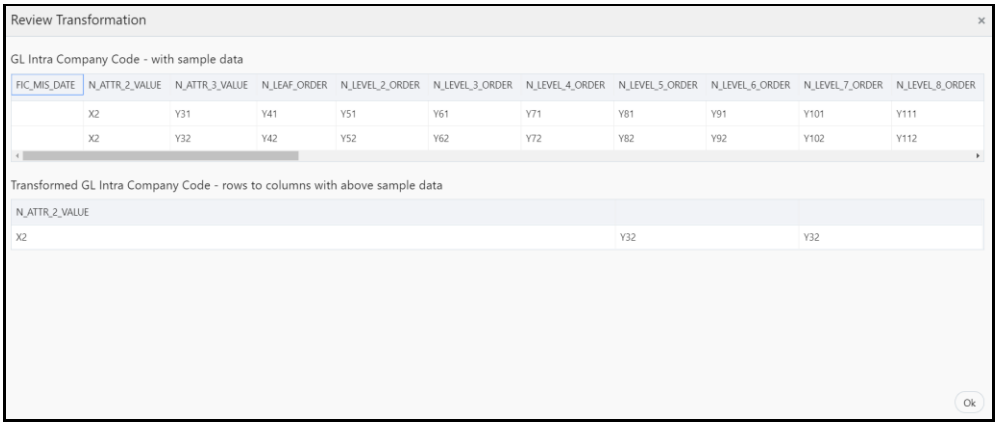
6. Here you see the selected EDD and parameters.

Figure 47: Transpose (Rows to Columns) Window



7. Specify the pivot data element to transpose rows into columns.
8. Specify the Row Value – Transposed Column – Expression combination. You must have a minimum of two combinations.
9. Click Review to review the transformation. The Review Transformation window displays the sample of the transformation data.

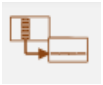
Figure 48: Review Transformation Window



10. Click **Ok**.

5.2.3.7 Using Transpose (Columns to Rows) for an EDD

To use the Transpose (Columns to Rows) component, follow these 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.

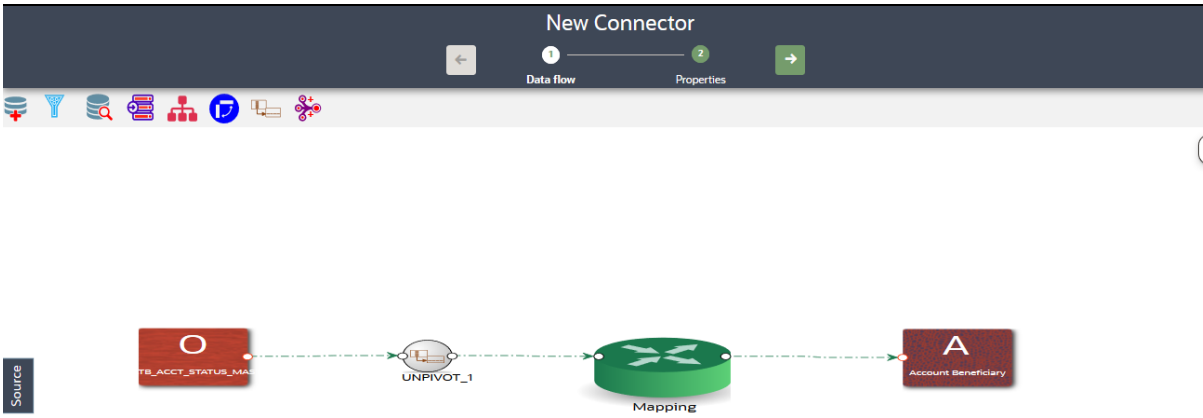
   Alternatively, you can navigate to the component using the Tab key and use key board shortcut Ctrl C (Copy) and Ctrl V (Paste) to copy and paste the component on the canvas. To position the component, select the component and use arrow keys on the keyboard to reorder.

2. It accepts input only from an EDD and it can have only one output.
3. If 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 numbers 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.

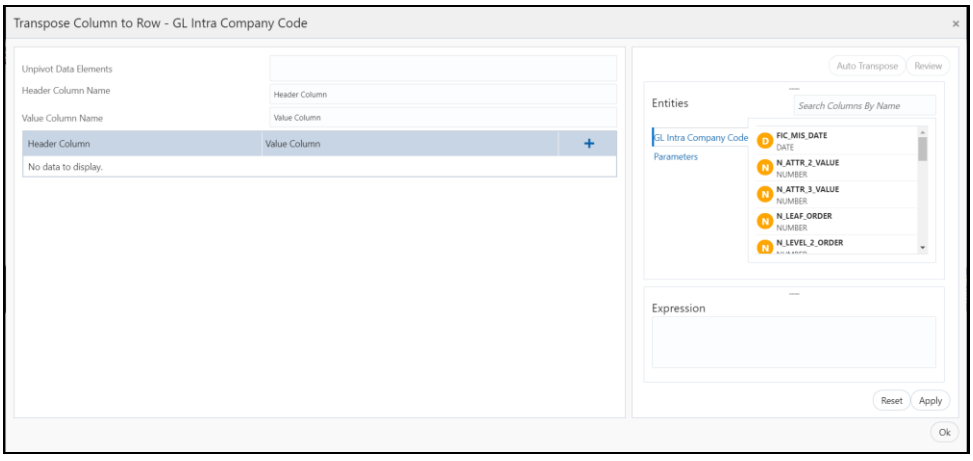
4. For example, to add the Transpose (Columns to Rows) component to three EDDs, drag three Transpose (Columns to Rows) components.

Figure 49: Transpose (Columns to Rows) for an EDD New Connector Window



5. 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.
6. Double-click the component to transpose the entity columns into rows. The Transpose Column to Row window is displayed.
7. Here you see the selected EDD and its parameters.

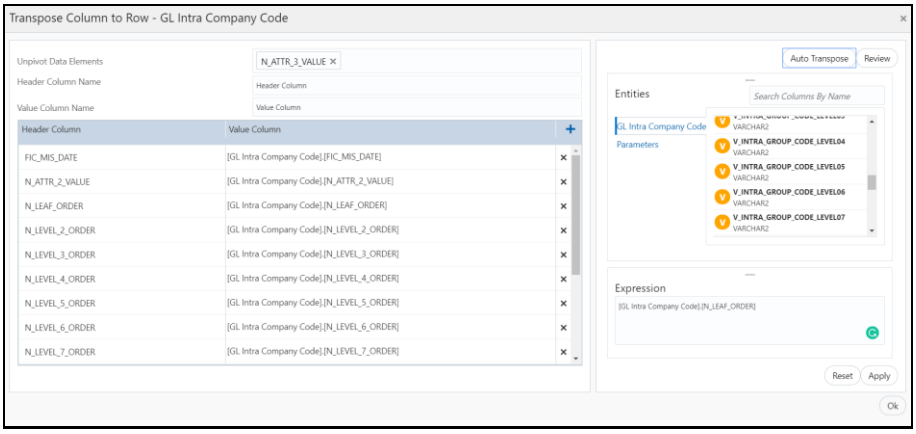
Figure 50: Transpose (Columns to Rows) Window



8. Specify the Unpivot Data Element to transpose columns into rows.

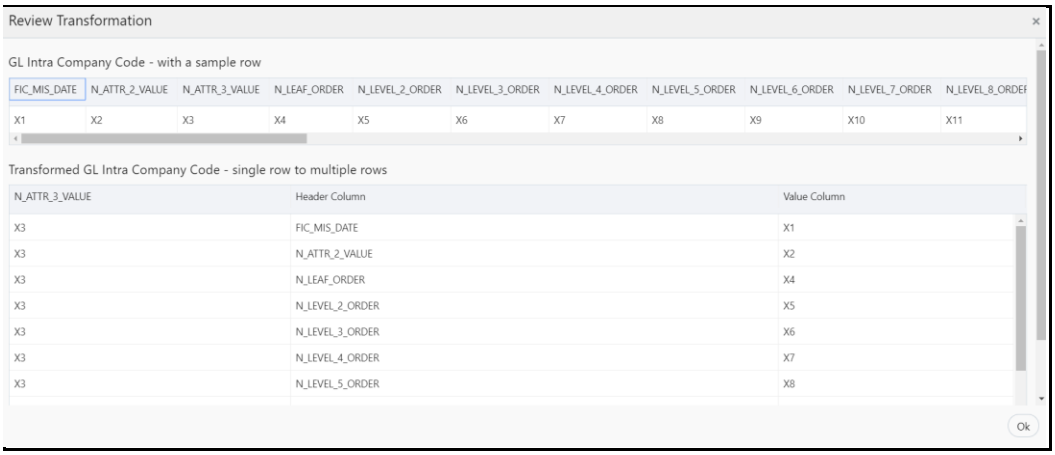
9. Specify the Header Column Name and Value Column Name.
10. Specify the Column Value (Header column) and Expression Pair (Value column) for each transposed row. You must have a minimum of two pairs.
11. After specifying the Unpivot Data Elements, click **Auto Transpose**. This will transpose columns into rows based on the unpivot data elements selected.

Figure 51: Transpose (Columns to Rows) Window



12. You can also click  drag and drop the columns.
13. Click **Review** to review the transformation. The Review Transformation window displays the sample of the transformation data.

Figure 52: Review Transformation Window



14. Click **Ok**.

5.2.3.8 Using Derived Column

To use the Derived Column component, follow these steps:

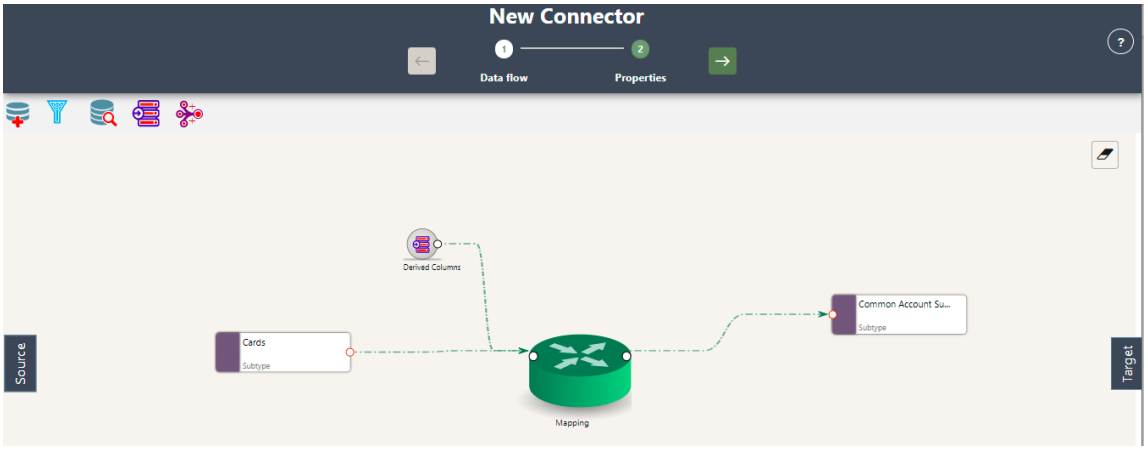
1. Drag and drop **Derived Column**  component on the canvas.

   Alternatively, you can navigate to the component using the Tab key and use key board shortcut Ctrl C (Copy) and Ctrl V (Paste) to copy and paste the component on the canvas. To position the component, select the component and use arrow keys on the keyboard to reorder.

2. Connect the Derived Column to the mapping.

   NOTE The output must be connected to the mapping.

Figure 53: Derived New Connector Window

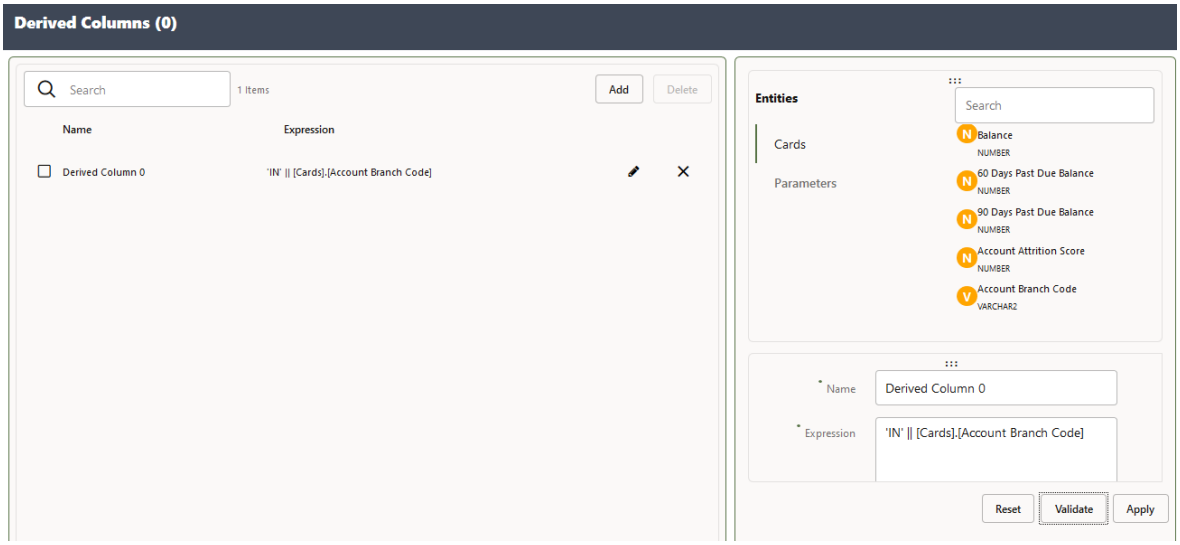


3. At any given time, right-click the expression component to either delink or remove outlinks or delete an expression component.

4. Double-click the Derived Column component.

   The Derived Expression window for Derived Column is displayed.

Figure 54: Derived Column Window



5. Click **Add** to define a new Derived Column.
6. Click **Edit** to specify the name and expression of the Derived Column. You see the selected EDDs in the right tab.
7. Click **Validate** in case you wish to verify the correctness of the SQL expression.
8. Click **Apply**.
9. Repeat the steps for as many Derived Columns.
10. Click **Ok**.

5.2.3.9 Using Mapping

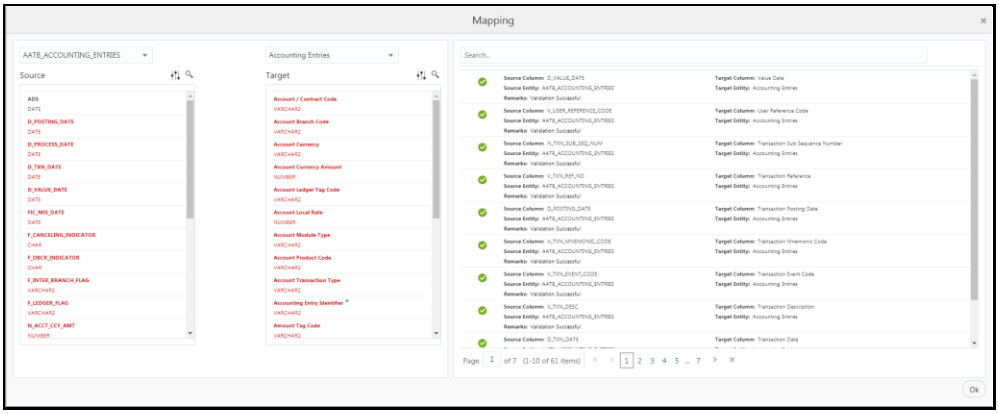
1. Double-click **Mapping**. The Mapping window is displayed.

   Alternatively, you can navigate to the component using the Tab key and use key board shortcut Ctrl C (Copy) and Ctrl V (Paste) to copy and paste the component on the canvas. To position the component, select the component and use arrow keys on the keyboard to reorder.

   > **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.

Figure 55: Mapping Window



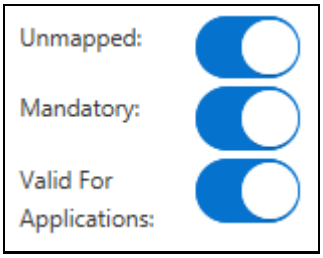
3. Click a Data Element under Source, Attribute under Target, and then click **Map**  . On the RHS, the column mapping is displayed.
4. The following validations are done for the mapping:
   a. Data Type Validation
   b. Data Length Validation
   c. Data Precision Validation
5. If validation is successful, it displays Successful  next to the mapping.
6. If any of the validations fail, it displays Warning  next to the mapping.
7. At any given time, you can select **Unmap** to unmap the source and target.
8. Click **Auto-Map**  to auto map a source and target.

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

9. In the Source column, click **Filter**  . Enable it to view the unmapped items.

> **NOTE** The mapped columns are displayed in red.

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



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

12. Click **Search**  to search for a column name under the 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**  to import a mapping Excel. Choose mapping Excel from the file browser.

15. Click **Export Mapping**  to export the mapping information. This downloads an Excel file.

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

5.2.3.10 Using the Flatten Table to PC Hierarchy Transformation for an EDD

To use the Flatten table to PC Hierarchy Transformation, follow these steps:

1. Drag and drop the **PC Hierarchy**  component on the canvas.

   Alternatively, you can navigate to the component using the Tab key and use key board shortcut Ctrl C (Copy) and Ctrl V (Paste) to copy and paste the component on the canvas. To position the component, select the component and use arrow keys on the keyboard to reorder.

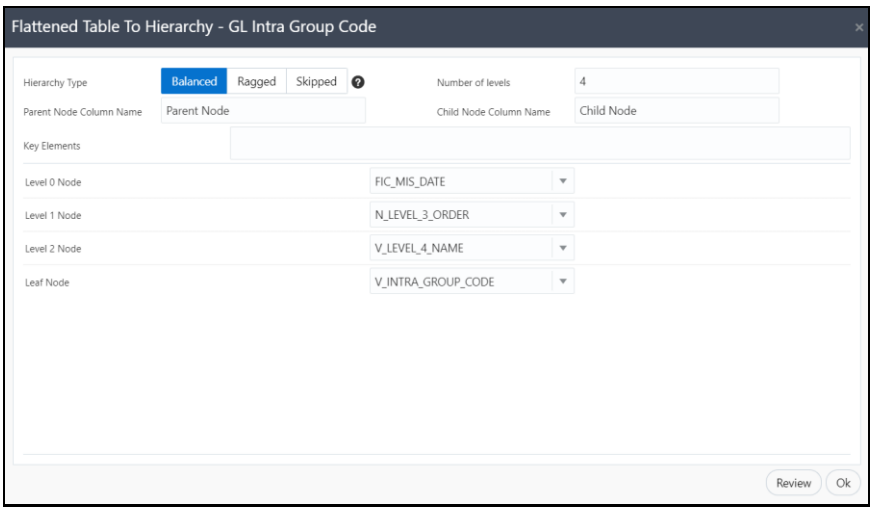
2. Connect the Derived Column to the mapping.

> **NOTE** The output must be connected to the mapping.

Figure 56: PC Hierarchy New Connector Window

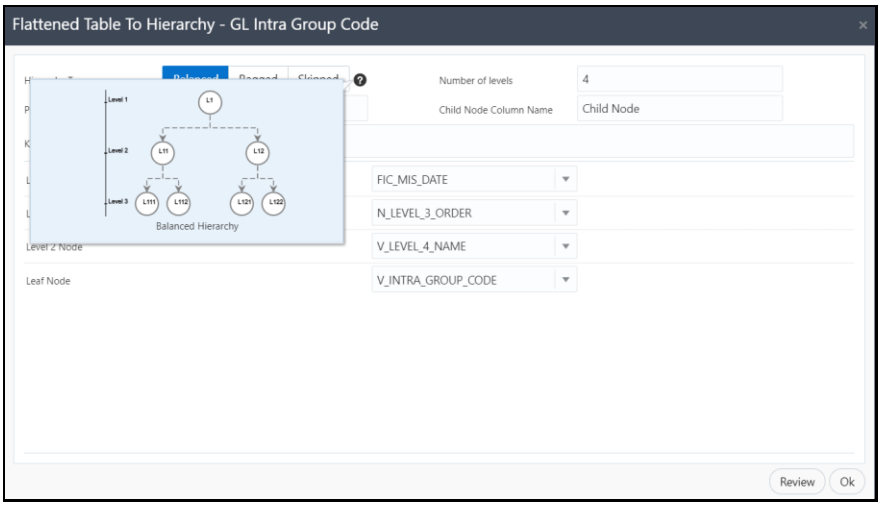
3. At any given time, right-click the expression component to either delink or remove outlinks or delete an expression component.
4. To define the expression, double-click the Flatten table to the PC hierarchy. The Flattened Table to Hierarchy window is displayed.

Figure 57: Flattened Table to Hierarchy Window



5. Choose the Hierarchy Type. The types of hierarchy supported are Balanced, Ragged, and Skipped. Click ? to view the details and understand how the hierarchies are defined.

Figure 58: Flattened Table to Hierarchy Window



6. Specify the Number of levels in the hierarchy. This field accepts only numbers.
7. Specify the Parent Node Column name and Child Node Column name which are used in the mapping.
8. Select the **Key Elements** from the drop-down list.
9. Select all nodes. You can change the date and or other details from the drop-down list.
10. Click **Review** to view the transformation changes.

11. Click **Ok**.

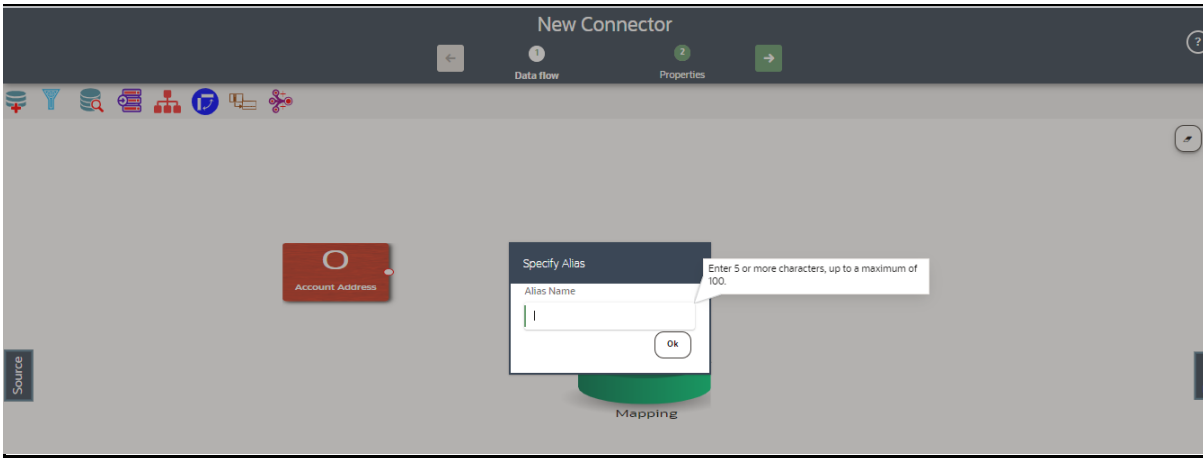
5.2.4 Specifying Alias in Connector

Alias refers to an assumed name or pseudonym assigned to an EDD or an ADI as you define Connectors, much like table aliases used in SQL statements. Aliases allow an EDD or an ADI to be referred in multiple joins, lookups, or both, within the same Connector definition, each in a distinct context.

Aliases are automatically initiated by DIH as and when required while defining Connectors. The following scenario explains the mechanism:

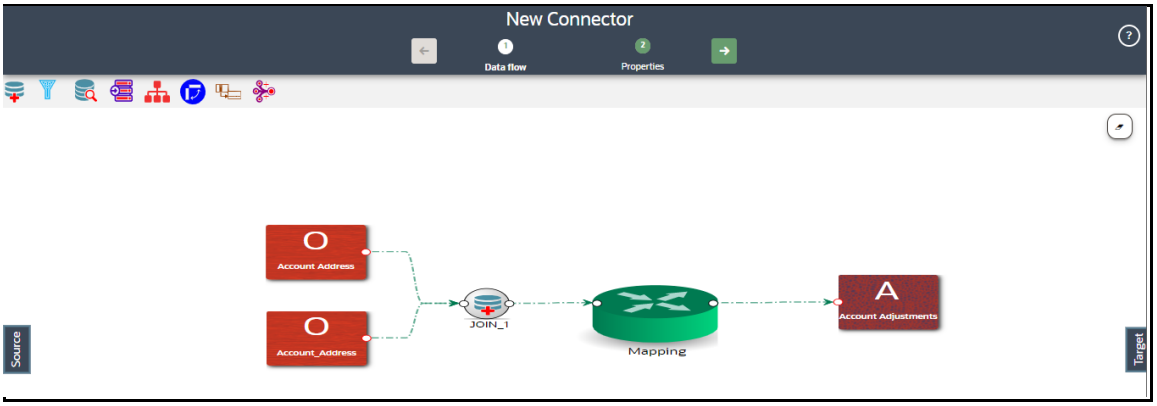
1. Drag and drop an ADI or EDD more than once, for use in separate joins or looks-up, on the New Connector canvas. DIH initiates the specification of an alias by displaying the **Specify Alias** dialog box.

Figure 59: Specify Alias



2. Enter a name of your choice under Alias Name and click Ok. Note that the Alias Names must be unique within a Connector.

Figure 60: New Connector Window



5.2.5 Connector Properties

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

The following table describes the fields in the connector properties.

Table 7: Connector Properties

Fields	Applicable Values	Description	Default Value
Loading mechanism	• **External Table** • **SQLLDR**	**There are two options External Table and SQLLDR.** • **External Table** - If the loading mechanism is selected as an External table, then the file-landing zone must be located/mounted on the database server. • **SQLLDR** - This option is only applicable when OFSAA is hosted in Oracle Database. The file-landing zone must be located or mounted on the server where the ODI agent is running. Oracle Database Client must be installed in the server where the ODI agent is running. **NOTE**: If the loading mechanism is selected as External Table, the file must be located in the same place as the database server. If the target database type is HDFS, only the External Table option is enabled. If the target database type is Oracle, provide CREATE DIRECTORY role to the Atomic schema. Also, the path/folder used in the directory must have read and write permissions.	SQLLDR
DIRECT	• True • False	Direct path load of SQLLDR. Values can be True and False.	TRUE
Parallel	• True • False	Parallel option. True means the loading happens with parallel option and False means it happens sequentially.	TRUE
Degree of Parallel	Integer	Decides the degree of parallelism. The values specified here must be a number.	0
No: of Errors	Integer	Shows the number of errors allowed for the SQLLDR and External Table to proceed. That means a single record fails the job fails. The values specified here must be a number.	0

Fields	Applicable Values	Description	Default Value
Maximum Discard	Integer	Discarded records allowed for SQLLDR. This must be set to a very high number when using multiple subtypes under an ADI. That means it is multiple targets.	1
XML date Format	Valid XML Date format	In this field, you can define the format of the XML Date. **Example**: MMDDYYYY.	MMDDYYYY
Avoid Partition Exchange	• Yes • No	The property option decides whether the Partition Exchange method is used during the data load. **NOTE:** If the connector execution fails during partition exchange for some reason, then it can be avoided by choosing the option "Yes".	No
Do you want to use Data Pump?	• Yes • No	There are two values 'Yes' and 'No'. 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 the DBLink method is followed. **NOTE**: The following access is required for the data pump option. Grant create any directory to Source schema Grant create any directory to the target schema Grant execute on DBMS_FILE_TRANSFER to the target schema Grant execute on utl_file to the source schema	No
Source and Target in the Same Environment?	• Yes • No	This parameter is used only if the Data Pump is used. If the value is, 'Yes' then the file transfer step is not performed during loading. Alternatively, it will transfer files from source to target folder using DBLink.	Yes
Source Dump Location	/src/tmp	Specify a folder/path that is accessible by the Source Oracle Database to create the dump file.	/src/tmp
Target Dump Location	/target/tmp	Specify a folder/path that is accessible by Target Oracle Database to read the dump file.	/target/tmp
Number of Splits for Dump File	Integer	Specify a number to transfer the files in parallel chunks. For example, 3 indicates that the dump file is split into three and transferred separately. This is to improve the performance of file transfer. The values specified here must be a number.	0

Fields	Applicable Values	Description	Default Value
Effective Dated Key for Result Area?	• Yes • No	This parameter is used for loading data into the result area. It decides whether it will perform a lookup into a dimension for the latest record, or an 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. **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 an Extraction date or any other date field, then do not rely on surrogate key generation. Use the derived column and enter the value in the format "YYYYMMDD" as a number.	No
Do you want to use DBLink?	• Yes • No	This parameter is used to specify the source database connection method. There are two values 'Yes' and 'No'. If the value is 'Yes', it indicates a connection source database is created using the DBLink method. If the value is 'No', it indicates a connection to the source database is created using the JDBC URL.	No
Hive Date Format	yyyy-MM-dd	This parameter is used to specify the date format for date columns in Hive source.	yyyy-MM-dd

Fields	Applicable Values	Description	Default Value
Do you want to use Big Data SQL?	• Yes • No	This parameter is used to specify the loading mechanism from the HIVE source. If you have selected Yes, Oracle Big Data SQL is used. **NOTE**: The following are the pre-requisites for this method: • The Oracle Big Data SQL is installed and configured on Oracle Big Data Appliance and Database (OFSAA) machines. • In the OFSAA database, a directory named DEFAULT_DIR is created. • The folder/system path specified for the above directory must be accessible to the database (OFSAA). For more information see: 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 this method: ▪ Oracle Loader of Hadoop connectors is installed and configured in the source system. ▪ The ODI agent is also configured for OLH. For more information see: https://docs.oracle.com/cd/E72987_01/odi/odi-big-data/setup.htm#ODIBD117	No

5.2.6 Modifying and Viewing a Connector

To edit or view a connector, follow these 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 connectors in Published status. To edit a connector in Published status, you must first un-publish it and then open it.

2. The connectors are created open in their respective view mode.
3. The details of the selected connector are displayed. You can modify or view the details.

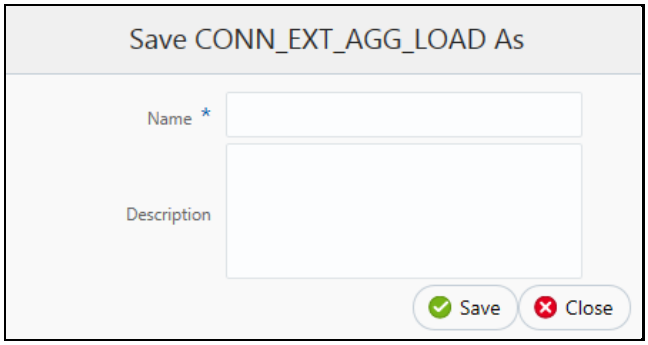
4. The Connector Name cannot be edited. Update the other required details.
5. Click **Save** to save the changes made.
6. To make changes to a published connector, click 'Unpublish'. The 'Unpublish' option clears the ODI metadata that has been created during publishing. Update the required changes and then click Publish. The updated changes are synced in ODI.

5.2.7 Copying a Connector

To copy an existing Connector, follow these steps:

1. Click **Copy** for the required connector. A **Save As** dialog box is displayed.

   Figure 61: Save Connector As

   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.

5.2.8 Deleting a Connector

To delete an existing Connector, perform the following steps:

1. Click **Delete** for the required connector. A confirmation dialog box is displayed.
2. Click **Yes** to delete a connector. The Connector is deleted. If you do not wish to delete, click No.

5.2.9 Search and Filter

The Search and Filter option in the UI 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 keyword 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).

5.2.10 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 the parameter, then it must be converted to date first. The following is the expression:

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

NOTE Runtime batch MIS date is in string format. It must be converted to DATE. The date format used here must be a valid SQL date format.

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