

Oracle Financial Services Compliance Studio

User Guide

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ORACLE®

Financial Services

OFS Compliance Studio User Guide

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Document Control

Table 1 lists the document control of this guide.

Table 1: Document Control

Version Number	Revision Date	Change Log
8.1.2.6.9	April 2024	Added <code>package_common.sql</code> in the Setting up Database for Fresh Installation and Upgrade section.
8.1.2.6.7	March 2024	Added the Using Dynamic Datasets with AML Scenario Conversion section. Added the “Load Dynamic Datasets” notebook details in the Setting up Database for Upgrade and Importing the Notebook (Draft) sections.
8.1.2.6.6	March 2024	Added Dynamic parameter list in the External Interface Component Scheduler Service section.
8.1.2.6.3	January 2024	Added the Using Delete Threshold Sets Notebook section. Added the “delete threshold sets” notebook details in the Setting up Database for Fresh Installation and Upgrade and Importing the Notebook (Draft) sections.
8.1.2.6.0	December 2023	Added the Setting up Database for Upgrade section. Updated all the steps in the Accessing the Verification Notebook section. Added a note in the Creating Ruleset (Match/Merge) section. Added notes in the following sections: <ul style="list-style-type: none"> • Importing the Notebook (Draft) • Importing the Notebook (Draft) • Generating Threshold and Scenario Notebook
8.1.2.6.0	November 2023	The new ER pipeline (CSA_8126) is added in the Table 57 and Table 59 . Added a new note related to multiple data survival rulesets in the Creating Data Survival Rules section. Added a new note related to masking party attributes based on jurisdiction and business domain in the Using Merge and Split Global Entities section. Added notes for approve and approve all action in the Pending - System Requests Tab section.

Table 1: Document Control

Version Number	Revision Date	Change Log
8.1.2.6.0	November 2023	<p>Added Step 10 and Figure 324 in the Accessing the Calendar Notebook section.</p> <p>Added three new scenario in the Conversion Steps section.</p> <p>Added new steps in the Creating a Pipeline section.</p> <p>Added upgrade steps in the Using Scenario Conversion Utility section.</p> <p>Added the following sections:</p> <ul style="list-style-type: none"> • Analyses • Data Stores • Adding a Version, Parameter set, and Python Runtime parameters
8.1.2.5.1	September 2023	Added new scenarios in the Conversion Steps section.
8.1.2.5.0	July 2023	<p>Added the following sections:</p> <ul style="list-style-type: none"> • Conda Environments • Notification • Model Monitor • Data Lineage • Publishing a Pipeline • Scope Detail • Schedule Details • Audit History • Execution History • APIs for Model Pipelines • Public APIs for Scheduler Operations • Using Subgraph Off loaded Graphs • Pending - System Requests Tab <p>Updated the “Connection Pool” information in the Health section.</p> <p>Updated the Audit Trail and Notification Settings information in the Profile section.</p> <p>Updated additional jars from BD installation in the Calendar Notebook section.</p> <p>Updated steps for notebooks and SQLScripts in the Setting up Database for Fresh Installation and Upgrade section.</p> <p>The new ER pipeline (CSA_8125) is added in the Table 57 and Table 59.</p> <p>Updated screens along with relevant content in the New Tab and Pending - User Requests Tab sections.</p>
8.1.2.4.4	May 2023	<p>Added the Calendar Notebook section.</p> <p>Updated the new scenario “(ML/CU) Hub and Spoke” in the Conversion Steps section.</p>

Table 1: Document Control

Version Number	Revision Date	Change Log
8.1.2.4.3	May 2023	<p>Added note for BD and ECM graph schemas in the Schedule Details section.</p> <p>Added key value for BD and ECM schemas in the Table 36.</p> <p>Added BD and ECM graphs information in the Compliance Studio Global Graph section.</p> <p>Added the new Pre-configured Graph FCGM Model section for BD and ECM graphs.</p>
8.1.2.4.0	March 2023	<p>All the UI elements are updated in the entire document due to OJET upgrade.</p> <p>Updated document to reflect that OpenSearch has replaced Elastic Search in 8.1.2.4.0.</p> <p>The new ER pipeline (CSA_8124) is added in the Creating Ruleset (Match/Merge) and Creating Data Survival Rules sections.</p> <p>Added Graph Refresh Schedules in the Updating Graph Definition section.</p> <p>Added the following sections:</p> <ul style="list-style-type: none">• Using Object Migration• Using Model Catalog• Schedule Details• Comparison of Events between BD and Conversion Utility• Download a Workspace• Health• External Interface Component Scheduler Service
8.1.2.3.0	January 2023	Updated User-group field in the Configure Basic Details .
8.1.2.1.0	December 2022	Updated a note (4.e) in the Updating Graph Definition section.

Table 1: Document Control

Version Number	Revision Date	Change Log
8.1.2.1.0	September 2022	<p>OJET Upgrade (all UI elements are updated according to UI in the entire document).</p> <p>Added the following sections:</p> <ul style="list-style-type: none"> • Managing Graph Pipelines • Managing Datasets • Using Scheduler Service • Compliance Studio Global Graph • Edit WorkspaceUpdating Graph Definition • Managing Data Pipelines • Accessing the Model Pipelines • Import a Workspace Model Data into a New Model • Cloning Ruleset (Match) <p>Updated the following sections:</p> <ul style="list-style-type: none"> • Using the OFS Compliance Studio Application • Using Audit Trail • ML4AML Model Templates
8.1.2.1.0	September 2022	<p>Added new interpreter-based paragraphs in the About Paragraphs section.</p> <p>Added new list of nodes, edges, and pre-seeded indexes in the Pre-configured Graph FCGM Model section.</p> <p>Removed scenarios such as HRG - AC Focus, RMF - AC Focus, RMF - CUS Focus in the Using Example Scenario Notebooks section.</p> <p>Added new method Generate Sequence in the Creating Data Survival Rules section.</p> <p>Removed a note in the Creating Data Survival Rules section.</p> <p>Updated steps in the Settings Window section.</p> <p>Added Re-initialize session icon in the Common Screen Elements in a Notebook section.</p>
8.1.2.0.0	March 2022	<p>Updated the following sections:</p> <ul style="list-style-type: none"> • About Paragraphs • ML4AML Model Templates • Entity Resolution • Using Ruleset (Match/Merge) • Data Survival Rules • Using Manual Decisioning <p>Add the Using Merge and Split Global Entities section.</p>
8.1.1.1.0	November 2021	Updated for the Data Survival Rules section.
8.1.1.0.0	October 2021	Created the user guide for the release v8.1.1.0.0 version.

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1 Preface

This preface provides information for the Oracle Financial Services Compliance Studio application (OFS Compliance Studio) User Guide.

Topics:

- [About this Guide](#)
- [Audience](#)
- [Additional Resources](#)
- [Conventions Used](#)
- [Acronyms Used](#)

1.1 About this Guide

This user guide is provided for Data Scientists working in financial crime, allowing them to create sandboxes for model development and management of the end-to-end model lifecycle, including deployment and scheduling. It will also be used by analysts and investigators who provide business input into the entity resolution and manual decision-making processes.

1.2 Audience

This document is intended for the system administrators and users configuring the Workspace and models in OFS Compliance Studio.

1.3 Additional Resources

This section identifies additional resources for the OFS Compliance Studio Application Pack.

You can access the following OFS Compliance Studio documents from the [Oracle Help Center \(OHC\)](#).

- [OFS Compliance Studio Matching Guide](#)
- [OFS Compliance Studio Administration Guide](#)
- [OFS Compliance Studio Release Notes](#)
- [OFS Compliance Studio Installation Guide](#)
- [OFS Compliance Studio Architecture Guide](#)

For more information about how Oracle Financial Services solves real business problems, see our website at www.oracle.com/financialservices.

1.4 Conventions Used

[Table 2](#) lists the conventions used in this guide.

Table 2: Conventions Used in this Guide

Convention	Meaning
<i>Italics</i>	<ul style="list-style-type: none"> Names of books, chapters, and sections as references Emphasis
Bold	<ul style="list-style-type: none"> The object of an action (menu names, field names, options, button names) in a step-by-step procedure Commands typed at a prompt User input
Monospace	<ul style="list-style-type: none"> Directories and subdirectories File names and extensions Process names Code sample, including keywords and variables within the text and as separate paragraphs, and user-defined program elements within the text
Hyperlink	Hyperlink type indicates the links to external websites and internal document links to sections.

1.5 Acronyms Used

Table 3 lists the acronyms used in this guide.

Table 3: Acronyms Used in this Guide

Conventions	Description
BA	Business Analysts
Infodom	Information Domain
Navigation Tree Menu or Navigation Menu	Left-hand side menu
OFS AAI	Oracle Financial Services Analytical Application Infrastructure
OFSAA	Oracle Financial Services Analytical Applications
Production Infodom	Production Information Domain
Sandbox Infodom	Sandbox Information Domain
SA	System Administrator
URL	Uniform Resource Locator
UI	User Interface
BD	Behavior Detection
ECM	Enterprise Case Management
PGX	Parallel Graph Analytics / Graph Analytics Engine

Table 3: Acronyms Used in this Guide

Conventions	Description
FCGM	Financial Crime Graph Model

2 About OFS Compliance Studio

Topics:

- [Introduction](#)
- [Capabilities offered by Compliance Studio](#)
- [Architecture Overview](#)
- [Process Flow](#)

2.1 Introduction

OFS Compliance Studio is an advanced analytics application that supercharges anti-financial crime programs for better customer due diligence, transaction monitoring, and investigations by leveraging the latest innovations in artificial intelligence, open-source technologies, and data management. It combines Oracle's Parallel Graph Analytics (PGX), Machine Learning for AML, Entity Resolution, and notebook-based code development and enables Contextual Investigations in one platform with complete and robust model management and governance functionality.

2.2 Capabilities offered by Compliance Studio

- Purpose-Built for Fighting Crime
 - Fully defined and sourced Financial Crime Graph Model supporting detection and investigation
 - Provided Accelerators for finding the needles in the haystack.
 - What if Analysis for existing Scenarios
 - Integration with ECM and Investigation Hub to provide meaningful guidance to investigators for rules-based and ML-generated alerts
 - Enterprise-ready and compatible with the underlying OFSAA framework
 - Works with earlier 8.x releases of Oracle Financial Compliance Management Anti Money Laundering (AML), Enterprise Case Management, and Fraud applications.
- Entity Resolution for AML
 - Entity Resolution to enhance monitoring effectiveness and provide a single customer view
 - Linking and Resolution across internal and external data to improve single entity detection
 - Allows for Scenario/Model detection across internal data
 - Multi-attribute enabled with ML boosts for Name/Address models
 - Prebuilt Integrations and easily configurable for Data Sources like ICIJ etc.
- Analytics of Choice
 - Choose from our proprietary models or bring your own
 - Fully embedded Graph Analytics Engine and Financial Crime Model
 - Embedded with a highly scalable in-memory Graph Analytics Engine (PGX)
 - Industry's most intuitive Graph Query Language to gain rapid insights

- Model Management and Governance
 - End-to-end management from model creation to model deployment.
 - Data Ingestion (Oracle DB, Graph, Hive)
 - Model Development
 - Supports virtually all open source packages, interpreters, etc.
 - Process in Database or Big Data
 - Model Training
 - Model Performance Evaluation
 - Model Explainability
 - Model Tracking and Audit
 - Approval Mechanisms
 - Model Deployment
 - Scheduling
 - Ongoing Monitoring
- ML Foundation for Financial Crimes
 - Integrated with Oracle Financial Crime Application Data and readily usable across the enterprise financial crime data lake
 - Pre-engineered features and transformations to address each use case
 - Simplified APIs for each stage of the modeling lifecycle
 - Leverage the power of Graph, Supervised ML, and Unsupervised ML build typology detection models, detect anomalies, and risk score customers or events
 - Event Scoring for false positive prediction and disposition
 - Ongoing Monitoring of Model Performance and Concept Drift
 - Automated Scenario Calibration and Scenario Conversion Utility for Oracle AML Scenarios
- Graphs
 - Graph Pipeline feature allows you to view the data relationships in a graphical format.
 - Graph Analytics will give Financial Institutions the ability to monitor the data financial institutions effectively. The data is organized as nodes, relationships, and properties (property data is stored on the nodes or relationships). The results of analytics algorithms are stored as transient properties of nodes and edges in the Graph.

2.3 Architecture Overview

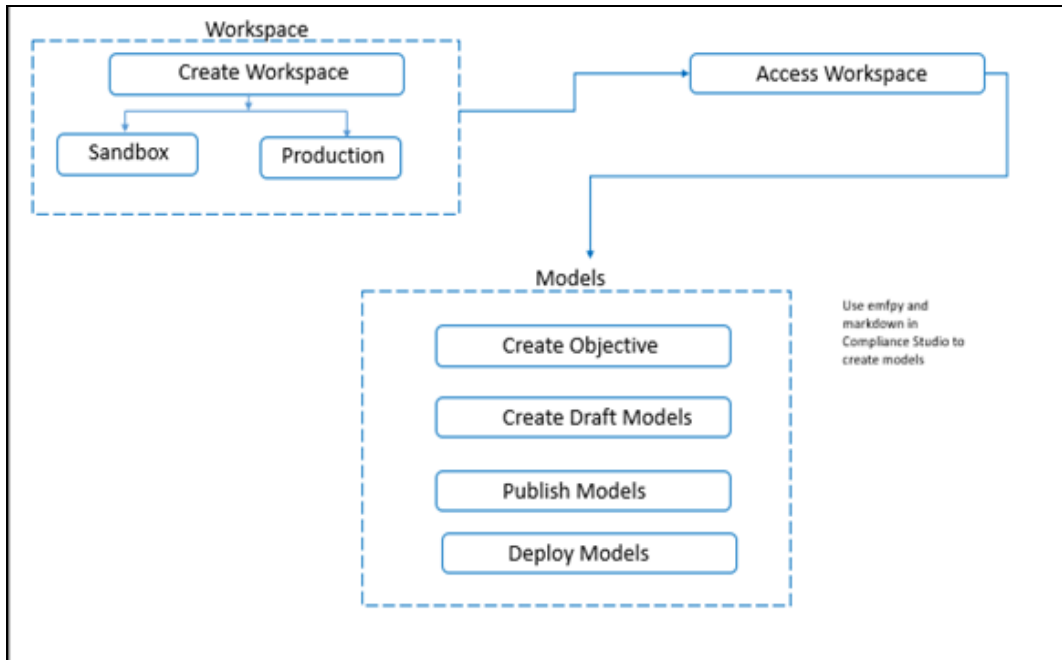
See the [OFS Compliance Studio Architecture Guide](#) for more details on Compliance Studio architecture.

2.4 Process Flow

The process flow for building models in Compliance Studio involves the creation of Sandboxes and the creation of Models mapped to the Sandboxes. Models can be deterministic rules or trained machine learning models. You can then publish a model into production and make it available to users after you

have determined that the models and the parameters used to construct the models meet business requirements and are consistent with business institution.

Figure 1: OFS Compliance Studio Process Flow



3 Getting Started

This section provides details on how to set up user groups and how users can access the application. It also provides an overview of the menu items in the user interface and their purpose.

Topics:

- [Accessing the OFS Compliance Studio Application](#)
- [Mapping User Groups](#)
- [Using the OFS Compliance Studio Application](#)

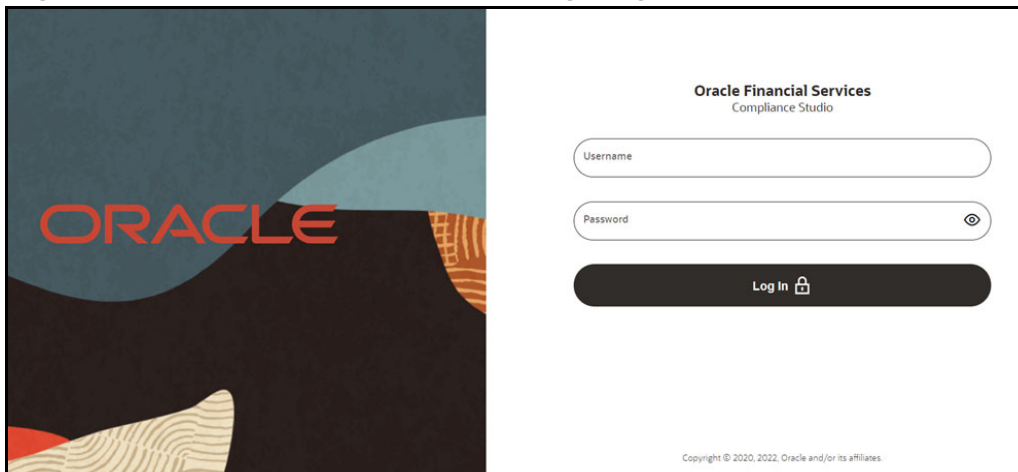
3.1 Accessing the OFS Compliance Studio Application

After the application is installed and configured, you can access the OFS Compliance Studio application.

To access OFS Compliance Studio, follow these steps:

1. Enter the application URL in your browser. The **Login** page is displayed.

Figure 2: OFS Compliance Studio Application Login Page

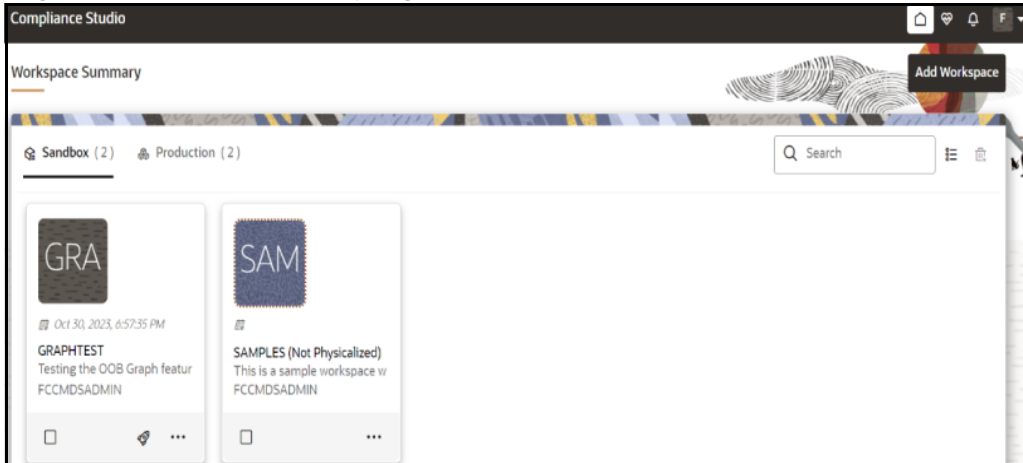


NOTE

- The login page only appears in the case of FCCMRealm.
- In the case of SAMLRealm, the user will see the login page of their Identity Provider.

2. Enter your **Username** and **Password**.
3. Click **Log in**. The Workspace Summary page is displayed.

Figure 3: Workspace Summary Page



3.2 Mapping User Groups

For information on User Groups and Mappings, see the **User Access and Permissioning Management** section in the [OFS Compliance Studio Administration and Configuration Guide](#).

NOTE

- At the first time login, User Group mappings are initialized from AAI/ Identity Management for the newly provisioned users. These will be reflected in Compliance Studio Admin Console in the next Compliance Studio login.
- If User Group mappings are deleted in AAI/ Identity Management, they will not delete in Compliance Studio Admin Console. Admin needs to delete this in Compliance Studio Identity screens too.
- The user must be given **DSADMNGRP** permission to create a notebook using DSUSER login. To verify and request permission, perform the following:
 - Login to Compliance Studio as an Administrator user.
 - Navigate to the top-right corner and select the **Admin**. The Identity Management window is displayed.
 - For more information on permissions, see [OFS Admin Console User Guide](#).

3.3 Using the OFS Compliance Studio Application

The Compliance Studio Application has the following key capabilities and concepts described in greater detail in this document.

3.3.1 Workspaces

Workspace Management is where the workspace Administrators define datasets and make them available to modelers in OFS Compliance Studio. It is an environment where the data is prepared for modelers to use in their modeling creation activity.

Workspaces are provisioned with the data required for modeling by administrators, who configure workspaces with subsets of production data. The data in the Workspace is made available to modelers

using datasets, who then build models with the dataset without any exposure being provided to the physical data tables and columns in the database. In effect, the data is ready for the modelers, and they do not have to undergo the arduous task of accessing and querying the database. See the [Workspace Dashboard Window](#) section for information on how to use Workspace Management in the application.

3.3.2 Dataset

Datasets allow for the creation of a dataframe, a data structure that captures the logic that organizes data into a 2-dimensional table of rows and columns. Datasets allow for the reuse of these dataframes across models, as well as the features derived from the data source(s).

The Dataset allows you to manage the entire operation related to data set. You can perform the following two things using the Dataset window:

- Define a metadata on how you want to create a dataset
- In addition, a mechanism where you can actually take a snapshot of real time data and store it. So, it can be used later in the pipeline.

For more information, see the [Datasets](#) section.

3.3.3 Pipelines

Modeling refers to the process of designing a prototype based on a structured data model for statistical analysis and for simulating actual events and functions. A user with access to the Workspace can create or modify models in a workspace. Model versions are preserved in the Workspace, along with execution and output histories. Once a model has been validated in the Workspace and considered fit for use, modelers can request to push the Model into the production environment.

See the [Pipelines](#) to create models from pre-defined models to predict business trends and validate the existing models with the help of Compliance Studio.

3.3.4 Model Actions

The Model Actions window allows you to view the list of models associated with the Workspace.

For more information, see the [Model Actions](#) section.

3.3.5 Graphs (Graph Pipeline)

Unlike traditional relational database management systems, the Graph Pipeline feature allows you to view the data relationships in a graphical format.

This feature uses the latest technology to harness the power of Graph Analytics to give Financial Institutions the ability to monitor the data financial institutions effectively. The data is organized as nodes, relationships, and properties (property data is stored on the nodes or relationships). The results of analytics algorithms are stored as transient properties of nodes and edges in the Graph.

For more information, see the [Graphs](#) section.

3.3.6 Scheduler Service

The Scheduler Service is a service in the Infrastructure system that automates behind-the-scenes work that is necessary to sustain various enterprise applications and functionalities. This automation helps the applications to control unattended background jobs program execution.

The Scheduler Service contains a graphical user interface and a single point of control for the definition and monitoring of background executions.

For more information, see the [Scheduler Service](#) section.

3.3.7 Audit Trail

The Audit Trail window provides the complete details of model. This shows the information such as, when Model was created, who created the Model, workflow of Model, for example when this Model became champion or deployed, and so on.

For more information, see the [Audit Trial](#) section.

3.3.8 Data Studio Options

Compliance Studio contains an underlying Notebook Server which has the following configurable options:

- Interpreters
- Tasks
- Permissions
- Credentials
- Templates

For more information, see the [Data Studio Options](#) section.

3.3.9 Object Migration

Object Migration is the process of migrating or moving objects between environments.

You may want to migrate objects for several reasons such as managing global deployments on multiple environments or creating multiple environments so that you can separate the development, testing, and production processes.

For more information, see the [Object Migration](#) section.

3.3.10 Model Libraries

The Model Library information is used to bind a particular technique and its details to one unique Model Library. The Starting point for the Model builder is to register a model library with application after it is properly set up in the python environment to be used.

For more information, see the [Model Libraries](#) section.

3.3.11 Model Techniques

Model Technique is the algorithm/technique used to create python model using the library/package which was created in the Model Library Screen. It is the actual information captured in the application that helps in training the model (Upload and Build).

For more information, see the [Model Techniques](#) section.

3.3.12 Model Catalog

The Model Catalog page allows you to add and manage the Model Technique, Model Library, and Model Objectives. You can either import the models from external sources or create, train and label it as champion model.

For more information, see the [Model Catalog](#) section.

3.3.13 Ruleset Details

The Ruleset facilitates identifying the similarity between two entities (customer, account, etc) and derives a match. A Ruleset is a set of rules applied to the defined source and target entities and compares the entities' attributes to derive a match.

For more information, see the [Creating Rulesets](#) section.

3.3.14 Manual Decisioning

The Manual Decisioning in Compliance Studio allows you to make manual decisions on similarity edges from the threshold set on the Match Ruleset page. This flexibility provides an Ad-hoc experience to improve the graph analytic capability and identify the match to analyze risk and take required actions.

For more information, see the [Using Manual Decisioning](#) section.

3.3.15 Merge and Split Global Entities

Merge and Split Global Entities in Compliance Studio allows you to manually break, merge, create, and re-arrange parties into global parties. This flexibility provides an Ad-hoc experience to enable users to make decisions on borderline cases or where data issues or rules logic has grouped records incorrectly.

For more information, see the [Using Merge and Split Global Entities](#) section.

3.3.16 ML4AML Model Templates

The prepackaged Model templates allow you to perform the following:

- Customer Risk Scoring
 - Model segmentation (model grouping)
 - Load and Preview data
 - User-defined transformation (deriving additional features)
 - EDA
 - Feature selections
 - Model training and evaluation
 - Model Agnostics (Explainability)
 - On-going validations
- Customer Segmentation
 - Anomaly detection (within Cluster)
 - Deviation detection (across Cluster)
- AML Event Scoring

- Train and Score ECM events
- Classify events into Low, Medium and High
- Typology Scenarios
 - Shell Account detection
- Automated Scenario Calibration
 - Prod scenario analysis
 - Scenario Execution
 - Above the Line (ATL) Analysis
 - Below the Line (BTL) Analysis
 - Outcome/Impact Analysis
 - Transaction Analysis
 - Pre-prod Scenario Analysis
 - Scenario Execution
 - Pre prod Analysis
 - Transaction Analysis

For more information, see the [OFS Compliance Studio ML4AML Use Case Guide](#).

4 Using the Application UI Features

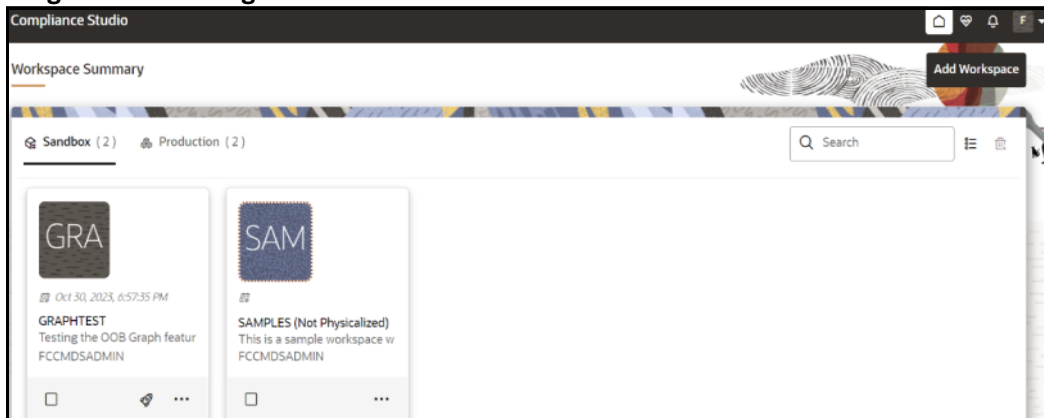
This section describes the user interface of the OFS Compliance Studio application. These are the common features that are found across the modules of OFS Compliance Studio. It describes the organization of the user interface and provides step-by-step instructions for navigating through the application.

4.1 Home Page Components

The Home Page contains the following features:

- Workspace Summary
- Home
- Health
- Notification
- Profile


Figure 4: Home Page



4.1.1 Workspace Summary

This page displays the Workspaces in Sandbox and Production environments. You can add and manage the workspaces from this page. In addition, you can launch, view, edit, populate, delete, and download the workspaces by clicking on Launch and Action icon. In the search bar, you can search a Workspace using Workspace Code, Owner, Creation Date, or Workspace Type fields.

4.1.2 Home

Click **Home**  icon to navigate to **Workspace Summary** page from any other window in application. You can add and manage Workspaces from this page.

4.1.3 Health


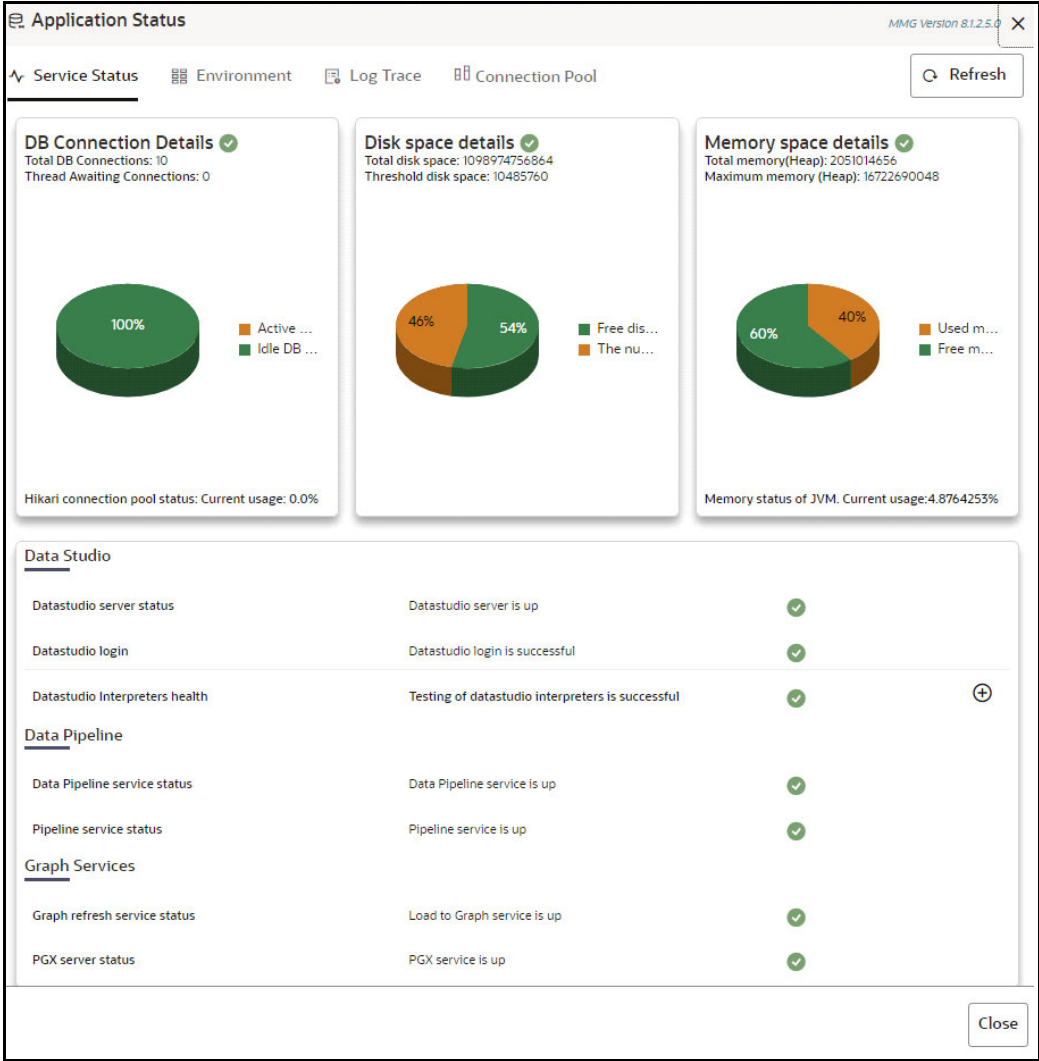
Click **Health**  icon to view the application status and version details. The Health page consists of four tabs:


Figure 5: Application Status




- **Service Status:** The Database connection, Disk space, Memory allocation details are displayed in graphical chart format. Hover on the chart to view more details. In addition, the status information of the services that are running such as Data Studio, Data Pipeline, and Graph Services are displayed. Click on the + icon to view individual services status
- **Environment:** The System and Application properties details are displayed.
- **Log Trace:** The individual logs are displayed that will help you during analysis and debugging of the issue. You can set the last lines of the log based on your example. For example, if you wish to see only 10 last lines of the log, enter 10 in the Show lines text box.

NOTE Access logs are available in the following location for UI and Services.
\$LOG_HOME/services/access/mmg-ui-access.log
\$LOG_HOME/services/access/mmg-service-access.log

- **Connection Pool:** The information of connections used for the data source are displayed. Select the data source from the drop-down list to view the connections and the maximum capacity. This will help you in monitoring the connections of the specific data source.

- Clicking on the **Refresh**  icon will refresh the application status details.

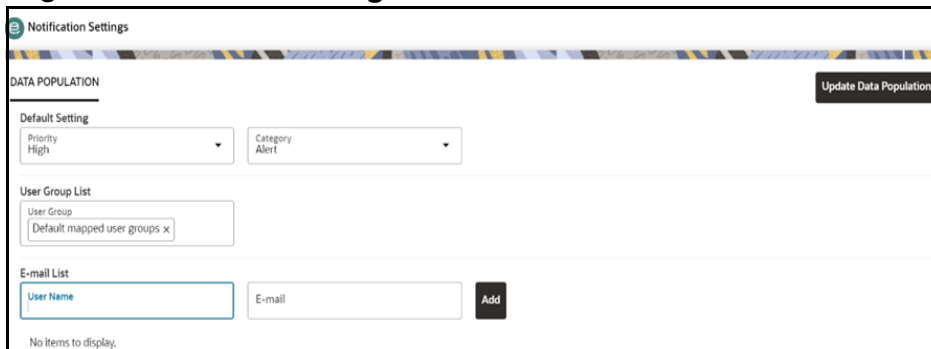
4.1.4 Notification

Click **Notification**  icon to display the notifications from the application. In the current release, only data population and model approval related notifications are displayed. You can delete the notifications by clicking on the **Close** icon when no longer needed.

To add or modify the notification details, perform the following:

1. In the header of the home page, click on the **Notification** icon.
The Notifications are displayed.
2. Click **Notification Settings**.
The Notifications Settings page is displayed.
3. Select the required options from the **Notification Settings** page and click **Update Data Population**. The selected User group will be notified via User Interface with the alerts under Notifications icon. If you wish to get the notifications in email, add the user name and email ID so that whenever a data population is triggered, an email notification is triggered to the user.

Figure 6: Notification Settings



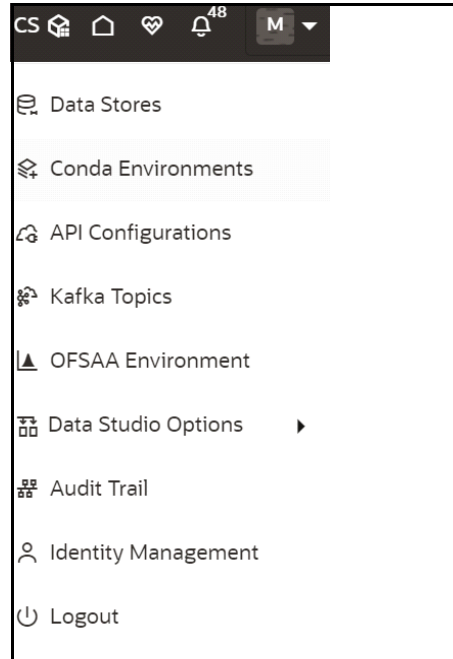
The notification alerts details are updated.

NOTE An email notification is sent to the default email id added in AAICL_SMS_USER_PROFILE present in the config schema.

4.1.5 Profile

The Header displays icons, buttons, and text for generic information and access to the application's features. The following user-interface elements are displayed.

Figure 7: User Profile



- **User Name:** Displays the first letter of the logged-in user name. Hover over to view the complete name of the user. Click on this icon to select from the following options in the drop-down list:
 - **Data Stores:** Click to navigate to **Data Store Summary** page. You can add and manage data stores from this page.
 - **Conda Environments:** Click to navigate to **Environment Summary** page. You can configure and manage conda environments from this page.
 - **API Configurations:** Click to navigate to **API Summary** page. You can configure and manage APIs from this page.
 - **Kafka Topics:** Click to navigate to **Kafka Topics** page. You can configure and manage kafka topics and clusters from this page.
 - **OFSAA Environment:** Click to navigate to **OFSAA Environment** page. You can register and OFSAA environments from this page.
 - **Data Studio Options:** OFS CS contains an underlying Notebook Server which has the following configurable options:
 - Interpreters
 - Tasks
 - Permissions
 - Credentials
 - Templates
 Clicking on the option will navigate you to the specific page. For more details, see [Data Studio Options](#) section.
 - **Admin:** Navigates to IDCS page.
 - **Audit Trail:** Click to navigate to **Audit Trail** page The details such as start and stop of UI and Service, add or delete of datasource, API configuration, Kafka topics, Conda Environments and so on are displayed. You can view the sequence of actions performed in table view or

timeline view (graphical representation) by clicking on **Audit Table View**, and **Audit Timeline View** options respectively.

- **Identity Management:** Click to navigate to IDCS page. You can manage users, groups, roles, and functions from this page.
- **Logout:** Click to log out of the application.

4.2 Mega Menu Components

To view the Mega Menu components, launch a Workspace. The Dashboard page is displayed with menu options such as Modeling, Orchestration, More, and other sections of application.

4.2.1 Modeling

The Modeling component contains the following features:

- **Datasets** : Explore data, engineer features and monitor data drifts.
- **Model Libraries** : Manage python libraries for model creation and usage.
- **Model Techniques:** Manage techniques and algorithms from registered model libraries.
- **Model Catalog** : Centralized hub for all your machine learning models.
- **Pipelines:** Design, deploy and govern end-to-end machine learning pipelines for seamless model development.
- **Graphs** : Analyze complex relationships within your data through interactive graph representations.

For more details, see [Modeling](#) section.

4.2.2 Orchestration

The Orchestration component contains the following features:

- **Scheduler Dashboard** : Get an overview of scheduled tasks and processes.
- **Define Batch** : Manage and configure batch definitions.
- **Define Tasks** : Create tasks, configure parameters and set execution dependencies within a batch process.
- **Schedule Batch:** Set execution schedules for your batch processes.
- **Monitor Batch:** Track and monitor batch process executions.

For more details, see [Orchestration](#) section.

4.2.3 More

The More component contains the following features:

- **Export Objects** : Utilize Object Migration feature to efficiently export and save objects.
- **Import Objects** : Import previously exported objects into the system.
- **Model Actions** : Review and approve model deployments in bulk.
- **Audit Trail:** Monitor all system activities and changes.
- **Data Pipelines:** Create and manage data pipelines for efficient data flow and processing.

For more details, see [More](#) section.


5 Workspace Dashboard Window

The Workspace Dashboard window allows you to view the models of launched workspace.

To access the Dashboard window, follow these steps:

1. Navigate to **Workspace Summary** page.

The page displays workspace records in a table.

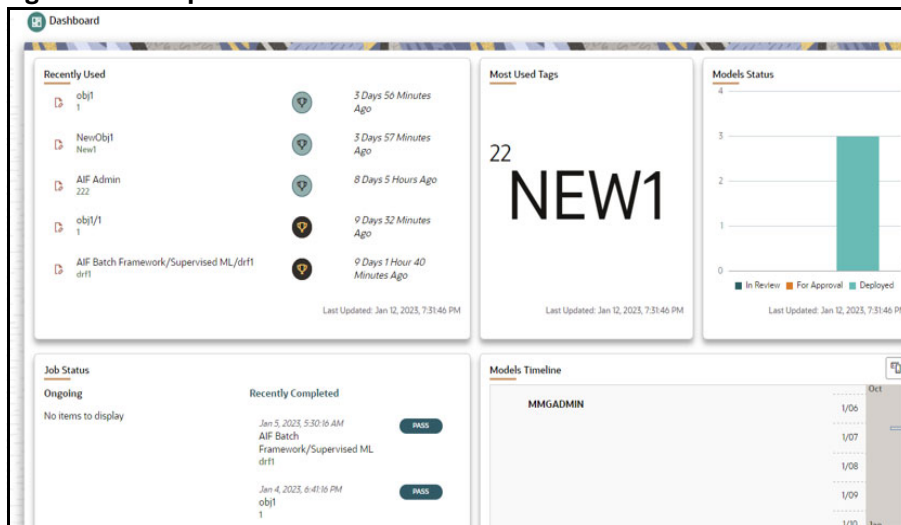
2. Click  next to corresponding Workspace to Launch Workspace.

The **CS Dashboard** window is displayed with application configuration and model creation menu.

The Workspace Dashboard shows the following details of a launched workspace:

- Recently Used
- Most Used Tags
- Models Status
- Job Status
- Models Timeline

Figure 8: Workspace Dashboard



5.1 Using Workspaces

Workspace management allows you to create and manage workspaces in the OFS Compliance Studio application.

Workspace can be in the production environment (deployed), or they can exist in a separate instance on their own (on local for testing purposes) with a copy of data that comes from the desired data source (production or external data source).

You can view the following details on Workspace Summary page:

- Number of Sandbox Workspaces
- Number of Production Workspaces

5.2 Accessing the Workspace Summary Page

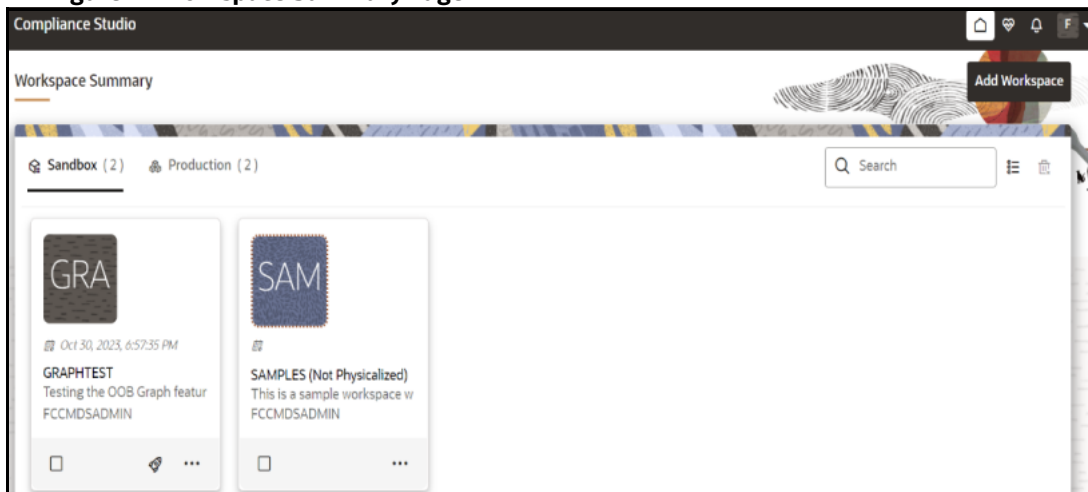
The Workspace Summary page gives access to the various workspace functions such as create and delete.

NOTE Users must be mapped to the Workspace Admin Group to access the Workspace Summary page.

To access the Workspace Summary page, follow these steps:

After login to **OFS Compliance Studio** application, the **Workspace Summary** page is displayed. The page displays workspace records in a table or card view. You can launch a workspace using the launch option or double clicking on it.

Figure 9: Workspace Summary Page



The [Table 4](#) provides descriptions for the fields and icons on the **Workspace Summary** page.

Table 4: Workspace Summary















Field or Icon	Description
Search	<p>The field to search for Workspace.</p> <p>Enter specific terms in the field for which you want to search, and press Enter on the keyboard to display the results.</p> <p>You can search a Workspace using Workspace Code, Owner, Creation Date, or Workspace Type fields.</p> <p>The search list shows the Workspace details with Workspace Code, Owner, Creation Date and time, and Type.</p>
Card and Grid View	<p>Click the Card View  or Grid View  on the top-right corner of this pane to view the workspace as a block or a table, respectively.</p>
Delete	<p>Click Delete  to delete all the Workspace.</p>
Workspace Code	<p>The code of the Workspace.</p> <p>NOTE: Use up to 20 characters consisting of alphanumeric and space characters only. Do not use "ALL" as a workspace code.</p>

Table 4: Workspace Summary

Field or Icon	Description
Description	The description of the Workspace
Owner	The owner of the Workspace.
Creation Date	The date on which the Workspace was created.
Data Source Type	Shows the type of the Data Source.
Add Workspace	Click Add Workspace to create a new Workspace. See the Creating a Workspace section for more information.
Launch Workspace	Click  next to corresponding workspace to display the Workspace Dashboard with application configuration and model creation menu. See the Launch a Workspace section for more information.
View Workspace	Click Action  next to corresponding Workspace and select View  to view the workspace with dataset data. See the View a Workspace section for more information.
Populate Workspace	Click Action  next to corresponding Workspace and select Populate  to populate the workspace with dataset data. See the Populate a Workspace section for more information.
Edit Workspace	Click Action  next to corresponding Workspace and select Edit  to edit the Workspace. See the Editing the Workspace section for more information.
Delete Workspace	Click Action  next to corresponding Workspace and select Delete  to delete the Workspace. See the Populate Workspace section for more information.
Download Workspace	Click Action  next to corresponding Workspace and select Download  to download the Workspace. See the Download a Workspace section for more information. The file is downloaded in .cfg format.

5.3 Launching a Workspace

To launch a Workspace, follow these steps:

1. Navigate to **Workspace Summary** page.
 The page displays workspace records in a table.


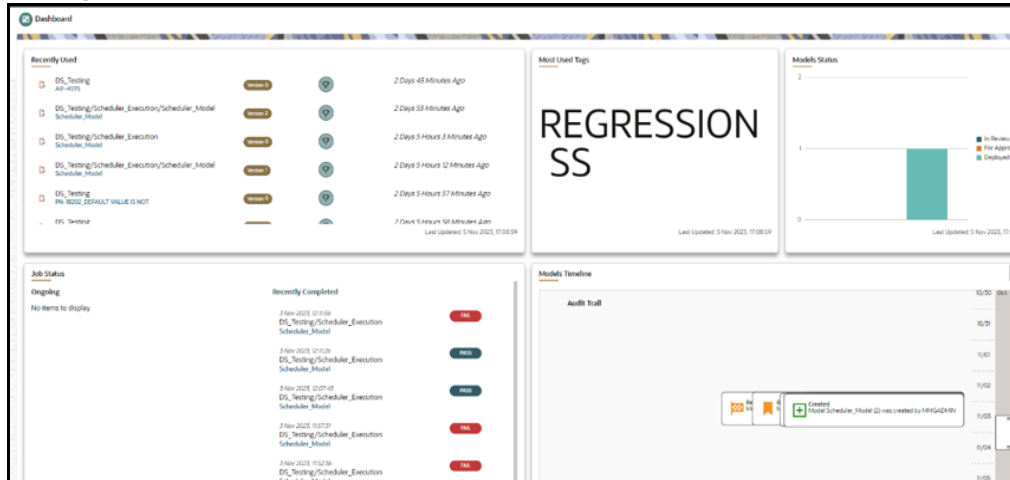
- Click **Launch**  icon next to corresponding Workspace.
The Workspace Dashboard is displayed.

Figure 10: Workspace Dashboard



5.4 Creating a Workspace

The Workspace creation requires entry of the source of dataset, validation, and deployment. Besides, the OFS Compliance Studio application may require users of different function groups to create and approve a Workspace. In other words, a user associated with the modeler function group creates a Workspace and the approval and deployment are done by a user associated with the modeling administrator function group. For information on User Groups, Mappings, see the **User Access and Permission Management** section in the [OFS Compliance Studio Administration and Configuration Guide](#).

NOTE UGDOMMAP function should be mapped to the user performing sandbox creation operation. Otherwise, the create operation will fail.

To create a Workspace, follow these steps:

- Navigate to **Workspace Management Summary** page.
The page displays workspace records in a table.
- Click **Add Workspace**.
The **Create Workspace** page is displayed.

Figure 11: Workspace Creation Window

The window displays a progress indicator at the left that indicates the active window where you are entering details. Click **Previous** to go back a step and click **Next** to go to the next step.

The following steps show the various phases from workspace creation to deployment:

- [Configure Basic Details](#)
- [Configure Workspace Schema](#)
- [Configure Data Sourcing](#)
- [Configure Metadata Sourcing](#)
- [Validate Workspace](#)
- [Display Summary](#)

5.4.1 Configure Basic Details

Enter basic configuration details in this window.

Figure 12: Configure Basic Details

To configure the basic details for the workspace, follow these steps:

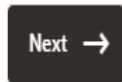
1. Enter the required details in the **Basic Details** pane as shown in the [Table 5](#).

Table 5: Configure Basic Details

Field	Description
Use Tempalte	Click on this field to create a workspace from a template. On selecting the template, any pre-filled values will be overridden with the template provided values.

Table 5: Configure Basic Details

Field	Description
Workspace Code	Enter the code of the workspace. NOTE: Use up to 20 characters consisting of alphanumeric and space characters only. Do not use "ALL" as a workspace code.
Purpose	Enter the purpose of the creation of the Workspace.
User-group	Click on this field to display a list of User-group values. Select the required value. <ul style="list-style-type: none"> Modeling Approver Modeling Reviewer Modeling User (Mandatory)
Type	<ul style="list-style-type: none"> Select the type of Workspace as Modeling or Simulation. NOTE: If Simulation is selection, fields to add the simulation data is displayed. <ul style="list-style-type: none"> Select the type of Workspace as Sandbox or Production.
Production Workspace	Move the toggle switch to the right to enable this option. Enabling it attaches the production schema, which selects the Workspace being created for automatic model promotion. Based on the selection of the Source Workspace, the model is promoted to the environment.
Import archive file	Enter the archived file to import for basic details. If you use this feature, the other fields described in the preceding rows are auto populated. Click on the box to open the file selector dialog and select the required configuration file or drag the file from its directory and drop it in the box.

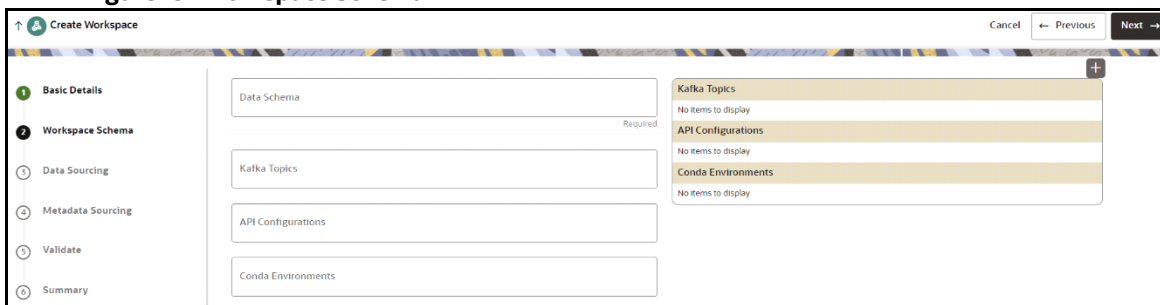


2. Click  to go to the next step.

5.4.2 Configure Workspace Schema

Select the schema operation and enter connection details.

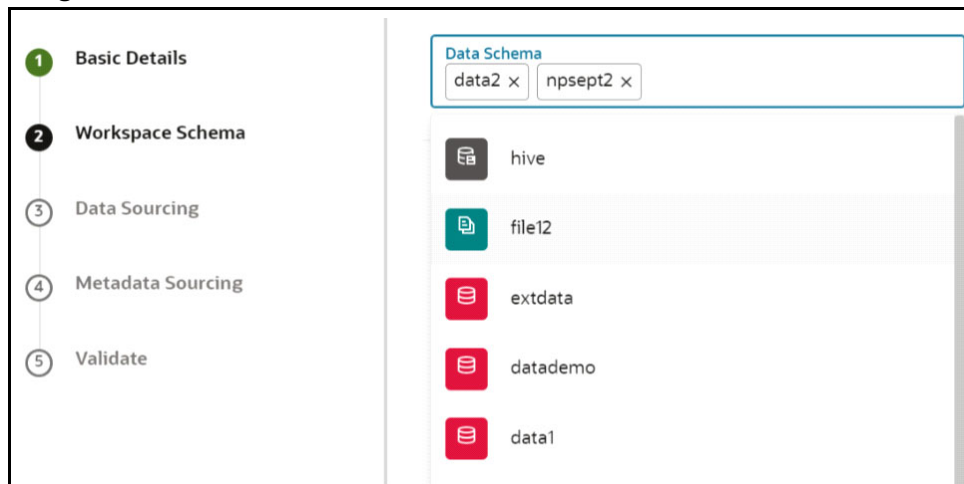
Figure 13: Workspace Schema




To configure the Workspace schema, follow these steps:

1. Select one from the options from the **Data Schema** drop-down list. This is the actual data used for model building. You can use multiple data schemas for one Meta Source. You can select an existing Schema or add a new Schema. The data source options such as Oracle, Hive, and File are displayed.

Figure 14: Data Schema



NOTE For details on adding a new data store, see [Data Stores](#) section.

2. Select the required option from the **Kafka Topics** list. The selected Kafka topics are listed in the right side menu with the order of selection. For more details, see [Kafka Topics](#).
3. Select the required option from the **API Configurations** list. The selected API Configurations are listed in the right side menu with the order of selection. For more details, see [API Configurations](#).
4. Select the required option from the **Conda Environments** list. The selected Conda Environments are listed in the right side menu with the order of selection. For more details, see [Conda Environments](#).
5. Click  to go to the next step.

OR

6. Click **Skip** to skip the step.

NOTE Click **Test Connection** to check the connection. A success message is displayed.

5.4.3 Configure Data Sourcing

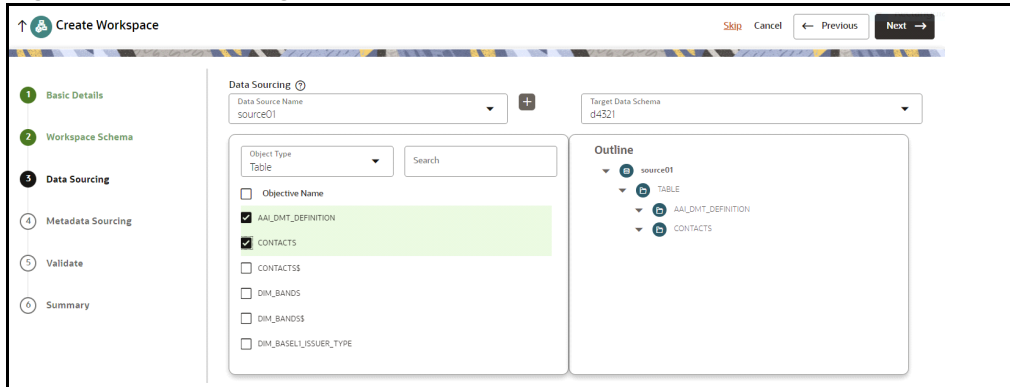
The schema type selected in the previous step requires the definition of database objects to be used for model creation. Data sourcing step of Workspace provisioning allows to select tables from Hive based data sources from which data has to pulled into the Oracle based Workspace data schemas. However, unlike the data sourcing from RDBMS data sources, the tables will not get physicalized in the target schema and hence it is expected that the tables with compatible structures are already present in target RDBMS schema.

In case any of the selected tables are not present in the target schema, those tables are included in the failed objects count in workspace provisioning summary.

This window shows the different icons for Oracle and Hive data sources.

Enter the details in this window.

Figure 15: Data Sourcing - External Data Source



To configure Data Sourcing, follow these steps:

1. You can select a Data Source from **Data Source Name** drop-down list or create a new Data Source.

To create a new Data Source, see the [Configure Data Sourcing](#) section.

2. Select the **Target Data Schema**.

You can select multiple Data Sources for a Target Data Schema.

For example, if there are D1, D2 and D3 Data Sources, then you can select the tables from all these Data Sources, tables from two Data Sources, tables from one Data Source, or as required. Here, multiple combination of tables are possible with Data Source and Target Data Source.

If two Data Sources are having same tables (from different Data Sources), then the columns from the first selected table will be used.

For example:

- If Table A has columns C1, C2 and C3
- If Table B has columns C1, C2 and C4

Then the data from the first table will be used.

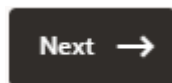
During the data population, only columns C1 and C2 will be used and those will be marked in Green color.

3. Select the type of objects to be displayed in the pane that follows the drop-down list.

The Object Type drop-down list will be enabled after selecting the Data Source from Data Source Name drop-down list.

The following are the options in the drop-down list:

- Table
- View
- Synonym



4. Click  to go to the next step.

OR

Click **Skip** to skip the step.

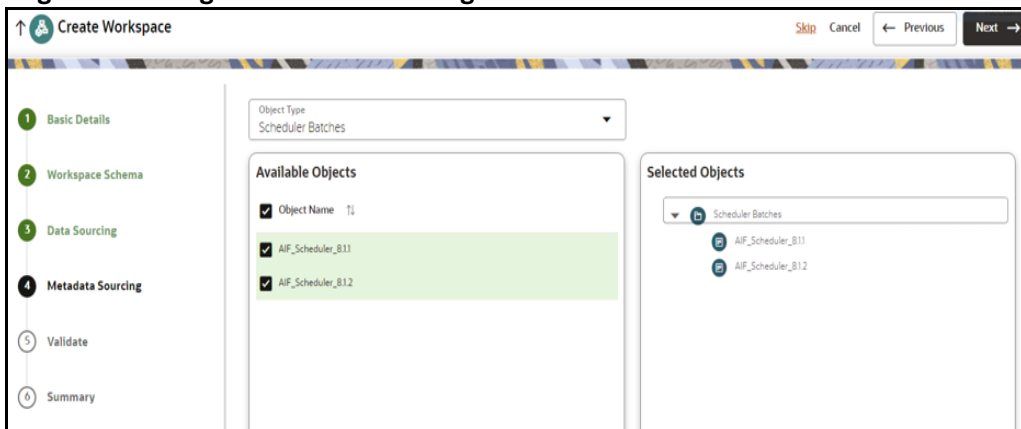
5.4.4 Configure Metadata Sourcing

The database objects selected in the previous step can be added with metadata for selected objects. Metadata Sourcing is a stage during Workspace provisioning to allow seeding of metadata like scheduler batches at the time of workspace provisioning.

Also, by default there will be seeded metadata. However, if you wish to seed the metadata, navigate to <Compliance Studio installed path>/ftpshare/CS/seeded/batches and drag and drop the metadata in SQL format.

NOTE This step is optional.

Figure 16: Configure Metadata Sourcing



To configure Metadata Sourcing, follow these steps:

1. Select the required schema from the **Object Type (Optional)** drop-down list.
The **Available Objects** are displayed in **Selected Objects** pane.
2. Select the objects that will be displayed under **Selected Objects** group.

3. Click  to go to the next step.

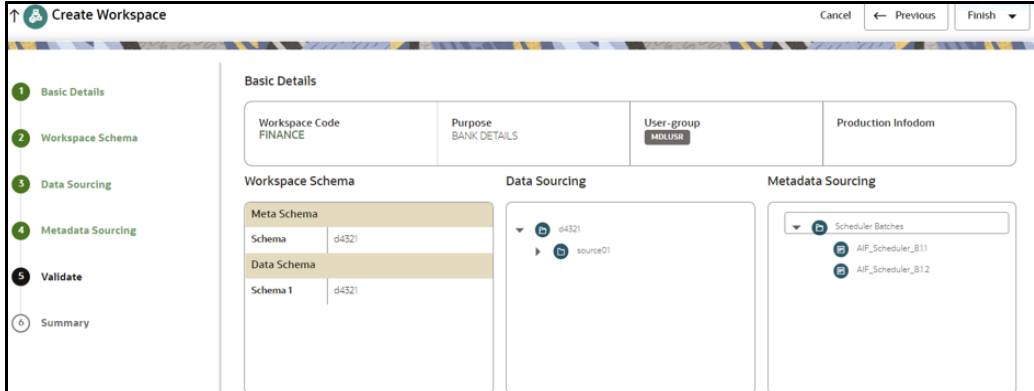
OR

Click **Skip** to skip the step.


5.4.5 Validate Workspace

The **Validate** pane displays a preview of the configuration values entered in the previous panes.

Figure 17: Validate Workspace



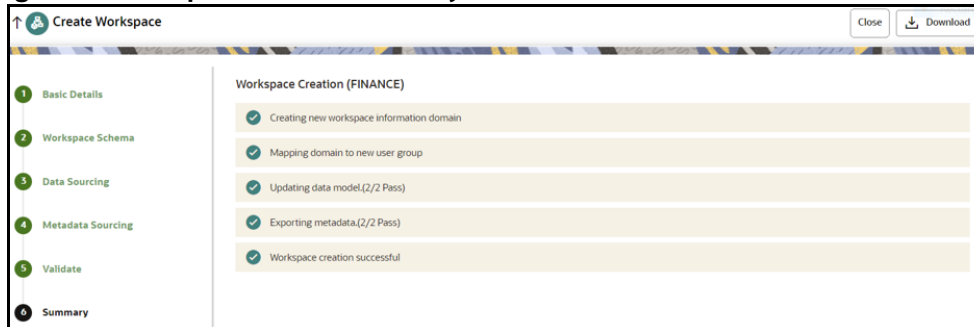
To validate the Workspace and deploy, follow these steps:

1. Review the details in the **Validate** pane. You can edit the Workspace by clicking on Edit icon .
2. Click **Finish** to creation of the Workspace using **Physicalize Sandbox** option or **Download Configurable Archive**.
 - When you click **Download Configurable Archive**, it exports the metadata information of the workspace in .zip format which can be used later using the Import option.
 - When you click **Physicalize Sandbox**, it creates actual workspace.

5.4.6 Display Summary

The **Summary** pane displays the status of the workspace creation.



Figure 18: Workspace Creation Summary



- Click  to download the deployment report.

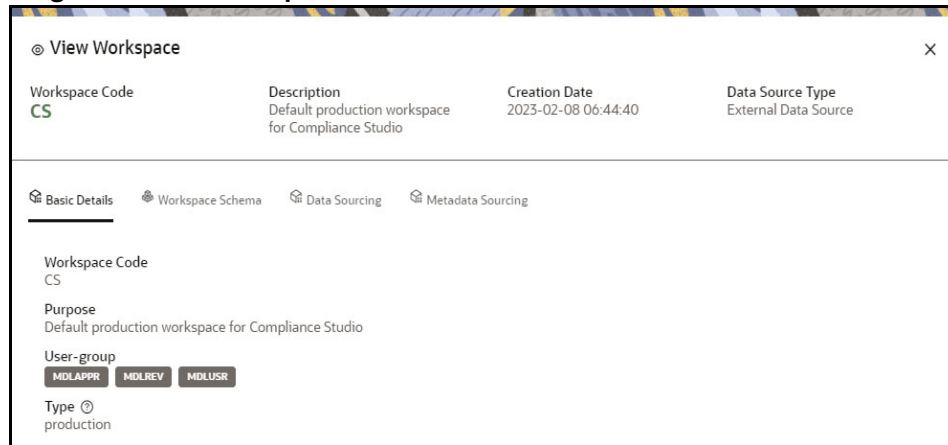
5.5 View a Workspace

To view a workspace, follow these steps:

1. Navigate to **Workspace Management** to display the **Workspace Summary** page. The page displays workspace records in a table.
2. Click **Action**  next to corresponding workspace and select **View**  to view the workspace.

The Basic Details of the Workspace is displayed.

Figure 19: View Workspace Window



3. Navigate to **Workspace Schema**, **Data Sourcing**, and **Metadata Sourcing** tabs to view the respective details.

NOTE You can view the data population logs under the Execution History page.

5.6 Populate a Workspace

The workspace is populated with data from the datasets in External sources.

To populate the Workspace, follow these steps:



1. Navigate to the **Workspace Summary** page.
The page displays Workspace records in a table.
2. Click **Action**  next to corresponding Workspace and select **Populate**  to populate the Workspace with data from a dataset data in the **Populate Workspace** window.

Figure 20: Populate Workspace Window

The screenshot shows a window titled "Populate Workspace" with a close button (X) in the top right corner. The window is divided into several sections:

- Workspace Details:** A table with four columns: Workspace Code (CS), Purpose (sandbox), Creation Date (2023-11-03 05:08:40), and Data Store Type (External Data Source).
- Write Mode:** A dropdown menu currently set to "Overwrite". Below it, a note states: "In this mode, all the underlying tables mapped to the workspace will be populated (truncate and insert) along with the filters mentioned below for specific tables."
- Data Filters - Global level:** A section with a "Use Template" link and a text input field containing "Data Filters - Global".
- Data Filters - Table level:** A section with a "+" icon in the top right. It contains two input fields: "Tables" and "SQL Filter", with a trash icon to the right of the "SQL Filter" field.
- Additional Parameters:** A section with two input fields: "Fetch Size" (value: 10) and "Batch Commit Size" (value: 1,000). Below these, it says "Select Unlimited or Customize the Rejection Threshold" and has two radio buttons: "Unlimited" (selected) and "Custom Rejection Threshold". A text input field below shows "Rejection Threshold" with the value "UNLIMITED".

The [Table 6](#) provides descriptions for the fields in the **Populate Workspace** window.

Table 6: Populate Workspace

Field	Description
Workspace Code	The code of the Workspace.
Purpose	The description for the Workspace.
Creation Date	The date on which the Workspace was created.
Data Source Type	The source of data. The value can be the OFSAA Data Schema or an external data source.
Data Filter - Global	Enter the data filter that needs to be applied on all the tables selected for data sourcing. For example: If MISDATE is equal to Today, then it is applied to all tables (wherever it is available) for selected Data Sources during population. If this field is not found (MISDATE) in the tables, it is not updated.
Data Filter - Table level	Provide the data filters individually on the tables here. NOTE: You can provide multiple table names for the same SQL filter. For example, there are two tables called Student and Employee in the target data source, and below filters are applied: <ul style="list-style-type: none"> MISDATE as Today for Student and Employee tables ID as 1 for Student table Then, Student table will be populated with MISDATE and ID filters and Employee table will be populated with only MISDATE filter. Global Filters will not be applicable for those tables on which filters have been applied individually. If the same table name is provided in more than one rows here, then filter condition is generated as a conjunction of all the provided filters.
<p>NOTE: You can also pass runtime values in workspace population for the user-defined parameters in Data Filter – Global/Table.</p> <p>Example: Table Filter /Global Filter</p> <pre>[{"id":1,"filter":"CUSTOMER_ID =\$CUSTID and INCOME =\$income and CUSTOMER_NAME =\$customerName", "tables":["CUSTOMERS"]}]</pre> <p>Additional Parameters:</p> <pre>{"fetch_size" :10, "batch_commit_size" :1000, "rejection_threshold" : "UNLIMITED", "write_mode" : "APPEND", "dynamic_parameters": [{"key": "\$CUSTID", "value": "125"}, {"key": "\$income\$", "value": "30000"}, {"key": "\$customerName", "value": "Cust125"}]}</pre> <p>The Runtime parameters can be passed as part of additional parameters json .Key = "dynamic_parameters" .It will replace all the \$ values in Table filter /Global Filters.</p>	
Fetch Size	Enter the Fetch size of JDBC properties for data upload.
Batch Commit Size	Enter the Batch Commit size of JDBC properties for data upload.
Write Mode	You can either overwrite the existing data (truncate and insert) or to append to the existing data. You can choose to either overwrite the data or append to the existing data.

Field	Description
Rejection Threshold	<p>Following two options are available:</p> <ul style="list-style-type: none"> • Custom Rejection Threshold Enter the maximum of number of inserts that may fail for any of the selected tables. You can provide the maximum number of inserts that can fail while loading data to a given table from all the sources. In case of threshold breach, all the inserts into the particular target schema will be rolled back. However, it will continue with populating the next target schema. • Unlimited Here, all the errors will be ignored during the data population.

3. Click **Populate Workspace** to start the process.

Here, you can create the batch using Create Batch, or create and execute using Create and Execute Batch option. On selecting either of these options, a workspace population task gets added to the batch.

- When you select Create and Execute Batch option, it allows you to create batch and triggers the batch as well.
- When you select 'Create Batch' option, it allows you to prepare the batch and then execute or schedule the batch at a later time through Scheduler Service window.

The Workspace population task execution can be tracked in the 'Monitor Batch' window in the Scheduler Service.

Figure 21: Task Parameters

Task Parameters				
Parameter	\$BATCHDATE\$	Value	Batch Date	<input checked="" type="checkbox"/>
Parameter	\$BATCHRUNID\$	Value	BATCHRUNID	<input checked="" type="checkbox"/>
Parameter	Global Filter	Value	<input type="text"/>	<input checked="" type="checkbox"/>
Parameter	Table Filters	Value	<input type="text"/>	<input checked="" type="checkbox"/>
Parameter	Additional Parameters	Value	<input type="text"/>	<input checked="" type="checkbox"/>

4. Enter the following parameters for workspace population.

NOTE This step is optional.

- **Additional Parameters:** Enter the Additional Parameters in following format:

```
{"fetch_size" :10, "batch_commit_size" :1000,
"rejection_threshold" : "UNLIMITED", "write_mode" : "OVERWRITE"}
```

- **Global Filter**

Provided input will be applied as a data filter on all the tables selected for data sourcing.

- **Table Filter**

You can provide data filters individually on the tables here. You must provide multiple table names for the same SQL filter. Global Filters will not be applicable for those tables on which filters have been applied individually. In case the same table name is provided in more than one rows here, the filter condition will be generated as a conjunction of all the provided filters.

Enter the Table filters in following format:

```
{{"id":1,"filter":"<filter condition>","tables":["TABLE1",
"TABLE2"]}, {"id":2,"filter":"<filter condition>","tables":["TABLE2"]}}
```

NOTE

You can run workspace population for a given workspace any number of times. New tables may be added to the definition. Any new table added to the definition, that is not present in the target schema will be physicalized on update of the workspace. Also, user can add new sources if required.

Any table that is deselected from the data sourcing definition will **NOT** be dropped.

5.7 Edit a Workspace

To edit a workspace, follow these steps:



1. Navigate to **Workspace Management** to display the **Workspace Summary** page. The page displays workspace records in a table.
2. Click **Action**  next to corresponding workspace and select **Edit**  to edit the workspace.

Figure 22: Edit Workspace Window

The screenshot shows the 'Edit Workspace Window' interface. On the left is a sidebar with five steps: 1. Basic Details (selected), 2. Workspace Schema, 3. Data Sourcing, 4. Metadata Sourcing, and 5. Validate. The main content area contains the following fields and controls:

- Workspace Code:** A text input field containing 'CS'.
- Purpose:** A text input field containing 'sandbox'.
- Import Archive File:** A dashed box with a download icon and the text 'Import Archive File' and 'Drag & Drop file here'.
- User-group:** A dropdown menu with a plus icon, showing two selected items: 'Modeling Approver x' and 'Modeling Reviewer x'.
- Type:** Two radio buttons: 'Sandbox Workspace' (selected) and 'Production Workspace'.
- Attach Production Workspace:** A toggle switch that is currently turned on.
- Source Workspace:** A dropdown menu showing 'PROD'.

NOTE

You can modify the Workspace Type from Sandbox to Production or vice versa.

For more details on the Basic Details fields, see [Configure Basic Details](#) section.

3. Click **Save**.

5.8 Delete a Workspace

NOTE When you delete a Workspace, all the underlying objects such as Dataset, Scheduler service metadata and so on from the associated tables are deleted.

To delete a Workspace, follow these steps:



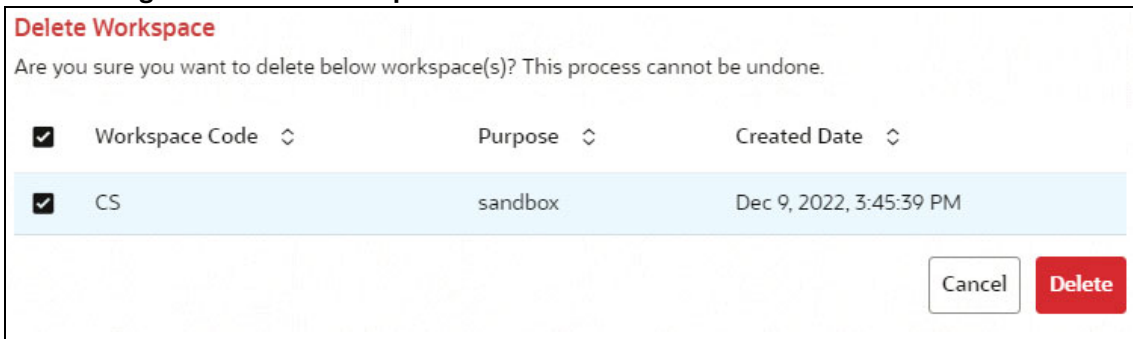
1. Navigate to **Workspace Management** to display the **Workspace Summary** page. The page displays workspace records in a table.
2. Click Action  next to corresponding Workspace and select **Delete**  to delete the workspace.

Figure 23: Delete Workspace Window



The [Table 7](#) provides descriptions for the fields in the **Delete Workspace** window.

Table 7: Delete Workspace

Field	Description
Workspace Code	The Code of the workspace.
Purpose	The description for the workspace.
Creation Date	The date on which the workspace was created.

3. Click **Delete**.
4. Click **OK** on the confirmation dialog box to confirm or click **Cancel** to cancel.



NOTE You must de-link the Sandbox workspaces from Production Workspace before deleting the Production Workspace.

5.9 Download a Workspace

Downloading a workspace allows you to export the workspace metadata definition (without underlying objects such as Models, Pipeline, Graphs, and so on) in a zip format. Further, the same can be used to re-create the workspace.

To download a workspace, follow these steps:

1. Navigate to **Workspace Management** to display the **Workspace Summary** page. The page displays Workspace records in a table.

2. Click Action  next to corresponding workspace and select **Download**  to download the workspace.

OR

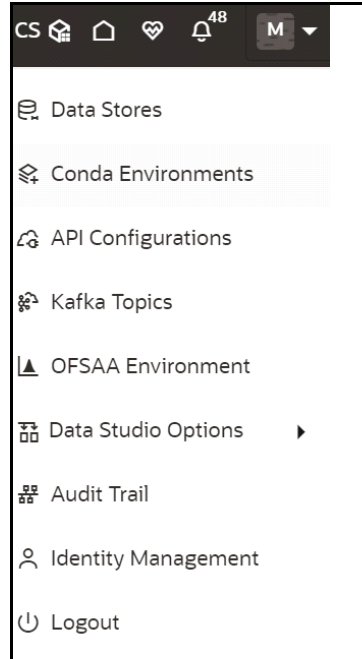
Navigate to the Summary screen during the creation of a Workspace and click Finish and select **Download Configuration Archive** option.

NOTE The file is downloaded in .cfg format.

6 Administration

The Header displays icons, buttons, and text for generic information and access to the application features. The following user-interface elements are displayed.

Figure 24: Header



- **User Name:** Displays the first letter of the logged-in user name. Hover over to view the complete name of the user. Click on this icon to select from the following options in the drop-down list:
 - **Data Stores:** Click to navigate to **Data Store Summary** page. You can add and manage data stores from this page.
 - **Conda Environments:** Click to navigate to **Environment Summary** page. You can configure and manage conda environments from this page.
 - **API Configurations:** Click to navigate to **API Summary** page. You can configure and manage APIs from this page.
 - **Kafka Topics:** Click to navigate to **Kafka Topics** page. You can configure and manage kafka topics and clusters from this page.
 - **OFSAA Environment:** Click to navigate to **OFSAA Environment** page. You can register and OFSAA environments from this page.
 - **Data Studio Options:** Compliance Studio contains an underlying Notebook Server which has the following configurable options:
 - Interpreters
 - Tasks
 - Permissions
 - Credentials
 - Templates

Clicking on the option will navigate you to the specific page. For more details, see [Data Studio Options](#) section.

- **Admin:** Navigates to IDCS page.
- **Audit Trail:** Click to navigate to **Audit Trail** page The details such as start and stop of UI and Service, add or delete of datasource, API configuration, Kafka topics, Conda Environments and so on are displayed. You can view the sequence of actions performed in table view or timeline view (graphical representation) by clicking on **Audit Table View**, and **Audit Timeline View** options respectively.
- **Identity Management:** Click to navigate to IDCS page. You can manage users, groups, roles, and functions from this page.
- **Logout:** Click to log out of the application.

6.1 Data Stores

This feature allows you to manage the Data Schemas registered with the application. The Data Store Summary window shows the list of Data schemas registered with the application. These Data schemas can be used either for workspace or for sourcing data. Click **Data Stores** to navigate to Data Source Summary window.

This window also allows you to manage these registered external sources.

Figure 25: Data Source Summary

The screenshot shows the 'Data Store Summary' window with two tabs: 'Used Data Store (6)' and 'Unused Data Store (2)'. A search bar is visible in the top right. The table below lists the data stores:

Data Store Name	Description	Type	Used In	Used As	Action
GraphTarget	GraphTarget	JDBC	CS	Data Schema	...
Samples Data Source	A Data source used by the sample workspace to illustrate to end user how data sources work and how they are integrated with workspaces	JDBC	SAMPLES	Data Schema	...
data2	data	JDBC	CS	Data Schema	...
GraphSource	GraphSource	JDBC	CS	Data Schema	...
mimg8125graphnew1	mimg8125graphnew1	JDBC	CS	Data Schema	...
data1	data	JDBC	PROD	Data Schema	...

At the bottom left, it shows '(1-6 of 6 items)' and a pagination control with '1' selected.

The Data Store Summary consists of two sections: Used Data Store and Unused Data Store.

- **Used Data Store:**
This shows the list of Data Stores registered with any workspace. Here, you can only view the Data Store details. The count of Used Data Store also displayed at the top of Data Store Summary page.
- **Unused Data Store:**
This shows the list of Data Store those are not registered with any workspace. Here, you can only view, edit, or delete the Data Source details. The count of Unused Data Store also displayed at the top of Data Store Summary page.

6.1.1 Adding a Data Store

To add a Data Store, follow these steps:

1. Navigate to **Workspace Summary** window.
2. Click **Profile** icon and select **Data Stores**.
The **Data Store Summary** page is displayed.
3. Click **Add Store**.

The Add **Data Store** window is displayed.

Figure 26: Add Data Store with Type File

Figure 27: Add Data Store with Oracle Database

Figure 28: Create Data Store with Hive Database

4. Enter the required details as shown in the [Table 8](#).

Table 8: Create Data Source

Field	Description
Database Store Name	Enter the connection URL to the database for the data schema.
Description	Enter the description of database connection.
Type	<p>Enter the type of the database connection. The supported types are JDBC and File.</p> <ul style="list-style-type: none"> JDBC : If selected, the Database type options Oracle and Hive are displayed. File: If selected, (see Figure 26), the following options are displayed. <ul style="list-style-type: none"> Global: Select this option if you want to fetch the global level data-source details. You need to place the file with the datasources details in JSON format in the following location: <code><COMPLIANCE_STUDIO_INSTALLATION_PATH>/ftp-share/mmg/Data Sources/datasources/##Data Source Name##/datafiles/##MISDATE##/*</code> Workspace-limited: Select this option if you want to fetch the workspace level datasources details. You need to place the file with the datasources details in JSON format in the following location: <code><COMPLIANCE_STUDIO_INSTALLATION_PATH>/ftp-share/mmg/##Workspace##/datasources/##Data Source Name##/datafiles/##MISDATE##/*</code>

Table 8: Create Data Source

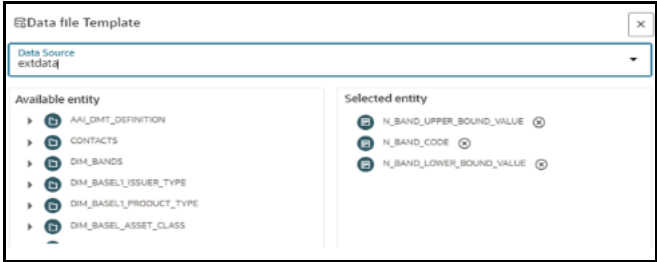

Field	Description
Type	<ul style="list-style-type: none"> ■ Record Delimiter: There is a separation of the records using a delimiter character like a comma, semicolon, hyphen, and so on for the rows. Enter the delimiter in the Record Delimiter field. This is a mandatory field and limited to two characters. ■ Field Delimiter: There is a separation of the records using a delimiter character for the columns. Enter the delimiter in the Field Delimiter field. This is a mandatory field. <p>You can either add the file details using data template or manually. Click Data File Template icon to select the Data Source entities and click Save.</p> <p style="text-align: center;">Figure 29: Data File Template</p>  <p>OR</p> <p>Click Add icon to add the details such as Physical Name, Logical Name, Data Type, and Field Order manually and click Save.</p> <p style="text-align: center;">Figure 30: Add Icon</p>  <p>Click Reorder Grid option to reorder the field orders.</p>

Table 8: Create Data Source

Field	Description
Database Type	<p>If the Type field is selected as JDBC, the following options are displayed. Select the Database Type as Oracle or Hive.</p> <p>NOTE: Selected tables during Hive sourcing should be preexisting in the RDBMS data schema before the workspace population.</p> <p>If you select Database Type as Oracle (see Figure 27), then following additional fields are displayed to enter details:</p> <ul style="list-style-type: none"> • Wallet Alias: Enter the Wallet Alias. This value should be same as configured using Oracle Wallet. For more information, OFS CS Administration and Configuration Guide. • Table Owner: Enter the Oracle Database schema name. This is an optional field. <p>If you select Database Type as Hive (see Figure 28), then following additional fields are displayed to enter details:</p> <ul style="list-style-type: none"> • User Name: User Name / Principal is used for Kerberos authentication. Example: mmg/hostname@ORACLE.COM. • Table Owner: Enter the Hive schema. • JDBC Connection String: Enter the JDBC Connection String. Example: jdbc:hive2://hostname:10000/default;principal=hive/hive-service-hostname@ORACLE.COM. • JDBC Driver: Supports org.apache.hive.jdbc.HiveDriver and com.cloudera.hive.jdbc4.HS2Driver. • Keytab File Name: Enter the Name of the keytab file present in conf directory. Example: mmg.keytab • Realm File Name: Enter the Name of the configuration file present in conf directory. Example: krb5.conf <p>NOTE:</p> <ul style="list-style-type: none"> • Schema population for Hive as target is not supported. • This is applicable only for Sandbox Workspace.

5. Click **Create**.

The Data Store is created.

6.1.2 Viewing the Data Store details

To view the Data Store details, Click **Action** icon next to corresponding Workspace and select **View** .

Figure 31: View a Data Store

The screenshot shows a 'View Data Store' dialog box with the following fields:

- Data Store Name:** GraphTarget
- Description:** GraphTarget
- File Availability:** JDBC
- Database Type:** Oracle
- Wallet Alias:** graph_als
- Table Owner:** mmg8125graphnew1

6.2 Conda Environments

Conda as a package manager helps you to find and install packages. With the capability of environment manager, you can set up a totally separate environment to run different versions of Python. In addition, you can continue to run your usual version of Python in your normal environment.

NOTE The supported version of Conda is 3.9.x.

You must add the miniconda/bin directory in the following path variable as shown below:

PATH=/scratch/ofsaadb/miniconda3/bin:\$PATH

For proxy support, you need to manually configure the `.condarc` file present in the root directory.

Limitation: Conda support currently does not include linking externally created environments to the OFS CS application.

To configure, perform the following:

Add the below in the `.condarc` file.

proxy_servers:

- http: http://www-proxy.idc.oracle.com:80
- https: http://www-proxy.idc.oracle.com:80

NOTE

- Conda package search is restricted only to the package name and does not include versions.
- Python version displayed in the Register Conda UI.

For more details on the user roles, and permissions, see **Functions and Roles required to perform CRUD operations for Conda** section in the [OFS Compliance Studio Administration and Configuration Guide](#).


Click **Conda Environments**  icon to navigate to **Environment Summary** page from any other window in OFS CS application. You can register and manage Conda environments from this page.

Figure 32: Environment Summary

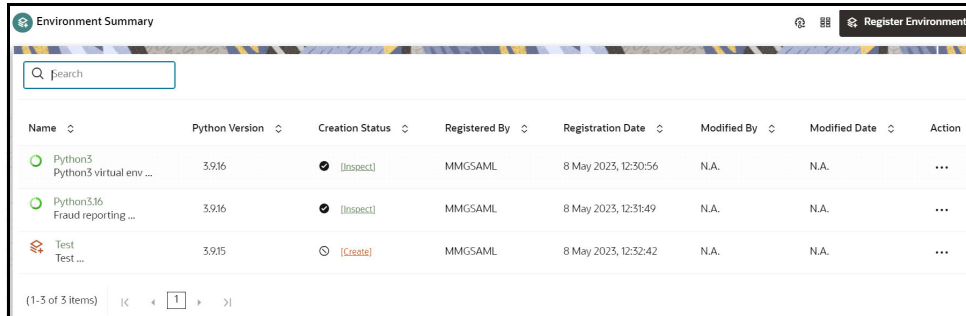





Table provides descriptions for the fields and icons on the **Environment Summary** page.


Table 9: Description for Environment Summary

Field or Icon	Description
Search	The field to search for a Conda environment. Enter specific terms in the field for which you want to search, and press Enter on the keyboard to display the results. NOTE: Conda package search is restricted only to the package name and does not include versions.
Name	The name of the Conda environment.
Python Version	The python library version of the Conda environment.
Creation Status	The status of the Conda environment. The status can be either Inspect or Create. <ul style="list-style-type: none"> Inspect: The environment is registered and created. You can perform functions such as Edit/View/Inspect/Clone/Export/Remove for the Inspect status environments. Create: The environment is registered but not created. You can perform functions such as Create/Edit/View/Deregister for the Inspect status environments
Registered By	The User Id of the User who registered the Conda environment.
Registration Date	The date on which the Conda environment has been registered.
Modified By	The ID of the Last Modified by user who has modified the Conda environment.
Modified Date	The date on which the Conda environment was modified.
Register Environment	Click to register a new Conda environment.
Conda Settings 	Click to add or modify the Conda components settings.
Conda Properties 	Click to view the Conda properties.

Field or Icon	Description
Action 	Click the three dots to perform Edit/View/Inspect/Clone/Export/Remove functions on selected Conda environment. The functions might vary based on the selected Conda environment.

6.2.1 Registering a Conda Environment

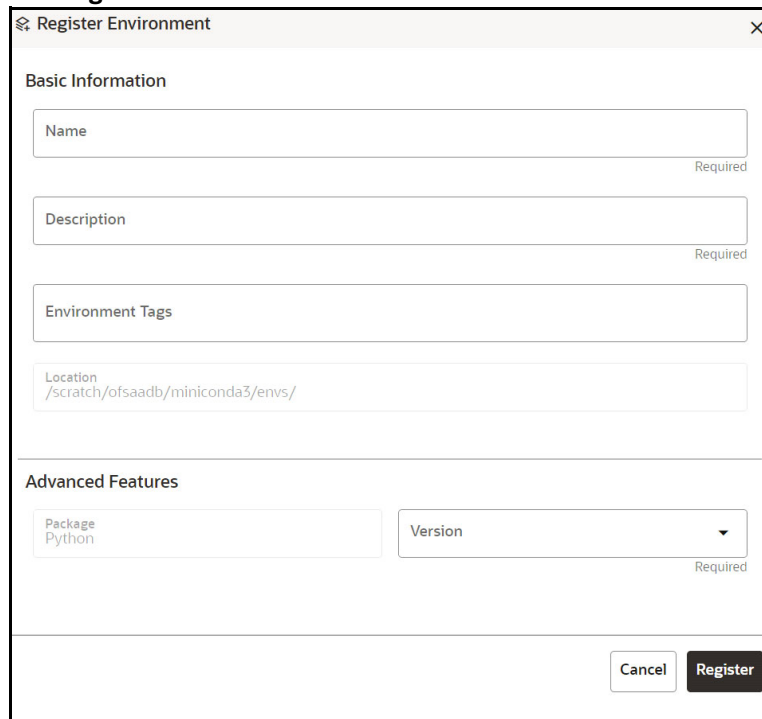
To register a Conda environment, follow these steps:

1. Click **Conda Environments**  icon to navigate to **Environment Summary** page from any other window in OFS CS application.

This page displays the Conda environments in a table.

2. In the **Environment Summary** screen, click **Register Environment**.
The **Register Environment** page is displayed.

Figure 33: Register Environment



3. Enter the **Name** for the environment. This field is mandatory.
4. Enter the **Description** for the environment. This field is mandatory.
5. Enter a tag in the **Environment Tags** field. You can add multiple tags.


NOTE The **Location** of the Conda environment is displayed. This field is greyed out and cannot be modified.

6. In the **Advanced Features** drop-down list, select the required python package for the Conda environment. Python as a package is selected by default.



7. Click **Register**.
The Conda environment is registered and displayed in the Environment Summary page.
8. Once the registration of the environment is complete, you must create the Conda environment.
For more details, see the [Creating a Conda Environment](#) section.

6.2.2 Creating a Conda Environment

To create a Conda environment, follow these steps:

1. Click **Conda Environments**  icon to navigate to **Environment Summary** page from any other window in OFS CS application.

This page displays the Conda environments in a table.

2. Click **Action**  next to corresponding environment and select **Create**  to create the Conda environment.

NOTE The **Create** option is not displayed for the Conda environment with the creation status **Inspect**.

A confirmation dialog is displayed.

3. Click **Create**.


The Conda environment is created.

These environments can be selected while creating a Workspace. For more details, see the [Configure Workspace Schema](#) section.

In addition, these environments can be selected during the Model pipeline execution.

6.2.3 Editing a Conda Environment

To edit a Conda environment, follow these steps:

1. Click **Conda Environments**  icon to navigate to **Environment Summary** page from any other window in OFS CS application.

This page displays the Conda environments in a table.



2. Click **Action**  next to corresponding environment and select **Edit**  to edit the details.
The **Edit Environment** page is displayed.

Figure 34: Edit Environment

Edit Environment

Basic Information

Name
Document

Description
enhanced version

Environment Tags

Location
/scratch/ofsaadb/miniconda3/envs/Document

Advanced Features

Package
Python

Version
3.9.16 (Recommended)

Cancel Update

For more details on the Edit environment fields, see [Registering a Conda Environment](#) section.

NOTE The **Name** of the Conda environment is greyed out and cannot be modified.

3. Click **Update**.
The details of the Conda environment is updated.

6.2.4 Viewing a Conda Environment

To view a Conda environment details, follow these steps:




1. Click **Conda Environments**  icon to navigate to **Environment Summary** page from any other window in OFS CS application.
This page displays the Conda environments in a table.
2. Click **Action**  next to corresponding environment and select **View**  to view the details.
The details of the Conda environment is displayed.


Figure 35: View Environment

The screenshot shows a 'View Environment' dialog box with the following fields:



- Basic Information**
 - Name: Python3
 - Description: Python3 virtual env
 - Environment Tags: conda, python
 - Location: /scratch/ofsaadb/miniconda3/envs/Python3
- Advanced Features**
 - Package: Python
 - Version: 3.9.16 (Recommended)

6.2.5 Deregister a Conda Environment

To deregister a Conda environment, follow these steps:

1. Click **Conda Environments**  icon to navigate to **Environment Summary** page from any other window in OFS CS application.

This page displays the Conda environments in a table.

2. Click **Action**  next to corresponding environment and select **Deregister**  to deregister the Conda environment.


NOTE The **Deregister** option is not displayed for the Conda environment with the creation status **Inspect**.

A confirmation dialog is displayed.

3. Click **Deregister**.
The registered Conda environment is deregistered and removed from the Environment Summary page.

6.2.6 Inspect a Conda Environment

To inspect a Conda environment, follow these steps:

1. Click **Conda Environments**  icon to navigate to **Environment Summary** page from any other window in OFS CS application.

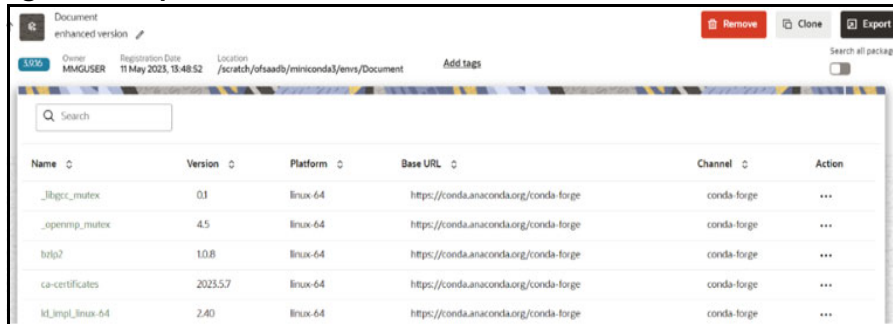
This page displays the Conda environments in a table.

2. Click **Action**  next to corresponding environment and select **Inspect**  to edit the details.

NOTE The **Inspect** option is not displayed for the Conda environment with the creation status **Create**.

The Conda environment details are displayed.

Figure 36: Inspect Conda Environment Details



Name	Version	Platform	Base URL	Channel	Action
_libgcc_mutex	0.1	linux-64	https://conda.anaconda.org/conda-forge	conda-forge	...
_openmp_mutex	4.5	linux-64	https://conda.anaconda.org/conda-forge	conda-forge	...
bitio2	1.0.8	linux-64	https://conda.anaconda.org/conda-forge	conda-forge	...
ca-certificates	2023.5.7	linux-64	https://conda.anaconda.org/conda-forge	conda-forge	...
ld_impl_linux-64	2.40	linux-64	https://conda.anaconda.org/conda-forge	conda-forge	...

You can perform the following in the above page:

- Remove Environment
- Clone Environment
- Export Environment
- Editing a Conda Environment Description
- Adding or Removing the Environment Tags
- Search All Packages
- Viewing the Package Properties
- Updating the Package
- Removing a package

6.2.6.1 Remove Environment

To remove the Conda environment, follow these steps:

1. In the Conda details page, click **Remove**.

A confirmation dialog is displayed.

2. Click **Remove**.

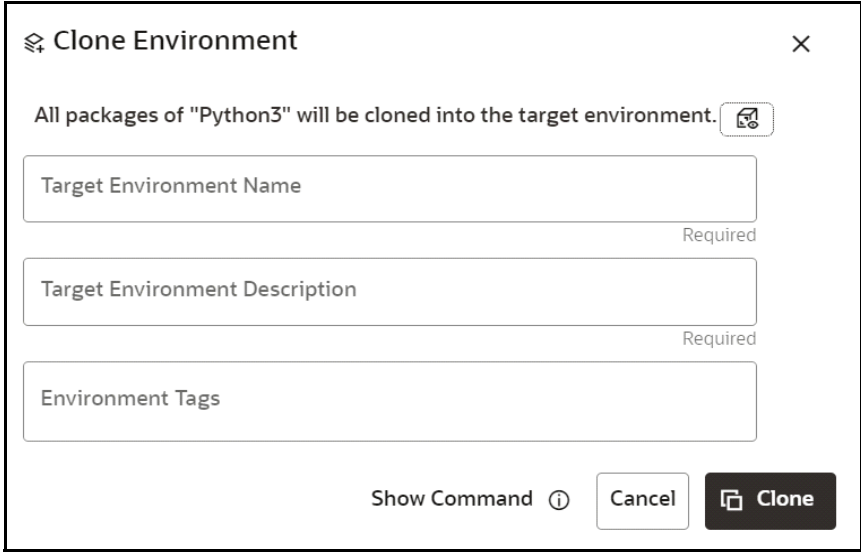
The Conda environment is deregistered and removed from the **Environment Summary** page.

6.2.6.2 Clone Environment


To clone a Conda environment, follow these steps:

1. In the Conda details page, click **Clone**.

The **Clone Environment** page is displayed.

Figure 37: Clone Environment

Clone Environment


All packages of "Python3" will be cloned into the target environment. 

Target Environment Name Required

Target Environment Description Required

Environment Tags

Show Command ⓘ Cancel Clone

NOTE You can preview the packages of the current Conda environment by clicking **Preview**  icon.

2. Enter the **Target Environment Name** to which the current environment needs to be cloned.
3. Enter the **Target Environment Description**.
4. Enter a tag in the **Environment Tags** field. You can add multiple tags
5. Click **Clone**.

The Conda environment is cloned to the targeted environment.

6.2.6.3 Export Environment

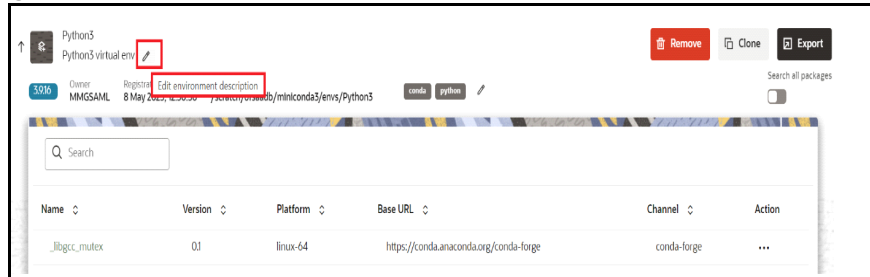
To export a Conda environment, follow the step:

1. In the Conda details page, click **Export**.
The Conda environment is exported in **yml** format.

6.2.6.4 Editing a Conda Environment Description

To edit a Conda environment description, follow these steps:

1. In the Conda details page, click **Edit**  icon next to the environment description field.

Figure 38: Edit Environment Description

2. Modify the description and click **Save** icon.

NOTE The **Name** of the Conda environment cannot be modified.

The details of the Conda environment is updated.

6.2.6.5 Adding or Removing the Environment Tags

To add or remove the Environment Tags, follow these steps:


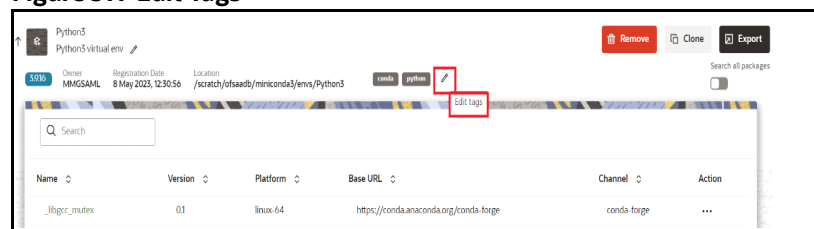
1. In the Conda details page, click **Edit**  icon next to the environment tags field.

Figure 39: Edit Tags

2. Add or remove the environment tags and click **Save** icon.

The environment tag details of the Conda environment is updated.

6.2.6.6 Search All Packages

To search all the packages, follow these steps:

1. In the Conda details page, enable the Search all packages option.
2. If you want to search the packages in cache, enable the Look up in cache option.

This option is set to true by default for faster processing. The searched package would be looked up in the cache and the result will be returned, if found. If not, a new search in the conda-forge channel is performed. Users can toggle this option in case if you expect more recent versions to be available.



3. Enter the package name in the search bar and press **Enter**.

All the package that meets the search criteria are displayed.

You can view and install the packages by clicking **Action** icon.

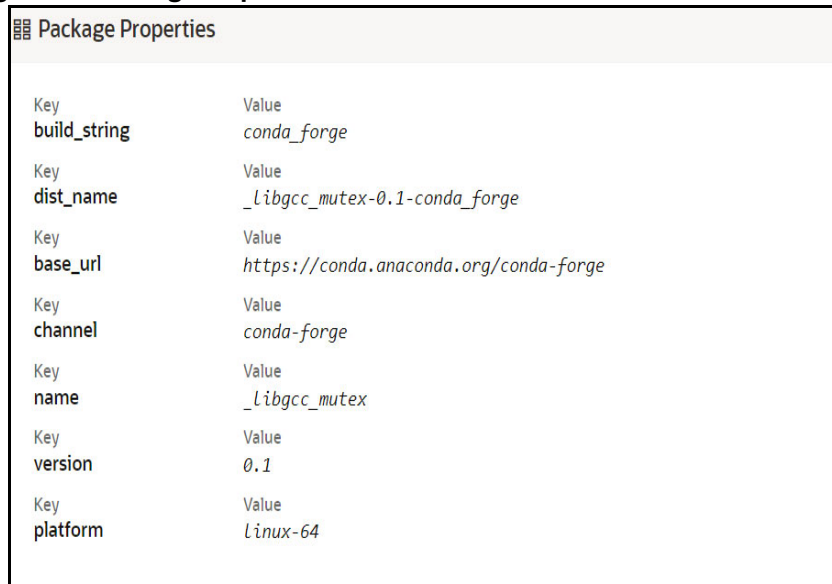
6.2.6.7 Viewing the Package Properties

To view the package properties of the Conda environment, follow these steps:

1. In the Conda details page, click **Action**  next to corresponding package and select **View**  to view the details.

The details of the package is displayed.

Figure 40: Package Properties





The screenshot shows a dialog box titled "Package Properties" with a list of key-value pairs for a Conda package. The keys and values are as follows:

Key	Value
build_string	conda_forge
dist_name	_libgcc_mutex-0.1-conda_forge
base_url	https://conda.anaconda.org/conda-forge
channel	conda-forge
name	_libgcc_mutex
version	0.1
platform	linux-64

6.2.6.8 Updating the Package

To update the package of the Conda environment, follow these steps:

1. In the Conda details page, click **Action**  next to corresponding package and select **Update**  to update the package.


A confirmation dialog is displayed.

2. Click **Update**.

The selected package is updated.

6.2.6.9 Removing a package

To remove a package from the Conda environment, follow these steps:


1. In the Conda details page, click **Action**  next to corresponding package and click **Remove**. A confirmation dialog is displayed.

2. Click **Remove**.



The selected package is removed from the Conda environment.

6.2.7 Clone Environment

To clone a Conda environment, follow these steps:

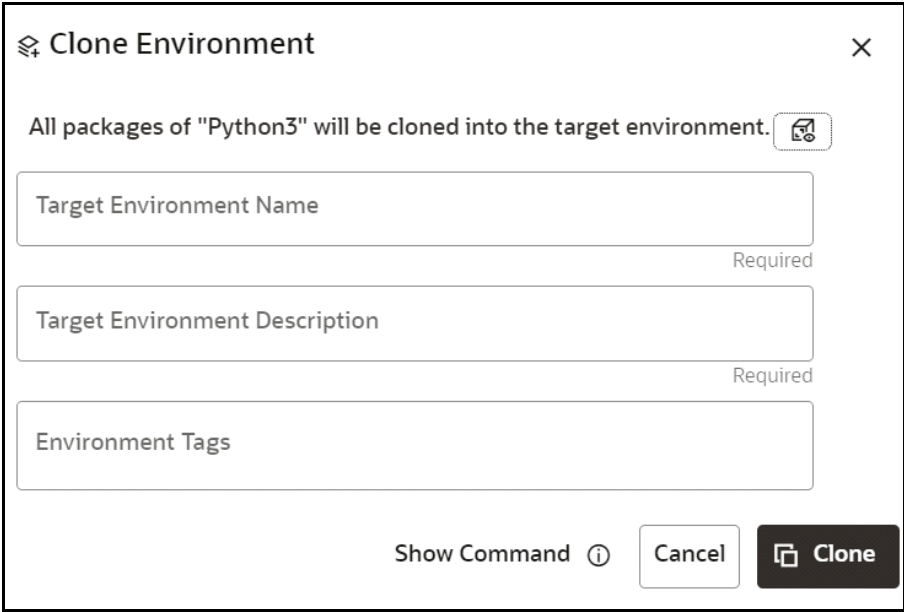
1. Click **Conda Environments**  icon to navigate to **Environment Summary** page from any other window in OFS CS application.

This page displays the Conda environments in a table.


2. Click **Action**  next to corresponding environment and select **Clone**  to clone the Conda environments.

The **Clone Environment** page is displayed.

Figure 41: Clone Environment




Clone Environment


All packages of "Python3" will be cloned into the target environment. 

Target Environment Name Required

Target Environment Description Required

Environment Tags

Show Command  Cancel **Clone**




NOTE You can preview the packages of the current Conda environment by clicking **Preview**  icon.

3. Enter the **Target Environment Name** to which the current environment needs to be cloned.
4. Enter the **Target Environment Description**.
5. Enter a tag in the **Environment Tags** field. You can add multiple tags.
6. Click **Clone**.

The Conda environment is cloned to the targeted environment.




6.2.8 Export Environment

To export a Conda environment, follow these steps:

1. Click **Conda Environments**  icon to navigate to **Environment Summary** page from any other window in OFS CS application.
This page displays the Conda environments in a table.
2. Click **Action**  next to corresponding environment and select **Export**  to export a Conda environment.
The Conda environment is exported in **yml** format.

6.2.9 Remove Environment

To remove the Conda environment, follow these steps:

1. Click **Conda Environments**  icon to navigate to **Environment Summary** page from any other window in OFS CS application.
This page displays the Conda environments in a table.
2. Click **Action**  next to corresponding environment and select **Remove**  to remove the Conda environment.
A confirmation dialog is displayed.
3. Click **Remove**.
The Conda environment is deregistered and removed from the **Environment Summary** page.

6.2.10 Conda Settings

To modify the Conda settings, follow these steps:



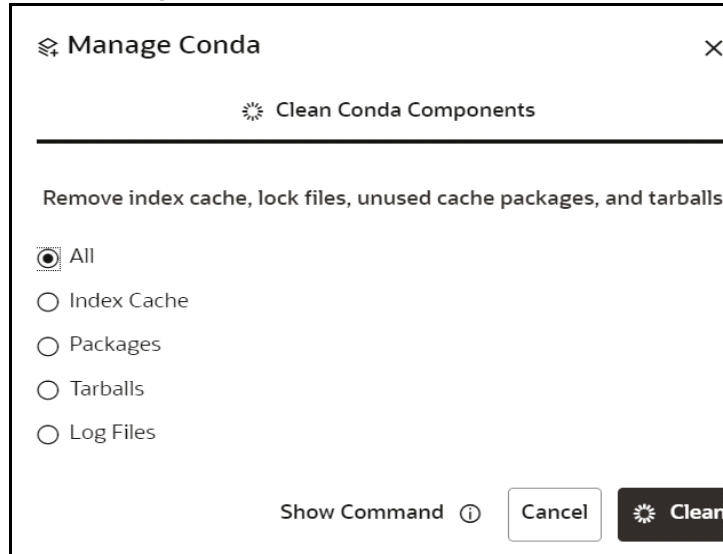
1. Click **Conda Environments**  icon to navigate to **Environment Summary** page from any other window in OFS CS application.
This page displays the Conda environments in a table.
2. Click **Conda Settings**  icon.
The **Manage Conda** screen is displayed.

Figure 42: Manage Conda




3. Select the required option and click **Clean**.
 - **All** : Remove index cache, lock files, unused cache packages, and tarballs.
 - **Index Cache** : Remove index cache.
 - **Packages** : Remove unused packages from writable package caches.
WARNING: This does not check for packages installed using symlinks back to the package cache.
 - **Tarballs** : Remove cached package tarballs.
 - **Log Files** : Remove log files.

This will clean up the Conda components based on the selection.

6.2.11 Viewing Conda properties

To view the Conda properties details, follow these steps:

1. Click **Conda Environments**  icon to navigate to **Environment Summary** page from any other window in OFS CS application.

This page displays the Conda environments in a table.

2. Click **Conda Properties**  icon.

The Conda properties are displayed in a key-value format.

Figure 43: Conda Properties

Conda Properties	
Key	Value
conda_version	23.3.0
conda_env_version	23.3.0
pkgs_dirs	/scratch/ofsaadb/miniconda3/pkgs, /scratch/ofsaadb/.conda/pkgs
av_data_dir	/scratch/ofsaadb/miniconda3/etc/conda
platform	Linux-64
default_prefix	/scratch/ofsaadb/miniconda3
site_dirs	~/.local/lib/python3.9, ~/.local/lib/python3.10
sys.executable	/scratch/ofsaadb/miniconda3/bin/python
rc_path	/scratch/ofsaadb/.condarc
python_version	3.9.16.final.0

6.3 API Configurations

Using API configurations, you will be able to register APIs above workspace level. Configured APIs can be mapped to multiple workspaces and the mapped APIs will be available for use in model pipelines.

Currently, only token-based and noAuth authentications are supported. Additionally, body parameters can only be provided with text data. All values that needs to be replaced during run time can be given in the format '<<placeholder variable name>>'.

Configured API can be viewed, edited (API code is not editable) and deleted. APIs that are not mapped to any workspace can only be deleted.

Integrating API with Model Pipelines

Mapped APIs will be available for use in model pipelines for the workspace. By selecting a specified API from the dropdown, you can link a node with an API. Additionally, you can provide an output variable name which will be assigned with the response from the API when that node is executed.

NOTE API configurations is available only for %python interpreters. Output variable will be a python variable accessible only for paragraphs with %python interpreters.

In pipeline execute screen, values can be entered for all the placeholder variables during run time.

NOTE Since variables are fetched during run time, it will be available in notebook or execute screen only after the first execution. This is the default behavior of all programmatic dynamic forms in Datastudio.

On executing the node/pipeline, result of the API executed can be accessed from the variable given under 'Output_variable_name'.

When the pipeline is imported to another workspace, it will seamlessly use the API that is mapped with the target workspace in the same order as that of the API mapped in source workspace.


Click **API Configurations**  icon to navigate to **API Summary** page from any other window in OFS CS application. You can configure and manage APIs from this page.

Figure 44: API Configurations

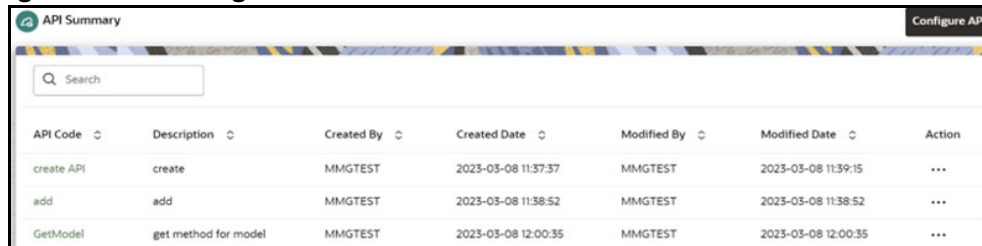



Table 10 provides descriptions for the fields and icons on the **API Summary** page.

Table 10: Description for API Configurations

Field or Icon	Description
Search	The field to search for an API. Enter specific terms in the field for which you want to search, and press Enter on the keyboard to display the results.
API Code	The code of the API.
Description	The description for the API.
Created By	The User Id of the User who created the API.
Created Date	The date on which the API was created.
Modified By	The ID of the Last Modified by user who has modified the API.
Modified Date	The date on which the API was modified.
Configure API	Click Configure API to create a new API.
Action 	Click the three dots to perform View/Edit/Delete functions on selected API.

6.3.1 Configuring an API

To configure an API, follow these steps:


1. Click **API Configurations**  icon to navigate to **API Summary** page from any other window in OFS CS application.
This page displays the API records in a table.
2. Click **Configure API** button.
The **Configure API** page is displayed.

Figure 45: Configure API

3. Enter the **Code** for the API. This field is mandatory.
4. Enter the **Description** for the API.
5. In the **Request Type** drop-down list, select the required option. Currently, REST type is supported.
6. In the **Method Type** drop-down list, select the required option. The supported types are GET, POST, PUT, and DELETE.
7. Enter the **URL** for the API. This field is mandatory.
8. You can provide the details such as Headers, Params, Body, and Authorization under the respective fields.
9. Click **Validate** to validate the API details.
Clicking on Validate button prompts you to add the values for all the placeholder variables. After entering the values for placeholders, you can click the Validate button to view the API responses.
10. Click **Add**.
The API is added and displayed in the API Summary page. These API's can be selected while creating a Workspace.

6.3.2 View an API Configuration

To view an API Configuration, follow these steps:




1. Click **API Configurations**  icon to navigate to **API Summary** page from any other window in OFS CS application.
This page displays the API records in a table.
2. Click **Action**  next to corresponding API and select **View**  to view the API.
The details of the API is displayed.

Figure 46: View API Details

Code
create API

Description
create

Request Type
REST

Method Type
POST

Uri
https://sic07oyt.us.oracle.com:3661/mmg8124/v1/datasource-servi

Placeholders can be given in the format '<<placeholder variable name>>'


Headers Params Body Authorization

Key locale	Value <<locale>>
Key user	Value <<user>>

3. Navigate to the Headers, Params, Body, and Authorization to view the respective details.

6.3.3 Edit an API Configuration

To edit an API configuration, follow these steps:

1. Click **API Configurations**  icon to navigate to **API Summary** page from any other window in OFS CS application.

This page displays the API records in a table.

2. Click Action  next to corresponding API and select **Edit**  to edit the API.

The **Edit API Details** page is displayed.

Figure 47: Edit API Details

For more details on the Edit API Details fields, see [Configuring an API](#) section.

3. Click **Save**.

6.3.4 Delete an API Configuration

To delete an API Configuration, follow these steps:




1. Click **API Configurations**  icon to navigate to **API Summary** page from any other window in OFS CS application.
This page displays the API records in a table.
2. Click Action  next to corresponding API and select **Delete**  to delete the API.

Figure 48: Delete Objects

3. Click **Delete**.
The API configuration is deleted.

6.4 Kafka Topics

Kafka is a distributed data source which is used to create real-time data pipelines and allows you to decouple data streams and systems.


Click **API Configurations**  icon to navigate to **API Summary** page from any other window in OFS CS application. You can configure and manage kafka topics and clusters from this page.

Figure 49: Kafka Topic

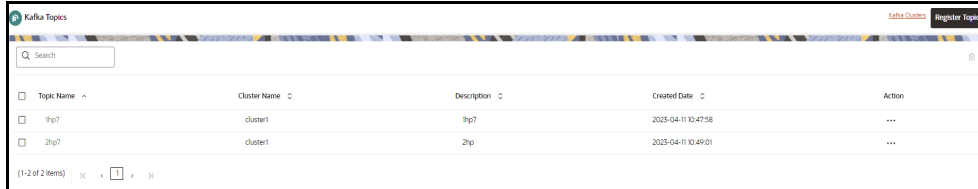



Table 11 provides descriptions for the fields and icons on the **Kafka Topics** page.

Table 11: Description for Kafka Fields

Field or Icon	Description
Search	The field to search for a Kafka topics and clusters. Enter specific terms in the field for which you want to search, and press Enter on the keyboard to display the results.
Topic Name	The topic name of the Kafka.
Cluster Name	The cluster name of the Kafka.
Description	The description of the Kafka.
Created Date	The date on which the API was created.
Kafka Clusters	Click Kafka Clusters to view/create/delete Kafka Clusters.
Register API	Click Register API to create a new Kafka topic.
Action 	Click the three dots to perform View/Edit/Delete functions on selected Kafka topic.

6.4.1 Creating a Kafka Cluster

To create a Kafka Cluster, follow these steps:


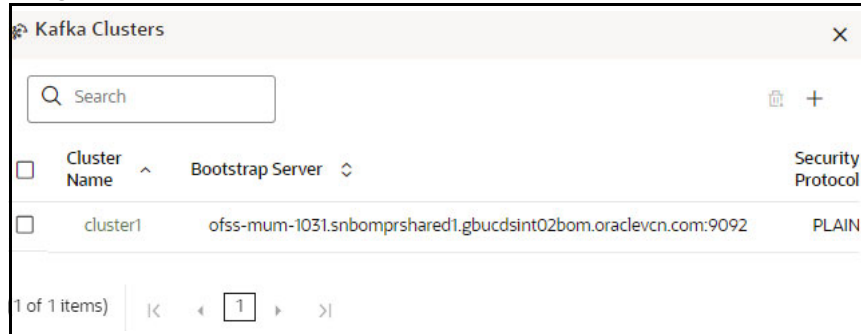
1. Click **Kafka Topics**  icon to navigate to **Kafka Topics** page from any other window in OFS CS application
This page displays the Kafka Topics in a table.
2. Click **Kafka Clusters** option.
The **Kafka Clusters** page is displayed.

Figure 50: Kafka Clusters

3. Click **Add** icon.
The Add Cluster window is displayed.
4. Enter the **Cluster Name**. This field is mandatory.
5. Enter the **Bootstrap server** details. This field is mandatory.
6. Select the **Security Protocol** as **Plain Text**.

NOTE


In the current release:

- The **SSL** security protocol is not supported, and it is recommended not to use the same.
- The Kafka feature is not supported in Solaris Operating System.

7. Click **Save**.
The Kafka cluster is created, and this will be displayed while registering the Kafka Topic.

6.4.2 Deleting a Kafka Cluster

To delete a Kafka Cluster, follow these steps:

1. Click **Kafka Topics**  icon to navigate to **Kafka Topics** page from any other window in OFS CS application.
This page displays the Kafka Topics in a table.
2. Click **Kafka Clusters** option.
The **Kafka Clusters** page is displayed.
3. Select the Kafka Cluster which you want to delete and click **Delete** icon.
A confirmation dialog is displayed.
4. Click **Delete**.
The Kafka Cluster is deleted.

6.4.3 Registering a Kafka Topic

To Registering a Kafka Topic, follow these steps:

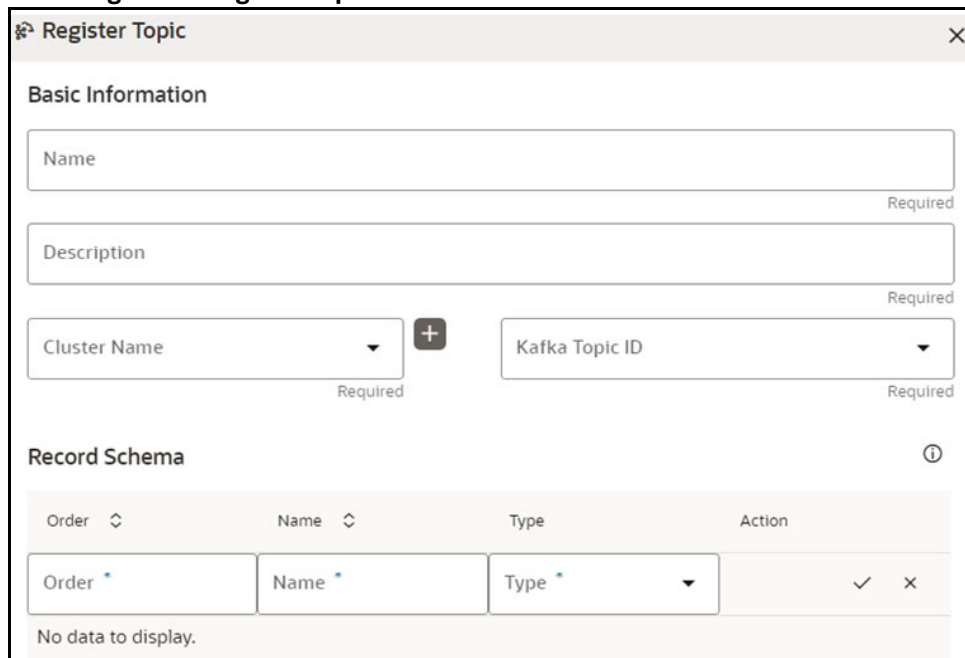
1. Click **Kafka Topics**  icon to navigate to **Kafka Topics** page from any other window in OFS CS application.

This page displays the Kafka Topics in a table.

2. Click **Register Topic** button.

The **Register Topic** page is displayed.

Figure 51: Register Topic



The screenshot shows the 'Register Topic' form with the following sections:

- Basic Information**:
 - Name (Required)
 - Description (Required)
 - Cluster Name (Required) with a '+' icon to add a new cluster.
 - Kafka Topic ID (Required)
- Record Schema** (with an info icon):
 - Table with columns: Order, Name, Type, Action.
 - Row 1: Order *, Name *, Type *, Action (✓, ✕).
 - Footer: No data to display.

3. Enter the **Kafka Topic Name**. This field is mandatory.
4. Enter the **Description** for the Kafka Topic. This field is mandatory.
5. In the **Cluster Name** drop-down list, select the required cluster or you can add a new cluster by clicking on + icon. This field is mandatory.
6. Based on the Cluster selection, the associated **Kafka Topic IDs** are displayed , select the required Kafka Topic ID. This field is mandatory
7. In the **Record Schema** field, enter the order, name, and the data type for the Kafka topic.

NOTE The schema types supported are **PyFlink, Python, and Java** . For more details, click the info icon next to Record Schema field.

8. Click **Register**.

The Kafka topic is added and displayed in the Kafka Topics page. These topics can be selected while creating a Workspace.

6.4.4 Viewing a Kafka Topic

To view a Kafka Topic, follow these steps:

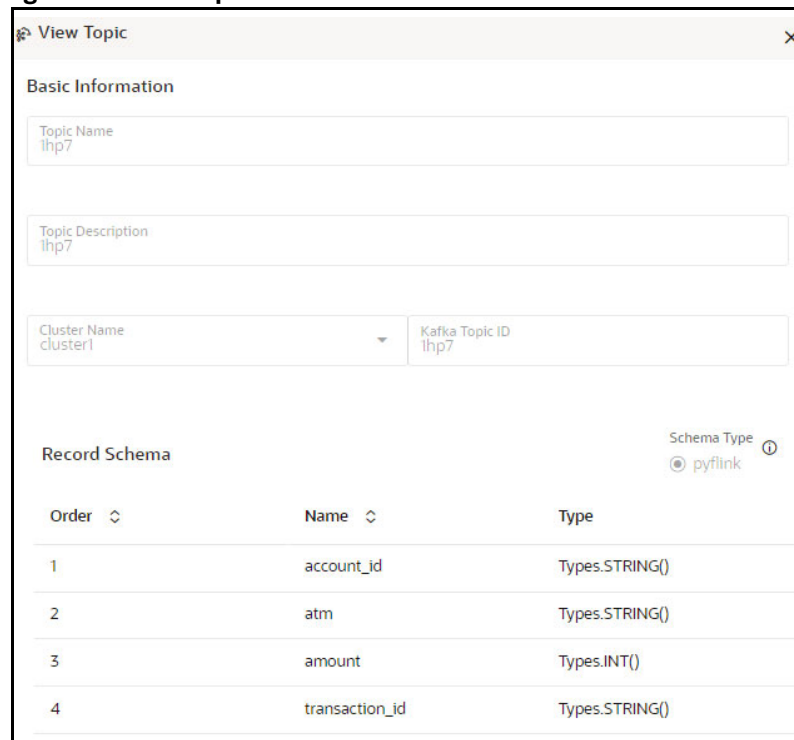
1. Click **Kafka Topics**  icon to navigate to **Kafka Topics** page from any other window in OFS CS application.

This page displays the Kafka Topics in a table.

2. Click **Action**  next to corresponding Kafka Topic and select **View** .

The details of the Kafka Topic is displayed.

Figure 52: View Topic



View Topic


Basic Information

Topic Name
lhp7

Topic Description
lhp7

Cluster Name
cluster1

Kafka Topic ID
lhp7

Record Schema Schema Type 

pyflink

Order	Name	Type
1	account_id	Types.STRING()
2	atm	Types.STRING()
3	amount	Types.INT()
4	transaction_id	Types.STRING()

6.4.5 Editing a Kafka Topic

To edit a Kafka Topic, follow these steps:

1. Click **Kafka Topics**  icon to navigate to **Kafka Topics** page from any other window in OFS CS application.

This page displays the Kafka Topics in a table.

2. Click **Action**  next to corresponding Kafka Topic and select **Edit** .

The **Edit Topic** page is displayed.

Figure 53: Edit Topic

Basic Information

Topic Name
lhp7

Topic Description
lhp7

Cluster Name
cluster1

Kafka Topic ID
lhp7

Record Schema

Schema Type
pyflink

Order	Name	Type	Action
			✓ ✕
1	account_id	Types.STRING()	✎ ✕
2	atm	Types.STRING()	✎ ✕
3	amount	Types.INT()	✎ ✕
4	transaction_id	Types.STRING()	✎ ✕

For more details on the Kafka Topic fields, see [Registering a Kafka Topic](#) section.

3. Click **Update**.

6.4.6 Deleting a Kafka Topic

To delete a Kafka Topic, follow these steps:

1. Click **Kafka Topics**  icon to navigate to **Kafka Topics** page from any other window in OFS CS application.

This page displays the Kafka Topics in a table.

2. Click Action  next to corresponding Kafka Topic and select **Delete** .

A confirmation dialog is displayed.

NOTE

If the selected Kafka Topic is mapped to a workspace, the delete option is disabled.

3. Click **Delete**.


The Kafka Topic is deleted.

6.5 Data Studio Options

Compliance Studio contains an underlying Notebook Server which has the following configurable options:

- Interpreters
- Tasks
- Permissions
- Credentials
- Templates

To access the Data Studio Options page, follow these steps:

1. On the **Workspace Summary** page, select Launch workspace  to display the **CS Production workspace** window.
2. Click on the **Profile** drop-down list and select **Data Studio Options**. The following options are available:
 - Interpreters
 - Tasks
 - Permissions
 - Credentials
 - Templates

6.5.1 Configuring Interpreters

An interpreter is a program that directly executes instructions written in a programming or scripting language without requiring them previously to be compiled into a machine language program. Interpreters are plug-ins that enable users to use a specific language to process data in the backend. Examples of Interpreters are jdbc-interpreter, spark-interpreters, python-interpreters, etc. Interpreters allow you to define customized drivers, URLs, passwords, connections, SQL results to display, etc.

In OFS Compliance Studio, Interpreters are used in Notebooks to execute code in different languages. Each Interpreter has a set of properties that are adjusted and applied across all notebooks. For example, using the python-interpreter makes it possible to change between versions, whereas the jdbc-interpreter offers to customize the URL, schema, or credentials. In Compliance Studio, you can either use a default interpreter variant or create a new variant for an interpreter. You can create more than one variant for an interpreter. The benefit of creating multiple variants for an Interpreter is to connect different versions of interpreters (Python ver:3, Python ver:2, etc.). This helps to connect a different set of users and database schema. For example, Compliance Studio schema, BD schema, etc. Compliance Studio provides secure and safe credential management such as Oracle Wallet (jdbc wallet), Password (jdbc password), or KeyStores to link to interpreter variants to access secured data.

Compliance Studio has ready-to-use interpreters such aspython, jdbc Interpreter, etc. You can configure them based on the use case. Additional variants of interpreters are created as multiple users might require different settings to access the database securely. The jdbc Interpreters use the credentials to enable secure data access.

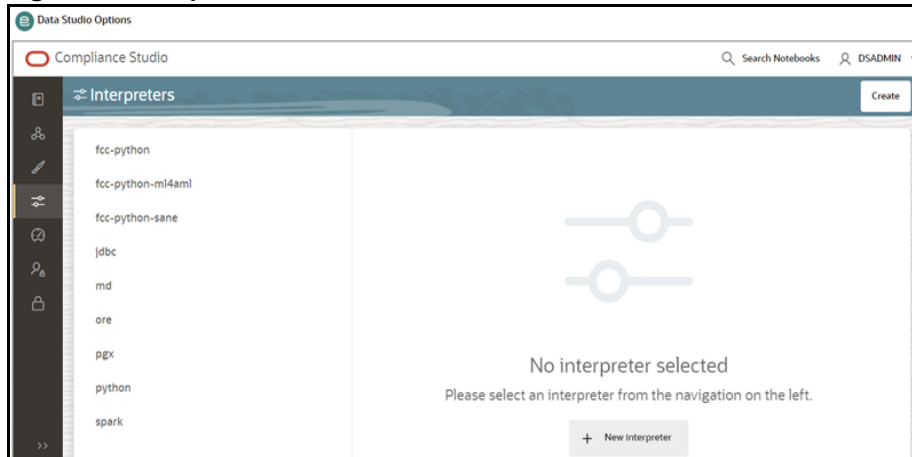
NOTE python, pyspark, and spark are a few other available interpreters.

Interpreters are configured when you want to modify URL, data location, drivers, enable or disable connections, etc.

To configure ready-to-use interpreters, follow these steps:

1. Click the **Interpreter** that you want to view from the list displayed on the LHS. The default configured interpreter variant is displayed on the RHS.

Figure 54: Interpreter's selection screen



2. Modify the values in the fields as per requirement. For example, to modify a parameter's limit, connect to a different schema, PGX server, etc.
3. Click **Update**. The modified values are updated in the Interpreter.

For more information on Interpreters, see the **Interpreter Configuration and Connectivity** section in the [OFS Compliance Studio Administration and Configuration Guide](#).

6.5.2 Managing Tasks

Tasks are created when notebooks or paragraphs are executed by the Notebook users. It is important to know the status of the execution, whether the tasks are created, rejected, canceled, etc. The Tasks page allows you to view the status of the task and associated notebooks, paragraphs, interpreters, etc. By default, all the tasks are listed on the Task page. You can view the specific task using filters such as task status, date of creation, and notebook name.

For more information on tasks, see the **Monitoring Tasks on Notebook Server** section in the [OFS Compliance Studio Administration and Configuration Guide](#).

6.5.3 Managing Permissions

Use this section to view the logged-in users and view, add, or modify ready-to-use permissions granted to the users, roles, or groups. You can create groups, roles, and permission templates (actions).

NOTE You can only view users and their details.

See the **User Access and Permissioning Management** section in the [OFS Compliance Studio Administration and Configuration Guide](#).

6.5.4 Managing Credentials

Compliance Studio provides secure and safe credential management. Examples of credentials are passwords, Oracle Wallets, or KeyStores. This section links credentials (a wallet and a password) to the jdbc interpreter variant to enable secure data access. This linking enables the jdbc interpreter to securely connect to the specified Oracle Database. You can also create new credentials based on your requirement to connect to the new interpreter variants.

For more information on Credentials, see the **Link Credentials** section in the [OFS Compliance Studio Administration and Configuration Guide](#).

NOTE

You can link credentials only to the jdbc interpreter. The Credentials section is enabled if an Interpreter variant can accept credentials.

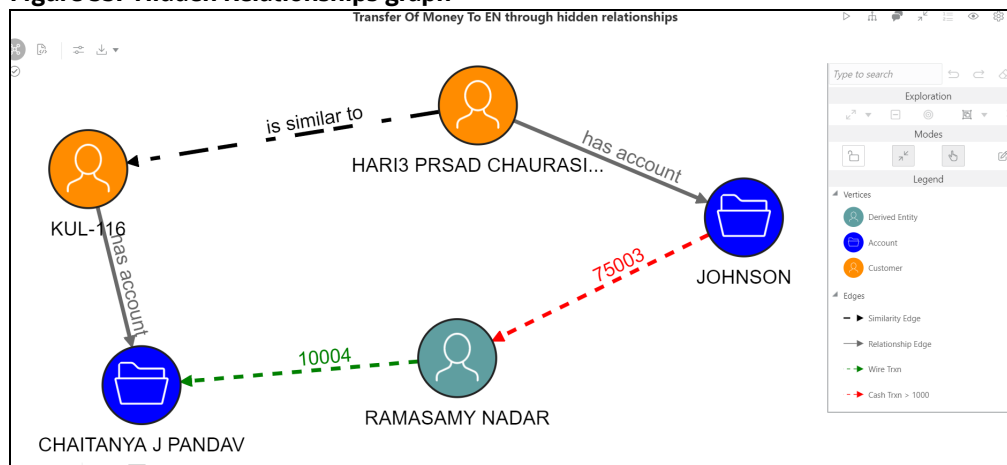
6.5.5 Configuring Graphs

The Notebook Server provides a pre-defined Financial crime graph that can be pre-loaded for most users and then states how to load different graphs. It also provides an intuitive way for creating graphs used in notebooks, where you can load graphs from external sources or create custom graphs. Using PGX, you can load multiple graphs into a notebook and create PGQL queries against different graphs. The result obtained from running a paragraph in a notebook can be used to input other paragraphs in the notebook. The results of analytics algorithms are stored as the graph's transient properties of nodes and edges. Pattern matching can then be used against these properties.

The pre-defined graphs within the notebook can be accessed and used for the analysis. To access the pre-defined graphs within the notebook, select any out-of-the-box notebooks, make the necessary changes for the PGQL code within the paragraph for the analysis you require, and run the paragraph. The query results are displayed as a graph.

For example, to view the Transfer of Money through hidden relationships, use the Financial Crime Graph Patterns notebook and execute the paragraph by providing the information about the entity, customer, and account.

Figure 55: Hidden Relationships graph



The graph configuration can be defined through a UI-based or JSON configurator. Graph configurations give you easy access to graphs using PGX-ALGORITHM, PGX-JAVA, and PGQL interpreters.

The graph can be created based on the following options:

- [Creating Graphs by using the UI-Based Configurator](#)
- [Creating Graphs by using the JSON Configurator](#)

6.5.5.1 Accessing the Graphs page



To create graphs based on the configurator, you need to access the Graphs page in the Notebook Server.

To access the Graphs page, follow these steps:

1. In the Notebook Server Workspace, click **Navigation Menu** in the upper-left corner. The menu items are listed.
2. Click **Graphs**. The Graphs page is displayed.
3. On the **Graphs** page, click **Create**.


The **Create new Graph Configuration** dialog box is displayed.

4. In the dialog box, you can choose your **graph type**. The options available are **Homogenous** and **Heterogeneous**.
5. On the Create new Graph Configuration page, you can click:

-  **Wizard** to configure the graphs based on the UI configurator.
-  **Plain** to configure the graphs based on the JSON configurator.

6.5.5.2 Creating Graphs by using the UI-Based Configurator

To create the Graphs by using the **UI-Based Configurator**, follow these steps:

1. In the **Create new Graph Configuration** dialog box, click  **Wizard** and specify the following information:
 - **Name**
Define a unique graph name for this graph.
 - **Format**
Notebook Server provides creating a graph from multiple formats, such as *Two tables*, *PGB*, *Edge list*, *Adjacency list*, *Flat file*, *GraphML*, *PG*, and *RDF*.
 - **Vertex Properties**
Define the properties and types that your vertices must-have in the graph. For example, a Patient Vertex can have a **Name (string)** property.
 - **Edge Properties**
Define the properties and types that your edges must-have in the graph. For example, a Patient_Medication Edge can have a **Dose (String)** property.
 - **Datastore**
Choose the data source for the vertices and edges of the graph. Depending on the option, you must provide different information:
 - **File**

Provide the Vertex URL List and the Edge URL List.

— **Spark**

Provide the Nodes and the Edges Table Name.

— **RDBMS**

Provide the username, password, the number of connections, Nodes, Edges Key Columns, and the From and To Node ID Columns.

— **Advanced Mode**

Click **Advanced Mode** to add more properties related to Vertex and Edge.

Figure 56: Create Graph Configuration

2. Click **Create**. The graph is created.

6.5.5.3 Creating Graphs by using the JSON Configurator

You can write a JSON configuration file based on the PGX JSON fields defined in the [PGX graph configuration documentation](#) to configure your graph.

To create the Graphs by using the **JSON Configurator**, follow these steps:


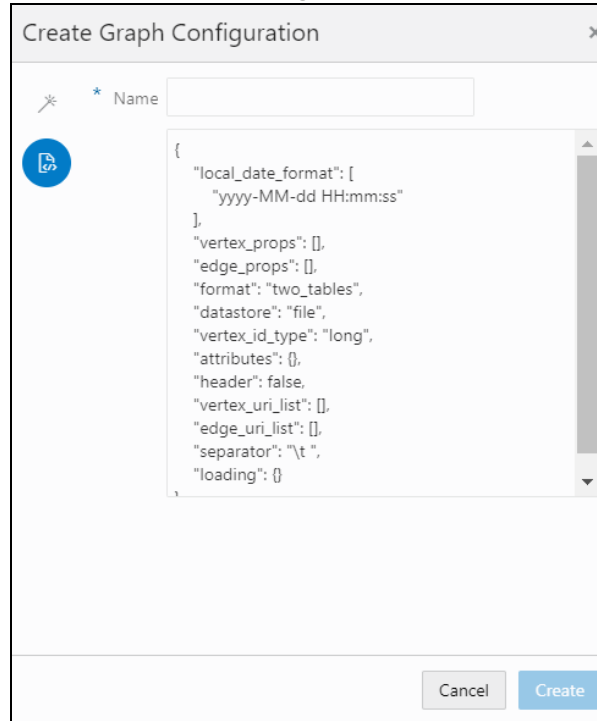
1. In the **Create new Graph Configuration** dialog box, click  **Plain**.
2. Specify the name of your graph and the **JSON** code in the code field.

Figure 57: Add details in configuration

3. Click **Create**. The graph is created. A sample code snippet is as follows:

```
{
  "vertex_labels": false, "edge_label": true, "loading": {
  "load_edge_label": true
  },
  "date_format": "yyyy-MM-dd HH:mm:ss", "vertex_props": [
  {
    "type": "string",
    "name": "type"
  },
  {
    "type": "string", "name": "religion"
  },
  {
    "type": "string",
    "name": "company"
  },
  {
    "type": "string", "name": "musicGenre"
  },
  ],
```

```
{
  "type": "string",
  "name": "show"
},
{
  "type": "string",
  "name": "name"
},
{
  "type": "string",
  "name": "country"
},
{
  "type": "string",
  "name": "team"
},
{
  "type": "string",
  "name": "genre"
},
{
  "type": "string", "name": "occupation"
},
{
  "type": "string",
  "name": "role"
}
],
"edge_props": [
  {
    "type": "float",
    "name": "weight"
  }
],
"format": "edge_list", "vertex_id_type": "integer", "attributes": {},
"header": "",
```

```
"uri": "http://pgx.us.oracle.com/graphs/connections.edge_list",  
"separator": "\t"  
}
```

This newly created graph configuration can be used in a notebook for the following:

- Load a graph using the PGX interpreter.

To load a graph, create a notebook and a paragraph with a PGX interpreter. Enter the code format given in the following example:

```
graph = session.readGraphWithProperties(dataSourceName, 'graphName')
```

Here, `dataSourceName` refers to the graph name that you have created.

- Query a graph using the PGQL interpreter.

To query a graph, create a notebook and create a paragraph with a PGQL interpreter. Specify the code format given in the following example:

```
"SELECT n,e,m FROM GRAPH_NAME MATCH (n) -[e]-> (m)"
```

Here `GRAPH_NAME` refers to the graph name that you have created.

6.5.5.4 Viewing the Details in a Graph

The graphs created and executed can be repositioned, collapsed, expanded, and then edges and vertex can be customized.

6.5.5.4.1 Repositioning Nodes

The Network Graph page allows you to move nodes around the screen, using the drag and drop feature, to reposition them.

To reposition nodes, follow these steps:

1. Navigate to the **Network Graph** in a notebook.
2. Select a node to reposition and click it.
3. Drag and drop the node to the required position.

NOTE

The graph only uses a specific portion of the browser window to display the graph. Dragging a node beyond a certain point towards the right side of the browser hides the portion of the graph dragged beyond that point. However, you can use the Zoom Out feature on the Graph Toolbar to view the hidden portion again.

6.5.5.4.2 Dropping and Expanding Nodes

You can drop the nodes to hide all the outgoing links and nodes to which these outgoing links are connected from the collapsed node. You also similarly expand the nodes. The dropped node can be regenerated again by executing the graph. To drop a node, follow these steps.

1. Navigate to the **Network Graph** in a notebook.
2. Select a node to collapse and right-click the node. An option menu is displayed.
3. Select the **Drop** option from the menu. The node and its outgoing links are dropped.

NOTE

If any child node has at least one incoming link from any other node, the child node and its child network are not dropped. But the link from the dropped node to the child node is hidden, and the icon of the dropped node changes to indicate that the node is in a dropped state.

On the Node menu of a dropped node, the drop option changes to Expand. The **Node** menu remains unchanged if the user drops a node but has no impact on the graph (if no part of the graph is hidden). There is no restriction on how many nodes can be dropped on a graph.

4. To expand the node, select **Expand** from the menu. The outgoing links are then restored on the page.

6.5.5.4.3 Viewing the Node Details

You can view the current information associated with the selected node. This is the same information displayed in this entity's **Entity Summary Historical Report** paragraph.

To view the node details, follow these steps:

1. Navigate to the **Network Graph** in a notebook.
2. Select a node and right-click. An option menu is displayed. The **Node Details** window is displayed with the current information associated with the selected node. This includes the Properties and Risk details of the node.

6.5.5.4.4 Deleting a Node

If you want to delete a node from a graph that is not required for your analysis, you can remove the unwanted node and view it. To delete a node, follow these steps:

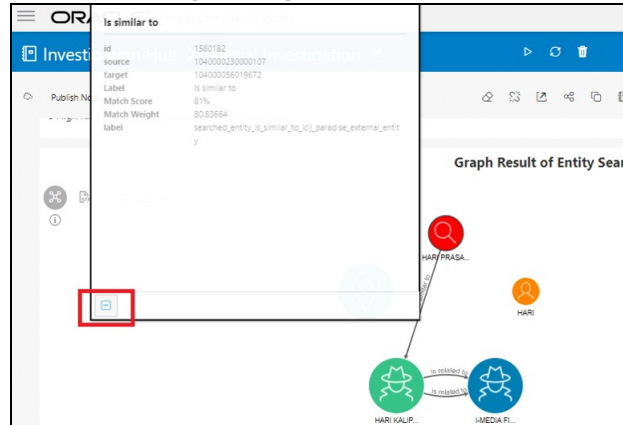
1. Navigate to the **Network Graph** in a notebook.
2. Right-click on any node and click **Drop**.

6.5.5.5 Removing an Edge

You can remove an edge from a network graph to view the result in On-screen data. To remove an edge, follow these steps:

1. Navigate to the **Network Graph** in a notebook.
2. Right-click on any edge and click **Drop - Delete** selected vertices.

Figure 58: Removing the Edges

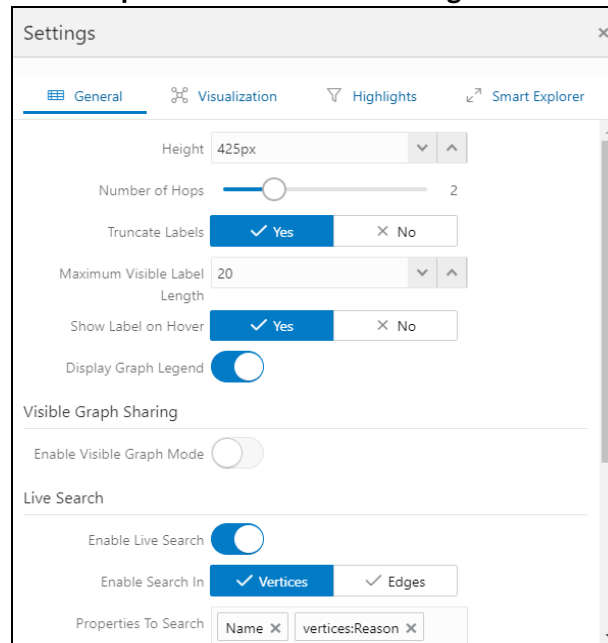


6.5.5.6 Customizing Graphs

The graph can be customized based on your visual needs. The graph customization and settings are based on the configuration in the graph settings, such as **General**, **Visualization**, **Highlights**, and **Smart Explorer**.

The graph settings can be accessed by clicking  **Settings** in the paragraph. You can specify the properties in the Settings window to customize your graphs.

Figure 59: Graph Customization and Settings



6.5.6 Configuring Templates

Perform the following steps to Create, Import, and set the FCGM Default **Template in the Template Dashboard**.


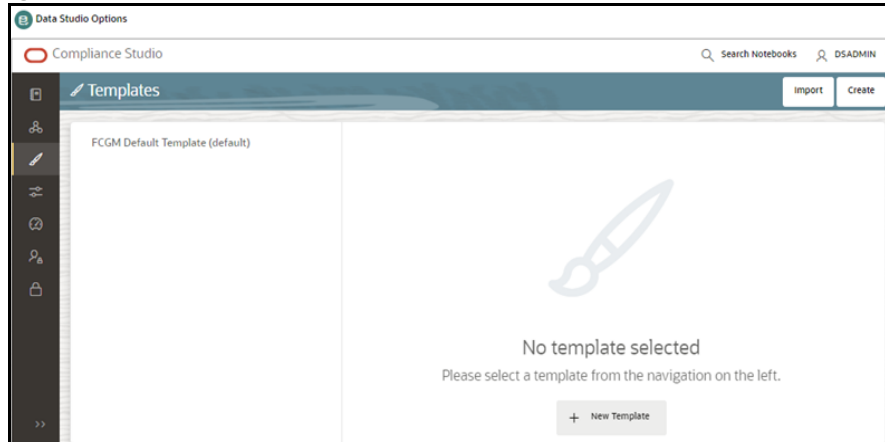
1. Click **CS Launch Workspace**  to display the **CS Production Workspace** window.
2. Click **Templates** from Data Studio Options.

Figure 60: Templates

The Compliance Studio offers different formats to view the result after a paragraph's execution. Templates enable you to define parameters to customize the result formats. You can customize the visualization of the result by defining parameters in a template and then applying that template to a notebook.

NOTE

- Compliance Studio comes with a default template, but users can customize this at the template level but can also override any global template settings in each notebook paragraph
- It is recommended to use the template that is available from out-of-the-box Compliance Studio.

For more information, see the Interpreter Configuration and Connectivity section in the [OFS Compliance Studio Administration and Configuration Guide](#).

7 Modeling

The Modeling component contains the following features:

- **Datasets:** Explore data, engineer features and monitor data drifts.
- **Model Libraries:** Manage python libraries for model creation and usage.
- **Model Techniques:** Manage techniques and algorithms from registered model libraries.
- **Model Catalog:** Centralized hub for all your machine learning models.
- **Pipelines:** Design, deploy and govern end-to-end machine learning pipelines for seamless model development.
- **Graphs:** Analyze complex relationships within your data through interactive graph representations.

7.1 Datasets

Datasets allow for the creation of a dataframe, a data structure that captures the logic that organizes data into a 2-dimensional table of rows and columns. Datasets allow for the reuse of these dataframes across models, as well as the features derived from the data source(s).

Dataset allows you to manage the entire operation related to data set. You can perform the following two things using the Dataset window:

- Define a metadata on how you want to create a dataset
- In addition, a mechanism where you can actually take a snapshot of real time data and store it. So, it can be used later in the pipeline.


This is similar to T2Ts, where you can select data from Data Source, such as file, table or another dataset and so on. The data can be imported from one column of one table, and another column from another table, or any file. After extracting the data from tables or files, provide the name to Target Dataset.

The Dataset is a trail based UI that allows you to configure the dataset details.

7.1.1 Accessing the Dataset Summary Page

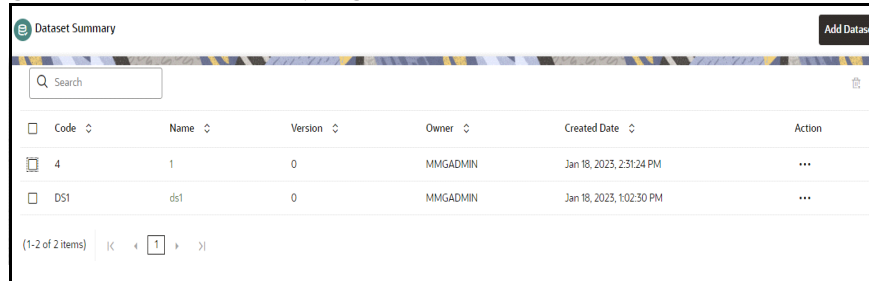
The Dataset Summary page gives access to the various Dataset functions such as create, view, and delete.

To access the Dataset Summary page, follow these steps:

1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **Modeling > Datasets** to display the **Dataset Summary** window.


This window displays the dataset records in a table.

Figure 61: Dataset Summary Page



The [Table 12](#) provides descriptions for the fields and icons on the **Dataset Summary** page.

Table 12: Dataset Summary Details

Field or Icon	Description
Search	The field to search for Dataset. Enter specific terms in the field for which you want to search, and press Enter on the keyboard to display the results.
Code	The code of the dataset.
Name	The name of the dataset.
Description	The description for the Workspace
Version	Version of dataset
Created Date	The date on which the Dataset was created.
Owner	The owner of the dataset.
Add Dataset	Click Add Dataset to create a new Dataset.
Delete 	Click Delete to delete multiple Datasets.
Action ...	Click the three dots to perform View/Edit/Delete functions on selected dataset.

7.1.2 Create a Dataset

The Dataset creation requires entry of the source of dataset and validation. These datasets are required for schema creation.

7.1.2.1 Creating a Dataset

To create a Dataset, follow these steps:

1. Navigate to Dataset Summary page to display the **Dataset Summary** page.
This page displays the dataset records in a table.
2. Click **Add Dataset** to create a Dataset in the Dataset **Summary** window.

Figure 62: Dataset Creation Window



The following steps show the various phases from Dataset creation:

- Define Pipeline Characteristics
- Source Selection
- Dataset Creation
- Dataset Transformation

7.1.2.2 Define Pipeline Characteristics

Enter basic configuration details in this window.

To configure the basic details for the dataset, follow these steps:

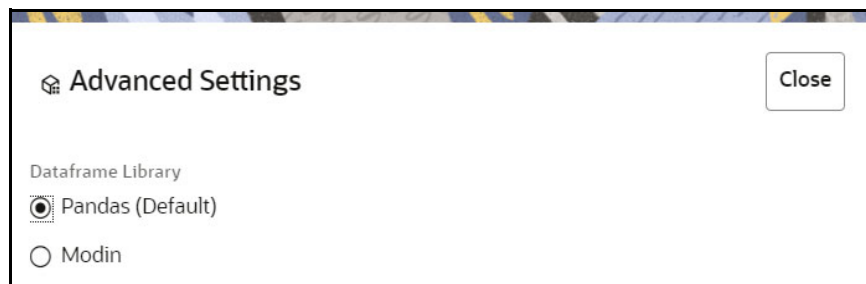
1. Enter the required details in the **Define Pipeline Characteristics** window as shown in the [Table 13](#).

Table 13: Dataset Transformation Details

Field	Description
Code	Enter the code of the dataset. This field is limited to 30 alphanumeric characters.
Dataset Name	Enter the name of dataset. This field is limited to 30 alphanumeric characters. Space not exceeding 30 characters. You cannot keep this field blank.
Description	Enter the purpose of the creation of the dataset. This field is limited to 150 alphanumeric characters. Space not exceeding 150 characters.

2. Click **Advanced Settings** to select the Dataframe Library.
The Advanced Settings window is displayed.

Figure 63: Advanced Settings



3. Select the Dataframe Library for the Dataset as Pandas (Default) or Modin and click **Close**.
 - **Pandas:** Pandas is an open-source data manipulation library for Python. It provides data structures such as Series (1-dimensional) and DataFrame (2-dimensional) that allow for easy manipulation and analysis of data. It also provides tools for reading and writing data to various file formats, including CSV, Excel, and SQL databases.
By default, **Pandas** is selected.
 - **Modin:** Modin is an open-source library that allows for faster operations on DataFrames using distributed computing which can lead to significant speed improvements, particularly for large datasets or computationally expensive operations.
4. Click **Next** to go to the next step.

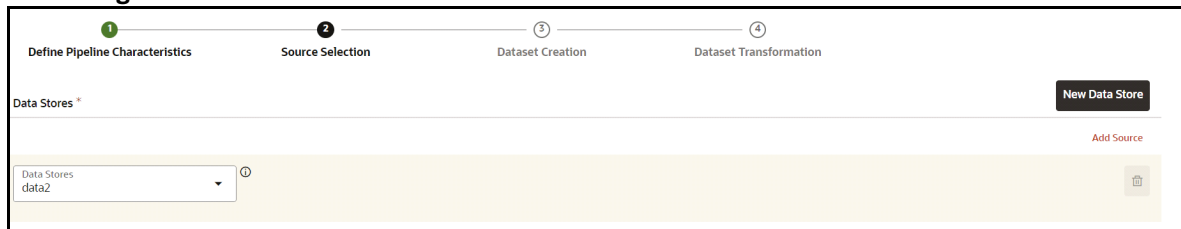
7.1.2.3 Source Selection

This section allows you to define the source of data. Here, you can choose the data structures from an existing datasources. Click on the icon next to Data Source field to view the tables/data source information associated with the data source.

To configure the Source details for the dataset, follow these steps:

1. Enter the required details in the **Source Selection Details** pane as shown in the [Table 14](#).

Figure 64: Source Selection



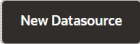

NOTE



The MISDATE feature is displayed only when the Data Source field is selected as a **File Type**.

If enabled, you need to add the Physical and Feature name for the Data Source.

Table 14 lists the data source details:

Table 14: Data Source Details

Field	Description
Data Source	<p>The Data Source drop-down list shows all the data sources and the data dorns those are tagged with the corresponding workspace. In addition, this lists all the available unused data source, which can be used. A confirmation message is displayed to tag an unused datasource with workspace.</p> <p style="text-align: center;">Figure 65: Confirmation Pop-up</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p style="text-align: center;">Unused Dataset Confirmation</p> <p>Shell_Accounts is unused datasouce want to continue?</p> <p style="text-align: right;"><input type="button" value="OK"/> <input type="button" value="Cancel"/></p> </div>
Data Source	<p>Here, either use the unused or create a new datasource using . When you create a new datasource, it becomes as unused.</p> <p>For more information, see Creating Data Source.</p> <p>You can add more Data Sources using Add More Add Source link.</p> <p>Use Delete  to delete added Data Source.</p>

2. Click  to go to the next step or click  to back to previous step.

7.1.2.4 Dataset Creation

This window allows you to select entity part (for example, column of table) of the datasource. The data source selected in the previous step requires the definition of database objects to be used.

To configure the DatasetCreation, follow these steps:

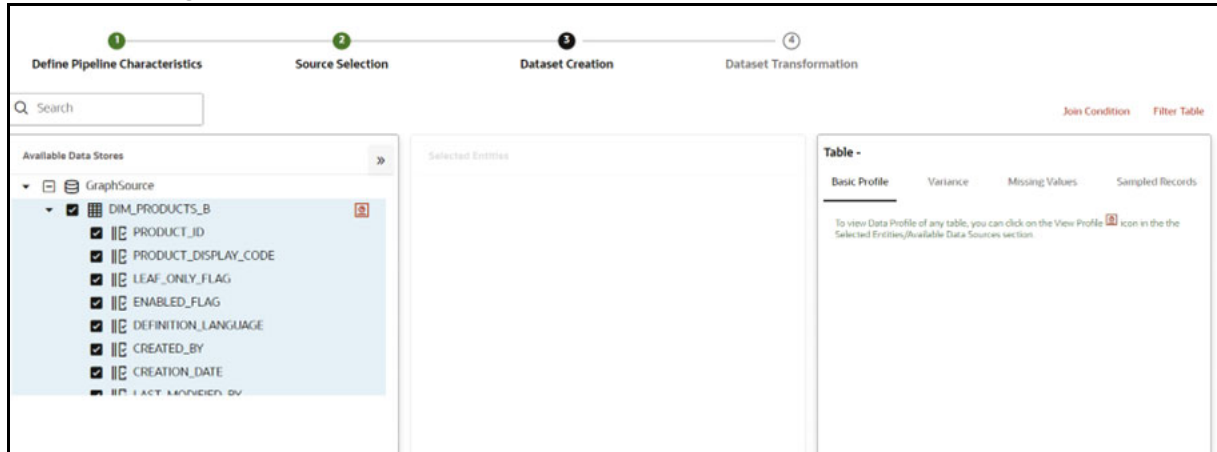
1. Select the required data source from the **Available Data Sources pane** and click >> to move the selected data to **Selected Entities** pane.

The **Available Data Sources** section shows the high-level data sources. You can select data from multiple data source entities. The **selected Data Sources** are displayed in **Selected Entities**

pane. You can use  to select or use  to de-select the data in the **Selected Entities**

pane. Also, clicking on  **View Profile** icon displays the profile details in the **Basic Profile** tab.

Figure 66: Dataset Creation



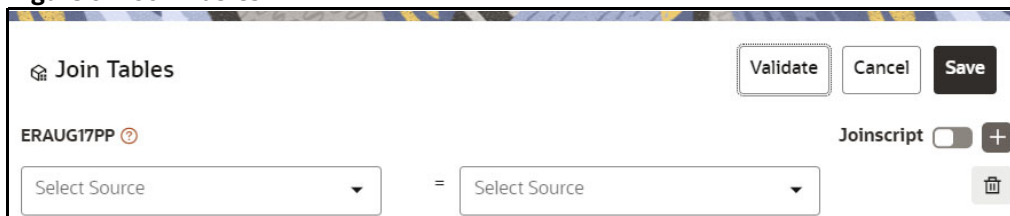
2. For more information on Joins, see [Joining Tables](#) section.
For more information on Filtering, see [Filtering Tables](#) section.
3. Click **Next** to go to the next step or click **Previous** to back to previous step.

7.1.2.4.1 Joining Tables

Use Join Condition to combine the data source details. Each data sources have multiple tables and multiple columns, so you can join them using Join Condition window. Joins can be applied only when user has selected more than 1 table.

NOTE As of now, only INNER JOIN is present.

Figure 67: Join Tables



You can join Tables either using drop-down or using the Joinscript Script option.

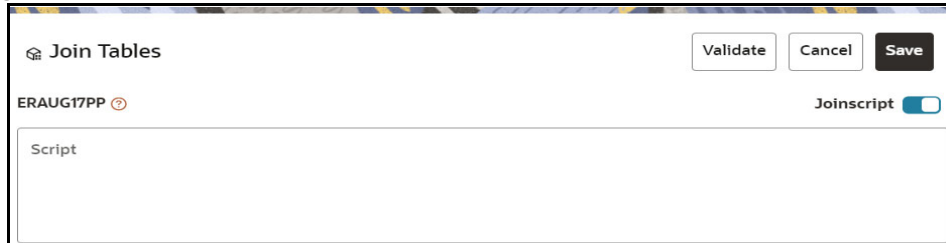
7.1.2.4.1.1 Using drop-down

Select the Column name of Table from the drop-down list. You can use multiple join conditions by using **+** icon.

7.1.2.4.1.2 Using Script

1. To use script, enable **Joinscript** option.
The Join Tables window is displayed to add scripts:

Figure 68: Join Tables



You must provide the script in below format:

Figure 69: Script

```
Script:
Table1
FULL OUTER JOIN Table2 ON Table1.Column1 = Table2.Column2
LEFT JOIN Table3 ON Table1.Column4 = Table3.Column3
INNER JOIN Table4 ON Table1.Column5 = Table4.Column7
RIGHT JOIN Table5 ON Table1.Column6 = Table5.Column8

SQL Query:
SELECT
Table1.Column1, Table1.Column4, Table1.Column5, Table1.Column6, Table2.Column2, Table3.Column3, Table5.Column8
FROM
Table1
FULL OUTER JOIN Table2 ON Table1.Column1 = Table2.Column2
LEFT JOIN Table3 ON Table1.Column4 = Table3.Column3
INNER JOIN Table4 ON Table1.Column5 = Table4.Column7
RIGHT JOIN Table5 ON Table1.Column6 = Table5.Column8
```

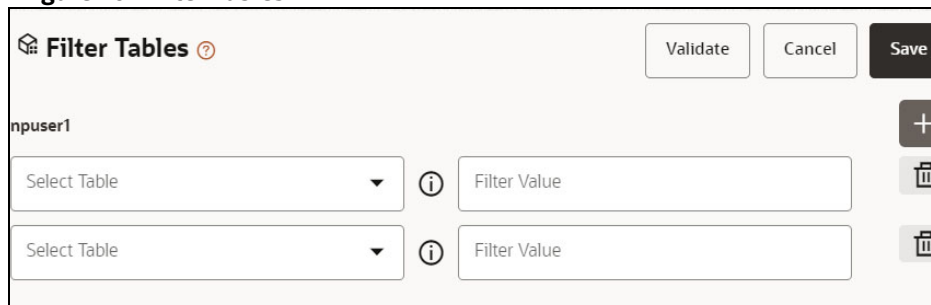
2. Click **Validate** to check the Join conditions.
3. Click **Save**.

7.1.2.4.2 Filtering Tables

You can also use the filters in dataframe creation from entity.

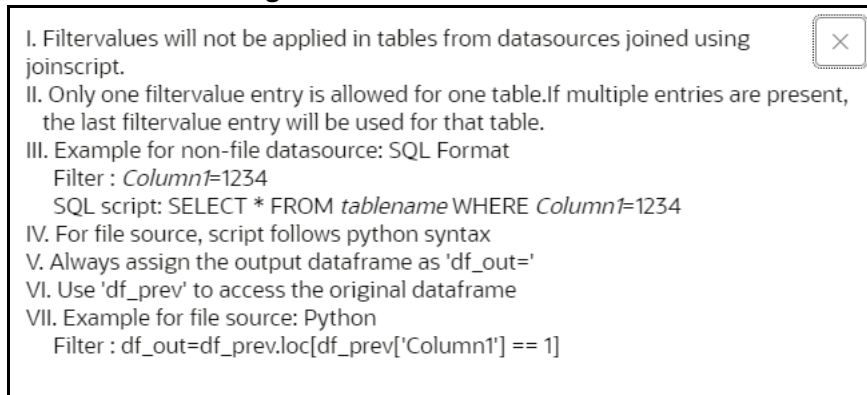
1. Click Filter Table to navigate to Filter Tables window.


Figure 70: Filter Tables



There are certain rules to be followed when adding filters

Figure 71: Rules while Adding Filters

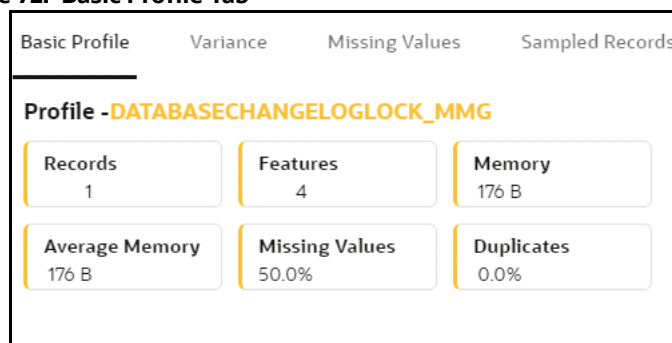


2. Multiple filters can be added by using  icon.
3. Click **Validate** to check the Filter conditions.
4. Click **Save**.

7.1.2.4.3 Viewing Profile

The Profile section from RHS shows the report based on Selected Objects (complete dataset) section. For example, Missing Values report shows the details of missing data in selected table in Selected Objects section.

Figure 72: Basic Profile Tab






7.1.2.5 Dataset Transformation


This window allows you to transform the data source information. This complete grid displays the Table like structure, which helps you to make the data better using many methods, such as by remove all the missing values, performing scaling and so on.

This window shows the following columns:

- **Physical Name:** Shows the Physical Name of column.
- **Feature Name:** Shows the Feature Name of column along with its data type. You can edit the Feature Name.
- **Observations:** The Observations field shows the value of column. For example, if any column is missing any value, you can easily identify missing value columns. Use Transformation button to fix these values. In addition, if all workspace/Infodom has one value, then Observation column can have Constant value and you can ignore this column to include.

-  **Create Feature** icon: To create a new feature/column by doing operations on the existing features.
- **View Report:** To view the complete report of the sampled data
-  **Re-Validate:** To re validate all the transformations.

You can also revalidate an individual transformation by clicking the More Action  icon and select **Re-Validate** option.

-  **Add:** To add new transformations

The profile button helps you to view profile the final data frame that you have selected. For more information, see the Viewing Profile section.

Here, you can perform following actions

- Re-ordering of transformations
- Insertion of transformation

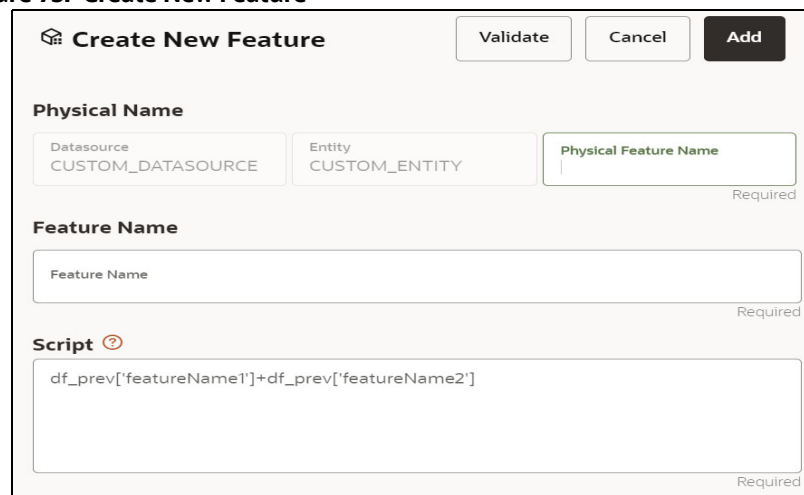
7.1.2.5.1 Create New Feature

The Create New Feature window allows you to create a new feature. This new feature is used in defining the Transformation. This is used to add a new column to dataset. This is useful, if you want to add a new column based on derived T2Ts (from data source).

To create a New Feature, follow these steps:

1. Click Create Feature on Dataset Transformation of Dataset UI.

Figure 73: Create New Feature



2. Enter the following details:
 - **Physical Feature:** Name of Physical feature
 - **Feature Name:** Logical Name of feature
 - **Script:** Update the script

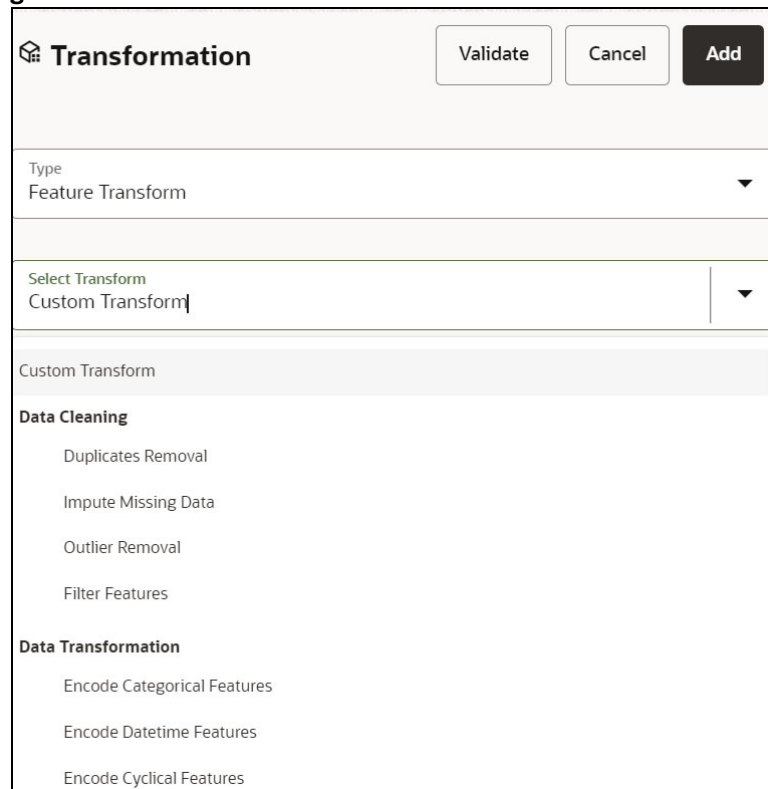
3. Click **Add** after validating the feature.
The new feature will be added at end of LHS section.
4. You can also edit or delete a newly added feature.

7.1.2.5.2 Add Data Transformation

To add the data transformation, follow these steps:

1. Click **Add**.
The Transform window is displayed.
2. Select the Transformation Type.
Following types are available:
 - **Dataframe Transform:** This is used to transform entire dataframe. For example, if you want to remove all missing values from all the columns of entire sampled data.
 - **Feature Transform:** This is used to transform a particular column of dataframe.

Figure 74: Transformation



The screenshot shows a 'Transformation' dialog box. At the top right are three buttons: 'Validate', 'Cancel', and 'Add'. Below the title bar, there is a 'Type' dropdown menu currently showing 'Feature Transform'. Underneath is a 'Select Transform' dropdown menu showing 'Custom Transform'. The main area of the dialog is divided into two sections: 'Data Cleaning' and 'Data Transformation'. The 'Data Cleaning' section includes 'Duplicates Removal', 'Impute Missing Data', 'Outlier Removal', and 'Filter Features'. The 'Data Transformation' section includes 'Encode Categorical Features', 'Encode Datetime Features', and 'Encode Cyclical Features'.

3. **Select Transform:** Here you either enter values using Method and Argument fields, or script.
4. Click **Validate** to validate the details.
5. Click **Add** to add the new transformation.
The New Transform is created and displayed at RHS section.
6. Click **Finish** to navigate to Dataset Summary window.
This saves the metadata of dataset.

Example:

If there is “missing value” for one of the column, then perform following steps to add the transform.

1. Click Add on Dataset Transformation window.
2. Select Type as Feature Transform.
3. Select Transform as Impute Missing Value.
4. Select the Physical Name from Physical Name drop-down list.
5. Select the Method and enter parameter in Argument field. The Method is updated on selected Column type. For example, if the selected column type is numerical, then following methods will be available: Simple, Constant, KNN, and Mice

OR

Enter the script

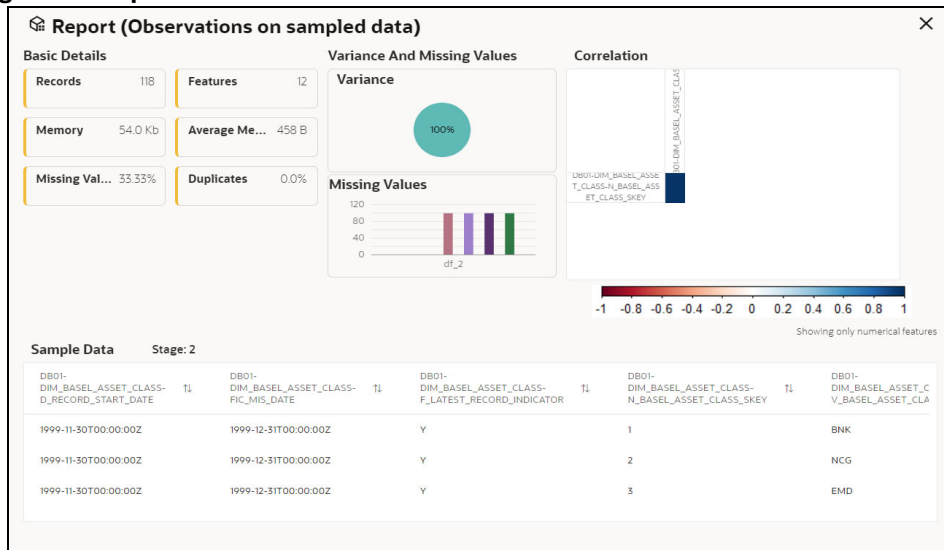
Below are Sample Custom Scripts

- Directly pass input data frame to output: `df_out=df_prev`
- Drop first row of data frame: `df_out=df_prev.drop(0,axis=0)` if not `df_prev.empty` else `df_prev`
- Drop column from data frame: `df_out = df_prev.drop('colname',axis=1)`

7.1.2.5.3 View Reports

This report shows the Observation on Sampled data, profiles, Variance, Correlation Matrix (correlation between columns), Sample Data. This report is based on sampled data.

Figure 75: Report



7.1.2.5.4 Re-ordering of Transformations

You can re-order the transformations using the drag-drop. During the transformation re-order, you can compare the profile of transformations. The transformation order gets adjusted accordingly.

7.1.3 View a Dataset

To view a Dataset, follow these steps:



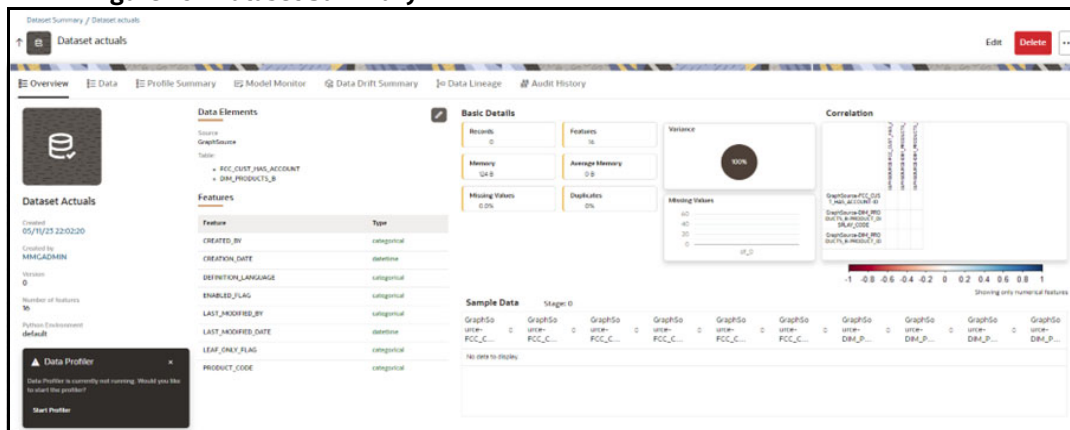
1. Navigate to Dataset Summary Page.
2. Click  next to corresponding Dataset and select View  .
The Profile Summary screen is displayed.



Figure 76: Dataset Summary



7.1.3.1 Overview



The details such as Data Elements, Features, Basic Details, Correlation, and Sample Data are displayed in graphical format.

To view the Overview of a Dataset, follow these steps:

1. Navigate to **Dataset Summary** page.
2. Click  next to corresponding Dataset and select View  .
The Overview page is displayed.



7.1.3.2 Data

To view the Data of a Dataset, follow these steps:

1. Navigate to **Dataset Summary** page.
2. Click  next to corresponding Dataset and select View  .
The Overview page is displayed.
3. Navigate to **Data** tab.

7.1.3.3 Profile Summary

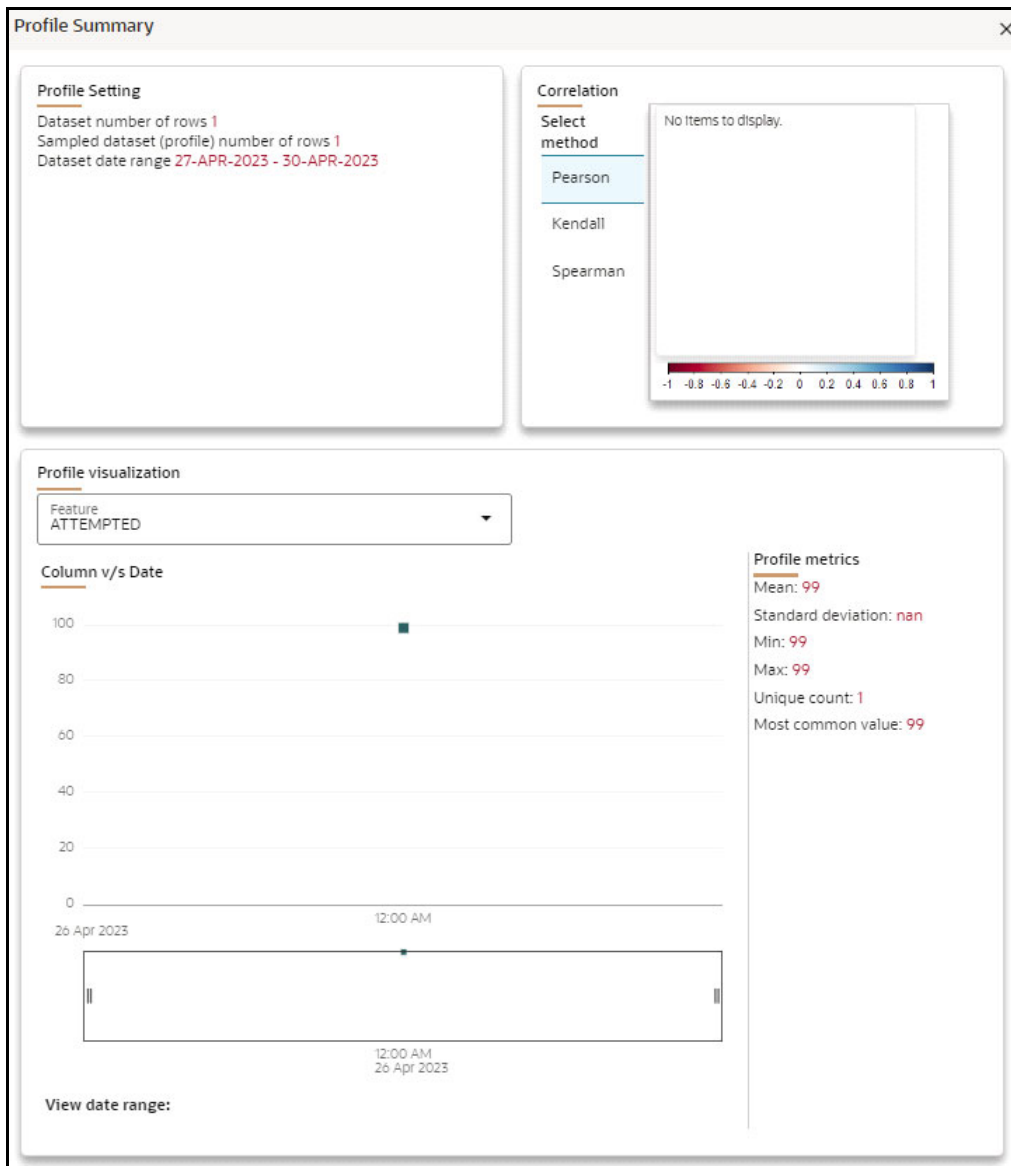
To view the profile summary, perform the following steps:

1. In the Profiler Summary screen, click  next to corresponding data profile and select View summary  .

This window displays the following details in graphical format.

- Profile Setting
- Correlation
- Profile visualization along with the metrics

Figure 77: Profile Summary



7.1.3.3.1 Start Profiling

To start a Profile, follow these steps:

Prerequisite:

You must create a Dataset with a datasource having columns with **DATA_TYPE** as **DATE**.

1. Navigate to Dataset Summary Page.



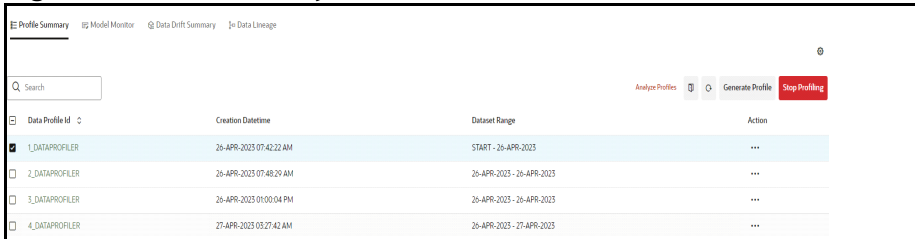
2. Click  next to corresponding Dataset and select View  .
This window displays the Dataset profiles in a table.

Figure 78: Profile Summary



Data Profile Id	Creation Datetime	Dataset Range	Action
1_DATAPROFILER	26-APR-2023 07:42:22 AM	START - 26-APR-2023	...
2_DATAPROFILER	26-APR-2023 07:48:29 AM	26-APR-2023 - 26-APR-2023	...
3_DATAPROFILER	26-APR-2023 01:00:04 PM	26-APR-2023 - 26-APR-2023	...
4_DATAPROFILER	27-APR-2023 03:27:42 AM	26-APR-2023 - 27-APR-2023	...

3. Click **Start Profiling** or click **Settings** icon.
The Profiler Settings page is displayed.

Figure 79: Profiler Settings



Profiler Settings

Basic Information

Columns Required

Threshold Required

[+Add Column](#)

Filter Column Required

[Schedule](#)

4. Under Basic Information section, enter the following details:
 - a. Select the required columns from the drop-down. All the numeric options are displayed under the Columns drop down. You can select multiple columns by clicking on + icon.
 - b. Enter the threshold for the columns. Threshold defines the Drift detection threshold for each column and only numerical columns can be selected for profiling.
 - c. Select the required filter column from the drop-down. Filter column contains date column of the dataset to filter.
5. Under Schedule section, enter the following details:
 - a. Enter a Schedule Name.
 - b. Select the Schedule Type as required:
 - Daily: Select to run the schedule everyday.

- Weekly: Select to run the schedule once in a week or the selected days in a week.
 - Monthly: Select to run the schedule once in a month or the selected days in a month.
- c. Click **Save**.

The Data Profiling has been started and Stop Profiling option is displayed in the Profile Summary screen.

For more details on disabling dataset profile, see [Stop Profiling](#) section.

6. Click **Generate Profile**.

The Data Profile is created.

7.1.3.3.1.1 Schedule Daily

To schedule the profiler to run daily, perform the following steps:

1. In the Profiler Settings screen, select the Schedule Type as Daily.
2. Select the start date on which you want to run the profiler.
3. Select the end date on which you want to stop your schedule.
4. Enter the time at which you want to run the profiler.
5. Click Save.

7.1.3.3.1.2 Schedule Weekly

To schedule the profiler to run weekly, perform the following steps:

1. In the Profiler Settings screen, select the Schedule Type as Weekly.
2. Select the start date on which you want to run the profiler.
3. Select the end date on which you want to stop your schedule.
4. Enter the time at which you want to run the profiler.
5. Select the day on which you want to run the profiler. You can select multiple days to run the profiler.
6. Click Save.

7.1.3.3.1.3 Schedule Monthly

To schedule the profiler to run monthly, perform the following steps:

1. In the Profiler Settings screen, select the Schedule Type as Daily.
2. Select the start date on which you want to run the profiler.
3. Select the end date on which you want to stop your schedule.
4. Enter the time at which you want to run the profiler.
5. Select the month on which you want to run the profiler. You can select multiple months to run the profiler.
6. Select the date on which you want to run the profile of the selected month to run.
7. Click Save.

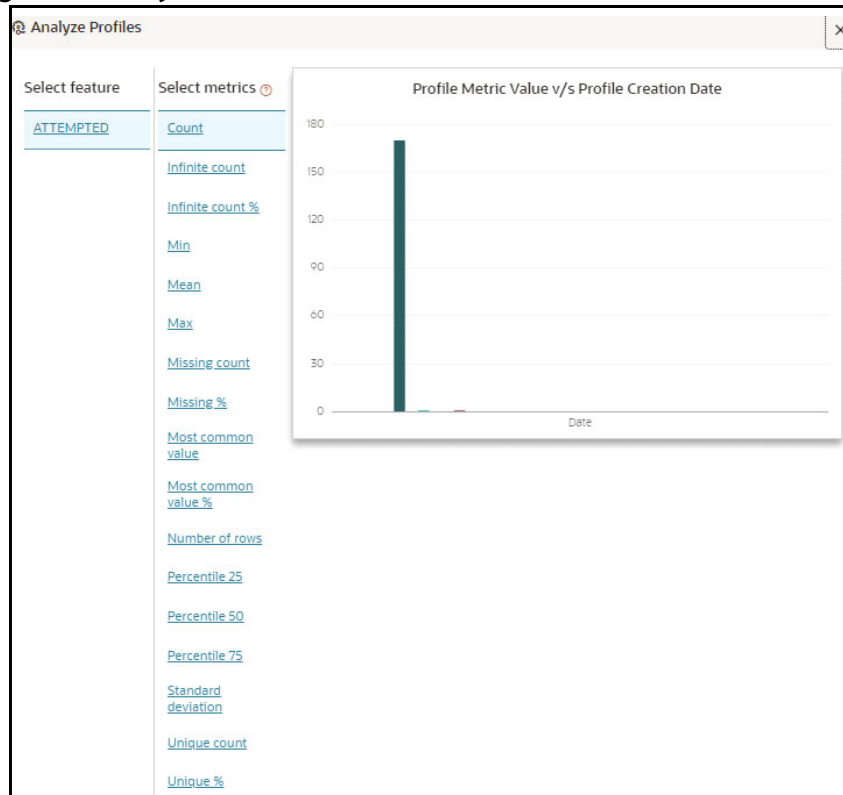
7.1.3.3.2 Analyze Profiles

To analyze multiple data profiles, perform the following steps:

1. In the Profiler Summary screen, select the data profiles that you want to analyze profiles. You can select multiple data profiles.
2. Click **Analyze Profiles**.

A window is displayed with multiple metrics of the selected profiles. Click on each metric to view the data in graphical format.

Figure 80: Analyze Profiles



7.1.3.3.3 Compare Profiles

To compare the data between two data profiles, perform the following steps:


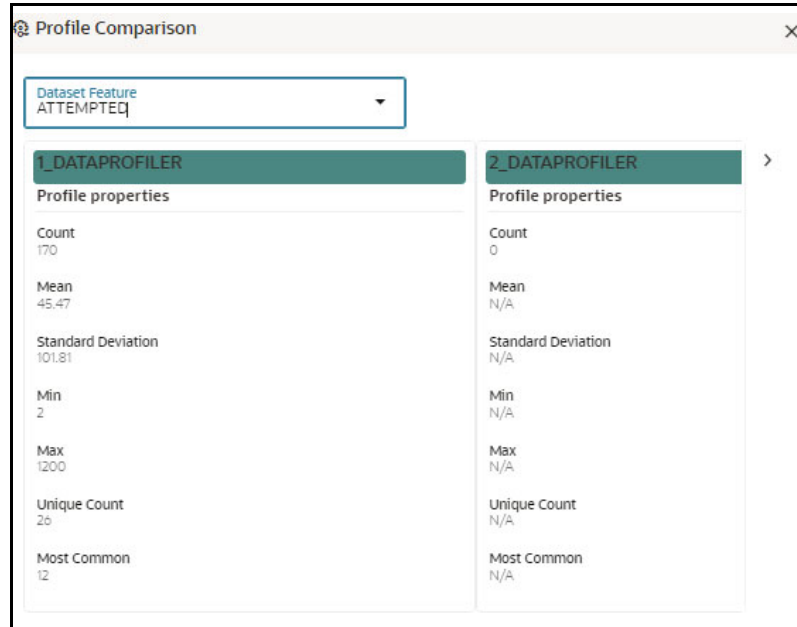
1. In the Profiler Summary screen, select two data profiles that you want to compare.
2. Click Compare Profiles .
The Profile Comparison is displayed.
3. In the Dataset Feature drop-down, select the feature that you want to compare.
The properties of both the profiles is compared and displayed in a tabular format.

Figure 81: Profile Comparison



7.1.3.3.4 Stop Profiling

To stop the profiling, perform the following steps:

1. In the Profiler Summary screen, select the data profiles that you want to stop profiling. You can select multiple data profiles.
2. Click Stop Profiling.

A confirmation pop-up window is displayed.



3. Click Yes to disable the dataset profile.

The dataset profiling has been disabled and Start Profiling option is displayed. For more information on profile, see [Profile Summary](#) section.


7.1.4 Create a Cache Snapshot

You can create a cache snapshot of the Dataset from this page.

To create a cache snapshot, follow these steps:

1. Navigate to **Dataset Summary** page.
2. Click  next to corresponding Dataset and select View .

The Overview page is displayed.

3. Click  on the header and select **Create a cache snapshot**.
4. Enter the **Snapshot Name** having alphanumeric character, underscore and hyphen not exceeding 30 characters and click Create.

This screen additionally allows users to cache a snapshot of the current state of data. The cached snapshots can be accessed later in Model Pipelines without any recompilation or re-read from data sources.

To use the dataset in model pipeline or data pipeline, the actual data is fetched using the Cache option. For example, to take the data from dataset on As of Date, create the data frame and provide the name to cache. Only Cache pulls the data from dataset.

This helps the things to work faster when you have millions of data, and you want to use intermediate data for use. For example, if you have 1 million data and want to use only 10,000 out of that, then perform the sampling for that 10, 000 entries. This increases the speed of processing, validation of information.

- Once the metadata is created, the original data can be cached. A snapshot of the actual data in the dataset at the current time can be stored referenced by a tag name.
- The location for caching is in the datastudio server location `$DS_HOME/work/ftpshare/mmg/workspace_name/dscode/tag`. The dataset will be saved as a parquet file with name `dscode_tag.parquet`
- When executing all APIs from notebook, workspace has to be attached.
- Caching can be performed in 2 ways
 - From UI, immediately after saving the metadata.

Or the users will have to fetch(create) a new snapshot/dataframe of the dataset using the API 'Fetch New Snapshot of dataset' and manually cache using the 'Caching Data Frame' API.

The [Table 15](#) provides information on the error and the troubleshooting procedure in case of dataset failure.

Table 15: Troubleshooting Procedure in case of Dataset Failure

Error	Troubleshooting procedure
ModuleNotFoundError: No module named '_bz2'	Install the package 'libbz2-dev' before building python.
ModuleNotFoundError: No module named '_sqlite3'	Install the package 'libsqlite3-dev' before building python.
Python-env-health-check fails if pandas version is less than 1.4.1. NOTE: modin dataframe library is supported only from pandas version 1.4.1 and higher.	You can switch between the options modin[dask] and pandas for the underlying dataframe library if pandas version 1.4.1 is installed.
"Not a valid file" error while profiling the Hive Data sources.	Copy the following required files : kbank.keytab , krb5.conf , hive-jdbc-driver.jar into the path : \$DS_HOME/conf folder of datastudio

7.1.5 Model Monitor

Model Monitoring refers to the process of closely tracking the performance of models in production and helps you to frequently monitor the distribution of the model and provides alerts in case of any exceptions.

In addition, it enables you to identify and eliminate bad quality predictions and poor technical performance of the models.

The model's robustness depends not only on the training of the feature-engineered data but also on how well the model is monitored after deployment. Typically a model's performance degrades over time, and it is essential to detect the cause of the decrease in performance of the model. The main cause of the decline in performance can be drift in the independent or/and dependent features which may violate the model's assumption and distribution about the data. When models are built, the model builder will create a snapshot of the dataset used for training the model and save it in a file which is later used for calculating drift with the current snapshot of the dataset.

To start the model monitoring, perform the following steps:



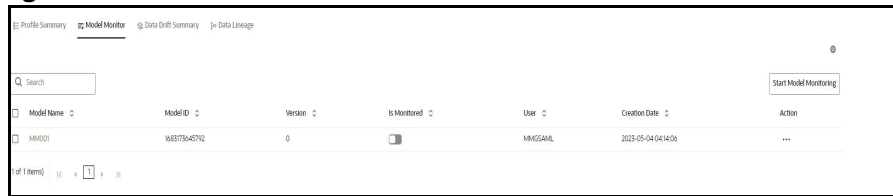
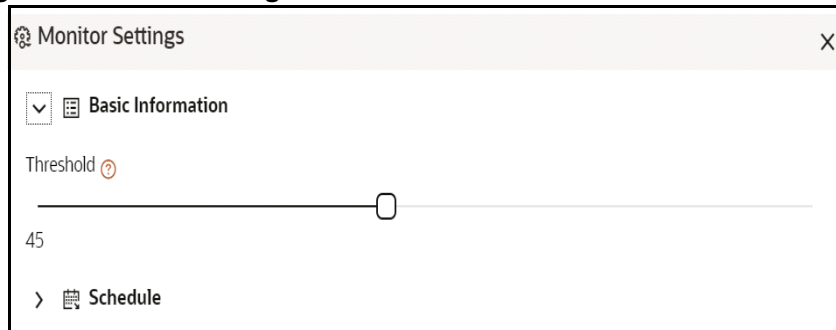
1. Navigate to **Dataset Summary** page.
2. Click  next to corresponding Dataset and select View  .
The Profile Summary screen is displayed.
3. Navigate to **Model Monitor** page.
All the models associated with the selected dataset will be displayed.

Figure 82: Model Monitor



4. Click **Start Model Monitoring**.
The Monitor Settings page is displayed.

Figure 83: Monitor Settings



5. Drag the slider and set the threshold settings. Threshold is the value in percentage, beyond which it is labelled as drifted.
6. Select the Schedule Type as required:
 - Daily: Select to run the schedule everyday.
 - Weekly: Select to run the schedule once in a week or the selected days in a week.
 - Monthly: Select to run the schedule once in a month or the selected days in a month.

The monitoring for the model is started and **Is Monitored** option is enabled by default and you can disable it if you do not want to monitor.



7.1.5.1 Stop the Model Monitoring

To stop the model monitoring, perform the following steps:

1. Navigate to **Model Monitor** page.
All the models associated with the selected dataset will be displayed.
2. Click **Stop Model Monitoring**.
A confirmation pop-up window is displayed.
3. Click **Yes**.
The Model Monitoring is stopped.

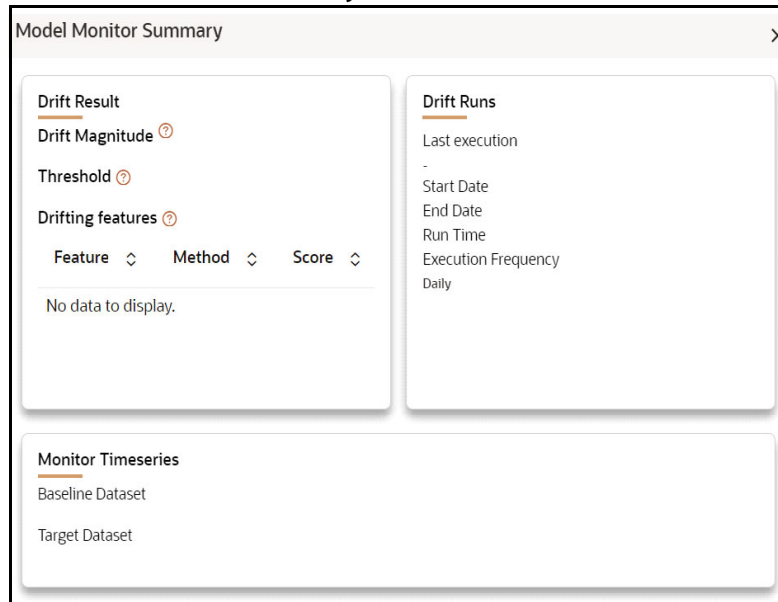
7.1.5.2 Viewing the Model Summary

To view the Model Summary, perform the following steps:

1. Navigate to **Model Monitor** page.
All the models associated with the selected dataset will be displayed.
2. Click **Action**  next to corresponding model and select **View Summary** .
This window displays the following details in graphical format.

- Drift Result
- Drift Runs
- Monitor Timeseries

Figure 84: Model Monitor Summary



7.1.5.3 Viewing the Model Latest Report

To view the Model Latest Report, perform the following steps:

1. Navigate to **Model Monitor** page.
All the models associated with the selected dataset will be displayed.



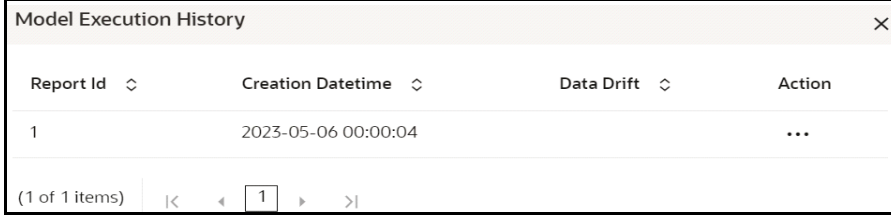
2. Click **Action**  next to corresponding model and select **View Latest Report**  .
The execution details of the model are displayed.

Figure 85: Model Execution History





Report Id	Creation Datetime	Data Drift	Action
1	2023-05-06 00:00:04		...

To view the report of each execution, click **Action**  next to corresponding report and select **View Report**.

7.1.5.4 Viewing the Model Execution History

To view the Model Execution History, perform the following steps:

1. Navigate to **Model Monitor** page.
All the models associated with the selected dataset will be displayed.
2. Click **Action**  next to corresponding model and select **View Execution History**  .
This window displays the details such as Baseline Distribution, Target Distribution, Drift Method, Drift Score, and Data Drift of the models.

7.1.6 Data Drift Summary

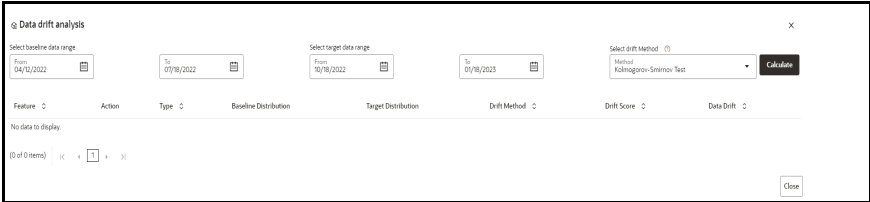
A Data Drift Summary report summarizes the changes in a dataset over time. It typically includes information for any changes in the data distribution of the selected features over the selected baseline and target date ranges.

The report is used to help identify potential issues with data quality which helps the users to take necessary actions further.

To calculate the data drift, perform the following steps:

1. In the Data Drift Summary screen, click Calculate Drift.
The Data drift Analysis window is displayed.

Figure 86: Data Drift Analysis



2. Select the data range (From and To) dates for the baseline.
3. Select the data range (From and To) dates for the target.
4. Select the drift method from the drop-down.

The available drift methods are:

- Kolmogorov–Smirnov (K-S) test
 - Only for numerical features
 - Output: `p_value`, drift detected when `p_value < threshold`.
- Kullback-Leibler divergence
 - For numerical and categorical features
 - Output: `divergence`, drift detected when `divergence >= threshold`.
- Wasserstein distance (normed)
 - Only for numerical features
 - Output: `distance`, drift detected when `distance >= threshold`.
- Population Stability Index (PSI)
 - For numerical and categorical features
 - Output: `psi_value`, drift detected when `psi_value >= threshold`.
- Jensen-Shannon distance
 - For numerical and categorical features
 - Output: `distance`, drift detected when `distance >= threshold`

5. Click **Calculate**.

The drift analysis report is displayed.

6. Click **Save**.

The reports are displayed under Data Drift Summary screen.

7.1.6.1 Disabling the Data Drift Monitoring

To stop the Data Drift monitoring, perform the following steps:

1. Navigate to **Data Drift Summary** page.
The data drift summary reports are displayed in a table.
2. Click **Stop Data Monitoring**.
A confirmation pop-up window is displayed.
3. Click **Yes**.
The Data Drift Monitoring is disabled.

7.1.6.2 Start the Data Drift Monitoring

To start the Data Drift monitoring, perform the following steps:

1. Navigate to **Data Drift Summary** page.
The data drift summary reports are displayed in a table.
2. Click **Start Data Monitoring**.
The Data Drift Settings window is displayed.

Figure 87: Data Drift Settings

The screenshot shows a 'Data Drift Settings' window with a close button (X) in the top right. It is divided into sections: 'Basic Information' (expanded), 'Schedule', and 'Dataset threshold (in %)'. Under 'Basic Information', there are three fields: 'Select reference dataset' (marked 'Required'), 'Select target dataset' (showing '05/31/2023, 06:49 PM'), and 'Drift Method' (set to 'Kolmogorov-Smirnov Test'). The 'Dataset threshold' section features a slider control currently set to 0. A 'Schedule' section is partially visible at the bottom.

3. Enter the basic information and schedule details and click **Save**.
For more details, see [Data Drift Summary](#) section.
The Data Drift Monitoring is started.

7.1.6.3 Viewing the Data Drift Summary Report

To view the Data Drift Summary Report, perform the following steps:



1. Navigate to **Data Drift Summary page**.
The data drift summary reports are displayed in a table.
2. Click **Action**  next to corresponding drift report Id and select **View** .
The drift report is displayed in a graphical format.



Figure 88: Drift Report




7.1.6.4 Deleting the Data Drift Summary Report

To delete the Data Drift Summary Report, perform the following steps:

1. Navigate to **Data Drift Summary page**.
The data drift summary reports are displayed in a table.

2. Click **Action**  next to corresponding drift report Id and select **Delete**  .
OR



If you wish to delete multiple data drift reports, select reports and click  .
A confirmation pop-up window with report details is displayed.

3. Click **Delete**.
The Data Drift Report is deleted.

7.1.7 Data Lineage

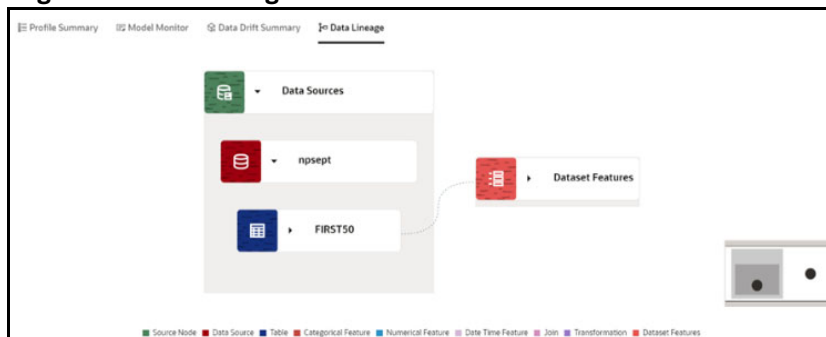
Data Lineage provides a summary view or visualization of Data Sources and its associated dataset and features in a graphical format. Also displays the complete data flow from start to finish.

To view the data lineage, perform the following steps:

1. Navigate to **Dataset Summary** page.
2. Click  next to corresponding Dataset and select View  .
The Profile Summary screen is displayed.
3. Navigate to **Data Lineage** page.

A summary view of Data Sources and its associated dataset and features in a graphical format.



Figure 89: Data Lineage



Click the drop-down of the respective features to view granular details and its workflow.

7.1.8 Edit a Dataset



To edit a Dataset, follow these steps:

1. Navigate to **Dataset Summary** Page.
2. Click  next to corresponding Dataset and select Edit  .
You can edit the Dataset fields except Code and Dataset Name.

7.1.9 Delete a Dataset

To delete a Dataset, follow these steps:

1. Navigate to **Dataset Summary** Page.

2. Click  next to corresponding Dataset and select Delete  .

7.1.10 Python functions for accessing Dataset from Model Pipelines/ Notebooks

7.1.10.1 Listing tags of Datasets Cached from UI

To get a list of all snapshots/tags of a dataset cached from UI, use the API below:

The [Table 16](#) lists the tag list.

Table 16: Tag List

API	Notebook Script	Notes/Input
List Tags of a Dataset	<pre>from mmg.datasets import list_tags list_tags(dscore)</pre>	dscore = dataset code - string tag = tag with which the dataset was cached - string

7.1.10.2 Deleting Cached Dataset

A cached dataset can be deleted by using the API below where tag refers to a particular snapshot/ timestamp of the dataframe.

The [Table 17](#) lists the delete dataset.

Table 17: Delete Dataset

API	Notebook Script	Notes/Input
Delete Dataset	<pre>from mmg.datasets import delete_df delete_df(dscore, tag)</pre>	dscore = dataset code - string tag = tag with which the dataset was cached - string

7.1.10.3 Listing all Datasets with Metadata saved from UI

The [Table 18](#) lists the datasets.

Table 18: All Datasets

API	Notebook Script	Notes/Input
List Datasets	<pre>from mmg.datasets import list_datasets list_datasets()</pre>	

7.1.10.4 Fetching Dataset in Notebook

Dataset whose metadata has been saved from UI can be fetched in 2 ways:

1. Dataset that has already been cached from UI can be fetched using first API below by providing the dataset code and tag.(DataFrame will not be recalculated. It will be read from cache.)
2. A new data frame for a dataset can be calculated/fetched using data from the present time with the metadata saved for that dataset as given in second API.

The [Table 19](#) lists the fetching dataset.

Table 19: Fetching Dataset

API	Notebook Script	Notes/Input
Fetch Dataset Cached from UI	from mmg.datasets import fetch_ds df = fetch_ds(dscode,tag)	dscode = dataset code - string tag - string
Fetch New Snapshot of dataset	from mmg.datasets import fetch_ds df = fetch_ds(dscode)	dscode = dataset code - string

7.1.10.5 Cache User's Dataframe from Notebook

A user-made data frame can also be cached using the below API. It will be stored in the the datastudio server in location : \$DS_HOME/work/ftpshare/mmg/workspace_name/cached/tag. The dataset will be saved as a parquet file with name cached_tag.parquet.

NOTE This dataframe is not related to dataset created from UI. This is independent of dataset metadata.

The [Table 20](#) lists the caching data frame.

Table 20: Cache User's Dataframe

API	Notebook Script	Notes/Input
Caching Data Frame	from mmg.datasets import cache_df path=cache_df(df, tag) path	df = dataframe to be cached - pandas dataframe tag - string

7.1.10.6 Fetching Data Frame Cached from Notebook

The data frame cached from notebook can be fetched using the API below:

The [Table 21](#) lists the fetch dataset:

Table 21: Fetching Data Frame

API	Notebook Script	Notes/Input
Fetch dataset cached manually	from mmg.datasets import fetch_ds df = fetch_ds("cached",tag)	tag - string

7.1.10.7 List Tags of all Data frames Cached from Notebook

The [Table 22](#) lists the tags of all Data frames Cached from Notebook.

Table 22: All Data Frames

API	Notebook Script	Notes/Input
List Tags of Manually Cached Datasets	from mmg.datasets import list_tags list_tags()	

7.1.10.8 Sample Custom Scripts

The [Table 23](#) displays the sample scripts which the users can refer to create transformations.

Table 23: Sample Script

Function	Script	Comments
Directly pass input data frame to output	df_out=df_prev	
Drop first row of data frame	df_out=df_prev.drop(0,axis=0) if not df_prev.empty else df_prev	
Drop column from data frame	df_out= df_prev.drop('colname',axis=1)	FEATURE TRANSFORMATION

7.1.10.9 Transformations

The [Table 24](#) lists the various transformations which can be done from the UI.

Table 24: Transformation

No.	Transformation	Function
1.	Add New Feature	A new feature can be added to the dataset which could be derived from the existing features using Script. Physical Feature Name and Feature Name are the names of the new feature. Script can be used to create a pandas Series for the new feature
2.	Encode Categorical Features	This function performs One Hot Encoding on a categorical feature and replaces it with multiple numerical features in the dataset.
3.	Encode Datetime Features	This function encodes a datetime feature and replaces it with multiple numerical features having the following information derived from the datetime feature - year, month, week, day, hour, minute, dayofweek
4.	Encode Cyclical Features	This function encodes a cyclical feature having hour, minute data etc and returns two features carrying the sine and cosine transformation of the cyclical data. 'fmax ' denotes the maximum possible value of the cyclical feature data.
5.	Impute Missing Data	This function imputes missing data within a feature. For numerical features, there are 4 methods for imputing missing data. simple - imputes with mean, median, most frequent values based on chosen arg value using the SimpleImputer in sklearn. const - fills the missing values with the value given in the arg knn - imputes using the KNNImputer in sklearn with k value given in arg mice - imputes using the IterativeImputer in sklearn For non-numerical data, missing values can be imputed using the 'const' method by replacing all missing values with the value given in arg

Table 24: Transformation

No.	Transformation	Function
6.	Feature Scaling	This function is used to scale multiple selected numerical features using the StandardScaler in sklearn
7.	Dimensionality Reduction	This function performs PCA on selected numerical features to reduce the dimensionality using sklearn.decomposition.PCA module. The number of output features can be specified using dim field. The names of the output features' names can be specified in the fields 'Physical Feature Name' and 'Feature Name'
8.	Outlier removal	This function is used to remove outliers present in a feature based on the specified zscore value. Non-numerical features are label encoded before removing the outliers.
9.	Duplicates Removal - Data Frame	This function removes all duplicate rows in the dataframe.
10.	Duplicates Removal - Feature	This function removes all duplicate rows within a specified subset of features and consequently removes those rows from the data frame.
11.	Filter Features	This function is used to filter the data frame based on conditions specified on features Operations allowed : >, >=, =, !=, <, <=, isin When the chosen operation is 'isin', the input to 'Filter Value' is a list of values that should be present in the output data frame.

7.2 Model Libraries

The Model Library information is used to bind a particular technique and its details to one unique Model Library. The Starting point for the Model builder is to register a model library with OFS CS application after it is properly set up in the python environment to be used.

Currently, OFS CS supports the following libraries:

- keras
- ONNX
- scikit-learn
- xgboost

As an example, the below section provides information on how to set up and register scikit-learn library.

Setting up the python library in the python environment:

Open the terminal and install the scikit-learn library using the following command:

```
python3 -m pip install scikit-learn
```

NOTE Proxy might be required to install the packages from pip.

Once the installation is complete, check for the package details using the following command:

```
pip show scikit-learn
```

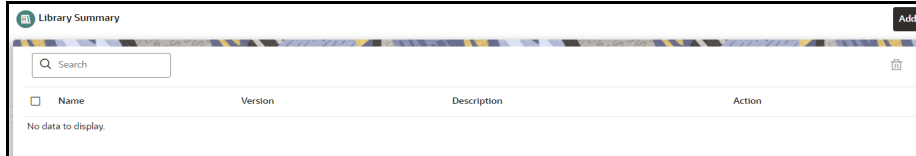
Once the installation is complete in python environment, you need to register the library into OFS CS application.

Registering the python library in OFS CS:

1. In the Mega menu, click **Modeling > Model Libraries** option.

The **Library Summary** page is displayed.

Figure 90: Library Summary



2. In the **Library Summary** page, click **Add**.

The **Add Library** page is displayed.

Figure 91: Add Library

3. Enter the name of the library.
4. Enter the version and description of the library.
5. Enter the signatures such as Import, Load, Train, Save, and Infer. For more details on the signatures, click on the respective help icon.

Some of the signatures captured in library stage might not be standard across different algorithm/techniques provided by the library.

6. Click **Create**.

The Model Objective is created and displayed in the Model Objective screen.

NOTE

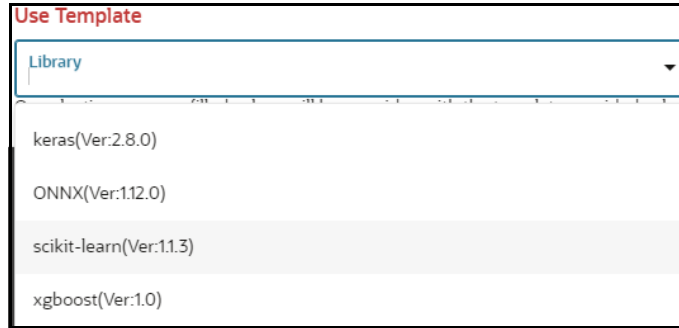
OFS CS User needs to check the details provided above from the homepage of the library being captured.

For example: <https://scikit-learn.org/stable/>.

OR

You can select the **Use Template** option to pre-fill the entries from the seeded list of Libraries. Currently following are the library present in the template.

Figure 92: Use Template Option



You can also edit the data based on your requirements.

7.2.1 Edit a Model Library

To edit a model library, follow these steps:



1. Navigate to **Library Summary** page.
2. Click  next to corresponding model library and select Edit  .
The **Edit Library** screen is displayed.

Figure 93: Edit Library



3. Make the necessary changes and click **Update**.

NOTE The Model Library name and version is unique and cannot be modified.

7.2.2 Delete a Model Library

To delete a model library, follow these steps:

1. Navigate to **Library Summary** page.



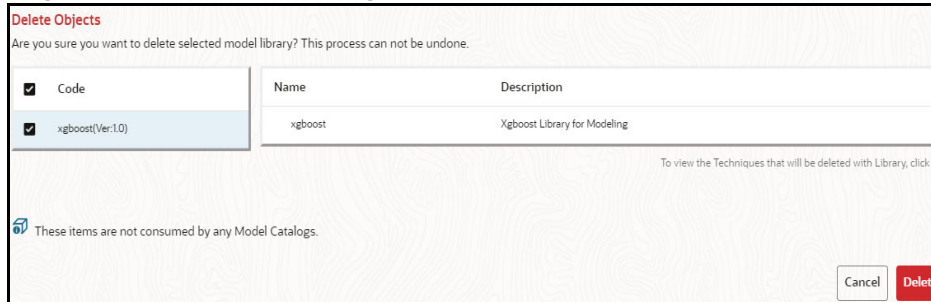

- Click  next to corresponding model library and select Delete  .
A confirmation dialog is displayed.

Figure 94: Confirmation Dialog



- Click **Delete**.
The selected model library and all the model techniques associated are deleted. The libraries that are deleted cannot be consumed by any model catalogs.

To delete multiple model libraries:

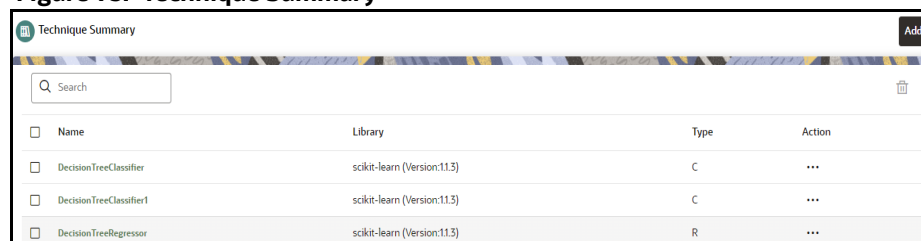
Select the model libraries which you want to delete and click  on the header of the page.

7.3 Model Techniques

Model Technique is the algorithm/technique used to create python model using the library/package which was created in the Model Library Screen. It is the actual information captured in the OFS CS application that helps in training the model (Upload and Build).

- In the Mega menu, click **Modeling > Model Techniques** option.
The **Technique Summary** page is displayed.

Figure 95: Technique Summary



- In the **Technique Summary** page, click **Add**.
The **Add Technique** page is displayed.

Figure 96: Add Technique

3. Enter the name of the technique.
4. Enter the description of the technique.
5. Select the library from the drop-down. Currently, OFS CS supports the libraries such as keras, ONNX, scikit-learn, and xgboost.
6. Select the type as either as **Classification** or **Regression**.

Classification: Classification is a process of finding a function which helps in dividing the dataset into classes based on different parameters. The task of the classification algorithm is to find the mapping function to map the input(x) to the discrete output(y).

Regression: Regression is a process of finding the correlations between dependent and independent variables. The task of the Regression algorithm is to find the mapping function to map the input variable(x) to the continuous output variable(y)

7. Enter the signatures such as Import, Load, Train, Save, and Infer. For more details on the signatures, click on the respective help icon.

Some of the signatures captured in library stage might not be standard across different algorithm/technique provided by the library.

8. Navigate to **Hyperparameter Details** tab and click **Add** to add the parameters.
You can add the type of parameters such as String, Integer, Float, and Boolean.
9. Click **Create**.

The Model Technique is created and displayed in the **Technique Summary** screen.

NOTE

OFS CS User needs to check the details provided above from the homepage of the library being captured.

For example: <https://scikit-learn.org/stable/>.

OR

You can select the Use Template option to pre-fill the entries from the seeded list of Libraries.

You can also edit the data based on your requirements.

7.3.1 Edit a Model Technique

To edit a model technique, follow these steps:



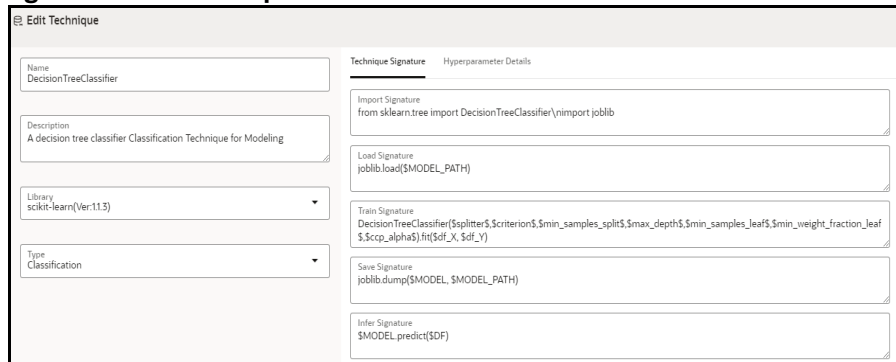
1. Navigate to **Technique Summary** page.
2. Click  next to corresponding model technique and select Edit  .
The **Edit Technique** screen is displayed.

Figure 97: Edit Technique



3. Make the necessary changes and click **Update**.
For more details, see [Model Techniques](#) section.

7.3.2 Delete a Model Technique

To delete a model technique, follow these steps:



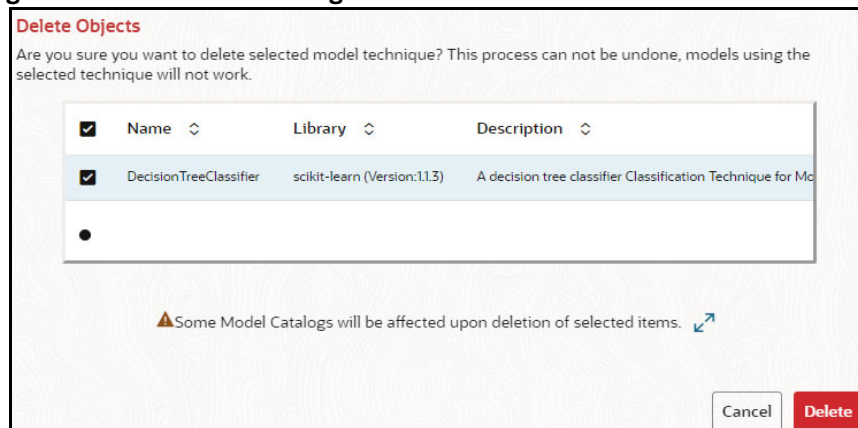

1. Navigate to **Technique Summary** page.
2. Click  next to corresponding model technique and select Delete  .
A confirmation dialog is displayed.

Figure 98: Confirmation Dialog



3. Click **Delete**.
The selected model technique and all the model catalogs associated are deleted.

To delete multiple model techniques:

Select the model techniques which you want to delete and click  on the header of the page.


7.4 Model Catalog

The Model Catalog page allows you to add and manage the Model Technique, Model Library, and Model Objectives. You can either import the models from external sources or create, train and label it as champion model.

7.4.1 Model Objective

Model Objective is the top level metadata where further models are created or trained which can be consumed in the upcoming steps.


To add a Model Objective , follow these steps:

1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **Model Catalog** to display the **Model Catalog Summary** window.

This window displays the model objectives in a table.

[Table 25](#) provides descriptions for the fields and icons on the **Model Objective Summary** page.

Table 25: Model Objective Summary

Field or Icon	Description
Search	The field to search for Model Objectives. Enter specific terms in the field for which you want to search, and press Enter on the keyboard to display the results.
Code	The unique identifier of the Model Objective.
Name	The name of the Model Objective.
Dataset	The dataset which is used to create the Model Objective.
Target Variable	Target Variable is the important parameter after the dataset. During the dataset selection, target variable is selected that constitutes of number of columns/features.
Type	The type which is selected during model objective creation. The type can be either Classification or Regression.
Action 	Click the three dots to perform View/Delete functions on the selected model objective.

7.4.1.1 Adding a Model Objective

To add a model objective, follow these steps:

1. In the **Model Objective Summary** screen, click **Add**.

The Add Model Objective screen is displayed.

Figure 99: Add Model Objective

The screenshot shows a dialog box titled "Add Model Objective" with a close button in the top right corner. The dialog contains the following fields from top to bottom:

- Select Dataset:** A dropdown menu with a downward arrow. A "Required" label is positioned below the field.
- Code:** A text input field. A "Required" label is positioned below the field.
- Name:** A text input field. A "Required" label is positioned below the field.
- Description:** A text input field.
- Select Target Variable:** A dropdown menu with a downward arrow.
- Type:** A dropdown menu with a downward arrow. A "Required" label is positioned below the field.

2. Select the required dataset from the drop-down.
For more details on the dataset, see [Datasets](#) section.
3. Enter the code for the Model Objective.
The code should be unique for each model objective.
4. Enter the name and description for the Model Objective.
5. Select one of the column/feature as the target variable for the models which needs to be trained/uploaded.
6. Select the Type as either as **Classification** or **Regression**.
Classification: Classification is a process of finding a function which helps in dividing the dataset into classes based on different parameters. The task of the classification algorithm is to find the mapping function to map the input(x) to the discrete output(y).
Regression: Regression is a process of finding the correlations between dependent and independent variables. The task of the Regression algorithm is to find the mapping function to map the input variable(x) to the continuous output variable(y).
7. Click **Create**.
The Model Objective is created and displayed in the **Model Objective Summary** screen.

7.4.1.2 View a Model Objective

To view a Model Objective, follow these steps:



1. Navigate to **Model Objective Summary** page.
2. Click  next to corresponding Model Objective and select View  .
The following page is displayed.

Figure 100: Model Objective

<input type="checkbox"/>	Model ID	Code	Version	Type	Status	Action	Champion
<input type="checkbox"/>	1677506289492	SAMPLE1 xnmkkl	0	Model	✖	...	👤
<input type="checkbox"/>	1677506513489	SAMPLE1	1	Model	✖	...	👤
<input type="checkbox"/>	1675078958019	TESTMODELBUILDER test	0	Model	✔	...	👤
<input type="checkbox"/>	1675078994551	UPLOADED uploaded model	0	Uploaded Model		...	👤

Clicking on the Type of the model displays the individual model and build details.

Figure 101: Model Details

Model Details
✕

Details

Build Details

Model Code
SAMPLE1

Description
xnmkkl

Library Name
keras (Version:2.8.0)

Technique Name
Teat

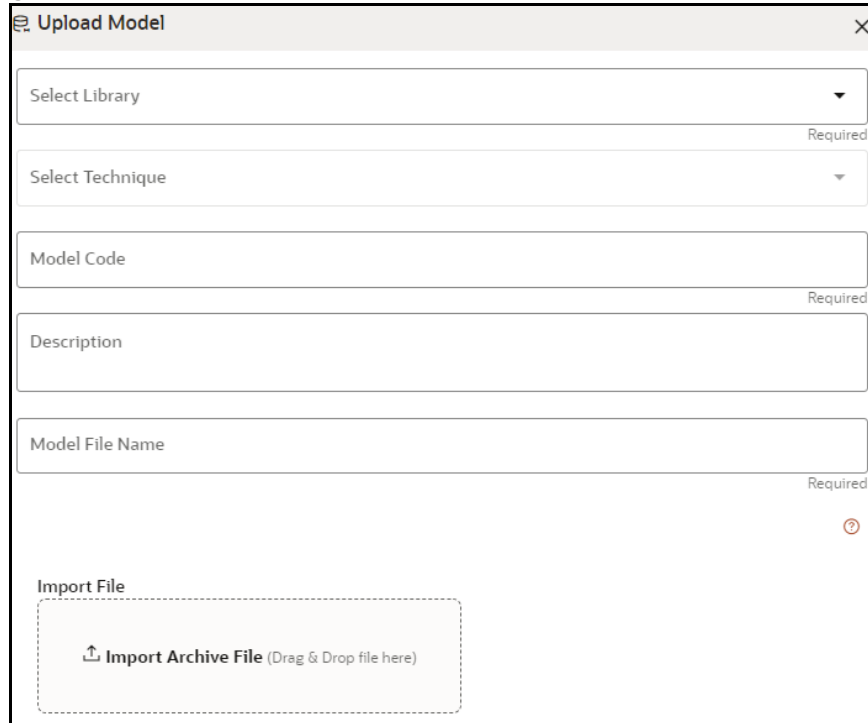
Created By
MMGADMIN

Created Date
2023-02-27 13:58:09

7.4.1.2.1 Upload a Model

To upload a model, follow these steps:

1. In the View Model Objective page, click **Add** and select **Upload Model**.
The **Upload Model** page is displayed.

Figure 102: Upload Model

2. Select the library from the drop-down.
For more details on the model library, see [Model Libraries](#) section.
3. Select the required technique from the drop-down.
For more details on the model technique, see [Model Techniques](#) section.
4. Enter the model code and description for the Model Objective.
5. Enter the name of model file with extension for use during Save and Load.
OR
Import the model using **Import Archive File** option.
6. Click **Upload Model**.
The model is uploaded successfully.

7.4.1.2.2 Build a Model

Building a model consists of the following steps:

- [Model Details](#)
- [Pre-Processing Stage](#)
- [Model Training Stage](#)
- [Model Validation Stage](#)
- [Model Summary](#)

7.4.1.2.2.1 Model Details

1. In the View Model Objective page, click **Add** and select **Build Model**.
The **Model Details** page is displayed.

Figure 103: Model Details

2. Select the library from the drop-down. Currently, the supported libraries are keras, ONNX, scikit-learn, and xgboost. For more details, see [Model Libraries](#) section.
3. Select the required technique from the drop-down. For more details, see [Model Techniques](#) section.
4. Enter the model code and description for the model.
5. Enter the name of model file with extension for use during Save and Load.
6. Click **Next** to go to the next step.

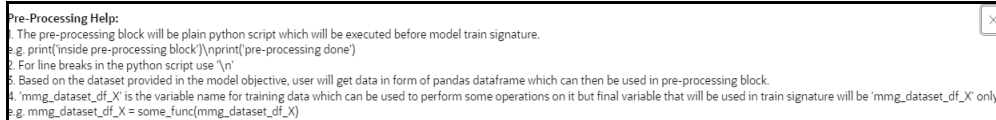
7.4.1.2.2.2 Pre-Processing Stage

After adding the details in the Model Details page, the Pre-Processing Stage screen is displayed.

Figure 104: Pre - Processing Stage

1. Enter the data in the Preprocessing textbox based on the following example.

Figure 105: Textbox

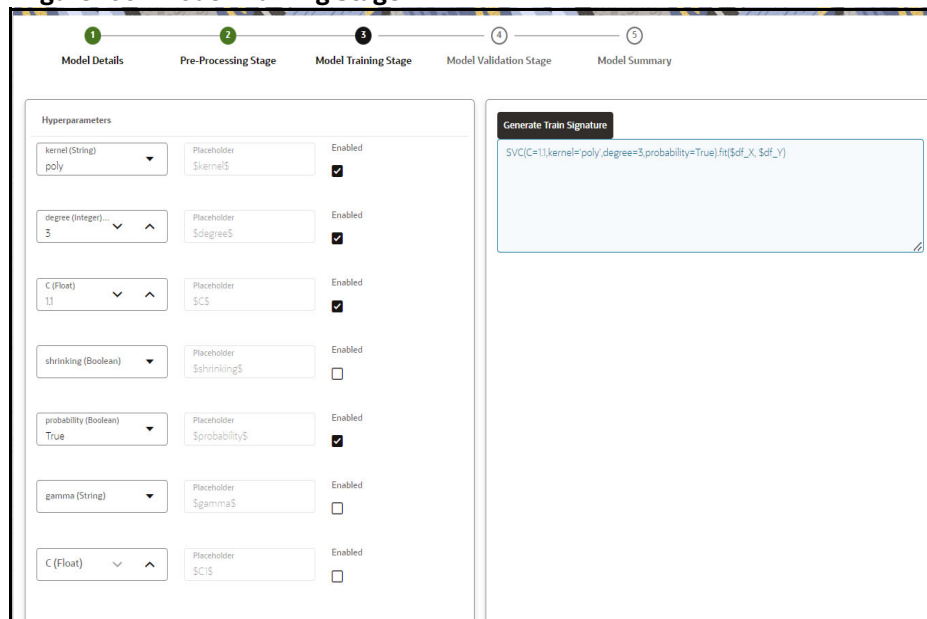


2. Click **Next** to go to the next step.

7.4.1.2.2.3 Model Training Stage

After adding the details in the Pre-Processing Stage page, the Model Training Stage screen is displayed.

Figure 106: Model Training Stage

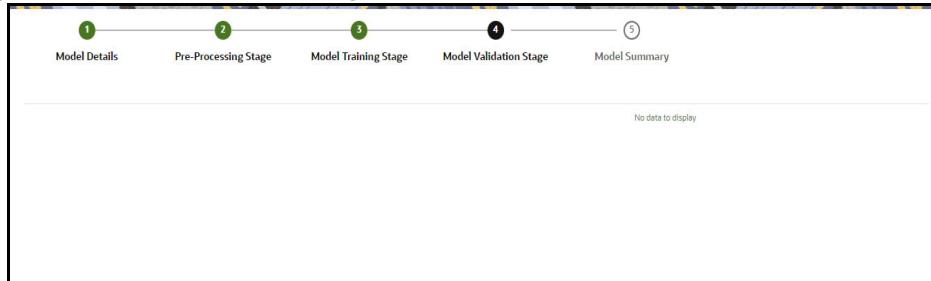


1. Select the hyperparameters.
When the parameters is selected, the **Enabled** check box is selected by default.
2. Click **Generate Train Signature**.
The signature is displayed.
3. Click **Next** to go to the next step.

7.4.1.2.2.4 Model Validation Stage

After adding the details in the Model Training Stage page, the Model Validation Stage screen is displayed.

Figure 107: Model Validation Stage



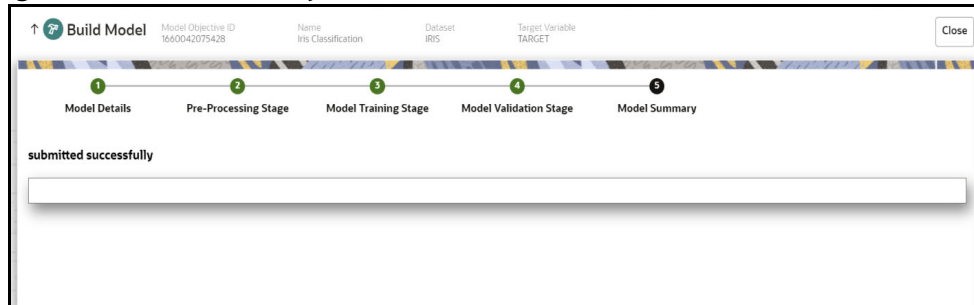
The Validation is work in progress.

1. Click **Finish** to start the training of the model.

7.4.1.2.2.5 Model Summary

Once the validation of the model is completed, the Model Summary screen is displayed.

Figure 108: Model Summary



1. Click **Close**.
The model is created and displayed in the Model Objective screen.

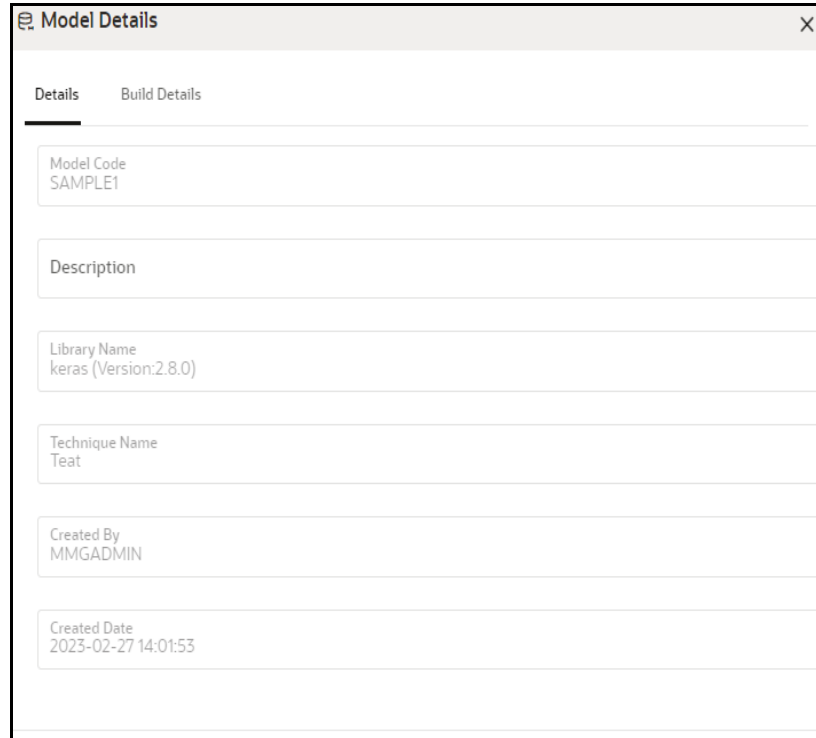
7.4.1.2.3 View Details of a Model

To view details of a model, follow these steps:

1. In the View Model Objective page, click **Action**  next to corresponding model and select **View Details**.

The model details are displayed.

Figure 109: Model Details



2. Click on the Build Details tab to view the Preprocessing, and Hyperparameters details of the model.

7.4.1.2.4 Setting the Model as Champion

You can set the trained models as champion model.

To set the model as champion, follow these steps:

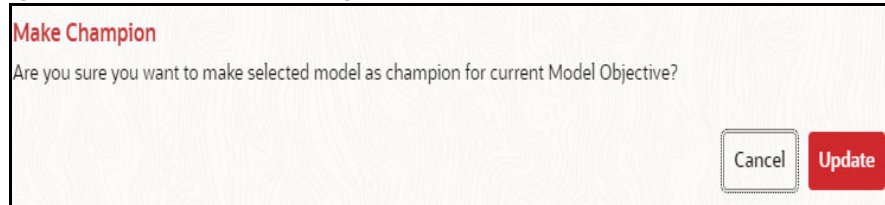
1. In the View Model Objective page, hover over the model which you want to set as champion and click **Set Champion** icon.

Figure 110: Champion Model

Model ID	Code	Version	Type	Status	Action	Champion
1677659802186	CZXCXZ KCEKCK	0	Model	⛔	⋮	🏆
1677506289492	SAMPLE1 XPMRSLJ	0	Model	⛔	⋮	🏆 Set Champion
1677506515489	SAMPLE1	1	Model	⛔	⋮	🏆

A confirmation dialog is displayed.

Figure 111: Confirmation Dialog



2. Click **Update**.
The model is set as champion for the selected model objective.

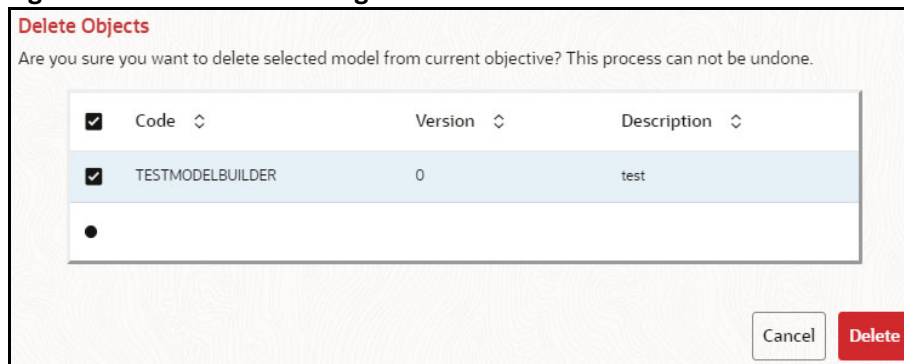
7.4.1.2.5 Delete a Model

To delete a model, follow these steps:

1. In the View Model Objective page, select the models which you want to delete.

2. Click Delete  .
A confirmation dialog is displayed.

Figure 112: Confirmation Dialog



3. Click **Delete**.
The selected models are deleted.

7.4.1.3 Delete a Model Objective

To delete a Dataset, follow these steps:



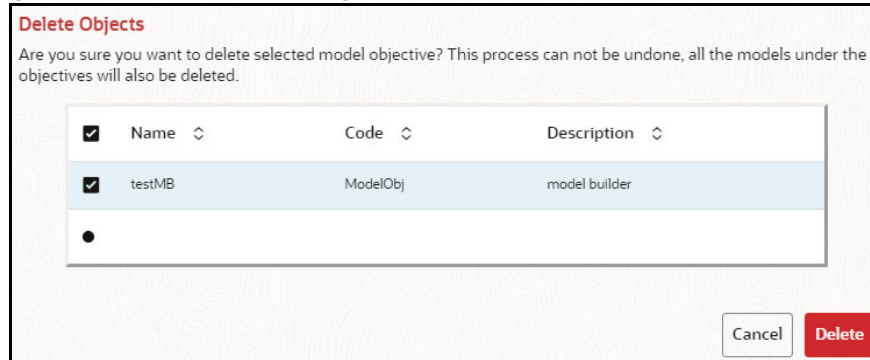
1. Navigate to Model Objective Summary page.
2. Click  next to corresponding Dataset and select Delete  .
A confirmation dialog is displayed.

Figure 113: Confirmation Dialog

3. Click **Delete**.

The selected model objective and all the models associated are deleted.

7.5 Pipelines

Pipeline allows you to create and publish models based on the workspaces created from datasets in the database. The published models are then deployed in production to be consumed by users. Modelers create models by using the Notebooks in the Data Studio. The Notebooks are used to create training models and the iterations of comparison between various models lead to the elimination of undesired models and filters a few robust ones that can be considered for deployment in production. Modelers then use their better judgement to consolidate their choice and fix on one model - the champion model. The champion model is also called the scoring model or the actual model in this document.

7.5.1 Prerequisites

The prerequisites for model pipeline are as follows:


- To create a model, your user profile must be mapped to the Group.
- To create a model, a workspace must be deployed. See the [Creating a Workspace](#) section for more information.
- To approve and deploy a model, your user profile must be mapped to the Modeling Administrator Group.

For information on User Groups and Mappings, see the [User Access and Permissioning Management](#) section in the [OFS Compliance Studio Administration and Configuration Guide](#).

7.5.2 Access the Model Pipelines

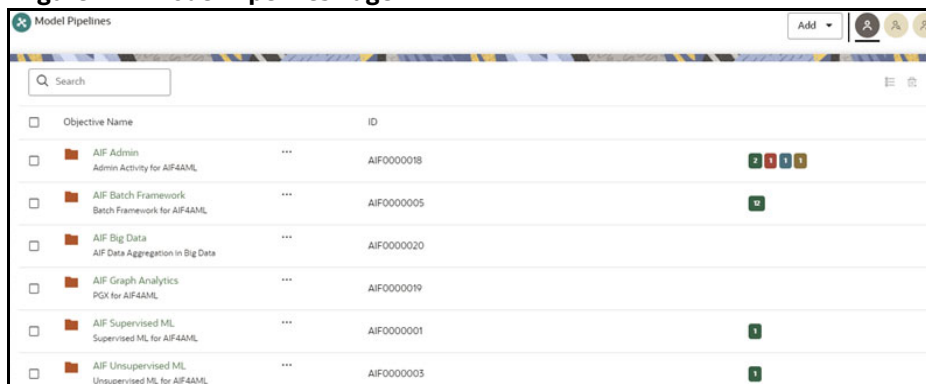
The Model Pipeline window allows you to create and publish models.

To access the Model Pipeline window, follow these steps:

1. Navigate to **Workspace Summary** page.
The page displays workspace records in a table.
2. Click  next to corresponding Workspace to Launch Workspace.
The **Dashboard** window is displayed with application configuration and model creation menu.
3. In the Mega menu, click **Modeling > Pipelines** to display the **Model Pipelines** page.

The window displays objectives that contain drafts and models. When you hover on the count that are next to the ID column, it displays the count of sub objectives, Drafts, Models, and Champion if available.

Figure 114: Model Pipelines Page



You can switch the Model Summary page view from Flat to Hierarchical and vice-versa. Flat list is the default view in Production workspace while Hierarchical list is the default in Sandboxes.

- Hierarchical option:** The Model Pipeline window shows the hierarchical list of the Objectives



using the Hierarchical option. In the Hierarchy view, you can see the following details of the Objectives such as Objective Name, and ID.

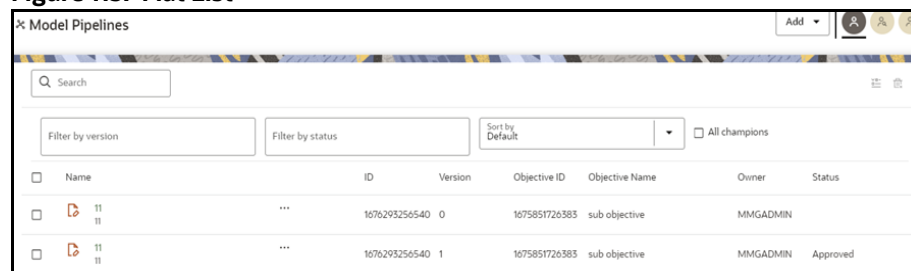
- Flat option:** The Model Pipeline window shows the flat list of all the models (published and



drafts) using the Flat option. Flat list is not objective-specific. It shows the models across objective. You can search the models using the Filter by Version and/or Filter by Status, and All champions. You can also sort the drafts and models by Default or Latest first options.

- In the Flat list of models, you can see the following details of the models such as Name, ID, Version, Objective ID, Objective Name, Owner, and Status.

Figure 115: Flat List



The Table 26 provides descriptions for the fields and icons on the **Model Pipelines** page.

Table 26: Model Pipelines

Field or Icon	Description
Model Pipelines Page Header	The header that follows the global header in the application.

Table 26: Model Pipelines












Field or Icon	Description
Breadcrumbs	<p>Indicates the position of the current page in the Model Management hierarchy. Use breadcrumbs locator links to navigate back to higher levels in the hierarchy after you have drilled-down through levels of functions.</p> <p> Model Pipelines / NewObj1</p> <p>Click  to navigate to Model Pipelines Summary page.</p> <p>Click  or  to navigate back to Workspace Summary page.</p>
Create Objectives and Models	<p>Select Add to display a list with the following options:</p> <ul style="list-style-type: none"> • Draft • Objective • Seeded Models <p>To create Models, select Draft. To create Objectives, select Objective. See the Create Objective (Folders) and Create Draft Models sections for more information.</p> <p>However, if you want to know about the cycle of model creation, see the Create, Review, Approve, and Deploy a Model Section.</p>
Requester	<p>Displays that the logged-in user has the Requester privileges when the status is green.</p> <p></p> <p>You can create a model. However, to approve and publish, the model must be reviewed by a user with reviewer privileges and approved by a user with approver privileges.</p>
Reviewer	<p>Displays that the logged-in user has the Reviewer privileges when the status is green.</p> <p></p> <p>You can review models. However, to approve and publish, the model must be approved by a user with approver privileges.</p>
Approver	<p>Displays that the logged-in user has the Approver privileges when the status is green.</p> <p></p> <p>You can approve models that are created and reviewed.</p>
Model Pipelines Page Table	The table displays the objective and model records on the page.
Objective and Model	<p>Displays the name of the Objective</p> <p></p>

Table 26: Model Pipelines




Field or Icon	Description
ID	Displays the ID of the objective.
Owner	Displays the owner who created the Drafts. This information does not display for an Objective.
Tags	Displays the tags associated with the Objective or Model.  This information does not display for an Objective.
Edit Objective	Select  to edit the models in Data Studio. See the Edit Models section for more information. This information does not display for an Objective.
Delete Objective	Select  to delete the model from the Confirmation dialog box. Click OK to process or click Cancel to cancel. This information does not display for an Objective.

7.5.3 Create, Review, Approve, and Deploy a Model

Model creation and deployment undergoes a workflow of Model Governance where the following types of users in the system have privileges that restrict the activities, they can do in the model creation and deployment workflow.

The [Table 27](#) provides descriptions for the fields and icons on the **Model Pipelines** page.

Table 27: Model Pipeline

Field or Icon	Description
Requester 	You can create a model. However, to approve and publish, the model must be reviewed by a user with reviewer privileges and approved by a user with approver privileges. NOTE: User Groups must be mapped to the MDLDEPLOY role to access Requester functions.
Reviewer 	You can review models. However, to approve and publish, the model must be approved by a user with approver privileges. NOTE: User Groups must be mapped to the MDLREVIEW role to access Reviewer functions.
Approver 	You can approve models that are created and reviewed. You can then promote to production and make the model the champion in the production. NOTE: User Groups must be mapped to the MDLAUTH role to access Approver functions.

The following sections in this topic provide details for the cycle of creation of a model, review, approval, and deployment:

- [Create Objective \(Folders\)](#)
- [Create Draft Models](#)

- Create Seeded Models
- Publish Data Studio
- Scope Detail
- View Model Details
- Understand Model Governance
- Request Model Acceptance
- Review Models and Move to Approve or Reject
- Approve Models and Promote to Production
- Deploy Models in Production and Make it a Global Champion

7.5.3.1 Create Objective (Folders)

Create folders called Objectives within which you can create Models.

To create an Objective, follow these steps:



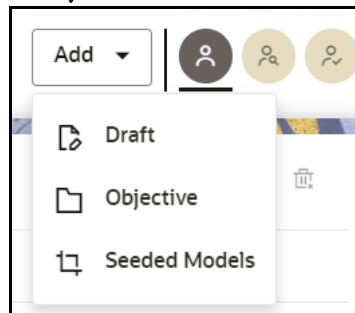
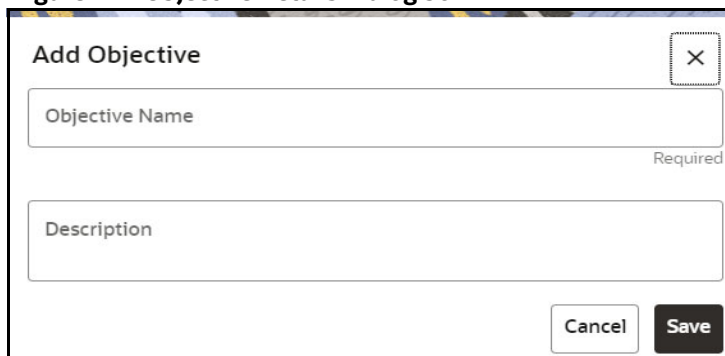
1. Click Launch Workspace  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. Click **Model Pipelines**  to display the **Model Pipeline** window.
The window displays folders that contain models and model records in a table.
3. Click **Add** and select **Objective** from the list to display the **Objective Details** dialog box.

Figure 116: Select Objective from Add



4. Enter details in Objective **Name** and **Description** fields in the Add **Objective** dialog box.

Figure 117: Objective Details Dialog box



5. Click **Save**.

7.5.3.2 Create Draft Models

Create Models that are classified as draft models. These models will be reviewed before being sent for Scoring.

To create a draft Model, follow these steps:



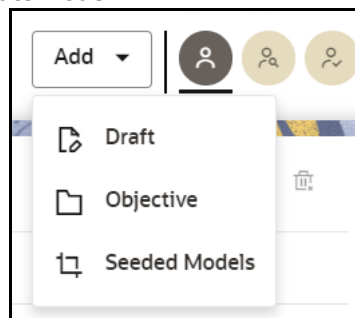
1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. Click **Model Pipelines**  to display the **Model Pipeline** window.
The window displays folders that contain models and model records in a table.
3. Click **Add** and select **Draft** from the list to display the **Add Draft** dialog box.

Figure 118: Create Model



4. **Create New Model** is the default setting in the **Model Details** dialog box. Drag the toggle button to select **Import Dump**. Use Create New Model to start from a blank Notebook in Compliance Studio. Import Dump lets you drag and drop an existing file with model data and modify it. To import a model data dump from another model, see the [Import a Model Data into a New Model](#) section. You can also create a draft under Objective (Folder) also. Click an Objective to open it.

To create a new model, follow these steps:

- a. Enter details for Draft **Name** and **Description**.

Figure 119: Model Details - Create New Model

- b. Enter a tag in the **Tags** field.
- c. Click **Create**.

7.5.3.3 Create Seeded Models

You can seed the models from the external sources which can be imported in the OFS CS application. To import the models, follow these steps:



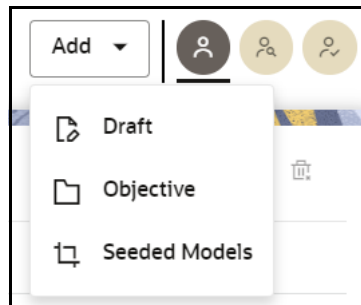
1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. Click **Model Pipelines**  to display the **Model Pipelines** window. The window displays folders that contain models and model records in a table.
3. Click **Add** and select **Seeded Models** from the list to display the **Add Draft** dialog box.

Figure 120: Add Seeded Models



4. You must add the models in the following installed path location:

`/scratch/ofsaaweb/ftpshare/mmg/seeded/models`

The added models is displayed in the Seeded Models page.

Figure 121: Seeded Models

<input type="checkbox"/>	Objective Path	Model Name	Model Description	Version	Seeded File Name
<input type="checkbox"/>	Test/NewDraft	NewDraft	Supervised learning analysis of loan application frauds	0	CS_1670477976040_0.zip
<input type="checkbox"/>	Test/NewDraft	NewDraft	Supervised learning analysis of loan application frauds	1	CS_1670477976040_1.zip

Import Seeded Models

5. Select the models which you want to import and click **Import Seeded Models**. The selected models are imported and displayed in the **Model Pipelines** page.

7.5.4 Pipeline Designer

Click on the More Actions icon and select Open in Pipeline Designer option to open a draft in the Pipeline Designer.

The following sections are available on the Pipeline Designer window:

- Pipeline

- Dashboard
- Notebook
- Simulations
- Execution History
- Compare

NOTE

- Models in Production workspace have the 'Dashboard' as the default tab.
- Drafts or Models in the Sandbox workspace have the 'Pipeline' as the default tab.

7.5.4.1 Pipeline

You can perform following functions on Pipeline Canvas:

- Creating a Pipeline
- Creating Script Template
- Viewing a Pipeline
- Execution of Pipeline
- Publishing a Pipeline

7.5.4.1.1 Create Paragraphs using Pipeline Designer

After creating the Models in the Workspace, create Paragraphs using the Pipeline Designer window.

Pipeline Designer enables you to design the paragraph using widgets (graphical representation) instead of using python codes. In addition, if you add new paragraphs in Data Studio, the added paragraphs are displayed in the widget format on Pipeline. Similarly, if you create a Notebook using Pipeline Designer, it can be opened for editing in Data Studio using Studio Notebook option.

NOTE

When you open the notebooks from OFS Compliance Studio, the attach workspace call will be made from mmg service and proper workspace will get attached.

If the OFS Compliance Studio is opened outside of MMG application, then the attach workspace command has to be used.

This helps the Financial Institutes and Banks in following ways:

- Visualization of the data (for example, based on data tasks)
- View the dependency
- Modify the flow of execution or execution order
- Easy for Auditing purpose

You can execute the flow based on requirement. For example, if you have created one flow and want to execute a flow of training paragraphs out of that and other flow as experimental way, then you can modify the using the Training and Experimentation link types. One flow can be break into 2-3 flows for execution purpose.

When a model is edited using the Pipeline Designer/Data Studio, and executed, then a new version of published model is displayed in Model Summary page.

NOTE

When you add a new paragraph from studio and opened the same in pipeline designer, it gets linked to multiple paragraphs.

For example, you have paragraphs P1, P2 and P3 in the same order in a Notebook. It shows in Pipeline Designer canvas as P1 > P3 > P2.

If you add two new paragraphs P1a and P1b in the Notebook after the P1 and open the canvas, this gets reflected as the following:

- a. 1. P1 -> P1a -> P1b -> P2
- b. 2. P1 -> P3 -> P2

After opening a Model in the Pipeline Designer, following options are displayed:

- Generate Model Report
- Download
- Delete
- Clone Model

After opening a Draft in the Pipeline Designer, following options are displayed:

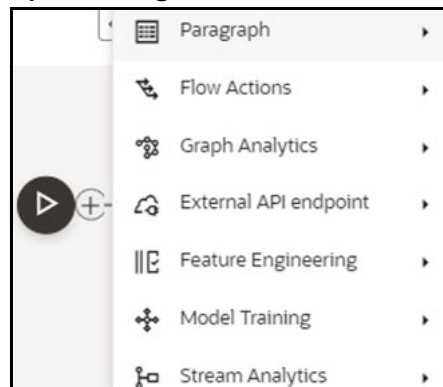
- Generate Model Report
- Download
- Delete
- Publish
- Script Template list

7.5.4.1.1.1 *Creating a Pipeline*

To create a paragraph using pipeline, follow these steps:

1. Navigate to the **Pipeline Designer** page.
The Start widget is displayed by default in the pipeline screen.
2. Hover over on Start widget and new nodes can be added using the add button in the Pipeline.
This will open a menu which contains all the widgets sectioned into different categories. The spectra diagram builder is based on row and column positioning.

Figure 122: Pipeline Designer



NOTE Click on each menu to select the widgets of the required categories.

The [Table 28](#) describes widgets and their categories are supported.

Table 28:

Widget	Supported Types
Paragraph	<ul style="list-style-type: none"> • md • pgql • pgx-algorithm • pgx-java • pgx-python • pyspark • python
Flow Actions	<ul style="list-style-type: none"> • If
Graph Analytics	<ul style="list-style-type: none"> • Load Graph
External API endpoint	<ul style="list-style-type: none"> • Custom API
Feature Engineering	<ul style="list-style-type: none"> • Feature Importance • Feature Selection
Model Training	<ul style="list-style-type: none"> • Model Evaluation • Train Model • Save Model • Load Dataset • Load Model
Stream Analytics	<ul style="list-style-type: none"> • Kafka Producer • Kafka Transform • Kafka Monitor • Kafka Consumer

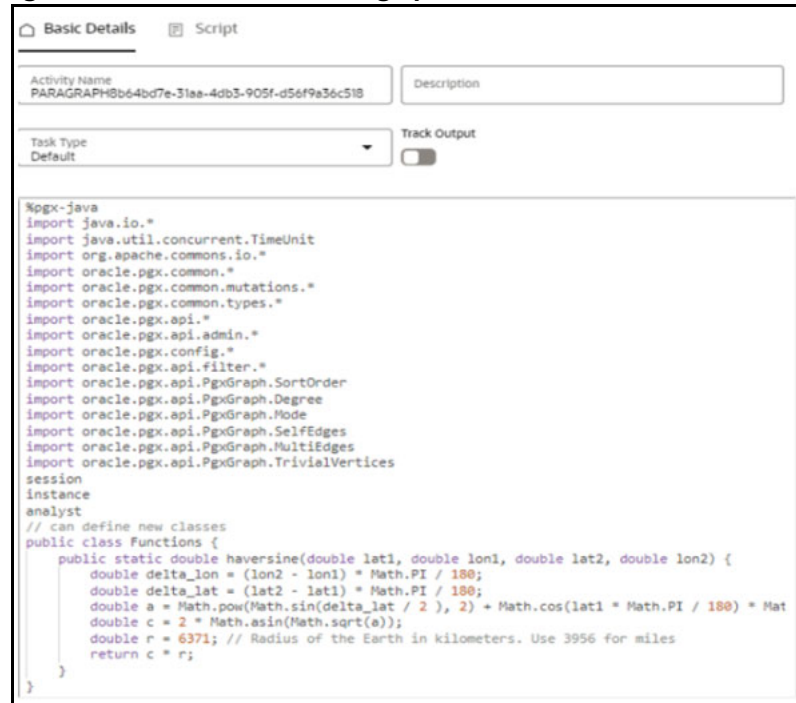
You cannot edit or delete this widget. Whenever a new draft is created (not by importing dump files), the default paragraph created is converted into a start widget. The visibility of code/result/title in notebook of this node will be kept to invisible.

Whenever the notebook is opened, init script execution including workspace attach will happen in this start node.

Title of the node is called 'Start widget'. Publish /download and import /promote to production of model with start widget will keep this widget. Publish from canvas will keep the start widget in the published model. When you publish model from model summary, you can explicitly select the start widget paragraph from the list of paragraphs. After this only, start widget will appear in the published model.

3. Click on the node to add the basic details. The Basic Details page is displayed.

Figure 123: Basic Details for Paragraph



4. Provide details as described in the [Table 29](#).

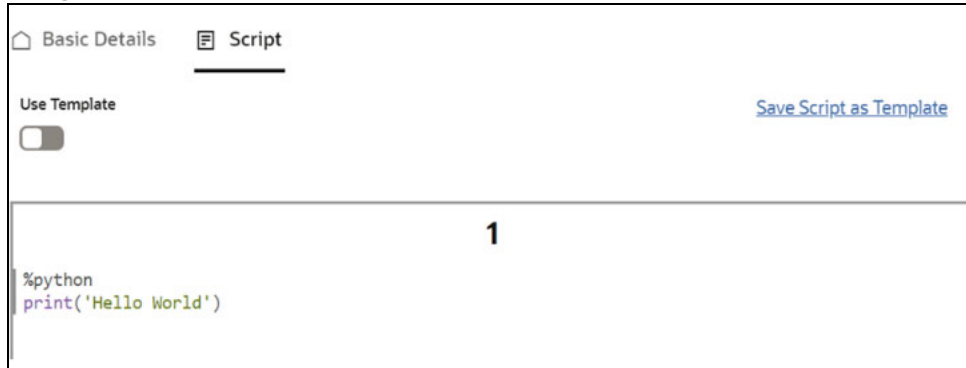
Table 29: Basic Details for Paragraph

Field	Description
Activity Name	Enter the Activity Name
Description	Enter the description of Activity
Task Type	Select the task type. For example, Model Training, Data Analysis and so on. You can also search the task type.
Track Output	If this option is selected for any paragraph, then during the model comparison the paragraph details are displayed. Keep the Track Output to ON in case you want to execute the paragraph from Execution tab.
Script	Shows the script.

7.5.4.1.1.2 Creating Script Template

Navigate to Script tab to manage scripts. These scripts can be called for paragraph. You can also create the Script template by clicking on the More options icon in the Pipeline Designer.

Figure 124: Script Template



To add a script template, follow these steps:

1. In the Script tab, Click Save Script as Template.

Figure 125: Script Tab

2. Enter the details in the [Table 30](#):

Table 30: Script Template Details

Field	Description
Script Name	Enter the Script Name
Description	Enter the description of Script
Task Type	Select the task type. For example, Model Training, Data Analysis and so on. You can also search the task type.
Script Content	Enter Python script

3. Click **Save**.

A node is created.

You can perform the following functions on Pipeline Designer window:

- Parameter Sets: Allows you to view,edit, clone, and delete the Parameter Set.
- Use the Clone option to duplicate the parameter set with different values and name.

- Publish: Allows publishing the pipeline. This option is displayed for the Drafts.
- Deploy: Allows you to deploy the model. This option is displayed for the published models.
- More Actions icon:
 - Generate Model Report : To generate model report
 - Download : Use Download to download the current working version in opened in canvas
 - Script Template list : Allows you to add, edit, view, and delete the script templates.
 - Delete : Allows to delete the current working version. If this is first draft of Model, it will delete all the dependent published version in the Sandbox. If the Model is not first version, then it will delete only the current working version.

The following options are displayed only for the published models.

- Clone to new draft: Allows to create a new draft with the same pipeline.
- Overwrite existing draft: Allows to overwrite the existing draft with the current published model.

7.5.4.1.1.3 Model Report

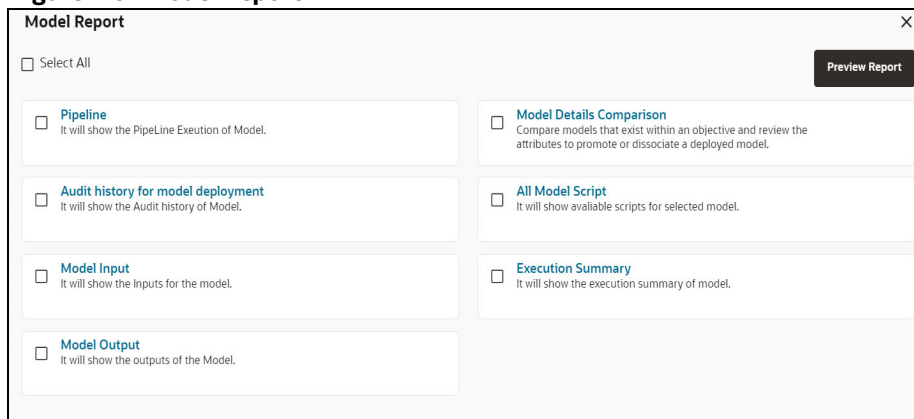
This option allows you to view the Model report and download the same in PDF format.

To view and download Report, follow these steps:

1. Open a Model in Pipeline Designer.
2. Click **Generate Model Report**.

The Model Report window is displayed.

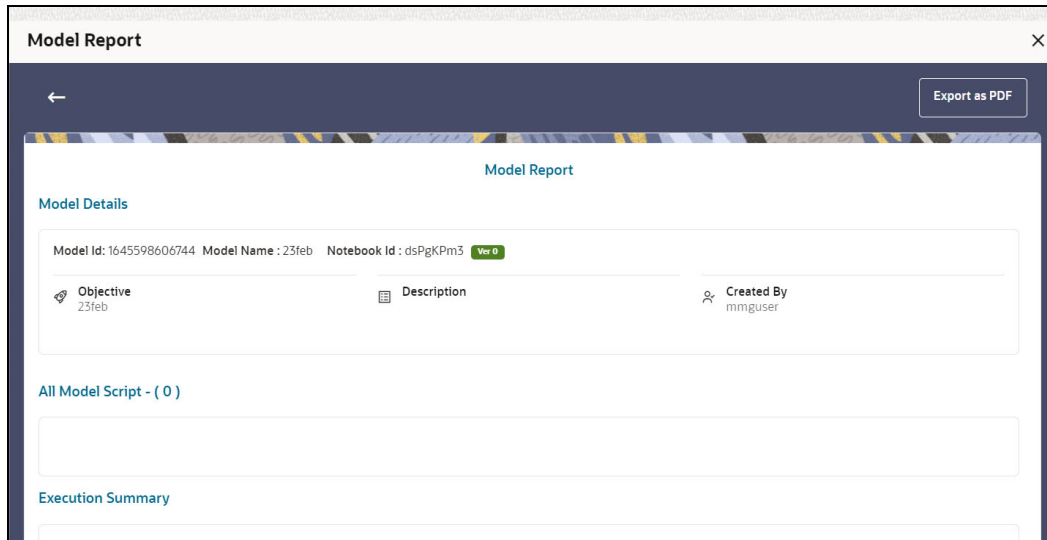
Figure 126: Model Report



3. Select the Parameters to generate the report.
4. Click **Preview Report**.

The report is displayed based on selected parameters. The following is a sample report.

Figure 127: Model Report



5. Click **Export as PDF** to save the report as PDF in local system.

7.5.4.1.1.4 **Download a Model**

This option allows you to download the Model.

To download a model, follow these steps:

1. Open a Model in Pipeline Designer.
2. Click **Download**.

A zip folder is downloaded. This folder contains .cfg and .dsnb files.

7.5.4.1.1.5 **Delete**

This option is used to delete the Model.

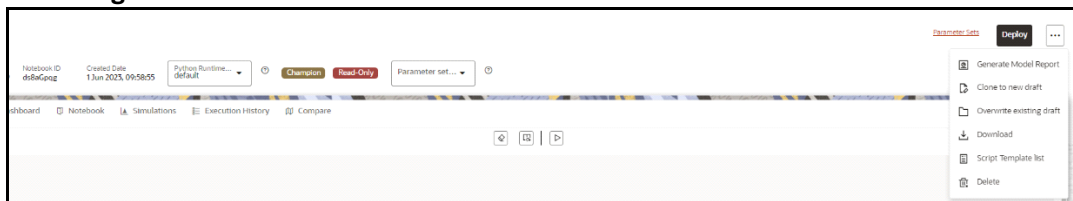
7.5.4.1.1.6 **Cloning a Model**

You can pick any published model and clone the contents to a new draft in the same objective or clone the content to the current parent draft. The cloned draft can be edited and used further. Audit Trail window also captures the clone information.

To clone the model details, follow these steps:

1. Open a Published Model in Pipeline Designer.

Figure 128: Clone Model



2. Click More Actions icon and select **Clone to new draft** or **Overwrite existing draft** option.

You can perform the following functions on Pipeline window:

- Clear Execution Results: Clears the execution details.
- Invalidate session: Deletes the previous session details.

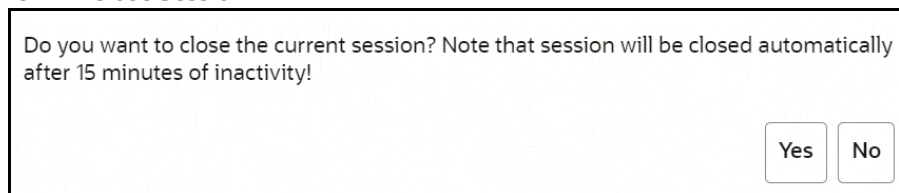
NOTE When you click on Reinitialize or Invalidate session icons, it will kill the existing session and all the session variables will be lost. You must re execute the prior paragraphs in the notebook to reinitialize these session variables.

- Execute : Allows you to execute the pipeline.
- Save Now: Allows saving the pipeline.
- Open Notebook in session: Allows you to open the notebook in canvas. This is displayed after the pipeline is executed.
- Execute Notebook in another session: Allows you to provide different data for the same notebook execution. This option is only displayed when execution is in progress.
- Stop Execution: Allows you to stop the execution which is in progress. This option is only displayed when execution is in progress.

Whenever user executes a batch, a user session is created. This execution time can be less or more for any execution. Sometime, user doesn't want to wait for execution to complete and navigate away from the Pipeline Canvas page.

For example, if user doesn't want to execute all the paragraphs and want to execute only Paragraph 1 and Paragraph 2. Paragraph 1 takes 15 mins time for execution and Paragraph 2 takes 10 mins for execution. Paragraph 2 execution also wants to use the execution of Paragraph 1. In this case, user can navigate away from the page. A confirmation message is displayed to close the current session. Here, this session time is configurable.

Figure 129: Close Session

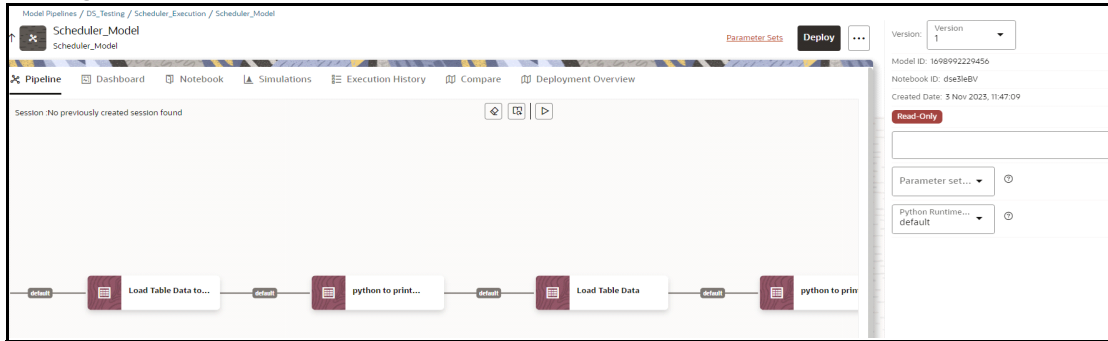


- If user clicks Yes, then execution thread will be closed after for this given session time.
- If user clicks No, then execution thread will be valid for this given kill time and run in the background.

7.5.4.1.1.7 Adding a Version, Parameter set, and Python Runtime parameters

The Pipeline canvas window allows you to add a Version, Parameter set, and Python Runtime parameters.

Figure 130: Pipeline Canvas



- Version: Select the version for the pipeline.
- Parameter set: Select the required parameter set. The selected parameter set will be promoted along with the model pipeline at the time of deployment and you can update this dependency based on your requirements.
- Python Runtime Parameters: Select the required Python Runtime parameter. The selected Python runtime parameter will be used during all the executions and you can update this dependency based on your requirements.

7.5.4.1.1.8 Viewing a Pipeline

The Pipeline canvas window allows you to view the Pipeline using following options:

- Auto-align : Arrange all the widgets in vertical order. After saving, the reverting option will not work.
- Revert-align : Revert all the widgets if they are Auto-aligned.
- Refresh : Refresh the pipeline canvas.

7.5.4.1.1.9 Executing a Notebook

The Execute icon on Pipeline Canvas allows us to execute the notebook.

The following link types are available in the Pipeline Designer:

- Default
- Scoring
- Training
- Experimentation

NOTE

When a model gets published from Model summary page, the Link types configured in Pipeline Designer are set to Default link type.

To execute the notebook, follow these steps:

1. Click Execute icon to view Execute Pipeline window.

Figure 131: Execute Pipeline

2. Execution parameters are the parameters defined in the notebook required for execution. Select the flow, which you want to execute Scoring, Training, and Experimentation. It displays all the keys defined for all the paragraphs in the notebook with a placeholder for providing the values.
3. Enter the execution Key and Value.

You can also use Runtime parameters for execution. This runtime parameter must be defined in Notebook. If this is defined, you can enter execution value during the process execution.

For more information, see [Create Paragraphs in Model Studio Notebooks](#) section.

The System Parameters window also shows the execution ID, execution Date, and execution Batch. These are required for executing all the paragraphs along with other parameters. It also shows from where the parameter comes from as a subscript.

- Parameter Sets:** These are the set of parameters with a specific value required for an instance of execution. It consists Key and Value. You can save the parameters set that can be used for one execution instance and reuse it for the next execution. It consists of parameters with a specific value to each parameter. Parameters containing no value will not be taken. Each set is identified with a unique code for each objective. While saving the parameter, you have to provide a code for identifying the name and description which is not mandatory.


You can save Key Value parameter set using the Save Parameter Set option. To Save Parameter Set, enter the Threshold Value and Description in the Parameter Set window.

- Selecting Parameter Set:** These saved Parameter Set can be selected during the execution. It will replace the values of the parameters from the chosen Parameter Set.

To select the Parameter Set, follow these steps:


- i. Click "Open from saved Parameter Set". The Threshold Code window is displayed.


- ii. Select the Parameter Set from the available list. You can select multiple Parameter Set in the same execution instance. In that case, if there are any common keys, value will be replaced with that from the latest Parameter Set selected.

4. You can add new parameters using **Add** .

Note: If the parameter is not defined in the notebook, it will not be used for the execution. In case of multi select, if there are common parameters among the chosen scenarios, it will take the value based on the order of selection. that is first chosen scenario parameter will be taken.

5. But if open from saved scenarios again (not on single go), then already added will get replaced by the newly added (same as what existed)
6. Execution is performed based on selected link types. It filters out all the not required/unused parameters. And, all the unused parameters for the current execution are displayed with a

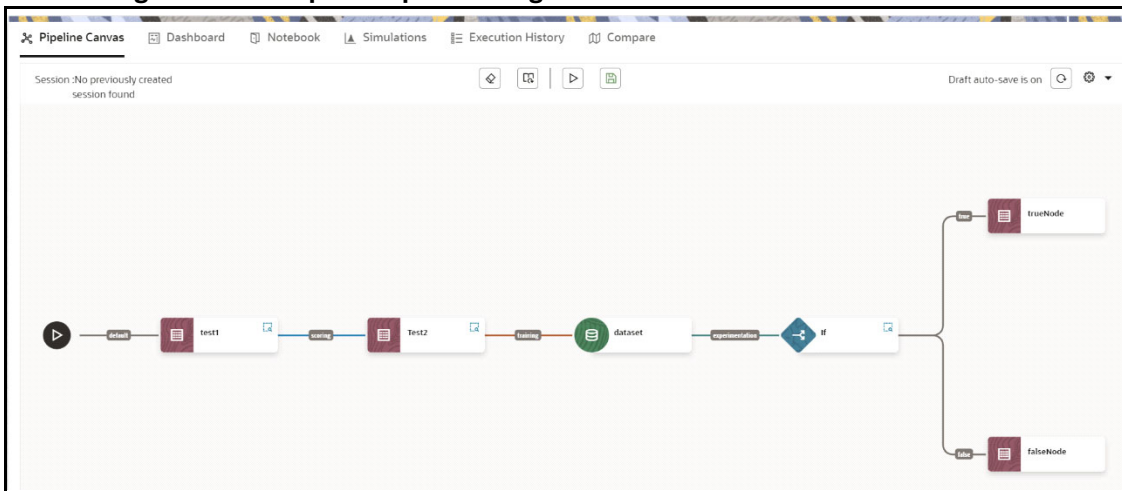
warning . To view the only required parameters, click **Show only required** link.

7. Click Reset  to reset the entered data.

8. Click Delete  to delete the entered Key and Value.

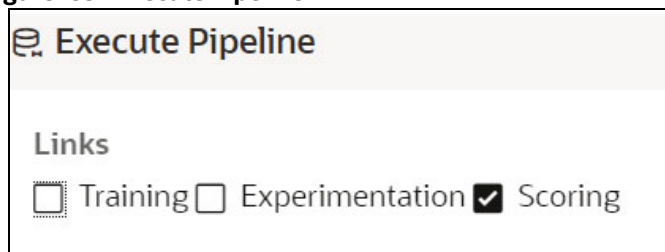
For example, refer to below [Figure 132](#).

Figure 132: Example of Pipeline Designer



- Here, if you want to execute this Notebook for scoring purpose, then the flow will be executed till EDA paragraph with default paragraphs. To perform this, Click Execute Notebook and select Links as Scoring.

Figure 133: Execute Pipeline



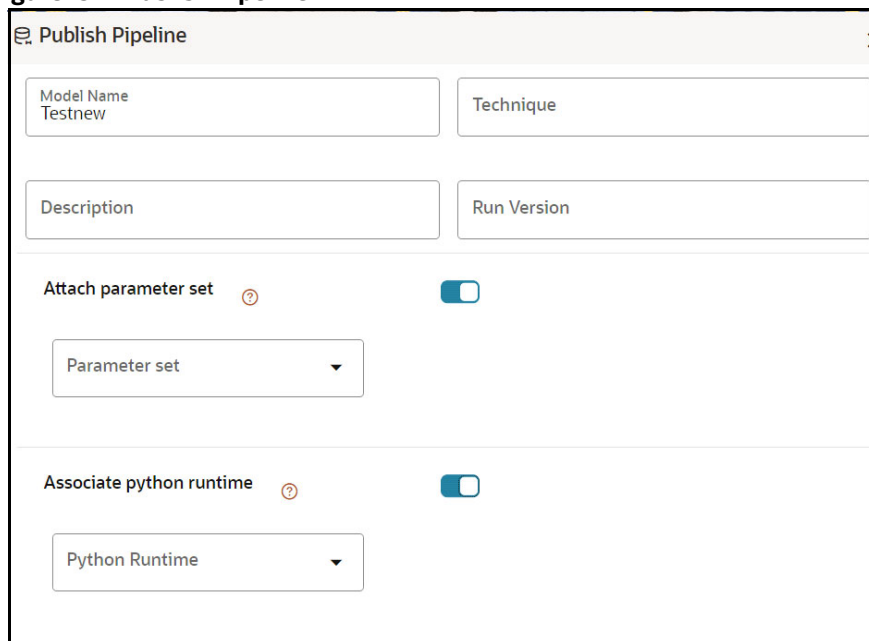
- Similarly, if you want to execute this Notebook for training purpose, then the flow will be executed till Analyze Result paragraph with default paragraphs. To perform this, Click Execute Notebook and select Links as Training.

7.5.4.1.1.10 Publishing a Pipeline

To publish the pipeline, follow these steps:

1. Click Publish to view Publish Pipeline window.

Figure 134: Publish Pipeline



2. Enter the details as shown in the [Table 31](#).

Table 31: Publish Pipeline

Field or Icon	Description
Model Name	The field displays the name of the Model. Modify the name if required.
Model Description	The field displays the description for the Model. Enter or modify the description if required.
Technique	Enter the registered technique to use.
Run Version	Select a run version.

Table 31: Publish Pipeline

Field or Icon	Description
Attach Parameter set	<p>If this option is enabled:</p> <ul style="list-style-type: none"> Selected parameter set will be associated with the published model. Best performing parameter set or prime reference of the objective is recommended to be associated with the model. This set is further used for promote to production at the time of deployment. Users can update this dependency from model details screen.
Associate python runtime	<p>If this option is enabled:</p> <ul style="list-style-type: none"> Selected python runtime will be associated with the published model. This python run time will be further used for promoting the model to production at the time of deployment. Users can update this dependency from model details screen.

3. Click **Publish**.

7.5.4.1.1.11 View Model Details

You can view model information for deployed models, models that require approval, and so on.

To view model details, follow these steps:




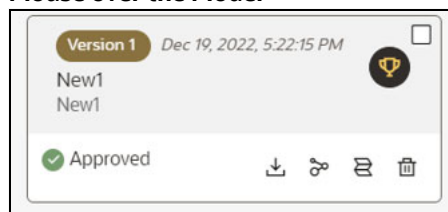




1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. Click **Model Pipelines**  to display the **Model Pipeline** window.
The window displays folders that contain models and model records in a table.
 - The  icon indicates that Model 1 is the champion
3. Hover over the model records to view the various icons.

Figure 135: Mouse over the Model



The icon actions are listed in the following:

- a.  Download

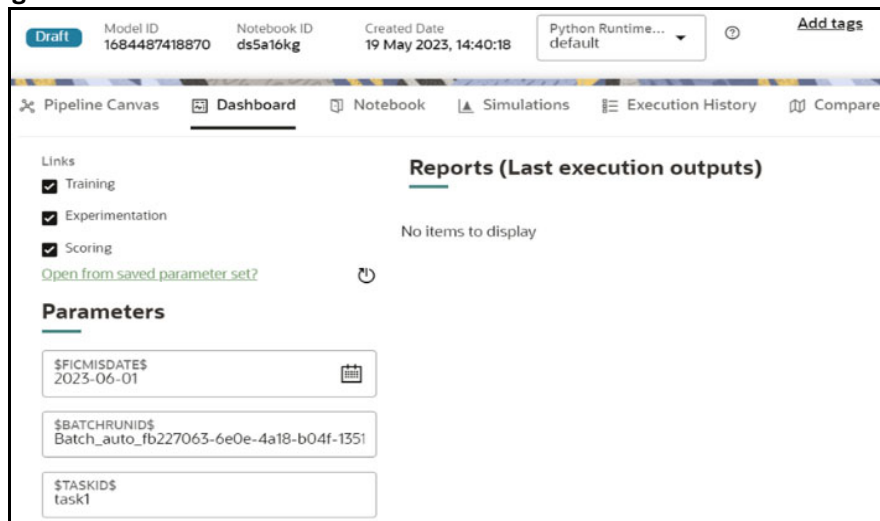
- b.  Open in Pipeline Designer. See the [Create Paragraphs using Pipeline Designer](#) section for more details.
- c.  See Scope Detail. See the [Scope Detail](#) section for more details.
- d.  Delete Model.

7.5.4.2 Dashboard

This section of Pipeline Designer shows the Model Dashboard to view the execution output of Model. You can also execute the Models from here.

NOTE For Promoted models, the 'Dashboard' is the default tab.

Figure 136: Dashboard

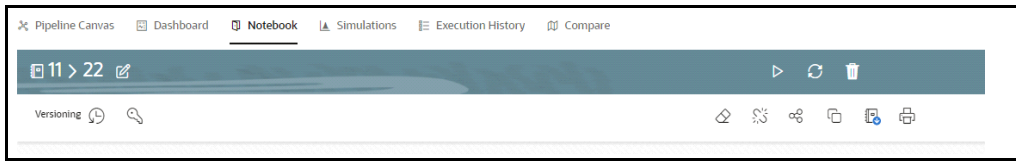


NOTE There is no Cancel button in Settings tab of reports in the Dashboard tab. You can press 'Escape' key to close the Settings.

7.5.4.3 Notebook

NOTE The Username is case sensitive. Ensure you use the correct case for the username when accessing and executing the notebook.

Navigate to **Notebook** page to view the paragraphs. You can run, invalidate session, edit, add, export the notebook, and so on.

Figure 137: Notebook**NOTE**

The following features on Notebook are not supported in the current release.

- Cloning the notebook
- Sharing the notebook
- Versioning the notebook
- Modifying the notebook
- Deleting the notebook
- Attaching credentials to the notebook
- Entering dependency modes to the notebook

7.5.4.3.1 Create a Paragraphs in Model Studio Notebooks

After creating the Models in the Workspace, create Paragraphs in the Model Studio window. To create Paragraphs, you must have a working knowledge of scripting and Python.

Navigate to **Notebook** page to view and modify the paragraphs.

7.5.4.3.1.1 Creating the Paragraphs

The paragraph should be added after the start widget paragraph. Navigate to **Notebook** page to create the paragraphs.

The following types of paragraph creation are supported for model creation:

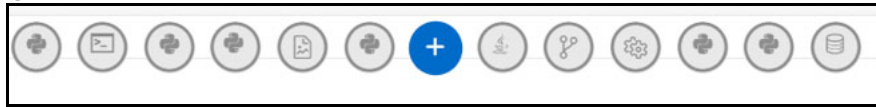
- Python Paragraph
- Shell in Python
- Paragraph
- Conda Paragraph
- PGQL Paragraph
- PGX - Java Paragraph
- Paragraph
- PGX - Python Paragraph
- PGX – Algorithm Paragraph
- PGX - PySpark Paragraph
- MySQL Paragraph
- Markdown Paragraph

To create Paragraphs in the Model Studio Notebooks, follow these steps:

1. Open the draft in Pipeline Designer and click **Notebook** tab.

2. Hover your mouse above or below a paragraph to display the interpreter toolbar.

Figure 138: Interpreter



3. Click an icon in the toolbar to select an interpreter and add a new paragraph that uses that interpreter. When you click some of the icons, the paragraph that's created includes example code that you can run.

NOTE You should not delete the start widget paragraph or rewrite the contents of this seeded paragraph.

7.5.4.3.1.2 Adding Python Paragraph

To add a python paragraph, follow these steps:

1. Click **Add Python Paragraph** icon in Model Studio to add a python paragraph in the Notebook and add the following scripting instructions.
 - a. To fetch connection objects:


```
conn = mmg.getConnection(<workspace name>)
```

This creates a cx_oracle based connection object to the datadom of the workspace being passed:
 - b. To fetch current Notebook and Model Objective details, use the following predefined parameters:
 - `currentNotebookId` - fetches the current notebook ID
 - `objectiveId` - fetches the current objective ID

To fetch the runtime parameters supported in Model Studio runtime or to access optional parameters passed from scheduler services;

- a. To access predefined batch runtime parameters like `taskId`, `batchrunid`, and `ficmis-date` passed during the model execution from scheduler, use the following variables : `$BATCHRUNID$`, `$TASKID$`, `$FICMISDATE$`.

Example:

```
%python
print('BATCHRUNID value is : ${$BATCHRUNID$}')
print('TASKID value is : ${$TASKID$}')
print('FICMISDATE value is : ${$FICMISDATE$}')
```


- b. To access any optional parameters passed during the model execution from scheduler, use the below sample script:

```
%python
```

```
print('threshold value is : ${threshold}')
```

NOTE

- Threshold is the optional parameter passed during the model execution.
- For more details on the predefined functions available for python scripting, see the [APIs for Model Pipelines](#) section.
- The execution result from the Pipeline Canvas screen is not displayed in the notebook tab.

c. Click  to run the script.

7.5.4.3.2 Managing your Notebooks

A notebook is a collection of paragraphs and acts as a container to hold one or more paragraphs. Each notebook is a collection of documentation and snippets of executable code. The notebook allows large scripts to be broken into a modular collection of executable code with tailored results. Different languages, such as Groovy, Scala, Python, and Oracle's own property graph query language (PGQL), can be combined into one notebook. Each notebook is mapped to the role of the logged-in user.

After creating a notebook, you can create Paragraphs in a notebook. To know more about the actions performed in a notebook, see the [Common Screen Elements in a Notebook](#) section.

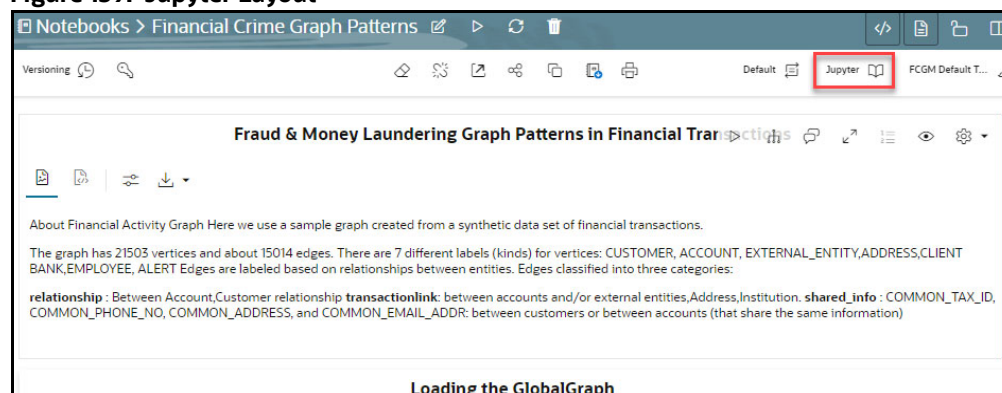
7.5.4.3.3 Data Visualization

The notebooks provide you the flexibility to visualize and customize your data. See available data visualizations in the [Using Data Visualizations](#).

Notebook Server supports multiple layouts to give the resemblance of familiar systems such as Project Jupyter and Apache Zeppelin.

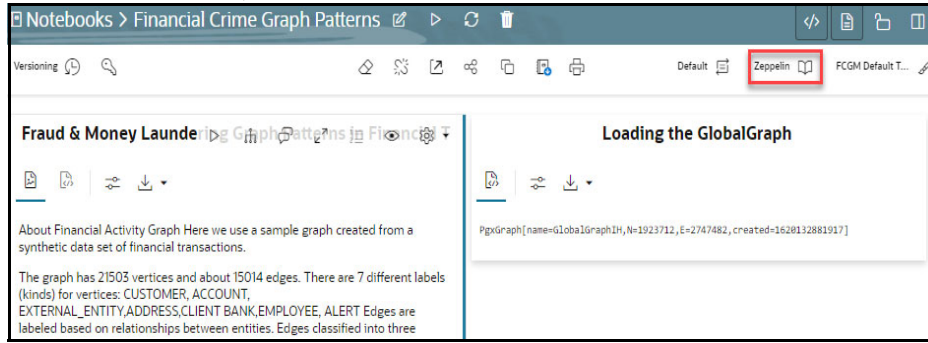
7.5.4.3.4 Jupyter Layout

The Jupyter Layout is a single-column layout that is something that the formal documents look like. To get the Jupyter-Experience, paragraphs can hide certain aspects, such as Input, Selection, and Result. For example, this allows showing only HTML when a Markdown paragraph is executed.

Figure 139: Jupyter Layout**7.5.4.3.5 Apache Zeppelin Layout**


The Zeppelin Layout allows you to resize paragraphs and have multiple paragraphs next to each other.

Figure 140: Zeppelin Layout



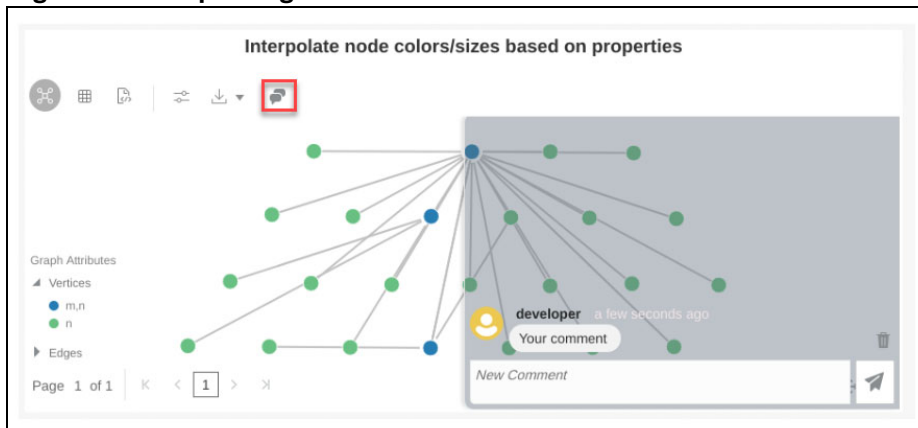
7.5.4.3.6 Comments

You can add comments on the paragraph to highlight changes or suggestions to the visuals. Comments can be added from the user interface, and they can delete their own comments.

You can click  **Comments** in the paragraph toolbar. The Comments view shows all paragraph comments, such as:

- **Add Comment**
Use a text area field labeled as New Comment on the bottom of comments.
- **Delete Comment**
Use a bin icon on the right of comments (you can only delete your comments).

Figure 141: Interpolating nodes



7.5.4.3.7 Dynamic Forms

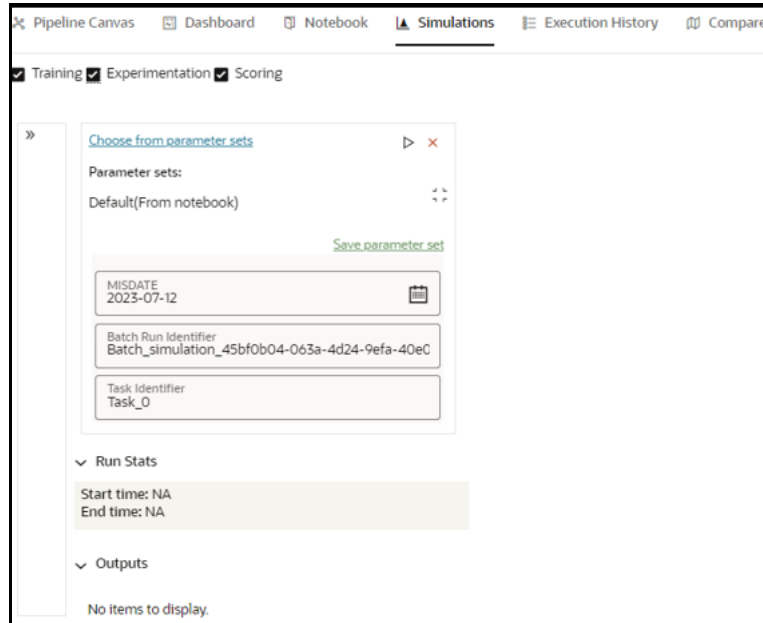
Dynamic Forms in Notebook Server are the dynamic input fields that you can create for the paragraphs. When the paragraphs with the dynamic input fields are executed, the existing paragraph properties are replaced with these dynamic values, displaying the results. For more information, see [Dynamic Forms](#).

7.5.4.4 Simulations

Simulation run is for executing a single notebook in parallel by giving different values for same parameters. The simulation flow allows for iterative execution along that path with input drivers (variables) that are passed through a parameter set.

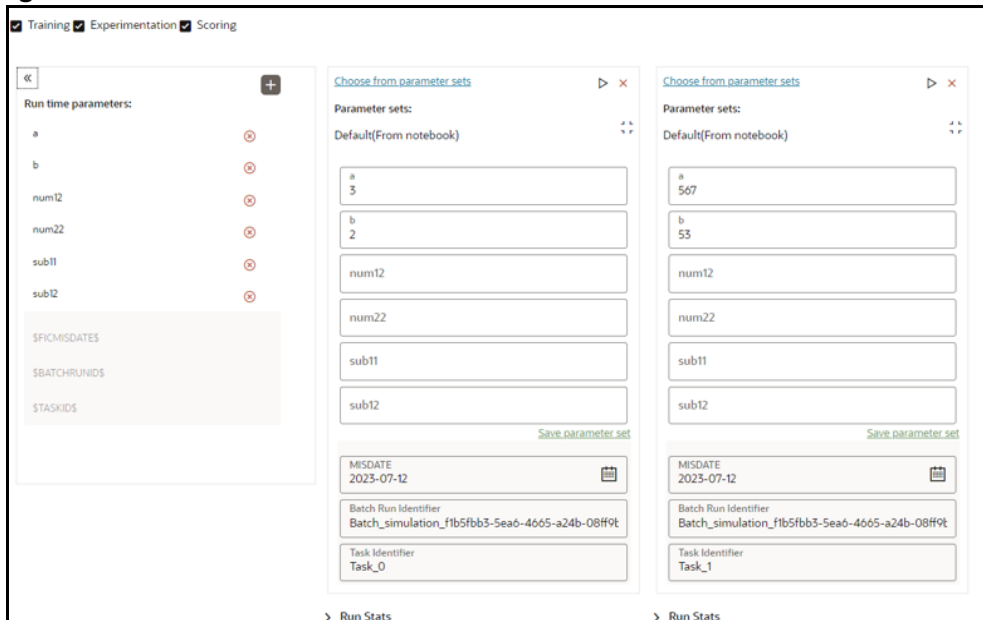
You can either create a new parameter set or use the existing parameter set and execute it from this tab. In addition, you can select or deselect the link types which you want to execute.

Figure 142: Simulations



If you want to add different values for the same parameter, click **Add Run**. You can add any number of Run based on your requirements and then click **Execute all** to execute at one time. The **Batch Run Identifier** will be same for all runs and the Task id will be incremented for newly created run.

Figure 143: Run Time Parameters



The Run Stats displays the execution start and end date. The Outputs of the tracked nodes will be shown under the inputs of each run panel.

7.5.4.5 Execution History

This section of Pipeline Designer shows the history of the executed pipelines including ongoing executions.

Figure 144: Execution History

Batch Run Identifier	Inputs	Task Identifier	Status	Outputs	Canvas view	MISDATE	Start Time	End Time
Batch_auto_d56c807d-acfc-4383-af2d-e264d0bec9b8	Custom	task1	●	📄	✖	2023-08-07	7 Aug 2023, 18:15:18	7 Aug 2023, 18:15:18
Batch_simulation_771a3711-5744-49fc-8a45-08fa0f1cd...	Default(From notebook)	Task_0	▲	📄	✖	2023-07-12	12 Jul 2023, 17:14:42	12 Jul 2023, 17:15:50
Batch_auto_ccceb145-aa70-4bd5-b1bb-d4b56ec7ed0	Custom	task1	▲	📄	✖	2023-06-26	26 Jun 2023, 16:55:16	26 Jun 2023, 16:56:15
Batch_auto_ccceb145-aa70-4bd5-b1bb-d4b56ec7ed0	Custom	task1	▲	📄	✖	2023-06-26	26 Jun 2023, 16:55:13	26 Jun 2023, 16:56:17
Batch_auto_ccceb145-aa70-4bd5-b1bb-d4b56ec7ed0	Custom	task1	▲	📄	✖	2023-06-26	26 Jun 2023, 16:55:10	26 Jun 2023, 16:56:14

You can compare and refresh the executions by clicking on **Compare** and **Refresh** icons.

To view the inputs, output, status, and canvas view, click on the corresponding options in the table.

7.5.4.6 Compare

This section allows you to compare the models with Champion model.

To compare, follow these steps:

1. Navigate to Pipeline Designer window and click **Compare** tab.

This shows the following comparison details:

- Model Properties
- Model Input (Last Execution Details)
- Audit Log
- Model Script
- Model Output (Last Execution Outputs)

Figure 145: Compare Model

	11 ver 1	11 ver 0
Model Properties		
Objective	sub objective	sub objective
Description	11	11
Version	1	0
Language	Default	Default
Technique	1	
Model Inputs (Last Execution Details)		
No data to display		
Audit Log		
Created By	MMGADMIN	MMGADMIN
Created Date	Feb 13, 2023, 6:31:04 PM	Feb 13, 2023, 6:30:56 PM
Modified By	MMGADMIN	
Modified Date	Feb 13, 2023, 6:31:27 PM	
Model Script		
Script 0	** Do not delete this paragraph. Also, ensure that... more >>	** Do not delete this paragraph. Also, ensure that... more >>
Model Output (Last execution outputs)		
No data to display		

7.5.5 Publish Data Studio

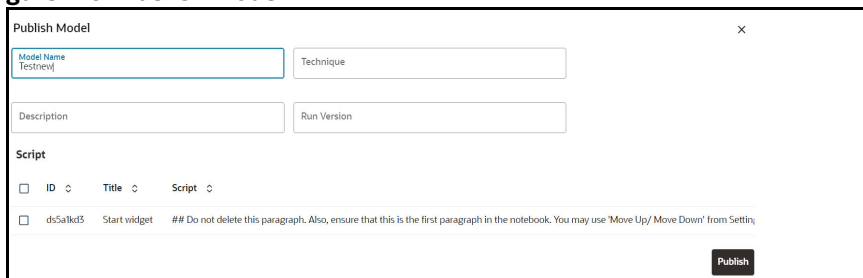
After creating the Draft Models, publish the Notebooks, which have the Model script.

To create a Scoring Model, follow these steps:

1. Create a Draft Model. See the **Create Draft Models** section for more information.

- Click  next to corresponding Draft Model and select **Publish Data Studio** option.

Figure 146: Publish Model



The screenshot shows a 'Publish Model' dialog box with the following fields and content:

- Model Name:** TestNew
- Technique:** (empty)
- Description:** (empty)
- Run Version:** (empty)
- Script Table:**

ID	Title	Script
ds5atk33	Start widget	## Do not delete this paragraph. Also, ensure that this is the first paragraph in the notebook. You may use 'Move Up/Move Down' from Settings.
- Buttons:** A 'Publish' button is located at the bottom right.

- Enter the details as shown in the [Table 32](#).

Table 32: Publish Model Details

Field or Icon	Description
Model Name	The field displays the name of the Model. Modify the name if required.
Model Description	The field displays the description for the Model. Enter or modify the description if required.
Technique	Enter the registered technique to use.
Run Version	Select a run version.
Variable Mapping	The table displays the OFSAA variables and datasets used in the creation of the Training Model.
Script	The table displays the Paragraphs created in the Training Model. Select the Paragraphs that you want to use to create the Scoring Model. Track Output - Select this to track the output of the paragraph.

- Click **Publish**.

7.5.6 Scope Detail

To view the scope details of the model, follow these steps:



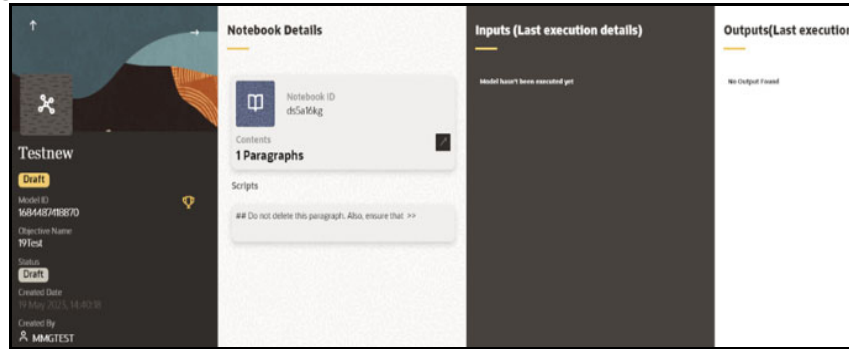
- Click Launch Workspace  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
- In the Mega menu, click **Modeling > Pipelines** to display the **Model Pipelines** page.
The window displays folders that contain models and model records in a table.
- Click  next to corresponding Model and select **Scope Detail** option. This is available for both Draft and Published models.
The details such as Notebook, Inputs (Last execution details), Deployment Details, and Outputs (Last execution outputs) are displayed.

Figure 147: Scope Detail



7.5.7 Understand Model Governance

After comparing models, you must understand the Model Governance system in OFS CS. The Model Governance has an impact on how the application functions with the various user types and the requests they can place from the Model Details window. You require to understand Model Governance before you request model acceptance, review models, or approve models for production.

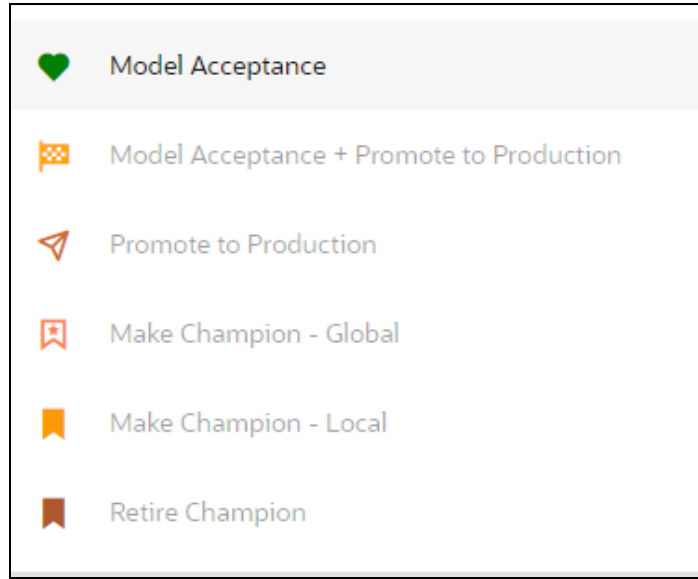
As discussed earlier, the users are of three types:

- Requester
- Reviewer
- Approver

The request consists of the following phases in the Request drop-down list (see the [Request Model Acceptance](#) section for how to access the drop-down list in the Model Deployment window):

- Model Acceptance
- Model Acceptance + Promote to Production
- Promote to Production
- Make - Champion - Global
- Make - Champion - Local
- Retire Champions

Figure 148: The Request Drop-down List



The values in the drop-down list are active based on the type of user (Requester, Reviewer, or Approver) and the phase that the model is in (accepted, promoted to production, global champion, and so on). Let us look at these with a few examples.

Example 1:

Assume that you are a user with Requester privileges, and you create a model. Now you can request for the model to be accepted on the Model Details window from the **Request** drop-down list. The values enabled for selection are **Model Acceptance** and **Model Acceptance + Promote to Production**. Let us proceed and assume that you select Model Acceptance, then a user with Reviewer privileges forwards your model to a user with Approver privileges. At this stage, the Approver can choose to reject or accept your model acceptance request. A rejection would bring the model back to the initial state with comments on the updates required before it can be requested for acceptance again. However, if the Approver accepts your model, then the **Make Champion - Local** selection is enabled when you log in. You can create many models and send them for acceptance. After acceptance, any model that is accepted can be made the champion on your local workspace at any time replacing the earlier local champion.


Example 2:

Assume that in the previous example, you selected **Model Acceptance + Promote to Production**, then a Reviewer forwards it to the Approver. The Approver, at this stage, chooses to promote the model to production by selecting **Promote to Production**. The model is now available in the production environment and the Approver can choose at any time to select a model from these models in production and select **Make Champion - Global**. If there exists a Champion model in the production environment, then it will be replaced by the new global champion. However, the earlier champion will still be available in the production environment along with other models and the Approver can choose to make it the global champion again at any time or select any of the other models and make one of them the global champion.

7.5.7.1 Request Model Acceptance

After comparing models, move the selected models to acceptance. Only a user with either Requester or Reviewer roles can request for model acceptance. The model moved to acceptance is then available to users with the Approver role, who can promote to production. See the [Understand Model Governance](#) section before you start here.

To request a model to promote to production, follow these steps:

1. In the Mega menu, click **Modeling > Pipelines** to display the **Model Pipelines** page.
The window displays folders that contain models and model records in a table.
2. Double click the Model to open it.
3. If a model is a champion, the  icon is displayed on it.
4. To make a model a champion from this window, place the mouse in the selected model columns.



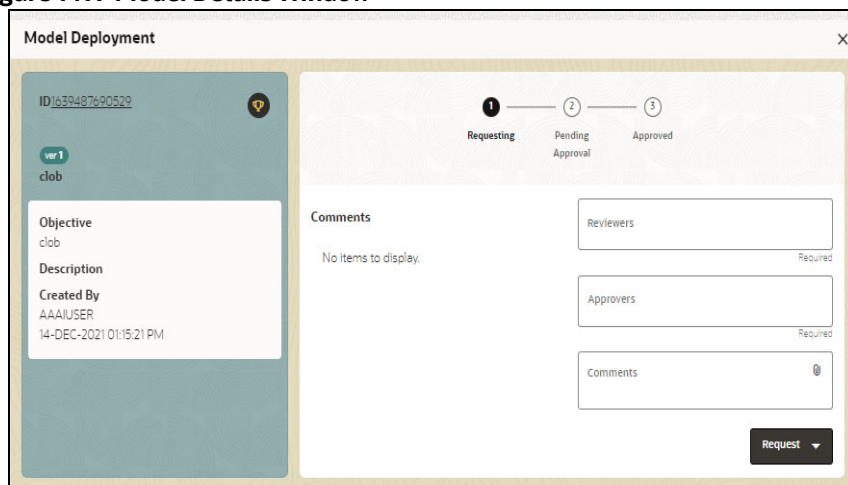
and click  to display the **Model Details** window. If a model is a champion model, the  icon is displayed.

Figure 149: Model Details Window




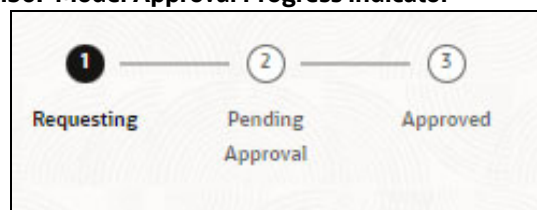
5. Select the reviewer group from the **Reviewers** drop-down list.
6. Select the Approver group from the **Approvers** drop-down list.
7. Enter comments in **Comments** and click  to attach files supporting the comments.
8. Use the following features on the window to perform additional actions.
 - View the model status change in the progress indicator. The Progress Indicator displays the various states of progress that the model has been through. Accordingly, you must request, review, or approve models.

Figure 150: Model Approval Progress Indicator



- Click the type of request from the drop-down list:
 - Model Acceptance: To review and accept the model creation.



- Model Acceptance + Promote to Production: To review and promote the model to production.
- Make Champion - Local: If the model is not the champion model, select to make it the local champion.
- Promote to Production: To promote a model to production
- Make Champion - Global: If the model is not the champion model, select to make it the Global champion.
- Retire Champion: To retire a Champion model
- Comment History: A record of comments entered in the cycle of model creation and approval with the feature to download attachments.

The model sent for acceptance or for promotion to production is now displayed to a Reviewer when signed in, who must either accept the request or reject it.

7.5.7.2 Review Models and Move to Approve or Reject

The Reviewer must provide comments describing the action (approve or reject). If comments are related to rejection, then model goes back to the Requester to make changes or to delete it. If comments are related to approval, then model moves further in the workflow and is displayed to an approver. See the [Understand Model Governance](#) section before you start here.

To review a model, follow these steps:

1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **Modeling > Pipelines** to display the **Model Pipelines** page.
The window displays folders that contain models and model records in a table.
3. Click  to display the Model Details Window.
4. Review the details and send it back to the Requester for modifications or send it to an Approver.

7.5.7.3 Approve Models and Promote to Production



The models reviewed and set to promote to production by either the Requester or Reviewer is displayed to the Approver when signed in. The Approver has to either reject the model and send it back to the requester with supporting comments or approve it for pushing to production. See the [Understand Model Governance](#) section before you start here.

NOTE

When dataset has used the datasource which is of order (N) for example 5 , and the Production workspace does not contain the datasources at order 5, then promotion of models containing dataset from Sandbox to Production workspace fails.

To remedy this issue, ensure that Sandbox and Production workspace contain the same number of Datasources before you perform promotion of models.

To approve or reject models, follow these steps:




1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **Modeling > Pipelines** to display the **Model Pipelines** page.
The window displays folders that contain models and model records in a table.
3. Select a model from the records in the objective.
4. Click  to display the Model Details Window.
5. Click **Approve** or **Reject** with appropriate comments.

7.5.7.4 Deploy Models in Production and Make it a Global Champion

After approving the models, deploy it to the production environment. You must have an Approver function role and privileges to do this activity.

NOTE Sandbox should have the production workspace attached in order to have this option enabled.

To deploy Models in production, follow these steps:

1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega Dash, click **Modeling > Pipelines** to display the **Model Pipelines** page.
The window displays folders that contain models and model records in a table.
3. Select the model to deploy and click  to display the details of the model. If a model is a champion, the  icon is displayed.


7.5.8 Import a Model Data into a New Model

The model data from existing models in OFS CS in .dmp format and the existing model data in OFS CS in .dsnb can be imported during the creation of a new model.

Note: The import should happen inside an Objective only.

The import of model data lets you reuse and extend on model creation. This topic is part of the procedure of creating Draft Models and after creating a new model using this method, see the [Create Draft Models](#) section for instructions on how to proceed further.

To import model data, follow these steps:

1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **Modeling > Pipelines** to display the **Model Pipelines** page.
The window displays folders that contain models and model records in a table.



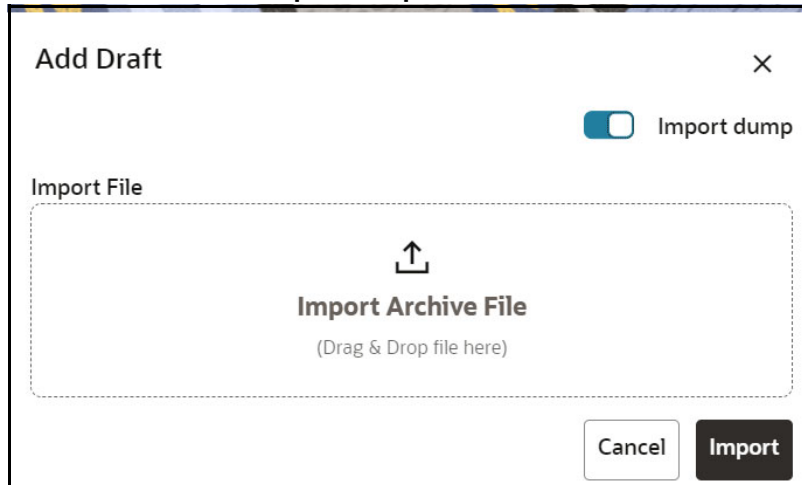
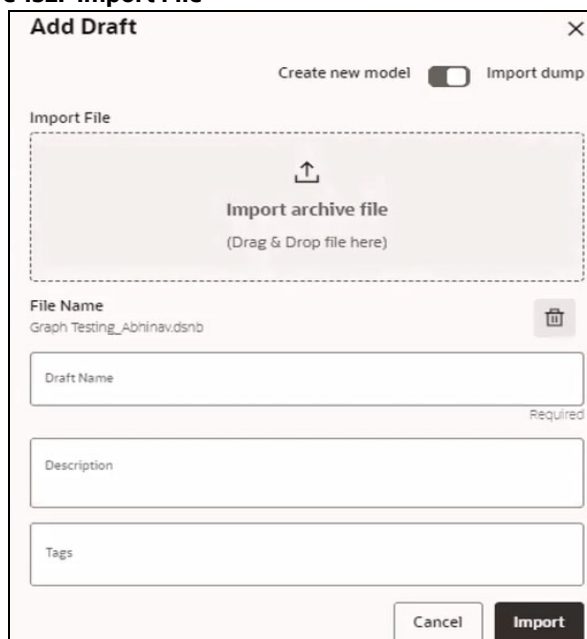
3. Select an **Objective**.
4. Double click a model to display the model versions in the expanded display.
5. Hover over a model and click  to download the model data dump.
6. Click **Add** and  Drafts to display the **Model Details** dialog box for the creation of a new model.

Figure 151: Model Details - Import Dump



7. Drag the toggle switch to select **Import Dump**.
8. Drag and drop the file into the **Import Dump File** field or click in the box to open the file selector dialog and select a file.
9. Click **Import**. The following image is displayed.

Figure 152: Import File



10. Enter the details for **Draft Name** and **Description**.

11. Enter a tag in the **Tags** field.
12. Click **Import**. A new model is created by importing the model data dump of another model.
13. Click **Delete** in the **File Name** field to delete the imported file, if required.

The imported file is deleted and then click **Import**. The empty model will be loaded.

NOTE Once the imported file is deleted, the user can import the new file and click **Import** to create a new model.

7.5.9 Executing Models using Scheduler Service

The models that you have created require that they are executed using Scheduler Service before they can be available to the users of OFSAA applications. For more information on this, see the [Scheduler Service](#) section.

7.5.9.1 Defining a Task

OFS CS supports following three Components during the Task creation:

- Model
- Populate Workspace
- Custom

Figure 153: Create Task

Enter the following details in Task Details section:

- **Task Name:** Enter the task name.

NOTE The Task Name must be alphanumeric and should not start with a number. The Task Name should not exceed 60 characters in length. The Task Name should not contain any special characters except underscore (_).

- **Task Description:** Enter the task description. No special characters are allowed in Task Description. Words like Select From or Delete From (identified as potential SQL injection vulnerable strings) should not be entered in the Description
- **Task Type:** Select the task type from the drop-down list. The options are REST and SCRIPT. You can enter Shell script for Model, Populate Workspace, Custom components. Status key in the curl command should be in uppercase as STATUS.
- **Batch Service URL:** Select the required Batch Service URL from the drop-down list. This can be blank, and you can provide the full URL in the Task Service URL field.
- **Task Service URL:** Enter task service URL if it is different from Batch Service URL.

NOTE Task Parameters will vary based on the selected Component.

7.5.9.2 When Component is Model

The following window shows the Task Parameters for Model Component.

Figure 154: Task Parameters

Parameter	Value	
\$BATCHDATES	Batch Date	
\$BATCHRUNID	BATCHRUNID	
Objective	Value*	Click to select param va... ▼
Model	Value*	Click to select param va... ▼
Link types	Value	Click to select param value ▼
Synchronous Execution	Value	Click to select param value ▼
Optional Parameters	Value	

NOTE Fields marked with * are mandatory fields.

- **Batch Date:** Shows the batch execution date. You can enable or disable this parameter.
- **Batch Run ID:** Shows the batch execution run ID. You can enable or disable this parameter.
- **Objective:** Select the Object which you want to use for execution. For more information, see the Create Objective (Folders) section. The Sub Objective is displayed with path. For example, if Test1 is Objective and Test11 is Sub Objective, and you want to use Test11 Objective for execution, then select this field as Test1/Test11.
- **Model:** Select the Model of selected Objective. It can be any specific model of Objective or All models of Objective.

- If the ALL_CHAMPION is selected here, then Objectives with no Champion Model is skipped, and the Objectives with Champion Models gets executed.
 - If CHAMPION is selected, and no Champion is present, then Model Execution gets fail.
- **Link Type:** Select the link type for execution. For example: Training, Scoring, or Training+Scoring. For more information, see the Links in the Pipeline Designer section.
- **Synchronous Execution:** You can set this parameter to Yes or No.
 - If Synchronous Execution is set to Yes, then execution will wait for the notebook execution status.
 - If Synchronous Execution is set to No, then execution will not wait for the notebook execution status, it will trigger the notebook and update task status as successful in batch monitor.
- **Optional Parameters:** This is used pass the parameters dynamically.

For example: model_group_name=LOB1,benford_flag=Y,benford_digit=1,from_date=01-Jul-2020,to_date=31-Jul-2021

Model group is parameter defined in model and value can be passed here.

The Create Task window also shows the following Header Parameters, which are not editable:

- User: logged in user name
- Workspace: shows the launched workspace name
- Locale: shows the locale. For example: en_US

7.5.9.3 When Component is Populate Workspace

If you select Component as Populate Workspace, then to use the data population, enter the following parameters

- Additional Parameters
- Table Filters
- Global Filters

For more information, see the [Populate a Workspace](#) section.

Figure 155: Create Task

Parameter	Value	Checkbox
\$BATCHDATES	Batch Date	<input checked="" type="checkbox"/>
\$BATCHRUNID\$	BATCHRUNID	<input checked="" type="checkbox"/>
Global Filter	<input type="text"/>	<input type="checkbox"/>
Table Filters	<input type="text"/>	<input type="checkbox"/>
Additional Parameters	<input type="text"/>	<input type="checkbox"/>
Header Parameters		
user	aaaiuser	<input type="checkbox"/>

7.5.10 Import / Export Models via Utility

You can import and export the models between Sandbox to Production or vice versa using the Utility.

Prerequisite:

Before you import, ensure the Model artifacts are available in the <installed path>/ftpsahre.

To import the models, perform the following steps:

1. Navigate to <OFS_COMPLIANCE_STUDIO_INSTALLATION_PATH>/mmg-home/bin and execute in the following format:

```
./model_export_import_utility.sh IMPORT WORKSPACE LOGIN_USER LOCALE
FILE_NAME Y/N
```

Example:

```
./model_export_import_utility.sh IMPORT CS SAUSER en_US
CS_1638105398036_0.zip Y
```

[Table 33](#) describes the description of the command.

Table 33: Command Description

Field	Description
Import	Command to import the Model into Workspace
Workspace	The name of the Workspace to which you are importing the Model
Login_User	The application language preferences For example: en_US
File_name	The file name with the following format: Workspace name_Model ID_Model version.zip For example: CS_1638105398036_0.zip

NOTE

- If you enter input as **Y**, the utility imports the models in the approved status.
- If you enter as **N**, the models are imported but not in the approved status.

To export the models, perform the following steps:

Prerequisite:

Before you export, ensure the Models and Drafts are available in the UI / setup.

1. Navigate to <OFS_COMPLIANCE_STUDIO_INSTALLATION_PATH>/mmg-home/bin and execute in the following format:

```
./model_export_import_utility.sh EXPORT WORKSPACE LOGIN_USER LOCALE
MODELID MODEL_VERSION
```

Example:

```
./model_export_import_utility.sh EXPORT CS SAUSER en_US 1638105398036 0
```

Table 34 describes the description of the command.



Table 34: Command Description

Field	Description
Export	Command to export the Model from the Workspace
Workspace	The name of the Workspace from which the model is exported
Login_User	The logged in user name
Locale	The application language preferences. For example: en_US
Model ID	The Model ID
Model Version	The version of the Model

7.5.11 View Models

The View Models feature launches the OFS Compliance Studio window. You can edit models on this window.

To use View Models, follow these steps:

1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **Modeling > Pipelines** to display the **Model Pipelines** page.
The window displays folders that contain models and model records in a table.
3. Click  next to corresponding Model and select Open in Pipeline Designer.

See the [Create Paragraphs using Pipeline Designer](#) sections for details on how to use the OFS CS Data Studio.


7.5.12 Edit Models

The editing of models created versions that are different from the previously saved model and the cycle of [Understand Model Governance](#) applies to any edited model. You can edit models from the OFS CS Data Studio window using Python scripting language.

You can edit the script of version 0 only even in Pipeline Designer and Studio. It is not possible in other versions.

7.5.13 Delete Objectives and Draft Models

To delete Objectives and Models that exist in the Objectives, follow these steps:

1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **Modeling > Pipelines** to display the **Model Pipelines** page.
The window displays folders that contain models and model records in a table.




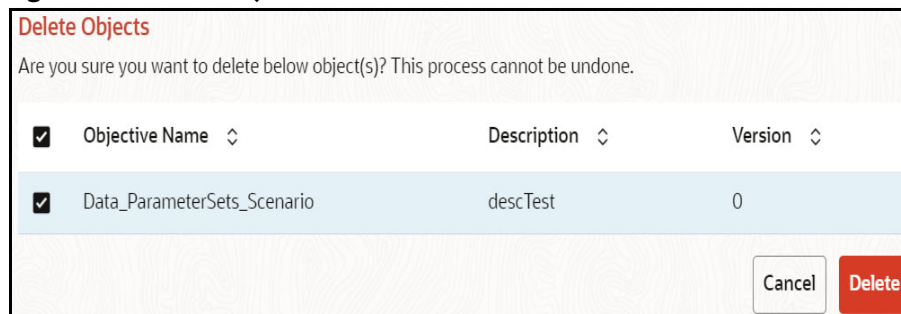
3. Click  next to corresponding Model and select Delete Draft .
4. Select two or more objectives or models from the records.
5. Click  to display the Delete Draft dialog box.
6. Click **Delete** to delete or click **Cancel** to cancel.

Figure 156: Delete Objects



NOTE If the Model is promoted to Production, you cannot delete the model even it is retired.

7.5.14 Programmatic Dynamic Forms and Fixed Dynamic Forms

The Programmatic Dynamic Forms and Fixed Dynamic Forms scripts are supported.

A dynamic form is a user input field that is generated from the code of a paragraph. Dynamic forms allow users to bind free variables in a paragraph.

For Example:

Textbox

The Textbox dynamic form allows users to input any string of characters. Its format is as follows:

1. Click **Add Python Paragraph** in Model Studio to add a Paragraph in the Notebook and fetch the runtime parameters supported in Model Studio runtime as shown in the following example. This is available for all the interpreters.

For example, enter as follows:

```
%python
```

```
ds.textbox('Name', 'Default Value', 'Label')
```


Click  to run the script and display.

Figure 157: Default Value



NOTE In the current release, the Compliance Studio supports Textbox, Select, Slider, Checkbox, Date Picker, Time Picker and DateTime Picker dynamic forms.

7.6 Graphs

Unlike traditional relational database management systems, the Graph Pipeline feature allows you to view the data relationships in a graphical format.

This feature uses the latest technology to harness the power of Graph Analytics to give Financial Institutions the ability to monitor the data financial institutions effectively. The data is organized as nodes, relationships, and properties (property data is stored on the nodes or relationships). The results of analytics algorithms are stored as transient properties of nodes and edges in the Graph.

Users can harness the power of Graph Analytics using our in-built in-memory Oracle Graph Analytics Engine (PGX).

The Graph Pipeline functionality allows users to define graphs easily, attach underlying data, and match pipelines to populate data in the graph.

The Graph Pipeline functionality allows users to quickly create and configure a graph for use in advanced analytics. It can also manage and schedule the tasks required to run populate the graph on a periodic basis.

Table 35 lists the users mapped to the groups are specific to graph related activities.

Table 35: Mapping User Group

User Group	Description
GRPADMIN	The Graph Administrator Group. Users mapped to this group have access to all the menu items in the application related to graph as well as Pipeline/Refresh graphs related health services.
GRPUSR	The Graph User Group. Users mapped to this group have access to all the menu items in the application related to graph as well as Pipeline/Refresh graphs related health services.

The Graph Pipeline functionality allows you to:

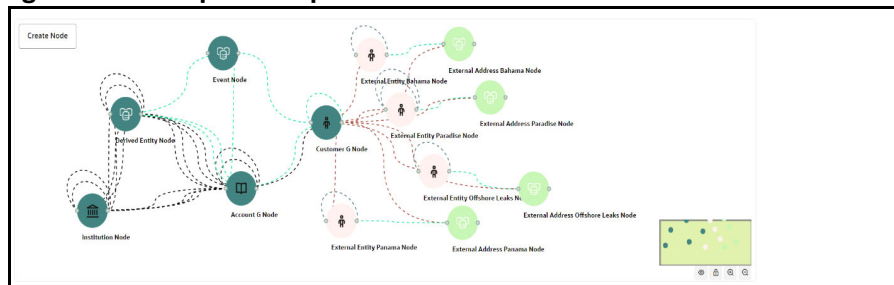
- Creating Graph Model from their existing relational data model
- Configuring the Graph Model through Pipeline UI

- Creating and Scheduling the data pipeline and matching (creation of similarity relationships) for created Graph Model
- Adding new sources and contextualizing the links quickly
- Standardizing the data before pushing it to Graph Model
- Using the following data source for Graph Model:
 - Oracle
 - File System (CSV)
- Using BD data source definitions for pre-seeded Workspace
- Using pre-configured Financial Crime Graph Model pipelines
- Using pre-seeded mappings of Graph Model properties with BD Data source properties
- Scheduling to create Graph by running pre-configured batches
- Blending data and getting insights from data quickly
- Load data into OpenSearch indexes so matching and entity resolution can occur in the graph
- Define matching rules for the generation of similarity edges in the graph.

Compliance Studio comes with a pre-configured Financial Crime Graph Model which can be used in models or applications such as Investigation Hub. The pre-configured model pipelines can source data from the Financial Crime Data Model and ICIJ but can be easily augmented with additional sources of data as required.

- The following figure is an example of the preconfigured Financial Crime Graph Model with Nodes and Edges:

Figure 158: Example of Graph Model



The Graph Model defines the nodes and the relationship between them:

- **Node:** It represents a single entity with its attributes. The entity can be a record from the table or combination of tables merged on some common feature, it could be from a file, or any generalized component of multiple substructures merged for a specific reason/objective.

For example, Customer.

A customer could be a single entity.

Customer, Salesperson, Manager, and so could be individual entities that can be structured together as a “Person” entity with a set of attributes persisted across individual entities.

- **Edge:** Edge is a connector between nodes or the same Node itself. Each edge can have a set of attributes associated with it. These edges will map to 'join' between two entities that could be direct or transitive.
- **Modeler Attributes:** Modeler attributes are the properties of Node/Edge, and these are mandatory inputs.

For example:

Customer Node will have properties like Customer ID, Name, Age, Gender, etc.


A Transaction edge will have properties like Transaction ID, Date, Amount, From/To account, etc.

See the [Adding a Graph Pipeline](#) for creating Graph, Nodes, Edges, and Scheduling.

7.6.1 Accessing the Graph Summary Page


The Graph Summary page gives access to the various graph pipeline functions such as create, view and delete.

To access the Graph Summary page, follow these steps:

1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **Modeling > Graphs**.

This displays the graph pipeline in a table.




Figure 159: Graph Summary Page



Name	Number of Nodes	Number of Edges	Owner	Created Date	Action
FINANCIAL_CRIME_GLOBAL_GRAPH FCDM-Graph CM	9	39	MMGUSER	Jun 2, 2023, 5:29:22 PM	...
FINANCIAL_CRIME_GLOBAL_GRAPH_BEHAVIOUR_DETECTION FCDM-Graph BD	7	34	MMGUSER	Jun 2, 2023, 5:29:22 PM	...

The [Table 36](#) provides descriptions for the fields and icons on the **Graph Summary** page.

Table 36: Graph Summary Details

Field or Icon	Description
Search	The field to search for a graph pipeline. Enter specific terms in the field for which you want to search, and press Enter on the keyboard to display the results.
Name	The name of the graph pipeline.
Number of Nodes	The number of nodes present in the graph pipeline.
Number of Edges	The number of edges present in the graph pipeline.
Owner	The owner of the graph pipeline.
Created Date	The date on which the graph pipeline was created.
	Click to delete multiple graph pipelines.
	Click to create a new graph pipeline. See Adding a Graph Pipeline section.
	Click Action icon to View/Edit/Delete/Create Population Schedule functions on the selected graph pipeline.

7.6.1.1 Adding a Graph Pipeline

To add a graph pipeline, follow these steps:

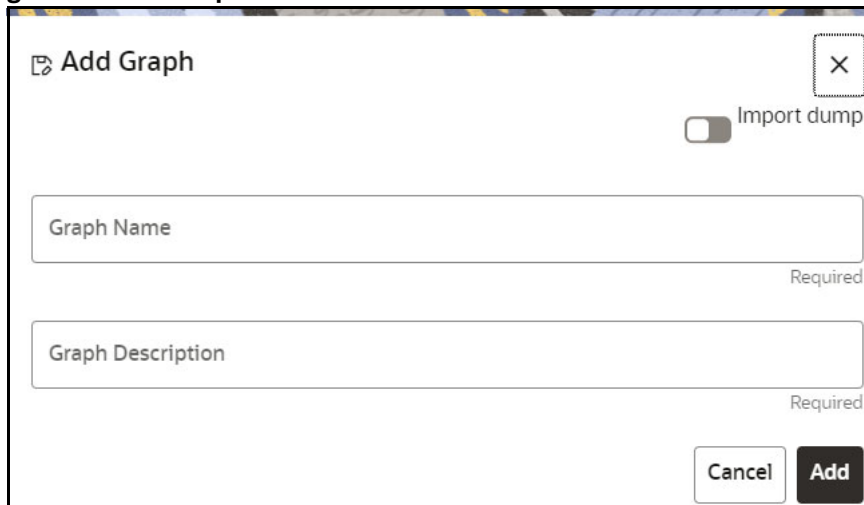
1. Navigate to Graph Summary page.

This page displays the graph summary records in a table.

2. Click **Add**.

The **Add Graph** pop-up window is displayed.

Figure 160: Add Graph Window



3. In the **Graph Name** field, enter a name for the graph pipeline.

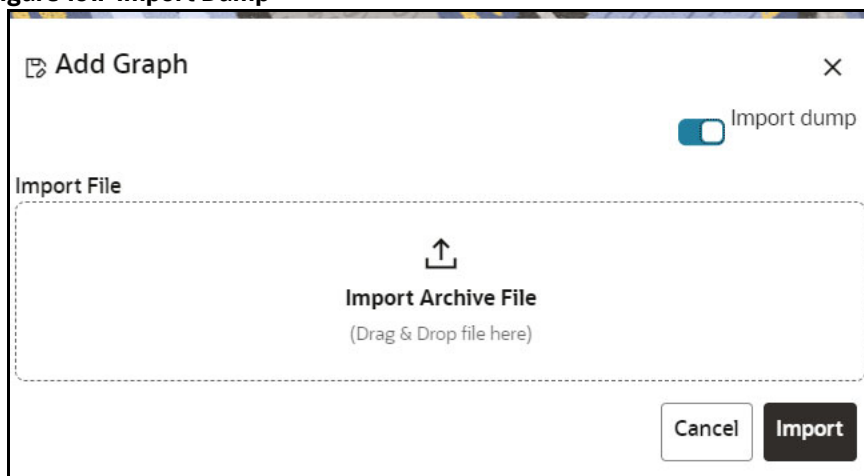
The name must be unique to a particular workspace.

4. In the **Graph Description** field, enter the description for the graph pipeline and click **Add**.

Or

Use the toggle button to select **Import Dump**. The following page is displayed.

Figure 161: Import Dump



5. Browse the file and click **Import**. Once the Import is successful, the Graph Model page is displayed.

Figure 162: Graph Page



The Maximum Age of Old session for a graph is 7 days by default. The Maximum age of old session of 7 days specifies that graph would be retained for a period of 7 days. You can modify


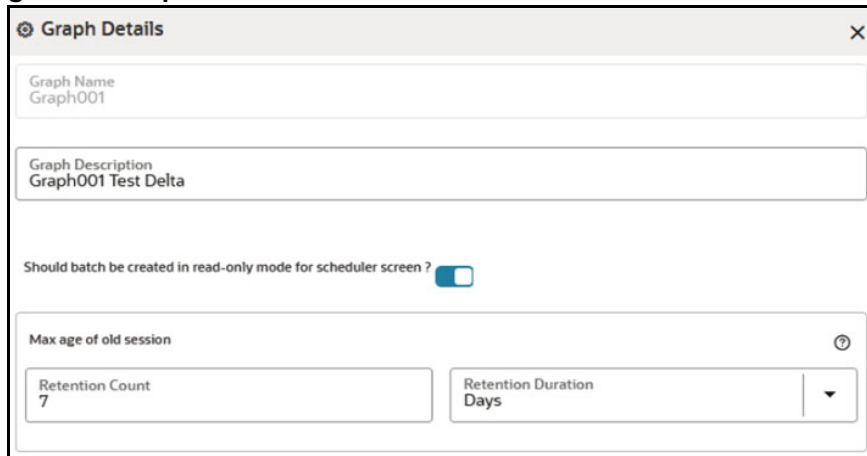
the description and Max Age of Old session by clicking on the Setting  icon. If you want the batch to be created in read-only mode for scheduler screen, enable the option.

Figure 163: Graph Details



6. Click **Save**. The user session of the Graph Pipeline will get refreshed after the set timeline.
7. You can perform the following:
 - a. [Creating a Node](#)
 - b. [Creating an Edge](#)
 - c. Toggle drawing which will enable or disable the user from dragging components
 - d. [Zoom In and Zoom Out](#)

7.6.1.2 Creating a Node

To create a Node, follow these steps:

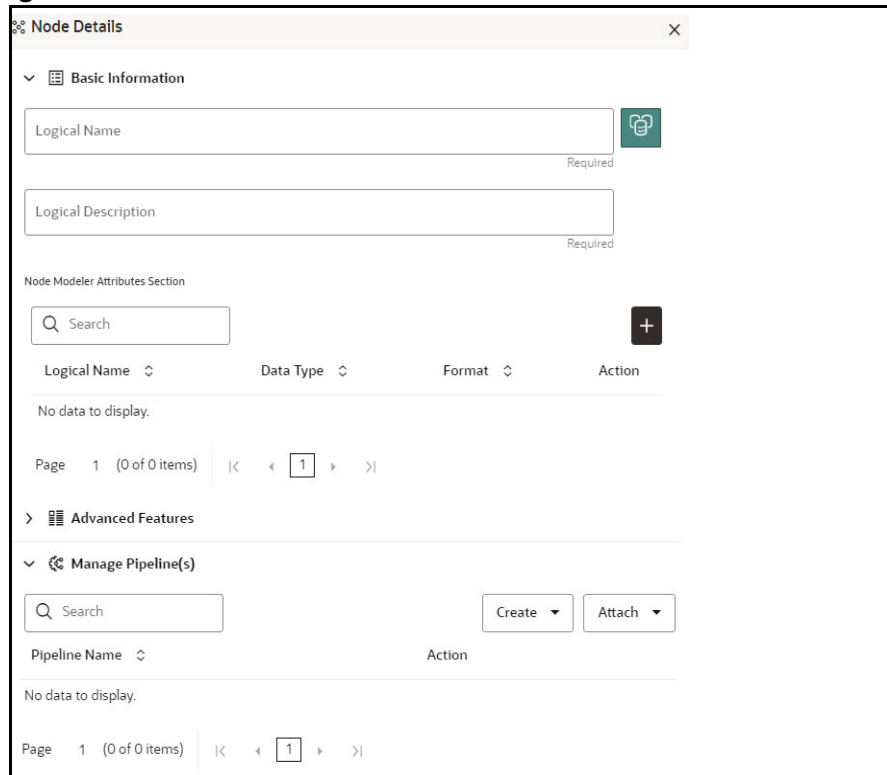
1. In the Graph Model page, click **Create Node**.

OR

Select the graph pipeline for which you want to create a Node, click on the **Action** button, and select the **Edit** option. In the Graph Model page, click **Create Node**.

The **Node Details** screen is displayed.

Figure 164: Node Details




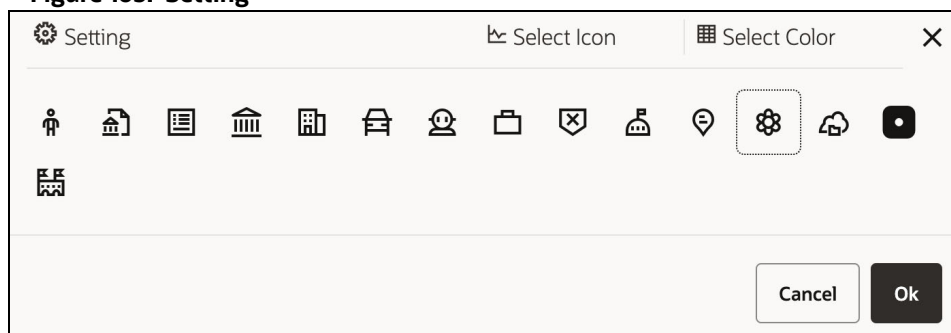

- In the **Logical Name** field, enter a name for the Node or click **Setting** icon . The **Setting** pop-up window is displayed.

Figure 165: Setting



- Select the required representation from the above Node icon. For example: Person, Institution, Account etc. Hover over the icon to view the definition of the node.
- Based on your selection, the related Nodes are displayed. Select the Node, and you can choose the required color for the Node using the **Select Color** option.
- The selected Node is displayed on the graph pipeline. To add attributes to the Node, click Add icon . Modeler attributes are the properties of Node/Edge, and these are mandatory inputs.

For Example:

Customer Node will have properties like Customer ID, Name, Age, Gender, etc.

The **Add Node Modeler Attribute(s)** screen is displayed.

Figure 166: Add Node Modeler Attribute(s)

6. In the **Logical Name** field, enter the logical name for the modeler attribute. This field is mandatory.
7. Select the data type based on your requirements in the **Data Type** field drop-down. The available data types are Text, Number, and Date. This field is mandatory. Based on the data type selection, the following input field is displayed. For example, the **Maximum Length of Text** field is displayed if the data type is selected as **Text**.

NOTE Ensure the Maximum Length attribute is set to at least the field's length from which the data is to be populated.

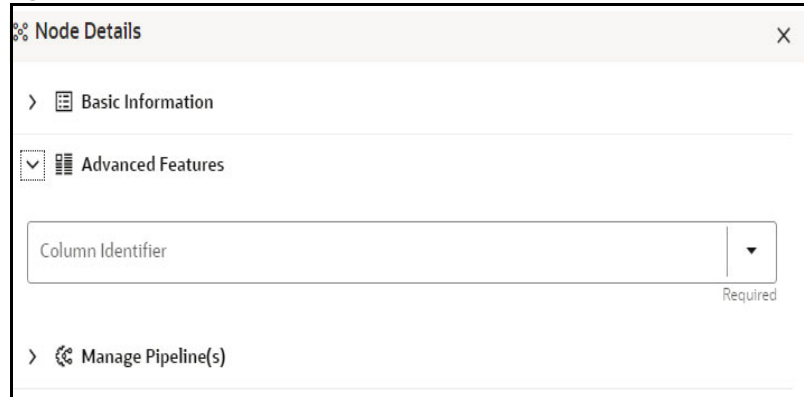
8. Enter the data and click **OK**. The Node attributes are displayed on the Node Details page below.

Figure 167: Node Modeler Attributes Section

You can add any number of modeler attributes based on your requirements by clicking on the Add icon.

9. Under the **Advanced Features** group, select the modeler attribute from the Column Identifier drop-down. All the created modeler attributes are displayed under this drop-down.

Figure 168: Advanced Features



Under the **Manage Pipeline(s)** group, you can either create a new data pipeline or attach the existing pipeline.

The application uses data pipelines to prepare filtered data which can be used to create and run scenarios. Data pipelines prepare data by selecting and joining data sources to create virtual data tables, adding derived attributes to data, running derivations on the data to determine the risk associated with the entity, and so on.

NOTE The newly created data pipeline is not automatically added to the Node. You must attach the pipeline using the **Attach** drop-down option.

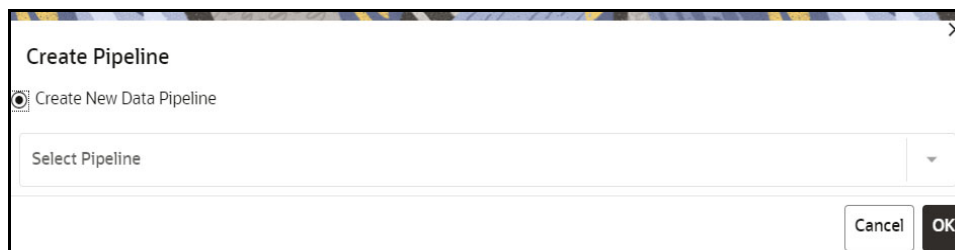
The selected data pipeline is displayed under the Manage Pipeline(s) group.

Figure 169: Manage Pipeline(s)



- Click **Create** drop-down and then select the **Data Pipeline**. The **Create Pipeline** window is displayed.

Figure 170: Create a New Data Pipeline

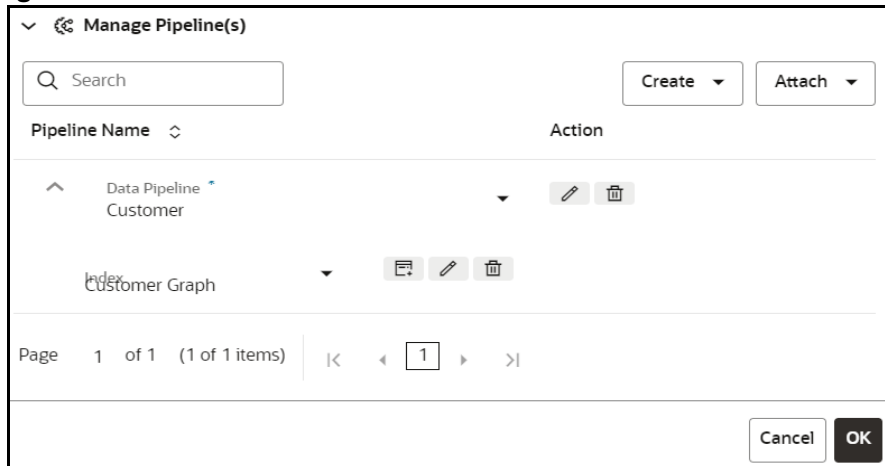


- Select the **Create New Data Pipeline** option and then click **OK**. The Pipeline Designer page is displayed.

- To create a new data pipeline, see the [Creating a New Data Pipeline](#) section.

NOTE The Persist of the Data pipeline of the corresponding edge should be defined with the prescript. See the **Prescript Condition** section in the [OFS Compliance Studio Administration and Configuration Guide](#).

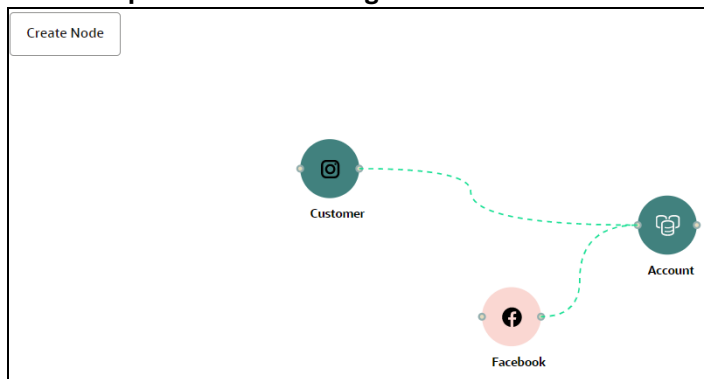
Figure 171: Create an Index



- To define an index for the data pipeline, see the [Defining an Index](#) section.
12. By clicking on the **Attach** drop-down, you can add any number of data pipelines to the Node-based on your requirements.
 13. Click **OK**.

The Node is created with pipeline Facebook and an account attached to it.

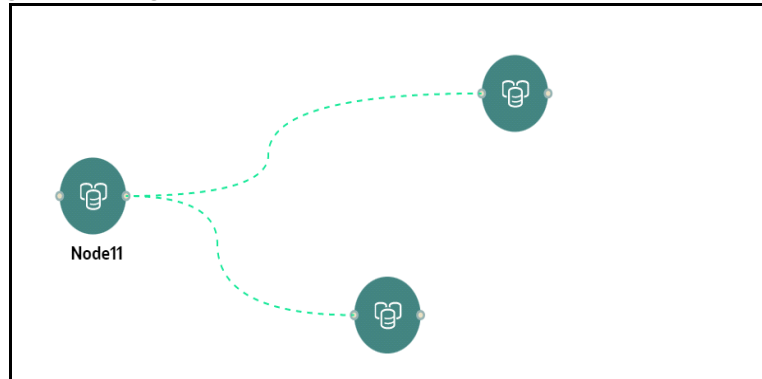
Figure 172: Graph with Node and Edge



7.6.1.3 Creating an Edge

An Edge can be used to connect two different nodes or connect to itself. When compared to nodes, edges also capture the basic information like name, description, attributes to an edge, and possible pipelines that can be attached to an edge.

Figure 173: Edge



To create an edge, perform these steps:

1. Hover on the Node to create a relationship between them.
The **Edge Details** screen is displayed.

Figure 174: Edge Details


2. In the **Logical Name** field, enter the Node's name or click the **Setting** icon .
The **Setting** pop-up window is displayed.


Figure 175: Setting



3. Select the required edge from the options displayed and choose the required color for the edge using the **Select Color** option.

4. Click **OK**.

The selected edge is displayed on the graph pipeline

5. To add attributes to the edge, click **Add** icon .

The **Add Edge Modeler Attribute(s)** screen is displayed.

Figure 176: Add Edge Modeler Attribute(s)

- In the **Logical Name** field, enter the logical name for the edge attribute.
This field is mandatory.
6. In the **Data Type** drop-down, select the data type based on your requirements.
The available data types are Text, Number, and Date. This field is mandatory.
Based on the data type selection, the following input field is displayed.
For example, the **Maximum Length of Text** field is displayed if the data type is selected as Text.
 7. Enter the data and click **OK**.
The edge attribute is displayed on the Edge Details page.

Figure 177: Search

Logical Name	Data Type	Format	Action
Test	Text	Maximum Length of Text 30	

By clicking on the **Add** icon, you can add any number of edge attributes based on your requirements.

Or

Figure 178: Edge details

Logical Name	Data Type	Format
Edge ID	Number	22
Source ID	Text	100
Target ID	Text	100
Label	Text	100
Source	Text	100

8. Drag the toggle button to **Is Similarity Edge** in the Edge Modeler Attributes Section to add the pre-defined set of attributes available in the edge.

Similarity edges in the graph are created by Match Rules. If the edge is defined using Match Rule (under Manage Pipeline, by selecting Match Rule from drop down), the toggle button should be enable to make it a Similarity edge.

9. Under the **Advanced Features** group, you can specify the Edge Retention Policy.
For example, An Edge Retention Policy of 7 Days specifies that the edge latest 7 days of data will be maintained in this edge.
10. Enter the retention count and select the retention duration from the drop-down.
The available retention durations are Days, Weeks, and Months.

Figure 179: Retention Policy

11. Enable the **Pluggable Attribute**, then the corresponding drop-down will contain the list of attributes of the Edge.

Pluggable edges are those edges whose data can be directly plugged in to the graph. In Financial Crime and Compliance domain, Transaction is a pluggable edge, which is generally large and is difficult to find out difference/ delta between two subsequent loads. Hence, it's data is provided

for a range of dates which can be directly plugged in to the PGX memory while refreshing the graph.

Any pluggable edge should have an identifier attribute, which is of “Date” data type.

Figure 180: Pluggable Attribute



12. Under the **Key Attributes** field, select the Column, Start, and End identifier from the respective Identifier drop-down. Without these attributes, an edge cannot be created.

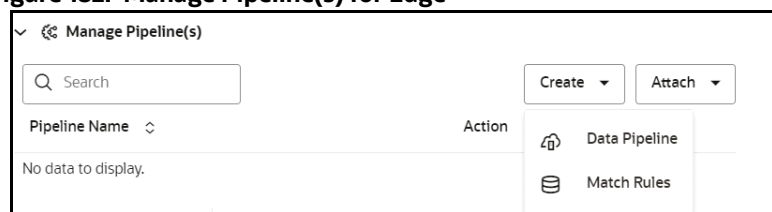
All the created edge attributes are displayed under this drop-down.

Figure 181: Key Attributes



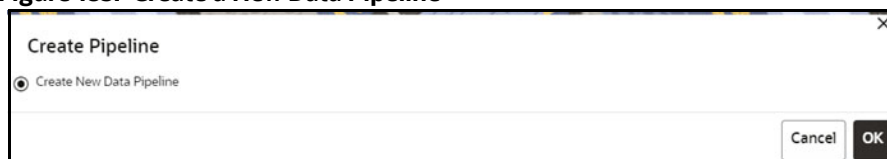
13. Under the **Manage Pipeline(s)** group, you can either create a new data pipeline if the edge is coming from source data and Match Rules, if a similarity edge is to be created between nodes or attach the existing pipeline and Match Rules.

Figure 182: Manage Pipeline(s) for Edge



14. Click **Create** drop-down and then select the **Data Pipeline**. The **Create Pipeline** window is displayed.

Figure 183: Create a New Data Pipeline



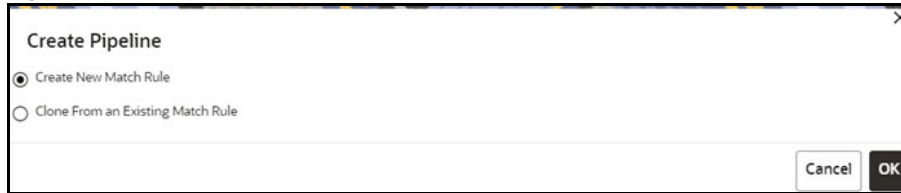
15. Select the **Create New Data Pipeline** option and then click **OK**. The Pipeline Designer page is displayed.
 - To create a new data pipeline, see the [Creating a New Data Pipeline](#) section.

NOTE

The Persist of the Data pipeline of the corresponding edge should be defined with the prescript. See the **Prescript Condition** section in the [OFS Compliance Studio Administration and Configuration Guide](#).

16. Click **Create** drop-down and then select the **Match Rules** from the Manage Pipeline(s) group. The **Create Pipeline** window is displayed.

Figure 184: Create a New Match Rule



17. Select the **Create New Match Rule** option and then click **OK**. The **Create Match Ruleset** window is displayed.
 - To create a new Match Rule, see the [Creating Ruleset \(Match/Merge\)](#) section.

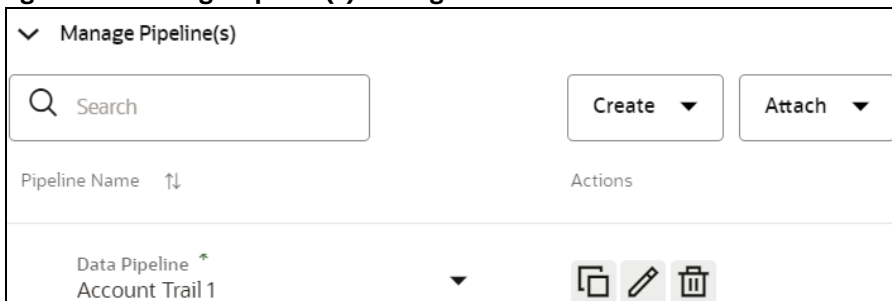
Or

 - To clone from an existing match rule, see the [Cloning Ruleset \(Match\)](#) section.

NOTE The newly created data pipeline and match rule are not automatically added to the edge. You must attach using the **Attach** drop-down option.

The selected data pipeline/match rule is displayed.

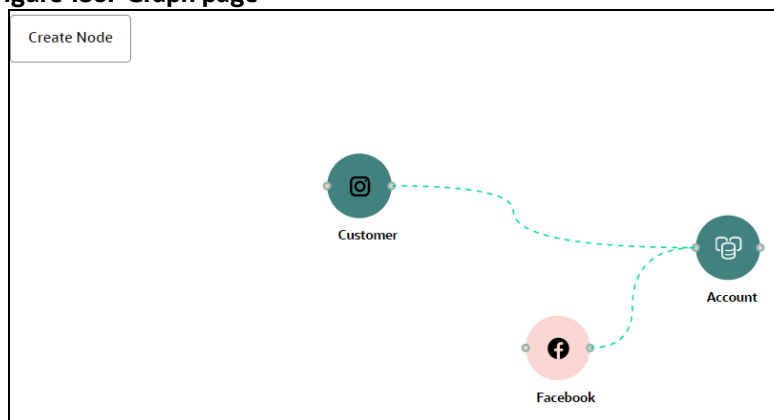
Figure 185: Manage Pipeline(s) for Edge



By clicking on the **Attach** drop-down, you can add any number of data pipelines/match rules to the Node-based on your requirements.




18. Click **OK**.
An Edge is created between the Customer, Facebook, and Account.

Figure 186: Graph page



7.6.1.4 Zoom In and Zoom Out

You can zoom in or zoom out of the graph pipeline and view the data pipelines using the diagram present in the bottom right corner of the page.

- Click  to zoom in on the graph pipeline.
- Click  to zoom out the graph pipeline.
- Click  to view the data pipelines.

7.6.1.5 Editing a Graph Pipeline

To edit a graph pipeline, perform these steps.

1. In the **Graph Summary** page, select the graph pipeline you want to edit, click the **Action** icon, and select **Edit**.
2. In the **Graph Name** field, modify the graph pipeline name.
The name must be unique to a particular workspace.


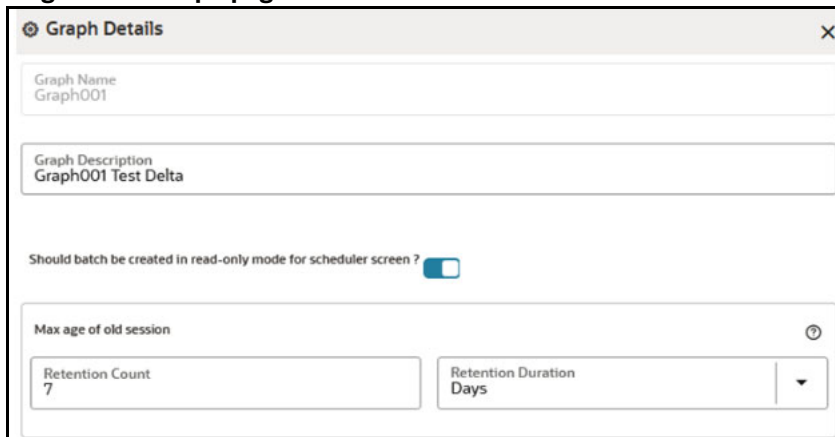
3. Click Setting  icon.
4. In the **Graph Description** field, enter the description for the graph pipeline and click **Save**.
The following page is displayed.


Figure 187: Graph page



The screenshot shows a 'Graph Details' dialog box with the following fields and controls:

- Graph Name:** Graph001
- Graph Description:** Graph001 Test Delta
- Should batch be created in read-only mode for scheduler screen?:**
- Max age of old session:**
 - Retention Count:** 7
 - Retention Duration:** Days

The Maximum Age of Old session for a graph is 7 days by default. The Maximim age of old session of 7 days specifies that graph would be retained for a period of 7 days. You can modify

the description and Max Age of Old session by clicking on the Setting  icon. If you want the batch to be created in read-only mode for scheduler screen, enable the option.

5. Click **Save**.

The user session of the Graph Pipeline will get refreshed after the set timeline.

7.6.1.6 Deleting a Graph Pipeline

To delete a graph pipeline, perform these steps.

1. On the **Graph Summary** page, select the graph pipeline you want to delete, click the **Action** icon, and select **Delete**.

To delete multiple graph pipelines, select the graph pipelines which you want to delete and click



delete icon in the Header.

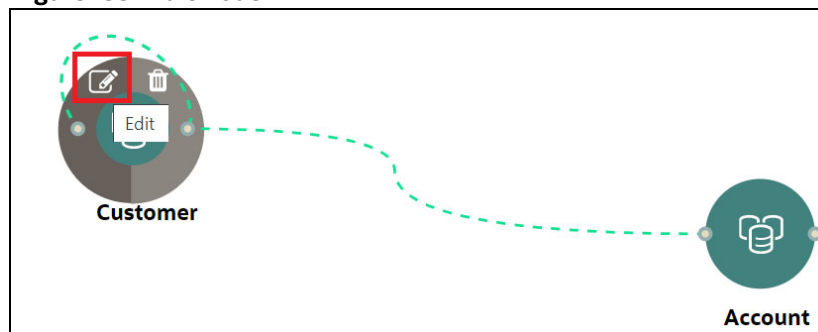
7.6.1.7 Editing a Node

To edit a node, perform these steps.

1. On the **Graph Summary** page, select the graph pipeline you want to edit, click the **Action** icon, and select **Edit**.
2. Hover over the graph pipeline and click **Edit** icon.

The Node Details page is displayed.

Figure 188: Edit Node



3. Perform the steps from 3 to 12 in the [Creating a Node](#) section.

NOTE

If you delete any attribute in the Node Modeler Attribute section of the Node Details page, you must delete the same attribute in the match rule details.

For example,

If the edge has two match rules and one is attached, and another match rule is not attached to the edge details. You need to remove attributes in both math rules for this case. To remove the deleted attribute from the Node Details page in the unattached match rule, perform the following:

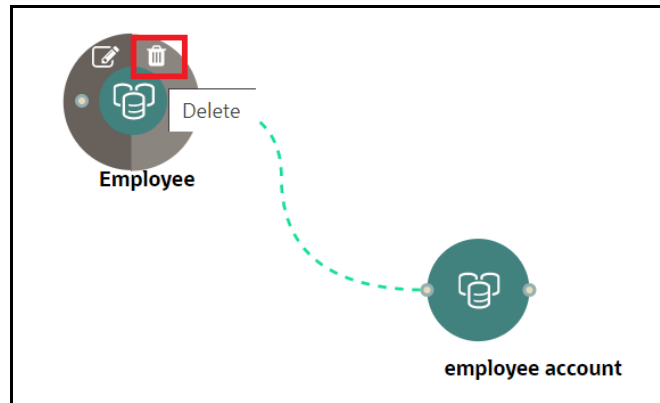
1. Navigate to **Edge Details > Manage Pipeline(s) > Attach**. Attach the new match rule, which is not attached to the node details.
2. Click **Edit** icon and delete the attribute in the Ruleset Details, which is removed from the Node Details page.
3. Click **Save**. The attribute is removed.
4. Click **Delete** in Manage Pipeline(s) of the Edge Details page to remove the attached match rule.
5. After saving in the Edge Details page, navigate to the Node Details page and delete the attribute again.
6. Click **OK**. The attribute is removed from the node.

7.6.1.8 Deleting a Node

To delete a node, perform these steps.

1. On the **Graph Summary** page, select the graph pipeline you want to edit, click the **Action** icon, and select **Edit**.
2. Hover over the graph pipeline and click **Delete** icon.

Figure 189: Delete Node



A confirmation dialog is displayed.

3. Click **Delete**.
The Node is deleted.

7.6.2 Schedule Details

To create a schedule details, perform these steps:


1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **Modeling > Graphs** .
This displays the graph pipeline in a table.
3. Click on the graph for which you want to create refresh schedule.
The **Graph Model** page is displayed.
4. Navigate to **Schedule Details** page and click **Add Schedule**.
The **Manage Schedule** screen is displayed.

Figure 190: Manage Schedule

Manage Schedule

Basic Information

Schedule Name Required

Schedule Type

Once Daily Weekly Monthly Cron

Start Date
02/27/2023

Run Time
12:00 AM

Select Data Pipelines

Selected Data Pipelines Required

Select Load Index

Select Load Index

Cancel Next

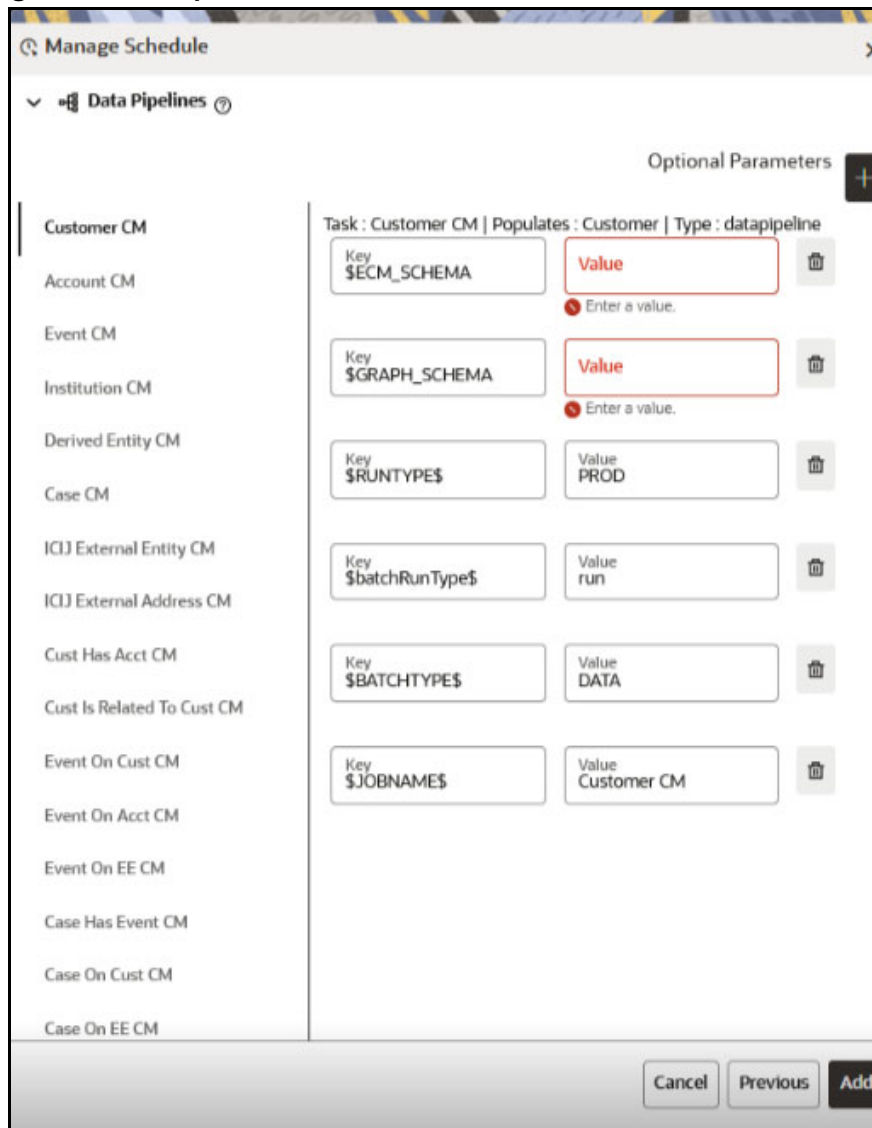
5. In the **Schedule Name**, enter the desired name.
6. Select the **Schedule Type** from the options.

Based on the schedule type, the following input field is displayed.

NOTE For more details and expressions of cron schedule type, click the **help** icon.

7. Select the **Data Pipelines** from the drop-down.
The load index will be attached based on the selected Data pipelines in the **Select Load Index** field.
8. Click **Next**. The following page is displayed.

Figure 191: Add Optional Parameters



NOTE For BD graph, \$BD_SCHEMA must be selected as the key value for the optional parameter. Similarly, for ECM graph, \$ECM_SCHEMA must be selected as the key value for the optional parameter.

9. Click + icon to add optional parameters for the selected task.

For the Pre-configured Data pipeline, respective Key fields will be displayed. You can configure the respective key-value in the Value field as required and specified in the [Table 37](#):

Table 37: Optional Parameters for Data Pipeline

Name	Description	Default Value
\$GRAPH_SCHEMA	Oracle wallet alias of graph schema. Navigate to <OFS_COMPLIANCE_STUDIO>/wallet/ tnsnames.ora and check the Graph Schema alias name. For example, graph_schema_alias	
\$BD_SCHEMA	Oracle wallet alias of BD schema. Navigate to <OFS_COMPLIANCE_STUDIO>/wallet/ tnsnames.ora and check the BD Schema alias name. For example, BD_schema_alias	
\$ECM_SCHEMA	Oracle wallet alias of ECM schema. Navigate to <OFS_COMPLIANCE_STUDIO>/wallet/ tnsnames.ora and check the ECM Schema alias name. For example, ecm_schema_alias	
\$RUNTYPE\$	Indicates Run type. It can be either a production batch or a test batch. If it is a production batch, set it as PROD and TEST for the test batch.	PROD
\$batchRunType\$	Indicates Batch Run type. It can be either run or re-run. If it needs to execute once, set it as RUN and RE-RUN for re-executing after failure.	RUN
\$BATCHTYPE\$	Indicates the batch type. It should be DATA for the data pipeline task.	DATA
\$JOBNAME\$	Name of the data pipeline to be executed.	

Figure 192: Load Index

Load Index ⓘ

Optional Parameters +

Institution Graph

Task : Institution Graph | Populates : Institution | Type : loadindex

Key datasource Value Required

Key loadType Value Required

Key indexName Value Institution Graph

For the Pre-configured load index, respective Key fields will be displayed.

- You can configure the respective key-value in the Value field as required and specified in the [Table 38](#).

Table 38: Parameter for Load Index

Name	Description	Default Value
datasource	<p>Datasource of the graph schema that is attached to the Compliance Studio workspace.</p> <p>NOTE: An entry should be added in the <code>resources.xml</code> file for the value provided in the <code>datasource</code> parameter. For more information about <code>resources.xml</code> file, see the Configure the resources.xml for Graph Schema section in the OFS Compliance Studio Installation Guide.</p>	
loadType	<p>Execution Load Type. Available types are full load and delta load.</p> <p>NOTE: In this release, only the delta load is supported.</p>	DeltaLoad
indexName	<p>Index name for the graph.</p> <p>NOTE: By default, index name will be added from the graph pipeline.</p>	

- To add Match Rules, enable the **Process Matching Rule** option and click **+** icon to add optional parameters.

For more information on Match Rule, see the [Creating Ruleset \(Match/Merge\)](#) section.

Figure 193: Process Matching Rule

Process Matching Rule ?

Optional Parameters +

Match_Rule

Task : Match_Rule | Populates : FINANCIAL_CRIME_GLOBAL_GRAPH |
Type : matchingservice

Key: datasource | Value: [] Required

Key: processingGroupName | Value: [] Required

Key: basedOnPipelineId | Value: [] Required

Key: runType | Value: [] Required

Key: loadType | Value: [] Required

For the Pre-configured Match Rules, respective Key fields will be displayed. You can configure the respective key-value in the Value field as required and specified in the [Table 39](#):

Table 39: Optional Parameter for Match Rules

Name	Description	Default Value
datasource	Datasource of the graph schema that is attached to the Compliance Studio workspace. NOTE: An entry should be added in the <code>resources.xml</code> file for the value provided in the <code>datasource</code> parameter. For more information about <code>resources.xml</code> file, see the Configure the resources.xml for Graph Schema section in the OFS Compliance Studio Installation Guide .	
loadType	Execution Load Type. Available types are full and delta. In this release, only the full mode is supported.	full
processingGroupName	Logical processing group name for the batch. You should set it as MAN.	MAN
basedOnPipelineId	Match rules can be executed based on pipeline Ids or ruleset Ids. The value should be true while running from the Graph.	true

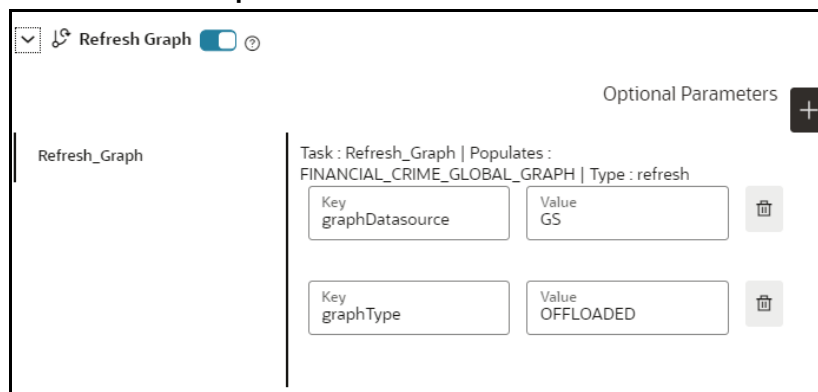
Table 39: Optional Parameter for Match Rules

Name	Description	Default Value
runType	Indicates matching job that can be executed as part of graph or Entity Resolution. It should be set as Graph.	graph

12. Enable the **Refresh Graph** option and click **Add** icon to refresh the Graph to add optional parameters.

NOTE The Key and Value parameters are not required.

Figure 194: Refresh Graph



- NOTE**
- If you do not enable the Refresh Graph option, the pipeline will add nodes and edges to the graph schema but does not load into PGX.
 - For more information about **offloaded** graph type, see the [Using Subgraph Off loaded Graphs](#) section.

You can configure the respective key-value in the Value field as required and specified in the [Table 40](#).

Table 40: Parameter for Graph

Name	Description	Default Value
graphDatasource	Datasource of the graph schema that is attached to the Compliance Studio workspace. NOTE: An entry should be added in the <code>resources.xml</code> file for the value provided in the datasource parameter. For more information about <code>resources.xml</code> file, see the Configure the resources.xml for Graph Schema section in the OFS Compliance Studio Installation Guide .	

Table 40: Parameter for Graph

Name	Description	Default Value
graphType	<p>Execution Graph Type. Available types are OFFLOADED and IN-MEMORY.</p> <ul style="list-style-type: none"> • IN-MEMORY: It collects all the data from the nodes and edge tables and it will be transformed into the Oracle Graph Analytics Engine (PGX). • OFFLOADED: It creates only metadata of the executed PGQL query instead of loading the entire graph into the PGX server. <p>For more information about offloaded graph type, see the Using Subgraph Off loaded Graphs section.</p>	OFFLOADED

13. Click **Add**. The schedule is added to respective graph.
The batch will be executed based on the schedule type.
The batch can be executed via Scheduler. For more information, see the [Schedule Batch](#) section.

7.6.3 Audit History

At any time, you can audit the Graphs from the Audit History page. This page provides the events on the Graph. This shows the information such as, when the Graph was created, who created the Graph and its status, and so on.

The sequence of actions performed on the Graph is listed in the table view and the timeline view (graphical representation).

To view the audit history of the Graph, follow these steps:


1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **Modeling > Graphs** .
This displays the graph pipeline in a table.
3. Click on the graph for which you want to view the audit history.
The **Graph Model** page is displayed.
4. Navigate to **Audit History** page to view the details.

Figure 195: Audit History



- Click **Audit Timeline View** for Timeline View and **Audit Table View** to switch to the regular view. Click **Refresh** to refresh the Audit History.

Figure 196: Audit History window Timeline View with Horizontal Time Axis



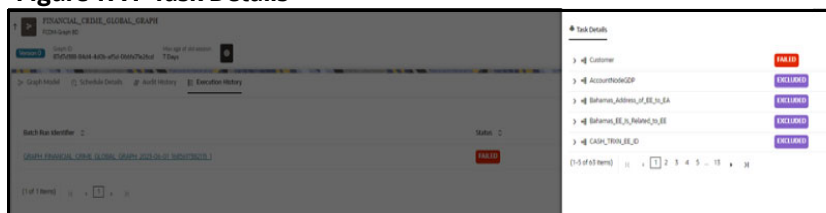
7.6.4 Execution History

To view the Graph Execution History, perform the following steps:

- Click **Launch Workspace** next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
- In the Mega menu, click **Modeling > Graphs** .
This displays the graph pipeline in a table.
- Click on the graph for which you want to view the execution history.
The **Graph Model** page is displayed.
- Navigate to **Execution History** page to view the details.

This window displays the details such as Batch Run Identifier, Status, Start and end time of the execution. Click on the Batch Run Identifier to view the individual task details.

Figure 197: Task Details



7.6.5 Analyses

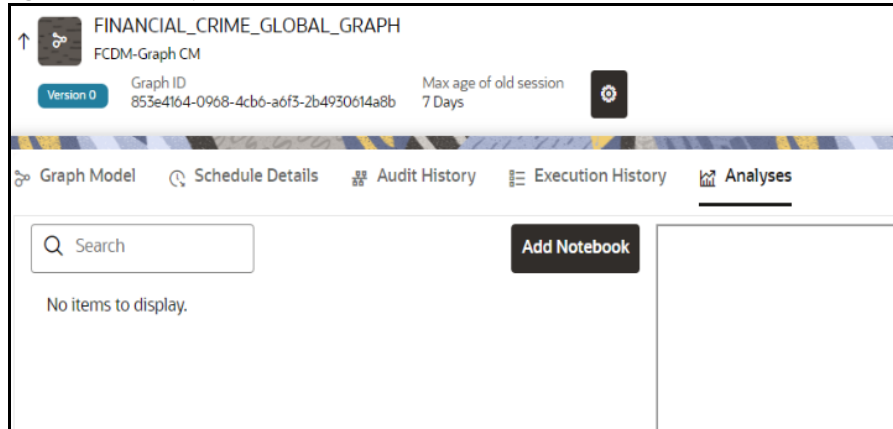
You can analyse and add a notebook from this page.

To analyse the Graph, perform the following steps:

- Click **Launch Workspace** next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.

2. In the Mega menu, click **Modeling > Graphs** .
This displays the graph pipeline in a table.
3. Navigate to **Analyses** page to view the details.

Figure 198: Analyses



8 Orchestration

The Orchestration component contains the following features:

- **Scheduler Dashboard:** Get an overview of scheduled tasks and processes.
- **Define Batch:** Manage and configure batch definitions.
- **Define Taks:** Create tasks, configure parameters and set execution dependencies within a batch process.
- **Schedule Batch:** Set execution schedules for your batch processes.
- **Monitor Batch:** Track and monitor batch process executions.

8.1 Scheduler Service

The Scheduler Service automates the running of models in the Compliance Studio application.

The Scheduler Service contains a graphical user interface and a single control point for defining and monitoring background executions.


The Scheduler Service is a service in the Infrastructure system that automates behind-the-scenes work that is necessary to sustain various enterprise applications and functionalities. This automation helps the applications to control unattended background jobs program execution.

The Scheduler Service contains a graphical user interface and a single point of control for the definition and monitoring of background executions.

Following are the concepts or terminologies in the Scheduler Service:

- **Batch:** Date and time-based execution of the background tasks based on a defined period during which the resources were available for batch processing.
- **Job:** A batch job is a piece of a program meant to meet specific and business-critical functions. The program is a RESTful API used in a batch.
- **Job Dependency:** When the batch job is submitted, it is moved to the job queue until the system is ready to process. The system processes the job based on chronological order or priority in case if more jobs are required to be executed in the job queue.
- **Schedule:** Batch jobs are used to automate the tasks that require to be performed on a regular basis but don't necessarily need to occur during the day or have an employee interacted with the system are batch schedule. Jobs that happen on a regular basis are incorporated into batch schedules.
- **Monitor:** The Scheduler Service enables you to monitor your executions by using a web-browser. It provides real-time feedback on the status of the current encoding job and lists the jobs pending in the batch. You can Cancel or Restart the service when required.

8.1.1 Scheduler Dashboard

1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **CS Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **Orchestration > Scheduler Dashboard**.
This displays the executed runs in a table.

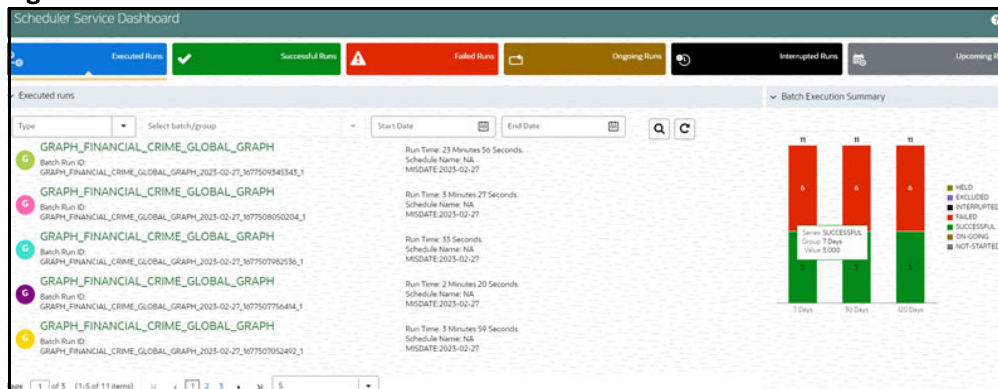
To view the demonstration of the Dashboard window, see the [Scheduler Service Introduction](#) video.

In the Scheduler Service window, you can view the following details:

- The *Executed Runs*, *Successful Runs*, *Failed Runs*, *Ongoing Runs*, *Interrupted Runs*, and *Upcoming Runs* tabs. You can click the tabs to view the details of the Batches based on their status. For example, click **Ongoing Runs** to view the details of the batches that are currently running.
- The Batches that were executed within the last 7 or 30 days contain details such as Batch Name, Batch Run ID, and Run Time. Click **30 days** to view the batches that were executed within the last 30 days.
- The **Batch execution Summary** pane displays the count of total batches executed that were executed within the last 7 days, 30 days, and 120 days. Additionally, you can see the separate count of successful batches, failed batches, interrupted batches, on-going batches, and the batches which are yet to start, by hovering your mouse the batches.

You can filter the executed runs based on Batch type, Batch/ group, start date and end date by selecting the corresponding options.

Figure 199: Scheduler Service Dashboard

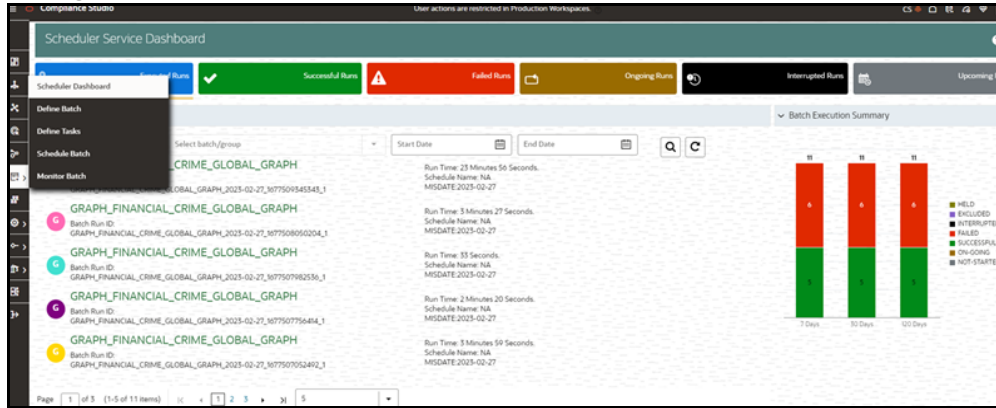


8.1.1.1 Header Details

The Header Details in the **Scheduler Service** window is displayed as shown and it has the following options.

- **Menu Navigation:** Shows the menu options available in Scheduler Service.
- **Quick Actions:** Quick actions can be performed by using the buttons in this section.
- **User Details:** The User details are displayed, you can view the help, set your profile preferences.

Figure 200: Header Details




On the left side of the window, click the **Scheduler Service** icon to see the different option in the Scheduler Service.

8.1.2 Define Batch

The **Define Batch** window displays the details of all existing **Batch** like Batch ID, Batch Name, Batch Description, Last Modified By and Last Modified Date. This window allows you to create a new, edit, copy, and delete the batches. You can also create a **Batch Group** and execute the Batch Group which has the list of batches that you have selected and grouped.

To navigate to the Define Batch window, click Define Batch option from the Header in the Dashboard

window. After selecting the batch, you can select the  icon corresponding to the batch to proceed to create or edit tasks.

8.1.2.1 Batch

Batch is a process of execution of the Date and time-based background tasks based on a defined period during which the resources were available for batch processing.

8.1.2.1.1 Create a Batch

You can create a new batch in the Define Batch Window and schedule and monitor the batch that you created.

To create a new Batch, perform the following steps:


1. In the Define Batch window, click  .
The **Create a New Batch** window is displayed.
2. Specify the details as tabulated in the Create a New Batch window as described in the [Table 41](#).

Table 41: Fields in the Create a New Batch window and their Description

Field	Description
Batch Details	

Table 41: Fields in the Create a New Batch window and their Description

Field	Description
Batch Name	The Batch Name is generated based on the values provided by you. NOTE: <ul style="list-style-type: none"> The Batch Name should be unique across the Information Domain. The Batch Name must be alphanumeric and should not start with a number. The Batch Name should not exceed 60 characters in length. The Batch Name should not contain any special characters except “_”.
Batch Description	Enter a description for the Batch based on the Batch Name. NOTE: The Batch description should be alphanumeric. The allowed special characters are _ : - and <blank space>, along with spaces and alpha-numeric. It should not exceed 200 characters in length.
Service URL Name/ Service URL	<ul style="list-style-type: none"> Select the Service URL name from the drop-down list, if it is available. The Service URL is displayed in the Service URL field. To add a new service URL, enter a name to identify it in the Service URL Name field and enter the proper URL in the Service URL field. You can give partial URL here and the remaining URL in the Task Service URL.

3. From the Batch Parameters pane, click  to add a new Batch Parameter. By default, \$FICMISDATE\$ and \$BATCHRUNID\$ are added as Batch parameters.

TIP Enclose the parameter value for a run time with \$ symbol. For example, \$paramName\$.

- Enter the Parameter name in the **Param Name** field.
- Enter the Parameter value in the **Param Value** field.

You can delete a parameter by clicking  corresponding to the parameter.

4. Click **Save**.


The new Batch is created and displayed in the **Define Batch** window.

8.1.2.1.2 Edit a Batch

The **Edit Batch** option allows you to edit the Batch details such as Batch Description, Service URL Name and Service URL and also add a new Batch Parameter.

NOTE Seeded batches cannot be edited.


To modify a Batch, perform the following steps:

1. In the **Define Batch** window, click  corresponding to the Batch you want to modify.
The **Edit Batch** window is displayed.
2. Modify the required Batch details. For more information, see [Create a Batch](#) section.
3. Click **Save**.
The edited batch is saved and displayed in the **Define Batch** window.

8.1.2.1.3 Copy a Batch

The **Copy Batch** option allows you to copy a Batch that you want to clone or create instances in the system from the **Define Batch** window.

To copy a Batch, perform the following steps:


1. In the **Define Batch** window, click  corresponding to the Batch that you want to copy.
The **Copy Batch** window is displayed.
2. Specify the Batch details as you want to clone and copy the existing batch.
For more information, see [Create a Batch](#) section.
3. Click **Save**.
The copied batch is saved and displayed in the **Define Batch** window.

8.1.2.1.4 Delete a Batch

The **Delete Batch** option allows you to delete a Batch that are no longer required in the system from the **Define Batch** window.

NOTE Seeded batches cannot be deleted.

To delete a Batch, perform the following steps:

1. From the **Define Batch** window, click  corresponding to the Batch you want to delete.
2. Click **OK** in the confirmation dialog to confirm deletion. If the batch has any active schedules a warning is displayed.
Upon confirmation, all schedules of the batch are also deleted.


8.1.2.2 Batch Group

Batch Group is a process of grouping the batches that are required to be execute together for execution of the Date and time-based background tasks based on a defined period during which the resources were available for batch processing.

8.1.2.2.1 Create a Batch Group

You can create a new batch group in the Define Batch window and schedule and monitor the batch group that you created.

To create a new Batch Group, perform the following steps:

1. In the Define Batch window, click .
The **Create a New Batch** window is displayed.
2. Select Batch Group option.
3. Specify the following fields:
 - Name
 - Description
 - Add Batches

NOTE


The Add Batches is a multi-select field, you can select the batches that you want to add to the group using this field.

4. Click **Save**.
The new Batch Group is created and displayed in the **Define Batch** window.

8.1.2.2.2 Edit a Batch Group

The **Edit Batch Group** option allows you to edit the Batch Group details such as Batch Group name, Added Batches, and Batch Group Description.


To modify a Batch Group, perform the following steps:

1. In the **Define Batch** window, click Batch Group option to list the batch groups.
2. Click  corresponding to the Batch Group you want to modify.
The **Edit Batch** window is displayed.
3. Modify the required Batch Group details.
For more information, see [Create a Batch Group](#) section.
4. Click **Save**.
The edited batch group is saved and displayed in the **Define Batch** window.

8.1.2.2.3 Copy a Batch Group

The **Copy Batch** option allows you to copy a Batch that you want to clone or create instances in the system from the **Define Batch** window.

To copy a Batch Group, perform the following steps:

1. In the **Define Batch** window, click Batch Group option to list the batch groups.
2. Click  corresponding to the Batch Group that you want to copy.
The **Copy Batch** window is displayed.
3. Specify the Batch Details as you want to clone and copy the existing batch.
For more information, see [Create a Batch Group](#) section.


4. Click **Save**.

The copied batch group is saved and displayed in the **Define Batch** window.

8.1.2.2.4 Delete a Batch Group


The **Delete Batch** option allows you to delete a Batch that are no longer required in the system from the **Define Batch** window.

To delete a Batch Group, perform the following steps:

1. From the **Define Batch** window, click Batch Group option to list the batch groups.
2. Click  corresponding to the Batch Group you want to delete.
3. Click OK in the confirmation dialog to confirm deletion.

8.1.3 Define Tasks

The **Define Tasks** window displays the list of tasks associated with a specific Batch definition. You can create new tasks, edit the existing tasks or delete unwanted tasks. Additionally, you can specify task

precedence for each task in Task Precedence window and click the Schedule  icon to Schedule the batch.

The **Define Tasks** window allows you to perform the following task operations for your batch and batch group:

- **Batch**
- **Batch Group**

8.1.3.1 Batch


Batch is a process of execution of the Date and time-based background tasks based on a defined period during which the resources were available for batch processing. You can perform the following operation for the batch based on the task.

- **Add a Task**
- **Modify a Task**
- **Define Task Precedence**
- **Delete a Task**

8.1.3.1.1 Add a Task

Adding a new task option allows you to add new tasks to a selected Batch definition.

To add new task, perform the following steps:



1. Click **Define Tasks** from the Header panel.
The **Define Task** window is displayed.
2. Select the Batch for which you want to add new task from the **Select** drop-down list.
3. Click Add .

The **Create a New Task** window is displayed.

- Enter the details in the [Table 42](#):

Table 42: Fields in the Create a New Task window and their Description

Field	Description
Task Details	
Task Name	Enter the task name. NOTE: <ul style="list-style-type: none"> The Task Name must be alphanumeric and should not start with a number. The Task Name should not exceed 60 characters in length. The Task Name should not contain any special characters except underscore (_).
Task Description	<ul style="list-style-type: none"> Enter the task description along with spaces and alpha-numeric. No special characters are allowed in Task Description. Words like Select From or Delete From should not be entered in the Description.
Task Type	Select the task type from the drop-down list.
Batch Service URL	Select the required Batch Service URL from the drop-down list. This can be blank, and you can provide the full URL in the Task Service URL field.
Task Service URL	Enter task service URL if it is different from Batch Service URL.

- From the *Task Parameters* pane, click Add  to add a new Task Parameter. By default, all Batch level parameters are added and enabled as task parameters. To disable, deselect the check box corresponding to the task parameter ()
 - Enter the Parameter name in the **Param Name** field.
 - Enter the Parameter value in the **Param Value** field.


You can delete a parameter by clicking  corresponding to the parameter.

- Click **Save**.

8.1.3.1.2 Modify a Task

Modifying a task option allows you to modify the details of existing tasks of a Batch definition such as Task Description, Task Type, Batch Service URL and Task Service URL. You can also add a new task parameter and enable or disable already existing task parameters.

To modify a Task, perform the following steps:

- From the **Define Task** window, select the Batch whose task details you want to modify, from the **Select** drop-down list.
- Click Edit  corresponding to the Task whose details you want to modify.
The **Edit Task** window is displayed.

3. Modify the required Task Details.
For more information, see [Add a Task](#) section.
4. Click **Save**.


8.1.3.1.3 Define Task Precedence

Task Precedence indicates the execution-flow of a Batch. Task Precedence value facilitates you to determine the order in which the specific Tasks of a Batch are executed.





For example, consider a Batch consisting of 4 Task. The first 3 Task does not have a precedence defined and hence will be executed simultaneously during the Batch execution. But, Task 4 has a precedence value as task 1 which indicates that, Task 4 is executed only after Task 1 has been successfully executed.

You can set Task precedence between Tasks or define to run a Task after a set of other tasks. However, multiple tasks can be executed simultaneously, and cyclical execution of tasks is not permitted. If the precedence for a Task is not set, the Task is executed immediately on Batch execution.

To define the task precedence in the *Define Task* window, perform the following steps:

1. Click Menu  button corresponding to the task for which you want to add precedence task.
The **Task Precedence Mapping** window is displayed.

NOTE The Task Precedence option is disabled if a batch has only one task associated.


- a. Select the Task you want to execute before the current task, from the **Available Tasks** pane and click . You can press Ctrl key for multiple selections.
 - b. To select all the listed Tasks, click .
 - c. To remove a Task, select the task from the *Selected Tasks* pane and click .
 - d. To remove all the selected Tasks, click .
2. Click **Save** to update Task Precedence.
 3. Click **Preview** to view the Precedence information.

8.1.3.1.4 Delete a Task

You can remove a task from a Batch definition which are no longer required in the system by deleting it from the **Define Task** window.

To delete a Task, perform the following steps:

1. From the **Define Task** window, select the Batch whose task details you want to delete from the **Select** drop-down list.

2. Click Delete  corresponding to the Task you want to delete.
3. Click **OK** in the confirmation dialog to confirm deletion.

8.1.3.2 Batch Group

Batch Group is a process of grouping the batches that are required to be execute together for execution of the Date and time-based background tasks based on a defined period during which the resources were available for batch processing. You can perform the following operation for the batch based on the task.

- **Define Task Precedence**


8.1.3.2.1 Define Task Precedence

Task Precedence indicates the execution-flow of a Batch. Task Precedence value facilitates you to determine the order in which the specific Tasks of a Batch are executed.





For example, consider a Batch consisting of 4 Task. The first 3 Task does not have a precedence defined and hence will be executed simultaneously during the Batch execution. But, Task 4 has a precedence value as task 1 which indicates that, Task 4 is executed only after Task 1 has been successfully executed.

You can set Task precedence between Tasks or define to run a Task after a set of other tasks. However, multiple tasks can be executed simultaneously, and cyclical execution of tasks is not permitted. If the precedence for a Task is not set, the Task is executed immediately on Batch execution.

To define the task precedence in the *Define Task* window, perform the following steps:

1. Click Menu  button corresponding to the task for which you want to add precedence task. The **Task Precedence Mapping** window is displayed.

NOTE The Task Precedence option is disabled if a batch has only one task associated.

- a. Select the batch that you want to execute before the current task, from the **Available Tasks** pane and click . You can press Ctrl key for multiple selections.
 - b. To select all the listed batches, click .
 - c. To remove a batch, select the task from the **Selected Tasks** pane and click .
 - d. To remove all the selected batches, click .
2. Click **Save** to update Task Precedence in the batches.
 3. Click **Preview** to view the Precedence information.

8.1.4 Schedule Batch

The *Schedule Batch* window facilitates you to run, schedule, re-start, re-run the batches in the Scheduler Service. After you upload the data in the required format into the Object Storage, you must load the data into the system using the Scheduler Service. You can schedule them to run in a required pattern and view the run time status of the scheduled services using the Monitor Batch feature.

The **Schedule Batch** window allows you to perform the following operations for your batch and batch group:

- [Batch](#)
- [Batch Group](#)

8.1.4.1 Batch

Batch is a process of execution of the Date and time-based background tasks based on a defined period during which the resources were available for batch processing. You can perform the following operation for the batch:

- [Execute a Batch](#)
- [Schedule a Batch](#)
- [Re-start a Batch](#)
- [Re-run a Batch](#)
- [Edit Dynamic Parameters](#)
- [Task Definitions of a Batch](#)

8.1.4.1.1 Execute a Batch

The Execute batch option allows you to run a batch instantaneously. To execute a batch, perform the following steps:

1. Click **Schedule Batch** from the Header panel.
The **Schedule** window is displayed.
2. Select the Batch Name from the Select Name drop down menu.
For example, AMLDataLoad.

NOTE

Out-of-the-box FINANCIAL_CRIME_GLOBAL_GRAPH_BEHAVIOUR_DETECTION and FINANCIAL_CRIME_GLOBAL_GRAPH batches should not be triggered in parallel in the same server.

3. Click **Execute**.
The Execution Status Dialog Box is displayed with the Batch executed successfully message.
This indicates the unique identification reference number for the batch and date of the batch execution.
4. In the Execution Status Dialog Box, click Monitor to monitor the batch.
5. If you want to exclude/include some tasks, click **Exclude Tasks**. For more information, see [Exclude or Include Tasks](#) section.
6. If you want to hold/release some tasks, click **Hold Tasks**.

For more information, see [Hold or Release Tasks](#) section.



7. If you want to edit the dynamic parameters of the batch, click **Edit Dynamic Parameters**. For more information, see [Edit Dynamic Parameters](#) section.

8.1.4.1.2 Schedule a Batch

You can schedule a Batch to run just for [Schedule Once](#), [Schedule Daily](#), [Schedule Weekly](#), [Schedule Monthly](#) or [Schedule Cron Expression](#) for scheduling the batches. You can also have a user defined schedule to schedule and run a batch.




8.1.4.1.2.1 Schedule Once

To schedule a Batch to run once, perform the following steps:

1. Click **Schedule Batch** from the Header panel.
The **Schedule Batch** window is displayed.
2. In the **Schedule Batch** window, click **Once**.
3. Select the Batch or Batch Name you want to schedule for once from the Select drop down menu.
4. Enter a Schedule Name.
5. Click  and select the date on which you want to run the Batch.
6. Click  and select the time at which you want to run the Batch.
7. Click **Schedule**.

8.1.4.1.2.2 Schedule Daily




To schedule a Batch to run daily, perform the following steps:

1. In the **Schedule Batch** window, click **Daily**.
2. Select the Batch or Batch Name you want to schedule daily from the Select drop down menu.
3. Enter a **Schedule Name**.
4. Click  and select the start date from which you want to run the Batch.
5. Click  and select the end date till which you want to run the Batch.
6. Click  and select the time at which you want to run the Batch daily.
7. Click **Schedule**.

8.1.4.1.2.3 Schedule Weekly




To schedule a Batch to run weekly, perform the following steps:

1. In the **Schedule Batch** window, click **Weekly**.
2. Select the Batch or Batch Name you want to schedule weekly from the Select drop down menu.
3. Enter a Schedule Name.


4. Click  and select the start date from which you want to run the Batch.
5. Click  and select the end date till which you want to run the Batch.
6. Click  and select the time at which you want to run the Batch.
7. Select the days on a week you want to run the Batch from the Select Days of the Week multi-select drop down menu.
8. Click **Schedule**.

8.1.4.1.2.4 *Schedule Monthly*


To schedule a Batch to run monthly, perform the following steps:

1. In the **Schedule Batch** window, click **Monthly**.
2. Select the Batch or Batch Name you want to schedule monthly from the Select drop down menu.
3. Enter a Schedule Name.
4. Click  and select the start date from which you want to run the Batch.
5. Click  and select the end date till which you want to run the Batch.
6. Click  and select the time at which you want to run the Batch.
7. Select the months in a year you want to run the Batch from the Select Months of the Year multi-select drop down menu.
8. Select the day of the month that you want to run the Batch from the Select Day of the Month drop down menu.
9. Click **Schedule**.

8.1.4.1.2.5 *Schedule Cron Expression*

To run a Batch in a user-defined schedule, you can have custom schedule with the help of Cron Expression. A cron expression is a string comprised of 6 or 7 fields separated by white space. Fields can contain any of the allowed values, along with various combinations of the allowed special characters for that field. For more information, click  icon next to the Cron Expression field.

To schedule a Batch based on Cron Expression, perform the following steps

1. In the **Schedule Batch** window, click **Cron Expression**.
2. Select the Batch or Batch Name you want to schedule from the Select drop down menu.
3. Enter a **Schedule Name**.
4. Enter the Cron Expression for your schedule. For more information about the Cron Expression, click  icon next to the Cron Expression field.
5. Click **Schedule**.

8.1.4.1.2.6 Pausing a Batch

You can pause a Batch which has previously been executed. User can click on pause button and can pause schedule for between firing dates of schedules. Time is not supported for pause activity, if any schedule is pause for current date, pause will be effective from immediate of pause. if pause start date is passed user cannot change pause start date, rest field can be manipulated. end will be valid one minute before eod.

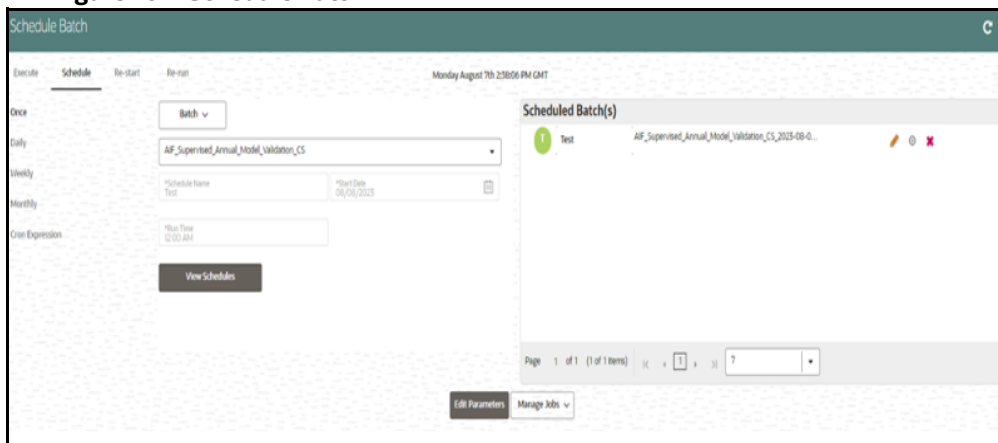
If pause is expired user cannot edit and delete but will shown in UI.

To pause a batch, perform the following steps:

1. From the Header panel, click **Schedule Batch** and then click the **Schedule** tab.
By default, Batch option is selected.
2. Select the Batch you want to pause from the drop down menu.
3. Based on the batch you have selected to pause, select the scheduling type from the LHS menu.
4. Click the View Schedules button.

The scheduled batches are displayed on the right pane.

Figure 201: Schedule Batch



5. Click the Pause icon on the batch which you want to pause.
6. In the Manage Pause screen, click Add Pause.
7. Select the Pause Start and End Date, add comments if required and click +.
The Pausing schedule appears in the Pause Summary.
8. Repeat the steps to add multiple pausing schedules for the same batch.

8.1.4.1.3 Re-start a Batch

You can restart a Batch which has not been executed successfully or which has been explicitly interrupted, or cancelled, or put on hold during the execution process. By restarting a Batch, you can continue Batch execution directly from the point of interruption or failure and complete executing the remaining tasks.

To re-start a batch, perform the following steps:

1. Click **Schedule Batch** from the Header panel.
The Schedule window is displayed.

2. From the **Schedule** window, select **Re-start** tab.
3. Select the Batch or Batch Name you want to re-start from the Select Name drop down menu.
4. Select the Batch Run ID.
5. Click **Re-start**.

8.1.4.1.4 Re-run a Batch

You can re-run a Batch which has previously been executed. Rerun Batch facilitates you to run the Batch irrespective of the previous execution state. A new Batch Run ID is generated during the Rerun process and the Batch is executed as similar to the new Batch Run.

To re-run a batch, perform the following steps:

1. Click **Schedule Batch** from the Header panel.
The **Schedule Batch** window is displayed.
2. In the **Schedule Batch** window, select **Re-run** tab.
3. Select the Batch or Batch Name you want to re-run from the Select Name drop down menu.
4. Select the Batch Run ID.
5. Click **Re-run**.

8.1.4.1.5 Edit Dynamic Parameters

Dynamic Parameters facilitates you to the modify the dynamic parameters for the batch. You can change the param value from the Edit Dynamic Params window and save the changes to the Batch. The Edit Dynamic Parameters option is available in all the tab in the *Schedule Batch* window.

To edit the dynamic parameters for a batch, perform the following steps:

1. In the **Schedule Batch** window, click Edit Dynamic Parameters.
The **Edit Dynamic Params** window is displayed.
2. In the **Edit Dynamic Params** window, modify the values as required.
3. Click **Save**.
The modified parameters are applied to the Batch.

8.1.4.1.6 Task Definitions of a Batch

You can modify the task definition state in the Batch Execution window to exclude or hold the defined task in a Batch from execution. The excluded tasks are therefore assumed to have completed execution and get excluded during the Batch Run.





While executing or scheduling a Batch from the **Schedule Batch** window, you can:

- Exclude a task or include the excluded task
- Hold a task or release the held task

8.1.4.1.6.1 Exclude or Include Tasks

You can exclude tasks or include the excluded tasks during Batch Execution. The excluded task components are therefore executed in the normal process assuming that the excluded task have completed execution.





To exclude/include tasks, perform the following steps:

1. In the **Schedule Batch** window, click **Exclude Tasks**.
The **Select Tasks** window is displayed.
2. To exclude tasks:
 - a. Select the required task from the **Included Tasks** list and click . You can press Ctrl key for multiple selections.
 - b. To exclude all tasks, click .
3. To include the excluded tasks:
 - a. Select the required task from the **Excluded Tasks** list and click . You can press Ctrl key for multiple selections.
 - b. To include all excluded tasks, click .
4. Click **Save**.

8.1.4.1.6.2 **Hold or Release Tasks**

You can hold tasks or release the held tasks during Batch Execution. The tasks which are on hold along with the defined components are skipped during execution. However, at least one task should be available in a Batch without being held/excluded for Batch execution.

To hold/release tasks, perform the following steps:

1. In the **Schedule Batch** window, click **Hold Tasks**.
The **Select Tasks** window is displayed.
2. To hold tasks:
 - a. Select the required task from the **Released Tasks** list and click . You can press Ctrl key for multiple selections.
 - b. To hold all tasks, click .
3. To release held tasks:
 - a. Select the required task from the **Held Tasks** list and click . You can press Ctrl key for multiple selections.
 - b. To release all held tasks, click .
4. Click **Save**.

8.1.4.2 Batch Group

Batch Group is a process of grouping the batches that are required to be execute together for execution of the Date and time-based background tasks based on a defined period during which the resources were available for batch processing. You can perform the following operation for the batch group:

- [Execute a Batch Group](#)
- [Schedule a Batch Group](#)
- [Re-start a Batch Group](#)
- [Re-run a Batch Group](#)
- [Edit Dynamic Parameters](#)
- [Task Definitions of a Batch Group](#)

8.1.4.2.1 Execute a Batch Group

The Execute batch option allows you to run a batch instantaneously. To execute a batch group, perform the following steps:

1. Click **Schedule Batch** from the Header panel.
The **Schedule** window is displayed.
2. Select the Batch Group from the Select Name drop down menu.
For example, AMLDataLoad.
3. Click **Execute**.
The Execution Status Dialog Box is displayed with the Batch executed successfully message.
This indicates the unique identification reference number for the batch and date of the batch execution.
4. In the Execution Status Dialog Box, click Monitor to monitor the batch.
5. If you want to exclude/include some tasks, click **Exclude Tasks**.
For more information, see [Exclude or Include Tasks](#) section.
6. If you want to hold/release some tasks, click **Hold Tasks**.
For more information, see [Hold or Release Tasks](#) section.
7. If you want to edit the dynamic parameters of the batch, click **Edit Dynamic Parameters**.
For more information, see [Edit Dynamic Parameters](#).



8.1.4.2.2 Schedule a Batch Group

You can schedule a Batch group to run just for [Schedule Once](#), [Schedule Daily](#), [Schedule Weekly](#), [Schedule Monthly](#) or [Schedule Cron Expression](#) for scheduling the batches. You can also have a user defined schedule to schedule and run a batch.

8.1.4.2.2.1 Schedule Once




To schedule a Batch to run once, perform the following steps:

1. Click **Schedule Batch** from the Header panel.
The **Schedule Batch** window is displayed.

2. In the **Schedule Batch** window, click **Once**.
3. Select the Batch Group you want to schedule for once from the Select drop down menu.
4. Enter a Schedule Name.
5. Click  and select the date on which you want to run the Batch.
6. Click  and select the time at which you want to run the Batch.
7. Click **Schedule**.




8.1.4.2.2.2 *Schedule Daily*

To schedule a Batch to run daily, perform the following steps:

1. In the **Schedule Batch** window, click **Daily**.
2. Select the Batch Group you want to schedule daily from the Select drop down menu.
3. Enter a **Schedule Name**.
4. Click  and select the start date from which you want to run the batch group.
5. Click  and select the end date till which you want to run the batch group.
6. Click  and select the time at which you want to run the batch group daily.
7. Click **Schedule**.

8.1.4.2.2.3 *Schedule Weekly*




To schedule a Batch to run weekly, perform the following steps:

1. In the **Schedule Batch** window, click **Weekly**.
2. Select the Batch Group you want to schedule weekly from the Select drop down menu.
3. Enter a Schedule Name.
4. Click  and select the start date from which you want to run the batch group.
5. Click  and select the end date till which you want to run the batch group.
6. Click  and select the time at which you want to run the batch group.
7. Select the days in a week you want to run the batch group from the Select Days of the Week multi-select drop down menu.
8. Click **Schedule**.


8.1.4.2.2.4 *Schedule Monthly*

To schedule a Batch to run monthly, perform the following steps:

1. In the **Schedule Batch** window, click **Monthly**.


2. Select the Batch Group you want to schedule monthly from the Select drop down menu.
3. Enter a Schedule Name.
4. Click  and select the start date from which you want to run the batch group.
5. Click  and select the end date till which you want to run the batch group.
6. Click  and select the time at which you want to run the batch group.
7. Select the months in a year you want to run the batch group from the Select Months of the Year multi-select drop down menu.
8. Select the day of the month that you want to run the batch group from the Select Day of the Month drop down menu.
9. Click **Schedule**.

8.1.4.2.2.5 Schedule Cron Expression

To run a Batch in a user-defined schedule, you can have custom schedule with the help of Cron Expression. A cron expression is a string comprised of 6 or 7 fields separated by white space. Fields can contain any of the allowed values, along with various combinations of the allowed special characters for that field. For more information, click  icon next to the Cron Expression field.

To schedule a Batch based on Cron Expression, perform the following steps

1. In the **Schedule Batch** window, click **Cron Expression**.
2. Select the Batch Group you want to schedule from the Select drop down menu.
3. Enter a **Schedule Name**.
4. Enter the Cron Expression for your schedule.

For more information about the Cron Expression, click  icon next to the Cron Expression field.

5. Click **Schedule**.

8.1.4.2.2.6 Pre Conditions for a Batch Group

You can schedule the batches and set the pre conditions within a Batch group with frequency as **Weekly**, **Monthly** or based on an **Interval** for scheduling the batches. The batch that satisfies the configured pre conditions are executed as part of the schedule.


NOTE

Pre Conditions can only be applied when using the Schedule option in the Schedule Batch window.

Weekly

To set the pre conditions to the batches in a batch group weekly, perform the following steps:

1. In the **Schedule Batch** window, you can select either **Schedule Once**, **Schedule Daily**, **Schedule Weekly**, **Schedule Monthly** or **Schedule Cron Expression** option based on the schedule that you want to run the batch group.


2. Select the Batch Group you want from the Select drop down menu.
3. Enter a Schedule Name.
4. Specify the other details displayed when you are selecting **Schedule Once**, **Schedule Daily**, **Schedule Weekly**, **Schedule Monthly** or **Schedule Cron Expression**.
5. Click Pre Conditions.
6. In the Pre Conditions window, specify the Batch from the drop down and from the Frequency drop down and select Weekly.
7. Select the days from the Select Days drop down that you want to schedule the batch run within the selected week.
8. Click  to add the specified entry.

NOTE Pre Conditions can be added only to one batch at a time.

9. Click **Save**.
The batch is executed based on the configured pre conditions.

Monthly

To set the pre conditions to the batches in a batch group monthly, perform the following steps:

1. In the **Schedule Batch** window, you can select either **Schedule Once**, **Schedule Daily**, **Schedule Weekly**, **Schedule Monthly** or **Schedule Cron Expression** option based on the schedule that you want to run the batch group.
2. Select the Batch Group you want from the Select drop down menu.
3. Enter a Schedule Name.
4. Specify the other details displayed when you are selecting **Schedule Once**, **Schedule Daily**, **Schedule Weekly**, **Schedule Monthly** or **Schedule Cron Expression**.
5. Click Pre Conditions.
6. In the Pre Conditions window, specify the Batch from the drop down and from the Frequency drop down and select Monthly.
7. Select the days from the Select Days drop down that you want to schedule the batch run within the selected week.
8. Click  to add the specified entry.

NOTE Pre Conditions can be added only to one batch at a time.


9. Click **Save**.
The batch is executed based on the configured pre conditions.

Interval

To set the pre conditions to the batches in a batch group based on an interval, perform the following steps:

1. In the **Schedule Batch** window, you can select either [Schedule Once](#), [Schedule Daily](#), [Schedule Weekly](#), [Schedule Monthly](#) or [Schedule Cron Expression](#) option based on the schedule that you want to run the batch group.
2. Select the Batch Group you want from the Select drop down menu.
3. Enter a Schedule Name.
4. Specify the other details displayed when you are selecting [Schedule Once](#), [Schedule Daily](#), [Schedule Weekly](#), [Schedule Monthly](#) or [Schedule Cron Expression](#).
5. Click Pre Conditions.
6. In the Pre Conditions window, specify the Batch from the drop down and from the Frequency drop down and select Interval.
7. Select the interval from the Custom Recurrence (Repeat every) Days drop down that you want to schedule the batch run within the selected week.

NOTE The Custom Recurrence can be set maximum to 60 days.

8. Click  to add the specified entry.

NOTE Pre Conditions can be added only to one batch at a time.

9. Click **Save**.
10. The batch is executed based on the configured pre conditions.

8.1.4.3 Re-start a Batch Group

You can restart a Batch which has not been executed successfully or which has been explicitly interrupted, or cancelled, or put on hold during the execution process. By restarting a Batch, you can continue Batch execution directly from the point of interruption or failure and complete executing the remaining tasks.

To re-start a batch, perform the following steps:

1. Click **Schedule Batch** from the Header panel.
The **Schedule** window is displayed.
2. From the **Schedule** window, select **Re-start** tab.
3. Select the Batch Group you want to re-start from the Select Name drop down menu.
4. Select the Batch Run ID.
5. Click **Re-start**.

8.1.4.4 Re-run a Batch Group

You can re-run a Batch which has previously been executed. Rerun Batch facilitates you to run the Batch irrespective of the previous execution state. A new Batch Run ID is generated during the Rerun process and the Batch is executed as similar to the new Batch Run.

To re-run a batch, perform the following steps:

1. Click **Schedule Batch** from the Header panel.
The **Schedule Batch** window is displayed.

2. In the **Schedule Batch** window, select **Re-run** tab.
3. Select the Batch Group you want to re-run from the Select Name drop down menu.
4. Select the Batch Run ID.
5. Click **Re-run**.

8.1.4.5 Edit Dynamic Parameters

Dynamic Parameters facilitates you to the modify the dynamic parameters for the batch. You can change the param value from the Edit Dynamic Params window and save the changes to the Batch. The Edit Dynamic Parameters option is available in all the tab in the **Schedule Batch** window.

To edit the dynamic parameters for a batch group, perform the following steps:

1. In the **Schedule Batch** window, click **Edit Dynamic Parameters**.
The **Edit Dynamic Params** window is displayed.
2. In the **Edit Dynamic Params** window, modify the values as required.
3. Click **Save**.

The modified parameters are applied to the Batch.

8.1.4.5.1 Accessing Scheduler optional parameters inside studio model paragraphs

The Scheduler Service automates the running of models in the application. The Scheduler Service contains a graphical user interface and a single control point for defining and monitoring background executions.

To access the optional parameters passed from the **Scheduler** during execution of any models, run the following script:

To print

```
print('BATCHRUNID value is : ${BATCHRUNID}')  
print('TASKID value is : ${TASKID}')  
print('FICMISDATE value is : ${FICMISDATE}')
```

To access the optional parameters passed during execution of any models, run the following scripts:

```
%python  
print('threshold value is : ${threshold}')
```

NOTE

Threshold is the optional parameter passed during the model execution.

8.1.4.6 Task Definitions of a Batch Group

You can modify the task definition state in the Batch Execution window to exclude or hold the defined task in a Batch from execution. The excluded tasks are therefore assumed to have completed execution and get excluded during the Batch Run.





While executing or scheduling a batch group from the *Schedule Batch* window, you can:

- [Exclude or Include Tasks](#)
- [Hold or Release Tasks](#)

8.1.4.6.1 Exclude or Include Tasks

You can exclude tasks or include the excluded tasks during Batch Group Execution. The excluded task components are therefore executed in the normal process assuming that the excluded task have completed execution.




To exclude/include tasks, perform the following steps:


1. In the *Schedule Batch* window, click **Exclude Tasks**.
The **Select Tasks** window is displayed.
2. To exclude tasks:
 - a. Select the required task from the **Included Tasks** list and click . You can press Ctrl key for multiple selections.
 - b. To exclude all tasks, click .
3. To include the excluded tasks:
 - a. Select the required task from the **Excluded Tasks** list and click . You can press Ctrl key for multiple selections.
 - b. To include all excluded tasks, click .
4. Click **Save**.

8.1.4.6.2 Hold or Release Tasks

You can hold tasks or release the held tasks during Batch Group Execution. The tasks which are on hold along with the defined components are skipped during execution. However, at least one task should be available in a Batch without being held or excluded for Batch execution.

To hold/release tasks, perform the following steps:

1. In the **Schedule Batch** window, click **Hold Tasks**.
The **Select Tasks** window is displayed.
2. To hold tasks:
 - a. Select the required task from the *Released Tasks* list and click . You can press Ctrl key for multiple selections.
 - b. To hold all tasks, click .
3. To release held tasks:
 - a. Select the required task from the *Held Tasks* list and click . You can press Ctrl key for multiple selections.

- b. To release all held tasks, click .
4. Click **Save**.

8.1.5 Monitor Batch

The Monitor Batch enables you to view the status of executed Batch along with the tasks details. You can track the issues if any, on regular intervals and ensure smoother Batch execution. A visual representation as well as tabular view of the status of each Tasks in the Batch is available.

The **Monitor Batch** window allows you to perform monitoring for the following operations:

- **Batch**
- **Batch Group**

8.1.5.1 Batch

Batch is a process of execution of the Date and time-based background tasks based on a defined period during which the resources were available for batch processing. To monitor a batch, perform the following steps:

1. Click **Monitor Batch** from the Header panel.
The **Monitor** window is displayed.
2. Select the **Batch from the Select drop-down and then select the Batch Run ID** from the Run ID drop-down.
3. Click Start Monitor.







The result is displayed in Visualization and List View tabs. Details of these tabs are as follows:

- The **Visualization** tab displays the details in the form of a chart represented with the following details:
 - **Batch Status:** Displays the batch status, the different batch status are NOT-STARTED, ON-GOING, SUCCESSFUL, FAILED, INTERRUPTED, EXCLUDED, HELD, and UNDEFINED.
 - **Batch Start Time:** Displays the batch start time details.
 - **Batch End Time:** Displays the batch end time details.
 - **Task Details:** Mouseover the task to display its status and details.
- The **List View** tab displays the details in a tabular form with the following details:
 - **Batch Status:** Displays the batch status, the different batch status are NOT-STARTED, ON-GOING, SUCCESSFUL, FAILED, INTERRUPTED, EXCLUDED, HELD, and UNDEFINED.
 - **Batch Start Time:** Displays the batch start time details.
 - **Batch End Time:** Displays the batch end time details.
 - **Task Details:** Mouseover the task to display its status and details.
 - **More Information:** The message returned by the Rest Service.

- If you wish to stop the monitoring, select Stop Monitor. You can also specify the Start and Stop Monitor options along with refresh interval in the Refresh every seconds and minutes fields.

NOTE

- You can select the refresh interval and the duration for the auto refresh. The refresh interval is defaulted to 5 seconds and duration is defaulted to 5 minutes. That is the refresh happens every 5 seconds for next 5 minutes.
- Range of interval input must be between 5 to 60 seconds and range of duration.
- Input should be between 5 to 180 minutes.
- You can use the Stop Monitor button to stop the auto refresh.
- If you have two batch run IDs for the first execution, ignore the execution status of run IDs and retrigger the batch one more time.

- To restart the Batch Group, select Restart .
- To rerun the Batch Group, select Rerun .
- To interrupt the Batch Group, select Interrupt .
- To view the log information about the batch, click the Log  icon in the List View tab. The Log Viewer pop-up is displayed.
- In the Log Viewer pop-up, the log information is displayed. You can click Download  icon to download the log or click the Close  icon to close the log information.

8.1.5.1.1 Batch Group

Batch Group is a process of grouping the batches that are required to be execute together for execution of the Date and time-based background tasks based on a defined period during which the resources were available for batch processing. To monitor a batch group, perform the following steps:

- Click **Monitor Batch** from the Header panel.
The **Monitor** window is displayed.
- Select the **Batch Group from the Select drop-down and then select the Batch Run ID** from the Run ID drop-down.
- Click Start Monitor.

The result is displayed in Visualization and List View tabs. Details of these tabs are as follows:

- The Visualization tab displays the details in the form of a chart represented with the following details:
 - Batch Status: Displays the batch status, the different batch status are NOT-STARTED, ON-GOING, SUCCESSFUL, FAILED, INTERRUPTED, EXCLUDED, HELD, and UNDEFINED.
 - Batch Start Time: Displays the batch start time details.

- iii. Batch End Time: Displays the batch end time details.
- iv. Batch Details: Mouseover the task to display its status and details.
- The **List View** tab displays the details in a tabular form with the following details:
 - i. Batch Status: Displays the batch status, the different batch status are NOT-STARTED, ON-GOING, SUCCESSFUL, FAILED, INTERRUPTED, EXCLUDED, HELD, and UNDEFINED.
 - ii. Batch Start Time: Displays the batch start time details.
 - iii. Batch End Time: Displays the batch end time details.
 - iv. Batch Details: Mouseover the task to display its status and details.
 - v. More Information: The message returned by the Rest Service.
- 4. If you wish to stop the monitoring, select Stop Monitor. You can also specify the Start and Stop Monitor options along with refresh interval in the Refresh every seconds and minutes fields.

NOTE

- You can select the refresh interval and the duration for the auto refresh. The refresh interval is defaulted to 5 seconds and duration is defaulted to 5 minutes. That is the refresh happens every 5 seconds for next 5 minutes.
- Range of interval input must be between 5 to 60 seconds and range of duration.
- Input should be between 5 to 180 minutes.
- You can use the Stop Monitor button to stop the auto refresh.

5. To restart the Batch Group, select Restart .

6. To rerun the Batch Group, select Rerun .

7. To interrupt the Batch Group, select Interrupt .

To view the log information about the batch group, click View Log in the List View tab.

8.1.6 External Interface Component Scheduler Service

Use the **EICSchedulerService.sh** utility located in the `<installed path>/mmg-home/bin` folder to perform basic scheduler operations.

Prerequisites:

- Ensure public and private keys are present in `conf` folder and corresponding path is present in `application.properties` of mmg UI service.
- You should be aware of `clientId/secret` which will be used for basic authentication.
(Currently, these values are stored in `application.properties` as `token.clientid` and `token.secret`).

Table 43 Lists possible flagged arguments to be passed while executing `EICSchedulerService.sh`.

Table 43: List of possible flagged arguments to be passed while executing `EICSchedulerService.sh`

Flag	Description	Comments
-o	Operation Type: The operation the user wants to perform.	A mandatory argument for all the type of requests. Possible Values are: 1 – To trigger an object 2 – To get the current status of a run. 3 – To re-start an execution. 4 – To re-run an execution. 5 – To interrupt an execution.
-u	<code>ofs_remote_user</code>	A mandatory argument for all the type of requests.
-w	Workspace Id	A mandatory argument for all the type of requests.
-c	Client Id for authentication	A mandatory argument for all the type of requests. Currently, in <code>mmg-ui</code> application.properties the parameter <code>token.clientid</code> is set to <code>ofsuser</code>
-s	Client Secret for authentication	A mandatory argument for all the type of requests Currently, in <code>mmg-ui</code> application.properties the parameter <code>token.secret</code> is set to <code>secret</code>
-b	Object Name	Batch or Batch Group Name in case of triggering.
-t	Object Type	For Batch, it is set to <code>rest</code> and for Batch Group, it is set to <code>group</code> .
-r	Batch Execution Id	Execution Id of the Batch or Batch Group
-x	External Unique Id	This is the unique Id for every execution and mandatory for execute and rerun operations.
-i	Included Jobs	In case of trigger, included jobs can be provided as comma separated using this flag.
-e	Excluded Jobs	In case of trigger, excluded jobs can be provided as comma separated using this flag.

Table 43: List of possible flagged arguments to be passed while executing EICSchedulerService.sh

Flag	Description	Comments
-h	Held Jobs	In case of trigger, held jobs can be provided as comma separated using this flag.
-v	Dynamic parameter list	This is an optional parameter to support passing of dynamic runtime parameters for Batch/Task.

Table 44 Lists possible exit codes returned by `EICSchedulerService.sh`.

Table 44: List of possible exit codes returned by EICSchedulerService.sh

Exit Code	Description
0	Success
-1	Failure/Failed
-2	Interrupted
1	Not Started
2	Ongoing
4	Excluded
5	Held
-3	Object does not exist
-4	Invalid arguments passed in request/not enough parameters in Request body
-6	No executable job is present
-7	Job is already interrupted
-9	Duplicate External Unique Id
-10	Unable to connect to scheduler

Sample commands to perform Scheduler Operations:

- **Trigger/Execute**

Execute batch “batch1”

Syntax:

`./EICSchedulerService.sh -o 1 -u < ofs_remote_user > -w < Workspace Id > -c < Client Id for authentication > -s < Client Secret for authentication > -x < External Unique Id > -b < Object Name > -t < Object Type >`

Example:

`./EICSchedulerService.sh -o 1 -u scheduser -w WS1 -c ofsauer -s secret -x batch1_1001 -b batch1 -t rests`

Execute batch “batch1” with Dynamic Parameter list**Syntax:**

```
./EICSchedulerService.sh -o 1 -u < ofs_remote_user > -w < Workspace Id > -c < Client Id for authentication > -s < Client Secret for authentication > -x < External Unique Id > -b < Object Name > -t < Object Type > -v < Dynamic Runtime parameter list >
```

Example:

```
./EICSchedulerService.sh -o 1 -u mmgadmin -w CS -c ofsouser -s secret -x 232 -b BatchModel -t rest -v '{"batchParams": {"$FICMISDATE$": "2021-11-30", "$BATCHRUNID$": "BATCHRUNID", "param_1": "qwerty", "param_2": "abcde"}, "taskRuntimeParams": {"Task1": {"p1": "11102", "p2": "22202", "abc": "123342", "extraP": "wert2y"}, "Task2": {"abc": "1233", "p3": "3333", "extP2": "0983"}}}'
```

NOTE

The Task/Batch parameters should be the actual parameter key.

Execute batch “batch1” with “task1” and “task2” included**Syntax:**

```
./EICSchedulerService.sh -o 1 -u < ofs_remote_user > --w < Workspace Id > --c < Client Id for authentication > --s < Client Secret for authentication > --x < External Unique Id > --b < Object Name > --t < Object Type > --l < Included Jobs with comma separated values >
```

Example:

```
./EICSchedulerService.sh -o 1 -u scheduser -w WS1 -c ofsouser -s secret -x batch1_1001 -b batch1 -t rest -i task1,task2
```

Execute batch “batch1” with “task1” as excluded and “task2” as held**Syntax:**

```
./EICSchedulerService.sh -o 1 -u < ofs_remote_user > --w < Workspace Id > --c < Client Id for authentication > --s < Client Secret for authentication > --x < External Unique Id > --b < Object Name > --t < Object Type > --e < Excluded Jobs > --h < Held Jobs >
```

Example:

```
./EICSchedulerService.sh -o 1 -u scheduser -w WS1 -c ofsouser -s secret -x batch1_1001 -b batch1 -t rest -e task1 -h task2
```

- **Status**

Get status of execution having runid = MMG_R1_2022-09-07_1662557327886_1**Syntax:**

```
./EICSchedulerService.sh -o 2 -u < ofs_remote_user > --w < Workspace Id > --c < Client Id for authentication > --s < Client Secret for authentication > --r < Batch Execution Id >
```

Example:

```
./EICSchedulerService.sh -o 2 -u scheduser -w WS1 -c ofsouser -s secret -r MMG_R1_2022-09-07_1662557327886_1
```

- **Re-Start**

Restart execution for batch “MMG_R1” having runid = MMG_R1_2022-09-07_1662557327886_1**Syntax:**

```
./EICSchedulerService.sh -o 3 -u < ofs_remote_user > --w < Workspace Id > --c < Client Id for authentication > --s < Client Secret for authentication > --b < Object Name > --r < Batch Execution Id >
```

Example:

```
./EICSchedulerService.sh -o 3 -u scheduser -w WS1 -c ofsouser -s secret -b MMG_R1 -r MMG_R1_2022-09-07_1662557327886_1
```

- **Re-Run**

Rerun execution for batch “batch1” having runid = batch1 -r batch1_2022-09-01_1662011065557_1

Syntax:

```
./EICSchedulerService.sh -o 4 -u < ofs_remote_user > --w < Workspace Id > --c < Client Id for authentication > --s < Client Secret for authentication > --x < External Unique Id > --b < Object Name > --r < Batch Execution Id >
```

Example:

```
./EICSchedulerService.sh -o 4 -u scheduser -w WS1 -c ofsouser -s secret -x batch1_1002 -b batch1 -r batch1_2022-09-01_1662011065557_1
```

- **Interrupt**

Interrupt execution for batch “batch1” having runid = batch1_2022-09-07_1662530601924_1

Syntax:

```
./EICSchedulerService.sh -o 5 -u < ofs_remote_user > --w < Workspace Id > --c < Client Id for authentication > --s < Client Secret for authentication > --b < Object Name > --r < Batch Execution Id >
```

Example:

```
./EICSchedulerService.sh -o 5 -u scheduser -w WS1 -c ofsouser -s secret -b batch1 -r batch1_2022-09-07_1662530601924_1
```

NOTE

- On successful request for execute/rerun, the batchrunid corresponding to external unique id will be stored in AAICL_SS_EXT_BATCH_RUN_ID_MAPPING table.
- External Unique Id is required only in case of execute/rerun request.

9 More

The More component contains the following features:

- **Export Objects:** Utilize Object Migration feature to efficiently export and save objects.
- **Import Objects:** Import previously exported objects into the system.
- **Model Actions:** Review and approve model deployments in bulk.
- **Audit Trail:** Monitor all system activities and changes.
- **Data Pipelines:** Create and manage data pipelines for efficient data flow and processing.

9.1 Object Migration

Object Migration is the process of migrating or moving objects between environments.

You may want to migrate objects for several reasons such as managing global deployments on multiple environments or creating multiple environments so that you can separate the development, testing, and production processes.

Prerequisites to Migrate Objects

In order to migrate the objects, the users must be mapped to the **Object Migration Admin Group**.

NOTE

The Identity Administrator Group Users cannot migrate objects if they are not mapped to the **Object Migration Admin Group**.

Migration Object Types

You can migrate (import/export) the following Object Types by clicking the Object Migration icon on the left menu.



- Schedule
- Batch
- Batch Group
- Pipeline
- Threshold
- Job
- PMF_Process
- Roles
- Groups

Schedule

Schedule provides the instruction to schedule the execution of defined processes. When a schedule is migrated, the associated batch is also migrated.

Batch

A batch is a group of jobs that are scheduled to automatically execute at a preset interval of time, without any user's intervention. When a batch is migrated, the batch and the associated pipeline information are also migrated.

Batch Group

A set of individual batches are consolidated to form a single Batch Group. When we migrate a Batch Group all the batches, tasks and pipeline information associated with that Batch Group are also migrated.

Pipeline

A pipeline is an embedded data processing engine that runs inside the application to filter, transform, and migrate data on-the-fly. Pipelines are a set of data processing elements called widgets connected in series, where the output of one widget is the input to the next element.

Threshold

The threshold limit associated with set variables values for scenarios in FCCM Cloud Service. These threshold values are set when scenarios are created or installed and can be changed, if required.

Job

Jobs provide set of instructions to execute Workflow Pipelines, based on the set threshold values

PMF_Process

PMF_Processes are defined to sequence the Workflow Pipelines the applications, and to design the artifacts that participate in the Pipelines, to implement the Pipelines. Export of PMF_Process will take care of dependent metadata, such as data fields, transition rules associated to the PMF process, that are defined in PMF.

Roles


Roles are used to map functions to a defined set of groups to ensure user access system security.

Groups

Groups are used to map Roles. Specific User Groups can perform only set of functions associated with that group.

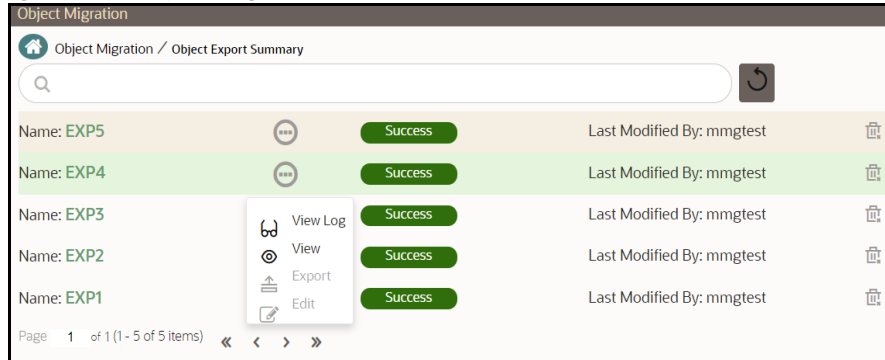
9.1.1 Export Objects

To access the Object Export Summary page, follow these steps:

1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **More > Object Migration** and select **Export Objects**.

The Object Export Summary page containing the records is displayed with the following details.

Figure 202: Object Migration



- **Name:** The unique migration name assigned to the collection when the migration definition was created.
- **Object Migration Status:** The migration status of the record corresponding to the specified Definition Name. The three migration status values are as follows:
 - **Success** - Set to Success, when the object export is completed successfully.
 - **Saved** - Set to Saved, when the migration definition is ready for export and needs to import.
 - **Failed** - Set to failed, when the migration definition is not exported successfully.
- **Last Modified By:** The ID of the Last Modified by user who has modified the record.

9.1.1.1 Navigating Migration Object Export Summary Page


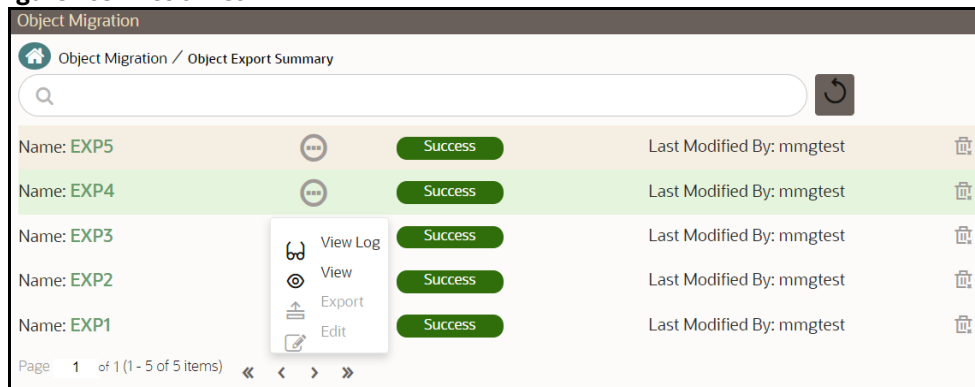



To search for a specific migration definition, type the first few letters of the user name that you want to search in the **Search** box and click Search  icon. The search results display the names that consist of your search string in the list of available users.

Figure 203: Action Icon




At the bottom of the page, you can enter the number of entries that are available on a single page in the **Records** box. You can increase or decrease the number of entries that are displayed using the up and down arrows. To navigate between pages in the **View** bar, use the following buttons:

- Use the **First Page**  button to view the entries in the first page.
- Use the **Previous Page**  button to view the entries in the previous page.

- Use the **Next Page**  button to view the entries in the next page.

- Use the **Last Page**  button to view the entries in the last page.

You can also navigate to the desired page. To do this, enter the page number in the **View** bar control and press **Enter**.

To create a new migration definition, click **Add**  button and proceed with [Creating Migration Export Object Definitions](#).

9.1.1.2 Creating Migration Export Object Definitions

You can create Migration Export object definitions for the following object types.

- Batch Group
- Threshold
- PMF Process
- Batch
- Pipeline
- Schedule
- Job

To create a definition for export of objects to be migrated, do as follows:

1. Click **Add**  in the **Object Export Summary** Page to display the **Migration Definition Window**.

Figure 204: Migration Definition


2. In the Migration Definition Window, enter the details for the following:
 - **Migration Name:** Enter the code of the export of objects to be migrated definition. This is a unique identifier.
 - **File Name:** The system auto-creates the file name of the objects that can be used to export the definition in the following format:
 - **For Business Objects:** Migration Name_BO_Time Stamp (MMDDYYYY HHMMSS)
 - **For Identity Objects:** Migration Name_IDM_Time Stamp (MMDDYYYY HHMMYY)
3. Click **Apply** to save the details.
The Object Selection Page is displayed.
4. In the Object Selection Page, select the required Object Type from the Object Types drop-down list.
The object types listed for the System Configuration tab are, Schedule, Batch group, Batch, Pipeline, Threshold, Job and PMF process. For more information about the object types, refer [Migration Object Types](#).
You can also enter the first few letters in Search to add a particular object from a selected Object type.
The list of objects is displayed.
5. Select the objects to be added to the Migrate Definition.
The selected objects are added to the respective object type branch.
6. Click **Save** to create the Migrate Definition.
A confirmation message is displayed, when the definition is saved successfully.

The new migration definition is listed in the Object Export Summary Page and the status is set to Saved.

NOTE If the migration definition object is not created successfully and the status is set to Failed. Contact [My Oracle Support](#) of more information.

9.1.1.3 Viewing Migration Export Objects

You can view and edit the migration objects from the **Object Export Summary** Page.

To view the list of migration export objects associated with a migration definition, highlight the migration definition and click **Menu** button  .

[Table 45](#) lists the menu options.

Table 45: Export Summary

Field	Description
View Log	View the migration log details of the selected Migration Definition. For more information, refer to View Log of Migration Export Objects .
View	View the Object Details for a specific Migration Definition. Click an object to view more details. For more information, refer to Viewing Export Migration Object Details .
Export	Click Export to initiate Object Migration (Export) for a specific Migration Definition. When the migration is completed, the status will change from Saved to Success. For more information, refer to Exporting Migration Objects .
Edit	Click Edit to view and edit the objects linked to a Migration Definition. For more information, refer to Editing Migration Export Definitions .

9.1.1.3.1 View Log of Migration Export Objects

To view the log details of object with migration status Success or Failed, follow these steps. The view log facilitates you to view the log information of the definition for export of objects to be migrated with its status.

1. Highlight the migration definition and click **Menu** button  and select **View Log**.
The View Log Page is displayed.

[Table 46](#) lists the export migration status.

Table 46: Migration Export Objects

Field	Description
Object Migration ID	The migration ID associated with the export object.
Object Type	The object type of the export object.
Object Code	The object code associated with the export object.
Creation Date	The date of creation of the export object.

Table 46: Migration Export Objects


Field	Description
Created By	The User Id of the User who created the export object.
Status	The migration status of the export object. <ul style="list-style-type: none"> • Success - Indicates that the export migration was completed successfully. • Failed - Indicates that the export migration did not complete.

NOTE The View Log Page for a migration object with status Saved will be empty.

2. Click **OK** to close the window.


9.1.1.3.2 Viewing Export Migration Object Details

To view the list of objects added to a specific Migration Definition:

1. Highlight the migration definition and click **Menu** button  and select **View**.
The list of migration objects added to the definition is displayed.
2. Double-click an object to view the object attribute details.

9.1.1.4 Exporting Migration Objects

To export the list of objects added to a specific Migration Definition:


1. Highlight the migration definition and click **Menu** button  and select **Export**.
After you export, the following types of status are displayed:
 - **Success** - When the object is migrated successfully
 - **Failed** - When the object migration didn't complete.

NOTE Object Migration (export) facilitates you to export a set of objects within the same setup or across different setups.

9.1.1.5 Editing Migration Export Definitions

You can edit the migration export objects that are not exported and their status is Saved or Failed. If the object is already exported and the status is set to Success, you cannot edit the object details.

To edit a record of the definition of export of objects to be migrated, follow these steps. You can add more objects to export or remove existing objects.

1. Highlight the migration definition and click **Menu** button  and select **Edit**.
The Object Selection Window is displayed.
2. Update the required details.

3. In the Object Selection window, select the required Object Type from the Object Types drop-down list.

The object types listed for the System Configuration tab are, Batch_Group, PMF_Process, Batch and Schedule. For more information about the object types, refer [Migration Object Types](#).

You can also enter the first few letters in Search to add a particular object from a selected Object type.

The list of objects is displayed.

4. Select the objects to be added to the Migrate Definition or to be deleted from the Migration Definition.

The selected objects are added/deleted to the respective object type branch.

5. Click **Save** to edit the Migrate Definition.

A confirmation message is displayed, when the definition is saved successfully.


The edited migration definition is listed in the Object Export Summary Page and the status is set to Saved.

6. Click **Save** to update the changes.

9.1.1.6 Deleting Migration Export Objects Definition

You can delete only a record that is set to Saved or Failed status and not a record that is in Success status.

To delete a migrate export object definition, follow these steps.

1. Highlight the record to be deleted and click the **Delete**  button.
2. Click **Yes** to confirm and proceed with the deletion.

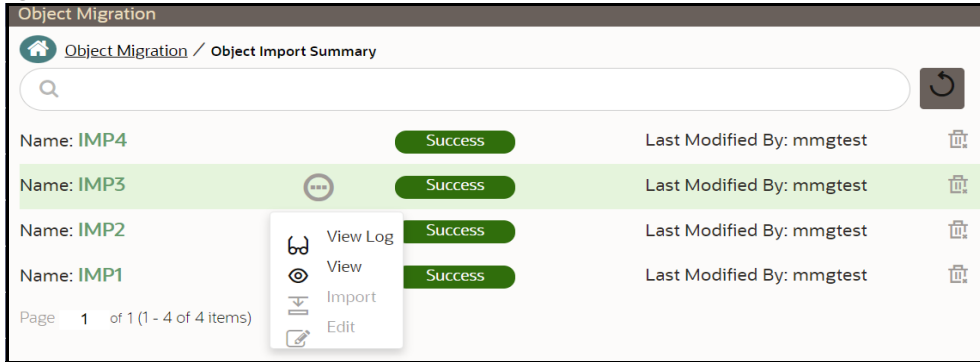
9.1.2 Import Objects

To access the Object, Import Summary page, follow these steps:

1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **More > Object Migration** and select **Import Objects**.

The Object Import Summary page containing the records is displayed with the following details.

Figure 205: Action Icon



- **Name:** The unique migration name assigned to the collection when the migration definition was created.
- **Object Migration Status:** The migration status of the record corresponding to the specified Definition Name. The three migration status values are as follows:
 - **Success** - Set to Success, when the object import is completed successfully.
 - **Saved** - Set to Saved, when the migration definition is ready for import and needs to import.
 - **Failed** - Set to failed, when the migration definition is not imported successfully.
- **Last Modified By:** The ID of the Last Modified by user who has modified the record.

9.1.2.1 Navigating Migration Object Import Summary Page


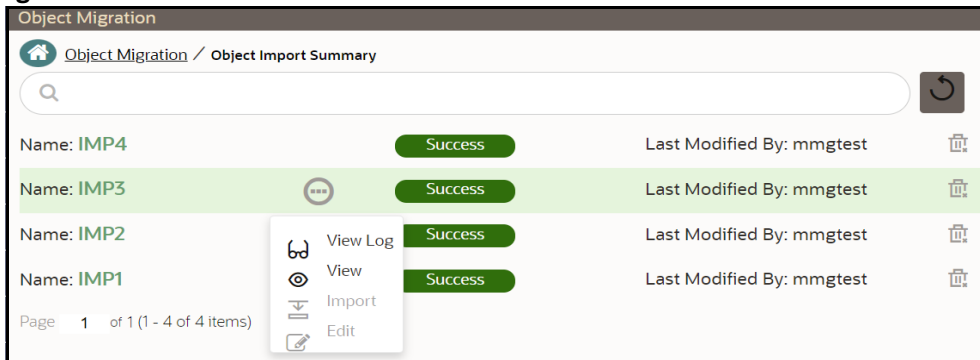



To search for a specific migration definition, type the first few letters of the user name that you want to search in the **Search** box and click Search  icon. The search results display the names that consist of your search string in the list of available users.


Figure 206: Action Icon




At the bottom of the page, you can enter the number of entries that are available on a single page in the Records box. You can increase or decrease the number of entries that are displayed using the up and down arrows. To navigate between pages in the **View** bar, use the following buttons:

- Use the **First Page**  button to view the entries in the first page.
- Use the **Previous Page**  button to view the entries in the previous page.

- Use the **Next Page**  button to view the entries in the next page.

- Use the **Last Page**  button to view the entries in the last page.

You can also navigate to the desired page. To do this, enter the page number in the **View** bar control and press **Enter**.

To create a new migration definition, click **Add**  button and proceed with [Creating Migration Import Object Definitions](#).

9.1.2.2 Creating Migration Import Object Definitions

You can create Migration Import object definitions for the following object types.

- Batch Group
- Threshold
- PMF Process
- Batch
- Pipeline
- Schedule
- Job

To create a definition for import of objects to be migrated, do as follows:

1. Click **Add**  in the **Object Import Summary** Page to display the **Migration Definition Window**.

Figure 207: Migration Definition

2. In the **Migration Definition** Window, enter the details for the following:
 - **ID:** Enter a valid name for the new migration import definition.
This is a unique identifier.
 - **Dump File:** Select the dump file to be utilized for creating the Migration Import Definition.
3. **Import All:** Select an option to import the nodes that are associated with the selected object type
You can edit this option if required, in the **Object Selection** page.

Figure 208: Object Selection




- **Yes** - Imports all the nodes that are included in the dump file.
 - **No** - Imports only those nodes that you can select in the **Object Selection** page.
4. **Fail on Error:** Select an option to proceed with the definition creation in case of an error.
You can edit this option if required, in the **Object Selection** Page.
 - **Yes** - Stops the creation process, if error is generated
 - **No** - Creates the import definition even when error is generated. The node with the error is not included in the object creation.
 5. **Overwrite:** Select an option to overwrite the existing definition file.
You can edit this option if required, in the **Object Selection** Page.

- **Yes** - Replaces the existing Import definition.
 - **No** - Creates a new Import definition.
6. Click **Apply** to save the details.
The **Object Selection** page is displayed.
 7. In the **Object Selection** page, click Add Members, to add objects associated with specific object types.
 8. In the **Object Selection** page, select the required **Object Type** from the **Object Types** drop-down list.
The object types listed are, Schedule, Batch group, Batch, Pipeline, Threshold, Job and PMF process. For more information about the object types, refer [Migration Object Types](#).
You can also enter the first few letters in **Search** to add a particular object from a selected Object type.
The list of objects is displayed.
 9. Select the objects to be added to the Migrate Definition.
You can select the objects only if you select **No** for **Import All**.
The selected objects are added to the respective object type branch.
 10. Click **Save** to create the Migrate Definition.
A confirmation message is displayed, when the definition is saved successfully.
The new migration definition is listed in the Object Import Summary Page and the status is set to **Saved**.

NOTE If the migration definition object is not created successfully and the status is set to Failed. Contact [My Oracle Support](#) of more information.

9.1.2.3 Viewing Migration Import Objects

You can view and edit the migration objects from the **Object Import Summary** Page.

To view the list of migration export objects associated with a migration definition, highlight the migration definition and click **Menu** button  .

[Table 47](#) lists the menu options.

Table 47: Migration Import Objects


Field	Description
View Log	View the migration log details of the selected Migration Definition. For more information, refer to View Log of Migration Import Objects .
View	View the Object Details for a specific Migration Definition. Click an object to view more details. For more information, refer to Viewing Import Migration Object Details .

Table 47: Migration Import Objects

Field	Description
Export	Click Export to initiate Object Migration (Import) for a specific Migration Definition. When the migration is completed, the status will change from Saved to Success . For more information, refer to Importing Migration Objects .
Edit	Click Edit to view and edit the objects linked to a Migration Definition. For more information, refer to Editing Migration Import Definitions .

9.1.2.3.1 View Log of Migration Import Objects

To view the log information of a record of the definition for import of objects to be migrated, follow these steps. The view log facilitates you to view the log information of the definition for import of objects to be migrated with its status.

1. Highlight the migration definition and click **Menu** button  and select **View Log**.

The View Log Page is displayed.

[Table 48](#) lists the menu option.

Table 48: Log Details


Field	Description
Object Migration ID	The migration ID associated with the export object.
Object Type	The object type of the export object.
Object Code	The object code associated with the export object.
Creation Date	The date of creation of the export object.
Created By	The User Id of the User who created the export object.
Status	The migration status of the export object. <ul style="list-style-type: none"> • Success - Indicates that the export migration was completed successfully. • Failed - Indicates that the export migration did not complete.

NOTE The View Log Page for a migration object with status Saved will be empty.

2. Click **OK** to close the window.

9.1.2.3.2 Viewing Import Migration Object Details

To view the list of objects added to a specific Migration Definition:


1. Highlight the migration definition and click **Menu** button  and select **View**.

The list of migration objects added to the definition is displayed.

2. Double-click an object to view the object attribute details.

9.1.2.4 Importing Migration Objects

To export the list of objects added to a specific Migration Definition:

1. Highlight the migration definition and click **Menu** button  and select **Export**.

After you export, the following types of status are displayed:

- **Success** - When the object is migrated successfully
- **Failed** - When the object migration didn't complete.


NOTE

Object Migration (export) facilitates you to export a set of objects within the same setup or across different setups

9.1.2.5 Editing Migration Import Definitions

You can edit the migration export objects that are not exported and their status is Saved or Failed. If the object is already exported and the status is set to Success, you cannot edit the object details.

To edit a record of the definition of export of objects to be migrated, follow these steps. You can add more objects to export or remove existing objects.

1. Highlight the migration definition and click **Menu** button  and select **Edit**.

The Object Selection Window is displayed.

2. Update the required details.
3. In the Object Selection window, select the required Object Type from the Object Types drop-down list.

The object types listed for the System Configuration tab are, Batch_Group, PMF_Process, Batch and Schedule. For more information about the object types, refer [Migration Object Types](#).

You can also enter the first few letters in Search to add a particular object from a selected Object type.

The list of objects is displayed.

4. Select the objects to be added to the Migrate Definition or to be deleted from the Migration Definition.

The selected objects are added/deleted to the respective object type branch.

5. Click **Save** to edit the Migrate Definition.

A confirmation message is displayed, when the definition is saved successfully.


The edited migration definition is listed in the Object Export Summary Page and the status is set to Saved.

6. Click **Save** to update the changes.

9.1.2.6 Deleting Migration Import Objects Definition

You can delete only a record that is set to Saved or Failed status and not a record that is in Success status.

To delete a migrate export object definition, follow these steps.

1. Highlight the record to be deleted and click the **Delete**  button.
2. Click **Yes** to confirm and proceed with the deletion.

9.2 Model Actions

The Model Actions window allows you to view the list of models for which the Workflow action has been taken which requires review or approve across the workspace.

For example, when any Model User sends and Model for review or approval, the user receives the bulk Models in Model Actions window for review or approval. This helps when lot of models are received for review before deployment or some actions need to be performed on many models, such as making models champion locally or globally, and so on.


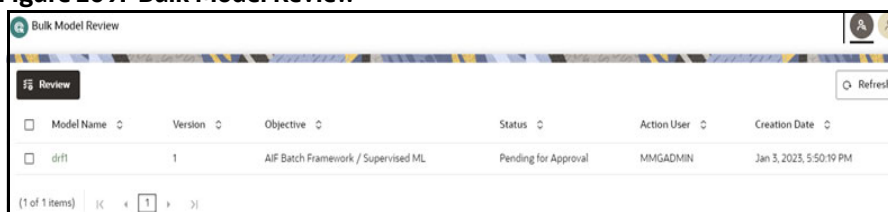
1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **More > Model Actions** to view the list Models pending for action.

Figure 209: Bulk Model Review



Model Name	Version	Objective	Status	Action User	Creation Date
drf1	1	AIF Batch Framework / Supervised ML	Pending for Approval	MMGADMIN	Jan 3, 2023, 5:50:19 PM

If you are a reviewer, Review Models screen is displayed and if you are an approver, Approve Models screen is displayed. This can be toggled in the header of the screen using Reviewer and Approver icon.

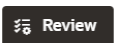
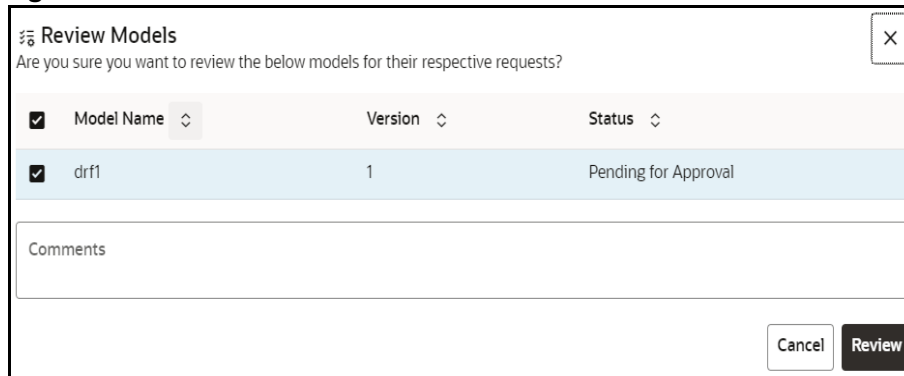


3. To review the model, follow these steps:
 - a. Select the Model using the corresponding check box and click Review .
 - b. Enter the comments in Comments field of the Review Models window and click **Review**.

Figure 210: Review Models window

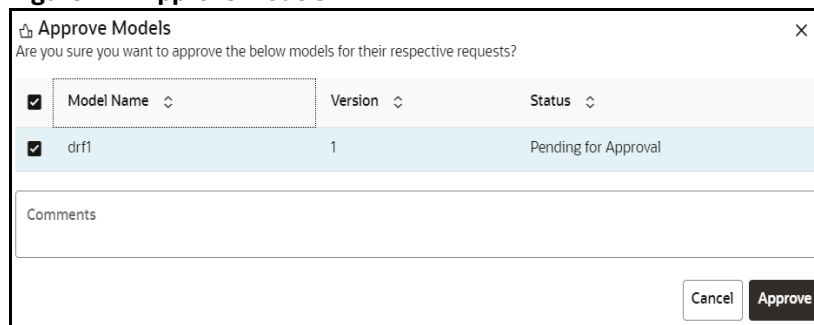


4. To approve or reject the models , follow these steps:
 - a. To approve or reject the model, follow these steps: Select the Model using the corresponding

check box and click Approve  or Reject .

- b. Enter the comments in Comments field of the Approve Models window or Reject Models window and click approve or Reject.

Figure 211: Approve Models



9.3 Audit Trial

At any time, you can audit the models from the Audit Trail window. The Audit Trail window provides the complete details of model. This shows the information such as, when Model was created, who created the Model, workflow of Model, for example when this Model became champion or deployed, and so on.

The sequence of actions performed in the model lifecycle is listed in the table view and the timeline view (graphical representation).

To audit models, follow these steps:


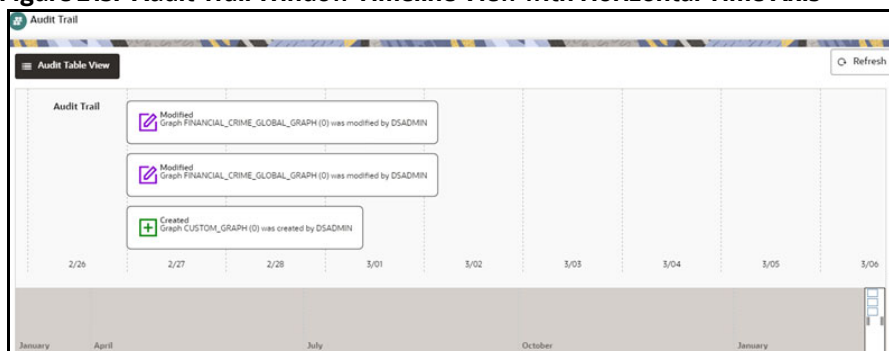
1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. In the Mega menu, click **More > Audit Trail** to view the time of the various actions performed on the model in the **Audit Trail** window.

Figure 212: Audit Trail Window

Status	Type	Name	User	Comments	Time
Created	Graph	CUSTOM_GRAPH	DSADMIN	Graph CUSTOM_GRAPH (0) was cre... Graph CUSTOM_GRAPH (0) was created by DSADMIN	Feb 27, 2023, 7:26:26 PM
Modified	Graph	FINANCIAL_CRIME_GLOBAL_GRAPH	DSADMIN	Graph FINANCIAL_CRIME_GLOBAL_G... Graph FINANCIAL_CRIME_GLOBAL_GRAPH (0) was modified by DSADMIN	Feb 27, 2023, 2:17:58 PM
Modified	Graph	FINANCIAL_CRIME_GLOBAL_GRAPH	DSADMIN	Graph FINANCIAL_CRIME_GLOBAL_G... Graph FINANCIAL_CRIME_GLOBAL_GRAPH (0) was modified by DSADMIN	Feb 27, 2023, 2:17:28 PM

- Click  for Timeline View. Click  to switch to the regular view.
- Click  to refresh the Audit Trail window.

Figure 213: Audit Trail Window Timeline View with Horizontal Time Axis



10 Using the Compliance Studio Workspace

The Compliance Studio Workspace provides core capabilities that are not model or sandbox-specific.

Topics:

- [Compliance Studio Global Graph](#)
- [Entity Resolution](#)
- [Creating Rulesets](#)
- [Using Manual Decisioning](#)
- [Using Merge and Split Global Entities](#)
- [Using Provided Notebooks](#)
- [Create Event API](#)
- [Publishing your Notebooks from Notebook Server](#)
- [Updating Graph Definition](#)
- [Managing Data Pipelines](#)

10.1 Compliance Studio Global Graph

Compliance Studio provides a pre-defined Financial Crime graph that can be pre-loaded for most Financial Crime use cases, including Investigation Hub. It also provides an intuitive way for creating graphs used in notebooks, where you can load graphs from external sources or create custom graphs. Compliance Studio includes the PGX, a fast, parallel, in-memory graph analytic framework developed by Oracle. Using PGX, you can load multiple graphs into a notebook and create PGQL queries against different graphs. The result obtained from running a paragraph in a notebook can be used as input to other paragraphs in the notebook. The results of analytics algorithms are stored as the graph's nodes and edges properties. Pattern matching can then be used against these properties.

The Financial Crime Graph is created by an ETL process that brings in data from our Financial Crime Data Model and freely available data from the International Consortium of Investigative Journalists by default but can be easily configured to include other data sources. As part of the ETL process, matching is run on nodes within the graph and creates similarity edges that link nodes based on name, address, and other attributes. For more information, see the [Creating Rulesets](#).

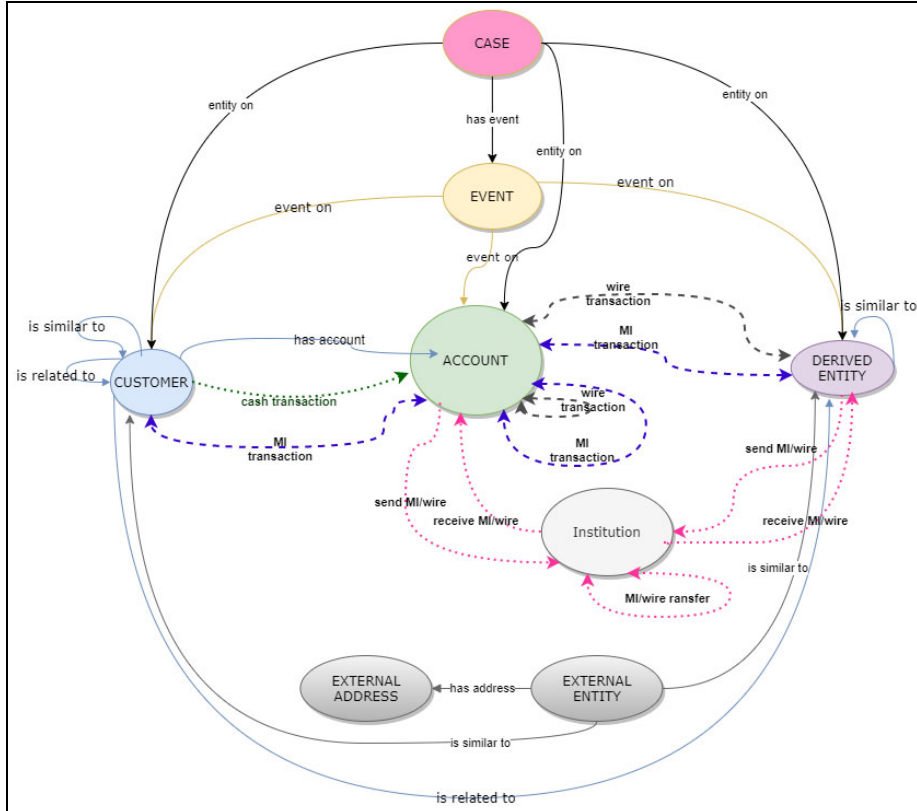
ETL can be run in two ways:

1. Through graph pipelines, for more information see [Managing Graph Pipelines](#) section.
2. To configure and execute the ETL, follow these steps:

NOTE This step is deprecated in the current release and will be removed in the future release.

- a. For more information, see the **Configure ETL** section in the [OFS Compliance Studio Administration and Configuration Guide](#).
- b. Through legacy ETL on hive, for more information see the **Execute ETL** section in the [OFS Compliance Studio Administration and Configuration Guide](#).

Figure 214: Oracle Financial Crime Graph Model



NOTE

The Case node in this Financial Crime Graph Model is loaded only when loading the FCDM data from Enterprise Case Management (ECM). The graph includes “CASE” nodes and “has event” edges when data is loaded from ECM.

10.1.1 Load Data into ICIJ Tables

To load data into ICIJ tables, see the [Load Data into ICIJ Tables](#) section in the [OFS Compliance Studio Administration and Configuration Guide](#).

After installing the Compliance Studio, you need to run the script. For more details, [Importing OOB Graph Definition and other related Metadata](#) section in the [OFS Compliance Studio Installation Guide](#).

10.1.2 Compliance Studio Global Graph

Compliance Studio provides a pre-defined Financial Crime graph that can be pre-loaded for most Financial Crime use cases, including Investigation Hub. It also provides an intuitive way to create graphs used in notebooks, where you can load graphs from external sources or create custom graphs that are then loaded into PGX. PGX is a fast, parallel, in-memory graph analytic framework developed by Oracle. Using PGX, you can load multiple graphs into a notebook and create PGQL queries against different graphs. Following are the pre-defined global financial crime graph for Compliance Studio:

- FINANCIAL_CRIME_GLOBAL_GRAPH
- FINANCIAL_CRIME_GLOBAL_GRAPH_BEHAVIOUR_DETECTION

Figure 215 illustrates the out-of-box Global Graph Model for BD:

Figure 215: Out-of-Box Global Graph Model for BD

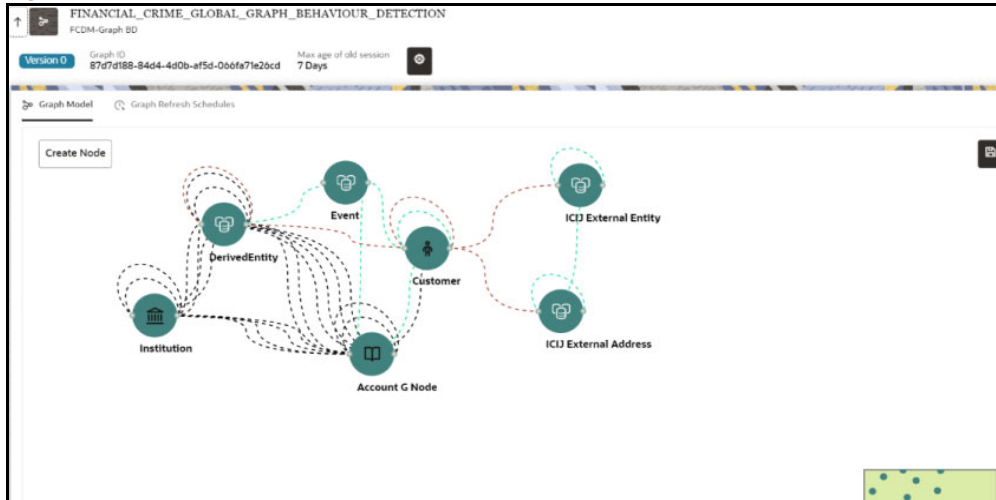
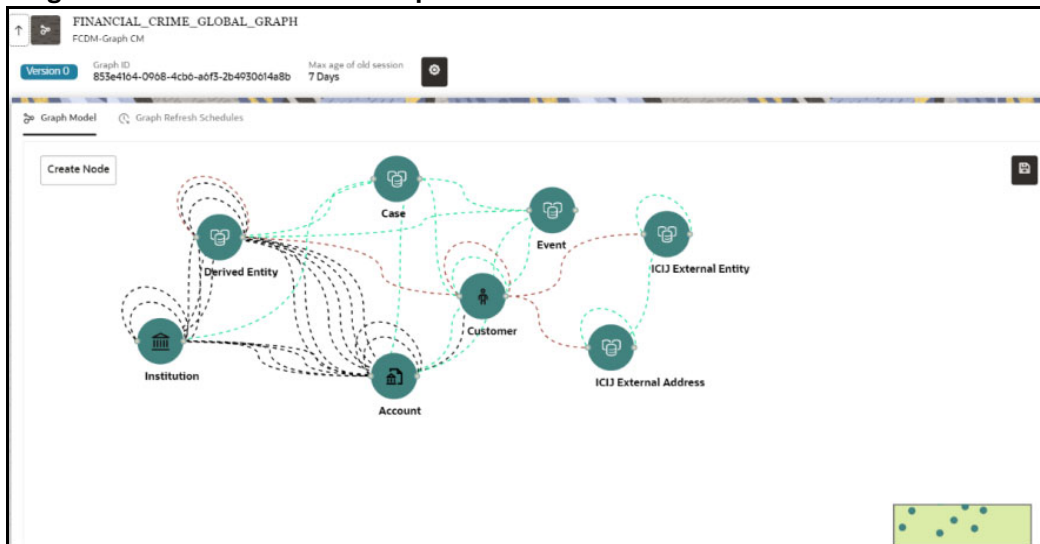


Figure 216 illustrates the out-of-box Global Graph Model for ECM:

Figure 216: Out-of-Box Global Graph Model for ECM



10.1.3 Pre-configured Graph FCGM Model

10.1.3.1 List of Nodes for BD

The Table 49 describes the Node details for BD:

Table 49: Node Details

Name	Description	Pipeline	Data Pipeline Name	Is Active
Customer	Customer	Data Pipeline	Customer	Yes
Account G Node	Account	Data Pipeline	AccountNodeGDP	Yes
DerivedEntity	Derived Entities	Data Pipeline	DerivedEntityDP	Yes

Table 49: Node Details

Name	Description	Pipeline	Data Pipeline Name	Is Active
Institution	Institutions	Data Pipeline	Institution	Yes
Event	Events	Data Pipeline	Event	Yes
ICIJ External Entity	ICIJ External Entity	Data Pipeline	ICIJ External Entity	Yes
ICIJ External Address	ICIJ External Address	Data Pipeline	ICIJ External Address	Yes

10.1.3.2 List of Nodes for ECM

The [Table 50](#) describes the Node details for ECM:

Table 50: Node Details

Name	Description	Pipeline	Data Pipeline Name	Is Active
Customer	Customer	Data Pipeline	Customer CM	Yes
Account	Account	Data Pipeline	Account CM	Yes
Event	Events	Data Pipeline	Event CM	Yes
DerivedEntity	Derived Entities	Data Pipeline	Derived Entity CM	Yes
Institution	Institutions	Data Pipeline	Institution CM	Yes
ICIJ External Entity	ICIJ External Entity	Data Pipeline	ICIJ External Entity CM	Yes
ICIJ External Address	ICIJ External Address	Data Pipeline	ICIJ External Address CM	Yes
Case	Case	Data Pipeline	Case CM	Yes

10.1.3.3 List of Edges for BD

The [Table 51](#) describes the Edge details for BD:

Table 51: Edge Details

Name	Description	Pipeline	Data Pipeline Name	Is Active
Cash Trxn Cust To Acct Edge	Cash Transactions between Customer and Account	Data Pipeline	Cash Trxn Cust To Acct Edge	Yes
Cust Has Account	Customer Has Account(s)	Data Pipeline	Cust Has Acct EdgeDP	Yes
Cust Is Related To Cust Edge	Customer is Related to any other Customers	Data Pipeline	Cust Is Related To Cust Edge	Yes
Cash Trxn EE Id	Cash Transactions between Account and Derived Entity	Data Pipeline	Cash Trxn EE Id	No

Table 51: Edge Details

Name	Description	Pipeline	Data Pipeline Name	Is Active
Cash Trxn EE Name	Cash Transactions between Account and Derived Entity	Data Pipeline	Cash Trxn for EE Name	No
End To End Mi EE to Acct	End to End Mi Transactions from Derived Entity to Account	Data Pipeline	End To End Mi EE to Acct	No
End to End Wire Acct to EE	End to End Wire Transactions from Account to External Entity	Data Pipeline	End to End Wire Acct to EE	No
End To End Mi Acct to EE	End to End Mi Transactions from Account to External Entity	Data Pipeline	End To End Mi Acct to EE	No
End to End Wire EE Acct	End to End Wire Transactions from External Entity to Account	Data Pipeline	End to End Wire EE to Acct	No
End to End Mi EE to EE	End to End Mi Transactions from External Entity to External Entity	Data Pipeline	End to End Mi EE to EE	No
End to End Wire EE to EE	End to End Wire Transactions from External Entity to External Entity	Data Pipeline	End to End Wire EE to EE	No
End to End MI Acct to Acct	End to End Mi Transactions from Account to Account	Data Pipeline	End to End MI Acct to Acct	No
End to End Wire Acct to Acct	End to End Wire Transactions from Account to Account	Data Pipeline	End to End Wire Acct to Acct	No
Event On Cust	Any events on Customers	Data Pipeline	Event On Cust	No
Event On EE	Any Events on External Entity	Data Pipeline	Event On EE	No
Event On Acct	Any events on Account	Data Pipeline	Event On Acct	No
Send Wire Acct to Instn	Sending Wire Transaction from Acct to Institution	Data Pipeline	Send Wire Acct to Instn	No

Table 51: Edge Details

Name	Description	Pipeline	Data Pipeline Name	Is Active
Send Wire EE to Instn	Sending Wire Transaction from Derived Entity to Institution	Data Pipeline	Send Wire EE to Instn	No
Send Mi Acct to Instn Edge	Sending Mi Transaction from Account to Institution	Data Pipeline	Send Mi Acct to Instn	No
Send Mi EE to Instn	Sending Mi Transaction from Derived Entity to Institution	Data Pipeline	Send Mi EE to Instn	No
Receive Mi Instn to Acct	Receiving Mi Transaction from Institution to Account	Data Pipeline	Receive Mi Instn to Acct	No
Receive Mi Instn to DE	Receiving Mi Transaction from Institution to Derived entity	Data Pipeline	Receive Mi Instn to EE	No
Receive Wire Instn to Acct	Receiving Wire Transaction from Institution to Account	Data Pipeline	Receive Wire Instn to Acct	No
Receive Wire Instn to DE	Receiving Wire Transaction from Institution to Derived Entity	Data Pipeline	Receive Wire Instn to EE	No
Transfer Mi Instn to Instn	Transfer an Intermediary Mi Transaction from Institution to Institution	Data Pipeline	Transfer Mi Instn to Instn	No
Transfer Wire Instn to Instn	Transfer an Intermediary Wire Transaction from Institution to Institution	Data Pipeline	Transfer Wire Instn to Instn	No
ICIJ EE Is Related To EE	ICIJ External Entity is Related To External Entity	Data Pipeline	ICIJ EE Is Related To EE	No
ICIJ Address Of EE To EA	ICIJ Address Of External Entity To External Account	Data Pipeline	ICIJ Address Of EE To EA	No
ICIJ EA Is Related To EA	ICIJ External Account Is Related To External Entity	Data Pipeline	ICIJ EA Is Related To EA	No

10.1.3.4 List of Edges for ECM

The [Table 52](#) describes the Edge details for ECM:

Table 52: Edge Details

Name	Description	Pipeline	Data Pipeline Name	Is Active
Cust Has Account	Customer Has Account(s)	Data Pipeline	Cust Has Acct CM	Yes
Cust Is Related To Cust	Customer is Relatedany other Customers	Data Pipeline	Cust Is Related To Cust CM	Yes
Cash Trxn Cust To Acct	Cash Transactions between Customer and Account	Data Pipeline	Cash Trxn Cust To Acct CM	Yes
Cash Trxn EE Id	Cash Transactions between Account and Derived Entity	Data Pipeline	Cash Trxn EE Id CM	No
Cash Trxn EE Name	Cash Transactions between Account and Derived Entity	Data Pipeline	Cash Trxn EE Name CM	No
End To End Mi Trxn Acct To Acct	End to End Mi Transactions from Derived Entity to Account	Data Pipeline	End To End Mi Trxn Acct To Acct CM	No
End To End Wire Trxn Acct To Acct	End to End Wire Transactions from Account to External Entity	Data Pipeline	End To End Wire Trxn Acct To Acct CM	No
End To End Mi Trxn EE To EE	End to End Mi Transactions from External Entity to External Entity	Data Pipeline	End To End Mi Trxn EE To EE CM	No
End To End Wire Trxn EE To EE	End to End Wire Transactions from External Entity to External Entity	Data Pipeline	End To End Wire Trxn EE To EE CM	No
End To End Mi Trxn EE To Acct	End to End Mi Transactions from External Entity to Account	Data Pipeline	End To End Mi Trxn EE To Acct CM	No
End To End Wire Trxn EE To Acct	End to End Wire Transactions from External Entity to Account	Data Pipeline	End To End Wire Trxn EE To Acct CM	No

Table 52: Edge Details

Name	Description	Pipeline	Data Pipeline Name	Is Active
End To End Mi Trxn Acct To EE	End to End Mi Transactions from Account to External Entity	Data Pipeline	End To End Mi Trxn Acct To EE CM	No
End To End Wire Trxn Acct To EE	End to End Wire Transactions from Account to External Entity	Data Pipeline	End To End Wire Trxn Acct To EE CM	No
Send Mi Trxn Acct To Instn	Sending Mi Transaction from Account to Institution	Data Pipeline	Send Mi Trxn Acct To Instn CM	No
Send Mi Trxn EE To Instn	Sending Wire Transaction from Acct to Institution	Data Pipeline	Send Mi Trxn EE To Instn CM	No
Send Wire Trxn EE to Instn	Sending Wire Transaction from Derived Entity to Institution	Data Pipeline	Send Wire Trxn EE To Instn CM	No
Receive Mi Trxn From Instn To Acct	Receiving Mi Transaction from Institution to Account	Data Pipeline	Receive Mi Trxn From Instn To Acct CM	No
Receive Wire Trxn From Instn To Acct	Receiving Wire Transaction from Institution to Account	Data Pipeline	Receive Wire Trxn From Instn To Acct	No
Receive Mi Trxn From Instn To EE	Receiving Mi Transaction from Institution to Derived entity	Data Pipeline	Receive Mi Trxn From Instn To EE CM	No
Receive Wire Trxn From Instn To EE	Receiving Wire Transaction from Institution to Derived Entity	Data Pipeline	Receive Wire Trxn From Instn To EE CM	No
Transfer Mi Trxn From Instn To Instn	Transfer an Intermediary Mi Transaction from Institution to Institution	Data Pipeline	Transfer Mi Trxn from Instn To Instn CM	No
Transfer Wire Trxn From Instn To Instn	Transfer an Intermediary Wire Transaction from Institution to Institution	Data Pipeline	Transfer Wire Trxn From Instn To Instn CM	No
Event On Cust	Any events on Customers	Data Pipeline	Event On Cust CM	No

Table 52: Edge Details

Name	Description	Pipeline	Data Pipeline Name	Is Active
Event On EE	Any Events on External Entity	Data Pipeline	Event On EE CM	No
Event On Acct	Any events on Account	Data Pipeline	Event On Acct CM	No
ICIJ EE Is Related To EE	ICIJ External Entity is Related To External Entity	Data Pipeline	ICIJ EE Is Related To EE CM	No
ICIJ Address Of EE To EA	ICIJ Address Of External Entity To External Account	Data Pipeline	ICIJ Address Of EE To EA CM	No
ICIJ EA Is Related To EA	ICIJ External Account Is Related To External Entity	Data Pipeline	ICIJ EA Is Related To EA CM	No
Case On EE	Case On External Entity	Data Pipeline	Case On EE CM	No
Case On Acct	Case On Account	Data Pipeline	Case On Acct CM	No
Case On Cust	Case On Customer	Data Pipeline	Case On Cust CM	No
Case On	Case On Institution	Data Pipeline	Case On Institution CM	No
Institution	Case Has Event	Data Pipeline	Case Has Event CM	No
Case Has Event	Customer Has Account(s)	Data Pipeline	Cust Has Acct CM	No

10.1.3.5 List of Similarity Edges for BD

The [Table 53](#) describes the Similarity Edge details for BD:

Table 53: Similarity Edge Details

Name	Description	Pipeline	Match Ruleset Name	Is Active
Cust is similar to Cust	Is Customer is similar to customer	Data Pipeline	Customer to Customer Match BDG	Yes
Cust is similar to Derived Entity	Is Customer similar to Derived Entity	Data Pipeline	Customer to Derived Entity Match BDG	Yes
Derived Entity is similar to Derived Entity	Is Derived Entity is similar to Derived Entity	Data Pipeline	Derived Entity to Derived Entity Match BDG	Yes
Cust is similar to External Entity ICIJ	Customer is similar to External Entity ICIJ	Data Pipeline	Customer to External Entity ICIJ Match BDG	Yes

Table 53: Similarity Edge Details

Name	Description	Pipeline	Match Ruleset Name	Is Active
Cust is similar to External Address ICIJ	Customer is similar to External Address ICIJ	Data Pipeline	Customer to External Address ICIJ Match BDG	Yes

10.1.3.6 List of Similarity Edges for ECM

The [Table 54](#) describes the Similarity Edge details for ECM:

Table 54: Similarity Edge Details

Name	Description	Pipeline	Match Ruleset Name	Is Active
Cust is similar to Cust	Is Customer is similar to customer	Data Pipeline	Customer to Customer Match CM	Yes
Cust is similar to Derived Entity	Is Customer similar to Derived Entity	Data Pipeline	Customer to Derived Entity Match CM	Yes
Derived Entity is similar to Derived Entity	Is Derived Entity is similar to Derived Entity	Data Pipeline	Derived Entity to Derived Entity Match CM	Yes
Cust is similar to External Entity ICIJ	Customer is similar to External Entity ICIJ	Data Pipeline	Customer to External Entity ICIJ Match CM	Yes
Cust is similar to External Address ICIJ	Customer is similar to External Address ICIJ	Data Pipeline	Customer to External Address ICIJ Match CM	Yes

10.1.3.7 List of Indexes for BD

The [Table 55](#) describes the Out-of-the-box indexes for the match rules that are defined as similarity edge ([Edge Details](#)) in the FCGM.

Table 55: Pre-seeded Indexes

Index Name	Attributes		
	Name	Display Name	Type
Customer Graph	address	Address	Text
	alias	Alias	Text
	business_domain	Business Domain	Text
	city	City	Text
	concat_name	Concatenated Name	Text
	country	Country	Text
	family_name	Last Name	Text
	given_name	First Name	Text
	industry	Industry	Text
	middle_name	Middle Name	Text
	name	Name	Text
	state	State	Text
	dob	DOB	Date
	d_date	Date	Date
	email	Email	Text
	entity_type	Entity Type	Text
	industry	Industry	Text
	jurisdiction	Jurisdiction	Text
	label	Label	Text
	naics_code	Naics Code	Text
	original_id	Original ID	Text
	phone	Phone	Text
	risk	Risk	Number
	source	Source	Text
status	Status	Text	
tax_id	Tax ID	Text	

Index Name	Attributes		
	Name	Display Name	Type
Derived Entity Graph	label	Label	Text
	source	Source	Text
	original_id	Original ID	Text
	jurisdiction	Jurisdiction	Text
	name	Name	Text
	risk	Risk	Number
	d_date	Date	Date
	business_domain	Business Domain	Text
	address	Address	Text
	city	City	Text
	state	State	Text
	country	Country	Text
	status	Status	Text
	external_id	External Id	Text
External Address Graph	address	Address	Text
	jurisdiction	Jurisdiction	Text
	country	Country	Text
	source	Source	Text
	label	Label	Text
External Entity Graph	label	Label	Text
	source	Source	Text
	original_id	Original ID	Text
	jurisdiction	Jurisdiction	Text
	name	Name	Text
	address	Address	Text
	city	City	Text
	state	State	Text
	country	Country	Text
	business_domain	Business Domain	Text

Index Name	Attributes		
	Name	Display Name	Type
Event Graph	jurisdiction	Jurisdiction	Text
	name	Name	Text
	risk	Risk	Number
	d_date	Date	Date
	status	Status	Text
	reason	Reason	Text
	rule_name	Rule Name	Text
	business_domain	Business Domain	Text
	label	Label	Text
	source	Source	Text
	original_id	Original ID	Text
Institution Graph	label	Label	Text
	risk	Risk	Number
	country	Country	Text
	state	State	Text
	d_date	Date	Date
	jurisdiction	Jurisdiction	Text
	original_id	Original ID	Text
	source	Source	Text
	name	Name	Text

Index Name	Attributes		
	Name	Display Name	Type
Account Graph	tax_id	Tax ID	Text
	d_date	Date	Date
	address	Address	Text
	city	City	Text
	state	State	Text
	country	Country	Text
	status	Status	Text
	risk	Risk	Number
	business_domain	Business Domain	Text
	source	Source	Text
	original_id	Original ID	Text
	jurisdiction	Jurisdiction	Text
	name	Name	Text
	entity_type	Entity Type	Text
	label	Label	Text

10.1.3.8 List of Indexes for ECM

The [Table 56](#) describes the Out-of-the-box indexes for the match rules that are defined as similarity edge ([Edge Details](#)) in the FCGM.

Table 56: Pre-seeded Indexes

Index Name	Attributes		
	Name	Display Name	Type
Customer_Graph_CM	address	Address	Text
	alias	Alias	Text
	business_domain	Business Domain	Text
	city	City	Text
	concat_name	Concatenated Name	Text
	country	Country	Text
	family_name	Last Name	Text
	given_name	First Name	Text
	industry	Industry	Text
	middle_name	Middle Name	Text
	name	Name	Text
	state	State	Text
	dob	DOB	Date
	d_date	Date	Date
	email	Email	Text
	entity_type	Entity Type	Text
	industry	Industry	Text
	jurisdiction	Jurisdiction	Text
	label	Label	Text
	naics_code	Naics Code	Text
	original_id	Original ID	Text
	phone	Phone	Text
	risk	Risk	Number
	source	Source	Text
status	Status	Text	
tax_id	Tax ID	Text	

Index Name	Attributes		
	Name	Display Name	Type
Derived_Entity_Graph_CM	label	Label	Text
	source	Source	Text
	original_id	Original ID	Text
	jurisdiction	Jurisdiction	Text
	name	Name	Text
	risk	Risk	Number
	d_date	Date	Date
	business_domain	Business Domain	Text
	address	Address	Text
	city	City	Text
	state	State	Text
	country	Country	Text
	status	Status	Text
	external_id	External Id	Text
External_Address_Graph_CM	address	Address	Text
	jurisdiction	Jurisdiction	Text
	country	Country	Text
	source	Source	Text
	label	Label	Text
External_Entity_Graph_CM	label	Label	Text
	source	Source	Text
	original_id	Original ID	Text
	jurisdiction	Jurisdiction	Text
	name	Name	Text
	address	Address	Text
	city	City	Text
	state	State	Text
	country	Country	Text
	business_domain	Business Domain	Text

Index Name	Attributes		
	Name	Display Name	Type
Account_Graph_CM	tax_id	Tax ID	Text
	d_date	Date	Date
	address	Address	Text
	city	City	Text
	state	State	Text
	country	Country	Text
	status	Status	Text
	risk	Risk	Number
	business_domain	Business Domain	Text
	source	Source	Text
	original_id	Original ID	Text
	jurisdiction	Jurisdiction	Text
	name	Name	Text
	entity_type	Entity Type	Text
label	Label	Text	

10.1.3.9 Graph Model

The Oracle Financial Crime Graph Model serves as a window into the financial crimes data lake. It collates disparate data sets into an enterprise-wide global graph, enabling an entirely new set of financial crime use cases. The Graph model enables to accelerate financial crime investigation use cases.

For information on Graph Data Model, see [Graph Data Model](#).

For information on the node and edge properties of the Oracle Financial Crime Graph Model, see the [Data Model Guide](#).

10.2 Entity Resolution

OFS Compliance Studio provides Entity Resolution (ER) capability. It allows firms to get unified views of both customers and external entities by consolidating duplicate representations of any customer or external entity into one consolidated Global party ID.

OFS Compliance Studio Entity Resolution is a configurable process that allows data to be matched and merged to create contextual links in the global graph or resolve relational party records to a global party record as part of ingestion. OFS Compliance Studio has pre-built configurations supporting matching (or linking) in the FCGM and resolving entities in CSA for data being loaded into Financial Services Data Foundation (FSDF).

- **Comparison for Delta Processing**

The first time Entity Resolution runs, it operates on the full data set. This means the initial run will take longer than subsequent runs after the initial processing where deltas are calculated

(regardless of whether full or delta data is populated in the input tables) so that matching happens only on new and changed records for improved performance.

- **Candidate Selection**

OpenSearch is a distributed search and analytical engine for all structured and unstructured data types in OFS Compliance Studio.

- **Matching**

Matching rules are used to compare entities to identify pairs that refer to the same entity. It creates a probable link between entities by comparing the attributes of the entities.

For example, deduplicating customers, resolving derived entities, or linking customers or derived entities to external data such as Panama papers or sanctions lists with different rules and thresholds.

For more information on scoring methods, see the [OFS Compliance Studio Matching Guide](#).

For more information on how to create the Matching Rules, see the [Creating Rulesets](#) section.

- **Grouping**

It is used to Group (entity Ids or Customer Ids) entities based on similarity links between them using matching rules and applying the merge rules on similarities. Once it is grouped, the system assigns the global party id to each Group.

NOTE Grouping is an automatic process. Grouping will be based on the match edges without any configuration.

- **Merge Rules**

Merging rules are used to group multiple entities or customers into a single global party based on the merge ruleset.

For more information on how to create the Merging Rules, see the [Creating Rulesets](#) section.

- **Persisting**

Records identified for merging will be collapsed into a single global party record, and a mapping from this global party record to the original party records will be created. Ongoing changes to the original party records may impact the global parties. For more details, see **Persisting the Data** section in the [OFS Compliance Studio Administration and Configuration Guide](#).

- **Data Survival**

When party records are identified for merging, a single output party record is created for the main or parent Dataset. Entity Resolution provides a mechanism to select the best view of the data from across the multiple-party records using attribute-by-attribute selection functions like Most Common or Maximum. It also provides a mechanism for transforming the child records stored in related tables, such as an address, email, or document ids.

- **Merge and Split Global Parties:** Entity Resolution provides a mechanism to manually merge, split, create, and rearrange the entities for Global parties. Whenever there is a manual action (merge, split, create, rearrange) to the entities of a global party, the same data survival

logic will be applied. See [Using Merge and Split Global Entities](#) section on how to perform the actions.

NOTE

- When the records are not matched and not merged, they pass straight through and have a one-to-one mapping with the global party.
- Where Entity has been resolved/unresolved, data origin is set to **EntRes** for all the records.
- The Data Survival job cannot override the manual actions to a global party in batch mode.

For more information on configuring the rules for attribute survival, see the [Data Survival Rules](#) section.

For further details on the end-to-end Entity Resolution Process, see the **Entity Resolution** section in the [OFS Compliance Studio Administration and Configuration Guide](#).

10.3 Creating Rulesets

Rulesets define similarity edges in the graph and match entities as part of the Entity Resolution process.

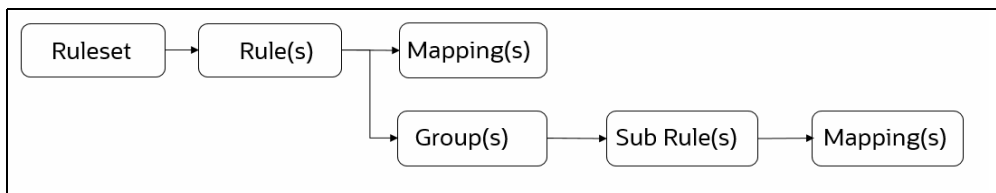
The Ruleset identifies the similarity between two entities (customer, account, etc.) and derives a match. A Ruleset is a set of rules applied to the defined source and target entities and compares the entities' attributes to derive a match.

Compliance Studio provides OOB rulesets; however, you can modify these rulesets or create your rulesets:

- Use Ruleset
- Create Ruleset

The process of creating Match and Merge Rule (s) is as follows:

Figure 217: Process of creating Match and Merge Rule



NOTE

- The sum of weightage for mappings and groups for each rule must be 1.
- The sum of weightage for mappings for each sub-rule must be 1.

10.3.1 Using Ruleset (Match/Merge)

Use this section to enable or disable the Out Of the Box rulesets. You can also modify source or target entities and attributes for these rulesets and also remove rulesets from the existing list.

Perform the following to use the existing Ruleset:


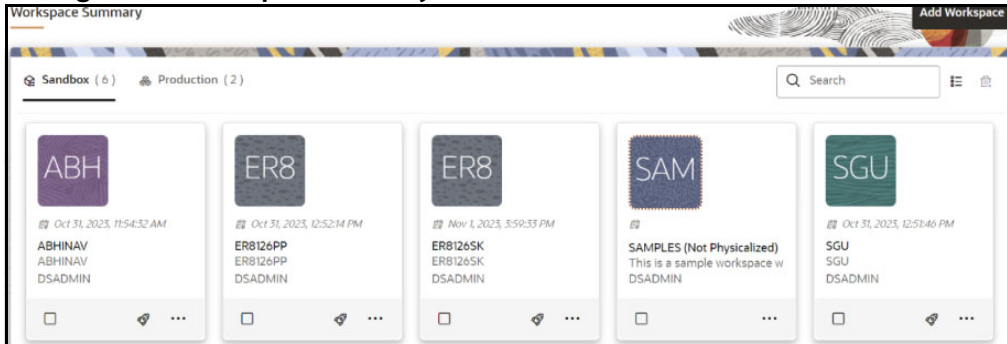
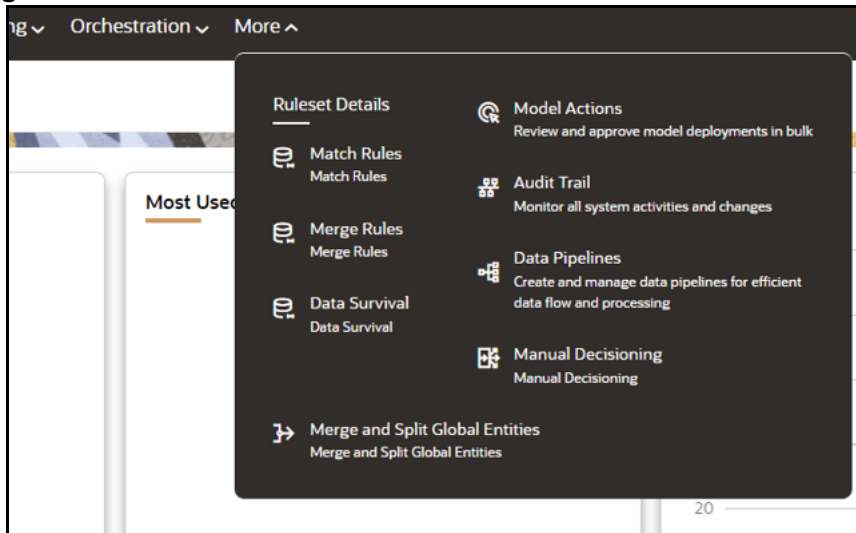
1. Login to the OFS Compliance Studio application. The Workspace Summary page is displayed.
2. On the Workspace Summary page, select Launch workspace  to display the **CS Production Workspace** window with application configuration and model creation menu.

Figure 218: Workspace Summary



3. On **More** menu, Click **Match Rules/Merge Rules**. The Match Rules/Merge Ruleset window is displayed according to the selection.

Figure 219: Ruleset Details



- **Match Rules**

The following figure illustrates the OOB Match Rules for FSDf 812 and Global Graph Nodes:

Figure 220: Match Ruleset

Rule Name	Source Entity	Target Entity	Enable
Customer To External Source Paradise Address Match Customer To External Source -Paradise Address	Customer	ICJ- Paradise Address	<input type="checkbox"/>
ER Name matching ER Name matching	Pre Staging - Party Data 8125	Pre Staging - Party Data 8125	<input type="checkbox"/>
Customer To Derived Entity Match BDG Customer To Derived Entity Match based on their attributes BDG	Customer Graph	Derived Entity Graph	<input type="checkbox"/>
Customer to Customer Match BDG Match Customer to Customer Match based on their attributes BDG	Customer Graph	Customer Graph	<input type="checkbox"/>
Derived Entity To Derived Entity Match BDG Derived Entity To Derived Entity Match based on their attributes BDG	Derived Entity Graph	Derived Entity Graph	<input type="checkbox"/>
Customer to Customer Match CM Match Customer to Customer Match based on their attributes CM	Customer Graph CM	Customer Graph CM	<input type="checkbox"/>
Customer To Derived Entity Match CM Customer To Derived Entity Match based on their attributes CM	Customer Graph CM	Derived Entity Graph CM	<input type="checkbox"/>
Customer to External Entity ICJ Match CM Match Customer To External Entity ICJ CM	Customer Graph CM	External Entity Graph CM	<input type="checkbox"/>
Derived Entity To Derived Entity Match CM Derived Entity To Derived Entity Match based on their attributes CM	Derived Entity Graph CM	Derived Entity Graph CM	<input type="checkbox"/>
Customer To External Address ICJ Match CM Match Customer To External Address ICJ CM	Customer Graph CM	External Address Graph CM	<input type="checkbox"/>



- **Merge Ruleset**

The following figure illustrates the OOB Merge Rules for FSDF 812:

Figure 221: Merge Ruleset


Rule Name	Source Entity	Enable
Entity Resolution - Pre-staging Party Data 808 to Pre-staging Party Data 808 Merge Merge on Pre-staging Party Data 808 to Pre-staging Party Data 808 attributes	Pre Staging - Party Data 808	<input type="checkbox"/>
Entity Resolution - Pre-staging Party Data 81201 to Pre-staging Party Data 81201 Merge Merge on Pre-staging Party Data 81201 to Pre-staging Party Data 81201 attributes	Pre Staging - Party Data 812	<input type="checkbox"/>

4. On the details page, perform the following actions:

- To enable the Ruleset, select the Ruleset and move the toggle switch to the right.
- To add the Ruleset, click **Add** . For more details, see [Creating Ruleset \(Match/Merge\)](#) section.
- To edit the Ruleset, click on the **Ruleset**, and the Ruleset page is displayed. On the Ruleset page, click **Edit** . The page displays Ruleset details.

You can modify the Ruleset details except for the following fields:

- Ruleset Name
- Scoring Aggregation Type
- SourceName

- Target (It is applicable only for Matching)
- To delete the Ruleset(s), click **Delete**  . The selected Ruleset(s) will be deleted from the list.

NOTE Fields marked with * are mandatory fields.

For information on the fields in the Match/Merge Ruleset window, see the [Creating Ruleset \(Match/Merge\)](#) section.

10.3.2 Creating Ruleset (Match/Merge)

ATTENTION To create custom match rulesets, see the **Custom Rulesets for Matching** section in the [OFS Compliance Studio Administration and Configuration Guide](#).

Each Ruleset comprises multiple rules. The Ruleset compares the attributes defined in the rules for the source entity with the target entity. For example, Customer to Customer, Customer to Derived Entity, Derived Entity to Derived Entity, etc.

Every entity has attributes such as email IDs, the date of birth, jurisdiction, etc. To derive a match and create a similarity edge on the graph or merge records in FSDF, you must apply the conditions for these attributes such as match type, scoring method, threshold score, and weightage.

Perform the following to create a new Ruleset:


1. On the Ruleset page, click **Add**  . The page displays as follows:
 - For Match Rules: Create Ruleset fields details
 - For Merge Rules: Create Merge Ruleset page details
2. Enter the ruleset field values as described in the [Table 57](#):

Table 57: Create a Ruleset table

Item	Description
Ruleset Name	The name of the Ruleset. NOTE: Ruleset Name field accepts only 255 characters.
Scoring Aggregation Type	By default, the maximum scoring aggregation method is selected. This scoring aggregation considers the highest score obtained out of all the rules created for a ruleset.
Source	The source entity. For example, customer, account, address, etc.

Table 57: Create a Ruleset table



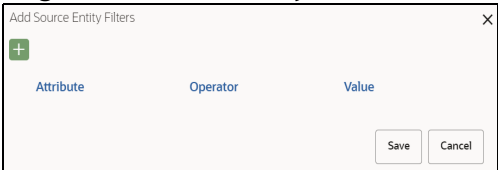

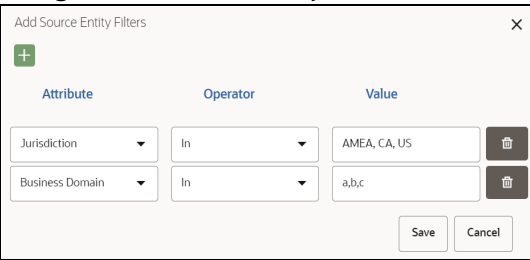

Item	Description
Source Filter	<p>Source Filter  icon is applicable for the Source field.</p> <p>You can filter the records further with Attributes corresponding to the selected Source type.</p> <p>It excludes the records by filtering out based on provided filter criteria and executes the matching rules on the filtered records.</p> <p>It is an optional step.</p> <p>Multiple filter criteria are allowed in the filter.</p> <p>To add filter conditions, perform the following;</p> <ol style="list-style-type: none"> Click  icon. The Add Source entity Filter window is displayed. <p>Figure 222: Source Entity filters</p>  <ol style="list-style-type: none"> Click  icon. The Attributes and conditions are displayed. <p>Figure 223: Source Entity filters</p>  <ol style="list-style-type: none"> Select the attribute, Like (equal to) operator from Attribute, Operator drop-down list and enter the corresponding value(s) in the Value text box, respectively.
Source Filter	<p>NOTE:</p> <ul style="list-style-type: none"> You can add multiple filter conditions based on the available attributes from the Attribute drop-down list. You can enter multiple values for each Attribute in the Value text box with comma-separated. The Value field accepts only a comma as a special character. If any of the attributes requires a special character other than a comma is not allowed to filter the records. For example, email ID, DOB, Date, Phone number (If it has a special character). <ol style="list-style-type: none"> Click Save to save the filters. Click Delete  icon to delete the corresponding filter.
Target	<p>This is applicable only to Match Ruleset.</p> <p>Select the target entity. For example, customer, account, address, etc.</p>

Table 57: Create a Ruleset table



Item	Description
Target Filter	<p>Target Filter  icon is applicable for the Target field.</p> <p>You can filter the records further with Attributes corresponding to the selected Target type.</p> <p>It excludes the records by filtering out based on provided filter criteria and executes the matching rules on the filtered records.</p> <p>It is an optional step.</p> <p>Multiple filter criteria are allowed in the filter.</p> <p>How to add filter conditions is similar to the source filter. See Source Filter description.</p> <p>NOTE: If you select the Target as any one of the following, then the only Country attribute is applicable in the Target Filters:</p> <ul style="list-style-type: none"> ● Panama ● Bahamas ● Paradise ● Offshore ● ICIJ- Paradise Address ● ICIJ- Panama Address ● ICIJ- Offshore Address ● ICIJ- Bahamas Address
Description	The description of the Ruleset.
ER Type	<p>The type of data that is to be matched.</p> <p>The values are as follows:</p> <ul style="list-style-type: none"> ● CSA_812 ● CSA_8124 ● CSA_8125 ● CSA_8126 ● Graph (This is applicable if any graphs that are available in the workspace. Graphs could be defined via Graph pipeline) <p>NOTE:</p> <p>It is recommended to use CSA_8126 pipeline with Compliance Studio 8126 and BD 8126 and the other pipelines are deprecated.</p> <p>The lower version pipelines are supported only if you are upgrading to CS 8.1.2.6.0.</p>
Auto Threshold	<p>The threshold value for a ruleset. This is cumulative of all the attribute values entered in the Rule for entity match.</p> <p>One stands for 100%.</p> <p>Enter values from 0 to <=1. Enter a matching percentage above which you want the matches to get into the graph automatically.</p> <p>The threshold scoring logic works in the following way:</p> <p>A total threshold score of less than 0.7 (70%) must be discarded.</p> <p>A total threshold score of more than or equal to 0.8 (80%) must create a similarity match automatically. This is configured using the Automatic Threshold in Ruleset.</p> <p>NOTE: The Threshold value must be less than or equal to 1.</p>

Table 57: Create a Ruleset table

Item	Description
Manual Threshold	<p>This is applicable only to Match Ruleset.</p> <p>Enter the threshold value for a ruleset. This is cumulative of all the attribute values entered in the Rule for entity match.</p> <p>One stands for 100%.</p> <p>Enter values from 0 to <=1. Enter a matching percentage above which you want the matches to get into the graph automatically.</p> <p>The threshold scoring logic works in the following way: A total threshold score of less than 0.7 (70%) must be discarded.</p> <p>The User must manually decide on a total threshold score between 0.7 (70%) and less than 0.8 (80%). This is configured using the Manual Threshold in the Ruleset.</p> <p>NOTE: The Manual Threshold value must be less than the Auto Threshold.</p>

1. Click **Add** . The page displays the attributes to create the rules for the new Ruleset. For information on creating Rule(s) in the Ruleset, see the [Creating Rules in Ruleset](#) section.
2. Click **Save** to save the Ruleset. You can save the Ruleset with or without creating Rules or click **Cancel** to cancel.

10.3.2.1 Creating Rules in Ruleset



Every Ruleset has a set of rules such as mapping, groups, rule threshold, scoring method (default or Jaro Winkler, ML Boosted Name, etc.), match type (exact or fuzzy), and source and target attribute (Country, Email, Date of birth, etc.). These attributes help to create a set of rules for a ruleset.

Figure 224: Creating Rules in Ruleset

NOTE

- You can create multiple rules in the Ruleset, multiple mapping and groups in Rule, and multiple sub-rules and mappings within the Group.
- The sum of the Weightage of Group(s) should be equal to the Weightage of the Rule.

NOTE

- You can navigate the Rules and Groups within the Rule using the Previous and Next arrow icons. The navigation icons will be enabled only when you create multiple rules and groups within the Rule.
- You can see the Add  and Delete  options on respective Mapping, Groups, and Sub Rule frames within the Rule tab to perform the operations add and delete, respectively.

Perform the following to create Rule(s):



1. On the Ruleset Page, click **Add** . The page displays the Rule (n), where n is the number based on the order of the creation.
2. On Rule (n) tab, click **Add**  to create Rule.

Table 58 provides descriptions for the fields on the page:

Table 58: Rules, Mappings, and Group table

Field	Description
Rules	
Name	The name of the Rule. NOTE: Rule Name field accepts only 255 characters.
Description	The description of the Rule.
Rule Threshold	The threshold value for a rule. The cumulative threshold value of all attributes in this Rule must not exceed this value. This Rule contributes to the matching only when the maximum score obtained for a rule is equal to or higher than the threshold value. NOTE: The Threshold value must be less than or equal to 1, and it cannot be null.
Mappings (Rules and Sub Rule)	
Source Attribute	The source attribute. For example, date of birth, email ID, entity type, jurisdiction, tax ID, etc. NOTE: Attributes are displayed based on the source entity selected when creating a rule. For example, address, event, etc. It cannot be null.
Target Attribute	The target attribute. For example, entity type, jurisdiction, tax ID, etc. NOTE: Attributes are displayed based on the source entity selected when creating a rule. For example, customer, account, etc. It cannot be null.

Table 58: Rules, Mappings, and Group table

Field	Description
Threshold	<p>The threshold score. It indicates the score value provided to the attribute. The sum of the total threshold value of all attributes must be from 0 to ≤ 1.</p> <p>It indicates that a score below the mentioned value does not generate a result from the matching engine.</p>
Weightage	<p>The weightage. It indicates the weightage given for the attributes in the Rule.</p> <p>NOTE: Cumulative of attributes' weightage must not exceed one, and it cannot be null.</p>
Must	<p>It indicates that this attribute cannot have a null value. This attribute must be populated and must return a value for the matching.</p>
% if Null	<p>It indicates that if a Group has null for one entity for all attributes and no scoring attributes.</p> <p>It considers weighted score for mapping is 50% of the weightage.</p>
Match Type	<p>Select one of the following match types:</p> <ul style="list-style-type: none"> ● Exact: To obtain the matches that are 100% perfect when finding the entities in a database. ● Fuzzy: To obtain the matches that are less than or equal to 100% perfect when finding the entities in a database. <p>For more information on the Matching Type, see the OFS Compliance Studio Matching Guide.</p>
Scoring Method	<p>The scoring methods are as follows:</p> <ul style="list-style-type: none"> ● Default ● Jaro Winkler ● ML-Boosted Name ● ML-Boosted Address ● Levenshtein ● Individual Name ● Entity Name <p>For more information on the Scoring Method, see the OFS Compliance Studio Matching Guide.</p>

Table 58: Rules, Mappings, and Group table


Field	Description
CED	<p>CED (Character Edit Distance) indicates the "fuzziness" for a fuzzy match.</p> <p>An edit distance is the number of one-character changes needed to turn one term into another. These changes can include:</p> <ul style="list-style-type: none"> • Changing a character (box → fox) • Removing a character (black → lack) • Inserting a character (sic → sick) • Transposing two adjacent characters (act → cat) <p>If no value is selected, CED/ fuzziness is set to AUTO wherein OpenSearch generates an edit distance based on the length of the term. AUTO should generally be the preferred value for fuzziness.</p>
Group	
Group name	The name of the Group.
Group Description	The description of the Group.
Threshold	<p>The threshold score. It indicates the score value provided to the attribute. The sum of the total threshold value of all attributes must be from 0 to <=1.</p> <p>It indicates that a score below the mentioned value does not generate a result from the matching engine.</p>
Weightage	<p>The weightage. It indicates the weightage given for the attributes in the sum of sub-rules.</p> <p>NOTE: Cumulative of attributes' weightage must not exceed 1. It cannot be null.</p>
Must	This attribute must be populated and must return a value for the matching.
% if Null	<p>It indicates that if a Group has null for one entity for all attributes and no scoring attributes.</p> <p>It considers weighted score for mapping is 50% of the weightage.</p>
Sub Rule	
Name	The name of the Sub Rule.
Description	The description of the Sub Rule.

3. Click **Delete**  to delete the Rule.

10.3.3 Cloning Ruleset (Match)

Use this section to clone ruleset from an existing match rule. You can also modify the ruleset name, description, source or target entities and attributes for these rulesets.

Perform the following to clone an existing match rule:

1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. On **Modeling** menu, click **Graphs**.

This displays the graph pipeline in a table.

Figure 225: Graph Summary



Name	Number of Nodes	Number of Edges	Owner	Created Date	Action
FINANCIAL_CRIME_GLOBAL_GRAPH FCDM-Graph BD	13	46	MMGUSER	Feb 23, 2023, 3:44:38 PM	...
Sample Graph test bugs	1	0	FCMDSADMIN	Feb 23, 2023, 11:44:10 AM	...
TEST test	1	0	FCMDSADMIN	Feb 22, 2023, 6:30:07 PM	...

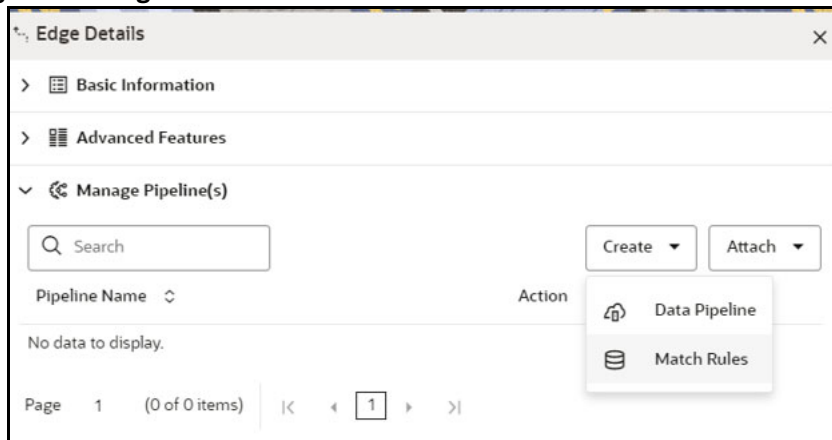
3. Click **Graph**. The Graph page is displayed.

Figure 226: Graph Page



4. Hover over the graph pipeline and click edge on the graph. The Edge details page is displayed.

Figure 227: Edge Details



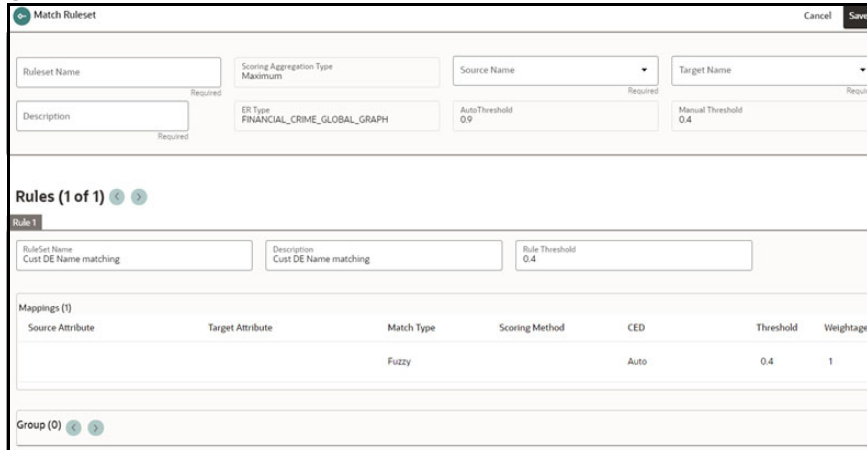
5. From the **Create** drop-down list, select the **Match Rules**. The Create Pipeline window is displayed.

Figure 228: Create Pipeline



6. Select **Clone From an Existing Match Rule** option and required pipeline from the **Select Pipeline** drop-down list and then click **OK**. The following window is displayed.

Figure 229: Ruleset Details



7. You can enter / select the Ruleset details for the following fields:
 - Ruleset Name
 - Source
 - Target
 - Description

For information on the fields in the Ruleset Details window, see the [Creating Ruleset \(Match/Merge\)](#) section.

NOTE For cloning an existing match rule, the selected source and target attributes must be same as the source and target attributes of the existing match rule.

8. Click **Save**. The new match rule is cloned.

10.3.4 Data Survival Rules

The Rule facilitates storing the master record/final output tables based on the dataset survival rule stored against pipeline id.

Compliance Studio provides OOB rules; however, you can modify these rules or create your rules:

- Using Data Survival
- Creating Data Survival

10.3.4.1 Using Data Survival Rules

Use this section to enable or disable the OOB rules. You can also modify this Rule's description and ER type attributes and remove rulesets from the existing list.

Perform the following to use the existing Ruleset:


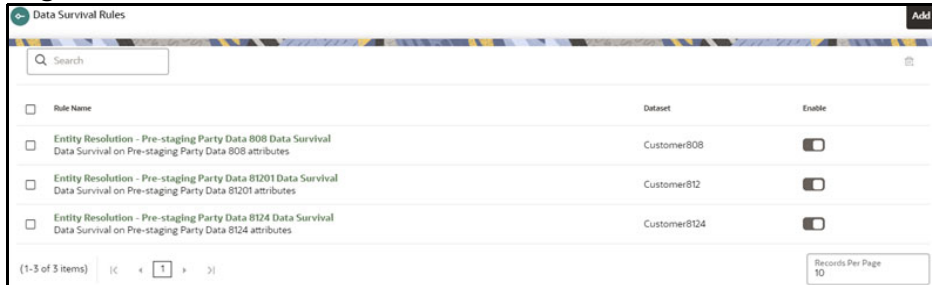

1. On the **Workspace Summary** page, select Launch workspace  to display the **CS Production Workspace** window with application configuration and model creation menu.
2. On **More** menu, click **Data Survival**. The Data Survival Rules page is displayed.

Figure 230: Data Survival Rules

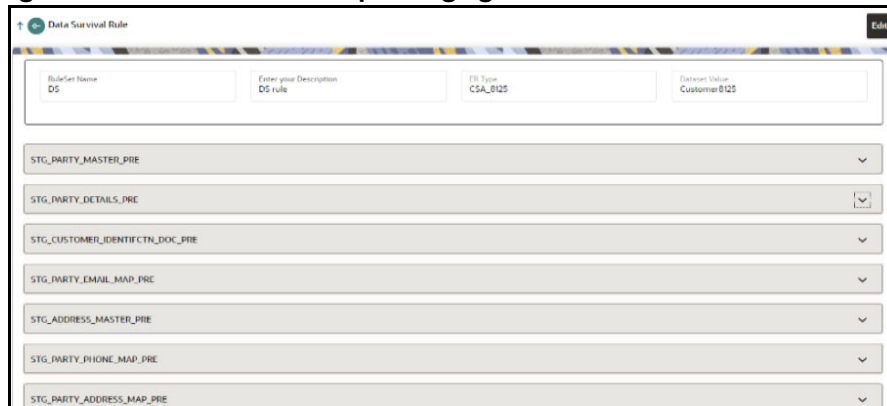



On the Summary page, perform the following actions:

- To enable the Rule, select the Rule and move the toggle switch to the right.
- To add the Rule, click **Add** . For more details, see [Creating Data Survival Rules](#) section.
- To delete the Rule(s), select the checkbox(s) corresponding to the rule(s) and click **Delete**. The confirmation message is displayed with details of Rule(s) to select again. You can check or uncheck check boxes for the required rule(s) and then click **Delete**.

The following figure illustrates the OOB Data Survival Rules for FSDF 812:

Figure 231: Data Survival Rules pre-staging tables for FSDF 812



3. On the details page, perform the following actions:
To edit the Rule, click on the **Rule**, and the corresponding Rule page is displayed. On the Rule page, click **Edit** . The page displays Rule details.

You can modify the Rule details except for the following fields:

- RuleSet Name

- Description
- ER Type
- Dataset Value

NOTE Fields marked with * are mandatory fields.

Figure 232: Data Survival Rule Page


On this page, perform the following actions.

- You can use the search filter to search for any particular attribute in each input table. The records will be displayed based on the specified value in the search filter (Type the filter).
- You can sort the records.
- Right-click on any of the columns and select **Sort > Sort Ascending** or **Sort Descending** for ascending and descending order, respectively. The records will be displayed according to sort order.
- You can select the method type from the **Type** drop-down list.

NOTE You must sort the records again when changing the value in the **Records per Page** field.

- Click **Save** to save the changes or click **Cancel** to revert the changes.

10.3.4.2 Creating Data Survival Rules

1. On the Data Survival Rules page, click **Add** . The page displays the attributes to create the Rule.

NOTE You should not create multiple data survival rulesets for a particular ER Type.

2. Enter the field values.

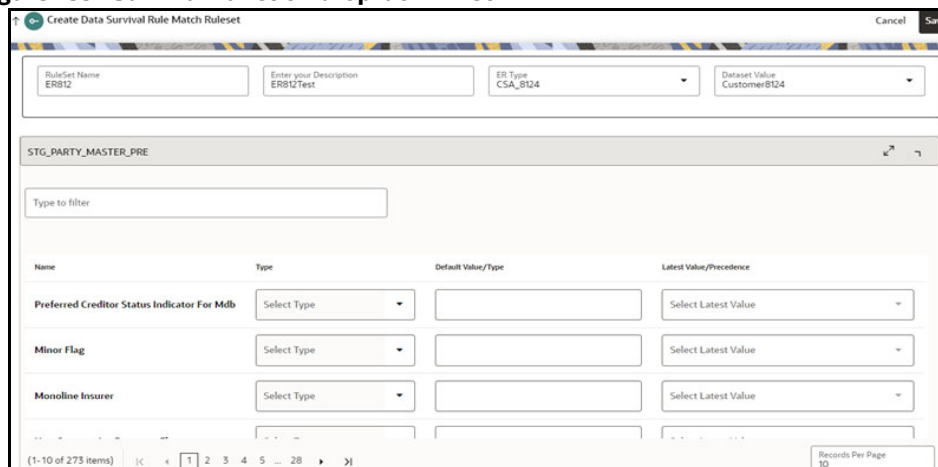
Table 59 provides descriptions for the fields on the page:

Table 59: Data Survival Rules fields

Field	Description
Rule Name	The name of the Rule.
Description	The description of the Rule.
ER Type	<p>The type of data that is to be matched. The values are as follows:</p> <ul style="list-style-type: none"> • CSA_812 • CSA_8124 • CSA_8125 • CSA_8126 <p>NOTE: It is recommended to use CSA_8126 pipeline with Compliance Studio 8126 and BD 8126 and the other pipelines are deprecated. The lower version pipelines are supported only if you are upgrading to CS 8.1.2.6.0.</p>
Dataset	<p>The name of the output data structure to which this data is saved. The values are as follows:</p> <ul style="list-style-type: none"> • Customer812 • Customer8124 • Customer8125 • Customer8126

Once you select the Dataset, the input tables are displayed. The list of tables will change based on the Dataset selection. Each table displayed can be expanded to allow you to select the survival function for each attribute if needed.

Figure 233: Survival Function drop-down List



On this page, perform the following:

- Filter the records using the search filter (Type the filter)
- Sort the records

- To sort the records, right-click on any of the columns and select **Sort > Sort Ascending** or **Sort Descending** for ascending and descending order, respectively. The records will be displayed according to sort order.
 - Select the method types. See the following step for method type details.
3. You can select the following method types used to store the final record.
- **Generate:** This is applicable for primary keys of the tables, where the system will generate the unique identification number for the record.
 - **Generate Sequence:** This is applicable for child records, where the system will generate the identification number in sequential order of the particular parent key.
 - **Distinct:** This will apply to child tables only. This will remove the duplicate values and allow the user to choose to save the unique record. This applies to columns that are marked as primary keys.

NOTE The user should not have **Type** “Distinct” and “All” together with other columns that return unique values in child tables.

- **Latest:** A date column like Data dump date against each row in the input tables will pick the latest date. For example, if the customer's Occupation is Teacher and Businessman and all the records have a Data Dump date against them, the latest record value will be taken.

You can select the latest date attribute from the **Latest Values** drop-down list.

- **Longest:** It counts the number of characters and picks the most extended values.
- **Most Common:** This will apply to the most repeated value that will be picked for data survival. For example, if the Occupation of three customers is 1. Business, 2. Business, and 3. The teacher then Business occurs twice so that value will be picked.
- **All:** This case can only apply to child records, where you can store multiple values against customer id. For example, you have three customers to be merged, and all three have different email IDs, so all the email IDs will be stored against the merged Global entity.
- **Default:** This will be used for inserting a user-defined value for columns. For example – if the user wants to provide the default value of the **Branch_Code** column as **ER**, then ER will be inserted for all the rows.
- **Maximum:** This will apply to number columns. Users can choose this for storing the maximum number value. For example, if Annual Income is C1 - 2M, C2- 3M, and C3 - 5M, then 5 M will be saved for the global entity.

NOTE This is applicable only for numbers attributes.

- **Minimum:** This will apply to number columns. Users can choose this for storing minimum number values. For example, if Annual Income is C1 - 2M, C2- 3M, and C3 - 5M, then 2M will be saved for the global entity.

NOTE This is applicable only for numbers attributes.

- **Null:** The user can choose not to insert any value while persisting the record. So null will signify a null value for that particular column.

- **Metadata:** This will apply to attributes that should be selected based on metadata, for example, to select the occupation with the highest risk score.

To enable this, select the **Type** as **Metadata**. You can select the metadata type in the **Default Value/Type** drop-down list. The types of Metadata are user-defined and can be set using an API call (See **Populate the Metadata for Data Survival in Studio Schema** section in the **OFS Compliance Studio Administration and Configuration Guide**). Each attribute value that appears in the metadata for the given type will be given a numerical value. In the UI, select the precedence value in the **Latest Values/Precedence** drop-down list as either Minimum or Maximum. This will select the attribute with the highest or lowest numerical score as part of the Data Survival logic.

NOTE

- This is applicable only for String attributes.
- Numerical scores have to be provided against each attribute value in the source data. Where a value does not exist in the metadata, then no numerical value will be assigned, and it will be excluded from selection if other attributes have values.
- Where no strings are in the metadata, the data survival algorithm will select any one of the attributes for the output.

4. Click **Save** to save the Rule or click **Cancel** to revert the changes.

10.4 Using Manual Decisioning

The **Manual Decisioning** in Compliance Studio allows you to make manual decisions on similarity edges in the Global Graph and matches for Entity Resolution, where the score is between the manual and automatic thresholds set on the Match **Ruleset** page. This flexibility provides an Ad-hoc experience to allow users to make decisions on borderline cases.

- **Global Graph**, if the decision is **approved**, the match edge will be moved to Global Graph. The match edge will not be part of the Global Graph if the decision is rejected.
- **Entity Resolution (CSA8xx)**, if the decision is **approved**, the match is added to the probable groups for merging in the Entity Resolution process. If the decision is **rejected**, it is not considered in probable groups.

You can specify your **Manual Threshold** on the Match Ruleset Details page for Manual Decisioning.

Figure 234: Manual Threshold

On **More** menu, click **Manual Decisioning**. The **Manual Decisioning** page is displayed.

Figure 235: Manual Decisioning

The role icons are at the top-right corner, the 1st is Request User, and the 2nd is Approver User. The number of icons will be based on user privileges. If both icons are shown, you can choose whether to make a decision as an Request User or Approver User.

You must select the following to display the records on the page.

- **Manual Decision Type**
- **Select Pipeline / Select Graph**
- **Data Source Type**

Other than **Graph**, records will be displayed only when you select the **Data Source Type** for **Entity Resolution (CSA8xx)** (ER Type).

The records on the Manual Decisioning page will be displayed based on the selection of **Manual Decision Type**. The **Data Source Type** field is applicable only when **ER Type** is selected as **Entity Resolution (CSA8xx)**.

Records are displayed on one of the following tabs, depending on where they are in the Manual Decisioning workflow.

New (where no decision has yet been made)

- Pending Approved (where Request User has made an approve decision and this is to be confirmed or rejected by a Approver User)
- Pending Rejected (where Request User has made a reject decision and this is to be confirmed or rejected by a Approver User)
- Approved (where the decision has been approved)
- Rejected (where the decision has been rejected)

See the [Manual Decisioning Workflow](#) section for more details.

Figure 236: Manual Decisioning

Source	Target	Match	Created Date
Name, Entity Type, Description	Name, Entity Type, Description	Score, Description	
<input type="checkbox"/> Dominic Gerard Francis Pre Staging - Party Data 8124 concat_name : Dominic Gerard F...	<input type="checkbox"/> Francis Dominic Gerard Pre Staging - Party Data 8124 concat_name : Francis Dominic ...	75.44 Matched on : Source concat_nam...	2023-03-03 10:14:35
<input type="checkbox"/> Hakeem-Ah Tiki Hakeem-Ah Attim Kiambu Pre Staging - Party Data 8124 alias : Hakeem-Ah Tiki Barber ...	<input type="checkbox"/> Attim Kiambu Hakeem-Ah Tiki Barber Pre Staging - Party Data 8124 concat_name : Attim Kiambu Hak...	60.54 Matched on : Source alias - Ta...	2023-03-03 08:31:49
<input type="checkbox"/> Layla Atkinson Pre Staging - Party Data 8124 concat_name : Layla Atkinson...	<input type="checkbox"/> Layla Pre Staging - Party Data 8124 concat_name : Layla , alias ...	64.1 Matched on : Source concat_nam...	2023-03-03 08:31:49
<input type="checkbox"/> Marcel Eug7ne Georges Pre Staging - Party Data 8124 concat_name : Marcel Eug7ne Ge...	<input type="checkbox"/> Georges Eug7ne Marcel Pre Staging - Party Data 8124 concat_name : Georges Eug7ne M...	63.98 Matched on : Source concat_nam...	2023-03-03 08:31:49

By default, ten edges or matches are displayed per page. Click the **Next arrow** to view the next set of edges or matches.

The following fields are available on the page:

You can filter the edges using the following options:

- Source Entity Type (Entity Resolution (CSA8xx))/Source Node Type (Graph)
- Target Entity Type (Entity Resolution (CSA8xx))/Source Node Type (Graph)
- Advanced Search

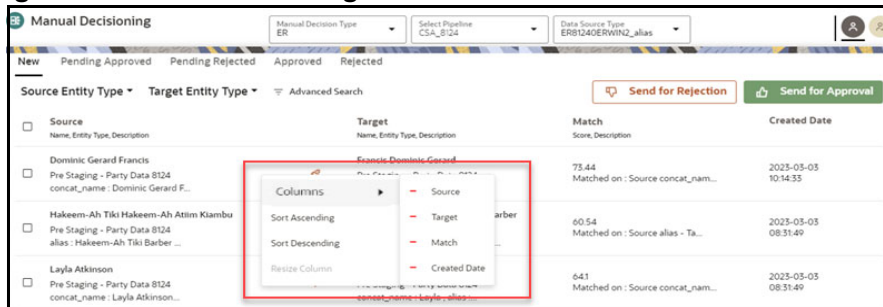
Click **Advanced Search**. The following page is displayed.

Figure 237: Advanced Search screen



- To customize the view on the page, perform the following:
 - a. Select any column on the page.
 - b. Right-click and the following menu options are displayed:

Figure 238: Manual Decisioning screen



- **Columns:** You remove and add the column from list.
- **Sort Ascending:** You can sort the edges on the page in Ascending order.
- **Sort Descending:** You can sort the edges on the page in Descending order.
- **Resize Column:** You can resize the column by specifying the column width.

To filter the edges on the page, perform the following:

- **Source Entity Type (Entity Resolution (CSA8xx))/Source Node Type (for Graph):** Select the source from the list. It filters the edges based on the list under the Source column.
- **Target Entity Type (Entity Resolution (CSA8xx))/Source Node Type (for Graph):** Select the target from the list. It filters the edges based on the list under the Target column.

- Advanced Search:** You can filter in which the recodes search criteria as specified. For more details, see the [Searching for Manual Decisions](#) section.

NOTE

You can apply all the filters in parallel. It considers source, target, and search criteria specified in Advanced Search. It uses AND logic.

For example,

- Source Node Type/Source Entity Type is the customer
- Target Node Type/ Target Entity Type is customer
- Advanced Search: The source Name is GRAF
- The column names (Source and Target) are replaced with selected Source and Target values from the drop-down list.
- You can drag and drop the columns on the page to change the order.

On the **Manual Decisioning** page, when you select the possible match from the **New** tab, the **Details** pane is populated on the right side of the screen, giving more detail on the possible match to allow the decision to be made.

Note that the view edge is different for **Graph** and **Entity Resolution (CSA8xx)**. For more information, see the [Viewing the Edges from the Source](#) section.

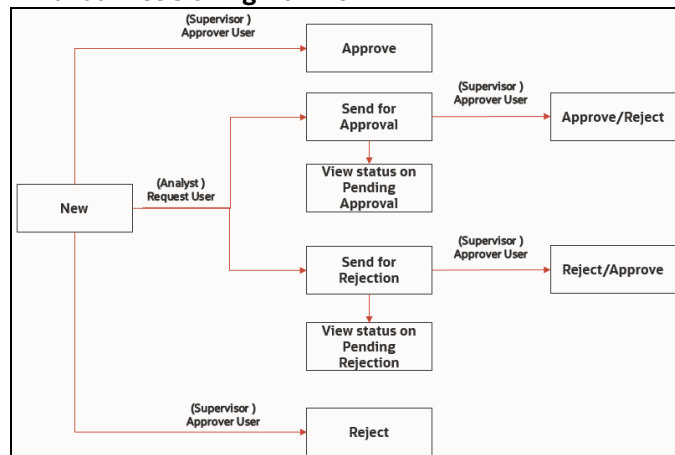
10.4.1 Manual Decisioning Workflow

You can take the following decision as an **Analyst** (New tab) or **Supervisor** (New, Pending Approved, Pending Rejected tabs) on this page:

- Send for Approval
- Send for Rejection
- Approve
- Reject

The following figure illustrates the Manual Decisioning workflow.

Figure 239: Manual Decisioning workflow



10.4.2 Searching for Manual Decisions

You can specify the Advanced Search using AND logic. It will display the edges only when they satisfy the search criteria.

To filter the edges in the Advance Search, perform the following:

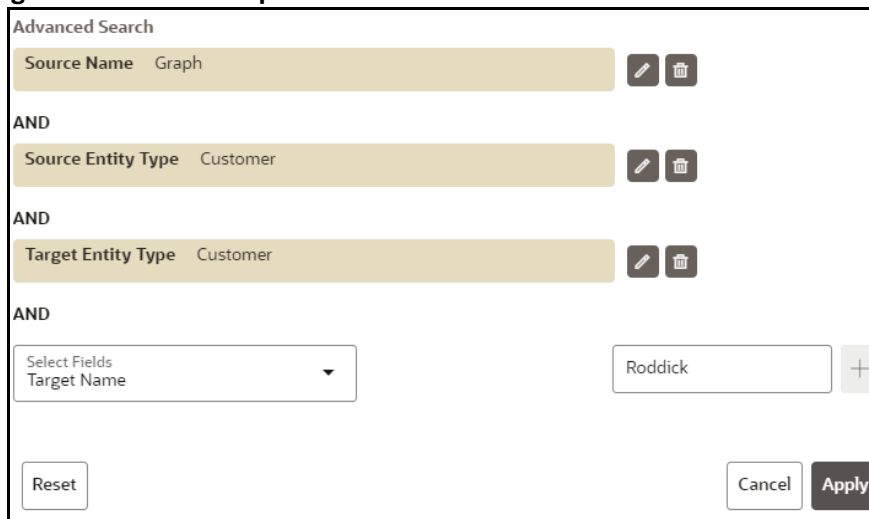
1. Click **Advanced Search**. The Advanced Search window is displayed.

Figure 240: Advanced Search screen



2. Select the fields from the Select Fields drop-down list. You can add multiple search criteria.

Figure 241: Select the option in the search screen



You can perform the following actions:

- Click **Add** icon to add the field value for the selected Field.
- Click the **Edit** icon to edit the field value for the selected Field
- Click the **Delete** icon to delete the field value for the selected Field
- Click **Apply** to display edges per search condition or click **Cancel** to Cancel.
- Click **Reset** to clear the specified values.

10.4.3 New, Pending Approved, and Pending Rejected Tabs

The action tabs contain a list of the similarity edges or Entity Resolution matches that require a decision to be made or approved. These tabs display the **Source** (Name, Node/Entity Type,

Description), **Target** (Name, Node/Entity Type, Description), **Match** (Score, Description), and **Created Date** information that can be **Rejected** and **Approved** to initially find the match. Additional information can be seen in the Details Panel

Comments: The supervisor can also review the analyst's comments on Pending Approved and Pending Rejected tabs and take further action (Approve or Reject).

See the [Manual Decisioning Workflow](#) section for more details.

10.4.4 Approved and Rejected Tabs

The Approved and Rejected tab contain a list of the similarity edges or Entity Resolution matches that have been approved or rejected. These tabs display the sources, Target, Match Score description, Created Date, and Comments Approved or Rejected that are sent by the Analyst and reviewed by Supervisor.


No further actions can be taken from these tab.

10.4.5 Taking a Decision on Similarity Edges

You can take the decision as an **Analyst** or **Supervisor**.


1. Select the edge and perform the following:

- Analyst

- Click on  to send for approval.

- Click on  to send for rejection.

- Supervisor

- Click on  to approve.

In the case of **Graph**, the match edge will be moved to Global Graph.

In the case of **Entity Resolution (CSA8xx)**, probable groups will be created for the selected records, and the new Global party IDs will be generated based on the merge rule.

- Click on  to reject.


In Graph, the match edge will not be part of the Global Graph.

In the case of **Entity Resolution (CSA8xx)**, probable groups will be created for the selected records, and the same Global party IDs will be retained as-is.

2. Report Action Pop-up window appears, provide comments in the **Comments text box** or choose **Standard Comments** from the drop-down list for selected edge(s):


- For Send for Approval or Approve:

Figure 242: Send for Approval/Approve

The screenshot shows a dialog box titled "Report Action" with a close button (X) in the top right corner. The main text reads "You are going to  Approve the report." Below this is a text input field labeled "Comments" with a "Required" label underneath. Underneath the text field is a dropdown menu labeled "Select Standard Comments" with a "Required" label underneath. At the bottom right are two buttons: "Cancel" and "Save".

- For Send for Rejection or Reject.

Figure 243: Send for Rejection/Reject

The screenshot shows a dialog box titled "Report Action" with a close button (X) in the top right corner. The main text reads "You are going to  Reject the report." Below this is a text input field labeled "Comments" with a "Required" label underneath. Underneath the text field is a dropdown menu labeled "Select Standard Comments" with a "Required" label underneath. At the bottom right are two buttons: "Cancel" and "Save".

- You can provide free-form comments for the selected similarity edge using the **Comments** text box to provide your own comments or choose from the **Select Standard Comments** drop-down list. The available options are as follows:
 - Additional identifier indicates the same entity
 - Address not similar enough
 - DOB missing or conflicting
 - Name is not similar enough
 - No additional identifiers are available
 - No transaction activity indicating the same entity

- Transactional behavior indicates same entity

NOTE

Send for Rejection/Reject and Send for Approval/Approve can be performed for single or multiple edges.

You can provide comments in the **Comments** text box or Select Standard Comments. Once you select **Comments**, the other one will be disabled automatically and vice versa.

- Click **Save** to save the change or click **Cancel** to revert the changes.

10.4.6 Viewing the Edges from the Source

On the **Manual Decisioning** page, when you select the edge from the action tab (that is, **New**, **Pending Approved**, **Pending Rejected**, **Approved**, and **Rejected**). The **Details** pane is populated on the right side of the screen. You can view the edge in the Details pane and validate it to include in your graph.

- Graph

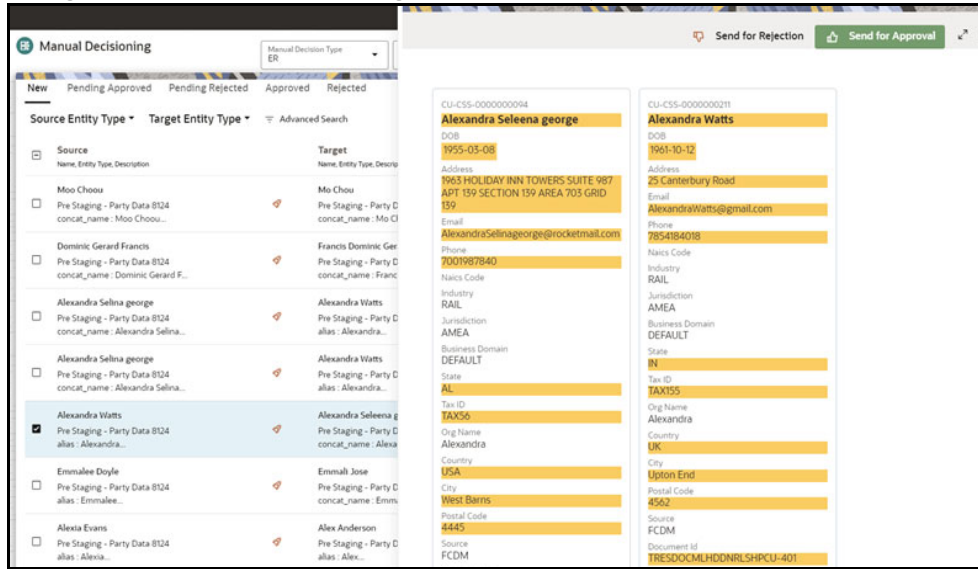
Figure 244: Manual Decisioning

Source	Target	Match	Created Date
Name, Node Type, Description	Name, Node Type, Description	Score, Description	
<input checked="" type="checkbox"/> BORDER COOL HILLS customer concat_name: BORDER COOL HILL...	WILLI MR customer concat_name: WILLIAM WILLI SH...	5196 Matched on: 'Source concat_nam...	2022-08-02 15:41:49
<input type="checkbox"/> GAWASKAR COOL HILLS customer concat_name: GAWASKAR COOL HL...	BORDER COOL HILLS customer concat_name: BORDER COOL HILL...	7792 Matched on: 'Source concat_nam...	2022-08-02 15:41:50

- Entity Resolution (CSA8xx)

You can perform actions (**Approve**, **Reject**, **Send for Approval**, and **Send for Rejection**) on the View Edges pane for **ER Type** is **Entity Resolution (CSA8xx)**.

Figure 245: Manual Decisioning screen for Entity Resolution (CSA8xx)



NOTE

- If you are viewing the paginated graph, increase the Page Size of the graph in Manual Decision UI to avoid the Paginated graph.
- Navigate to **Settings > Visualization** > Increase the Page size to accommodate the graph on one page.
- You need to unlock the Manual Decision notebook from the Notebook server UI to view the graph.

10.5 Using Merge and Split Global Entities

Merge and Split Global Entities in Compliance Studio allows you to manually break, merge, split, create, and re-arrange parties into global parties. This flexibility provides an Ad-hoc experience to enable users to make decisions on borderline cases or where data issues or rules logic has grouped records incorrectly. It also allows users to approve system changes to global party membership where this has been configured.

On **More** menu, click **Merge and Split Global Entities**. The Merge and Split Global Entities page is displayed.

Figure 246: Merge and Split Global Entities

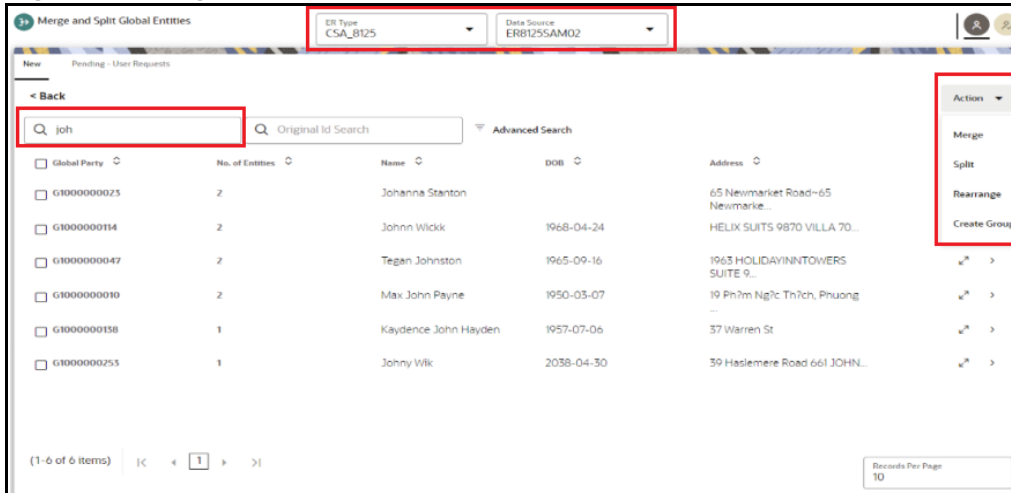


The role icons are at the top-right corner, the 1st is **Analyst**, and the 2nd is **Supervisor**. The number of icons will be based on the user privileges. If both icons are shown, you can choose whether to make a decision as an Analyst or Supervisor.


Unlike the Manual Decision Screen, there are no records displayed initially. The user needs to search for entities to merge or split.

First, select the **ER Type** and **Data Source** drop-down list, and click the **search** icon after entering the customer name or customer ID in the search filter.

Figure 247: Merge and Split Global Entities



By default, the ten records are displayed per page. Click the **Next arrow** to view the next set of records.

You can filter the records using the search filter  based on a customer name in the **Name Search** field or customer ID in the **Original Id Search** field and **Advanced Search** based on search criteria.

NOTE

- Enter at least 3 characters for every token in the search field for better search results.
- The following special characters are not supported for search result: * & \ % _ , ~ - ; \$? [] { } = () > ! |
- Advanced Search will further filter the results from the initial search (Name and Original ID).
- The maximum number of global party IDs is 100. The page will display only 100 global party IDs in the UI even if the results of the partial name search are more than 100 and the order of display will be random.

In addition, you sort the records by selecting each column.

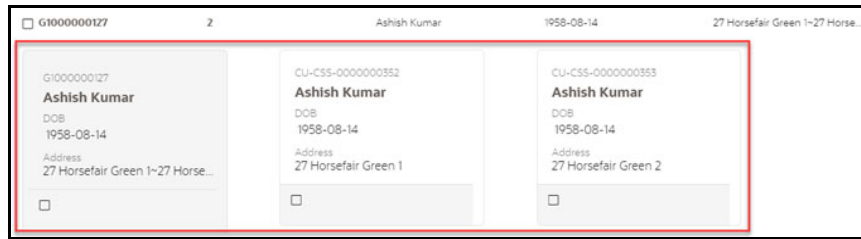
NOTE

- You can apply all the filters in parallel. It considers customer name or customer ID and search criteria specified in **Advanced Search**. It uses AND logic.
- For example, enter the name Lily in the search filter and select Country as the US in an Advanced Search.
- The Global Party records with customer details (Customer name and Country) are displayed.
- The records are displayed and refreshed based on the ER Type and Data Source for Entity Resolution (CSA8xx) selection on the New and Pending tabs along with the search filter.

When you initially select records on which to take action, you will see some details for the Entity:

- **Card View:** Displayed as a card with the customer ID, name, DOB, and address.

Figure 248: Card View

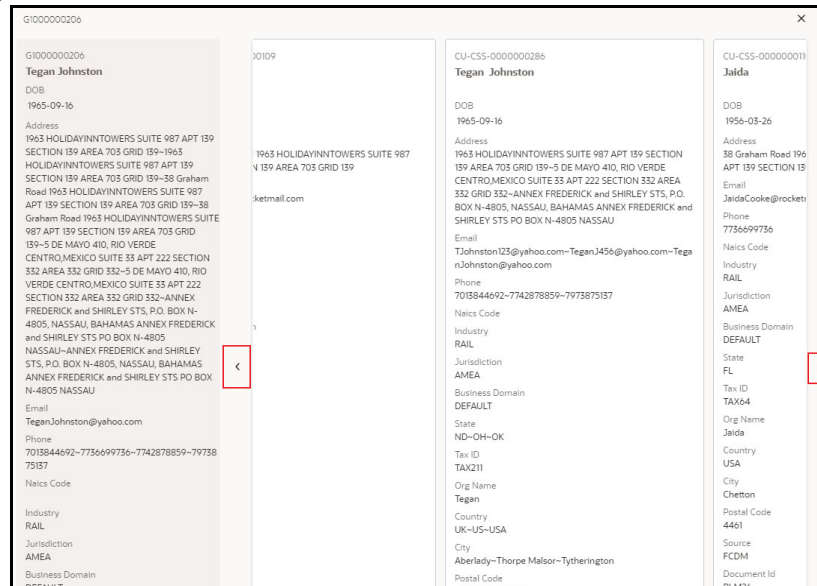


NOTE If entity does not belong to the User's business domain and jurisdiction, then all attributes are masked except Original ID.

To help in making a decision, you can view the Expand the records to Full view (to compare the customer records with Global Party details).

Full View: Highlighted the comparison in the Customer details with respect to Global Party details. You can see next customer details by clicking the **Next** and **Previous** arrows.

Figure 249: Next and Previous arrows



Analysts and Supervisors can perform the following actions:

- **Merge:** Customers in the existing Group have different global ids assigned. These customers are merged into a single group, and a new global id is assigned.
- **Split:** A single global id is assigned to all customers in the existing Group, and the customers are split into different groups with new global ids assigned to each.
- **Rearrange:** A number of parties exist in more than one global party with different global ids assigned. This action can be used to re-arrange the parties into different global parties. New global party ids will be assigned.
- **Create Group:** A new global party is created to which customers can be moved. New global party ids will be assigned.
- **Override Global Party (Reset to Source):** The override flag is enabled only when manual action is taken on the particular global party id.

Additionally, supervisors can take the following actions on the Pending - User Requests and Pending - System Requests tab, where an Analyst has taken action already:

- **Approve:** The action taken by the analyst is approved, and the changes are committed.
- **Reject:** The initial state of the Global Party before manual action will be retained.

10.5.1 Merge and Split Global Entities Workflow

You can take the following actions as an **Analyst** (New tab) or **Supervisor** (New tab)) on this page:

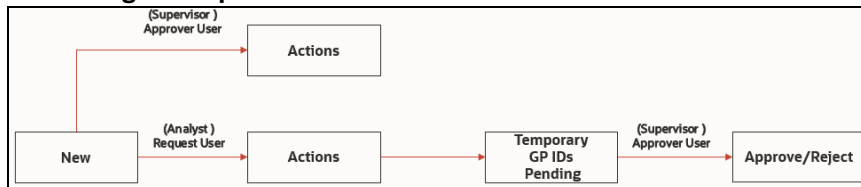
- Merge
- Split
- Rearrange
- Create Group

As a Supervisor, you can make a decision on the actions taken by the Analyst.

- Approve
- Approve All
- Reject

The following figure illustrates the Merge and Split Global Entities workflow.

Figure 250: Merge and Split Global Entities workflow



10.5.2 Searching for Global Entities

You can specify the Advanced Search using AND logic. It will display the records only when they satisfy the search criteria.

To filter the records in the Advanced Search, perform the following.

1. Click **Advanced Search**. The Advanced Search window appears.

Figure 251: Advanced Search screen



2. Select the fields from the **Select Fields** drop-down list. You can add multiple search criteria.

Figure 252: Select the option in the search screen

The screenshot shows an 'Advanced Search' interface. It features three search criteria stacked vertically, each with an 'AND' connector. The first criterion is 'Original ID' with the value 'CU'. The second is 'First Name' with the value 'Lily'. The third is 'Tax ID' with the value 'TAX133'. Each criterion has a dropdown menu for field selection and a text input for the value. To the right of each criterion are edit and delete icons. At the bottom of the search area, there are 'Reset', 'Cancel', and 'Apply' buttons.

You can perform the following actions:

- Click **Add** icon to add the field value for the selected Field.
- Click the **Edit** icon to edit the field value for the selected Field
- Click the **Delete** icon to delete the field value for the selected Field
- Click **Apply** to display edges per search condition or click **Cancel** to Cancel.
- Click **Reset** to clear the specified values.

10.5.3 New Tab

Enter the customer name or ID in the search filter and click the **Search** icon. The record information (**Global Party, No. of Entities, Name, DOB, and Address**) is displayed.

Use breadcrumb locator **<Back** link to navigate back to Home after checking the action results.

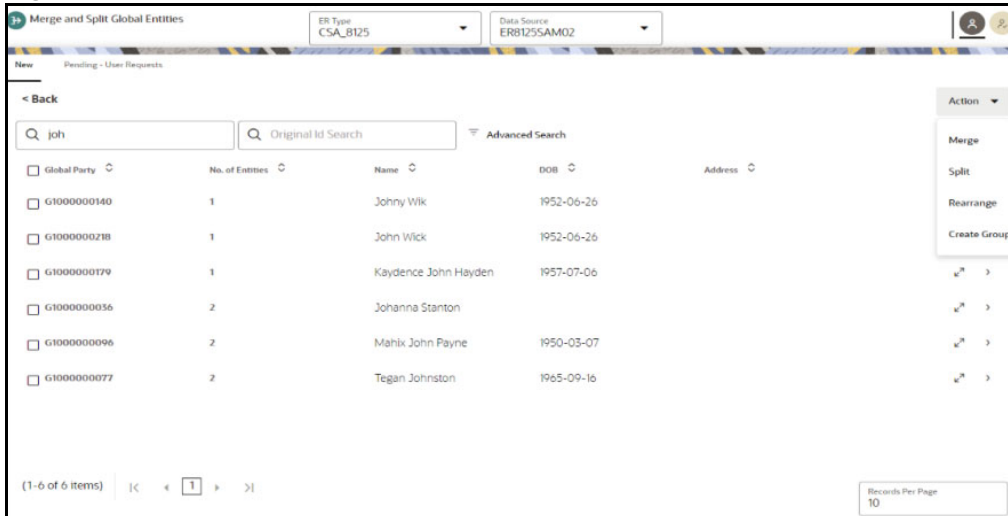
The results are displayed for each action (Merge/Split/Create/Create Group) in **New/<Actions>** tab with a new Global Party ID and the number of customers in **No. of Entities**.

For Rearrange, you can select the records along with Global parties on the page and select the Global Party where you want to move all selected records. You must save the changes to reflect on the page.

NOTE You must select at least two Global Parties for Merge/Rearrange/Create Group. For Split, only one Global Party.

See the [Merge and Split Global Entities Workflow](#) section for more details.

Figure 253: Fields on New tab



Analyst or Supervisor can perform the following actions:

1. Expand the records to Full view (to compare the customer records along with Global Party details) or Card view (to view customer name, id, and address).
2. Select the customer records and Global Party.
3. Click **Action** drop-down and select any one of the actions according to your requirement:
 - **Merge:** You must select at least two Global Parties.

NOTE

- You can persist the Global Party ID using the **Select ID For Persistence** drop-down list.
Persisting Global Party ID means one of the new parties retains the previous global id and hence retains the history of the previous global party.
- It can only be done at the Global Party level, not for individual customer records in different Global Parties.

- **Split:** You should select only one Global Party and multiple records to split.
 - **Rearrange:** You must select at least two Global Parties.
 - Select the Global Parties on which the user wants to perform Rearrange. Then the user will be moved to **New/Rearrange** breadcrumb, where you need to select customers and perform Rearrange.
 - Click **Save** to save the changes or **Cancel** to revert the changes.
 - **Create Group:** The records and respective Global Parties must be selected.
4. After selecting the action, you can provide free-form comments for the selected action using the **Comments** text box or select comment from the **Select Standard Comments** drop-down list.

Figure 254: Merge Action pop-up

Merge Global Parties

Select ID For Persistence

Comments

Select Standard Comments

Cancel Save

NOTE The **Select ID For Persistence** drop-down list is applicable for the following actions:

- **Merge**
- **Split**

Persisting Global Party ID means one of the new parties retains the previous global id and hence retains the history of the previous global party.

The available standard comments are as follows:

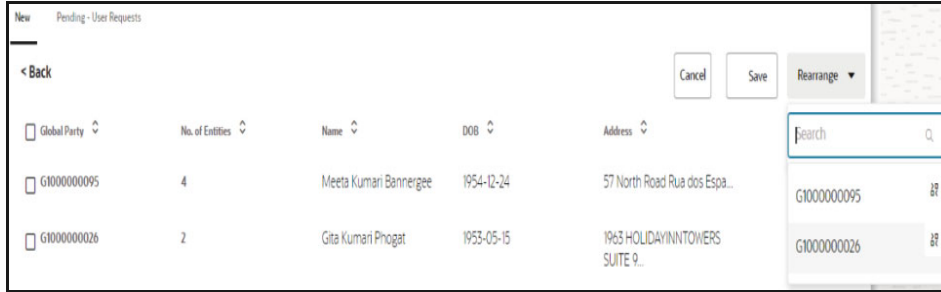
- Merge Entity as identifiers indicate the same entity
- Merge Entity as addresses indicate the same entity
- Split Entity as address not similar enough
- Split Entity as DOB missing or conflicting
- Split Entity as name not similar enough
- Split Entity as no additional identifiers available or not similar enough
- Remove any manual split or merge - fixed at source

NOTE

- Actions can be performed for single or multiple Global Parties.
- You can provide comments in the **Comments** text box or Select Standard Comments. Once you select **Comments**, the other one will be disabled automatically and vice versa.

5. The results are displayed to rearrange on **New/<Action>** tabs as follows:

Figure 255: New/<Action> Tabs

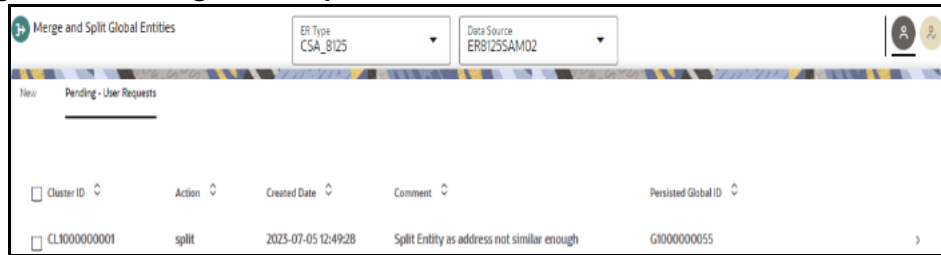


The new Global Party ID has the selected records while creating the group, and existing the Global Party is updated with the number of records in **No. of Entities**.

10.5.4 Pending - User Requests Tab

The Pending - User Requests tab displays Cluster ID details for which Supervisor needs to take an action. This tab shows **Cluster ID, Action, Created Date, Comment** and **Persisted Global ID** information.

Figure 256: Pending - User Requests Tab



Cluster


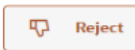
A Cluster is a group of global parties that collectively participates in an action. This action can involve various operations such as Split, Merge, or a combination of both Split and Merge.

For example, G1 has C1 and C2 entities, G2 has C3 and C4 entities.

While performing a Split & Merge of G1 & G2, such that G1 and G2 are split, then C1, C3 are merged to be a single group and C2, C4 are merged to be another group; and then both G1 and G2 are grouped together to form a single cluster.


The global parties are processed as clusters in order to maintain the integrity and consistency of the resolution of entities.

To Approve or Reject as Supervisor on actions taken by the Analyst, perform the following:

1. Select the record(s) and perform the following:
 - Click on  **Approve** to approve.
The match is resolved as per action which Analyst has taken.
 - Click on  **Reject** to reject.
The initial state of the Global Party before manual action will be retained.
2. A pop-up window is displayed for both Approve and Reject.

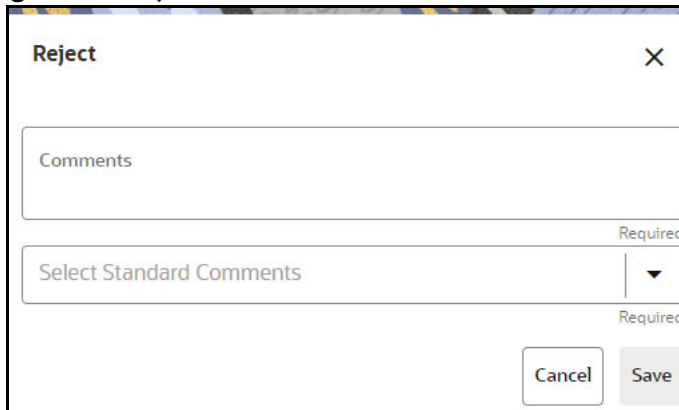
- For Approve:

Figure 257: Approve



- You can provide free-form comments for the selected action using the **Comments** text box or select comment from the **Select Standard Comments** drop-down list.
 - Click **Save** to approve the action or click **Cancel** to revert the changes.
- For Reject:

Figure 258: Reject



- You can provide free-form comments for the selected action using the **Comments** text box or select comment from the **Select Standard Comments** drop-down list.
- Click **Save** to reject the action or click **Cancel** to revert the changes.

10.5.5 Pending - System Requests Tab

The Pending - System Requests tab displays Cluster ID details for which changes have been made by the system (Batch) and manual approval is required.. This tab shows **Cluster ID, Action, Created Date,** and **Persisted Global ID** information.

NOTE

- The records will be displayed only if the GID Persistence and Manual Approval flags are set to true.
- If both the flags are set to false, the GIDs are not persisted and a new global party will be created.

NOTE

- If GID persistence flag is set to true and manual approval flag is set to false, then the GID is persisted but the requests are approved automatically.

By default, the Global Party ID will be persisted that has most number of entities and if the number of entities are same between the groups, the global party with the lowest global party id will be persisted.

For more information about Global Party ID persistence, see the **Persisting the Data** section in the [OFS Compliance Studio Administration and Configuration Guide](#).

Figure 259: Pending - System Requests Tab

Cluster ID	Action	Created Date	Persisted Global ID
CL-1000000001	split	2023-07-05 07:12:48	
CL-1000000002	split and merge	2023-07-05 07:12:48	G1000000004,G1000000077
CL-1000000003	split and merge	2023-07-05 07:12:48	G1000000112,G1000000025
CL-1000000004	split and merge	2023-07-05 07:12:48	G1000000051,G1000000003
CL-1000000008	split and merge	2023-07-05 07:12:48	G1000000092,G1000000090
CL-1000000021	split	2023-07-05 07:12:48	G1000000079
CL-1000000007	split and merge	2023-07-05 07:12:48	G1000000108,G1000000023
CL-1000000016	colt and maroc	2023-07-05 07:12:48	G100000010A,G1000000007


For more information about the **Cluster ID** details, see the [Cluster](#) section.

To Approve/Approve All/Reject as Supervisor for the changes are done by the system on running the ER batches, perform the following:

1. Select the record(s) and perform the following:
 - Click on **Approve** to approve the selected records.

NOTE

Enable the **Cluster ID** check box and click **Approve** to approve all the records. All records will be approved only on the selected page. If you need to approve the remaining records, then navigate to the next page and perform the same action again to approve all records on the particular page.

- Click on  to approve all the records that are updated by the batch action.

NOTE

The records need not to be selected when using the **Approve All** button.

- If F_ER_DS_SUBSEQUENT_BATCH is set to False in the FCC_ER_CONFIG table in the ER Schema. After clicking **Approve All**, all the records will be approved only on the selected page. If you need to approve the remaining records, navigate to the next page and click **Approve All** again to approve all the records on the particular page.
- If F_ER_DS_SUBSEQUENT_BATCH is set to True, then **Approve All** button approves all the records across all the pages.

To configure F_ER_DS_SUBSEQUENT_BATCH and ER_DS_SYSTEM_PENDING_MAX_NO_REC, see the **Create Index and Load the Data** section in the [OFS Compliance Studio Administration and Configuration Guide](#).


- Click on  to reject the selected records.
2. A pop-up window is displayed for **Approve**, **Approve All** and **Reject** actions.
- For example, if it is Approve action.

Figure 260: Approve



- You can provide free-form comments for the selected action using the **Comments** text box or select comment from the **Select Standard Comments** drop-down list.
- Click **Save** to approve the action or click **Cancel** to revert the changes.

10.5.5.1 Persisting the Global Party ID through the Manual Action

Supervisor can choose which global party ids are persisted as part of the manual approval process.

NOTE

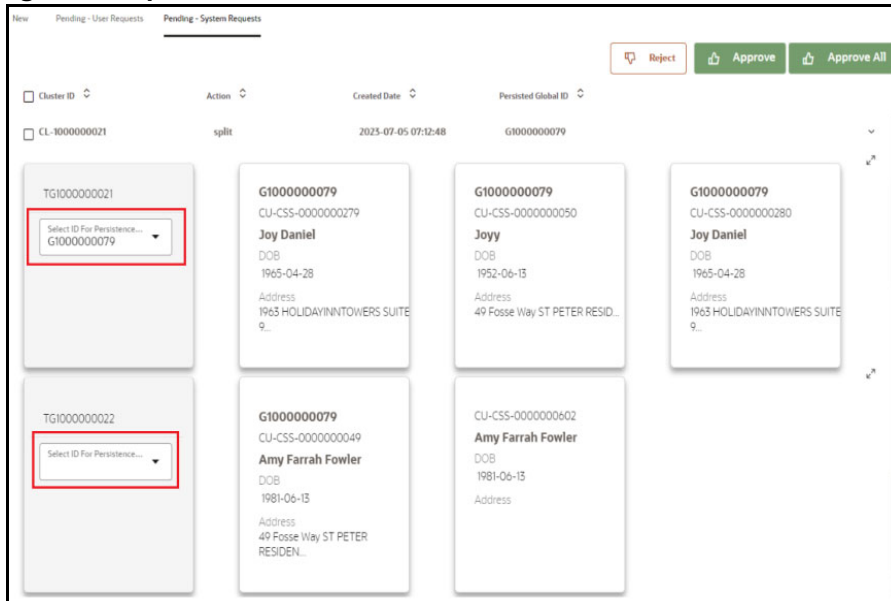
Approve/Reject: Select the particular Cluster ID and click **Approve/Reject** to approve/reject the records.

Approve All: Click **Approve All** to approve all the records that are updated by the batch action.

For example, if you want to split multiple records in one Global Party ID then follow these steps:

1. Select the Cluster ID and click **Expanded**  arrow to view the cluster details.

Figure 261: Split Action



2. Select Global Party ID from the **Select ID for Persistence** drop-down list.

You can persist Global Party ID in the following methods:

- By default, the Global Party ID will be persisted for the group that has the most number of entities and if the number of entities are same between the groups, then the group with the least entity id gets the persisted GID. This is the behaviour if **Approve All** is selected and is also the default behaviour if manual approval is not configured.
- If you want to persist the Global Party ID based on your requirement, then follow these steps:
 - i. Select blank Global Party ID from the **Select ID For Persistence** drop-down list which need not be persisted.
 - ii. Select Global Party ID from the **Select ID For Persistence** drop-down list which needs to be persisted.

3. Click **Approve** to persist the Global Party ID for the selected cluster.

A new Global Party ID will be created for the split cluster once the subsequent day's batch is executed.

10.6 Using Provided Notebooks

Compliance Studio has a collection of Notebooks that are available as part of the product. These notebooks are deployed directly on the Notebook Server but can be exported and loaded as models if required.

10.6.1 Using Financial Crime Graph Patterns Notebook

Financial Crime Graph Pattern notebook provides sample graphs that are created from a synthetic data set of financial transactions. There are 7 different label vertices: CUSTOMER, ACCOUNT, DERIVED ENTITY, EXTERNAL ENTITY, EXTERNAL ADDRESS, CASE, EVENT, and INSTITUTION. The graph edges are classified into the following categories:

- **has event**
- **entity on**
- **event on**
- **is similar to**
- **is related to**
- **has account**
- **cash transaction**
- **MI transaction**
- **wire transaction**
- **send MI/wire**
- **receive MI/wire**
- **MI/wire transfer**
- **has address**

This notebook provides patterns such as Transfer of money through an external entity, Transfer of money to an external entity, and High-risk accounts transacting with counterparties in high-risk geographies.

For example, the High-risk accounts transacting with counterparties in high-risk geographies patterns identify the following:

- Accounts that are alerted
- Accounts that have a high activity risk
- Accounts that are also located in high-risk areas.

The high-risk geography determination is based on the geographic risk value of the addresses that the related to a counterparty.

10.6.2 Using Example Scenario Notebooks

The RMF scenario notebook is available for you to create notebooks that can be baselined based on these notebooks as an example and create different AML scenarios using different interpreters and be able to push events ECM.

RMF Account (SQL)

The notebook contains the Rapid Movements of Fund (RMF) - Account scenario. The scenario logic is defined in the Oracle SQL query. You can run the RMF Account scenario using the JDBC Interpreter. This interpreter uses Oracle (RDBMS) as the source and target database to create the required temporary tables. Temporary tables are used in the scenario development process.

10.6.3 Creating a Data Discovery Notebook or Model

It is difficult to detect and discover the new patterns that criminals execute daily in the real world. These patterns are not just new; they could be used for years and are difficult to identify with traditional techniques.

The sections in this chapter will quickly walk you through building your notebook or model based on the common scenarios explained in the following sections and get a quick insight.

10.6.3.1 Anti-Money Laundering Pattern Data Discovery

Anti-money laundering (AML) refers to the laws, regulations, and procedures intended to prevent criminals from disguising illegally obtained funds as legitimate income. The AML Pattern Data Discovery is a scenario that helps you to see new financial crime patterns. These patterns enable you to easily explore any relationship among entities in real-time to extract valuable insights from your data.

This data discovery pattern quickly uncovers emerging, complex money laundering and terrorist financing threats with network and entity generation processes that automatically build network diagrams and reveal hidden relationships. The advanced graph analytics enables entity resolution by looking at multiple data sources and references to a customer, then accounting for inconsistencies, errors, abbreviations, and incomplete records to help determine whether they relate to the same entity.

The scenario includes the following actions that you can perform for the data discovery:

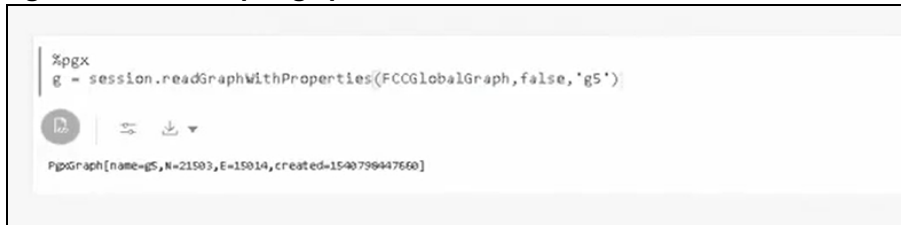
- Creating a Notebook or Model for Your Financial Crime Discovery
- Loading a Financial Crime Graph
- Insight to Customize and Arrange Data in a Graph
- Customizing the Nodes and Edges of the Graph

10.6.3.2 Creating a Notebook for Your Financial Crime Discovery

The first step in any scenario is to create a notebook or model. In this use case, you can create a notebook to discover your financial crime. To create a new notebook, follow these steps:

1. Create a Notebook and specify the notebook details.
2. After the notebook is created, create a Paragraph **using the PGX Interpreter**.

Figure 262: Create a paragraph



In this example, the **PGX Interpreter** is used to create a **PGX query** to load the graph. You must specify the session information that you want to retrieve the data. The query is executed, and the graph details such as graph name, edges, nodes, or vertices are displayed. Further, to understand pattern detection, you must understand the node details, vertices, and edges within the displayed data.

3. For instance, you can specify the matrices, such as the vertices and edges that exist within the data.

Figure 263: Specify the matrices

```
%pgx
g = session.readGraphWithProperties(FCCGlobalGraph,false,'g5')

%pgql
SELECT v.entity,v.jrsdcn,count(*),max(v.rishnb) from g
MATCH (v)
GROUP BY v.entity, v.jrsdcn]
```

In this example, the parameters included are:

- **SELECT**
The code `v.entity,v.jrsdcn, count(*),max(v.rishnb) from g`, fetches the jurisdiction count and risk numbers within the graph **g**, which is built from the previous paragraph.
- **MATCH**
Matching the vertices.
- **GROUP BY**
Grouping the entities by vertices and jurisdiction.

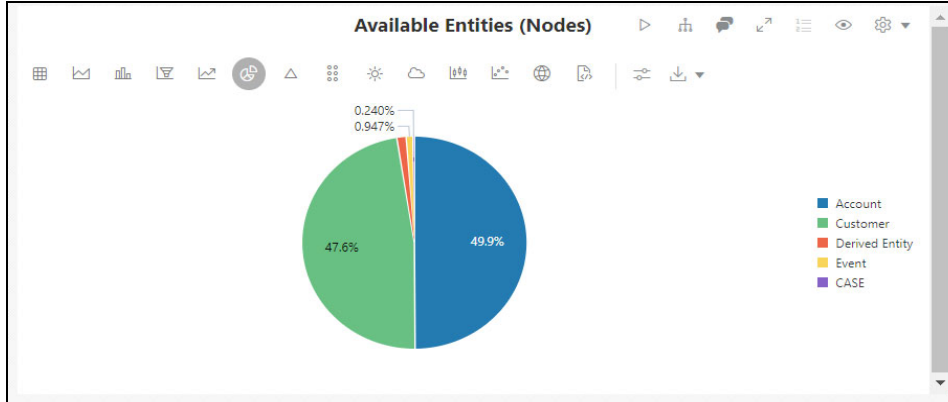
4. Click **Execute Paragraph**. The entities' data, such as the jurisdiction, country, and risk numbers, are displayed.

Figure 264: Entities data

entity	jurisdiction	COUNT(*)	MAX(v.rishnb)
Account	EMEA	11	10
Customer	IND	1	0
Customer	INDA	27	4
Customer	D	154	10
Customer	JR11	3	2
Customer	JR10	171	9
Alert	INDA	1	0
Account	US	23	9
Account	GE	89	9
Account	AMEA	668	10

5. You can click the **Data Visualization** icons within the paragraph to view the details in the visual form to make it more consumable for you.
6. You can hide the code and add a title to the data fetched to make it presentable, consumable, and sharable with others.

Figure 265: Available Entities



The visualizations displayed are easy to consume, allowing you the flexibility to choose the type of visual. The visualization, in this case, is a **Pie Chart**, which enables you to see the entities associated by their type based on the percentage.

You can use the other visualization option to see various types of visuals and different visualization formats.

7. After the first level execution, execute further to understand the relationships that exist between the edges by writing the relationship query.

Figure 266: Execute the paragraph

```
%pgql
SELECT e.relationship,e.type,count(*) from g
MATCH (v1)-[e]->(v2)
GROUP BY e.relationship,e.type
```

In this example, the parameters included are:

- **SELECT**

The code `e.relationship,e.type,coun(*) from g` fetches the relationship count within the graph **g**, which is built from the first paragraph.

- **MATCH**

Matching the vertices "v1" and "v2" and the edge is "e". You must write the vertices within parenthesis and edges within brackets to fetch the PGQL query.

- **GROUP BY**

Grouping the entities by relationship and type.

8. Click **Execute Paragraph**. The entities' data, such as the jurisdiction, country, and risk numbers, are displayed.

Figure 267: Entities data

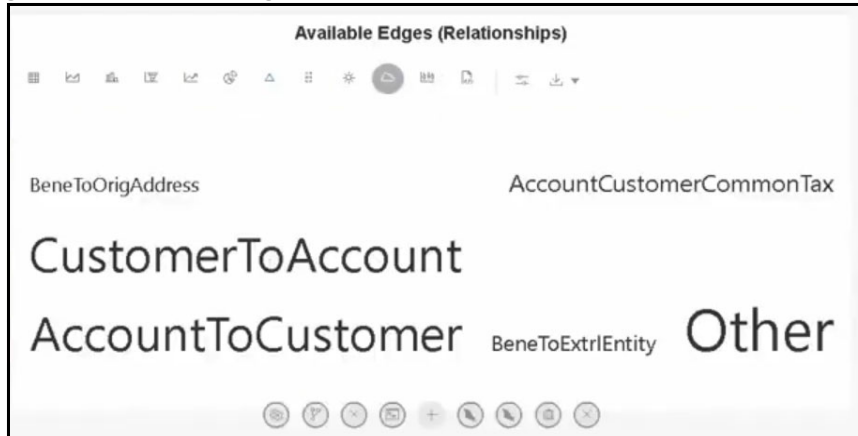
```
%pgsql
SELECT e.relationship,e.type,count(*) from g
MATCH (v1)-[e]->(v2)
GROUP BY e.relationship,e.type
```

e.relationship	e.type	COUNT(*)
AccountCustomerCommonEmail	shared_info	2
AccountCommonTax	shared_info	482
BeneToRecvInstn	transactionlink	128
OrigToExtrlEntity	transactionlink	487
CustomerToCustomer	relationship	62
AccountExtrlEntityCommonWireTrnn	shared_info	238
ExternalAccountToAddress	transactionlink	724
BeneToOrigAddress	transactionlink	802
InternalAccountToAddress	transactionlink	431
InstitutionToAddress	transactionlink	321

Page 1 of 3 (1-10 of 26 items)

9. You can click the **Data Visualization** icons within the paragraph to view the details in the visual form to make it more consumable for you. Each paragraph executed is a rest service that allows you to execute based on the updated service. You can hide the code and add a title to the data that is fetched to make it presentable, consumable, and sharable with others.

Figure 268: Available Edges



10.6.3.3 Loading a Financial Crime Graph

To make your pattern even more readable, you can write plain text in a paragraph and then simultaneously write the query in another paragraph and seamlessly produce a readable graph insight. This pattern can be a pattern that an investor or an analyst has provided.

To create a plain text paragraph, perform the following steps:

1. Create a paragraph and write the description of the analysis or your use case. For example, see the figure.

Figure 269: Description of use case

```

Pattern 1 - transfer | ▶ 🔍 🗨️ ↗️ ⋮ 👁 ⚙️ ▼ |
<h3>Description</h3>
Let's start from a simple layering pattern -
a customer transfers money from one of his/her accounts to
another his/her account through an external entity,
(i.e. the person may be hiding money transfer via an exter

<h3>Explanation</h3>
The right-hand-side paragraph shows how to describe this p
Especially, the pattern is encoded in the WHERE clause of

<h3>PGQL</h3>
(c:CUSTOMER) -[e1:CustomerToAccount]->
(a1:ACCOUNT) -[e2]-> (en:EXTERNAL_ENTITY) -[e3]->
(a2:ACCOUNT) -[e4:AccountToCustomer]-> (c)
    
```

2. After executing the paragraph, the plain text is formatted and displayed as shown.

Figure 270: Plain Text displayed

```

Pattern 1 - transfer | ▶ 🔍 🗨️ ↗️ ⋮ 👁 ⚙️ ▼ |
Description
Let's start from a simple layering pattern - a customer transfers money
from one of his/her accounts to another his/her account through an
external entity, (i.e. the person may be hiding money transfer via an
external entity).

Explanation
The right-hand-side paragraph shows how to describe this patten in
PGQL. Especially, the pattern is encoded in the WHERE clause of the
query.

PGQL
(c:CUSTOMER) -[e1:CustomerToAccount]-> (a1:ACCOUNT) -[e2]->
(en:EXTERNAL_ENTITY) -[e3]-> (a2:ACCOUNT) -
[e4:AccountToCustomer]-> (c)
    
```

As your next step, create another paragraph to run a PGQL query based on the pattern that you described in the previous paragraph. The code snippet can be provided, as shown in the figure.

Figure 271: Code to create another paragraph

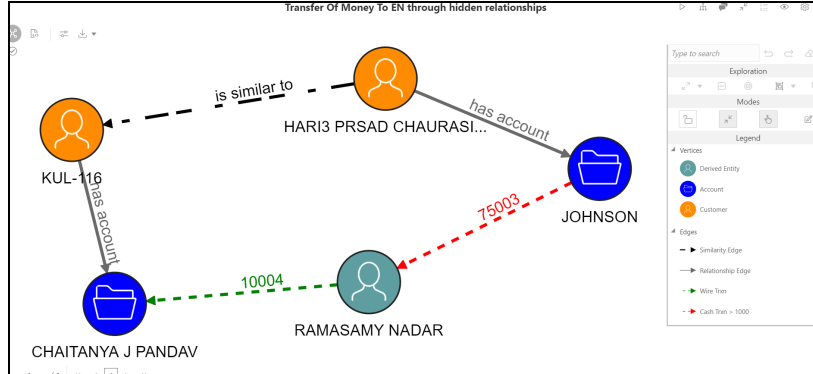
```

Transfer Of Money To EN through hidden relationships
%pgql
SELECT Cust1,e,Acct1,e1,EN,e2,Acct2,e3,Cust2,e4,Cust4

FROM GlobalGraphIH match
(Cust1)-[e]->(Acct1)-[e1]->(EN)-[e2]->(Acct2)-[e3]->(Cust2),(Cust2)-[e4]->(Cust4)
where e.Label = 'has account'
and e1.Label in ('end to end wire trxn','end to end mi trxn','cash trxn')
and e3.Label = 'has account'
and e4.Label='is similar to'
and Cust1."Original ID"='CUTRUSTFTNCU-103'
    
```

3. Click **Execute Paragraph** to visualize your pattern.

Figure 272: Graph Results



You can hide the code and add a title to the data that is fetched to make it presentable, consumable, and sharable with others. You can provide more highlights (such as labels and vertices), rearrange the nodes, and toggle the graph to enrich your graph, and you can open the paragraph in the iframe mode or expand the graph to make it more readable.

10.6.3.4 Insight to Customize and Arrange Data in a Graph

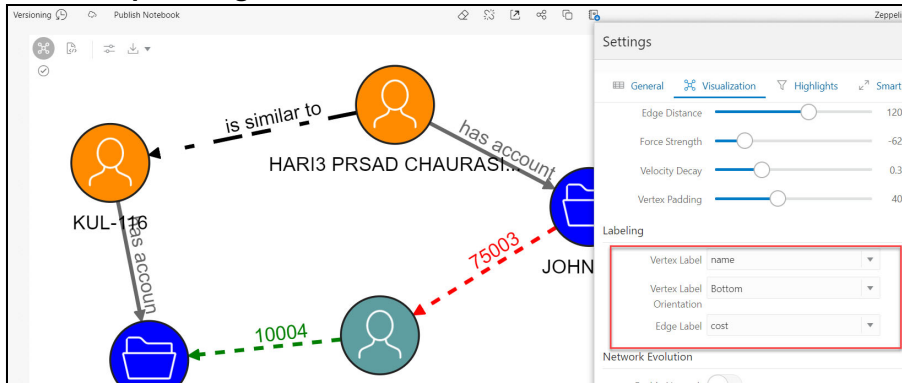
Using Graph Customization options, you can provide more highlights (such as labels and vertices) to enrich the executed graph.

The graph can be customized based on your visual needs. The graph customization and settings are based on the configuration in the graph settings, such as **General**, **Visualization**, **Highlights**, and **Smart Explorer**. For more information, see [Customizing Graphs](#).

The following figure is customized using **Visualization** and **Highlights** in Graph Settings.

The graph is displayed as follows by providing Labeling changes, such as **Name Label** and **Edge Label**.

Figure 273: Graph settings



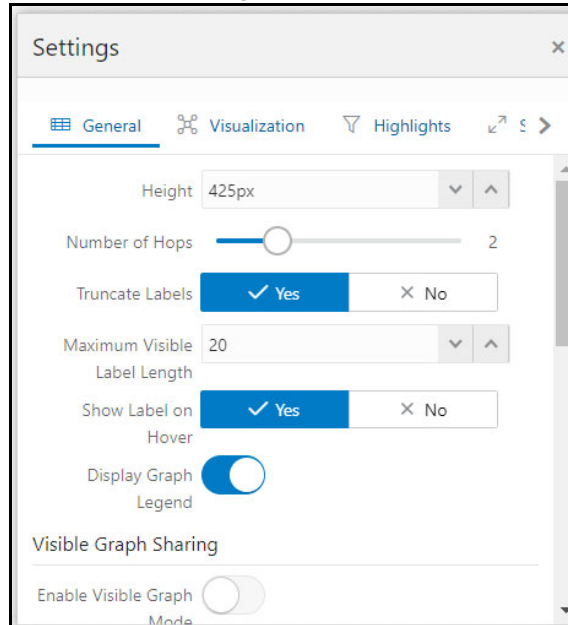
10.6.4 Highlighting the Nodes and Edges of the Graph

The Nodes and Edges in your graphs can be customized to visualize the data flow between the entities better. To customize the Nodes and Edges, you can navigate to the graph setting and add new highlights in the **Highlights** tab.

10.6.4.1 Vertices

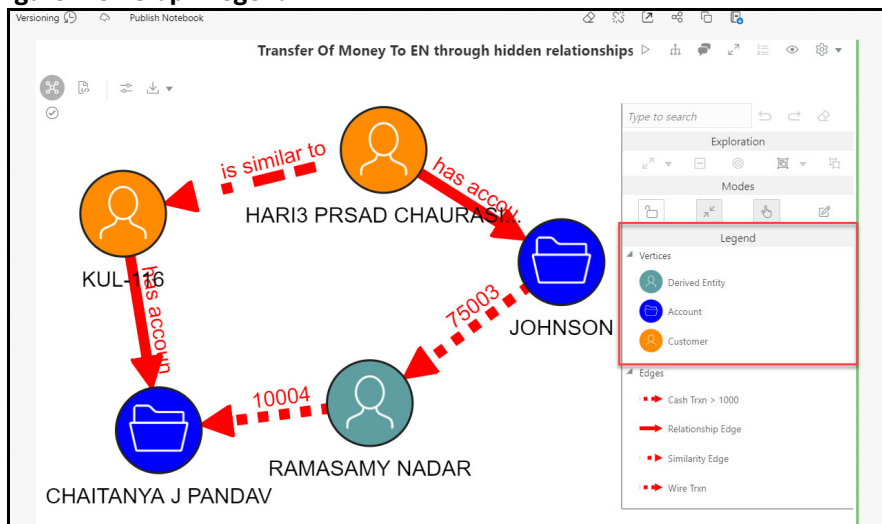
Vertices can be highlighted by clicking the **New Highlight** and specifying the parameters for the highlights. For example, the figure shows how you can differentiate the vertices with different entities such as Customer, Account, and Derived Entity.

Figure 274: Vertices settings



Based on the applied highlights, the graph changes are displayed as follows.

Figure 275: Graph Legend



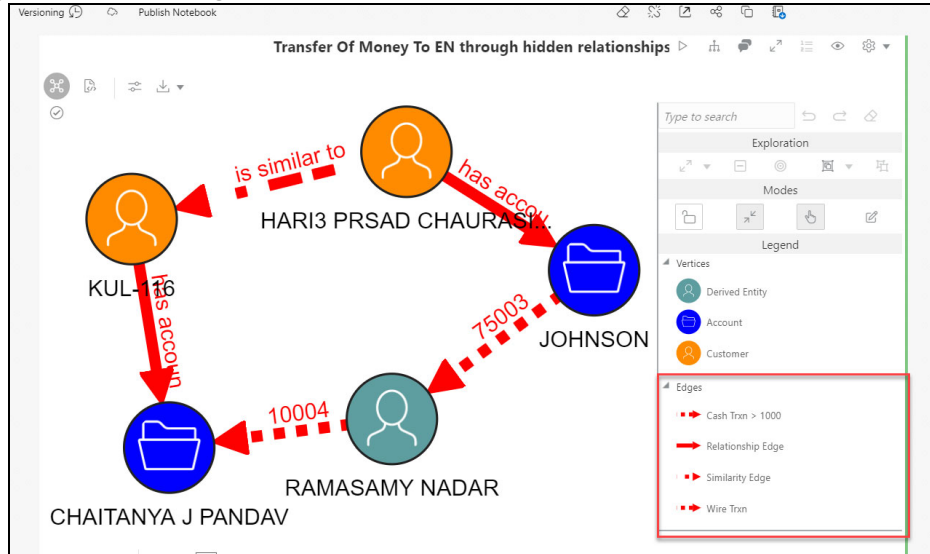
The graphs illustrate a pattern with a money flow from the different entities with a hidden relationship.

10.6.4.2 Edges

Edge can be highlighted by clicking the **New Highlight** and specifying the highlights' parameters. For example, the figure shows how you can differentiate the edges with different colors and animations to visualize money flow from the entities.

Based on the applied highlights, the graph changes are displayed as follows.

Figure 276: Graph Edges

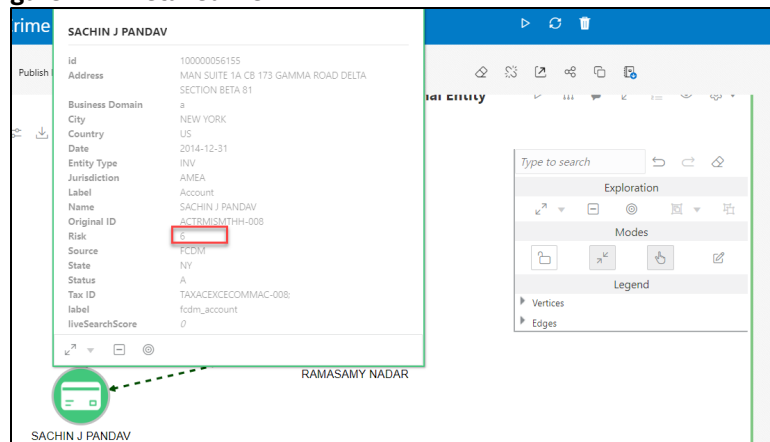


The graphs illustrate a pattern, where there is a money flow from the bank to the different accounts from a customer, with the flow of money highlighted with different colors. Blue represents the money flow from the account to the bank, and red represents the money flow from the bank to the account.

You can also specify the risk numbers to this pattern and visualize your risk. For example, if you use the risk parameters as highlights.

The graphs illustrate a pattern where there is a risk in the account, and when you click for **details**, the risk number is displayed.

Figure 277: Detailed view



By exploring the options available within the graph customization, you can streamline your analysis and present your reports based on your use case.

10.7 Create Event API

The Create Event API generates events at the end of a scenario Notebook or Model for transfer to the Enterprise Case Management Application for correlation into a Case. It accepts inputs from two tables to generate alerts that are populated in the event tables.

The syntax to call the Create Event API is as follows:

```
SELECT FUNC_CREATE_EVENT(, ) FROM DUAL;
```

For information on Table_1 and Table_2, see [Table 1 Details](#) and [Table 2 Details](#).

10.7.1 Table 1 Details

Table 1 contains information related to the direct focus. This information is aggregated for focus. For example, the account number and the total transaction amount for that account will be stored in the [Table 60](#). One record is inserted for each focus (account or customer).

Table 60: Table 1 Details

Column Name	Sample Values	Description
V_FOCUS_TYPE	ACCOUNT	The main focus of the scenario. The value can be obtained from the kdd_dataset_base table.
V_ENTITY_NAME	ANDERSON	Name of the focused entity, that is, account display name and customer display name.
V_DATA_ORIGIN	AMLBIG	Data origin, that is, MAN, DLY, etc.
V_STATUS_CD	NEW	Event status code. Default value: New.
D_EVENT_CREATED_DATE	3/11/2019 15:02	Event creation date.
V_JURISDICTION_CD	AMEA	Jurisdiction.
V_BUSINESS_DOMAIN_CD	a	Business domain.
V_COMMENTS		General comment for the scenario.
V_SCENARIO_CLASS	AML	Class to which the scenario belongs to, that is, AML, TC, and BC.
V_FOCUS_CD	ACMLTERR ORFINFAC- 005	Code for focus, that is, account internal ID in case of account.
V_ENTITY_CD	832	Focus sequence ID, that is, account sequence ID in case of account focus.
MAX_DATA_DUMP_DT	12/10/2015	Data Dump date for which business data is involved.

Table 60: Table 1 Details

MAX_NOT_EFT_TRANS	0	Specific for an account. This column can be ignored for other scenarios.
TOT_TRXN_AMT	10500	
TOT_TRXN_CNT	2	
EFFECTIVERISK	9	
ACTIVITYRISK	10	
RISK_CATEGORY	HR	
ACCT_TYPE	Seasoned	
TRUSTED_PRCTG	0	
PASS_THRU_PRCTG	0	
LRP_PRCTG	0	
HR_PRCTG	0	
ACT_TOT_CREDIT_TRXN_AMT	5400	Threshold specific for an account. It can be different for other scenarios.
TH_TOT_MIN_CREDIT_TRXN_AMT	50	
TH_TOT_MAX_CREDIT_TRXN_AMT	10000000	
ACT_TOT_CREDIT_TRXN CT	2	
TH_TOT_MIN_CREDIT_TRXNCT	1	
TH_TOT_MAX_CREDIT_TRXNCT	20	
ACT_TOT_DEBIT_TRXNCT	2	
TH_TOT_MIN DEBIT_TRXNCT	1	
TH_TOT_MAX_DEBIT_TRXNCT	20	
ACT_TOT_DEBIT_TRXN_A MT	5100	
TH_MIN_DEBIT_TRXN_A MT	20	
REMARK		Name of scenario notebook.
SCENARIO_CD	10000	
SCENARIO_MN	RMF Account(sql)	The Create Event API automatically creates this value.
N_RUN_ID	84	

Table 60: Table 1 Details

N_EVENT_CD	366	
V_ENTITY_CD	25291	Transaction sequence ID.
V_FOCUS_CD	ACMLNOA AC-302	Account Internal ID in case of account focus.
N_ENTITY_ID	FOMLNOA AC-301	Transaction Internal ID.
TRXN_DATADUMP_DT	12/10/2015	Transaction Data Dump date.
TRXN_PRDCT_TYPE	WIRE_TRXN	Transaction Product type. The value can be obtained from the kdd_dataset_base table.

10.7.2 Table 2 Details

Table 61 contains information on all the transactions involved in alert generation.

Table 61: Table 2 Details

Columns	Sample Values	Description
V_ENTITY_C D	25291	Transaction sequence ID.
V_FOCUS_C D	ACMLNOAAC-302	Account Internal ID in case of account focus.
N_ENTITY_ID	FOMLNOAAC-301	Transaction Internal ID.
TRXN_DATA DUMP_DT	12/10/2015	Transaction data dump date
TRXN_PRDC T_TYPE	WIRE_TRXN	Transaction Product type. The value can be taken from the kdd_dataset_base table.

10.8 Publishing your Notebooks from Notebook Server

Scenario Notebooks can be published from the Notebook interface and published as models using the Model Management Framework. Only one notebook can be in a published state for a given notebook ID. If another version of a notebook is published, the previously published version is replaced.

When a notebook is published:

- The original notebook is cloned, and a published notebook is created.
- Any changes made to the original notebook will have no impact on the published notebook.
- A new version of the published notebook is created whenever the original notebook is republished.
- The published notebook is in a read-only format.
- The published notebook can be run in a batch pipeline.

The notebook toolbar is extended by following conditional buttons after publishing the notebook:

- **Publish**

Clicking this button will publish the given notebook. The published notebook is automatically loaded.

- **Published Notebook**

If the notebook has a published version, this button appears and, on click, will redirect you to the published notebook.

The workspace view shows an additional Published column that reflects whether a notebook is published.

NOTE

- When Publishing a Notebook, you must ensure there are no empty paragraphs.
- Published notebooks do not appear in the overview. Published notebooks can only be seen by either knowing the direct link or navigating from a notebook that has a published notebook.

10.8.1 Publishing a Scenario Notebook Directly

After the notebook is approved, you can publish that notebook for your organization to use it. To publish a scenario notebook, follow these steps:

1. Navigate to a **Scenario Notebook** page.
2. Click **Publish Notebook** on the top left corner.

The **Publish for Approval** dialog box is displayed with the Parameter Keys, and the corresponding Parameter values are added to the paragraphs.

NOTE

Ensure that the parameters with the same name must have the same values.

3. Click **Publish**.

The Scenario Notebook is published for approval and listed in the Notebooks page with the *For Approval* tag. The published scenario notebook is shared with the user mapped to the DSBATCHGRP group in OFSAA, with the *For Approval* tag.

10.8.2 Approving a Scenario Notebook Directly

The notebook that is published must be approved by the group administrator. To approve a notebook, follow these steps:

1. Log in to the Notebook Server application as a DSBATCHGRP user.
2. Navigate to the **Scenario Notebook** page that you want to approve.
3. Click **Approve Notebook** on the top left corner. The Approve Notebook dialog box is displayed.
4. Click **Approve**.

A confirmation message is displayed to indicate that the notebook is approved. The following scenario and threshold tables are updated in the BD Atomic Schema: *KDD_SCNRO*.

For an approved notebook, a scenario record is created in the KDD_SCNRO table, and the columns **scnro_id** and **cntry_id** are updated with ML and customer focus values (113000004), respectively.

- KDD_TSHLD_SET
- KDD_TSHLD

For an approved notebook, the parameters are captured in the *KDD_TSHLD* table. Publishing multiple notebooks creates multiple threshold sets in the *KDD_TSHLD* table: *SCNRO_NB_PUBLISH*.

NOTE

In the current release, Notebook execution using Batch is deprecated and will be removed in the future release. It is recommended to use the scheduler to execute the notebook in Batch.

You can see the example. For more details, see the **Example of Creating a batch in the Scheduler for Notebook Execution** section in the [OFS Compliance Studio Administration and Configuration Guide](#).

10.9 Updating Graph Definition

To update graph definition (run-time parameter and create the batch), follow these steps:

1. Log in to Compliance Studio and navigate to workspace summary.
2. On **Modeling** menu, click **Graphs**. The Graph Summary page is displayed.

Figure 278: Graph Summary:

Name	Number of Nodes	Number of Edges	Owner	Created Date	Action
Custom graph Custom graph	2	0	FCCMDSADMIN	Jul 18, 2023, 6:59:40 PM	...
FINANCIAL_CRIME_GLOBAL_GRAPH FCDM-Graph CM	8	36	FCCMDSADMIN	Jul 18, 2023, 3:44:39 PM	...
FINANCIAL_CRIME_GLOBAL_GRAPH_BEHAVIOUR_DETECTION FCDM-Graph BD	7	31	MMGUSER	Nov 24, 2023, 12:36:11 PM	...

NOTE

- The derived entity nodes will be processed (new/updated) and moved to the graph schema only if the date of the graph pipeline execution (START_DATE parameter in the Run time parameters) and FIC_MIS_DATE for the derived entity are the same.
- Whenever a node is added/deleted from graph pipeline, the population schedule needs to be re-created; so that the graph population schedule would be synchronized with the graph definition with the latest nodes and edges. This step is required to update the respective Scheduler batch-tasks definitions.
- The Match Ruleset drop-down list will be displayed if it is a Similarity Edge. Any ruleset that is available on this drop-down list should not be edited from the Match Ruleset window.

3. Select the FINANCIAL_CRIME_GLOBAL_GRAPH, and then click **Action** icon.

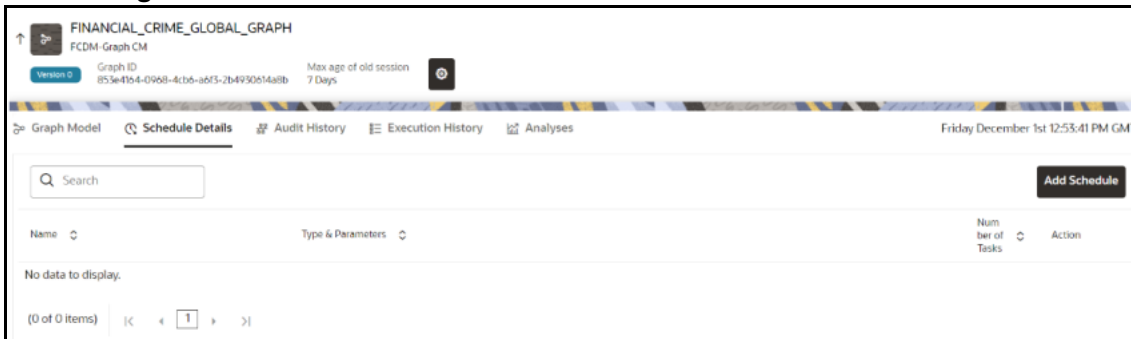
4. Select **Edit** to view the graph.

Figure 279: Graph Model



5. Click **Schedule Details** tab.

Figure 280: Schedule Details



6. To edit the schedule of the graph, click **Edit** under Actions column.
7. Click **Add Schedule** to add a new schedule.
8. On the **Add Schedule** screen, select all the tasks and click **Next**.

For more information on how to select/enter the parameters, see [Schedule Details](#) section.

Figure 281: Add Schedule Window

Manage Schedule

Basic Information

Schedule Name Required

Schedule Type

Once Daily Weekly Monthly Cron

Start Date
02/22/2023

Run Time
12:00 AM

Select Data Pipelines

Selected Data Pipelines

Customer x AccountNodeGDP x EVENT x Institution x External Address Panama x

External Entity Panama x External Entity Offshore x

Select Load Index

Select Load Index

Customer Graph x Account Graph x Event Graph x Institution Graph x

External Address Panama Graph x External Entity Panama Graph x

External Entity Offshore Graph x

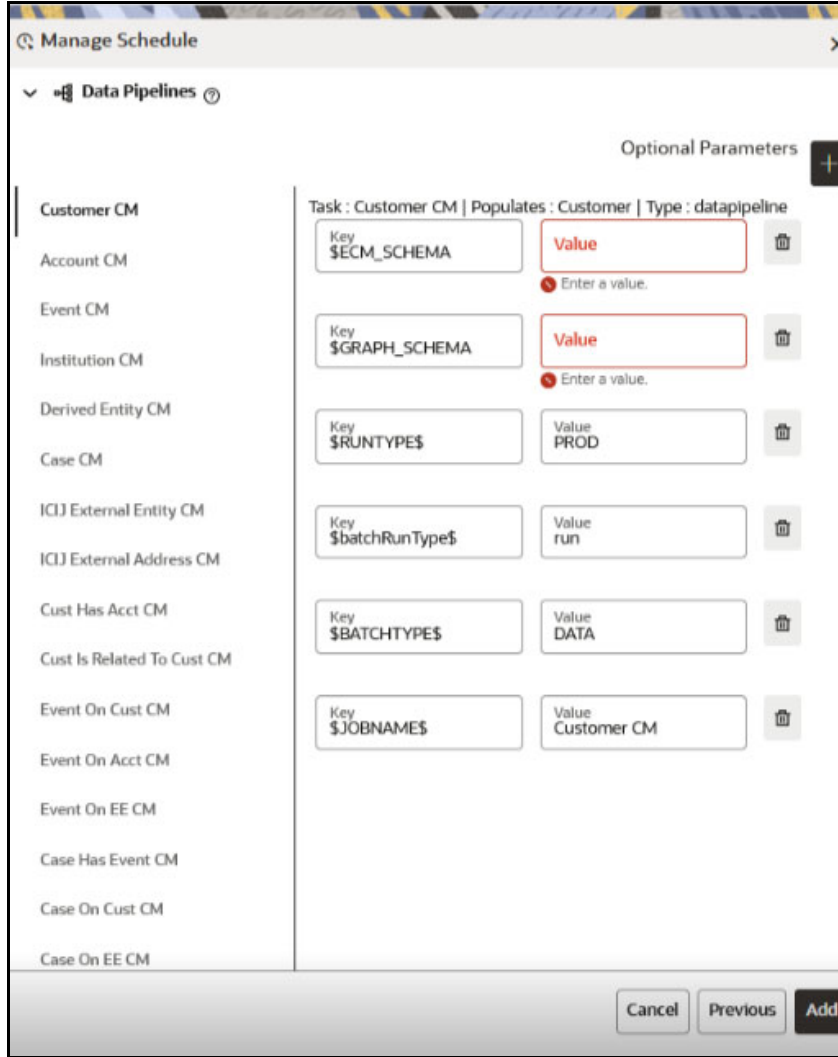
Cancel Next

9. Update the value for “\$BD_SCHEMA” or “\$ECM_SCHEMA”, “\$GRAPH_SCHEMA” in the selected task(s) where the value will be respective schema wallet alias. For “\$GRAPH_DS”, where the value will be datasource of the graph schema that is attached to the Compliance Studio workspace.

NOTE

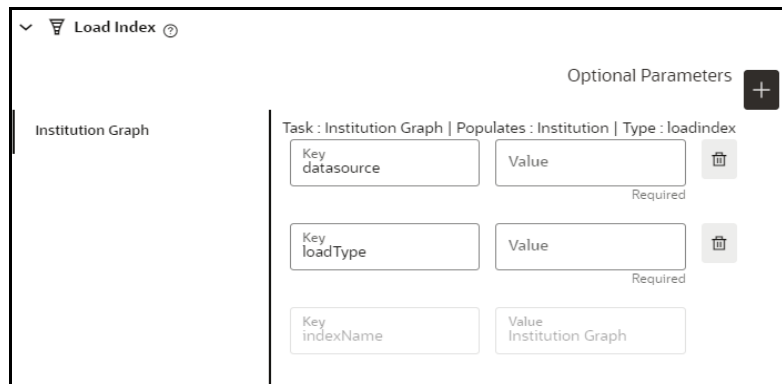
For BD graph, \$BD_SCHEMA must be selected as the key value for the optional parameter. Similarly, for ECM graph, \$ECM_SCHEMA must be selected as the key value for the optional parameter.

Figure 282: Add Schedule Window



In **Load Index** group,

Figure 283: Load Index



For the Pre-configured load index, respective Key fields will be displayed.

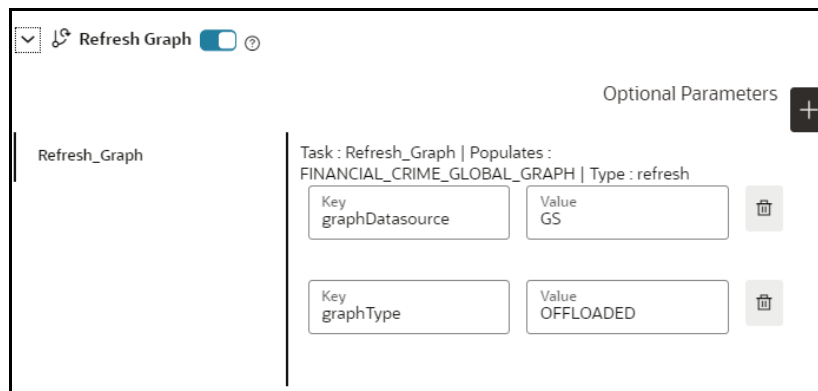
You can configure the respective key-value in the Value field as required and specified in the [Table 62](#).

Table 62: Parameter for Load Index

Name	Description	Default Value
datasource	Datasource of the graph schema that is attached to the Compliance Studio workspace. NOTE: An entry should be added in the <code>resources.xml</code> file for the value provided in the datasource parameter. For more information about <code>resources.xml</code> file, see the Configure the resources.xml for Graph Schema section in the OFS Compliance Studio Installation Guide .	
loadType	Execution Load Type. Available types are full load and delta load. NOTE: In this release, only the delta load is supported.	DeltaLoad
indexName	Index name for the graph. NOTE: By default, index name will be added from the graph pipeline.	

10. Enable the **Refresh Graph** option and click **Add** icon to refresh the Graph to add optional parameters.

Figure 284: Refresh Graph



You can configure the respective key-value in the Value field as required and specified in the [Table 63](#).

Table 63: Parameter for Graph

Name	Description	Default Value
graphDatasource	<p>Datasource of the graph schema that is attached to the Compliance Studio workspace.</p> <p>NOTE: An entry should be added in the <code>resources.xml</code> file for the value provided in the <code>datasource</code> parameter. For more information about <code>resources.xml</code> file, see the Configure the resources.xml for Graph Schema section in the OFS Compliance Studio Installation Guide.</p>	
graphType	<p>Execution Graph Type. Available types are OFFLOADED and IN-MEMORY.</p> <ul style="list-style-type: none"> • IN-MEMORY: It collects all the data from the nodes and edge tables and it will be transformed into the Oracle Graph Analytics Engine (PGX). • OFFLOADED: It creates only metadata of the executed PGQL query instead of loading the entire graph into the PGX server. <p>For more information about offloaded graph type, see the Using Subgraph Off loaded Graphs section.</p>	OFFLOADED

11. Click **Add**. The schedule is added to respective graph. The batch will be executed based on the schedule type.

The batch can be executed via Scheduler. For more information, see the [Schedule Batch](#) section.

NOTE

For each pipeline execution, inter and delta tables would be created. When the pipeline is executed for the second time, the tables from the first execution should be deleted which is not currently happening. However, the cleanup happens for the second execution on the next day.

For example,

Cleanup does not work for the first run on 1st- Aug and the second run on 1st- Aug.

Cleanup works only when the first run is on 1st- Aug and the second run on 2nd- Aug.

10.10 Managing Data Pipelines

Data Pipeline is required to transform the source data into the Node and edge that are required in Graph Schema.






The application uses data pipelines to prepare filtered data which can be used to create and run scenarios. Data pipelines prepare data by selecting and joining data sources to create virtual data tables, adding derived attributes to data, running derivations on the data to determine the risk associated with the entity, and so on.

10.10.1 Widgets in Data Pipelines

Depending on the pipeline type, specific widgets are available in the widgets pane of the pipeline.

The [Table 64](#) describes the widgets available in Data pipelines.

Table 64: Data Pipeline – Widgets and Descriptions

Widget	Name	Description
	Dataset	Use this widget to add a Dataset. Datasets correspond to the contents of a single database table which can be a staging table, business table, or a table that a data pipeline has created. A data pipeline must always begin with a Dataset widget.
	Filter	Use this widget to filter the data in the pipeline to use a subset of the available data records. On applying a filter, all data matching the filter conditions are obtained. This allows you to search and analyze behaviors of interest.
	Join	Use this widget to combine or group multiple tables using various join operators.
	Persist	Use this widget to write data to database tables to be used in other pipelines.
	External Service	Use this widget to add an external service. External Services perform actions on the data, such as loading or moving the data or performing a virus scan.

10.10.1.1 Dataset Widget

The dataset widget enables you to select and filter data sources for use in the later stages of the pipeline. A data pipeline must always begin with a dataset. Datasets correspond to the contents of a single database table which can be a staging table, business table, or a table that a data pipeline has created.

Using the dataset widget, you can select any available staging table, name the dataset, perform DQ (data quality) checks on one, multiple, or all columns of the selected staging table, and filter the output by defining conditions for one, multiple, or all columns of the selected staging table using one of three

methods: Expression Builder, Tables, or Text. When multiple columns are selected, the OR logic is applied to filter the outputs.

To create a dataset, follow these steps:




1. Navigate to the **Pipeline Designer** page.
2. Drag and drop the **Dataset** widget from the widgets pane in the upper-right corner of the designer pane.
3. Hover on the **Dataset** widget and click **Edit** . Provide details as described in the [Table 65](#):

Table 65: Dataset Widgets and their Descriptions

Field	Description
Name	Enter the name for your dataset.
Tables	<p>Select a table from the Tables drop-down list. This list consists of all the available staging tables.</p> <p>The columns of the selected table are displayed in the Attributes pane. The attributes include the Logical Name, Column name, and Column Type.</p>
Enable DQ check	<p>Select this option to enable the data quality check for the table. You can select each table column, specify checks such as range, length, LOV, and null check, and save the rule after naming it. Based on the rule, checks are performed on the columns of the selected staging table to filter out information you do not require.</p> <p>To specify DQ rules, follow these steps:</p> <ol style="list-style-type: none"> a. Click Add + next to the Enable DQ check option. b. Under Master DQ, select one or multiple Primary Key options. All columns of the selected staging table are listed for you to select. c. Under DQ Rules, select a column from the Available Columns list. This list contains all columns of the selected staging table. d. Enter a rule name for the selected column of the staging table and specify the following checks for this rule: <ul style="list-style-type: none"> ● Range Check DQ Rules. Specify the following range checks: <ul style="list-style-type: none"> ■ Is Range Check Required: Select Yes or No. If you select No, jump to the length check rule. If you select Yes, provide a value in the Minimum Value field. ■ Is Provided Minimum Value Inclusive: Select Yes or No. ■ Maximum Value: Provide a value in the Maximum Value field. ■ Is Provided Maximum Value Inclusive: Select Yes or No.

Table 65: Dataset Widgets and their Descriptions

Enable DQ check	<ul style="list-style-type: none"> ● Length Check DQ Rules: Specify Is Length Check Required: Select Yes or No. If you select No, jump to the LOV check rule. If you select Yes, provide a value each in the Minimum Length and Maximum Length fields. ● LOV Check DQ Rules: Specify is LOV Check Required: Select Yes or No. If you select No, jump to the Null Check DQ rule. If you select Yes, provide the LOV values in the LOV Values field. ● Null Check DQ Rules: Specify the following Null check DQ rules: <ul style="list-style-type: none"> ■ Is NULL Check Required: Select Yes or No. If you select No, jump to the Is Null Value Allowed rule. If you select Yes, provide the null default value in the Null Default Values field. ■ Is NULL Value Allowed: Select Yes or No. If you select No, provide the null default value in the Null Default Values field. <ol style="list-style-type: none"> a. Click Save to save your DQ rule. b. Repeat these steps to define DQ rules for all the table columns based on your requirement.
-----------------	--

4. Click **Save**  to save the changes. The dataset is created and is visible on the canvas. It is also available for use in the Dataset pane.
5. To reuse a dataset you have created, click the **Dataset** icon  on the upper-left corner to view the Dataset pane. Click **Expand** to open the list to display the available datasets, including those you have created. Click the dataset name you want and drag it into the canvas of the Pipeline Designer.
6. You can perform certain common tasks in all the widgets, such as Edit, Delete, filter, etc. See [Common Tasks](#) for more information.

10.10.1.2 Creating Persist

The Persist widget enables you to write data to database tables so that it can be used in other pipelines. It is used to map columns of the source table to a destination table. The Persist widget helps you to map attributes from the input datasets to the target table, which will be stored.

To create a persist, follow these steps:


1. Navigate to the Pipeline Designer page.
2. Drag and drop the Persist widget from the widgets pane to the designer pane.
3. Hover on the Persist widget and click Edit . A dialog box is displayed.
4. Provide the details as described in the [Table 66](#).

Table 66: Fields to Create Persist and their Descriptions

Field	Description
Save As	Enter the name for the Persist widget.
Source Datasets	Displays the list of datasets that are linked to the persist widget.
Target Table	Select the target table to which you want to map the columns in the source dataset tables.

Table 66: Fields to Create Persist and their Descriptions

Field	Description
Type	<p>Select the type of mapping that you want to implement for the columns in the target table.</p> <p>The following options are available:</p> <ul style="list-style-type: none"> ● Full Load: This option enables you to truncate the existing data in the target table and load it with new data from the source datasets. ● SCD: This option represents a slowly changing dimension. This option is used to map data from source datasets to the target table with both current and historical data stored in the target table. You can select the following options: <ul style="list-style-type: none"> ■ Surrogate: Values of this type are typically generated by incremental keys. For example, Sequence IDs. ■ Unique: Use this type for values which are unique across the dataset. For example, Customer Identifiers. ■ Type 2: Use this type for values that may be changed or added to. For example, Customer Names. Values of this type compare both current and historical data to provide the latest record as active. Historical values will be marked inactive. ■ Direct: Use this type for values that should consider only the current data for this record. For example, Data Origin. ■ Incremental: This option is used to map data from the source dataset to a target table incrementally. Incremental mapping adds new entries in addition to the existing data. ● Merge: This option is used to map data from the source dataset to the target table such that both current and historical data are stored, and incremental data is also stored. ● Delta: This option allows to identify the delta records of the source by comparing with the available records in the target.
Join	<p>Available only if you have connected multiple datasets. See beginning at Step 5 in the Creating Join section for information on Joining datasets.</p>
Hints	<p>Hints provide a mechanism to direct the optimizer to choose a certain query execution plan based on the specific criteria. Select the Type of SQL Operation from the drop-down list and provide a hint in the Hints field.</p>

5. Follow these steps in the **Map** pane:

- a. Select the source dataset from the drop-down list on the left-hand side.


The columns in the table that are associated with the selected source dataset are listed on the left-hand side.

NOTE

The source dataset table is referred to as Source Entity, and the columns in the Source Entity are referred to as Source Column.


- b. Select the target table on the right-hand side. The columns in the target table are listed on the right-hand side.

NOTE The target dataset table is referred to as the Target Entity. The columns in the Target Entity are referred to as the Target Column.

- To Automap, click the link icon. Source and target columns are auto-mapped based on Column Names and Data Types.
- To map source and target columns manually, select a source column and target column, and then click **Expand** .

NOTE You must select columns of the same data type.

The source column is mapped to the target column. The mapping details are displayed in the table on the right-hand side.



- To add a condition to the target column, click **Add +** and use the **Expression Builder** to create the condition. The result is displayed in the target column on the right pane.
 - You can also import source and target columns from an Excel sheet. Click **Choose File** and select the Excel sheet.
 - You can also export the mapped source and target columns to Excel using **Export**.
6. Click **Save**  to save the changes. The persist is created.

You can perform certain common tasks in all the widgets, such as Edit, Delete, filter, etc. For more information, see [Common Tasks](#).

10.10.1.3 Creating Join

The Join widget enables you to combine or group multiple tables using various join operators.

To create a join, follow these steps:

1. Navigate to the Pipeline Designer page.
2. Drag and drop the **Join** widget from the widgets pane to the designer pane.
3. Hover on the Join widget and click **Edit** . A dialog box is displayed.
4. Enter the name in the **Name** field.
5. Follow these steps in the **Output** pane:
 - a. Select the required tables from the drop-down lists on the left-hand side and right-hand side that you want to join.
 - b. Select the join operators to join the two tables. For more information, see [Join Operators](#).
6. Add a Join condition to the join table to save the widget.
7. To add a condition, click **Add +** on the right (Add Group and then Add Condition) and specify rules for the condition. You can add multiple groups and multiple conditions under each Group.
8. Click **Save**  to save the changes. The join widget is created.

You can perform certain common tasks in all the widgets, such as Edit, Delete, Filter, etc. For more information, see [Common Tasks](#).

10.10.1.3.1 Join Operators


The following types of join operators are available:

- **Inner Join:** The Inner Join selects all rows from both participating tables as long as there is a match between the columns.
- **Left Join:** The Left Join returns all rows from the left table, with the matching rows in the right table.
- **Right, Join:** The Right Join returns all rows from the right table, with the matching rows in the left table.
- **Full Join:** The Full Join combines the results of both the left and right outer joins and returns all rows from the tables on both sides.

10.10.1.4 Creating Filters

The Filter widget defines criteria that filter the data in the pipeline to use a subset of the available data records. The data matching the filter conditions are obtained by applying a filter, which can be used to search and analyze behaviors of interest.


To create a filter, follow these steps:

1. Navigate to the **Pipeline Designer** page.
2. Drag and drop the **Filter** widget from the widgets pane to the designer pane.
3. Hover on the Filter widget and click **Edit** . The Filter pane is displayed.
4. Enter the name for the filter in the **Name** field.
5. Navigate to the **Filter** pane. The **Output** pane is displayed.
6. Configure the filter. For more information, see [Configuring Filters](#).

10.10.1.5 Creating External Service

External Service refers to an existing set of services that the Customer can use to derive the risk of certain business entities, configure data movement for case management, create events, etc. A business entity refers to parameters such as Customer, account, transaction, etc.

To create an external service, follow these steps:

1. Navigate to the **Pipeline Designer** page.
2. Drag and drop the **External Service** widget from the widgets pane to the designer pane.
3. Hover over the External Service widget and click **Edit** . The External Service pane is displayed.
4. Select the external Service from the Name drop-down list.

Based on the external Service selected, the following details are auto-populated:

- The description for the external Service is auto-displayed in the Description field.
- The corresponding details of the selected external Service are displayed in a table. The details include parameter names and parameter values associated with the External Service.

5. Click **Save**  to save the changes. The external Service is created.

You can perform certain common tasks in all the widgets, such as Edit, Delete, Filter, etc. For more information, see [Common Tasks](#).

10.10.2 Creating a Pipeline

10.10.2.1 Creating a New Data Pipeline

You can create a pipeline and then configure the pipeline.

To create a pipeline, follow these steps:


1. Navigate to the Pipeline Designer page.
2. Click **Add**  in the upper-right corner. The New Pipeline dialog box is displayed.
3. Provide the details as described in the [Table 67](#).

Table 67: Fields to Create a Pipeline and their Descriptions

Field	Description
Name	Enter the name for the pipeline.
Description	Enter the description for the pipeline.
Add Search Tags	Enter the keywords for the pipeline. These keywords can be used as search tags while searching for a pipeline. Search tags are also used to group pipelines of the same type. These search tags appear as filters on the Pipeline page.
Type	Select the type of pipeline as either Scenario, Scoring, Data Loading, or Data.



4. Click **Create**. A new pipeline is created and displayed on the Pipeline page. You can perform the required configurations in the newly created pipeline.


10.10.3 Common Tasks

10.10.3.1 Configuring Filters

You can configure a filter by defining various filter conditions. For more information on defining conditions, see [Defining Filter Conditions](#).

To configure a filter, follow these steps:

1. Navigate to the Output pane.
2. Click **Add**  corresponding to the Output pane to open the filter group. The filter group opens where you can add filter conditions.
3. Click **Add**  in the Output pane to create a filter condition. The filter condition is displayed.
4. Define the filter condition. For more information, see [Defining Filter Conditions](#).
5. Click **Include** to include the filter in the widget. The filter is included and is functional in the widget.

6. Click **Save**  to save the changes. The filter is created. The entire expression that is formed as part of filter creation is displayed in the Output pane.

10.10.3.2 Defining Filter Conditions


You can define the filter conditions using one of the following:

- Expression Builder
- Tables
- Text

10.10.3.2.1 Defining Filter Condition Using Expression Builder

You can form filter conditions using all the operators given in the Expression Builder. The Expression Builder is used to define free flow text filter conditions.

To define a filter condition using the Expression Builder, follow these steps:

1. Click **Exp.** The Expression Builder dialog box is displayed.
2. Select the required Dataset, Attribute, and Runtime Parameters and operators. The resulting condition is displayed in the Condition field.
3. Click **Save**  to save the changes.

10.10.3.2.2 Defining Filter Condition Using Tables

You can define filter conditions using the various columns of tables. The columns of the two tables are compared with each other using the required operators.


To define filter conditions using tables, follow these steps:

1. Click **Tables**.
2. Select the dataset or risk indicator and column on the left-hand and right-hand sides, and then select the operator.

10.10.3.2.3 Defining Filter Condition Using Text

You can define filter conditions using text. A particular column in a table is compared with the input text using the required operators.

To define filter conditions using text, follow these steps:

1. Click **Text**.
2. Select a dataset and column on the left-hand side, operator, and then enter the text in the field on the right-hand side.
3. Click **Save**  to save the changes.

10.10.3.3 Creating Runtime Parameter

A Runtime parameter is a variable whose value can be defined and then called from within that same pipeline. When you define a runtime parameter, you enter the default value to use. You can specify another value to override the default when you create or edit a job that includes a pipeline with runtime parameters.

To create a runtime parameter, follow these steps:


1. Configure a filter. For more information, see [Configuring Filters](#).
2. Define the filter condition using Expression Builder. For more information, see [Defining Filter Condition Using Expression Builder](#).
3. Click **Add** . The New Runtime Parameter dialog box is displayed.
4. Provide the details as described in the [Table 68](#):



Table 68: Fields on New Runtime Parameter and their Descriptions

Field	Description
Name	Enter the name for the runtime parameter.
Datatype	Enter the datatype for the runtime parameter.
Description	Enter the description for the runtime parameter.
Default Value	Enter the default values for the runtime parameter.

5. Click **OK**. The runtime parameter is created.


10.10.3.4 Editing Widget

To modify a widget, follow these steps:

1. Navigate to the Pipeline Designer page.
2. Select the widget that you want to modify.
3. Hover on the widget and click . A dialog box is displayed.
4. Modify the required details.
5. Click  to save the changes. The widget details are modified.

10.10.3.5 Deleting Widget

To delete a widget, follow these steps:

1. Navigate to the Pipeline Designer page.
2. Select the widget that you want to delete.
3. Hover on the widget and click .
4. The Pipeline Delete dialog box is displayed. Click Confirm. The widget is deleted.

10.10.4 External Service Widget




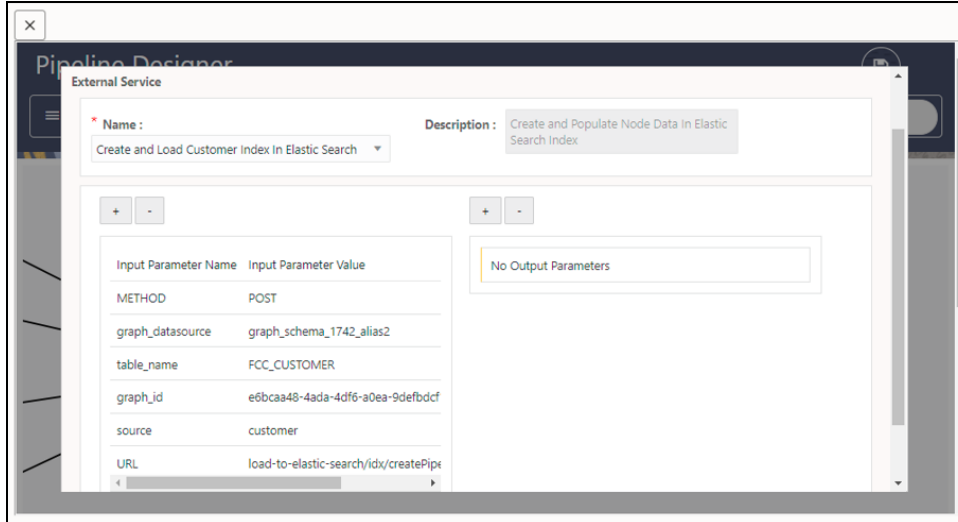
The  widget is used to add an external service. It performs actions on the data, such as loading or moving the data or performing a virus scan. The Node information should be loaded into OpenSearch if similar edges are found in the graph between two nodes.

Figure 285: External Service



10.10.5 Defining an Index

An index is used to map the node attributes and load the data into OpenSearch Indexes. To define an index, follow these steps:


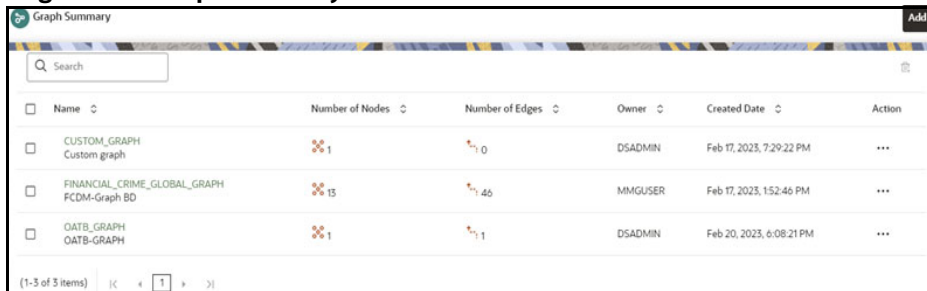
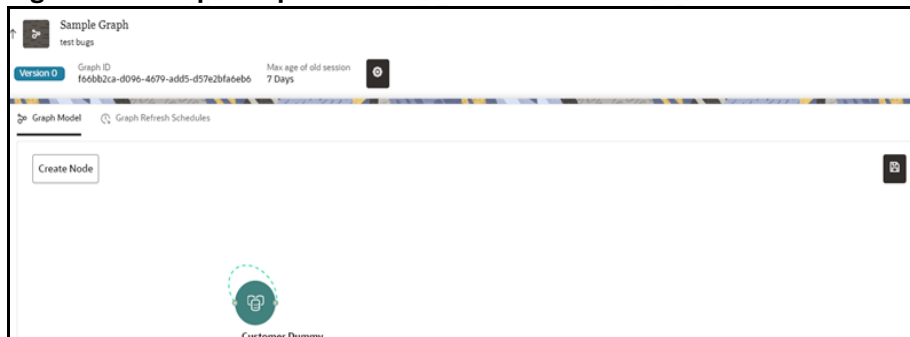
1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. On **Modeling** menu, click **Graphs**. The Graph Summary page is displayed.

Figure 286: Graph Summary



3. Click **Graph**. The sample graph page is displayed.

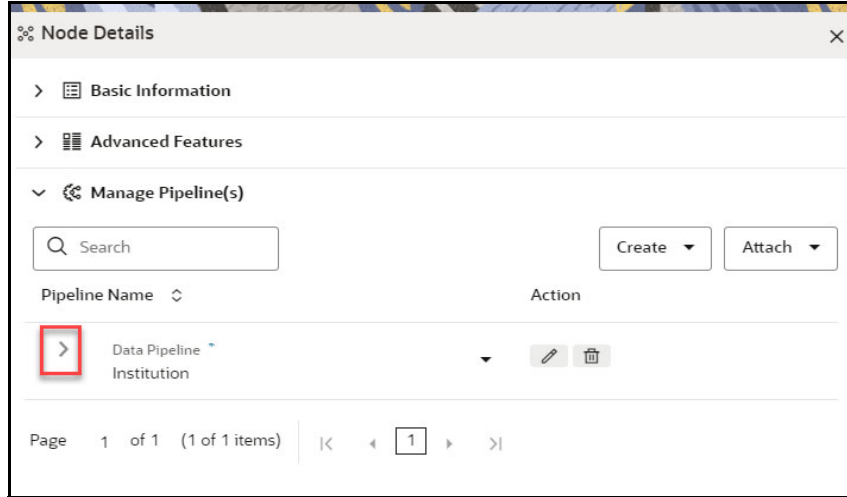
Figure 287: Sample Graph



4. Hover over the graph pipeline and click node on the graph.

5. On the Node Details page, click **Attach** drop-down list and click **Data Pipeline**. The following page is displayed.

Figure 288: Node Details

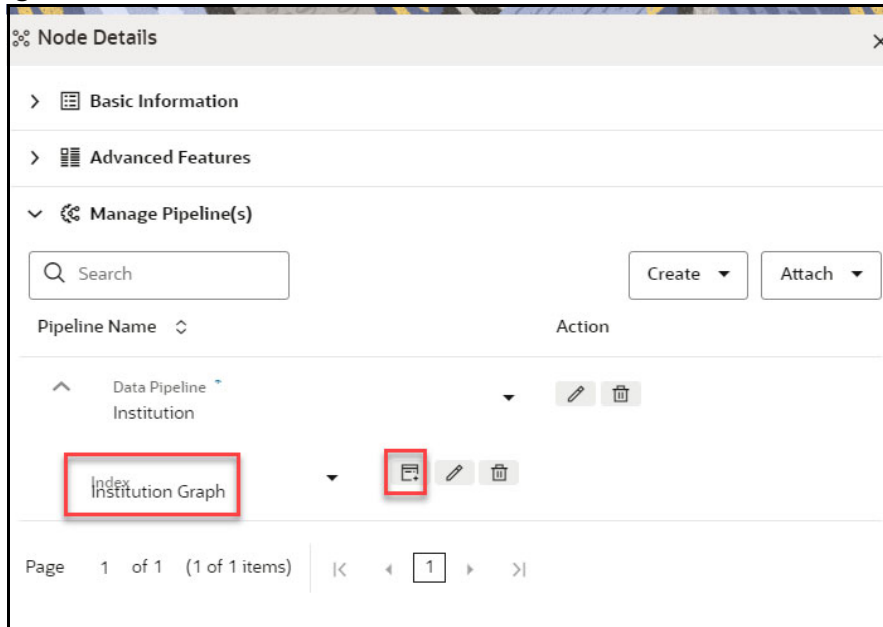


10.10.5.1 Creating an Index

To create an index, follow these steps:

1. Click **Show attached index** drop-down list to view the index. The following page is displayed. By default, an index is attached to the data pipeline.

Figure 289: Create an Index



2. If you need to create a new index then click **Create** button to create the index. The **Define Index** window is displayed.

Figure 290: Define Index


3. Enter the following fields:
 - **Index Name:** Enter the unique index name across all the graphs. The field is limited to 30 characters.
 - **Index Description:** Enter the description of the index. The field is limited to 255 characters.
 - **Shards:** Enter the required integer value. Enter the value as 1. The maximum value for shards is 1024.
 - **Replicas:** Enter the required integer value. Enter the value as 3. The maximum value for replicas is 1024.
4. Click  icon to add mapping to the index. The **Mappings** section is displayed.

Figure 291: Mapping

The [Table 69](#) provides descriptions for the fields in the **Mappings** section.

Table 69: Mapping Details

Field	Description
Attributes	Select the Attributes from the drop-down. It lists all the attributes which are created in the node modeler attribute. NOTE: To create an index, you should select the attribute which is defined as Key Attributes in the Advanced Features group of the Node Details page.

Table 69: Mapping Details

Field	Description
Analyzer	<p>It should be set as default for key attributes. For other attributes, you can select from the drop-down. The available options are:</p> <ul style="list-style-type: none"> • DEFAULT • ADDRESS • ORGANIZATION • NAME • NAMESTOP <p>NOTE: If you want to seed a new value in the Analyzer Type, then enter the value as FCC_IDX_JSON_CONTENT in the metadata table.</p>
Data Type	<p>It should be set as default for key attributes. For other attributes, you can select from the drop-down. The available options are:</p> <ul style="list-style-type: none"> • DATE • NUMBER • TEXT <p>NOTE: If you want to seed a new value in the Data Type, then enter the value as FCC_IDX_JSON_CONTENT in the metadata table. Data Type is set to default as "Text" and non-editable when Analyzer type is selected as "Default".</p>
Translation Apply	Enable this option for language translation, if required.
Char Replacement	Enable this option for character replacement in the OpenSearch while matching, if required.
Target Characters	This field is applicable only, if char Replacement field is enabled. Enter the target characters which have to be modified.
Replace With	This field is applicable only, if char Replacement field is enabled. Enter the required characters to be replaced which is defined in the target characters.
Delete	<p>Click Delete button to delete the selected mapping, if required.</p> <p>NOTE: If the attribute is deleted in the Node Modeler Attributes Section of the Node Details page, then same attribute must be deleted in the Mappings section of the Define Index page.</p>

10.10.5.2 Editing an Index

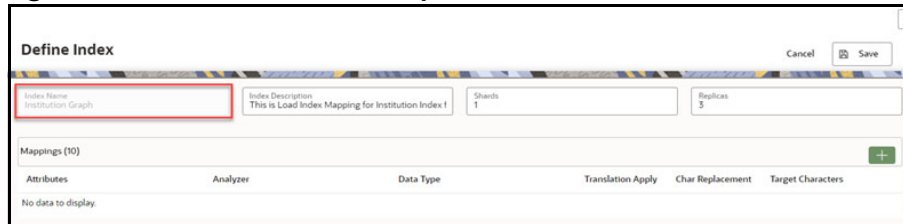
To edit an index, perform these steps:

Figure 292: Edit the Index



1. Click **Edit** icon to edit the required fields. The Define Index page is displayed.

Figure 293: Define Index with Edit Option



2. Edit the fields as required and click **Save**. The index is saved.

NOTE You cannot edit the Index Name.

10.10.5.3 Deleting an Index

1. Click **Delete** icon in the Manage Pipeline(s) group.
The index is removed from the respective data pipeline.

11 Appendix

Topics:

- [Common Screen Elements in a Notebook](#)
- [Managing Resource Utilization](#)
- [Using Data Visualizations](#)
- [Dynamic Forms](#)
- [Quantifind Risk Report](#)
- [Using Scenario Conversion Utility](#)
- [Using Subgraph Off loaded Graphs](#)
- [APIs for Model Pipelines](#)
- [Public APIs for Scheduler Operations](#)

11.1 Common Screen Elements in a Notebook

The [Table 70](#) describes the common screen elements in a notebook that can be used to perform quick actions when preparing and executing the notebooks.

Table 70: Common Screen Elements in a Notebook






Icon	Action or Description
	Modify Notebook: Modifies the details of a notebook, such as a name, description, and (or) tags.
	Hide Code: Hides or shows the Code Section in all the paragraphs in a notebook.
	Hide Result: Hides or shows the Results Section in all the paragraphs in a notebook.
	Re-initialize session: Re-initialize the paragraph in a notebook. By default, the Start Widget gets executed automatically on clicking the Re-initialize icon. All other paragraphs need to be executed manually.
	Read-Only: Sets the notebook to read-only mode. NOTE: The notebook is protected from edit, clear result, delete, share, reset session, and run paragraphs in Read-only mode.

Table 70: Common Screen Elements in a Notebook












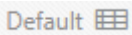

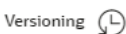
	<p>Write: Set the notebook to write mode.</p>
	<p>Run Paragraphs: Executes all the paragraphs in a notebook in sequential order. For more information, see Running All Paragraphs.</p>
	<p>Invalidate Session: Resets any connection or code executed in a notebook.</p>
	<p>Delete Notebook: Deletes a notebook.</p>
	<p>Clear Result: Clears results for all the paragraphs in a notebook.</p> <p>NOTE: This action clears all the results. You must rerun the paragraphs to view the results.</p>
	<p>Clear Paragraph Dependencies: Remove all defined paragraph dependencies.</p>
	<p>Open as an iframe: Opens a notebook in an Iframe. This allows a notebook to be embedded inside another webpage.</p>
	<p>Clone Notebook: Creates a copy of a notebook. All paragraphs in the current notebook are replicated in the new notebook. The cloned notebook is created with the default name, Copy of <Current Notebook Name>.</p>
	<p>Save Notebook: Saves the notebook to your computer as a DNSB file. For more information, see Exporting Individual Notebooks.</p>
<p>Zeppelin </p>	<p>Layout: Sets the preferred layout: Zeppelin or Jupyter.</p>

Table 70: Common Screen Elements in a Notebook

	<p>Default Template: Applies the overall look and feel of the notebook using the default template.</p>
	<p>Default View: Switches between Default, Simple, and Report views.</p>
	<p>Show Panel: Shows or hides the Paragraph Settings Bar Commands, Results Toolbar, and Settings Dialog for a selected paragraph in a panel to the notebook's right.</p>
	<p>Versioning: You can use this option to create versions for your notebook, which helps you analyze the changes based on the version control.</p>

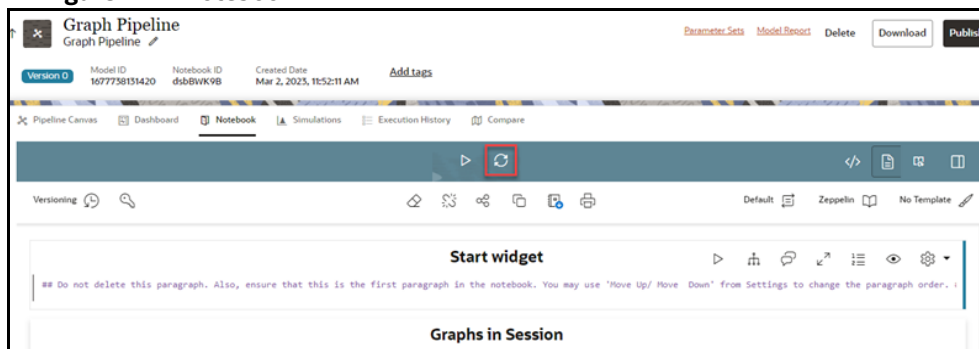
11.2 Managing Resource Utilization

If any of the Notebooks are no longer needed, you can invalidate the session of that notebook and free up the system resources.

To invalidate a session, perform the following steps:

1. Login to the CS application.
2. On **Modeling** menu, click **Pipelines**.
3. Click **Notebook** tab. The notebook is displayed.

Figure 294: Notebook



4. Click  to invalidate the session.

11.3 Using Data Visualizations

The following are the data visualizations that are available in the Notebook Server:

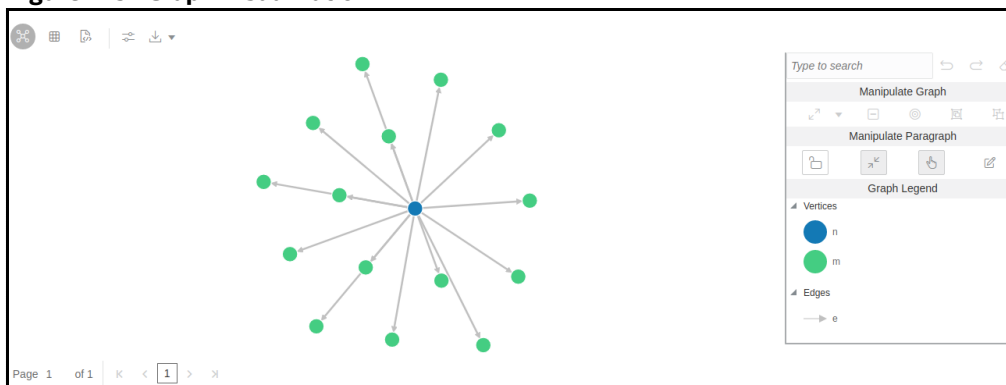
- Graph Visualization

- Table
- HTML or Markdown
- Text
- Area Chart
- Bar Chart
- Funnel Chart
- Line Chart
- Pie Chart
- Pyramid Chart
- TreeMap Diagram
- Sunburst Diagram
- Tag Cloud
- Box Plot
- Scatter Plot
- Map Visualize

11.3.1 Graph Visualization

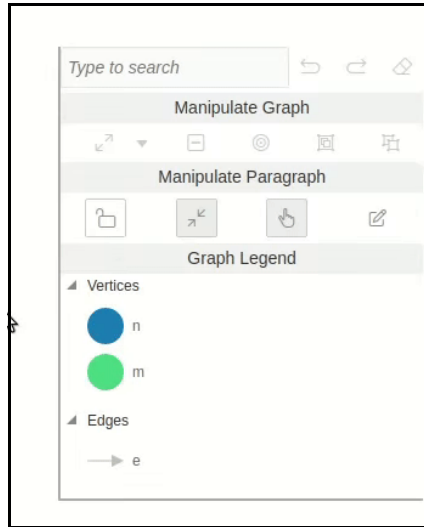
The Notebook Server allows visualizing data in the form of a Graph Visualization. All actions of the graph visualization are collected inside a panel.

Figure 295: Graph Visualization



The panel can be resized and includes two states, default and minimized panel. These panels enable you to manipulate paragraphs and graphs and provide options to customize your graph.

Figure 296: Minimized Panel



11.3.2 Table

The Notebook Server allows you to visualize your data in the form of a Table Diagram. The table can be sorted by column in ascending or descending order. Additionally, the table can be filtered for a specific search term. Rows that do not contain this term are hidden from view, and the remaining rows highlight the location of the search term within the row.

Figure 297: Table Diagram

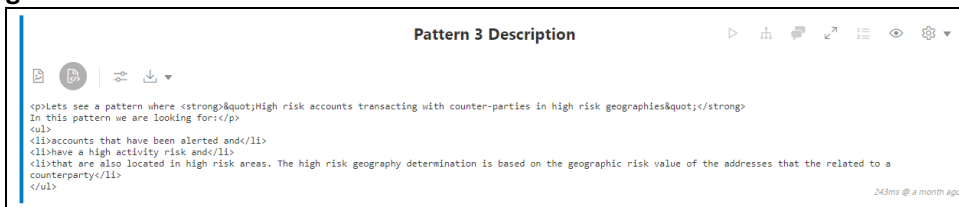
Code	Name	Continent	Region	SurfaceArea	Population	LifeExpectancy	GNP	GNPOId	LocalName
ABW	Aruba	North America	Caribbean	193.00	103000	78.4	828.00	793.00	Aruba
AFG	Afghanistan	Asia	Southern and Central Asia	652090.00	22720000	45.9	5976.00	null	Afghanistan/Afqanestan
AGO	Angola	Africa	Central Africa	1246700.00	12878000	38.3	6648.00	7984.00	Angola
AIA	Anguilla	North America	Caribbean	96.00	8000	76.1	63.20	null	Anguilla
ALB	Albania	Europe	Southern Europe	28748.00	3401200	71.6	3205.00	2500.00	Shqipëria
AND	Andorra	Europe	Southern Europe	468.00	78000	83.5	1630.00	null	Andorra
ANT	Netherlands Antilles	North America	Caribbean	800.00	217000	74.7	1941.00	null	Nederlandse Antillen
ARE	United Arab Emirates	Asia	Middle East	83600.00	2441000	74.1	37966.00	36846.00	Al-'Imarat al-'Arabiya al-Mutti
ARG	Argentina	South America	South America	2780400.00	37032000	75.1	340238.00	323310.00	Argentina
ARM	Armenia	Asia	Middle East	29800.00	3520000	66.4	1813.00	1627.00	Hajastan

Page 1 of 24 (1-10 of 239 items) | 1 2 3 4 5 ... 24

11.3.3 HTML or Markdown

The Notebook Server allows you to visualize your data in the form of HTML or Markdown text.

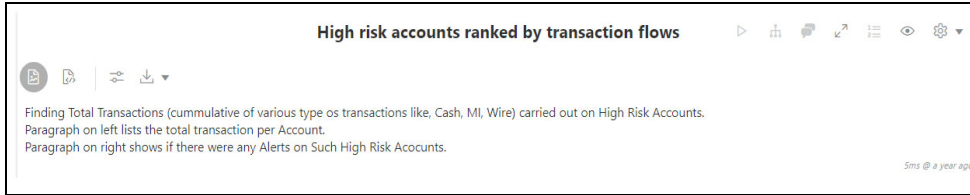
Figure 298: HTML Text



11.3.4 Text

The Notebook Server allows you to visualize your data in structured and presented text for you to customize the data.

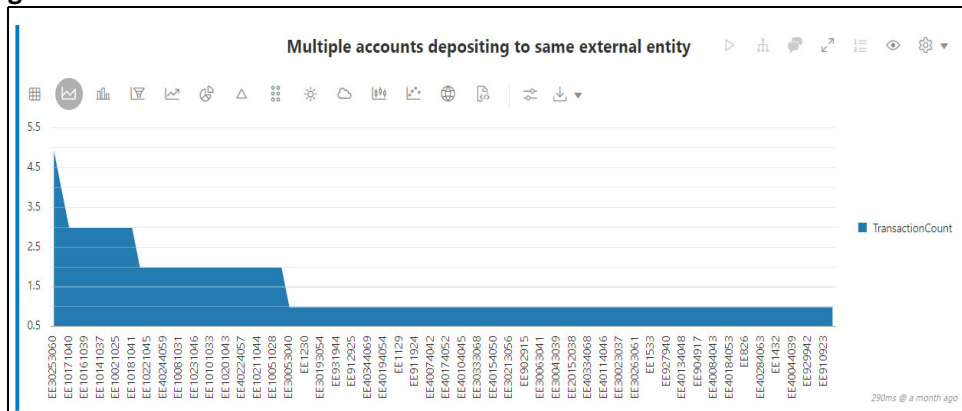
Figure 299: Text



11.3.5 Area Chart

The Notebook Server allows you to visualize your data in the form of an Area Chart.

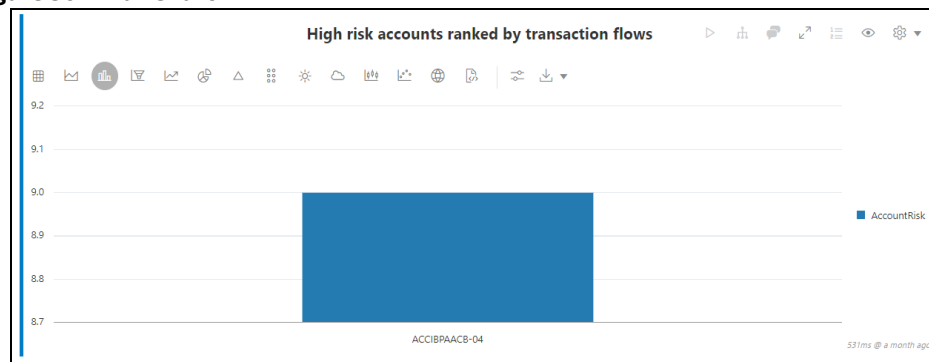
Figure 300: Area Chart



11.3.6 Bar Chart

The Notebook Server allows you to visualize your data in the form of a Bar Chart.

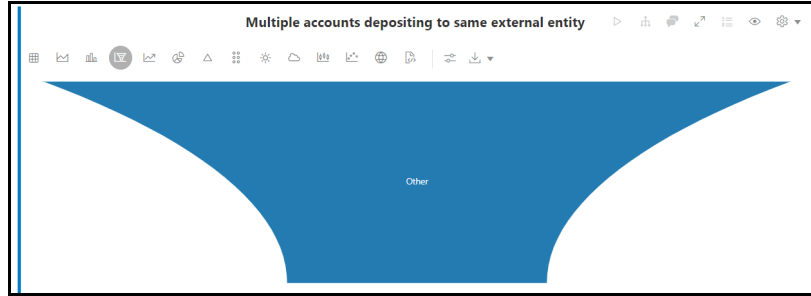
Figure 301: Bar Chart



11.3.7 Funnel Chart

The Notebook Server allows you to visualize your data in the form of a Funnel Chart.

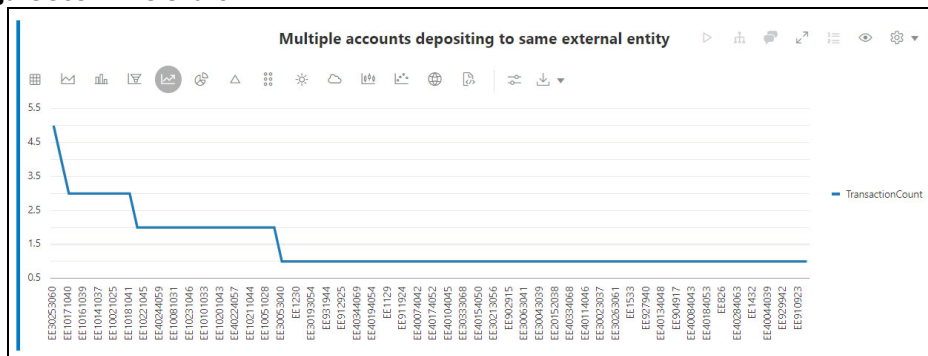
Figure 302: Funnel Chart



11.3.8 Line Chart

The Notebook Server allows you to visualize your data in the form of a Line Chart.

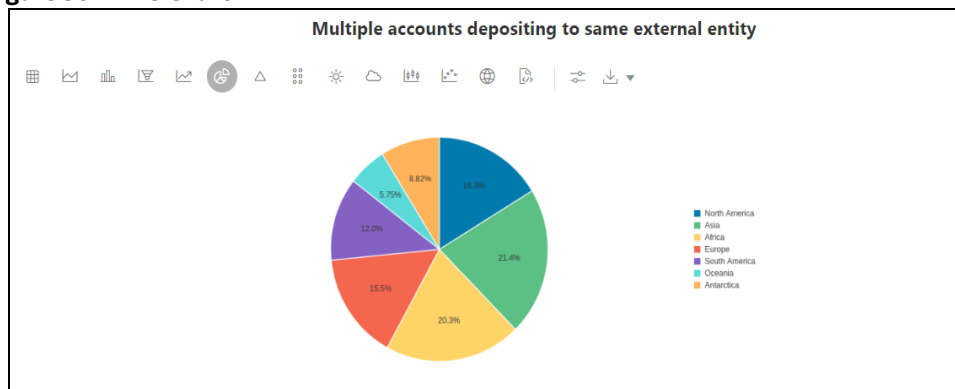
Figure 303: Line Chart



11.3.9 Pie Chart

The Notebook Server allows you to visualize your data in the form of a Pie Chart.

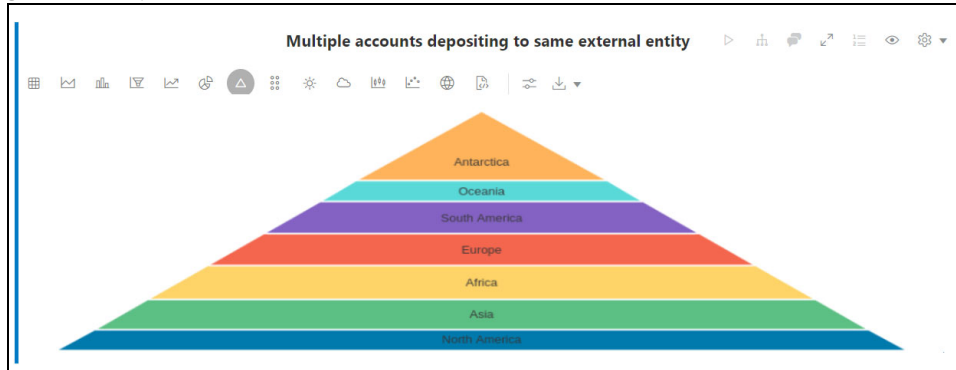
Figure 304: Pie Chart



11.3.10 Pyramid Chart

The Notebook Server allows you to visualize your data in the form of a Pyramid Chart.

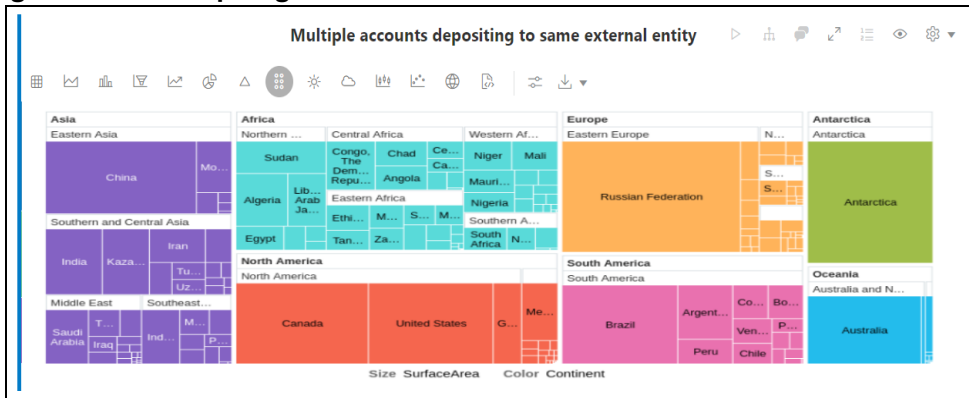
Figure 305: Pyramid Chart



11.3.11 TreeMap Diagram

The Notebook Server allows you to visualize your data in the form of a Tree Map Diagram.

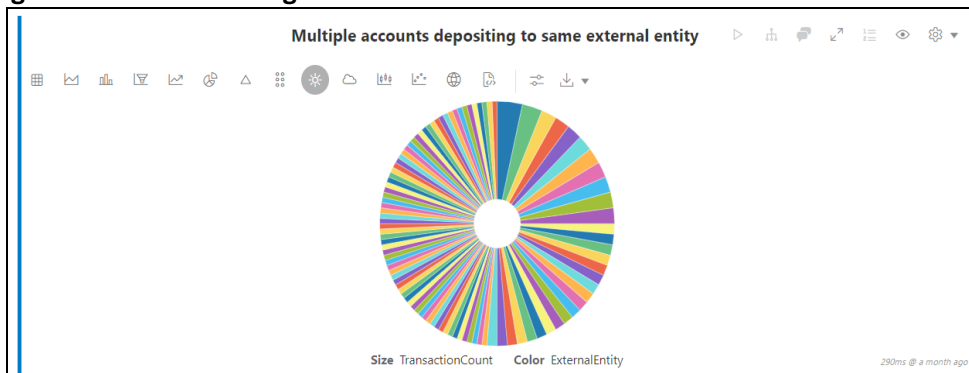
Figure 306: TreeMap Diagram



11.3.12 Sunburst Diagram

The Notebook Server allows you to visualize your data in the form of a Sunburst Diagram.

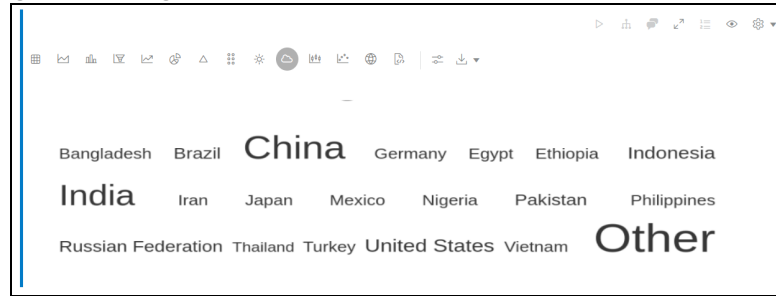
Figure 307: Sunburst Diagram



11.3.13 Tag Cloud

The Notebook Server allows you to visualize your data in the form of tags. The tag cloud operation is used to identify the spots where there are more flags.

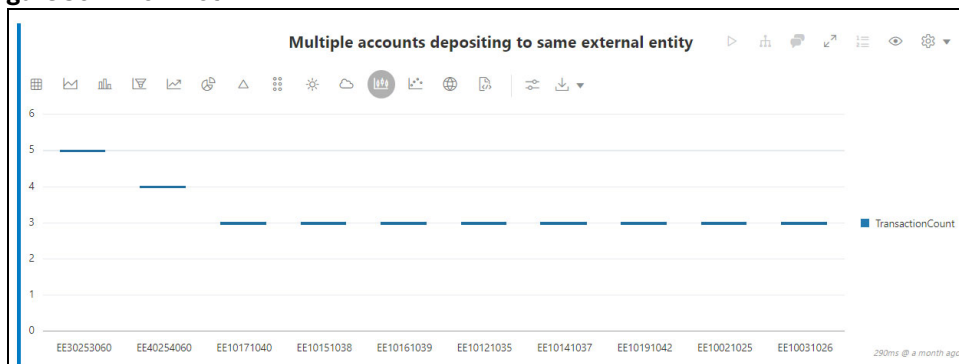
Figure 308: Tag Cloud



11.3.14 Box Plot

The Notebook Server allows you to visualize your data in the form of a Box Plot.

Figure 309: Box Plot



11.3.15 Scatter Plot

The Notebook Server allows you to visualize your data in the form of a Scatter Plot.

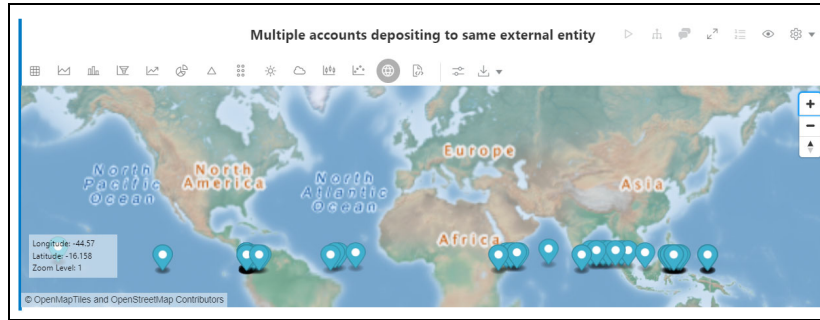
Figure 310: Scatter Plot




11.3.16 Map Visualizer

The Notebook Server allows you to visualize your data on top of a Map.

Figure 311: Map Visualizer



11.3.16.1 Setting up the Visualizations

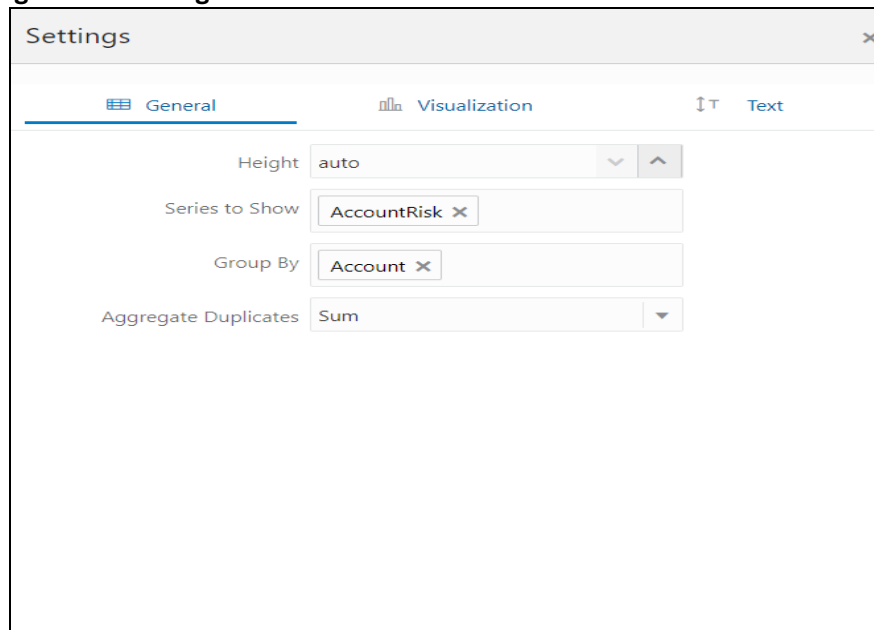
The visualization settings offer several ways of configuration, which are split into three tabs: General, Visualization, and Text. To set the configuration for your table view, click  **Settings**.

These tabs in the Settings window allow you to customize the properties of the text, graphs, and visuals and view the visuals in various orientations. For example, you can view the Bar Chart to change the colors, bar type, and 360-degree view of the visuals.

The Settings window is displayed and contains the following category:

- General
- Visualization
- Text

Figure 312: Settings Window



11.3.16.2 Download As


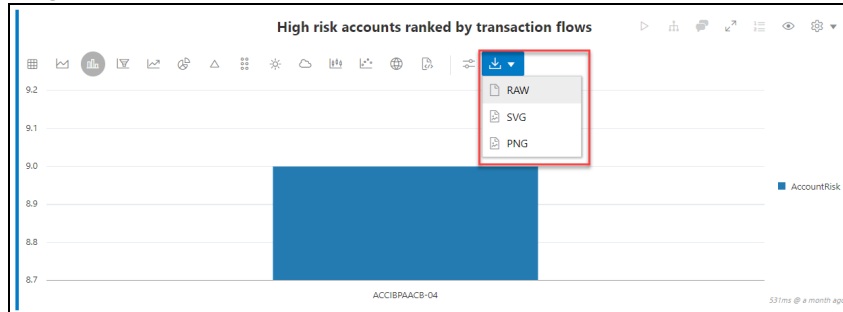
The displayed visuals can be downloaded using the  **Download As** option. The available download formats are RAW, SVG, and PNG.

Figure 313: Download As an option

11.4 Dynamic Forms

The following are the supported input fields in Notebook Server:

- Textbox
- Select
- Slider
- Checkbox
- Date Picker
- Time Picker
- DateTime Picker
- Setting Values through a Notebook URL

The following sections in this chapter provide details about how you can specify the dynamic parameters for the existing fields.

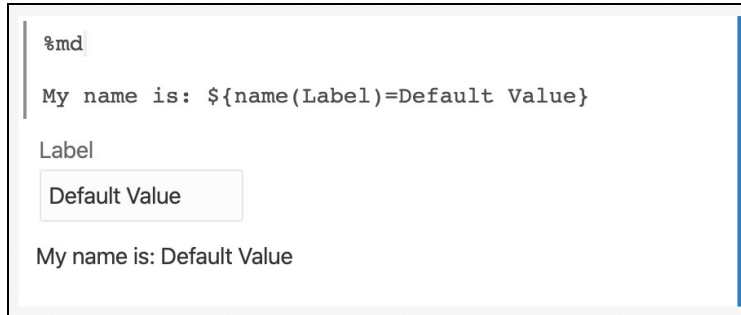
11.4.1 Textbox

The textbox offers a simple user input that accepts any characters.

- The name of the user input can be defined using `${name}`.
- A customized label can be set using `${name (Label)}`.
- A default value can be assigned using the equals operator `${name (label)=Default Value}` or `${name=Default Value}`.

For example, `${name (Label)=Default Value}`

Figure 314: Textbox



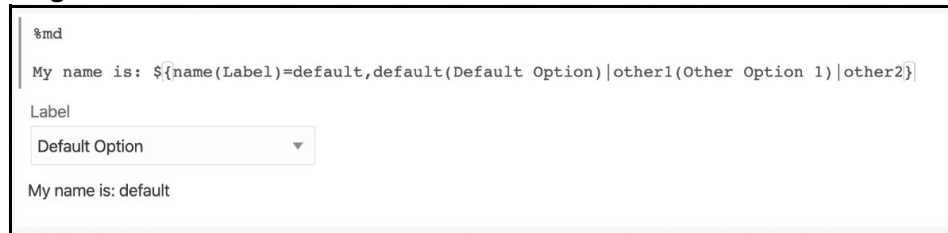
11.4.2 Select

A select field allows you to choose from a given selection.

- The name, label, and default value can be set like the [Textbox](#).
- Options follow the ", (comma)" after the default assignment name=default,default|other1|other2 etc.
- The label of an option can be added in the brackets following the option other1 (Other Option 1).

For example: `${name (Label)=default,default (Default Option)|other1 (Other Option 1)|other2}`

Figure 315: Select field



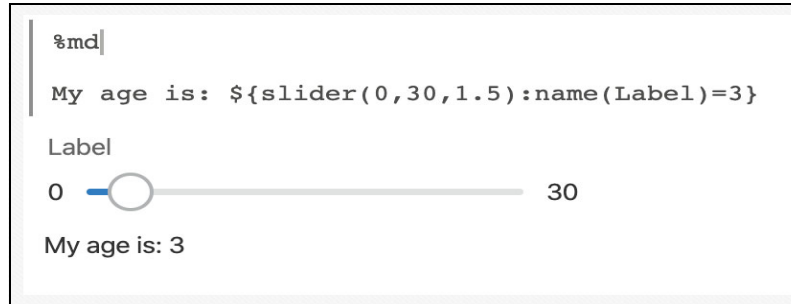
11.4.3 Slider

A slider allows you to choose from a given range.

- The first part of the slider dynamic form is the keyword `slider`, followed by brackets containing the values for minimum, maximum, and step size: `slider(<min>,<max>,<step size>)`.
- Then, after a : (colon), the name, label, and default value can be set similar to the [Textbox](#).

For example: `${slider (0,30,1.5) :name (Label)=3}`

Figure 316: Slider



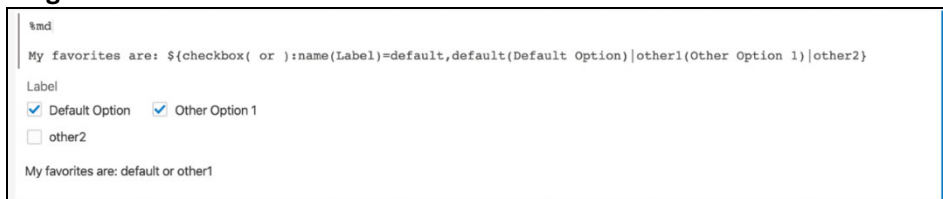
11.4.4 Checkbox

A checkbox allows you to choose from a given selection.

- The first part of the checkbox dynamic form is the keyword `checkbox`, followed by brackets containing the values join parameter of the options: `checkbox(<join parameter>)`.
- The join parameter is used between all selections and only shows up if at least two elements are selected.
- Then, after a `:` (colon), the name, label, default value, and options can be set similar to the [Dynamic Forms](#).

For example: `${checkbox(or):name(Label)=default,default(Default Option)|other1(Other Option 1)|other2}`

Figure 317: Checkbox



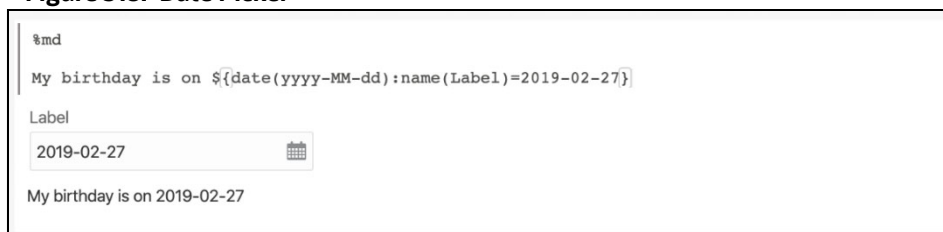
11.4.5 Date Picker

A date-picker allows you to choose from a given date.

- The first part of the checkbox dynamic form is the keyword `date`, followed by brackets containing the **output format**: `date (day) or date (yyyy-MM-dd)`.
- The name, label, and default value can be set similar to the [Textbox](#).

For example: `${date(yyyy-MM-dd):name(Label)=2019-02-27}`

Figure 318: Date Picker



11.4.6 Time Picker

A time picker allows you to choose from a given time.

- The first part of the checkbox dynamic form is the keyword `time`, followed by brackets containing the **output format**: `time (HH:mm)` or `time (HH)`.
- The name, label, and default value can be set similar to the [Textbox](#).

For example: ``${time (HH:mm) :name (Label) =T13:30}`.

Figure 319: Time Picker

11.4.7 DateTime Picker

A datetime picker allows you to choose from a given date and time.

- The first part of the checkbox dynamic form is the keyword `dateTime`, followed by brackets containing the **output format**, that is, `dateTime (YYYY-MM-dd hh:mm)`.
- The name, label, and default value can be set similar to the [Textbox](#).

For example: ``${dateTime (yyyy-MM-dd hh:mm) :name (Label) =2019-02-28 11:30}`.

Figure 320: DateTime Picker

11.4.8 Setting Values through a Notebook URL

In the web interface, dynamic form values can also be set by passing a name-value pair as the parameter of a notebook URL. For example, to set the value of the dynamic form named `myDynamicForm` to `FCCStudio`, the parameter `&form_myDynamicForm=FCCStudio` must be added to the URL. If there are multiple dynamic forms with the same name in the same notebook, all of them will be set.

NOTE

It is recommended not to pass sensitive information via the URL. If you have sensitive information, you can use the REST API to change the values of a dynamic form.

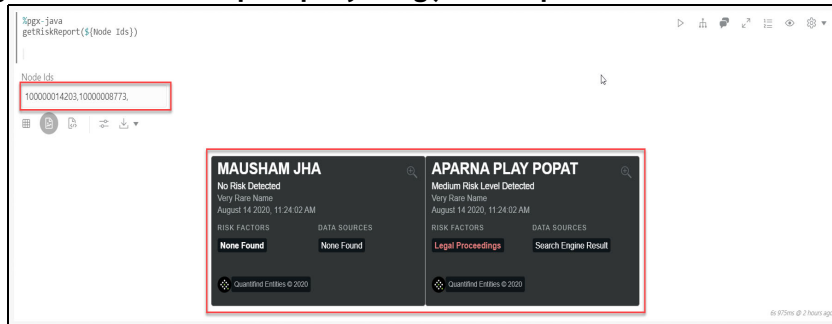
11.5 Quantifind Risk Report

Quantifind integration for real-time risk reports in Notebook Server enables financial institutions to discover revenue drivers and risk signals, including fraud and money.

NOTE These reports are only available for Notebook Server integration with ECM.

The figure shows that you can run the risk report query in the ECM notebook using the java interpreter.

Figure 321: Run Risk Report query using java interpreter



The results are displayed as a card, which displays the risk status of the identified node details. Based on the risk, you can perform the required measures for the risk analysis.

11.6 Using Scenario Conversion Utility

11.6.1 Introduction

Scenario Conversion Utility converts BD scenarios to Compliance Studio notebooks for the scenarios and respective thresholds.

NOTE The utility converts only BD AML scenarios to Compliance Studio notebooks based on the rule matcher algorithm.

11.6.2 Prerequisites

- Ensure that the OFS Compliance Studio v8.1.2.6.0 is installed and running.
- Make sure that all the Compliance Studio patches are applied.
- Ensure that the OFS BD v8.1.2.*.* is installed and running.
- Ensure that the following tables and sequence exist in the Compliance Studio Schema:
 - Tables:
 - ds_notebook
 - ds_paragraph
 - Sequence:
 - seq_paragraph

11.6.2.1 Calendar Notebook

The calendar notebook is used to set calendar information and processing batch date for execution of the scenario notebook.

Import `SCU_Set_Calendar.dsnb` notebook into the sandbox workspace and pointing to the non-prod BD atomic schema.

The following jars are available in the `<OFS_COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/ficdb/Scenario-Conversion-Utility/db_tools/lib` directory.

- `dbtools.jar`
- `kddcore.jar`
- `log4j-api-<version>.jar`
- `log4j-core-<version>.jar`

NOTE This section is applicable only if you are using Scenario Conversion Utility and Automated Scenario Calibration use case (ML4AML).

11.6.2.1.1 Importing the Notebook (Draft)

NOTE In case of upgrade scenario (from v8.1.2.5.0 to v8.1.2.6.0), user has to delete the `Scenario_Conversion_Utility` notebook which was imported on CS v8.1.2.5.0. The latest version of notebooks, i.e. 8.1.2.6.0 has to be imported again by performing the below steps.

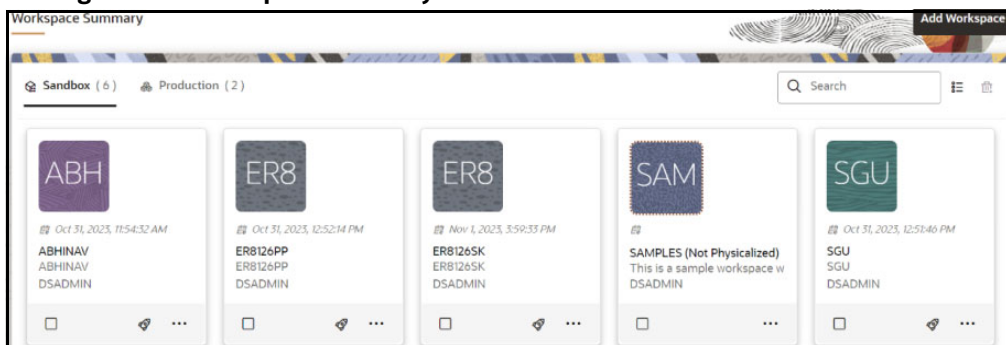
To import the calendar notebook, follow these steps:

1. To create the Sandbox workspace, see the [Create a Workspace](#) section.
2. Navigate to `<OFS_COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/ficdb/Scenario-Conversion-Utility/notebooks` directory and download the following notebook:

`SCU_Set_Calendar.dsnb`

3. Navigate to the **Workspace Summary** page.

Figure 322: Workspace Summary



4. Navigate to any Sandbox workspace where non-prod BD atomic schema is the data source.

NOTE Ensure that the non-prod BD atomic schema is added as a data source for the workspace.

- The Objective can be created newly or you can use the existing Objective. To create an Objective, see the [Creating Objective \(Folders\)](#) section.
- Import the following Notebook as a Draft. To import, see the [Import a Workspace Model Data into a New Model](#) section.

SCU_Set_Calendar.dsnb

A new model is created by importing the model data dump of another model.

- Open the Model in **Pipeline Designer** and click **Notebook** tab to view the notebook.

11.6.2.2 Accessing the Calendar Notebook

To access the calendar notebook, follow these steps:


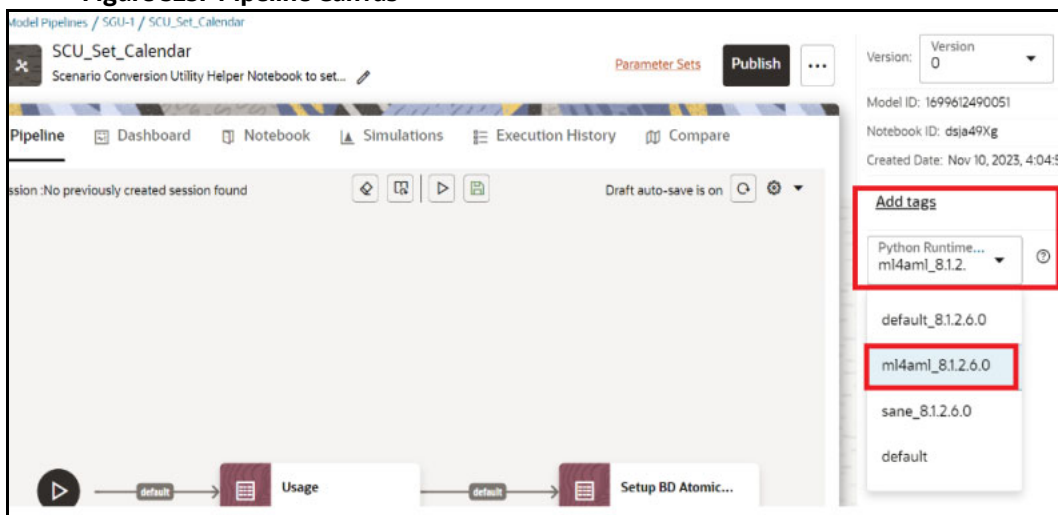
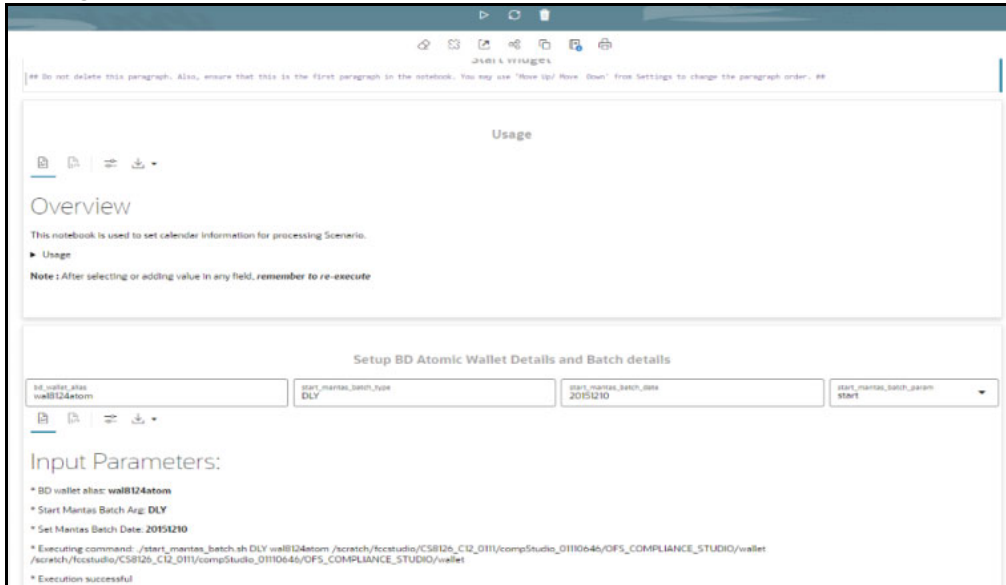
- Click **Launch**  on the **Scenario Generation Utility** workspace to launch workspace to display the **Dashboard** window with application configuration and model creation menu.
- On **Modeling** menu, click **Pipelines**.
- Click **Scenario Generation Utility** Objective Name.
Generally, the notebooks are available where you imported.
- Click **SCU_Set_Calendar** notebook. The Pipeline canvas page is displayed.

Figure 323: Pipeline Canvas



- From the **Python Runtime** drop-down list, select the **mi4aml_8.1.2.6.0**. The selected Python runtime parameter will be used during all the notebook executions.
- Click the **Notebook** tab. The following page is displayed.

Figure 324: Calendar Notebook



In the **Setup BD Atomic Wallet Details and Batch details** paragraph,

7. Enter the Behavior Detection Atomic Schema's oracle wallet alias in the **BD wallet alias**.

The wallet alias is available in the `<COMPLIANCE_STUDIO_INSTALLATION_PATH>/wallet/tnsnames.ora` directory.

8. Enter the **Processing Batch Name (Code)**. By default, it is DLY.

For example, DLY indicates the Daily Batch.

9. Enter the **Processing Batch Date** in the specified format YYYYMMDD. By default, enter the current date.

For example, 20230524 for 24th May 2023.

10. Select **Batch Type** from the drop-down list. The available options are **set_date**, **start**, and **end**.

- **set_date**: To set a specific date.
- **start**: To setup the bd atomic schema details and other batch processing information.
- **end**: To close the existing mantas batch.

11. Execute **Run Paragraph** icon to processing batch date for execution of the scenario notebook.

After execution, you can verify the data are populating for the batch processing by executing the following queries:

```
select * from kdd_cal;
select * from kdd_prcsng_batch_control;
```

NOTE Do not execute the **Batch Type** as **end** until the scenario notebook execution is completed.

11.6.3 Conversion Steps

The following terms are used in the scenario:

- AC – Account
- CU – Customer
- ML – Money Laundering
- ML/AC – Money Laundering Account focus Scenario
- ML/CU – Money Laundering Customer focus Scenario

The following scenarios are supported:

- (ML/AC) Transactions in Round Amounts
- (ML/CU) Early Payoff or Paydown of a Credit Product
- (ML/AC) CIB: High Risk Geography Activity
- (ML/AC) Anticipatory Profile - Expected Activity
- (ML/AC) CIB: Significant Change from Previous Peak Activity
- (ML/AC) CIB: Significant Change from Previous Average Activity
- (ML/AC) CIB: Product Utilization Shift
- (ML/CU) Anomalies in ATM, Bank Card: Foreign Transactions
- (ML/CU) Anomalies in ATM, Bank Card: Excessive Withdrawals
- (ML/CU) Rapid Movement of Funds - All Activity
- (ML/AC) Rapid Movement of Funds - All Activity
- (ML/CU) Single or Multiple Cash Transactions: Large Significant Transactions
- (ML/AC) Deposits / Withdrawals in Same or Similar Amounts
- (ML/AC) Patterns of Funds Transfers Between Customers and External Entities
- (IML/CU) Frequent Changes to Instructions
- (IML/CU) High Risk Electronic Transfers
- (IML/EN) High Risk Electronic Transfers
- (ML/CU) High Risk Transactions: Focal High Risk Entity
- (ML/AC) High Risk Transactions: Focal High Risk Entity
- (ML/AC) High Risk Transactions: High Risk Counter Party
- (ML/HH) High Risk Transactions - High Risk Counter Party
- (ML/AC) High Risk Transactions: High Risk Geography
- (ML/CU) Single or Multiple Cash Transactions: Possible CTR
- (ML/HH) Single or Multiple Cash Transactions: Possible CTR
- (ML/AC) Anomalies in ATM, Bank Card: Excessive Withdrawals
- (ML/AC) Deposits/Withdrawals in Same or Similar Amounts
- (ML/EN) Hub and Spoke

- (ML/AC) Terrorist Financing
- (ML/EN) Terrorist Financing
- (ML/EN) Transactions in Round Amounts (MI)
- (ML/CU) Large Reportable Transactions
- (ML/EN) Patterns of Recurring Originators/Beneficiaries in Funds Transfers
- (ML/CU) Patterns of Funds Transfers Between Customers and External Entities
- (ML/AC) Patterns of Funds Transfers Between Internal Accounts and Customers
- (ML/CU) Hub and Spoke
- (ML/AC) CIB: Foreign Activity
- (ML/CB) CIB: Significant Change from Previous Peak Activity
- (ML/CB) CIB: Significant Change from Previous Average Activity
- (ML/CU) Routing of Funds Through Multiple Location
- (ML/CU) High Risk Transactions: High Risk Geography
- (ML/CU) Terrorist Financing
- (ML/AC) Escalation in Inactive Account
- (ML/CU) Structuring: Deposits/Withdrawals of Mixed Monetary Instruments
- (ML/AC) Anomalies in ATM, Bank Card: Foreign Transactions
- (ML/CU) Structuring: Avoidance of Reporting Threshold

NOTE	Other BD scenarios apart from the above mentioned list are under the verification process.
-------------	--

To convert the BD AML scenario, perform the following:

- [Setting up Database for Fresh Installation and Upgrade](#)
- [Importing the Notebook \(Draft\)](#)
- [Generating Threshold and Scenario Notebook](#)
- [Running the Scenario](#)

11.6.3.1 **Setting up Database for Fresh Installation and Upgrade**

Users need to set up a database for fresh installation and upgrade as well.

11.6.3.1.1 **Setting up Database for Fresh Installation**

To set up a database for fresh installation, follow these steps:

1. Log in to the server where Compliance Studio is installed.
2. Navigate to <OFS_COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/ficdb/Scenario-Conversion-Utility/notebooks directory.
3. Download the following notebooks and save it to the local machine.
 - Scenario_Conversion_Utility.dsnb

- Delete_Threshold_Sets.dsnb
4. Navigate to <OFS_COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/ficdb/Scenario-Conversion-Utility/SQLScripts directory.
 5. The following files are available and it should be executed in sequential order:
 - a. db_link.sql
 - b. synonym.sql
 - c. sequence.sql
 - d. table.sql
 - e. view.sql
 - f. package.sql
 - g. package_common.sql

NOTE

- Disable the variable substitution before executing all the SQL scripts. For example, if you are executing SQL steps from the SQL Developer then disable the variable substitution using the following command:
SET DEFINE OFF;
- Before running the db_link.sql script, the following place holders inside the script must be modified:
 - HOST IP address of database where Studio schema is available
 - Service Name of database
 - Username for Studio schema
 - Password for Studio schema

- i. @<Fully Qualified path of scenario conversion utility>/db_link.sql
- ii. @<Fully Qualified path of scenario conversion utility>/synonym.sql
- iii. @<Fully Qualified path of scenario conversion utility>/sequence.sql
- iv. @<Fully Qualified path of scenario conversion utility>/table.sql
- v. @<Fully Qualified path of scenario conversion utility>/view.sql
- vi. @<Fully Qualified path of scenario conversion utility>/package.sql
- vii. @<Fully Qualified path of scenario conversion utility>/package_common.sql

NOTE

- If any BD scenario xml files are modified, then ensure that the materialized views are refreshed using the following commands:

```
BEGIN DBMS_SNAPSHOT.REFRESH( '"<BDSHEMA-  
NAME>". "VW_SCNRO_BIND_MD"', 'C'); end;  
  
/  
  
BEGIN DBMS_SNAPSHOT.REFRESH( '"<BDSHEMA-  
NAME>". "VW_SCNRO_CHKPT_BIND_MD"', 'C'); end;  
  
/  
  
BEGIN DBMS_SNAPSHOT.REFRESH( '"<BDSHEMA-  
NAME>". "VW_SCNRO_CHKPT_MD"', 'C'); end;  
  
/  
  
BEGIN DBMS_SNAPSHOT.REFRESH( '"<BDSHEMA-  
NAME>". "VW_SCNRO_CONSTRAINT_MD"', 'C'); end;  
  
/  
  
BEGIN DBMS_SNAPSHOT.REFRESH( '"<BDSHEMA-  
NAME>". "VW_SCNRO_DATASET_JOB_MD"', 'C'); end;  
  
/  
  
BEGIN DBMS_SNAPSHOT.REFRESH( '"<BDSHEMA-  
NAME>". "VW_SCNRO_HIGHLIGHT_MD"', 'C'); end;
```

- Replace the <BDSHEMANAME> placeholder with the username/ schema name of the target data source of the underlying workspace/sandbox. i.e., BD Atomic schema in case of a production workspace, target data source of ASC workspace.

11.6.3.1.2 Setting up Database for Upgrade

To set up a database for upgrade, follow these steps:

1. Log in to the server where Compliance Studio is installed.
2. Navigate to <OFS_COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/ficdb/Scenario-Conversion-Utility/notebooks **directory**.
3. Download the following notebooks and save it to the local machine.
 - Scenario_Conversion_Utility.dsnb
 - Delete_Threshold_Sets.dsnb
 - Load_Dynamic_Datasets.dsnb
4. Navigate to <OFS_COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/ficdb/Scenario-Conversion-Utility/SQLScripts **directory**.
5. The following files are available and it should be executed in the sequential order:
 - a. table.sql
 - b. package.sql
 - c. package_common.sql

NOTE

- Execute these scripts only if Scenario Conversion Utility is configured in the CS 8.1.2.5.0 and then upgrade to v8.1.2.6.0.
- Disable the variable substitution before executing all the SQL scripts. For example, if you are executing SQL steps from the SQL Developer then disable the variable substitution using the following command:
SET DEFINE OFF;

- i. @<Fully Qualified path of scenario conversion utility>/table.sql
- ii. @<Fully Qualified path of scenario conversion utility>/
package.sql
- iii. @<Fully Qualified path of scenario conversion utility>/
package_common.sql

NOTE

- If any BD scenario xml files are modified, then ensure that the materialized views are refreshed using the following commands:

```
BEGIN DBMS_SNAPSHOT.REFRESH( '<BDSHEMA-
NAME>'."VW_SCNRO_BIND_MD"','C'); end;
/
BEGIN DBMS_SNAPSHOT.REFRESH( '<BDSHEMA-
NAME>'."VW_SCNRO_CHKPT_BIND_MD"','C'); end;
/
BEGIN DBMS_SNAPSHOT.REFRESH( '<BDSHEMA-
NAME>'."VW_SCNRO_CHKPT_MD"','C'); end;
/
BEGIN DBMS_SNAPSHOT.REFRESH( '<BDSHEMA-
NAME>'."VW_SCNRO_CONSTRAINT_MD"','C'); end;
/
BEGIN DBMS_SNAPSHOT.REFRESH( '<BDSHEMA-
NAME>'."VW_SCNRO_DATASET_JOB_MD"','C'); end;
/
BEGIN DBMS_SNAPSHOT.REFRESH( '<BDSHEMA-
NAME>'."VW_SCNRO_HIGHLIGHT_MD"','C'); end;
```

- Replace the <BDSHEMANAME> placeholder with the username/schema name of the target data source of the underlying workspace/sandbox. i.e., BD Atomic schema in case of a production workspace, target data source of ASC workspace.

11.6.3.2 Importing the Notebook (Draft)

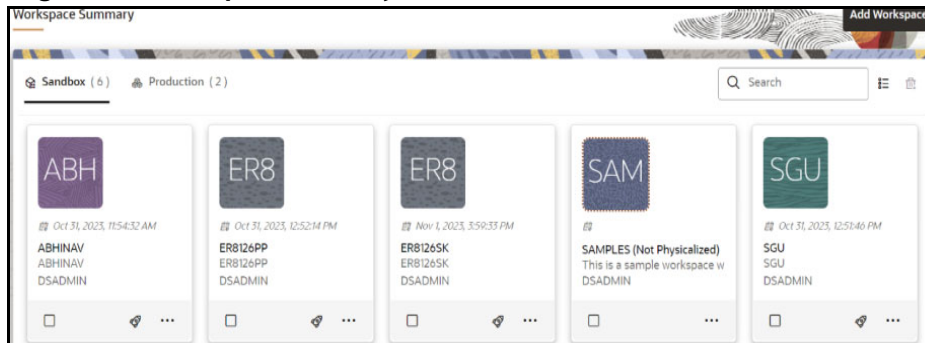
NOTE

This section is applicable for both **fresh installation** and **upgrade**.

To import the Notebook, follow these steps:

1. Navigate to the **Workspace Summary** page.

Figure 325: Workspace Summary



2. Navigate to any Sandbox workspace where BD atomic schema is the data source.

NOTE

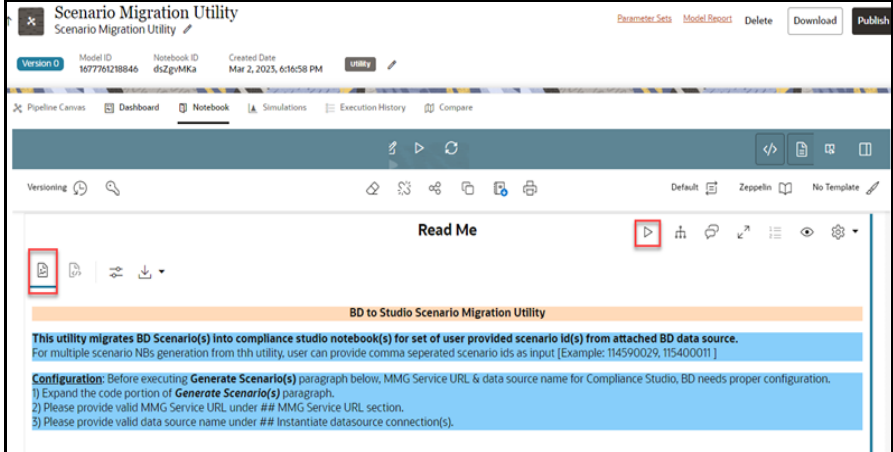
- In case of upgrade scenario (from v8.1.2.5.0 to v8.1.2.6.0), the user has to delete the Scenario_Conversion_Utility notebook which was imported on v8.1.2.5.0. The latest version of notebooks, i.e., v8.1.2.6.0, must be imported again by performing the below steps.
- Ensure that the BD atomic schema is added as a data source for the workspace.

3. Under Model Pipelines, create an **Objective** and provide name as **SCU**. To create an Objective, see the [Creating Objective \(Folders\)](#) section.
4. Import the following notebooks as a Draft. To import, see the [Import a Workspace Model Data into a New Model](#) section.
 - Scenario_Conversion_Utility.dsnb
 - Delete_Threshold_Sets.dsnb
 - Load_Dynamic_Datasets.dsnb

A new model is created by importing the model data dump of another model.

5. Open the Scenario_Conversion_Utility.dsnb model in **Pipeline Designer**.
6. Click the **Notebook** tab, and the following page is displayed.

Figure 326: Notebook Tab



7. Click the **Run Paragraph** icon in the **Read Me** paragraph to open further instructions.

11.6.3.3 Generating Threshold and Scenario Notebook

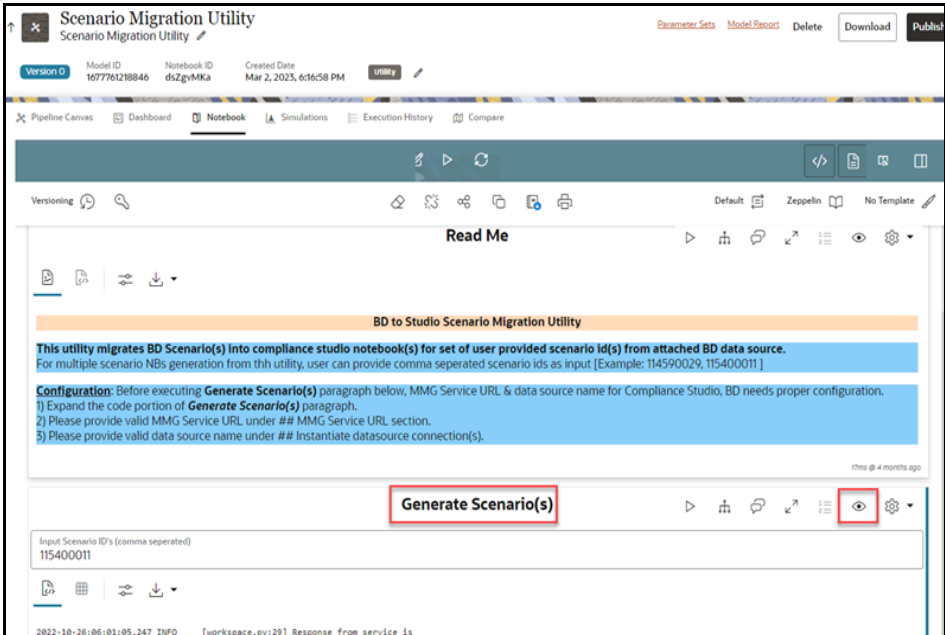
NOTE

- This section is applicable for both **fresh installation** and **upgrade**.
- In case of upgrade scenario (from v8.1.2.5.0 to v8.1.2.6.0), the user has to delete all the generated scenario notebooks which were generated on v8.1.2.5.0 in the 'AMLScenarios-Converted' objective. The scenario notebooks should be generated again in v8.1.2.6.0 by performing the below steps.

To generate a threshold and Scenario Notebook, follow these steps:

1. Navigate to **Notebook** tab. The following page is displayed.

Figure 327: Generate Scenario(s)



2. In the **Generate Scenario(s)** paragraph, click the **Visibility** icon and select the **Code** option.

3. Replace the Hostname for `obj_url` and `url` variables with your server Hostname under `##MMG Service URL` section in the **Generate Scenario(s)** paragraph.
4. Provide valid data source name for `cs_datasource` and `bd_datasource` variables under `## Instantiate datasource connection(s)` section in the **Generate Scenario(s)** paragraph.

Figure 328: Editing MMG Server URL and Data Source Name

```

%%cc-python
## Importing required libraries for utility
import pandas as pd
import requests
import json
import time
from mg import workspace

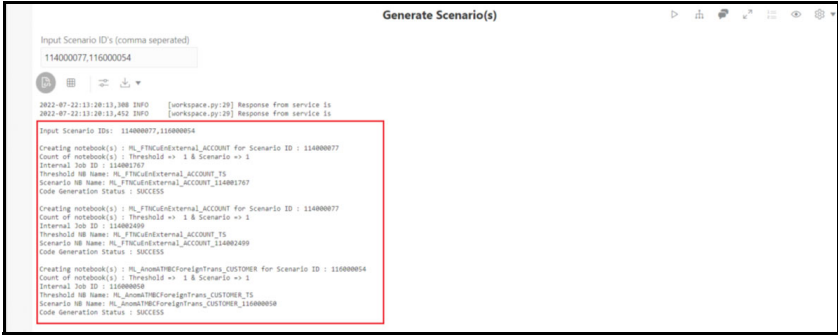
## Instantiate datasource connection(s):
cs_datasource = "CS"
bd_datasource = "BD"
fcc_studio_conn=workspace.get_connection(cs_datasource)
fcc_ora_conn=workspace.get_connection(bd_datasource)

## Auth Token:
AuthToken=z.getInterpreterContext().getConfig().get("token")

## MMG Service URL:
obj_url="https://<COMPLIANCE STUDIO SERVER HOSTNAME>:7002/cs/v1/model-service/ModelController/ADD_OBJECTIVES"
url="https://<COMPLIANCE STUDIO SERVER HOSTNAME>:7002/cs/v1/model-service/ModelController/CREATE_NOTEBOOK"
  
```

5. Enter the required Scenario ID(s) in the **Input Scenario ID's (comma-separated)** text box. You can enter multiple IDs with commas separated.
6. Click **Run Paragraph** to generate threshold and Scenario Notebook. Once it is executed successfully, you can view the success message and scenario notebook details in **Generate Scenario(s)** paragraph.

Figure 329: Successful Output Message



NOTE

The folder structure for the generated scenario and threshold set notebooks is as follows.

The objective will be created by the name AMLScenarios-Converted.

- Inside the AMLScenarios-Converted objective (see Figure 331), one or more objectives will be created by the name <Scenario ID>. This depends upon scenario ids provided in the Scenario Conversion Utility notebook.
- Inside the <Scenario ID> objective (see Figure 332), the threshold set notebook will be generated as "Threshold."
- Inside the <Scenario ID> objective, one or more than one scenario notebooks will be generated based on the number of jobs for each scenario.

7. After successful execution, navigate to **Pipelines** and click **AMLScenarios-Converted** objective to display the list of scenarios created from the conversion utility.

Figure 330: AMLScenarios-Converted Folder

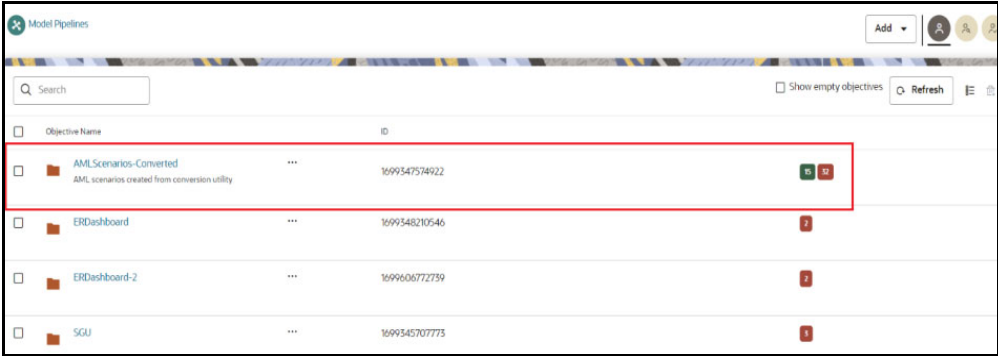
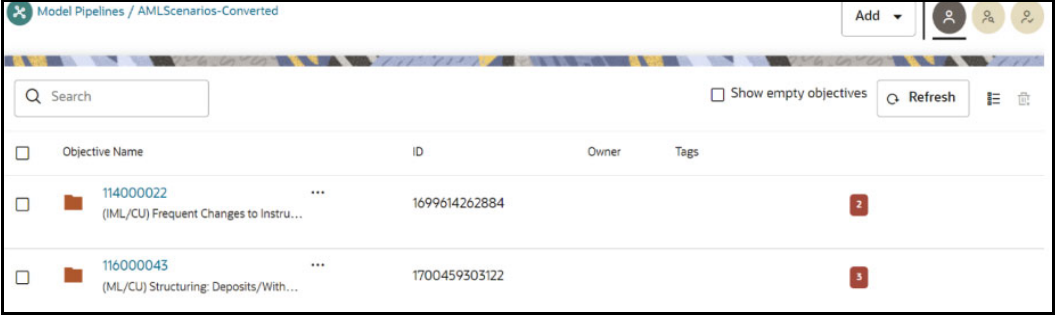


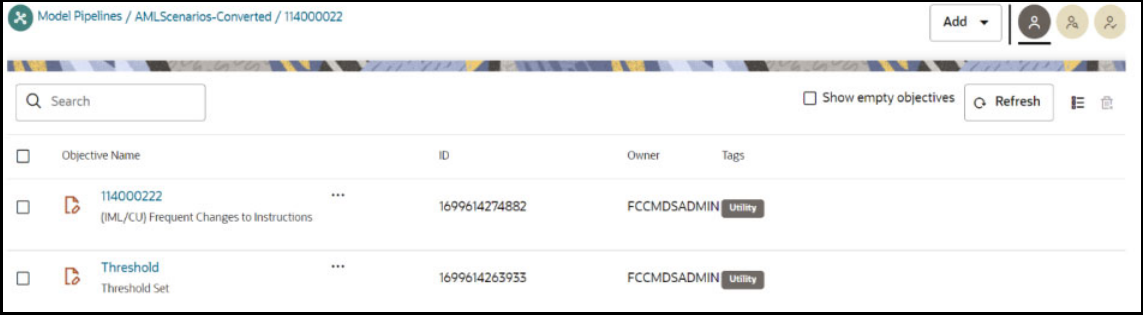
Figure 331: Scenario ID



- 8. Select the <Scenario ID> objective from the **AML Scenarios-Converted** folder. Use the threshold and Scenario Notebook ID generated during the execution in step 5 to identify the Scenario Notebook folder.

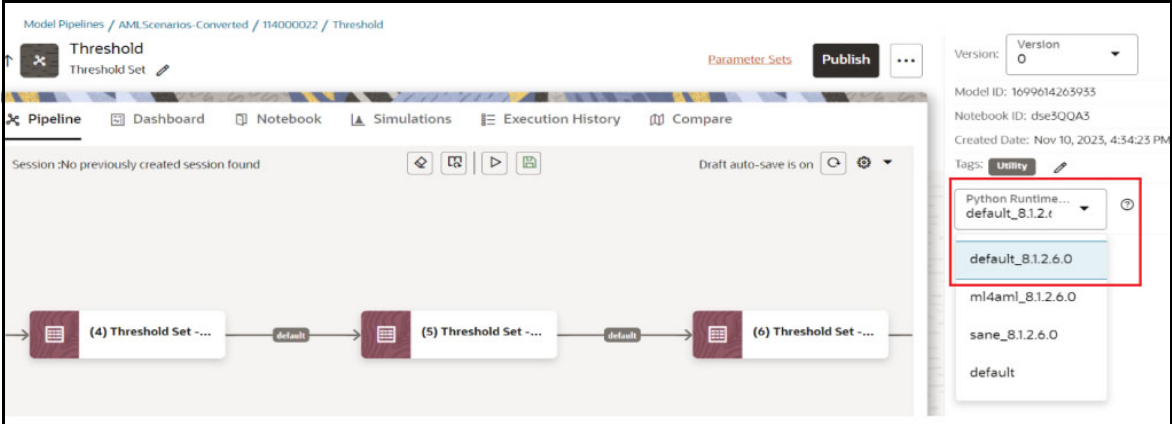
NOTE For n number of jobs n number of Notebook IDs are created for scenario.

Figure 332: Scenario ID Objective



- 9. Click <Scenario ID> objective. The Pipeline canvas page is displayed.

Figure 333: Pipeline Canvas



- 10. From the **Python Runtime** drop-down list, select the **default_8.1.2.6.0**. The selected Python runtime parameter will be used during all the notebook executions.

NOTE If generated scenario notebook is used with ASC feature, then **ml4aml_8.1.2.6.0** should be selected from the Python Runtime drop-down list.

11. Navigate to **Notebook** tab to run paragraph and generate the events.

11.6.3.4 Running the Scenario

NOTE This section is applicable for both **fresh installation** and **upgrade**.

To run the scenario, follow these steps:

1. In Threshold Notebook, configure the following paragraphs:
 - Metadata
 - Base threshold set
 - Custom threshold set

Follow the markdown provided under **(1) About** and **(5) Custom Threshold Builder – Instructions** paragraphs for instructions.

Figure 334: (1) About Paragraph

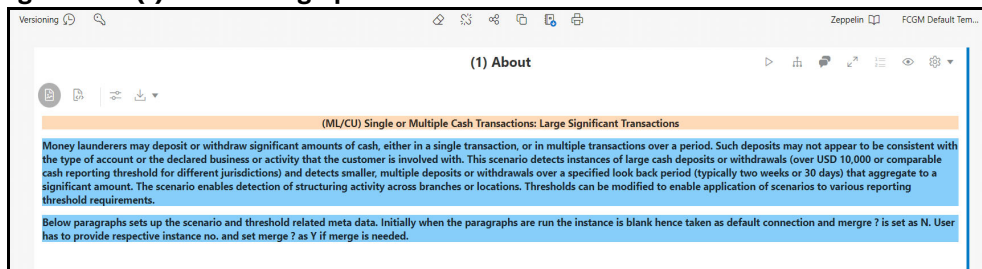
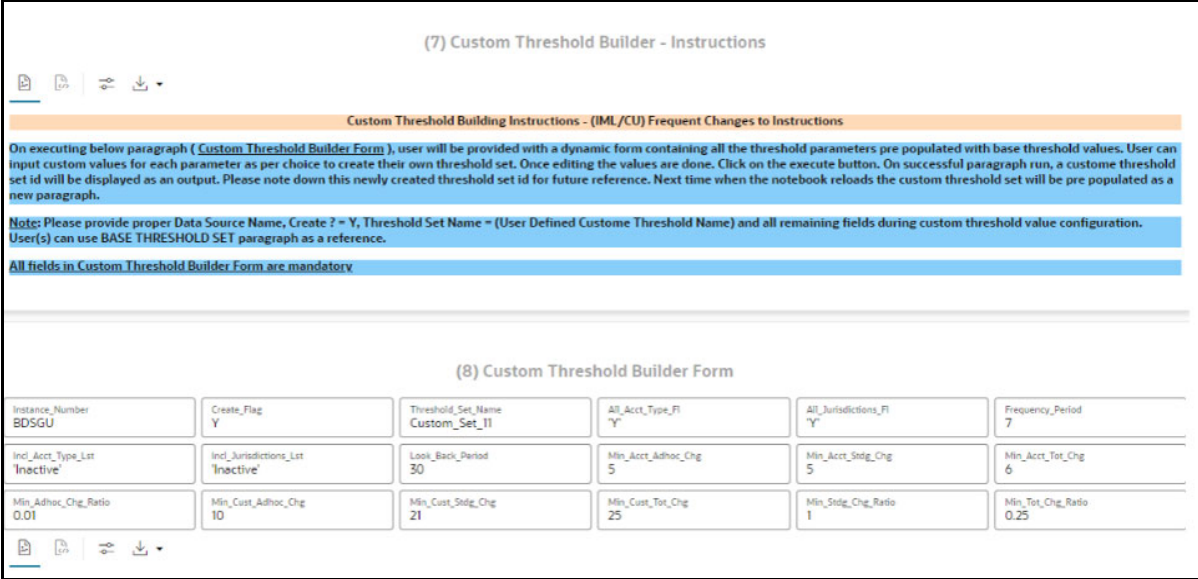


Figure 335: (5) Custom Threshold Builder – Instructions Paragraph



NOTE

- Instance number is Data source of the BD atomic schema.
- Threshold Notebook naming is created in the following format:
ML_<Scenario Catalogue Name>_<Focus>_TS

2. Once the threshold configuration is completed, navigate to the respective scenario Notebook and click **Run Paragraphs** to generate events.

Enter the custom value in the **Custom Threshold Set ID** field to run the scenario with a custom threshold set id.

NOTE

Scenario Notebook naming is created in the following format:
ML_<Scenario Catalogue Name>_<Focus>_<Job ID>

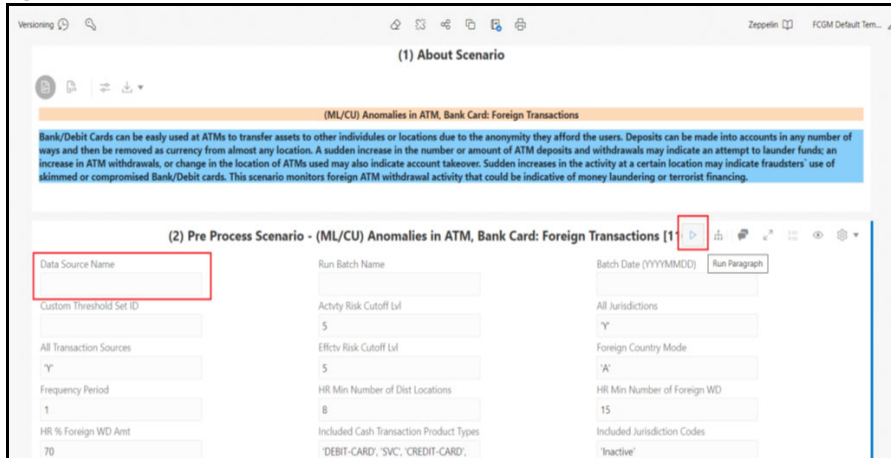
You can use the **Run ID** from the **Create Event** paragraph to verify the data for whom the events are generated with the event details created in the BD schema.

11.6.3.4.1 Using Custom Data Source

To use a custom data source (example: sandbox) for running the scenario(s), follow these steps:

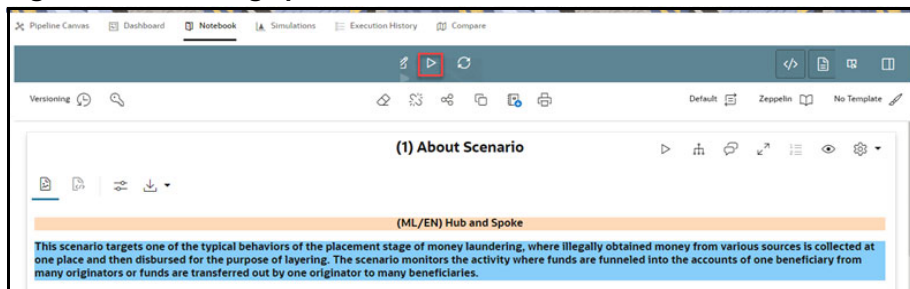
1. To create a data source, see the [Configure Workspace Schema](#) section.
2. Navigate to **Workspace summary > Managed Data Sources**. Select the custom data source name and enter the same name in the **Data Source Name** text box of the **(2) - Pre Process Scenario -<Scenario notebook>** paragraph in the respective scenario notebooks.

Figure 336: Custom Data Source



3. Click **Run Paragraph** to execute the scenario using a custom data source.

Figure 337: Run Paragraphs Action



4. Once it is executed, click **Run Paragraphs** at the top of the Notebook to run the scenario notebook entirely rather than executing each paragraph in sequence.

NOTE By default, scenario notebooks use data sources as BD.

11.6.4 Comparison of Events between BD and Conversion Utility

Scenario Conversion Utility allows you to compare scenario execution results from BD Engine with the Scenario Conversion utility notebook of Compliance Studio.

11.6.4.1 Prerequisites

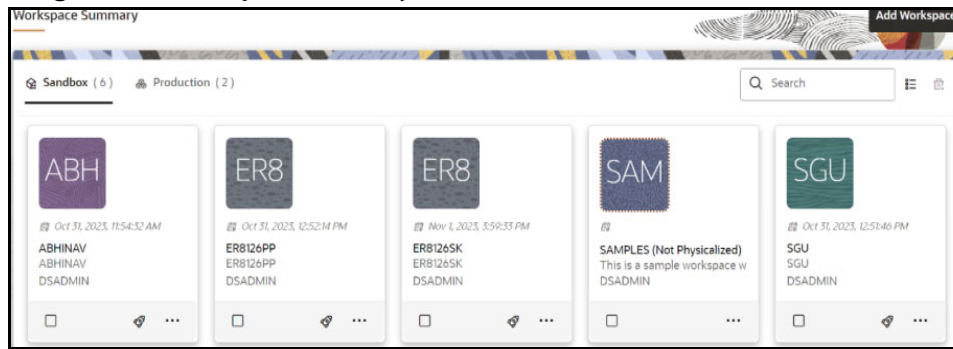
- A notebook should be imported in the following path:
<OFS_COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/ficdb/Scenario-Conversion-Utility/notebooks
- The same scenario should be run in the BD engine and using the Converted Scenario.

11.6.4.2 Importing the Notebook (Draft)

To import the Notebook, follow these steps:

1. Navigate to the **Workspace Summary** page.

Figure 338: Workspace Summary



2. Navigate to any Sandbox workspace where Scenario Conversion Utility is running.

NOTE Ensure that the BD atomic schema is added as a data source for the workspace.

3. The Objective can be created newly or you can use the existing Objective. To create an Objective, see the [Creating Objective \(Folders\)](#) section.
4. Import the following Notebook as a Draft. To import, see the [Import a Workspace Model Data into a New Model](#) section.


Scenario_conversion_Utility_Verification_NB.dsnb

A new model is created by importing the model data dump of another model.

5. Open the Model in **Pipeline Designer** and click **Notebook** tab to view the notebook.

11.6.4.3 Accessing the Verification Notebook

To access the verification notebook, follow these steps:

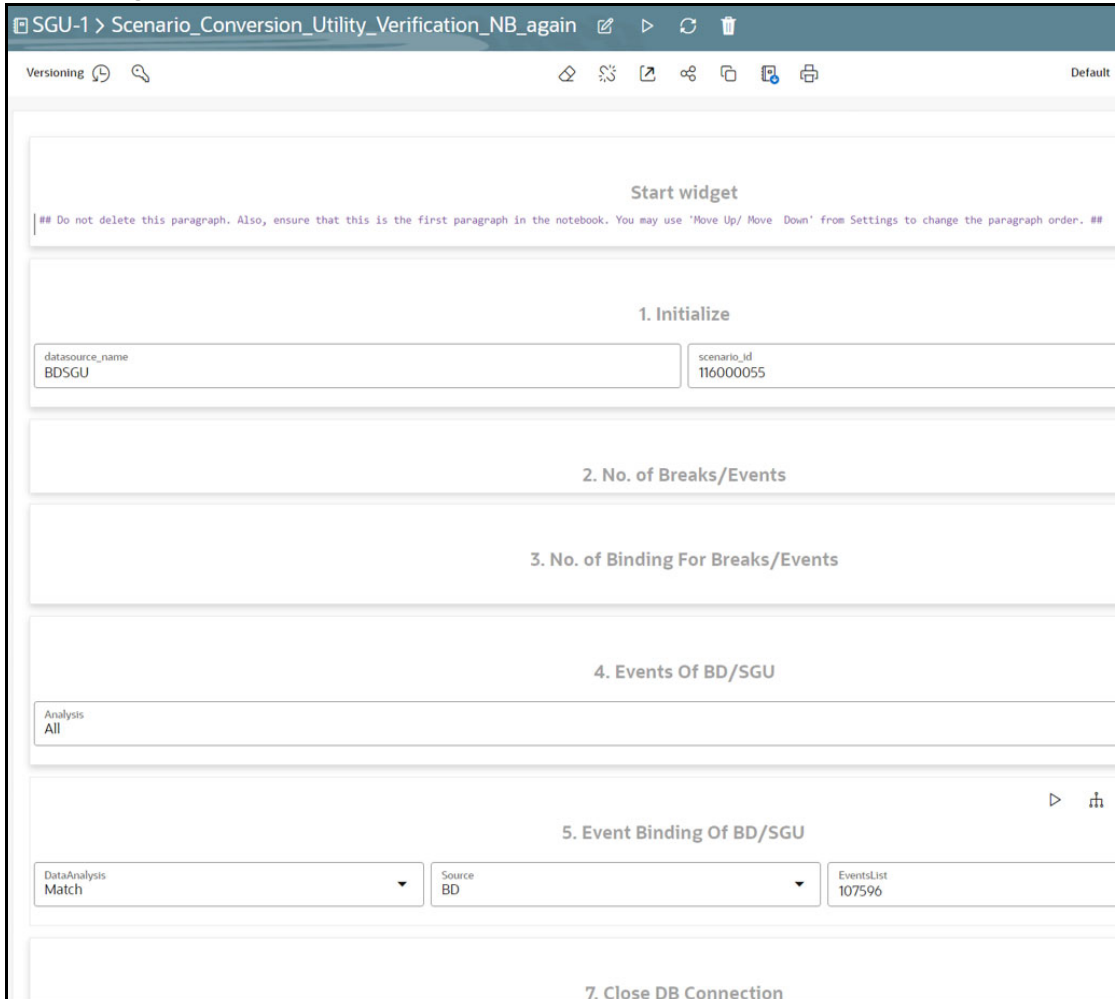
1. Click **Launch**  on the **Scenario Conversion Utility** workspace to launch workspace to display the **Dashboard** window with application configuration and model creation menu.
2. On **Modeling** menu, click **Pipelines**.
3. Click **Scenario Conversion Utility** Objective. The following notebooks are displayed:

- Scenario Generation Notebook
- SGU Verification Notebook
- Delete Threshold Sets
- Load Dynamic Datasets

Generally, the notebooks are available where you imported.

4. Click **SGU Verification Notebook** and click the **Notebook** tab. The following page is displayed.

Figure 339: Verification Notebook



In the **Initialize** paragraph,

5. Enter the **Datasource Name** and **Scenario ID**.
6. Run the **Initialize** paragraph.

After successful execution, the following paragraphs are displayed.

- a. **No. of Breaks/Events:** Displays the number of breaks and events generated by BD and SGU for the scenario entered in the **Initialize** paragraph.
- b. **No. of Binding for Breaks/Events:** Displays the number of break bindings from BD and event bindings from SGU for the scenario entered in the **Initialize** paragraph.

In the **Events of BD/SGU** paragraph,

7. From the **Analysis** drop-down list, select the required option. The available options are All, BD Side Available, SGU Side Available, Mismatch, and Match.
 - **All:** Displays all the events from the BD and SGU.
 - **BD Side Available:** Displays all events from the BD that are not available in the SGU.
 - **SGU Side Available:** Displays all events from the SGU that are not available in the BD.
 - **Mismatch:** Displays if any event attributes do not match between BD and SGU.

- **Match:** Displays all events with similar attributes matching between BD and SGU.
 - 8. Click **Run Paragraph** to view the event analysis.
- In the **Event Binding of BD/SGU** paragraph,
- 9. From the **Data Analysis** drop-down list, select the required option. The available options are All, Mismatch, and Match.
 - **All:** Displays all the event binding from the BD and SGU.
 - **Mismatch:** Displays if any event binding attributes do not match between BD and SGU.
 - **Match:** Displays all event binding with similar attributes matching between BD and SGU.
 - 10. Click **Run Paragraph** to view data for the event binding.

NOTE	If you need to close connection from the database then Run Paragraph in the Close DB Connection.
-------------	---

11.6.5 Using Delete Threshold Sets Notebook

This notebook provides functionality for deleting threshold sets created for SCU, especially when migrating threshold sets from the lower to the higher version of the BD environment by deleting unwanted threshold sets from the systems.

To access the delete threshold sets notebook, follow these steps:

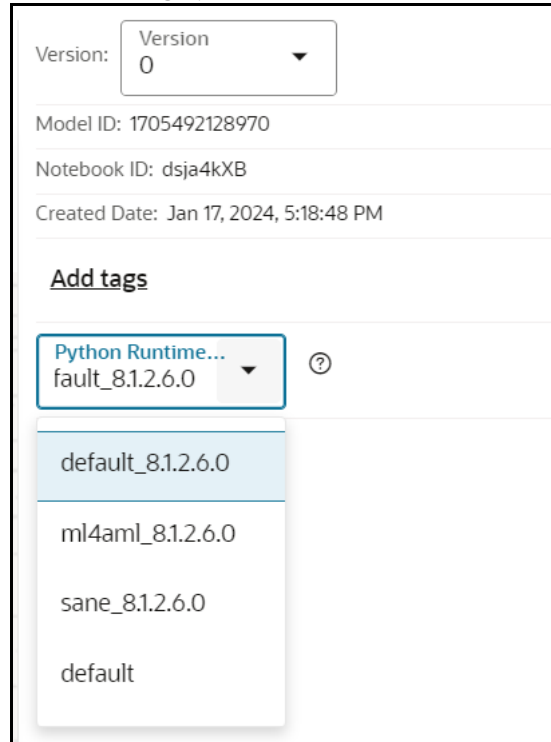
1. Make sure that all the Compliance Studio patches are applied.
2. Execute `table.sql` and `package.sql` in the SCU BD schema.

For more information on how to execute, see the [Setting up Database for Upgrade](#) section.
3. Download the `Delete_Threshold_Sets.dsnb` the notebook to your local machine.

For more information on how to download, see the [Setting up Database for Upgrade](#) section.
4. Import the `Delete_Threshold_Sets.dsnb` notebook into the SCU workspace.

For more information on how to import, see the [Importing the Notebook \(Draft\)](#) section.
5. On **Modeling** Mega menu, click **Pipelines** to display the Model Pipelines page.
6. Navigate to the **SCU** objective folder and open the **Delete_Threshold_Sets** notebook in Pipeline Designer.

Figure 340: Selecting Python Runtime Parameter



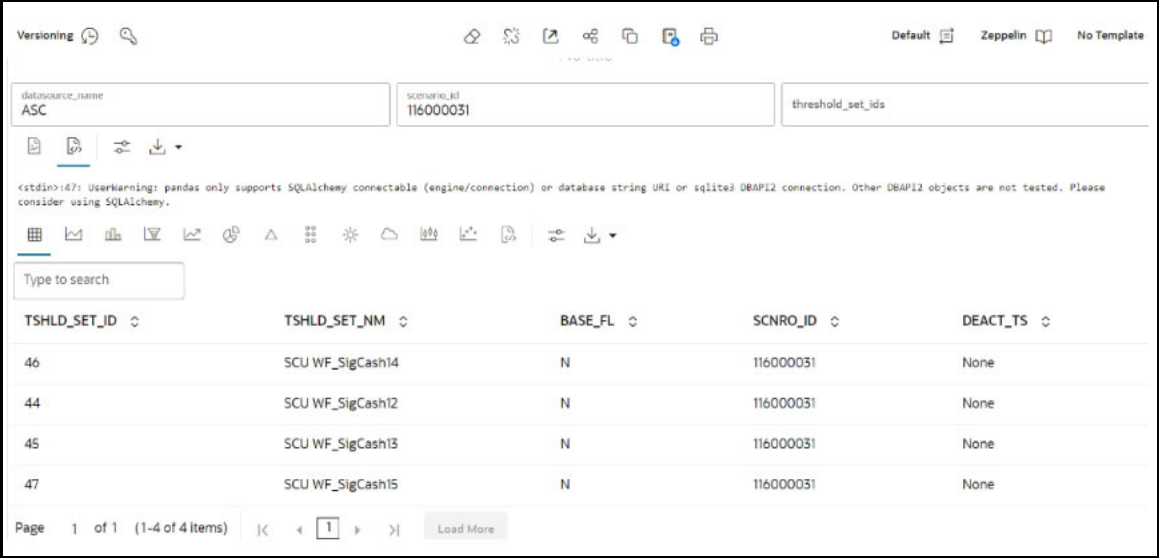
7. From the **Python Runtime** drop-down list, select the **default_8.1.2.6.0**. The selected Python runtime parameter will be used during all the notebook executions.
8. Click the **Notebook** tab.
The notebook contains a couple of markdown paragraphs and a single Python paragraph.

11.6.5.1 View Threshold Sets for SCU

To view the threshold sets created for SCU, follow these steps:

1. Open the **Delete_Threshold_Sets** notebook.
2. Navigate to the **Last/Python** paragraph.

Figure 341: Python Paragraph



3. Enter the valid **datasource_name**.
4. Enter the **scenario_id**. You must enter only one scenario_id.
5. Do not enter any value (leave it blank) in the **threshold_set_ids** field.
6. Execute the paragraph to list all threshold sets created for SCU based on the provided scenario.

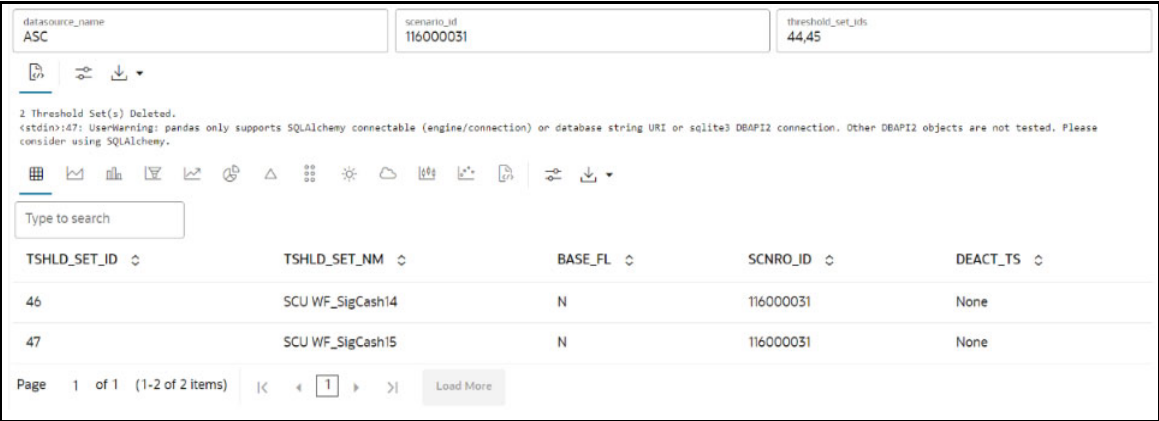
11.6.5.2 Delete Threshold Sets for SCU

WARNING The running below paragraph will permanently delete the specified threshold sets. Ensure the other users do not need this threshold set before completing this action.

To delete the threshold sets created for SCU, follow these steps:

1. Open the **Delete_Threshold_Sets** notebook.
2. Navigate to the **Last/Python** paragraph.

Figure 342: Python Paragraph



3. Enter the valid **datasource_name**.
4. Enter the **scenario_id**. You must enter only one scenario id.

5. Enter the **threshold_set_ids** which needs to be deleted.
You can enter multiple IDs with commas separated. For example: 44, 45.
6. Execute the paragraph to delete specified threshold id(s).
By default, the remaining threshold sets will be available in the paragraph after successful deletion.

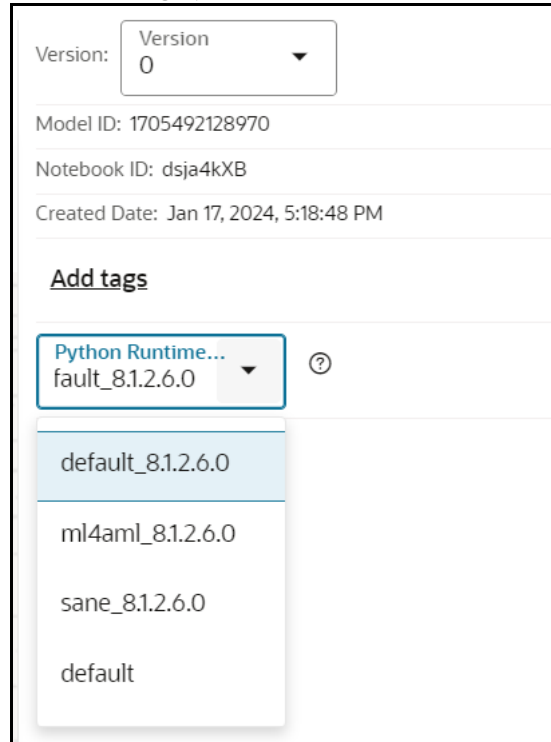
11.6.6 Using Dynamic Datasets with AML Scenario Conversion

This notebook provides functionality for loading dynamic datasets while AML scenario conversion using SCU.

To access the Load Dynamic Datasets notebook, follow these steps:

1. Make sure that all the Compliance Studio patches are applied.
2. Execute `table.sql` and `package.sql` in the SCU BD schema.
For more information on how to execute, see the [Setting up Database for Upgrade](#) section.
3. Download the `Load_Dynamic_Datasets.dsnb` notebook to your local machine.
For more information on how to download, see the [Setting up Database for Upgrade](#) section.
4. Import the `Load_Dynamic_Datasets.dsnb` notebook into the SCU workspace.
For more information on how to import, see the [Importing the Notebook \(Draft\)](#) section.
5. On **Modeling** Mega menu, click **Pipelines** to display the Model Pipelines page.
6. Navigate to the **SCU** objective folder and open the **Load_Dynamic_Datasets** notebook in Pipeline Designer.

Figure 343: Selecting Python Runtime Parameter



7. From the **Python Runtime** drop-down list, select the **default_8.1.2.6.0**. The selected Python runtime parameter will be used during all the notebook executions.
8. Click the **Notebook** tab.

The notebook contains a couple of markdown paragraphs and a single Python paragraph.

11.6.6.1 Dynamic Dataset Text File

If OOB datasets performance are inefficient, then dataset tuning is required. Tuned datasets using DB hints can be configured in the Compliance Studio through **Dynamic Datasets**.

To copy dynamic dataset text file into the Compliance Studio, follow these steps:


1. Tune dataset query in the DB schema using SQL hints.
2. Once the dataset query is tuned, copy the tuned SQL query in a text file and name the text file as `dataset<DATASET_CODE>.txt`.
 - Where `<DATASET_CODE>` is the original DATASET code used in the AML scenario. For example, `dataset114012498.txt`.
3. Copy the newly created dynamic dataset file into the `<COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/Scenario-Conversion-Utility/DynamicDatasets` directory.
4. In the Compliance Studio Unix server, convert text file using the following command:

```
Execute dos2unix dataset<DATASET_CODE>.txt
```
5. Delete the sample dataset file provided (`dataset9999999.txt`) as a reference template in the same directory.

NOTE The user should provide correct queries in the dataset text files for a successful scenario execution.

11.6.6.2 Executing Dynamic Dataset Notebook

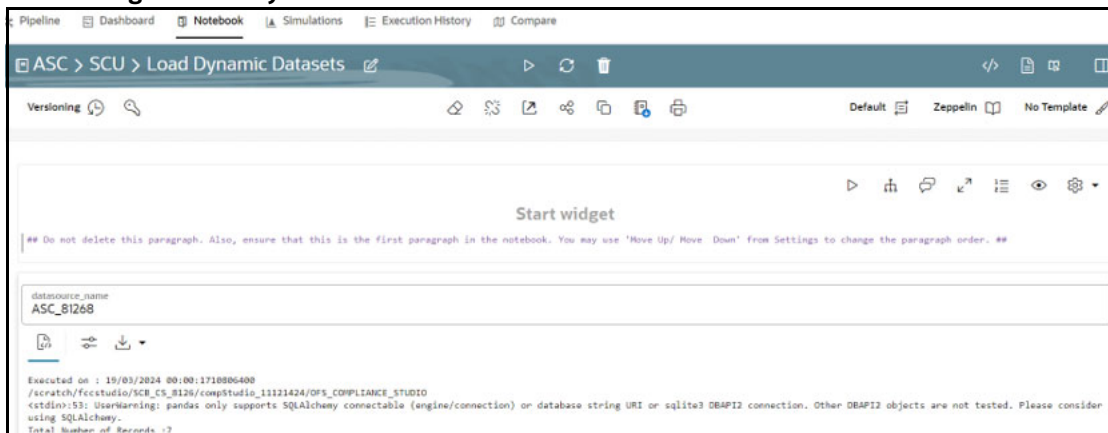
To execute the Load Dynamic Dataset notebook, follow these steps:

1. Click **Launch**  icon on the workspace which contains **Scenario Conversion Utility**.
2. On **Modeling** menu, click **Pipelines**.
3. Click **Scenario Conversion Utility (SCU) Objective**. The following notebooks are displayed:
 - Scenario Generation Notebook
 - SGU Verification Notebook
 - Delete Threshold Sets
 - Load Dynamic Datasets

Generally, the notebooks are available where you imported.

4. Click **Load Dynamic Dataset** notebook and click the **Notebook** tab. The following page is displayed.

Figure 344: Dynamic Dataset Notebook



5. Enter the **Datasource Name**.
6. Run the paragraph.

After successful execution, the dynamic dataset in the file system will be loaded into the **SCU_DYNAMIC_DATASET** table. The notebook can load all dynamic dataset files in the file system at a time.

Once dynamic datasets are loaded into the table, the User can run the scenario conversion notebook, which converts the AML scenario into the Compliance Studio notebook by considering the Dynamic Dataset is present in the table.

Post Scenario Conversion

If Dynamic datasets are re-loaded into the table, Users need to re-run the scenario conversion steps by deleting the scenario notebook folder manually.

11.7 Using Subgraph Off loaded Graphs

There are two options for loading graphs into the in-memory graph server (PGX).

- **In-memory:** It collects all the data from the nodes and edge tables and it will be transformed into a single global graph in the Oracle Graph Analytics Engine (PGX).
- **Offloaded:** It collects all the data from the nodes and edges and keeps it ready to be loaded in Oracle Graph Analytics Engine (PGX) so that users can load subgraphs while doing graph analytics.

The following are the advantages of using subgraph:

1. This feature provides a much more flexible way to declare the scope of the data to be loaded into PGX server.
2. For global graphs with a high volume of records, the PGX server may need to be very large to hold the full global graph. Subgraph loading allows for many smaller graphs to be loaded which requires a smaller PGX server size.


11.7.1 Creating and defining Graph Pipelines

- For information on how to create a graph, see the [Graphs](#) section.
- For information on how to define the graph, see the [Updating Graph Definition](#) section.

11.7.2 Loading an Initial Subgraph

You can load the subgraph by executing PGQL query in the notebook. This section is an example of loading a subgraph for a given use case and this can be replicated depending on the users use case for the subgraph.

To load the subgraph, follow these steps:

1. Click **Launch Workspace**  next to the corresponding Workspace to Launch Workspace to display the **Dashboard** window with application configuration and model creation menu.
2. Navigate to `<OFS_COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/mmg-home/mmg-studio/server/builtin/notebooks` directory and download the following notebooks:
`Sub Graph_Dynamic Graph Loading.dsnb`
`Sub Graph_Dynamic graph loading from OOB graph.dsnb`
3. On **Modeling** menu, click **Pipelines** and create an Objective to import the notebook. For more information on create objective, see the [Importing the Notebook \(Draft\)](#) section.

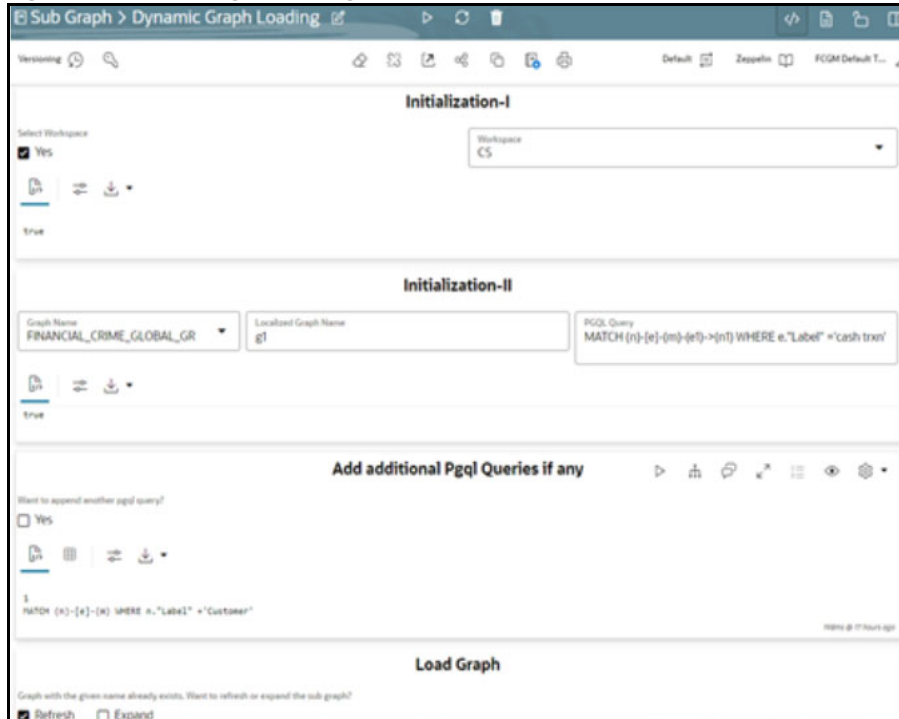
11.7.2.1 Dynamic Graph Loading

This notebook loads graphs from the property graphs created by graph pipeline execution.

To execute the PGQL query, follow these steps:

1. Click **Dynamic Graph Loading** on the Sub Graph notebooks to execute the PGQL query.

Figure 345: Defining the Paragraph



In the **Initialization-I** paragraph,

2. Select **Yes** in the **Select Workspace** check box to list the available workspaces where graph pipelines are executed.
3. Select the **Workspace** from the drop-down list to get the list of graphs executed in that workspace.

In the **Initialization-II** paragraph,

4. Select the **Graph Name** from the drop-down list that lists the property graphs executed from graph pipelines.
5. Enter the **Localized Graph Name**. The graph will be loaded with the name entered in this textbox.

Localized graph name is the name with which the subgraph will be created. This will be the name for all references of the subgraph in the session.

6. Enter the **PGQL Query** in the textbox. The graph will be loaded from the entered pgql query.
For information on sample queries, see [Dynamic graph loading from OOB graph](#) section.

In **Add additional Pqql Queries if Any** paragraph,

7. Select **Yes** in the **Want to append another pqql query?** check box to load graph from more than one pgql query. A textbox is displayed to enter the PGQL query if the option **Yes** is selected. Re-run the paragraph until the number of pgql queries has to be appended.

In the **Load Graph** paragraph,

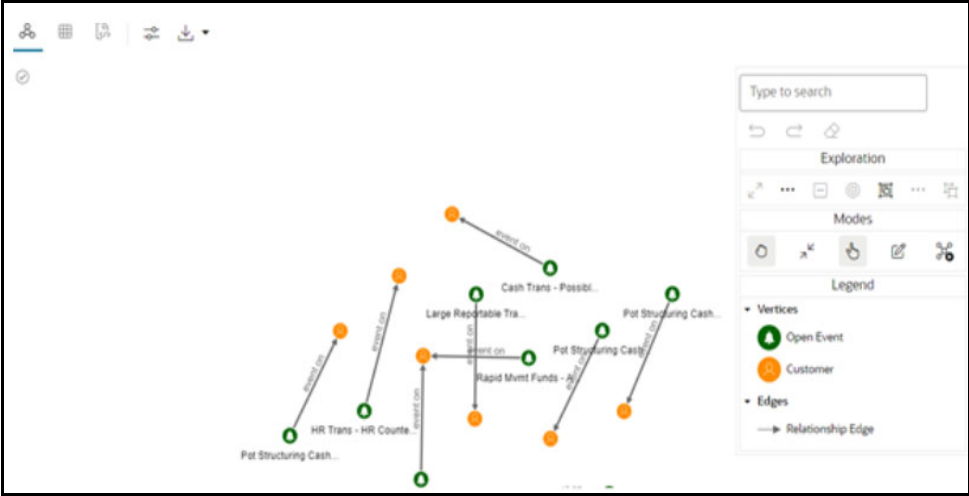
8. The graph is loaded based on the PGQL query execution. If the graph with the same name already exists in the current session, a check box is displayed with the following options:
 - a. **Refresh:** This option will drop the graph and load it with the new graph.

- b. **Expand:** This option will expand the existing graph with pgql queries added from the above paragraphs.

NOTE If any field is modified, then you need to **re-execute** the paragraph.

The following figure shows the sample graph based on the executed PGQL query.

Figure 346: Sample Graph



11.7.2.2 Dynamic graph loading from OOB graph

This notebook provides the sample PGQL queries for dynamically loading graphs from property graphs (PG VIEWS) in the database.

NOTE This notebook is created for sample purpose only.

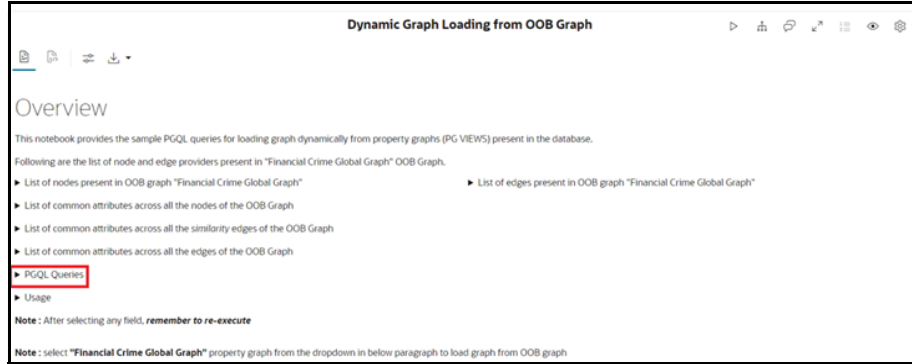
Figure 347: Sub Graph

Name	Author	Last Edit	Tags
Dynamic Graph Loading 🔍 (6) 🗑️ (5) 📄 (1)	«system user»	7 minutes ago	
Dynamic graph loading from OOB graph demonstrate sample PGQL queries to load sub graph from Financial Crime Global Graph 🔍 (14) 🗑️ (4) 📄 (1)	«system user»	3 days ago	

To access the sample PGQL queries for loading subgraph, follow these steps:

1. Click **Dynamic graph loading from OOB graph**. The following page is displayed.

Figure 348: Sample PGQL Query



2. Click ▶ **PGQL Queries** group to view the list of sample queries to be executed for loading the subgraph as shown in [Table 71](#).

Table 71: Sample PGQL Query

PGQL Query	Description
<code>MATCH (p) - [e] - (m)</code>	This will load the complete property graph.
<code>MATCH (p: "label (p) ") - [e: "label (e) "] - (m: "label (m) ")</code>	This will load two node providers and the corresponding edge provider to connect two nodes. NOTE: Replace label (p) and label (m) with the node provider names and label (e) with the edge provider name.
<code>MATCH (p: "label (p) ") - [e: "label (e) "] - (m: "label (m) ") WHERE id(p) = "label (p) (Id) "</code>	This will load the graph corresponding to the Id. Multiple conditions can be included similarly in the WHERE clause, separated by " AND "OR" condition. NOTE: Replace label (p) and label (m) with the node provider names and label (e) with the edge provider name. Replace Id with the Id property value.
<code>"MATCH (p: "label (p) ") - () - () - (m: "label (m) ") WHERE id(p) = 'label (p) (Id) "</code>	This will only load p and m vertices, but not the edge or vertices linking them. NOTE: Replace label (p) and label (m) with the node provider names and replace Id with the Id property value.
Limitations The following sample queries are not allowed for execution.	
<code>"MATCH () "</code>	This is not allowed as the query must have at least one vertex.
<code>"MATCH () - [e] - () "</code>	This is not allowed for loading an edge because it should load both the source and destination vertex.

Table 71: Sample PGQL Query

PGQL Query	Description
"MATCH (v) - [e] - () "	This is not allowed for loading an edge because it should load both the source and destination vertex.

11.8 APIs for Model Pipelines

Table 72 listed APIs/Functions can be utilized by users in Model Pipelines.

Table 72: Python paragraph scripting

API Type	Functionality	Prerequisite	Notebook Execution Script	Notebook Script Input	Minimum Supported Version
Set User	Set the user for a session		<pre>%python from mmg.constants import * user = "SAUSER" set_user(use r)</pre>	user - username to be set	8.1.1
Get User	Get the user that has been set	Set User	<pre>%python from mmg.constants import * get_user()</pre>		8.1.1
Attach Workspace	Attach the workspace for a session		<pre>%python from mmg.workspac e import attach_works pace workspace = "CS" attach_works pace(workspa ce)</pre>	workspace- workspace to be attached	8.1.1
Get Workspace	Get the workspace that has been attached	Attach Workspace	<pre>%python from mmg.workspac e import get_workspac e get_workspac e()</pre>		8.1.1

Table 72: Python paragraph scripting

API Type	Functionality	Prerequisite	Notebook Execution Script	Notebook Script Input	Minimum Supported Version
List Workspaces	Lists all workspaces available to a user	Set User	<pre>%python from mmg.workspac e import list_workspa ces list_workspa ces()</pre>		8.1.1
Check AIF	Check if AIF is set or not	Set User	<pre>%python from mmg.workspac e import check_aif check_aif()</pre>		8.1.1
List All Data Sources	List all data sources available in a workspace for a set user. The default workspace chosen is the one that is attached.	Set User, Attach Workspace	<pre>%python from mmg.workspac e import list_datasou rces list_datasou rces(order=N one)</pre>	order - None ensures that all the data sources will be listed for the attached workspace	8.1.1
List All Data Sources of Workspace	List all Data Sources of a specific Workspace that is not the attached workspace for a set user.	Set User	<pre>%python from mmg.workspac e import list_datasou rces workspace="H ELLO NEW" list_datasou rces(workspa ce,order=Non e)</pre>	workspace - Name of workspace for which data sources should be listed order - None ensures that ALL data sources will be listed for that workspace	8.1.1

Table 72: Python paragraph scripting

API Type	Functionality	Prerequisite	Notebook Execution Script	Notebook Script Input	Minimum Supported Version
Fetch First Order Data Source	This method will fetch the data source related to attached workspace with default order 1.	Set User, Attach Workspace	<pre>%python from mmg.workspace import list_datasources list_datasources()</pre>	order - 1 by default, if not specified	8.1.1
Fetch First Order Data Source of Workspace	This method will fetch the data source with default order 1 related to specified workspace.	Set User	<pre>%python from mmg.workspace import list_datasources workspace="CS" list_datasources(workspace)</pre>	workspace - Name of workspace for which data source should be listed order- 1 by default if not specified	8.1.1
Fetch Nth Order Data Source	This method will fetch the data source related to attached workspace with given order	Set User, Attach Workspace	<pre>%python from mmg.workspace import list_datasources list_datasources(order=2)</pre>	order - Order of data source to be fetched	8.1.1
Fetch Nth Order Data Source of Workspace	This method will fetch the data source with given order related to specified workspace.	Set User	<pre>%python from mmg.workspace import list_datasources workspace="CS" list_datasources(workspace,order=2)</pre>	workspace - Name of workspace for which data source should be listed order = Order of data source to be fetched	8.1.1

Table 72: Python paragraph scripting

API Type	Functionality	Prerequisite	Notebook Execution Script	Notebook Script Input	Minimum Supported Version
Get Connection Object	Returns Oracle/ SQL Alchemy Connection Object to Data Source of order 1 in attached workspace.	Set User, Attach Workspace	<pre>%python import cx_Oracle from mmg.workspac e import get_connecti on conn=get_con nection() if not isinstance(c onn,cx_Oracl e.connect): print("Not Connection Object") print(conn)</pre>		8.1.2.0
Get Connection Object To Specific Data Source	Returns Oracle/ SQL Alchemy Connection Object to specified Data Source	Set User	<pre>%python import cx_Oracle from mmg.workspac e import get_connecti on datasource=" DS001" conn=get_con nection(data source) if not isinstance(c onn,cx_Oracl e.connect): print("Not Conn Object") print(conn)</pre>	datasource - Name of datasource for which the connection object has to be returned	8.1.2.0

Table 72: Python paragraph scripting

API Type	Functionality	Prerequisite	Notebook Execution Script	Notebook Script Input	Minimum Supported Version
Get Connection Object To Data Source Using Order	Returns Oracle/ SQL Alchemy Connection Object to Data Source of specified order in attached workspace.	Set User, Attach Workspace	<pre>%python import cx_Oracle from mmg.workspac e import get_connecti on datasource=2 conn=get_con nection(data source) if not isinstance(c onn,cx_Oracl e.connect): print("Not Conn Object") print(conn)</pre>	datasource - Order number of datasource in attached workspace for which the connection object has to be returned	8.1.2.0
Test Connection Object	This script can be used to test the connection object to data source	Get Connection Object OR Get Connection Object To Specific Data Source OR Get Connection Object To Data Source Using Order	<pre>%python query="SELEC T table_name FROM user_tables" cur = conn.cursor() cur.execute(query) print(cur.fe tchall()) if cur: cur.close()</pre>		8.1.2.0

PYTHON LINEPARSER APIs (for MMG version 8.1.0)

Table 73 lists API of the python lineparser.

Table 73: Python Lineparser Apis

API Type	Functionality	Notebook Execution Script	Note
Attach Workspace	Attach the workspace for a session	<pre>%python mmg.attachWorkspace(workspace) #eg- mmg.attachWorkspace("CS")</pre>	workspace - workspace to be attached (String) Sets 'mmg' python variable which contains the information about the attached workspace. Output- Print a boolean in one line on the status of workspace attachment and another line of boolean on status of AIF enabled and attached.
List Workspaces	Lists all workspaces available to a user	<pre>%python mmg.listWorkspaces()</pre>	Sets 'ofs_wsList' python variable which is the list of all available workspaces. Output- Print the list of workspaces.
Check AIF	Check if AIF is set or not	<pre>%python print(aif__isAttached)</pre>	Output- Boolean on the status of AIF.
Get Connection Object	Returns cx_Oracle Connection Object	<pre>%python mmg.getConnection(schema_name) #eg- mmg.getConnection("OFSAA")</pre>	schema_name = name of the schema for which connection is required (String). Sets 'conn' python variable which is the cx_Oracle connection object to be used for firing queries.
Publish	Fetch and sets the Notebook JSON dump	<pre>%python mmg.publish()</pre>	Sets 'emf_para' python variable which is the JSON dump for the notebook component. Output- Print the set 'emf_para' value.
Register	Register the Notebook	<pre>%python mmg.register(register) #eg- mmg.register({"modelname": "model1", \ # "modeldescription": "Model description"}) #eg- mmg.register(emf_para) {After doing mmg.publish() }</pre>	register - JSON Stringify object for RegisterNotebookBean Object. Sets 'publishedNotebookId' python variable which is the studio notebook id for the published version. Output- Prints the published notebook id.

Table 73: Python Lineparser Apis

API Type	Functionality	Notebook Execution Script	Note
Load Flat File		<pre>%python mmg.loadFlatFile() #eg- mmg.loadFlatFile() Incomplete</pre>	
Profile Data		<pre>%python mmg.profileData (code, title) #eg- mmg.profileData (ABC, XYZ)</pre>	

11.9 Public APIs for Scheduler Operations

The following APIs are exposed for the Scheduler Operations.

NOTE

1. All the below APIs are POST requests.
2. All the APIs accept below values in request header:
 - ofs_tenant_id - Optional
 - ofs_service_id - Optional
 - ofs_workspace_id - Respective workspace id where the batch needs to be created
 - ofs_remote_user – OFS CS login user

The ofs_workspace_id and ofs_remote_user are mandatory fields.

Base URL: `http(s)://<OFS_CS_Service_HostName>:<OFS_CS-Service_Port>/<CONTEXTNAME>/`

Table 74 lists API for scheduler operations.

Table 74: APIs for Scheduler Operations

Functionality	API	Sample Request JSON	Sample Response JSON	Comments
Execute Immediate	rest-api/v1/external/trigger	<pre>{ "batchName": "batch1", "batchType": "rest", "included- Tasks": "task1,tas k2", "excluded- Tasks": "task1,tas k2", "held- Tasks": "task1,tas k2" }</pre>	<pre>{ "severity": "info", "summary": "Object triggered successfully with Run Id: batch1_2022-08- 17_1660721567845 _1", "batchRunId": "batch1_2022-08- 17_1660721567845 _1", "details": "Object triggered successfully.", "status": "success", "statusCode": "0" }</pre>	<p>The includedTasks/excludedTasks/heldTasks are options keys.</p> <p>The batchType will be “group” for batch group execution.</p>

Table 74: APIs for Scheduler Operations

Functionality	API	Sample Request JSON	Sample Response JSON	Comments
Execution Status	rest-api/v1/external/status	<pre>{ "batchRunId": "batch1_2022-08-17_1660721567845_1", "tasks": ["task1", "task2"] }</pre>	<pre>{ "severity": "info", "batchRunId": "batch1_2022-08-17_1660721567845_1", "taskStatusList": [{ "taskCode": "task1", "taskStatus": "SUCCESSFUL", "statusCode": "0" }, { "taskCode": "task2", "taskStatus": "EXCLUDED", "statusCode": "4" }], "batchStatusCode": "0", "batchList": [], "batchStatus": "SUCCESSFUL", "status": "success", "statusCode": "0" }</pre>	<p>“tasks” is options key. If not passed, then response will contain status all the tasks inside a batch.</p>

Table 74: APIs for Scheduler Operations

Functionality	API	Sample Request JSON	Sample Response JSON	Comments
Rerun	rest-api/v1/external/rerun	<pre>{ "batchName": "batchgroup1", "batchRunId": "batch- group1_2022-08- 17_1660720814942_ 1" }</pre>	<pre>{ "severity": "info", "summary": "Object triggered successfully for rerun with Run Id: batch- group1_2022-08- 17_1660730049819 _1", "batchRunId": "batch- group1_2022-08- 17_1660730049819 _1", "details": "Object triggered successfully.", "status": "success", "statusCode": "0" }</pre>	
Restart	rest-api/v1/external/restart	<pre>{ "batchName": "MMG_R1", "batchRunId": "MMG_R1_2022-07- 15_1657867378160_ 1" }</pre>	<pre>{ "severity": "info", "summary": "Object triggered successfully for restart with Run Id: MMG_R1_2022-07- 15_1657867378160 _1", "batchRunId": "MMG_R1_2022-07- 15_1657867378160 _1", "details": "Object triggered successfully.", "status": "success", "statusCode": "0" }</pre>	

Table 74: APIs for Scheduler Operations

Functionality	API	Sample Request JSON	Sample Response JSON	Comments
Interrupt	rest-api/v1/external/interrupt	<pre>{ "batchName": "B2001", "batchRunId": "B2001_2022-05- 22_1653222717896_ 1" }</pre>	<pre>{ "summary": "Execution inter- rupted success- fully for Run Id: B2001_2022-05- 30_1653233511394 _1", "severity": "info", "batchRunId": "B2001_2022-05- 30_1653233511394 _1", "details": "Execution inter- rupted success- fully.", "statusCode": "0", "status": "success" }</pre>	

Failed Response Body

Table 75 lists the sample failed response body.

Table 75: Failed Response Body

Failed Sample Response JSON	Description
Batch Status Failed	<pre>{ "severity": "info", "batchRunId": "BT-BI-EXCH- G_RATES_EOD_2022-05- 27_1653662703599_1", "batchStatusCode": "-1", "batchList": [], "batchStatus": "FAILED", "statusCode": "0", "status": "success" }</pre>

Table 75: Failed Response Body

Failed Sample Response JSON	Description
Object Not found	<pre>{ "severity": "error", "summary": "Object does not exist.", "details": "Object does not exist.", "error": { "errorCode": "OBJECT_NOT_EXIST", "errorMsg": "Object does not exist." }, "statusCode": "-3", "status": "failed" }</pre>

Status Codes in the Response Body

Table 76 lists the status code in the response body.

Table 76: Status Codes in the Response Body

Status Code	Description
0	Success
1	Not Started
2	Ongoing
4	Excluded
5	Held
-1	Failure
-2	Interrupted
-3	Object does not exist
-4	Invalid arguments passed in request/not enough parameters in the Request body
-5	Invalid request headers/request headers missing
-6	No executable job is present
-7	Job is already interrupted

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