

# **Oracle Financial Services Model Management and Governance**

**User Guide**

**Release 8.1.2.0.0**

**Feb 2022**

**ORACLE**  
Financial Services

## OFS Model Management and Governance User Guide

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# Table of Contents

|          |  |           |
|----------|--|-----------|
| <b>1</b> | <b>Preface</b>   | <b>7</b>  |
| 1.1      | Access to Oracle Support   | 7         |
| 1.2      | Audience   | 7         |
| 1.3      | What is New in This Release  | 7         |
| 1.4      | Additional Resources   | 9         |
| 1.5      | Conventions Used   | 9         |
| 1.6      | Acronyms Used  | 10        |
| <b>2</b> | <b>Getting Started</b>   | <b>11</b> |
| 2.1      | About this Guide   | 11        |
| 2.2      | About Oracle Financial Services Model Management and Governance                        | 11        |
| 2.3      | Oracle Financial Services Model Management and Governance Workflow                     | 12        |
| 2.4      | Components of Oracle Financial Services Model Management and Governance                | 12        |
| 2.4.1    | <i>Workspace Management</i>  | 13        |
| 2.4.2    | <i>Model Management</i>  | 13        |
| 2.4.3    | <i>Scheduler Service</i>   | 13        |
| 2.4.4    | <i>Dataset</i>   | 13        |
| 2.4.5    | <i>Model Audit</i>   | 13        |
| 2.4.6    | <i>Model Actions</i>   | 14        |
| 2.5      | Mapping User Groups  | 14        |
| 2.5.1    | <i>User Groups</i>   | 14        |
| 2.5.2    | <i>User Group - Role Mapping</i>   | 15        |
| 2.6      | Signing into the Oracle Financial Services Model Management and Governance Application | 17        |
| 2.7      | Using the Application UI Features  | 18        |
| 2.7.1    | <i>Home Page Components</i>  | 18        |
| 2.8      | Using the OFS MMG Compliance Studio Application  | 20        |
| 2.8.1    | <i>Prerequisites</i>   | 20        |
| <b>3</b> | <b>Using Workspace Management</b>  | <b>21</b> |
| 3.1      | Accessing the Workspace Summary Page   | 21        |
| 3.2      | Create a Workspace   | 23        |
| 3.2.1    | <i>Configure Basic Details</i>   | 24        |

|          |  |           |
|----------|--|-----------|
| 3.2.2    | Configure Workspace Schema.....                                | 26        |
| 3.2.3    | Configure Data Sourcing.....                                   | 29        |
| 3.2.4    | Configure Metadata Sourcing.....                               | 31        |
| 3.2.5    | Validate Workspace.....  | 32        |
| 3.2.6    | Display Summary.....   | 33        |
| 3.3      | Launch a Workspace .....                                       | 34        |
| 3.4      | Populate a Workspace .....                                     | 35        |
| 3.5      | Edit a Workspace .....   | 39        |
| 3.6      | Delete a Workspace .....                                       | 40        |
| 3.7      | Managing Data Sources .....                                    | 41        |
| <b>4</b> | <b>Using Model Management .....</b>                            | <b>44</b> |
| 4.1      | Prerequisites.....   | 44        |
| 4.2      | Access the Workspace Dashboard Window.....                     | 45        |
| 4.3      | Access the Advance Model Management Window.....                | 46        |
| 4.4      | Create, Review, Approve, and Deploy a Model .....              | 50        |
| 4.4.1    | Create Objective (Folders).....                                | 51        |
| 4.4.2    | Create Draft Models .....                                      | 52        |
| 4.4.3    | Publish Models (Scoring).....                                  | 70        |
| 4.4.4    | View Model Details .....                                       | 71        |
| 4.4.5    | Understand Model Governance.....                               | 73        |
| 4.4.6    | Request Model Acceptance .....                                 | 74        |
| 4.4.7    | Review Models and Move to Approve or Reject.....               | 76        |
| 4.4.8    | Approve Models and Promote to Production.....                  | 76        |
| 4.4.9    | Deploy Models in Production and Make it a Global Champion..... | 77        |
| 4.5      | Execute Models using Scheduler Service.....                    | 78        |
| 4.5.1    | Defining a Task .....  | 78        |
| 4.5.2    | When Component is Model .....                                  | 79        |
| 4.5.3    | When Component is Populate Workspace.....                      | 80        |
| 4.6      | Import a Workspace Model Data into a New Model .....           | 81        |
| 4.7      | Use View Models .....  | 82        |
| 4.8      | Edit Models .....  | 83        |
| 4.9      | Delete Objectives and Draft Models .....                       | 83        |

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|          |  |            |
|----------|--|------------|
| <b>5</b> | <b>Dataset.....</b>  | <b>84</b>  |
| 5.1      | Accessing the Dataset Summary Page .....                       | 84         |
| 5.2      | Create a Dataset .....   | 85         |
| 5.2.1    | <i>Creating a Dataset.....</i>                                 | 85         |
| 5.2.2    | <i>Define Pipeline Characteristics .....</i>                   | 86         |
| 5.2.3    | <i>Source Selection.....</i>                                   | 87         |
| 5.2.4    | <i>Dataset Creation.....</i>                                   | 88         |
| 5.2.5    | <i>Dataset Transformation.....</i>                             | 92         |
| 5.2.6    | <i>Display Summary.....</i>                                    | 99         |
| 5.3      | Caching the Data .....   | 100        |
| 5.4      | View a Dataset.....  | 100        |
| 5.5      | Edit a Dataset .....   | 101        |
| 5.6      | Delete a Dataset.....  | 101        |
| 5.7      | Dataset Transformation Backend Details .....                   | 101        |
| 5.7.1    | <i>Creating Dataset Metadata .....</i>                         | 101        |
| 5.7.2    | <i>Caching Dataset.....</i>                                    | 101        |
| 5.7.3    | <i>Listing tags of Datasets Cached from UI.....</i>            | 102        |
| 5.7.4    | <i>Deleting Cached Dataset.....</i>                            | 102        |
| 5.7.5    | <i>Listing all Datasets with Metadata saved from UI .....</i>  | 102        |
| 5.7.6    | <i>Fetching Dataset in Notebook .....</i>                      | 102        |
| 5.7.7    | <i>Cache User's Dataframe from Notebook .....</i>              | 103        |
| 5.7.8    | <i>Fetching Data Frame Cached from Notebook .....</i>          | 103        |
| 5.7.9    | <i>List Tags of all Data frames Cached from Notebook .....</i> | 103        |
| 5.7.10   | <i>Sample Custom Scripts.....</i>                              | 104        |
| 5.7.11   | <i>Transformations .....</i>                                   | 104        |
| <b>6</b> | <b>Model Audit.....</b>  | <b>106</b> |
| <b>7</b> | <b>Model Actions .....</b>                                     | <b>108</b> |

# 1 Preface

This preface provides information for the Oracle Financial Services Model Management and Governance application (OFS MMG) User Guide.

## Topics:

- [Access to Oracle Support](#)
- [Audience](#)
- [Additional Resources](#)
- [Conventions Used](#)
- [Acronyms](#)

## 1.1 Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit:

- <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info>
- <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

## 1.2 Audience

This document is intended for the system administrators and users configuring the workspace and models in OFS MMG.

## 1.3 What is New in This Release

### 1 Workspace

- Support of HIVE based Data Sources during Workspace Provisioning  
For more information, see the *Create a Workspace* Section of [Oracle Financial Services Model Management and Governance \(OFS MMG\) User Guide](#).

### 2 General

- Single configuration for MMG Application and MMG Studio  
For more information, see the *Configure the config.sh File* Section of [Oracle Financial Services Model Management and Governance \(OFS MMG\) Installation Guide](#).

### 3 Pipeline Builder

- View Model Dashboard Report and allows you to execute Models from Dashboard
- Comparison of Models
- Allows to select multiple Scenarios at a time
- View Model Input and Output details
- Allows to Download Model details using Download option
- Supports to view Model Report and download the same in PDF format using Model Report option.
- Session management for paragraph execution

For more information, see the *Create Paragraphs using Pipeline Designer* Section of [Oracle Financial Services Model Management and Governance \(OFS MMG\) User Guide](#).

### 4 Model Enhancements

- Supports Model Summary page view as Flat and Hierarchical
- Cloning of Model

### 5 Dataset

- Added Filters for entities on Data Frame Creation window.
- Supports continue Data profiling and display complete EDA (Exploratory Data Analysis)

For more information, see the Dataset Section of [Oracle Financial Services Model Management and Governance \(OFS MMG\) User Guide](#).

- Supports the following enhancements on the Data Frame Transformation window
  - Added **Create New Feature** option
  - Re-ordering of transformations
  - Insertion of transformation

For more information, see the Managing Dataset Section of [Oracle Financial Services Model Management and Governance \(OFS MMG\) User Guide](#).



6. Scheduler Service

- Supports Shell script in Task Definition.

For more information, see the Execute Models using Scheduler Service Section of [Oracle Financial Services Model Management and Governance \(OFS MMG\) User Guide](#) and [Oracle Financial Services Scheduler Services User Guide](#).

## 1.4 Additional Resources

This section identifies additional resources for the OFS MMG Application Pack. You can access the online documentation for the OFS AAI 8.1.2.0.0 from the [Oracle Help Center \(OHC\)](#) and the OFS MMG 8.1.2.0.0 from the [Oracle Help Center \(OHC\)](#).

- OFS Model Management and Governance Release Notes
- OFS Model Management and Governance Installation Guide

To find additional information about how Oracle Financial Services solves real business problems, see our website at [www.oracle.com/financialservices](http://www.oracle.com/financialservices).

## 1.5 Conventions Used

The following table lists the conventions used in this guide.

**Table 1: Conventions Used in this Guide**

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

## 1.6 Acronyms Used

The following table lists the acronyms used in this guide.

**Table 2: Acronyms Used in this Guide**

| Conventions                                | Description   |
|--|---|
| BA   | Business Analysts   |
| Infodom                                    | Information Domain  |
| Navigation Tree Menu<br>or Navigation Menu | Left-hand side menu   |
| OFS AAI                                    | Oracle Financial Services Analytical Application Infrastructure |
| OFSAA                                      | Oracle Financial Services Analytical Applications               |
| OFS MMG                                    | Oracle Financial Services Model Management and Governance       |
| Production Infodom                         | Production Information Domain                                   |
| Sandbox Infodom                            | Sandbox Information Domain                                      |
| SA   | System Administrator  |
| URL  | Uniform Resource Locator  |
| UI   | User Interface  |

## 2 Getting Started

This section gives an introduction to OFS Model Management and Governance and the requirements to use the application.

### Topics:

- [About this Guide](#)
- [About Oracle Financial Services Model Management and Governance](#)
- [Oracle Financial Services Model Management and Governance Workflow](#)
- [Components of Oracle Financial Services Model Management and Governance](#)
- [Mapping User Groups](#)
- [Signing into the Oracle Financial Services Model Management and Governance Application](#)
- [Using the Application UI Features](#)
- [Using the OFS MMG Compliance Studio Application](#)

### 2.1 About this Guide

This guide has information about configuring and publishing workspaces using the OFS Model Management and Governance application. The further sections in this guide provide information for the creation and deployment of models into production. Use it for information about workspace and model management or help with the processes in the application. For other products such as OFS AAI, see the [Additional Resources](#) section.

### 2.2 About Oracle Financial Services Model Management and Governance

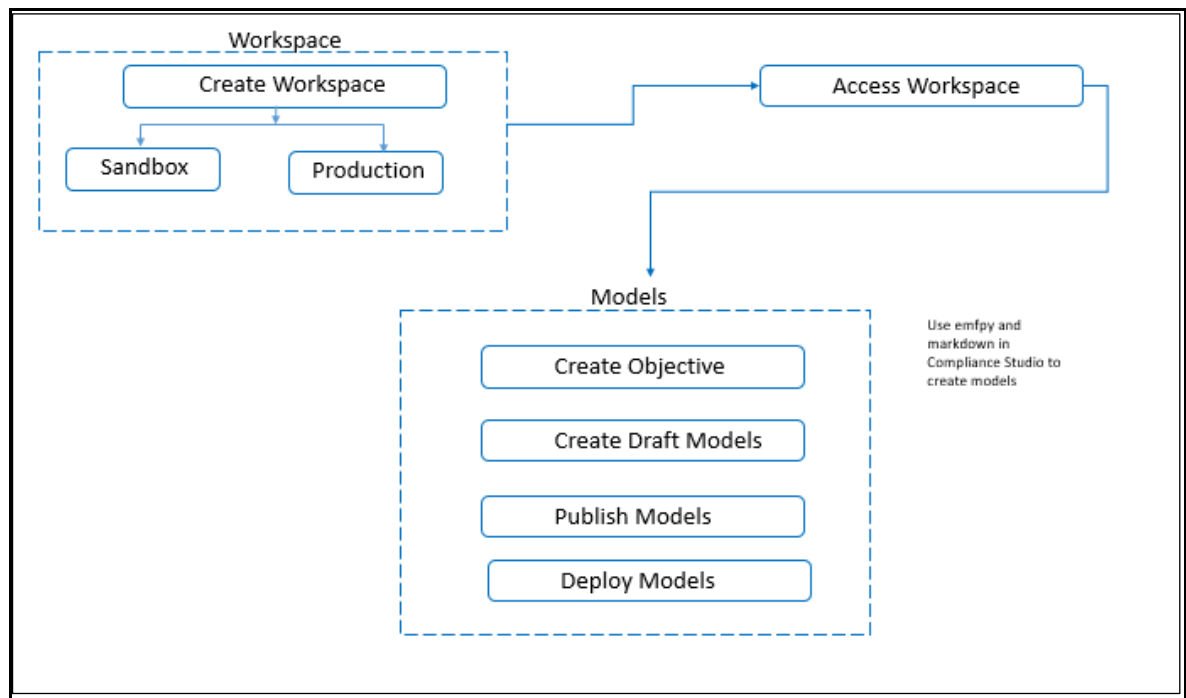
Financial institutions require models that work on traditional statistical techniques, modern machine-learning methods, computational and simulation models. Oracle Financial Services Model Management and Governance leverage the Data Studio environment to develop, deploy, and manage models at the enterprise level.

The OFS Model Management and Governance application enables institutions to implement their IT policies while providing flexibility and freedom that Data Scientists and Statistical Modelers desire. OFS MMG's design facilitates financial institutions to manage external regulatory and internal governance policies by building testing models in a workspace environment. A workspace is provisioned and authorized for use (usually by an administrator) before making it available to modelers. Administrative users grant analysts and modelers access to workspaces along with a subset of production data to build models. Validated and approved models can then be promoted from workspaces to the enterprise model repository. Models in the repository can then be woven into analytical application flows crafted by mixing data management tasks, model execution, and deterministic business logic.

## 2.3 Oracle Financial Services Model Management and Governance Workflow

The workflow involves the creation of workspaces and the creation of Models mapped to the Workspaces. Models are then configured as training models that you can use to perform model visualizations and test for the outcomes. 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 the requirements of your business logic.

**Figure 1: Oracle Financial Services Model Management and Governance Workflow**



## 2.4 Components of Oracle Financial Services Model Management and Governance

The following are the components of Oracle Financial Services Model Management and Governance application:

- [Workspace Management](#)
- [Model Management](#)
- [Dataset](#)
- [Scheduler Service](#)
- [Model Audit](#)
- [Model Actions](#)

### 2.4.1 Workspace Management

Workspace Management is where the workspace Administrators define datasets and make them available to modelers in Oracle Financial Services Model Management and Governance. 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 [Using Workspace Management](#) section for information on how to use Workspace Management in the application.

### 2.4.2 Model Management

Modeling refers to the process of designing a prototype based on a structured data model, for statistical analysis and to simulate real events and processes. Models in a workspace can be created or modified by a user with access to the 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.

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

### 2.4.3 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.

### 2.4.4 Dataset

The Dataset allows you to manage the entire operation related to data set.

### 2.4.5 Model Audit

The Model Audit 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.

## 2.4.6 Model Actions

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

## 2.5 Mapping User Groups

Users must be mapped to User Groups that are mapped to the required roles to access OFS MMG. The following subsections provide information about the user groups and roles required in addition to the information about configuring the user groups.

### Topics:

- [User Groups](#)
- [User Group - Role Mapping](#)

### 2.5.1 User Groups

The following table gives details about the User Groups in the Oracle Financial Services Model Management and Governance application. See the [Oracle Financial Services Analytical Applications Infrastructure Administration Guide](#) for more information.

**Table 3: User Groups**

| User Group Name | User Group Description   |
|-----------------|--|
| IDNTYADMN       | Identity Administrator group   |
| IDNTYAUTH       | Identity Authorizer group  |
| MDLREV          | The Modeling Reviewer Group.<br>Users mapped to this group have access to the menu items in the OFS COMPLIANCE STUDIO application that are related to model review activities.   |
| MDLAPPR         | The Modeling Approver Group.<br>Users mapped to this group have the rights to approve models created by the users.   |
| MDLBATCHUSR     | The Modeling Batch User. Scheduler can use this Group for executing batches.   |
| WKSPADMIN       | The Workspace Administrator Group.<br>Users mapped to this group have access to all the menu items in the OFS COMPLIANCE STUDIO application. Additionally, they have authorization rights to create and populate workspaces. |
| MDLUSR          | The Modeling User Group.<br>Users mapped to this group have access to all the menu items in the OFS COMPLIANCE STUDIO application that is related to model creation.   |
| DSUSRGRP        | General Role<br>Users mapped to this group have permission to access/modify MMG Studio Interpreter Configurations.   |

| User Group Name | User Group Description   |
|-----------------|--|
| DSREDACTGRP     | Roles for applying redaction in graph. This group will be applicable to only those users for whom graph redaction is required. |

**NOTE**

At the first time login, User Group mappings are initialized from AAI/IDCS for the newly provisioned users. These will be reflected in MMG Admin Console in next MMG login.

If User Group mappings are deleted in AAI/IDCS, it would not be deleted in MMG Admin Console. Admin needs to delete this in MMG Identity screens too.

Only the group with MDLSUMM role will be displayed in the Workspace provisioning steps.

MDLSUMM function is mapped to the MDLACCESS role.

## 2.5.2 User Group - Role Mapping

Map the user groups in the application to the roles in the following table to enable access to the OFS MMG application.

**Table 4: User Group to Role Mapping**

| Group Name  | Role Name              |
|-------------|------------------------|
| DSREDACTGRP | DSREDACT               |
| IDNTYADMN   | Batch Advance Role     |
| IDNTYADMN   | Batch Write Role       |
| IDNTYADMN   | Admin Link Role        |
| IDNTYADMN   | User Advanced Role     |
| IDNTYADMN   | Group Advanced Role    |
| IDNTYADMN   | Role Advanced Role     |
| IDNTYADMN   | Function Advanced Role |
| IDNTYAUTH   | Group Authorize Role   |
| IDNTYAUTH   | User Authorize Role    |
| IDNTYAUTH   | Group Read Role        |
| IDNTYAUTH   | Admin Link Role        |

| Group Name  | Role Name              |
|-------------|------------------------|
| IDNTYAUTH   | Function Read Role     |
| IDNTYAUTH   | Role Read Role         |
| IDNTYAUTH   | Role Authorize Role    |
| MDLAPPR     | DSINTER                |
| MDLAPPR     | Model Authorize        |
| MDLAPPR     | Model Deployment       |
| MDLAPPR     | Workspace Read         |
| MDLAPPR     | Model Read             |
| MDLAPPR     | Model Access           |
| MDLAPPR     | Workspace Access       |
| MDLAPPR     | DSAPPROVER             |
| MDLBATCHUSR | DSBATCH                |
| MDLREV      | Workspace Read         |
| MDLREV      | Model Review           |
| MDLREV      | Model Access           |
| MDLREV      | Workspace Access       |
| MDLREV      | DSUSER                 |
| MDLREV      | Model Read             |
| MDLUSR      | Model Advanced         |
| MDLUSR      | Model Write            |
| MDLUSR      | Model Read             |
| MDLUSR      | Batch Advance Role     |
| MDLUSR      | Model Execute          |
| MDLUSR      | DSUSER                 |
| MDLUSR      | Model Access           |
| MDLUSR      | Workspace Access       |
| MDLUSR      | Workspace Read         |
| MDLUSR      | Datasource Access      |
| MDLUSR      | Datasource Write       |
| MDLUSR      | Datasource Read        |
| WKSPADMIN   | Workspace Access       |
| WKSPADMIN   | DSADMIN                |
| WKSPADMIN   | Identity MGMT advanced |



| Group Name | Role Name           |
|------------|---------------------|
| WKSPADMIN  | Workspace Authorize |
| WKSPADMIN  | Workspace Read      |
| WKSPADMIN  | Workspace Write     |
| DSUSRGRP   | DSADMIN             |

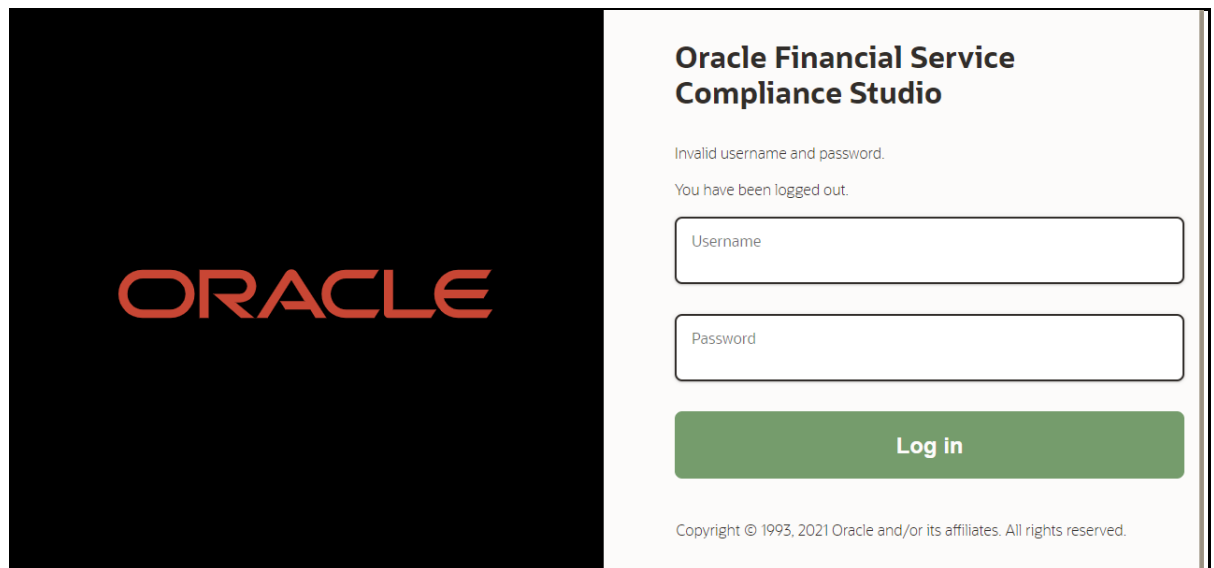
## 2.6 Signing into the Oracle Financial Services Model Management and Governance Application

After the application is installed and configured, you can access the Oracle Financial Services Model Management and Governance application.

To access Oracle Financial Services Model Management and Governance, follow these steps:

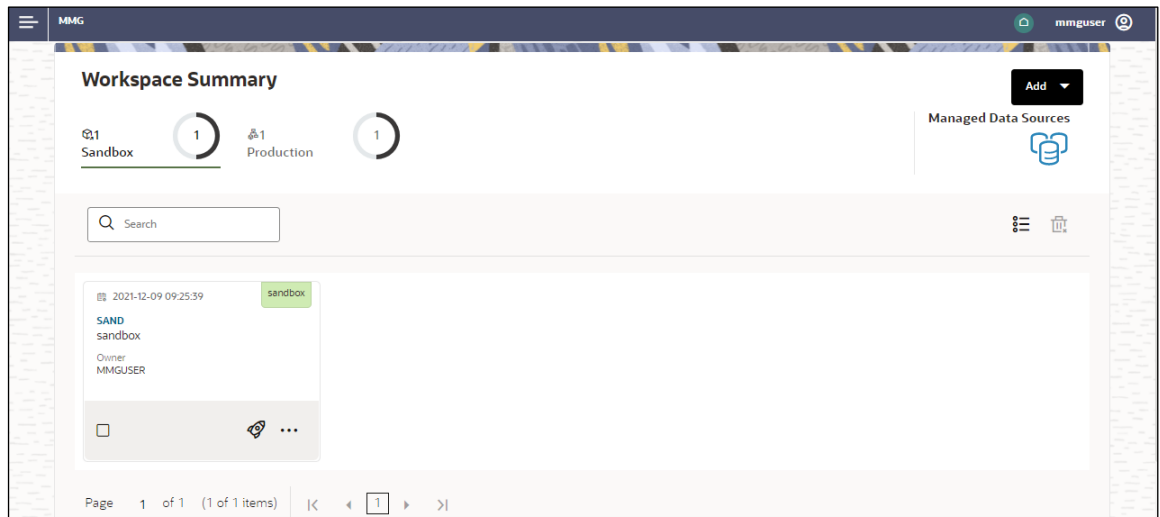
1. Enter the application URL in your browser. The **Login** page is displayed.

**Figure 2: OFS Model Management and Governance Application Login Page**



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

**Figure 3: Model Management and Governance Application Selection**



## 2.7 Using the Application UI Features

This section describes the user-interface of the Oracle Financial Services Model Management application. These are the common features that are found across the modules of Oracle Financial Services Model Management. It describes the organization of the user interface and provides step-by-step instructions for navigating through the application.

### Topics:

- [Home Page Components](#)

### 2.7.1 Home Page Components

The Home Page contains the following sections:



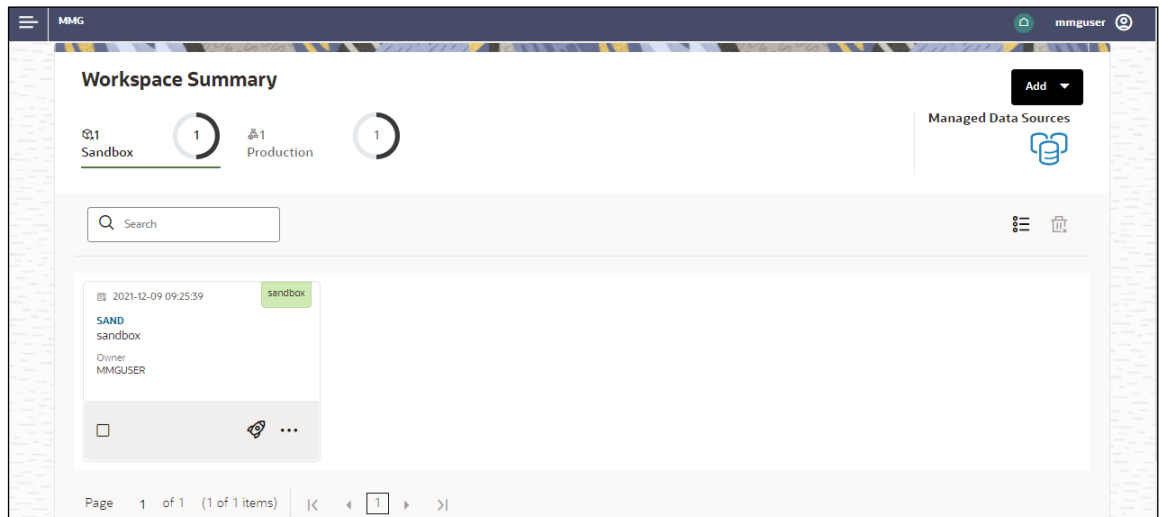
- Header
- Home icon 
- Application Navigation 
- Workspace Summary

Figure 4: Home Page



### 2.7.1.1 Home Page icon



Click **Home** icon to navigate to Workspace Summary page from **any other window in MMG application**.

### 2.7.1.2 Application Navigation



Click Application Navigation icon to navigate to Dashboard, Dataset, Advance Options, and other sections of MMG application.

### 2.7.1.3 Header

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

- **User Name:** Displays the logged-in user name. Click this to select from the following options in the drop down list:
  - **Admin:** Navigate to IDCS page.
  - **Logout:** Select to log out of the application.

### 2.7.1.4 Workspace Summary

Shows the list of Workspaces. Select the checkbox next to the Workspace that you want to View, Edit, Copy, or Delete. Click **Add** to create a new Workspace. You can search a Workspace using Workspace Code, Owner, Creation Date, or Workspace Type fields. The search list shows the Workspace details with Workspace Code, Owner, Creation Date, and Type.

## 2.8 Using the OFS MMG Compliance Studio Application

The OFS MMG application displays windows and pages that are interconnected to the OFS AAI and Compliance Studio. Primarily, you will create Workspace. Within these Workspaces, you will create models, compare them for the best fit, and promote one to production.

Use the information in the following topics to create the workspaces and models:

- [Using Workspace Management](#)
- [Using Model Management](#)

### 2.8.1 Prerequisites

The prerequisites for OFS MMG are as follows:

- To create a workspace, your user profile must be mapped to the Workspace Administrator role. For more information, see the [User Groups](#) section.
- To use a workspace to create models, your user profile must be mapped to the Model User role (such as a modeler). For more information, see the [User Group - Role Mapping](#) section.

## 3 Using Workspace Management

Workspace management allows you to create and manage workspaces in the Financial Services Model Management and Governance 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
- Managed Data Sources

### Topics:

- [Accessing the Workspace Summary Page](#)
- [Create A Workspace](#)
- [Launch A Workspace](#)
- [Populate A Workspace](#)
- [Delete A Workspace](#)

### 3.1 Accessing the Workspace Summary Page

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

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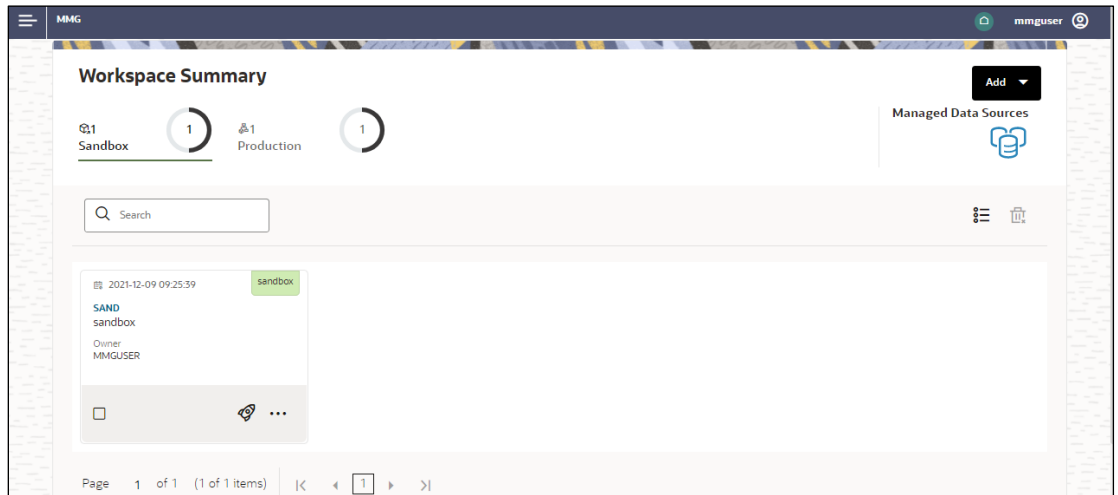
**NOTE**

Users Groups must be mapped to the Workspace Admin role to access the Workspace Summary page.





To access the Workspace Summary page, follow these steps:








After login to **Financial Services Model Management and Governance** 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 5: Workspace Summary Page



The following table provides descriptions for the fields and icons on the **Workspace Summary** page.

| Field or Icon      | Description  |
|--------------------|--|
| Search             | The field to search for Workspace.<br>Enter specific terms in the field for which you want to search and press Enter on the keyboard to display the results. The search is available for all the fields.   |
| Card and Grid View | 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. |
| Delete All         | Click <b>Delete All</b>  to delete all the Workspaces.   |
| Workspace Code     | The code of the Workspace.   |
| Description        | The description for the Workspace  |
| Creation Date      | The date on which the Workspace was created.   |
| Type               | Shows the type of Workspace as Sandbox or Production   |
| Attachment         | The Production Workspace shows the attached Sandbox in Card view.  |
| Add                | Click Add  and select Workspace to create a new Workspace. See the <a href="#">Create a Workspace</a> section for more information.  |

| Field or Icon      | Description   |
|--------------------|---|
| Launch Workspace   | Click <b>Launch Workspace</b>  next to corresponding workspace to display the <b>Workspace Dashboard</b> with application configuration and model creation menu. See the <a href="#">Launch a Workspace</a> section for more information.  |
| Populate Workspace | Click Action  next to corresponding Workspace and select <b>Populate Workspace</b>  to populate the workspace with dataset data. See the <a href="#">Populate a Workspace</a> section for more information. |
| Edit Workspace     | Click Action  next to corresponding Workspace and select <b>Edit Workspace</b>  to edit the Workspace.  |
| Delete Workspace   | Click Action  next to corresponding Workspace and select <b>Delete Workspace</b>  to delete the Workspace. See the <a href="#">Delete Workspace</a> section for more information.                             |

### 3.2 Create a Workspace

The Workspace creation requires entry of the source of dataset, validation, and deployment. Besides, the OFS MMG 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. See the [Mapping User Groups](#) section for more information.

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:


1. Navigate to Workspace **Management Summary** page to display the **Workspace Summary** page. The page displays workspace records in a table.
2. Select  to create a Workspace in the Workspace **Summary** window.

Figure 6: Workspace Creation Window

The screenshot shows a 'Create Workspace' window with a progress indicator on the left. The progress indicator has six steps: 1. Basic Details (active), 2. Workspace Schema, 3. Data Sourcing, 4. Metadata Sourcing, 5. Validate, and 6. Summary. The main content area is for the 'Basic Details' step. It includes a 'Workspace Code' field with the value 'NEWWORKSPACE', a 'Purpose' field with the value 'New workspave', and a 'User-group' field with the value 'Modeling User X'. Below these fields are radio buttons for 'Type', with 'Sandbox Workspace' selected and 'Production Workspace' unselected. There is also a toggle for 'Attach Production Workspace' which is currently off. On the right side of the window, there is a dashed box labeled 'Import Archive File ( Drag & Drop file here )'. At the top right, there is a 'Next' button with a right arrow. At the bottom, there is a 'Previous' button with a left arrow.

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:

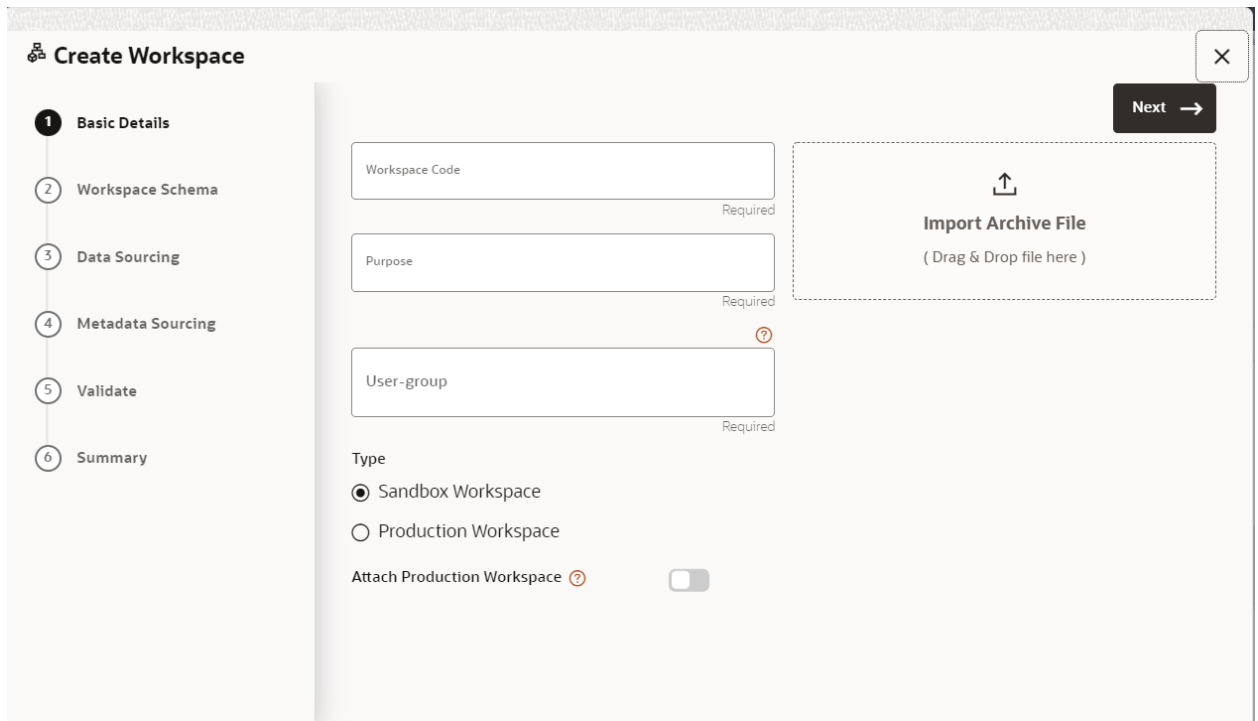
- a. [Configure Basic Details](#)
- b. [Configure Workspace Schema](#)
- c. [Configure Data Sourcing](#)
- d. [Configure Metadata Sourcing](#)
- e. [Validate Workspace](#)
- f. [Display Summary](#)

### 3.2.1 Configure Basic Details

Enter basic configuration details in this window.

Figure 7: 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 following table.

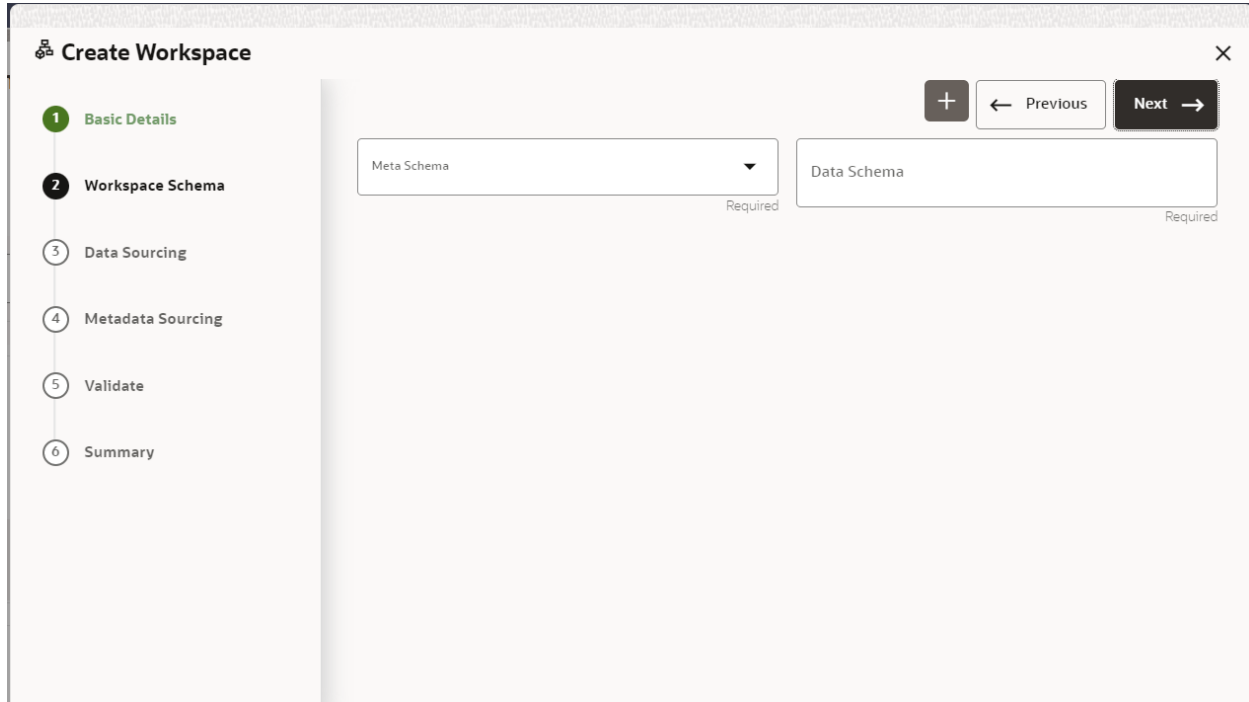
| Field                      | Description   |
|----------------------------|---|
| Workspace Code             | Enter the code of the workspace. This field is limited to 20 characters.  |
| Purpose                    | Enter the purpose of the creation of the Workspace.   |
| User-group                 | Click on this field to display a list of User-group values. Select the required value. <ul style="list-style-type: none"> <li>• Modeling Approver</li> <li>• Modeling Reviewer</li> <li>• Modeling User</li> </ul>  |
| Type                       | Select the type of Workspace as Sandbox or Production. UGDOMMAP function should be mapped to the user performing sandbox creation, else create operation will fail.   |
| Attached Production Schema | 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 OFSAA Schema, 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.

### 3.2.2 Configure Workspace Schema

Select the schema operation and enter connection details.

Figure 8: Workspace Schema



The screenshot shows the 'Create Workspace' dialog box. On the left, a vertical progress bar indicates the current step is '2 Workspace Schema'. The main content area contains two required fields: 'Meta Schema' (a dropdown menu) and 'Data Schema' (a text input field). Navigation buttons include a plus sign, 'Previous', and 'Next'.

To configure the Workspace schema, follow these steps:

1. Select one from the options from the **Meta Source** drop-down list.
2. You can to upload a new data model with the details you provide in the Data Sourcing drop-down list. You can select an existing Schema or add a new Schema.
  - Meta Source: Every workspace has a schema to store the meta information such as batch ID and so on. This is used for saving all the definitions and metadata related to models.
  - Data Source: This is the actual data used for model building. You can use multiple data schemas for one Meta Source.

To add a new Schema, follow these steps:

3. Click Add . The Create Data Source window is displayed.

**Figure 9: Create Data Source with Oracle Database**

The screenshot shows a 'Create Data Source' dialog box with the following fields and controls:

- Data Source Name:** A text input field with a 'Required' label below it.
- Description:** A text input field with a 'Required' label below it.
- Type:** A dropdown menu currently showing 'JDBC'.
- Database Type:** A dropdown menu currently showing 'Oracle'.
- Wallet Alias:** A text input field with a 'Required' label below it.
- Table Owner:** A text input field.
- Buttons:** 'Test Connection', 'Cancel', and 'Create' (highlighted in black).

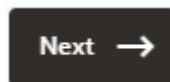
**Figure 10: Create Data Source with Hive Database**

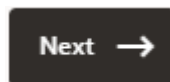
4. Enter the required details as shown in the following table.

| Field                | Description   |
|----------------------|---|
| Database Source Name | Enter the connection URL to the database for the data schema. |
| Description          | Enter the description of database connection.                 |
| Type                 | Enter the type of the database connection.                    |

| Field         | Description   |
|---------------|---|
| Database Type | <p>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 9), then following additional fields are displayed to enter details:</p> <ul style="list-style-type: none"> <li>• Table Owner: Enter the Oracle Database name.</li> </ul> <p>If you select Database Type as Hive (see Figure 10), then following additional fields are displayed to enter details:</p> <ul style="list-style-type: none"> <li>• User Name: User Name / Principal is used for Kerberos authentication.</li> <li>• Table Owner: Enter the Hive schema.</li> <li>• JDBC Connection String: Enter the JDBC Connection String.</li> <li>• JDBC Driver: Supports org.apache.hive.jdbc.HiveDriver and com.cloudera.hive.jdbc4.HS2Driver</li> <li>• Keytab File Name: Enter the Name of the keytab file present in conf directory.</li> <li>• Realm File Name: Enter the Name of the configuration file present in conf directory.</li> </ul> <p>Note: Schema population for Hive as target is not supported.</p> <p>Note: This is applicable only for Sandbox Workspace.</p> <p>For more information on Setting the Environment, see the <a href="#">Oracle Financial Services Model Management and Governance Installation Guide</a>.</p> |
| Wallet Alias  | Enter the Wallet Alias. This value should be same as configured using Oracle Wallet. For more information, see the OFS MMG User Guide.  |

5. Click **Create** on Create Data Source window.



6. Click  to go to the next step. Click Skip to skip the step.

**NOTE**

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

### 3.2.3 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.

**NOTE** This step does not apply to the prepopulated schema and OFSAA Infodom options in [Workspace Schema](#).

Figure 11: Data Sourcing - External Data Source

The screenshot displays the 'Create Workspace' application interface. On the left, a sidebar shows a progress indicator with six steps: 1. Basic Details, 2. Workspace Schema, 3. Data Sourcing (highlighted), 4. Metadata Sourcing, 5. Validate, and 6. Summary. The main panel is titled 'Data Sourcing' and contains the following elements:

- Data Source Name:** A dropdown menu with 'ext\_als' selected.
- Target Data Schema:** A dropdown menu with 'New' selected.
- Object Type:** A dropdown menu with 'Table' selected.
- Search:** A text input field.
- Object List:** A list of objects with checkboxes:
  - AAI\_DMT\_DEFINITION
  - DIM\_BANDS
  - DIM\_BANDS\$
  - DIM\_BASEL1\_ISSUER\_TYPE
- Outline:** A tree view showing the selected objects:
  - ext\_als
    - TABLE
      - AAI\_DMT\_DEFINITION
      - DIM\_BANDS

Navigation buttons include 'Skip', 'Previous', and 'Next'.

To configure Data Sourcing, follow these steps:

1. You can select Data Source from Data Source Name drop-down list or create a new Data Source. To create a new Data Source, see the Configure Workspace Schema section.
2. Select the Target Data Schema. You can select multiple Data Sources for a Target Data Schema.
3. 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.

4. 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,
5. If Table A has columns C1, C2 and C3
6. Table B has columns C1, C2 and C4
7. Then the data from the first table will be used.
8. During the data population, only columns C1 and C2 will be used and those will be marked in Green color.
9. 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

10. Click  to go to the next step. Click Skip to skip the step.

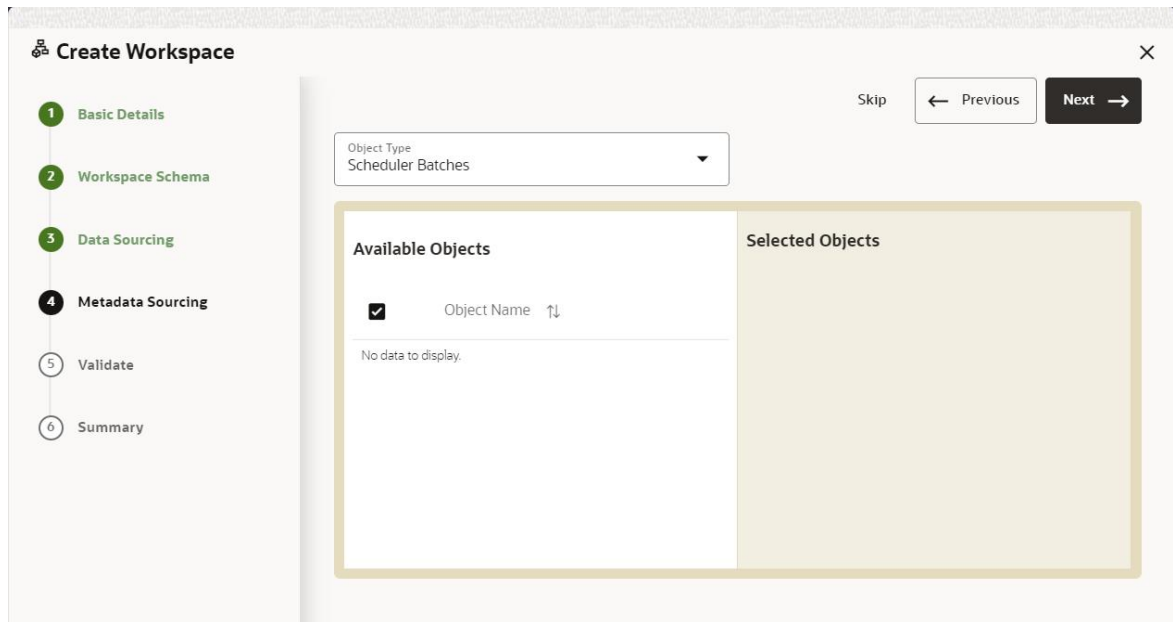
### 3.2.4 Configure Metadata Sourcing

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.

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**NOTE** This step is optional.


**Figure 12: 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. Click  to go to the next step. Click Skip to skip the step.

### 3.2.5 Validate Workspace


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

Figure 13: Validate Workspace



To validate the Workspace and deploy, follow these steps:

1. Review the details in the **Validate** pane. You can edit the Workspace using

Edit. 

2. Click **Finish** to creation of the Workspace using **Physicalize Sandbox** option or **Download Configurable Archive**.

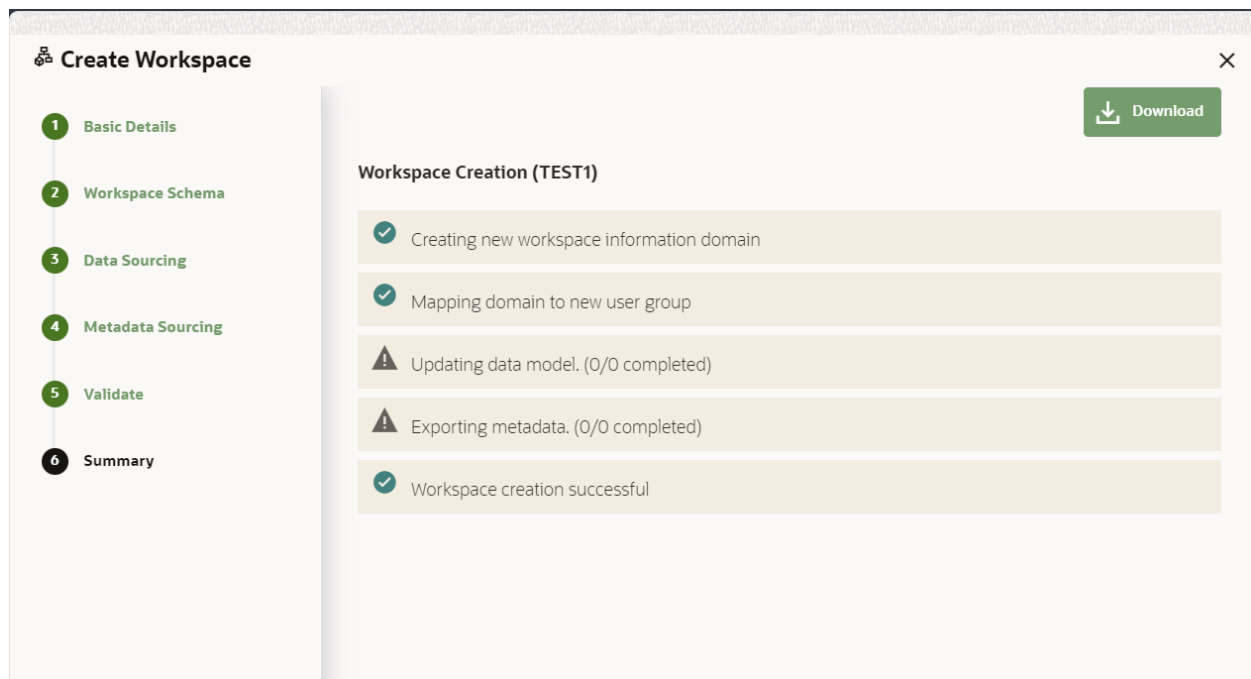
- When you click **Download Configurable Archive**, it exports the metadata information of the workspace in .zip format which can be used later using the Import option.
- When you click **Physicalize Sandbox**, it creates actual workspace.


3. Click  to go to the next step.

### 3.2.6 Display Summary

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

Figure 14: Workspace Creation Summary



- Click  to download the deployment report.

### 3.3 Launch a Workspace

The launching of the Workspace displays the **Workspace** window. The workspace displays a menu for Models and an application configuration and model creation submenu as shown in the following list:

- Dashboard
- Dataset
- Advanced Model Management
- Model Actions
- Scheduler Service
- Model Audit


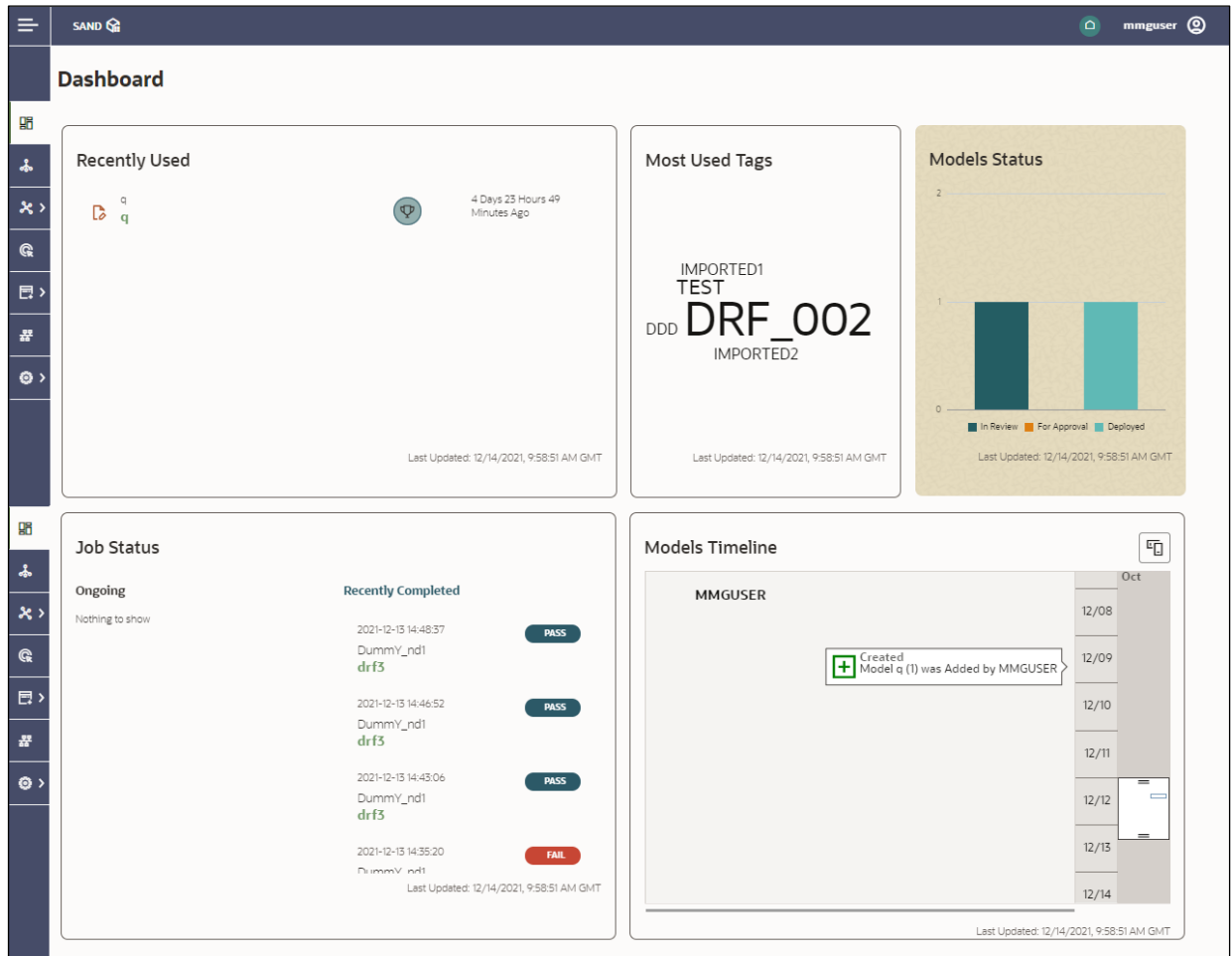
1. Navigate to Click Launch  next to corresponding Workspace. The Workspace Dashboard is displayed.

Figure 15: Workspace Dashboard



### 3.4 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**

**Workspace**  to populate the Workspace with data from a dataset data in the **Populate** Workspace window.

Figure 16: Populate Workspace Window

The following table provides descriptions for the fields in the **Populate** Workspace window.

| 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. |

| Field                     | Description  |
|---------------------------|--|
| Data Filter - Table level | <p>Provide the data filters individually on the tables here.</p> <p>Note: You can provide multiple table names for the same SQL filter.</p> <p>For example, there are two tables called Student and Employee in the target data source, and below filters are applied</p> <p>MISDATE as Today for Student and Employee tables</p> <p>ID as 1 for Student table</p> <p>Then, Student table will be populated with MISDATE and ID filters and Employee table will be populated with only MISDATE filter.</p> <p>Global Filters will not be applicable for those tables on which filters have been applied individually.</p> <p>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> |
| 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.  |
| Rejection Threshold       | <p>Following two options are available:</p> <ul style="list-style-type: none"> <li>Custom Rejection Threshold                     <p>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.</p> </li> <li>Unlimited                     <p>Here, all the errors will be ignored during the data population.</p> </li> </ul>  |
|                           |  |

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.

**NOTE** You may require approval from an approver to populate the workspace.

- 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. Navigate to Scheduler Service and select Define Task.

**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 type="checkbox"/>            |
| Parameter | Table Filters         | Value | <input type="text"/> | <input type="checkbox"/>            |
| Parameter | Additional Parameters | Value | <input type="text"/> | <input type="checkbox"/>            |

5. Enter the following parameters for workspace population.

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

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

- Gobal 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

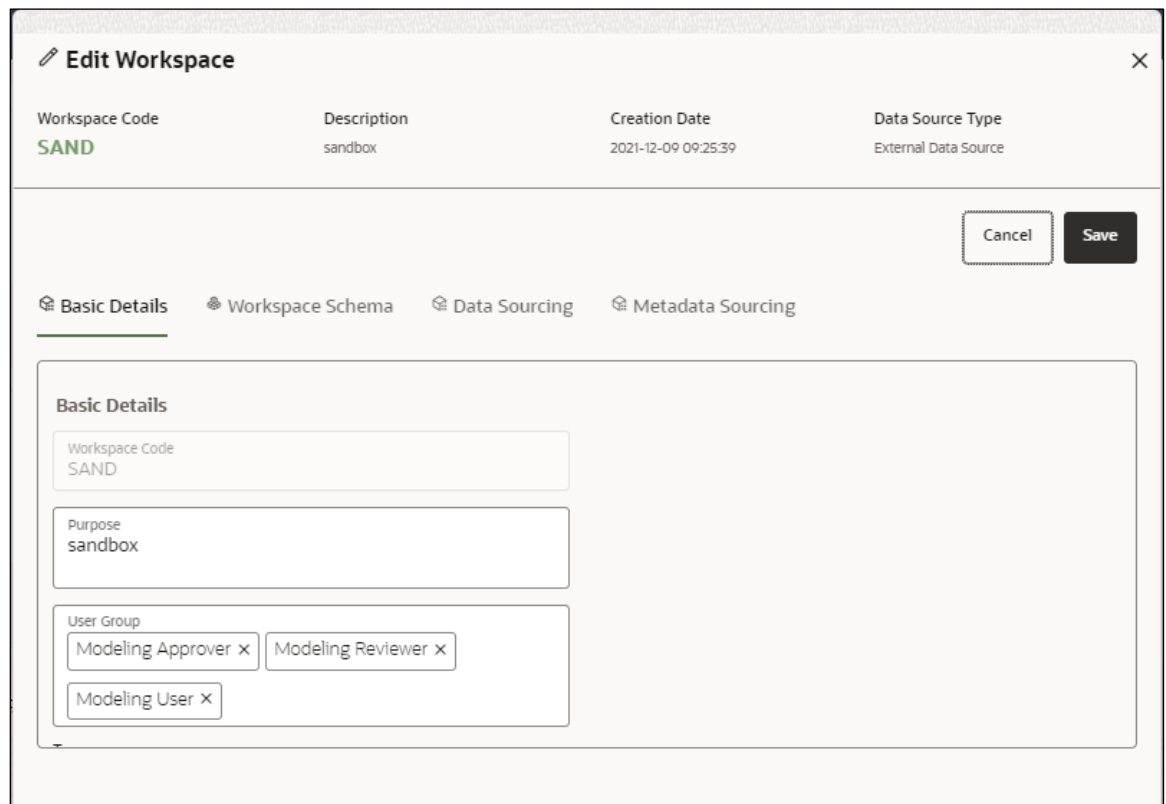
can add new sources if required.  
 Any table that is deselected from the data sourcing definition will **NOT** be dropped.

### 3.5 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 Workspace  to edit the workspace.

**Figure 17: Edit workspace Window**





The following table provides descriptions for the fields in the **Edit Workspace** window.

| Field             | Description  |
|-------------------|--|
| Workspace Code    | The code of the Workspace.   |
| Description       | The description for the Workspace.   |
| Creation Date     | The date on which the Workspace was created.                                     |
| Data Source Type  | The data source of Workspace   |
| Basic Details tab | To edit the basic details of workspace.<br>Note: You cannot edit workspace Name. |
| Workspace Schema  | To edit the Workspace Schema details of workspace.                               |
| Data Sourcing     | To edit the Data Sourcing details of workspace.                                  |
| Meta Sourcing     | To edit the Meta Sourcing details of workspace.                                  |

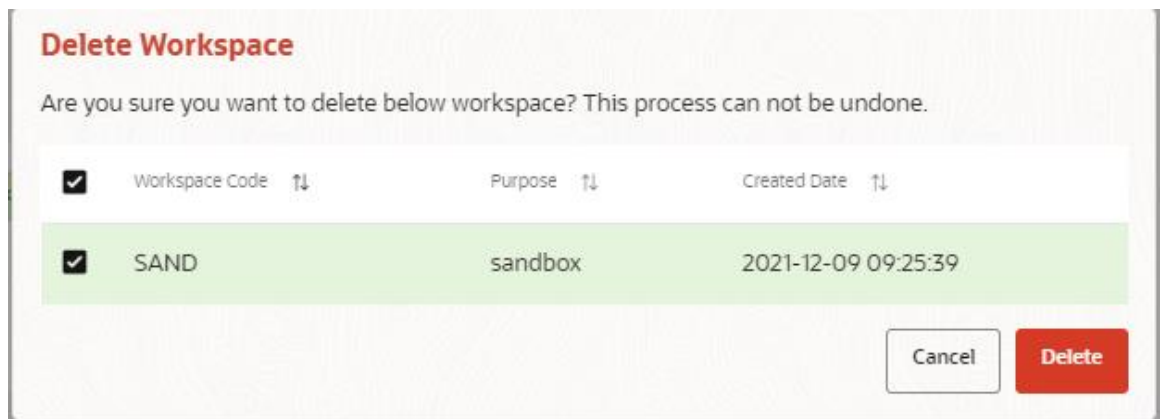
3. Click **Save**.

## 3.6 Delete a Workspace

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 Workspace  to delete the workspace.

**Figure 18: Delete Workspace Window**



The following table provides descriptions for the fields in the **Delete Workspace** window.



| Field          | Description                                  |
|----------------|--|
| Workspace Name | The name of the workspace.                   |
| Purpose        | The description for the workspace.           |
| Creation Date  | The date on which the workspace was created. |

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

**NOTE**

You may require approval from an approver to delete a workspace. You must de-link the Sandbox workspaces from Production Workspace before deleting the Production Workspace

## 3.7 Managing Data Sources


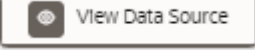
This feature allows you to manage the Data Schemas registered with MMG. The Data Source Summary window shows the list of Data schemas registered with MMG. These Data schemas can be used either for workspace or for sourcing data. Click Managed Data



Sources to navigate to Data Source Summary window.

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

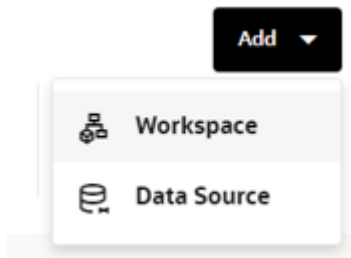
| Data Source Name    | Type | Used In    | Used As     | Action |
|---------------------|------|------------|-------------|--------|
| ext_als<br>ext_als  | JDBC | HEYPHOGAAT | Meta Schema | ...    |
| d4<br>kjhkjk        | JDBC | W TYUIIO   | Data Schema | ...    |
| db0311<br>db031_als | JDBC | W12        | Meta Schema | ...    |
| New<br>New          | JDBC | TEST1      | Data Schema | ...    |
| 12<br>12            | JDBC | DS         | Meta Schema | ...    |
| d88<br>gl           | JDBC | DS         | Data Schema | ...    |
| npuser1<br>testing  | JDBC | HEYPHOGAAT | Data Schema | ...    |

The Data Source Summary is divided into two sections: Used Data Sources and Unused Data Sources. Click  next to corresponding Workspace and select View Data Source  to view the Data Source details.

- **Used Data Sources:**  
This shows the list of Data Sources registered with any workspace. Here, you can only view the Data Source details.
- **Unused Data Sources:**  
This shows the list of Data Sources those are not registered with any workspace. Here, you can only view, edit, or delete the Data Source details.

To add a Data Source from Workspace Summary window, follow these steps:

1. Navigate to Workspace Summary window.
2. Click Add from the Top-right corner and select Data Source.



The Create Data Source window is displayed.

To add a Data Source from Data Source Summary window, follow these steps:

1. Navigate to Workspace Summary window.



2. Click Managed Data Sources to navigate to Data Source Summary window

and click Add .

For more information, see the [Configure Data Sourcing](#) section.

## 4 Using Model Management

Model management 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.

Topics:

- [Advanced Model Management](#)
- [Model Audit](#)
- [Model Actions](#)

Topics:

- [Prerequisites](#)
- [Access the Model Management Window](#)
- [Create, Review, Approve, and Deploy a Model](#)
- [Execute Models using Scheduler Service](#)
- [Import a Workspace Model Data into a New Model](#)
- [Use the Model Audit Window](#)
- [Use Scope](#)
- [Use View Models](#)
- [Edit Models](#)
- [Delete Objectives and Models](#)

### 4.1 Prerequisites

The prerequisites for model management are as follows:


- To create a model, your user profile must be mapped to the Modeler Group. For more information, see the [Mapping User Groups](#) section.
- To create a model, a workspace must be deployed. See the [Create a Workspace](#) Section for more information.
- To approve and deploy a model, your user profile must be mapped to the Modeling Administrator Group. For more information, see the [Mapping User Groups](#) section.

## 4.2 Access the Workspace Dashboard Window

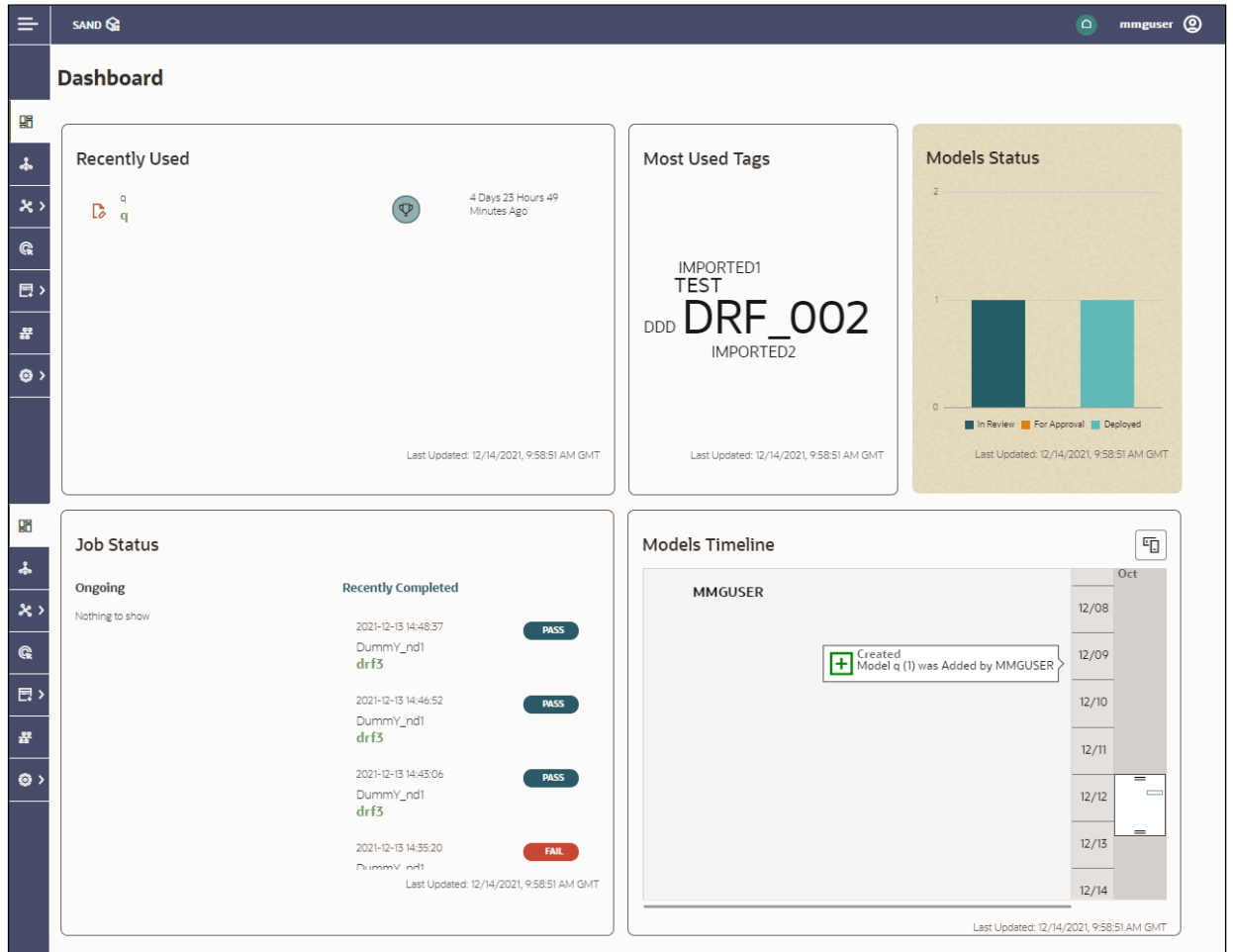
The Workspace Dashboard window allows you to view the models of launched workspace. The Workspace Dashboard shows the following details of a launched workspace:


- Recently Used model
- Most Used Tags models
- Status of models
- Job Status of models
- Timeline of models

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

**Figure 19: Workspace Dashboard**




Click  to navigate back to Workspace Summary window.

### 4.3 Access the Advance Model Management Window

The Advance Model Management window allows you to create and publish models.

To access the Advance Model Management 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 MMG **Dashboard** window is displayed with application configuration and model creation menu.

3. Click **Advanced Model Management**  to display the **Model Management** window. The window displays folders that contain models and model records in a

table. When you click on any draft for Objective Name, it shows the type of model, such as champion

**Figure 20: Model Management Page**

| <input type="checkbox"/> | Objective Name              | ID             |       |
|--------------------------|-----------------------------|----------------|-------|
| <input type="checkbox"/> | 12                          | 1639466177775  | 4     |
| <input type="checkbox"/> | 123                         | 1639127109040  | 3     |
| <input type="checkbox"/> | Dummy_nd1<br>Dummy_nd1 Desc | 1639401015285  | 4 7   |
| <input type="checkbox"/> | import                      | 1639124809016  | 1     |
| <input type="checkbox"/> | nikobj                      | 16394669310652 |       |
| <input type="checkbox"/> | obj2                        | 1639061178990  | 1 2 1 |

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.

- Flat option: The Model Management 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.

- In the Flat list of models, you can see the following details of draft models: Model Name, ID, Description, Objective ID, Objective Name, Owner, Deployment Status
- In the Flat list of models, you can see the following details of published models: Model Name, ID, Description, Objective ID, Objective Name, Owner, Version, Deployment status

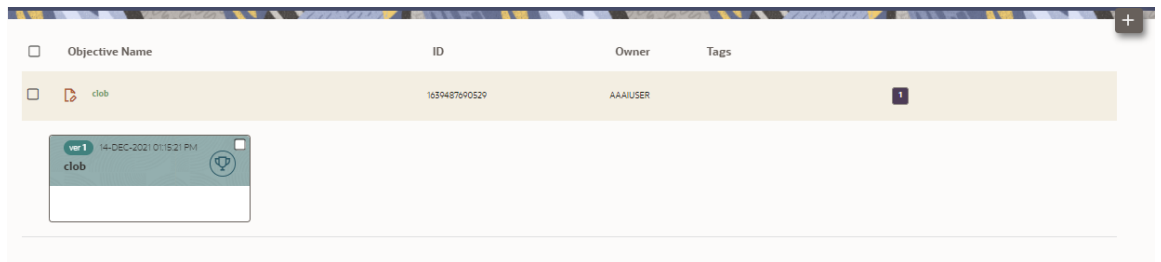
The screenshot shows the 'Model Pipelines' section of the application. At the top, there is a search bar and filters for 'Filter by version', 'Filter by status', and 'Sort by'. Below these are three rows of model data:

| <input type="checkbox"/> | Name          | ID            | Version | Objective ID  | Objective name | Owner   | Status |
|--------------------------|---------------|---------------|---------|---------------|----------------|---------|--------|
| <input type="checkbox"/> | nikmodel test | 1640185581263 | 0       | 1640185556538 | NikkiObj       | MMGUSER |        |
| <input type="checkbox"/> | nikmodel test | 1640185581263 | 1       | 1640185556538 | NikkiObj       | MMGUSER |        |
| <input type="checkbox"/> | nikdraft new  | 1640266456939 | 0       | 1640266435059 | niknew         | MMGUSER |        |

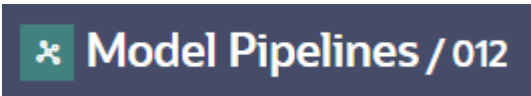



- Hierarchical option: The Model Management window shows the hierarchical list of all the models (published and drafts) using the Hierarchical  option.

4. Navigate to Model.







Figure 21: Draft Model




The following table provides descriptions for the fields and icons on the **Model Management** page.

| Field or Icon                       | Description  |
|-------------------------------------|--|
| <b>Model Management Page Header</b> | The header that follows the global header in the application.  |
| 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>Click  to navigate to Model Summary page.</p> <p>Click  to navigate back to Workspace Summary page.</p> |
| Requester                           | <p>Displays that the logged-in user has the Requester privileges when the status is green.</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>  |






| Field or Icon                      | Description   |
|------------------------------------|---|
| Reviewer                           | <p>Displays that the logged-in user has the Reviewer privileges when the status is green.</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>You can approve models that are created and reviewed.</p>  |
| <b>Model Management Page Table</b> | The table displays the objective and model records on the page.   |
| Objective and Model                | <p>Displays the name of the Objective</p>    |
| Description                        | Displays the description for the Objective or Model.  |
| Created User                       | Displays the user ID of the user who created the Model. This information does not display for an Objective.   |
| Tags                               | <p>Displays the tags associated with the Objective or Model.</p>  <p>This information does not display for an Objective.</p>   |
| Edit Model                         | <p>Select  to edit the models in Data Studio. See the <a href="#">Edit Models</a> Section for more information.</p> <p>This information does not display for an Objective.</p>   |
| Delete Model                       | <p>Select  to delete the model from the <b>Confirmation</b> dialog box. Click <b>OK</b> to process or click <b>Cancel</b> to cancel.</p> <p>This information does not display for an Objective.</p>                        |

| Field or Icon                | Description   |
|------------------------------|---|
| Create Objectives and Models | <p>Select Add  to display a list with the following options:</p> <ul style="list-style-type: none"> <li>• Draft</li> <li>• Objective</li> </ul> <p>To create Models, select Draft. To create Objectives, select Objective. See the <a href="#">Create Objective (Folders)</a> and <a href="#">Create Draft Models</a> sections for more information.</p> <p>However, if you want to know about the cycle of model creation, see the <a href="#">Create, Review, Approve, and Deploy a Model</a> Section.</p> |

## 4.4 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.

| Field or Icon   | Description  |
|---|--|
| Requester  | <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> <ul style="list-style-type: none"> <li>• Model Acceptance</li> <li>• Make Champion – Local</li> </ul> <p><b>NOTE:</b> User Groups must be mapped to the MDLDEPLOY role to access Requester functions.</p>   |
| Reviewer   | <p>You can review models. However, to approve and publish, the model must be approved by a user with approver privileges.</p> <ul style="list-style-type: none"> <li>• Model Acceptance</li> <li>• Model Acceptance + Promote to Production</li> <li>• Promote to Production</li> </ul> <p><b>NOTE:</b> User Groups must be mapped to the MDLREVIEW role to access Reviewer functions.</p> |
| Approver   | <p>You can approve models that are created and reviewed. You can then promote to production and make the model the champion in the production.</p> <ul style="list-style-type: none"> <li>• Promote to Production</li> <li>• Make Champion – Global</li> </ul> <p><b>NOTE:</b> User Groups must be mapped to the MDLAUTH role to access Approver functions.</p>                            |

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

1. [Create Objective \(Folders\)](#)

2. [Create Draft Models Publish Models \(Scoring\)](#)
3. [Show Model Versions](#)
4. [Compare Models](#)
5. [Understand Model Governance](#)
6. [Request Model Acceptance](#)
7. [Review Models and Move to Approve or Reject](#)
8. [Approve Models and Promote to Production](#)
9. [Deploy Models in Production and Make it a Global Champion](#)

### 4.4.1 Create Objective (Folders)

Create folders called Objectives within which you can create Models.

To create an Objective, follow these steps:



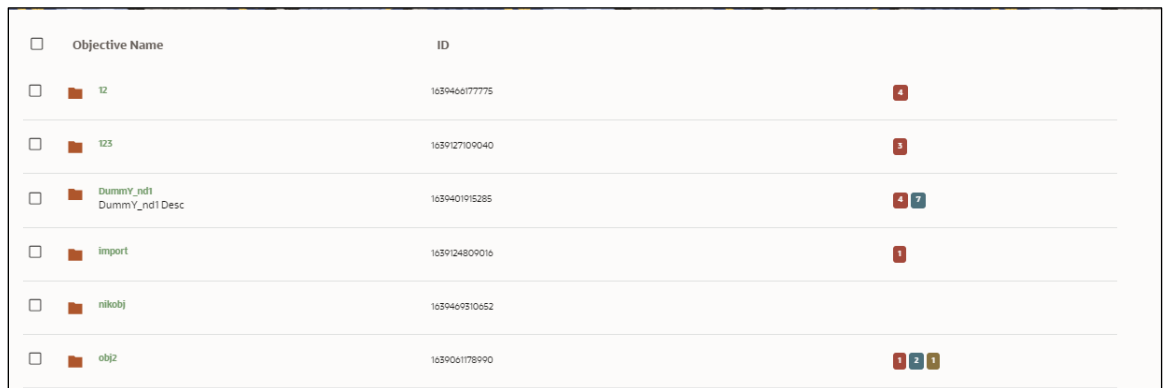
1. Click Launch Workspace  next to corresponding Workspace to Launch Workspace to display the **MMG Dashboard** window with application configuration and model creation menu.
2. Click **Advanced Model Management**  to display the **Model Management** window. The window displays folders that contain models and model records in a table.

Figure 22: Create Model Objectives



| <input type="checkbox"/> | Objective Name              | ID            |       |
|--------------------------|-----------------------------|---------------|-------|
| <input type="checkbox"/> | 12                          | 1639466177775 | 4     |
| <input type="checkbox"/> | 123                         | 1639127109040 | 3     |
| <input type="checkbox"/> | Dummy_nd1<br>Dummy_nd1 Desc | 1639401916385 | 4 7   |
| <input type="checkbox"/> | import                      | 1639124809016 | 1     |
| <input type="checkbox"/> | nikobj                      | 1639469310652 |       |
| <input type="checkbox"/> | obj2                        | 1639061178990 | 1 2 1 |


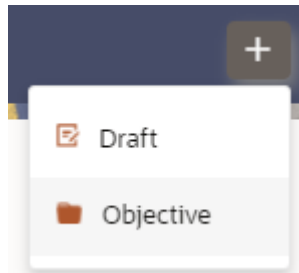
3. Click **Add**  and select **Objective** from the list to display the **Objective Details** dialog box.

Figure 23: Select Objective from Add



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



Figure 24: Objective Details Dialog box


5. Click **Save**.

## 4.4.2 Create Draft Models

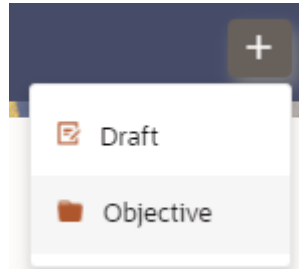
Create Models that are classified as draft models. These models will be reviewed before being sent for Scoring.

To create a draft Model, follow these steps:

1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **MMG Dashboard** window with application configuration and model creation menu.
2. Click **Advanced Model Management**  to display the **Model Management** 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 25: Create Model**

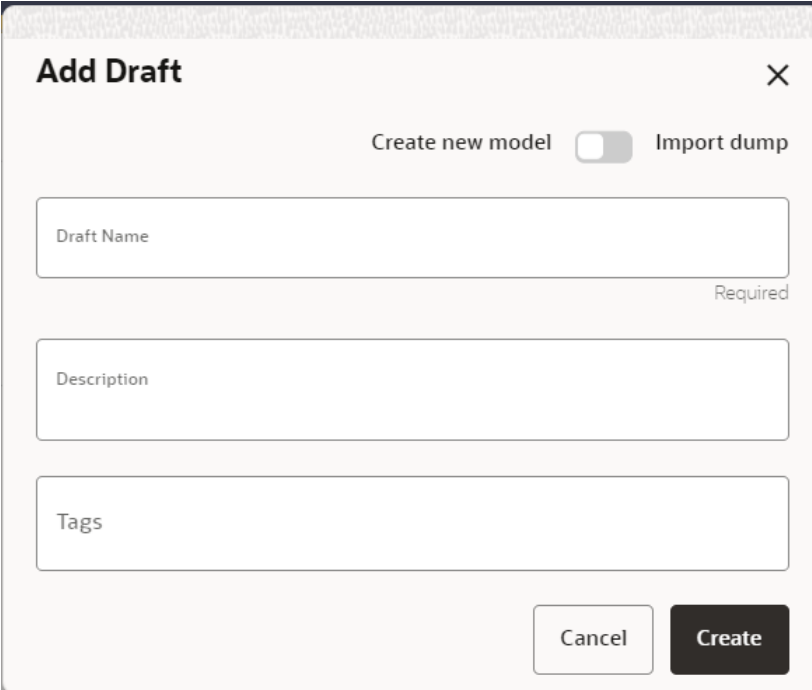


4. **Create New Model** is the default setting in the **Model Details** dialog box. Drag the toggle button to select **Import Dump**. Use Create New Model to start from a blank Notebook in Compliance Studio. Import Dump lets you drag and drop an existing file with model data and modify it. To import a model data dump from another model, see the [Import a Workspace 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 26: Model Details - Create New Model**



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

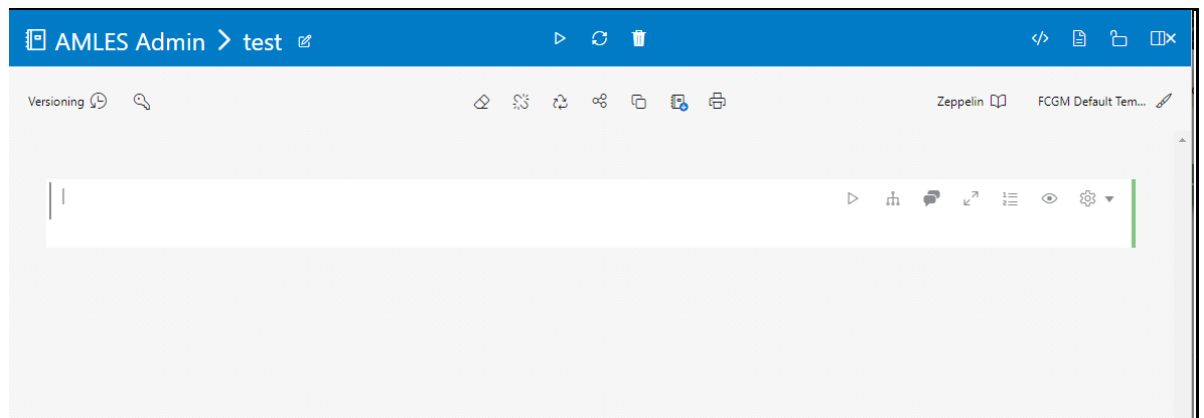
#### 4.4.2.1 Create Paragraphs in Model Studio Notebooks

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.

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


- Add empty Paragraph:  To create Model building scripts in Python.

**Figure 27: Create Draft Models in Model Studio Notebooks**



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


1. Open Model Studio in OFS MMG. Follow the instructions in the [Create Draft Models \(Draft\)](#) section to open it.


2. Click  in Model Studio to add a Paragraph in the Notebook and add the scripting instruction to fetch connection objects in the following format. This creates a cx\_oracle based connection object to the datadom of the infodom being passed:

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

**NOTE**


The fetch connection objects function works only with %Python interpreters and requires an Oracle client installed on the server that runs Model Studio.

Click  to run the script and display the Notebook ID and the Model Objective ID.

3. Click  in Model Studio to add a Paragraph in the Notebook and add in the following format to fetch current Notebook and Model Objective details:


- Notebook Id: **currentNotebookId**
- Model Objective: **objectiveld**

Click  to run the script and display the Notebook ID and the Model Objective ID.

4. Click  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  
print('threshold value is : ${[threshold]}')
```

Click  to run the script and display.

After the Draft Models are created, publish the Notebooks to create Scoring Models. See the [Publish Models \(Scoring\)](#) section for more information.

#### 4.4.2.2 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 MMG UI, the attach workspace call will be made from mmg service and proper workspace will get attached,

If the Studio is opened outside of mmg, 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:

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

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



Download

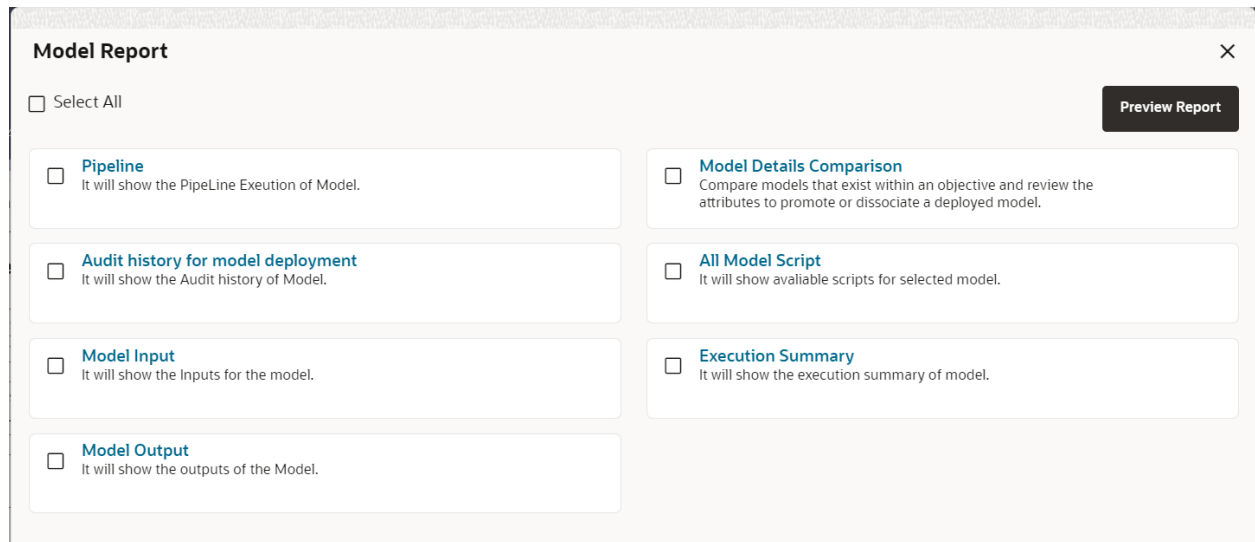
Delete

#### 4.4.2.2.1 Model Report

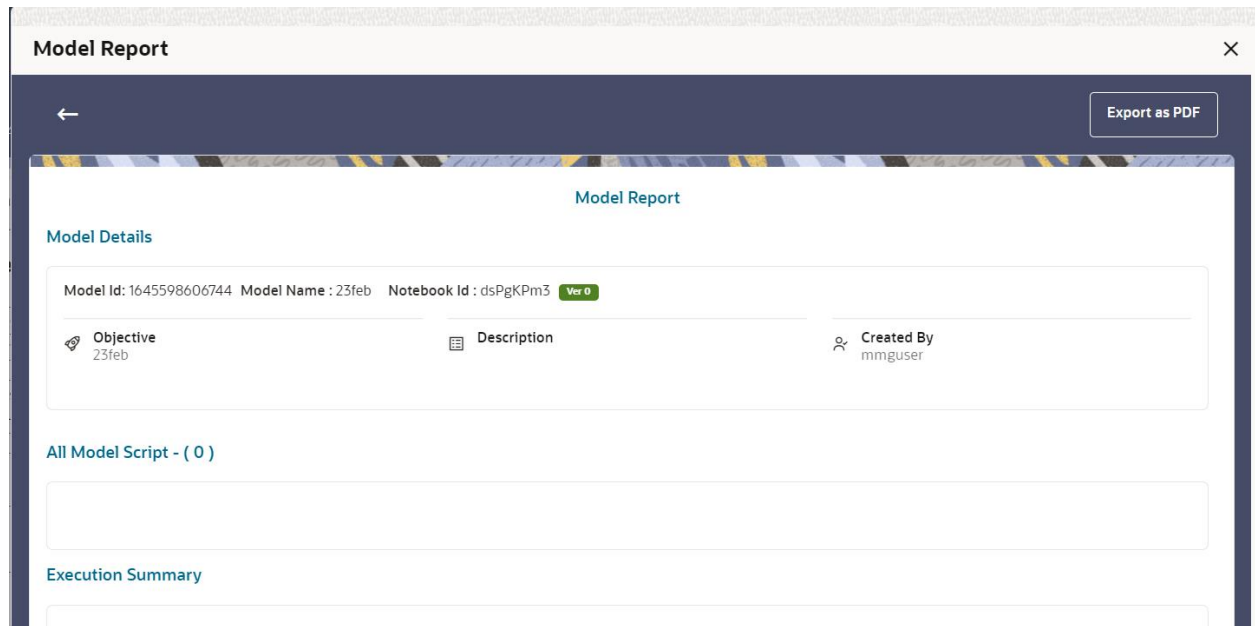
This option allows you to view the Model report and download the same in PDF format.

To view and download Report, follow these steps:

1. Open a Model in Pipeline Designer.
2. Click **Model Report**. The Model Report window is displayed.



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



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

#### 4.4.2.2.2 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.

#### 4.4.2.2.3 Delete

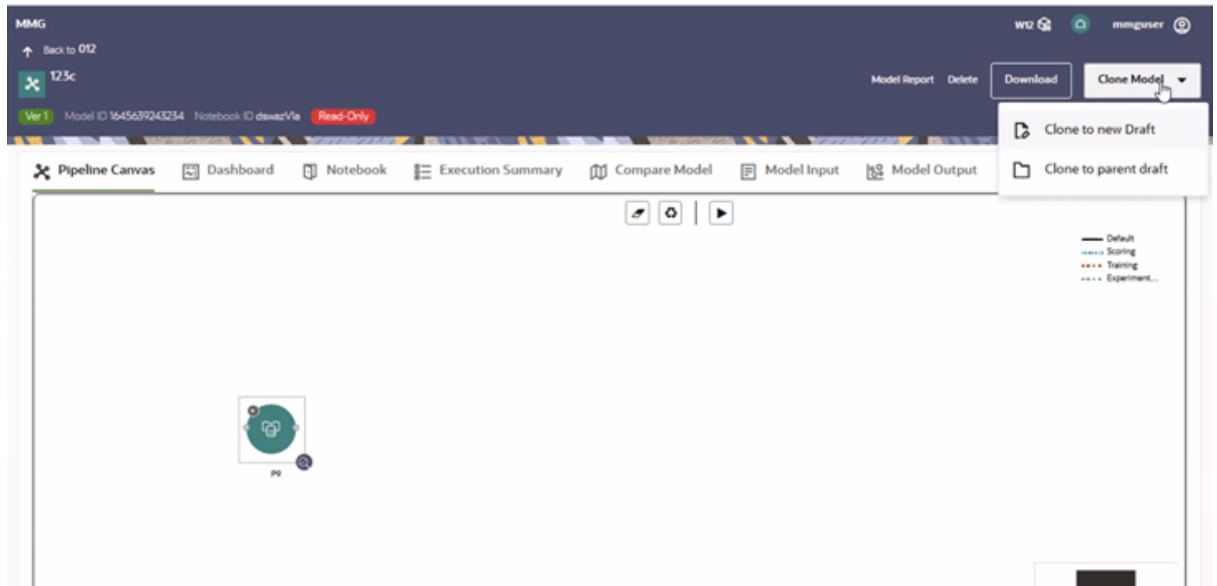
This option is used to delete the Model.

#### 4.4.2.2.4 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. Model Audit window also captures the clone information.

To clone the model details, follow these steps:

1. Open a Published Model in Pipeline Designer.



2. Select Clone to new Draft or Clone to Parent draft.

#### 4.4.2.2.5 Pipeline Designer

The following sections are available on the Pipeline Designer window:

- Pipeline Canvas
- Execution Summary
- Notebook
- Dashboard
- Compare Model
- Model Input
- Model Output

Note:

- a. Published models have the 'Dashboard' as the default tab.
- b. Drafts models have the 'Pipeline Canvas' as the default tab.

#### 4.4.2.2.6 Pipeline Canvas


You can perform following functions on Pipeline Canvas:

- Creating a Pipeline
- Creating Script Template

- Viewing a Pipeline
- Using Link Connector Nodes
- Execution of Pipeline

### Creating a Pipeline

To create a paragraph using pipeline, follow these steps:

1. Navigate to the **Pipeline Designer** page. For more information, see the Creating Draft Models section.
2. Drag and drop the Paragraph widget from the widgets pane in the upper-left corner of the designer pane.
3. Hover the mouse over the Paragraph widget and click  to add Basic Details.

**Figure 28: Pipeline Designer**



**Figure 29: Basic Details for Paragraph**

The image shows a dialog box titled "PARAGRAPH5950167" with a close button (X) in the top right corner. The dialog is divided into a "Basic Details" section and a bottom area with buttons. The "Basic Details" section contains the following fields:


- Activity Name \***: A text input field with an asterisk indicating it is required.
- Description**: A text input field.
- Task Type**: A dropdown menu currently showing "Default".
- Track Output**: A toggle switch currently in the "off" position.

At the bottom of the dialog, there are two buttons: "Cancel" and "Save".

4. Provide details as described in the following table:

| 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.   |

You can perform the following functions on Pipeline Canvas window:

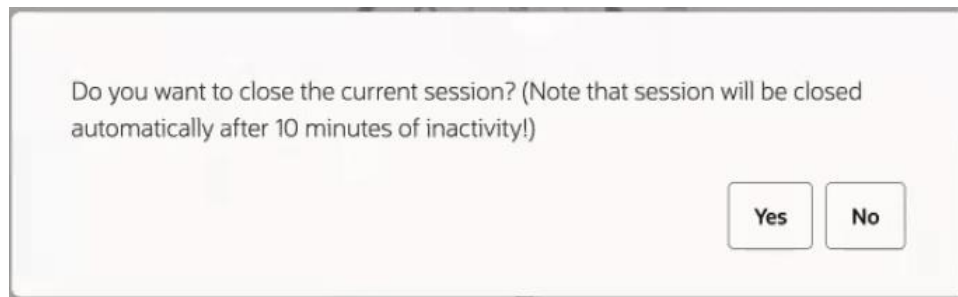
- Clear Execution Details: Clears the execution details.
- Re-initialize session: Allows you open a new session.
- Studio Notebook: Allows you to view the paragraphs in Studio application.
- Publish: Allows publishing the Notebook.
- Save: Allows saving the Notebook.
- Delete: Click to Delete  icon to 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.

- Download: Use Download to download the current working version in opened in canvas
- Execute: Allows to execute the Notebook. For more information, see Executing a Pipeline

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.







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.

User can configure these values in Application.xml file. For more information, see the MMG Installation Guide.

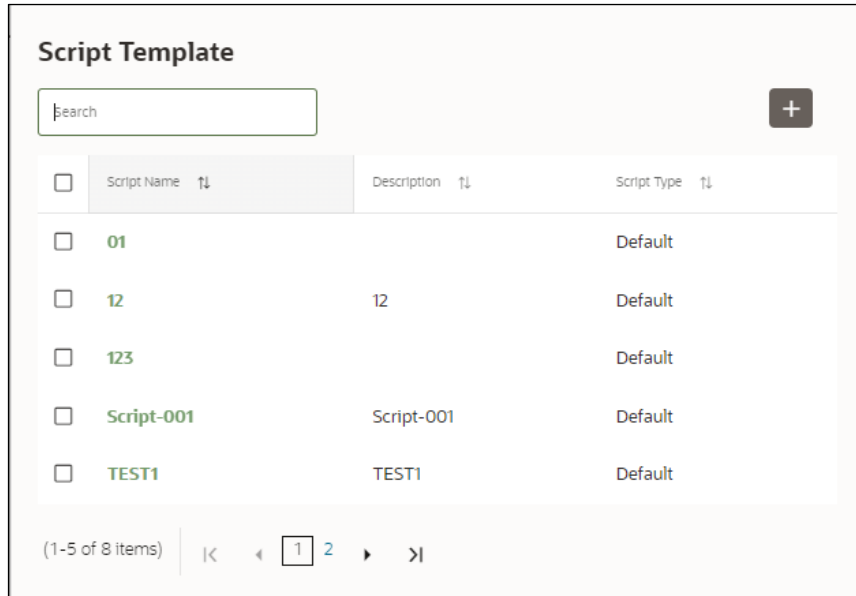
### Viewing a Pipeline

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.
- Hide/Show Overview : Shows or Hides the overview of widgets.
- Show Full Labels : Shows the full name of activity. By default, it shows only 14 characters of label name.

Creating Script

The Script Template window allows you to manage scripts. These scripts can be called for paragraph.



To add a script, follow these steps:

1. Click Tasks  to navigate to Script Template.
2. Click Add  in Script Template window.
3. Enter the following 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  |



The screenshot shows a form for configuring a script. It contains the following elements:

- Script Name \***: A text input field with the placeholder text "Script name should be unique" and a "Required" label to its right.
- Description**: A text input field with the placeholder text "Description".
- Task Type**: A dropdown menu with a downward arrow on the right side.
- Script Content**: A text area containing the code `%python print('Hello World')`.
- Buttons**: "Cancel" and "Save" buttons at the bottom right.

### Using Link Connector Nodes

You can use a dummy node that helps to service connecting functions. If a paragraph in studio got deleted, this type of widget will be placed instead of the paragraph widget in pipeline canvas Node name for deleted node 'Connector'. This helps if the links are not broken. You can drag and drop this node, but will not be associated with any paragraph. If required, you can delete it and provide name and description for it.

To use Link connector nodes, follow these steps:

1. Click Tasks  to navigate to Script Template.
2. Select Link Connector and click . This is a dummy node with no paragraph is created/associated on node save. During execution, this is used in to execute API, but will not get executed. It behaves like non-physicalised paragraph widget on execute. This node can be used as a dummy start node or connector node.

### 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 to view Execute Pipeline window.

**Figure 30: Execute Pipeline**

**Execute Pipeline**

Links

Training  Experimentation  Scoring

[Open from saved Scenario?](#)

**Execution Parameters**

Key: [ ] Value: [ ]

Default

[Save Scenario](#)

**System Parameters**

|                      |   |
|----------------------|---|
| Key: \$FICMISDATES\$ | Value: 2021-12-15                                 |
| Key: \$BATCHRUNID\$  | Value: Batch_auto_f7af850a-bcb6-4a10-be73-180291f |
| Key: \$TASKID\$      | Value: task1                                      |

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.

- **Scenario Creation:** Scenarios 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. Each scenario consists of parameters with a specific value to each parameters. 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 scenario and description which is not mandatory.

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

- **Importing Scenario:** These saved scenarios can be imported during the execution. It will replace the values of the parameters from the chosen scenario.

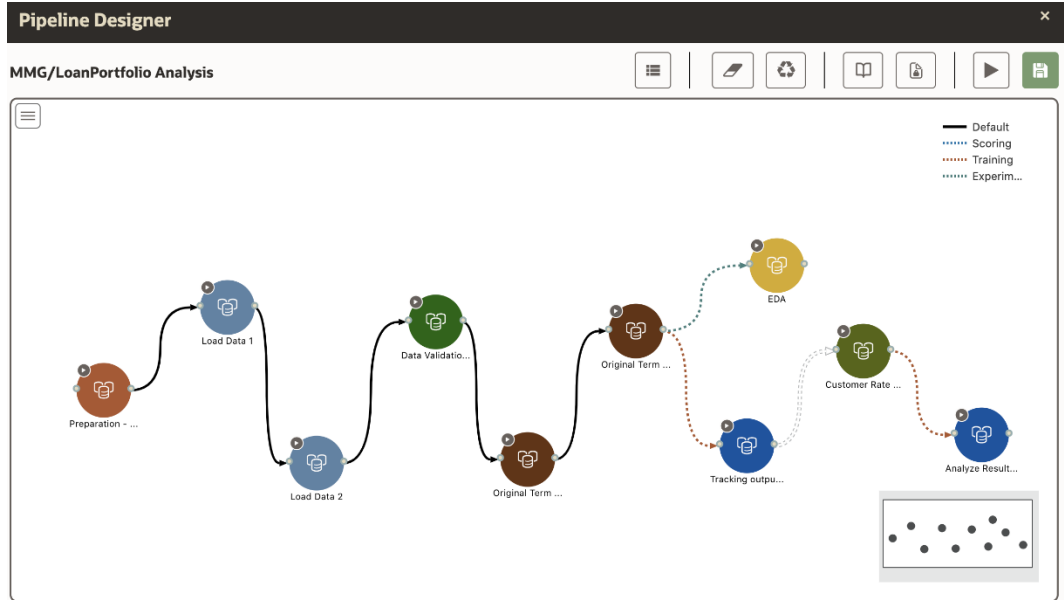
To import scenario, follow these steps:

- i. Click "Open from saved scenario". The Threshold Code window is displayed.
  - ii. Select the scenarios from the available threshold code. You can import multiple scenarios in the same execution instance. In that case, if there are any common keys, value will be replaced with that from the latest scenario imported.
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.

Example:

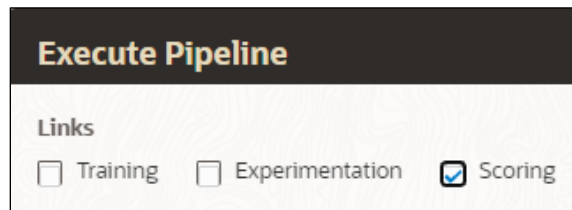
For example, refer to below Figure.

**Figure 31: Example of Pipeline Designer**



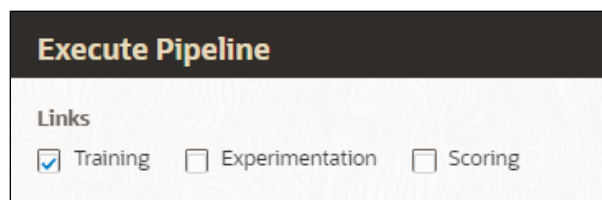
- Here, if you want to execute this Notebook for scoring purpose, then the flow will be executed till EDA paragraph with default paragraphs. To perform this, Click Execute Notebook and select Links as Scoring.

**Figure 32: Execute Pipeline**



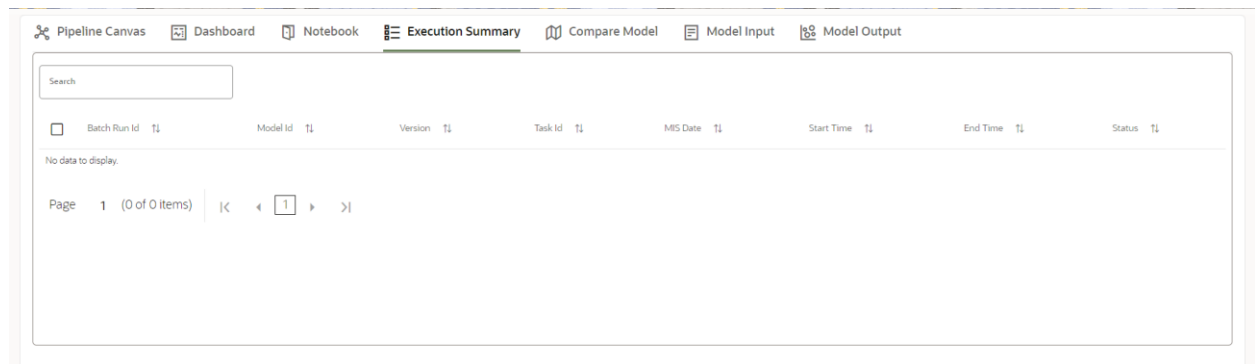
- Similarly, if you want to execute this Notebook for training purpose, then the flow will be executed till Analyze Result paragraph with default paragraphs. To perform this, Click Execute Notebook and select Links as Training.

**Figure 33: Execute Pipeline**



#### 4.4.2.7 Execution Summary


This section of Pipeline Designer shows the summary of executed pipelines.



#### Comparing Execution

The Compare option allows you to compare the two executions.

To compare, follow these steps:

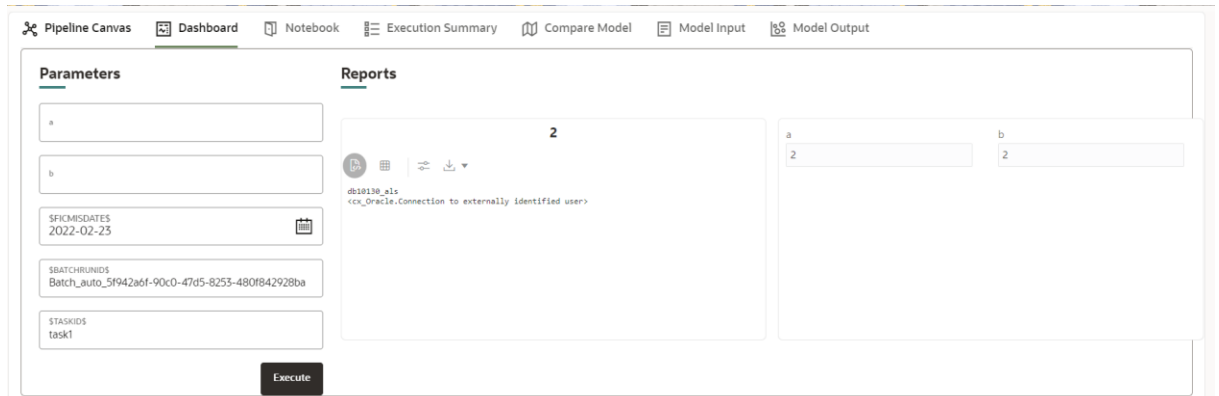
- 1 Navigate to Execution Summary window.
- 2 Select the executions using the corresponding check-boxes.
- 3 Click Compare . The Execution Comparison window is displayed.

#### 4.4.2.8 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 Published models, the 'Dashboard' is the default tab.



**NOTE**

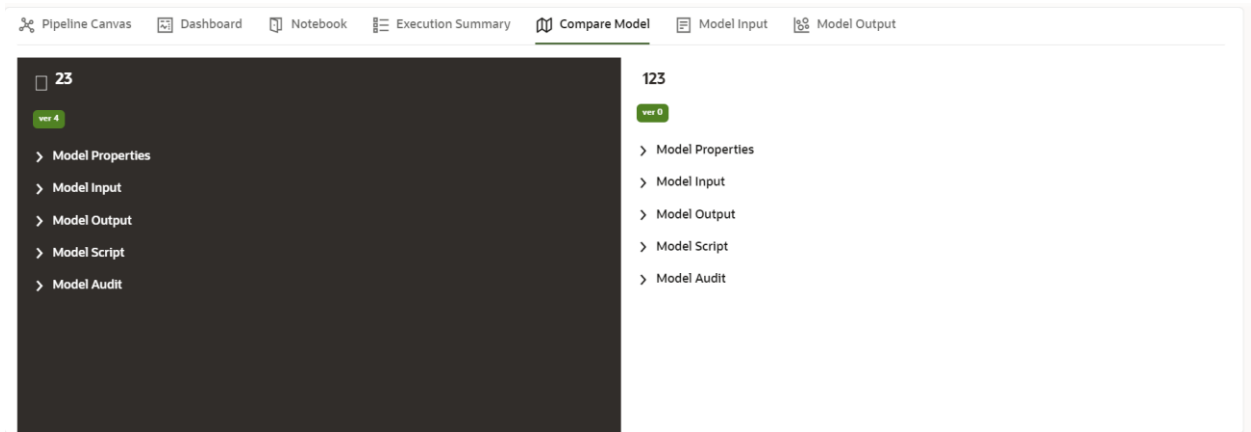
There is no **Cancel** button in Settings tab of reports in the Dashboard tab. You can press 'Escape' key to close the Settings.

#### 4.4.2.2.9 Compare Models

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

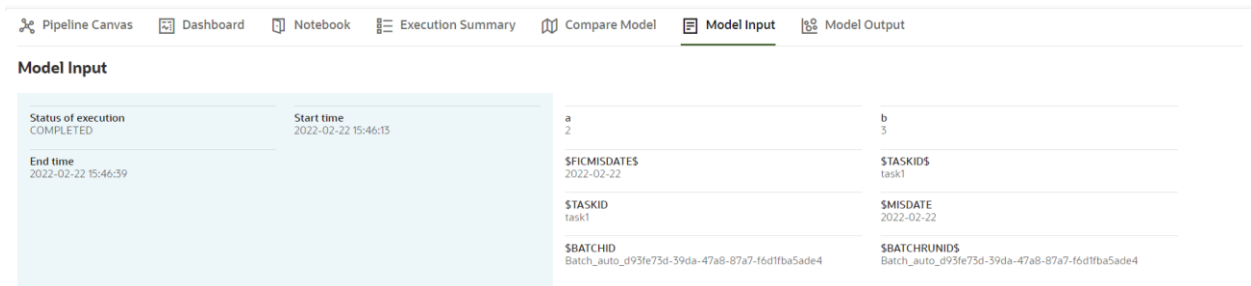
To compare, follow these steps:

- 1 Navigate to Pipeline Designer window.
- 2 Click Compare Model window. This shows the following comparison details:
  - Model Properties
  - Model Input
  - Model Output
  - Model Script
  - Model Audit



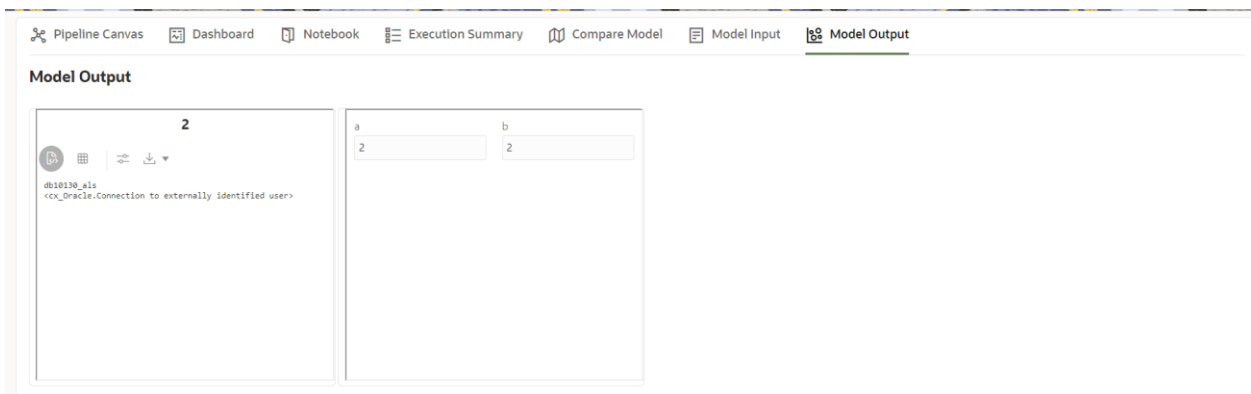
#### 4.4.2.2.10 Model Input

This section shows the input details those were given for Model execution.



#### 4.4.2.2.11 Model Output



This section shows the output details of model post execution.



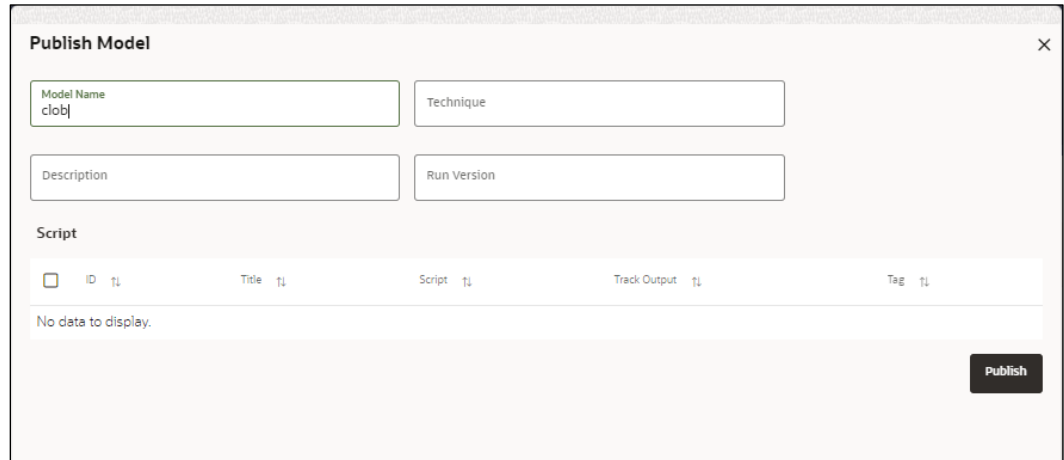
### 4.4.3 Publish Models (Scoring)

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.
2. Click  next to corresponding Draft Model and select Publish Data Studio  to open Open Model window.

**Figure 34: Publish Model**



3. Enter the details as shown in the following table.




| 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.<br>Track Output - Select this to track the output of the paragraph. |

4. Click **Publish**.

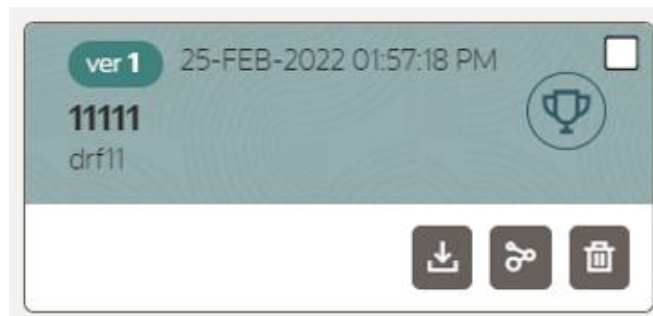
#### 4.4.4 View Model Details

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 **MMG Dashboard** window with application configuration and model creation menu.
2. Click **Advanced Model Management**  to display the **Model Management** 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 35: Mouse over the Model**



The icon actions are listed in the following:

- a.  Download Model Data. See the [Import a Workspace Model Data into a New Model](#) section for more details.
- b.  Open in Pipeline Designer. See the Create Paragraphs using Pipeline Designer section for more details.
- c.  Delete Model. See the [Delete Objectives and Models](#) section for more details.



## 4.4.5 Understand Model Governance

After [comparing models](#), you must understand the Model Governance system in OFS MMG. 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.

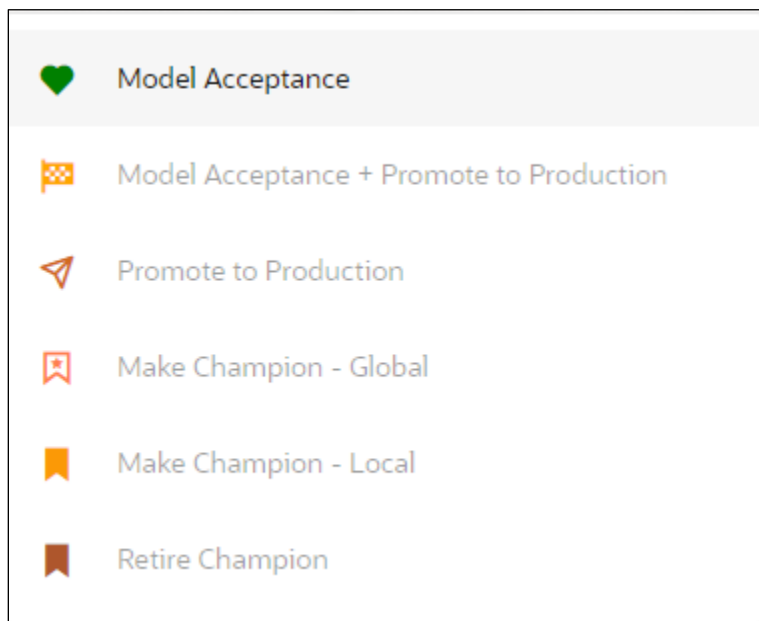
As discussed earlier, the users are of three types:

1. Requester
2. Reviewer
3. 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):

1. Model Acceptance
2. Model Acceptance + Promote to Production
3. Promote to Production
4. Make - Champion - Global
5. Make - Champion - Local
6. Retire Champions

Figure 36: 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.

## 4.4.6 Request Model Acceptance

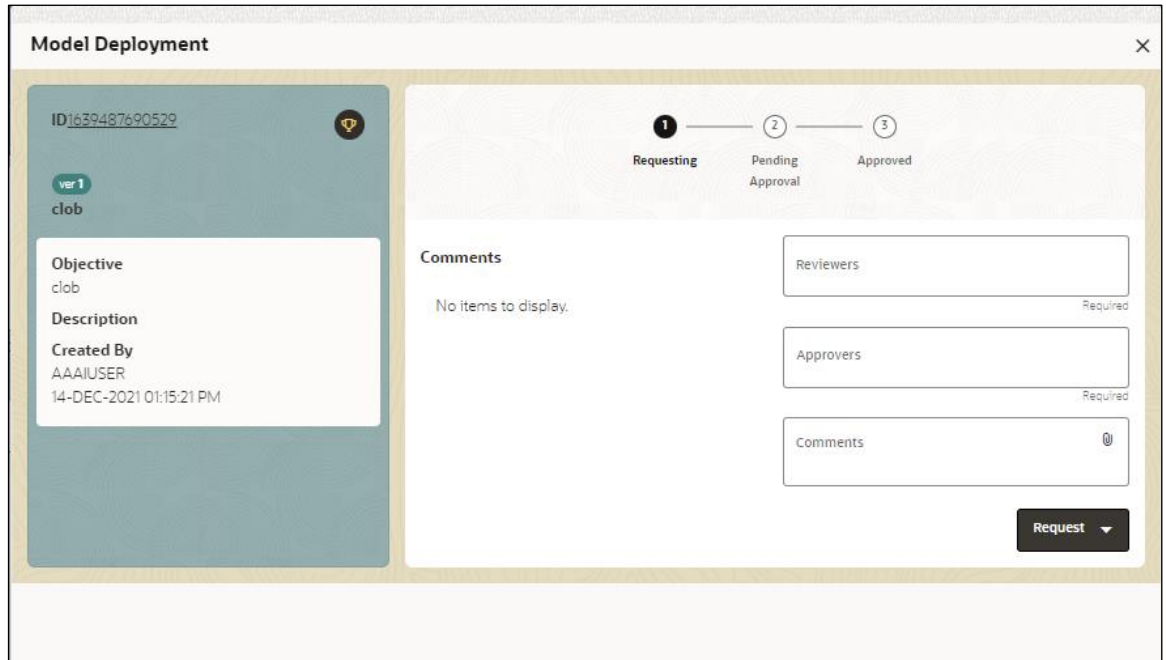
After comparing models, move the selected models to acceptance. Only a user with either Requester or Reviewer roles can request for model acceptance. The model moved to acceptance is then available to users with the Approver role, who can promote to production. See the [Understand Model Governance](#) section before you start here.


To request a model to promote to production, follow these steps:

1. Click **Advanced Model Management**  to display the **Model Management** window. 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.

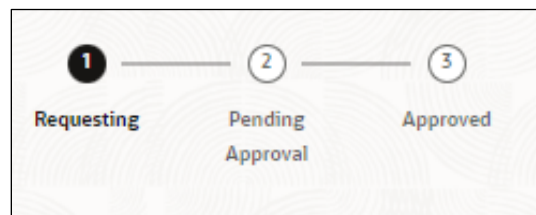
- To make a model a champion from this window, place the mouse in the selected model columns. and click  to display the **Model Details** window. If a model is a champion model, the  icon is displayed.

**Figure 37: Model Details Window**



- Select the reviewer group from the **Reviewers** drop-down list.
- Select the Approver group from the **Approvers** drop-down list.
- Enter comments in **Comments** and click  to attach files supporting the comments.
- 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 38: 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.

#### 4.4.7 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 **MMG Dashboard** window with application configuration and model creation menu.
2. Click **Advanced Model Management**  to display the **Model Management** window. 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.

#### 4.4.8 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.

To approve or reject models, follow these steps:





1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **MMG Dashboard** window with application configuration and model creation menu.
2. Click **Advanced Model Management**  to display the **Model Management** window. 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.

### 4.4.9 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 **MMG Dashboard** window with application configuration and model creation menu.
2. Click **Advanced Model Management**  to display the **Model Management** window. 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.

## 4.5 Execute 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](#).

### 4.5.1 Defining a Task

MMG supports following three Components during the Task creation:

- Model
- Populate Workspace
- Custom

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.

## 4.5.2 When Component is Model

The following window shows the Task Parameters for Model Component.

**Figure 39: Task Parameters**

| Task Parameters |                       |        |                               |
|-----------------|-----------------------|--------|-------------------------------|
| Parameter       | \$BATCHDATES          | Value  | Batch Date                    |
| Parameter       | \$BATCHRUNID\$        | Value  | BATCHRUNID                    |
| Parameter       | Objective             | Value* | Click to select param va... ▼ |
| Parameter       | Model                 | Value* | Click to select param va... ▼ |
| Parameter       | Link types            | Value  | Click to select param value ▼ |
| Parameter       | Synchronous Execution | Value  | Click to select param value ▼ |
| Parameter       | 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

### 4.5.3 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 [Populating Workspace](#) section.



| Parameter                | Value                |                                     |
|--------------------------|----------------------|-------------------------------------|
| \$BATCHDATES             | Batch Date           | <input checked="" type="checkbox"/> |
| \$BATCHRUNID\$           | BATCHRUNID           | <input checked="" type="checkbox"/> |
| Global Filter            | <input type="text"/> | <input checked="" type="checkbox"/> |
| Table Filters            | <input type="text"/> | <input checked="" type="checkbox"/> |
| Additional Parameters    | <input type="text"/> | <input checked="" type="checkbox"/> |
| <b>Header Parameters</b> |                      |                                     |
| user                     | aaaiuser             | <input checked="" type="checkbox"/> |

## 4.6 Import a Workspace Model Data into a New Model

The model data from existing models in OFS MMG in .dmp format and the existing model data in MMG 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:





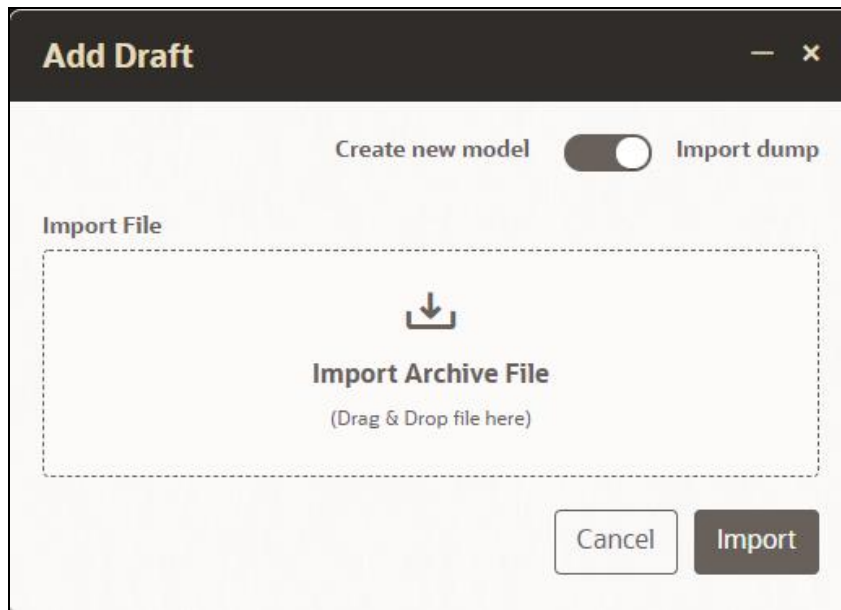
1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **MMG Dashboard** window with application configuration and model creation menu.
2. Click **Advanced Model Management**  to display the **Model Management** window. The window displays folders that contain 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 40: 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**. A new model is created by importing the model data dump of another model.

## 4.7 Use View Models

The View Models feature launches the OFS MMG Data 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 **MMG Dashboard** window with application configuration and model creation menu.
2. Click **Advanced Model Management**  to display the **Model Management** window. 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 in Pipeline Designer](#) sections for details on how to use the OFS MMG Data Studio.






## 4.8 Edit Models

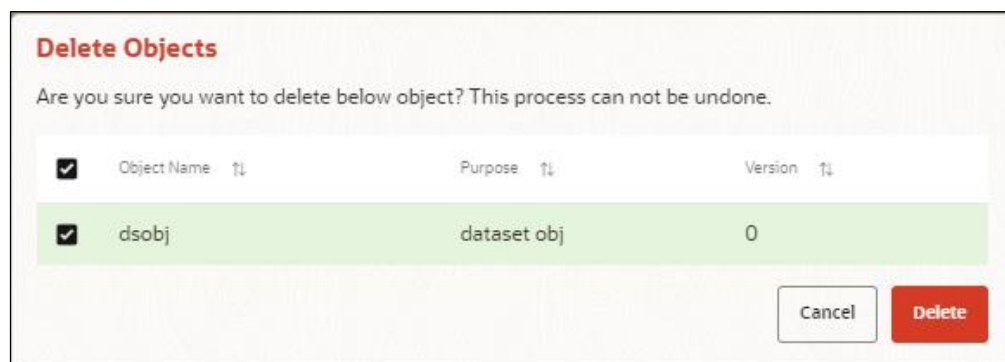
The editing of models created versions that are different from the previously saved model and the cycle of [Model Governance](#) applies to any edited model. You can edit models from the OFS MMG Data Studio window using Python scripting language.

You can edit the script of version 0 only even in Pipeline Designer and Studio. It is not possible in other versions.

## 4.9 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 **MMG Dashboard** window with application configuration and model creation menu.
2. Click **Advanced Model Management**  to display the **Model Management** window. 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.



## 5 Dataset

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 other 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.

### 5.1 Accessing the Dataset Summary Page

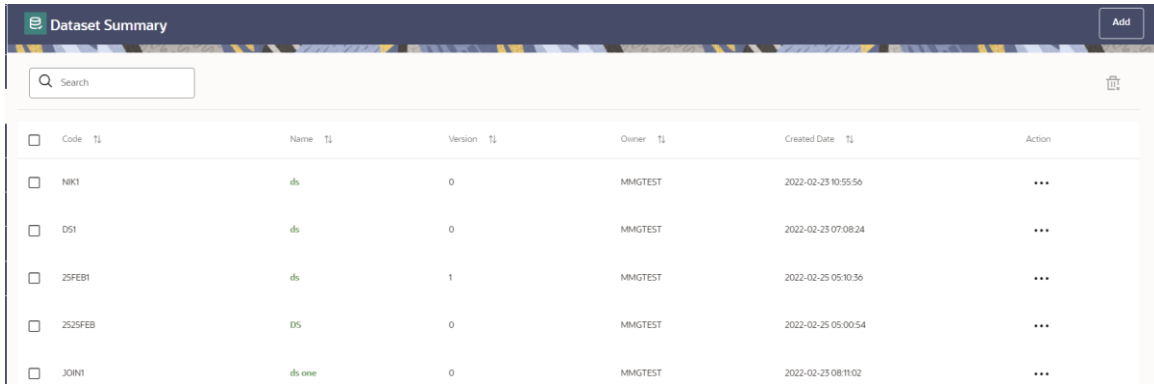
The Dataset Summary page gives access to the various Dataset functions such as create, view, and delete.

**NOTE** Users Groups must be mapped to the SBADMIN role to access the Sandbox Summary page.

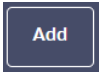


To access the Dataset Summary page, follow these steps:

1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **MMG Dashboard** window with application configuration and model creation menu.
2. Click Dataset  to display the **Dataset Management** window. This window displays the dataset records in a table.

**Figure 41: Dataset Summary Page**



The following table provides descriptions for the fields and icons on the **Dataset Summary** page.

| Field or Icon  | Description  |
|--|--|
| Search   | The field to search for Dataset.<br>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     | Click Add to create a new Dataset. See the <a href="#">Create a Dataset</a> section for more information.  |
| Delete  | Click Delete to delete multiple Datasets.  |
| Action  | Click the three dots to perform View/Edit/Delete functions on selected dataset.  |

## 5.2 Create a Dataset

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

### 5.2.1 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. Select **Add** to create a Dataset in the Dataset **Summary** window.

**Figure 42: Dataset Creation Window**

The screenshot shows a multi-step process for creating a dataset. A progress bar at the top indicates five steps: 1. Define Pipeline Characteristics, 2. Source Selection, 3. Dataset Creation, 4. Dataset Transformation, and 5. Summary. Step 1 is currently active. Below the progress bar, there are three input fields: 'Code' (with a 'Required' label), 'Dataset Name' (with a 'Required' label), and 'Description'.

The following steps show the various phases from Dataset creation:

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

## 5.2.2 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 following table.

| 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.          |

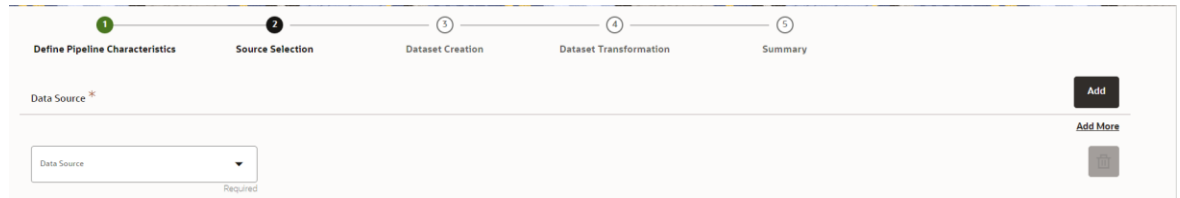
2. Click Next  to go to the next step.


### 5.2.3 Source Selection


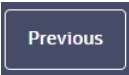
This section allows you to define the source of data. Here, You can choose the data structures from an existing datasources.

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 following table.



| Field       | Description  |
|-------------|--|
| Data Source | <p>The Data Source drop-down list shows all the data sources and the data dorms 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> <div data-bbox="561 1003 1466 1329" style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p><b>Unused Dataset Confirmation</b></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> <p>Here, either use the unused or create a new datasource using <a href="#">Add</a> . When you create a new datasource, it becomes as unused.</p> <p>For more information, see <a href="#">Creating Data Source</a>.</p> <p>You can add more Data Sources using Add More <a href="#">Add More</a> link.</p> <p>Use Delete  to delete added Data Source.</p> |

- Click **Next**  to go to the next step or click **Previous**  to back to previous step.

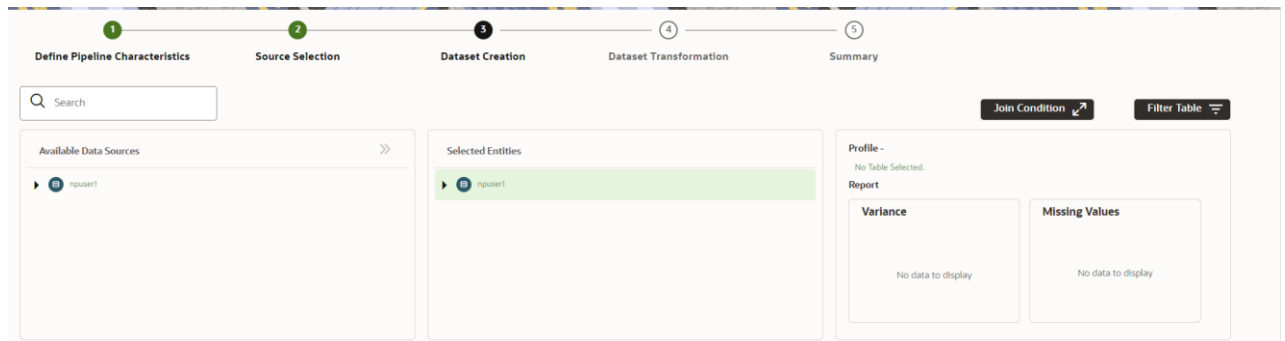
## 5.2.4 Dataset Creation

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.


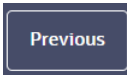
To configure the DatasetCreation, follow these steps:

- 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.

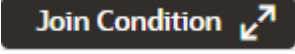


- For more information on Joins, see the Joining Conditions. For more information on Filtering, see the Filtering Table.

- Click **Next**  to go to the next step or click **Previous**  to back to previous step.

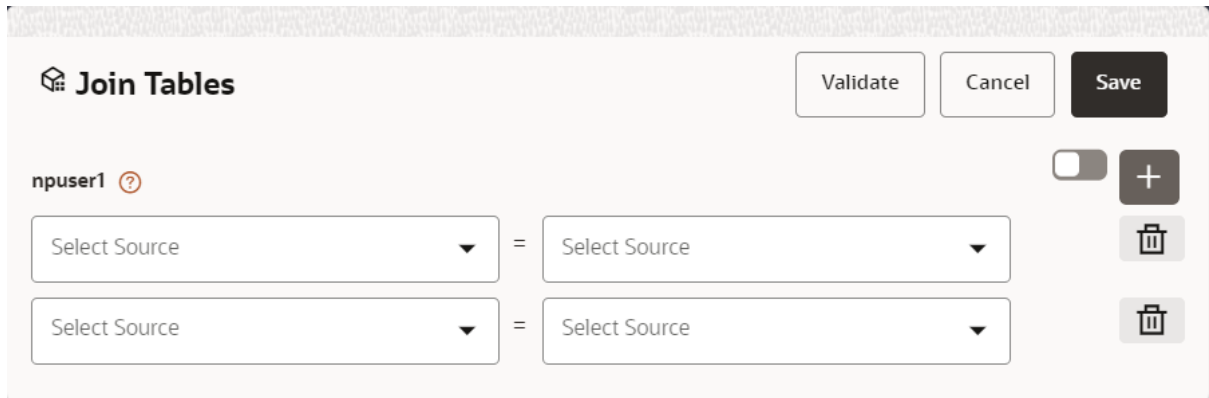
### 5.2.4.1 Joining Tables

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

Click **Join Condition**  to navigate to Join Condition window.

Note: As of now, only INNER JOIN is present.





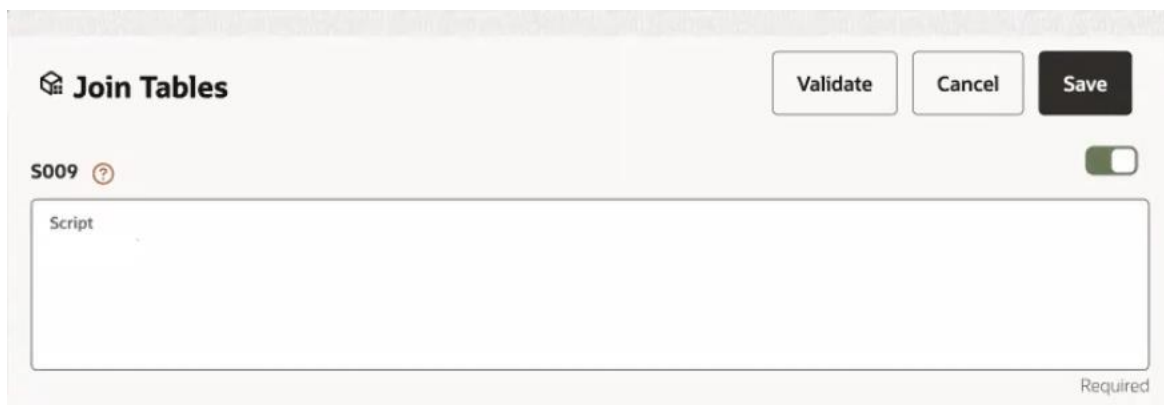
You can join Tables either using drop-down or using the Script.

#### 5.2.4.1.1 Using drop-down

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

#### 5.2.4.1.2 Using Script

To use script, click . The Join Tables window is displayed to add scripts:



You must provide the script in below format:

```
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
```

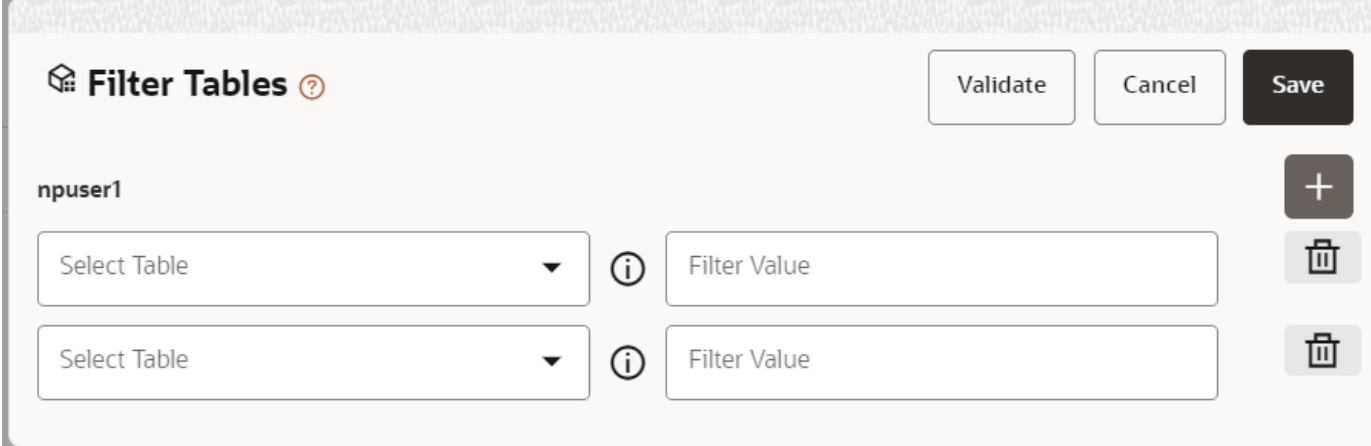
Click Validate to check the Join conditions.

Click Save.

### 5.2.4.2 Filtering Tables

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

Click Filter Table  to navigate to Filter Tables window.



There are certain rules to be kept in mind when adding filters

- I. Filter values will not be applied in tables from datasources joined using joinscript.
- II. Only one filter value entry is allowed for one table. If multiple entries are present, the last filter value entry will be used for that table.
- III. Example : Filter Value : *Column1=1234 AND Column2='US'*  
*SELECT \* FROM tablename WHERE Column1=1234 AND Column2='US'.*

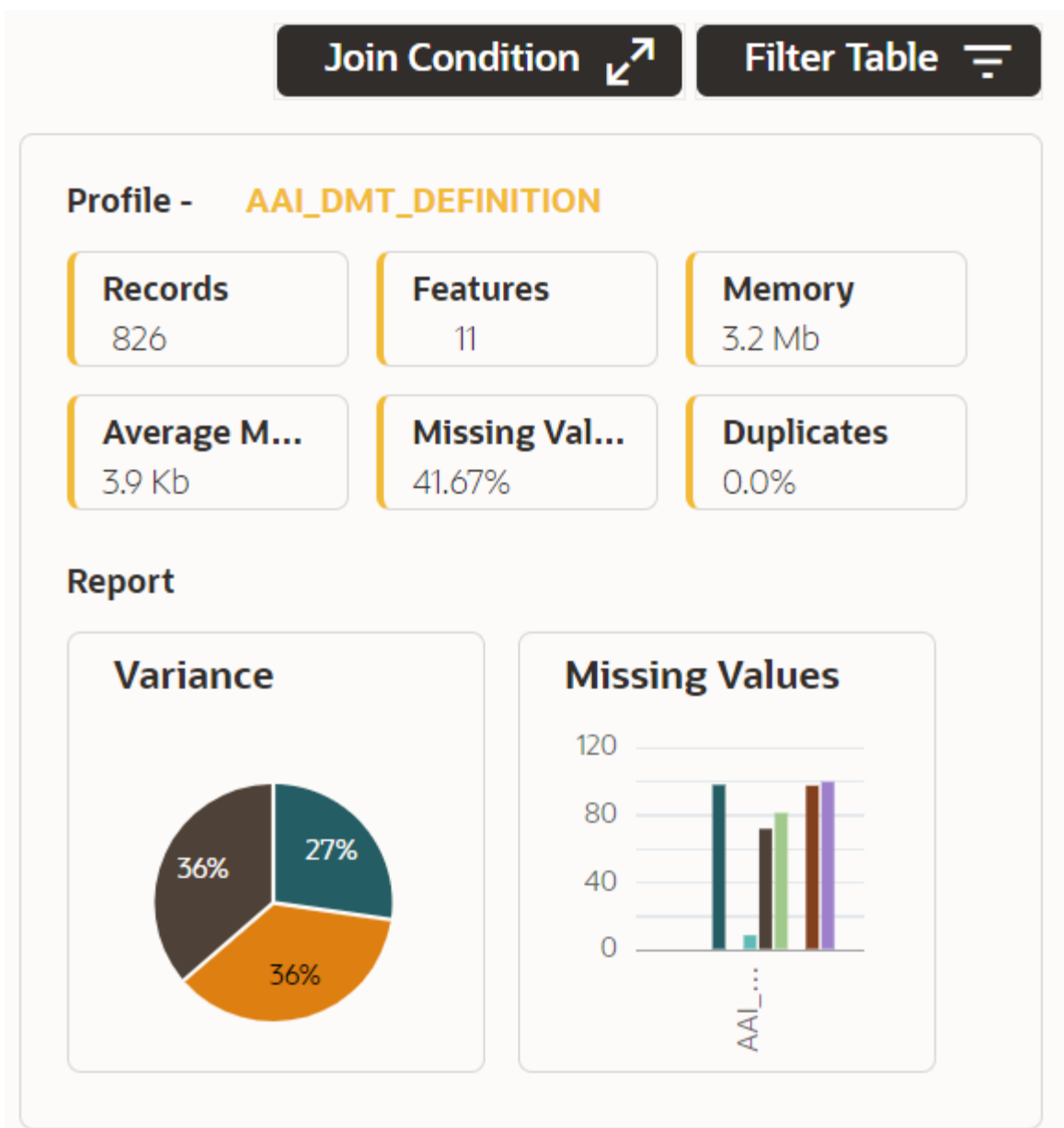
Multiple filters can be added by using the + symbol.

Click Validate to check the Filter conditions.

Click Save.

### 5.2.4.3 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 and you must fix these missing values before using the selected table. You can perform three types of data transformations to correct PCA, Scaling, and Missing Values.



### 5.2.5 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.

The screenshot shows a workflow for creating a dataset. The progress bar indicates the current step is 'Dataset Transformation'. Below the progress bar, there is a search bar and several action buttons: 'Create Feature', 'View Report', 'Transformation', and 'Add'. A table below these buttons lists columns with their physical and feature names. The table has three columns: 'Physical Name', 'Feature Name', and 'Observations'. The 'Observations' column shows the number of observations for each feature, along with status tags like 'low variance' and 'missing values'.

| Physical Name                                    | Feature Name    | Observations                |
|--|-----------------|-----------------------------|
| npuser1<br>AAL_DMT_DEFINITION<br>V_DEFINITION_ID | V_DEFINITION_ID |                             |
| npuser1<br>AAL_DMT_DEFINITION<br>V_INFODOM       | V_INFODOM       | low variance                |
| npuser1<br>AAL_DMT_DEFINITION<br>V_SOURCE_CODE   | V_SOURCE_CODE   |                             |
| npuser1<br>AAL_DMT_DEFINITION<br>V_DATASET_CODE  | V_DATASET_CODE  | low variance missing values |

This window shows the following columns:

- **Physical Name:** Shows the Physical Name of column.
- **Feature Name.** Shows the Physical Name of column. You can edit the Logical 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:** To create a new feature/column by doing operations on the existing features.
- **View Report-** To view the complete report of the sampled data
- **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

### 5.2.5.1 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.

## Create New Feature

Validate

Cancel

Add

### Physical Name

Datasource

CUSTOM\_DATASOURCE

Entity

CUSTOM\_ENTITY

Physical Feature Name

Required

### Feature Name

Feature Name

Required

### Script ?

df\_prev['featureName1']+df\_prev['featureName2']

Required

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.

You can also edit or delete a newly added feature.

### 5.2.5.2 Add Data Transformation

To add the data transformation, follow these steps:

1. Click Add. The Transform window is displayed.

Type  
Dataframe Transform

- Dataframe Transform
- Feature Transform
- Add Feature

Cancel Validate Template Add

## Transformation

Type  
Feature Transform ▼

Select Transform  
Custom Transform ▼

- Custom Transform
- Duplicates Removal
- Impute Missing Data
- Outlier Removal
- Encode Categorical Features
- Encode Datetime Features
- Encode Cyclical Features
- Dimensionality Reduction
- Feature Scaling
- Filter Features

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.
3. Select the 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

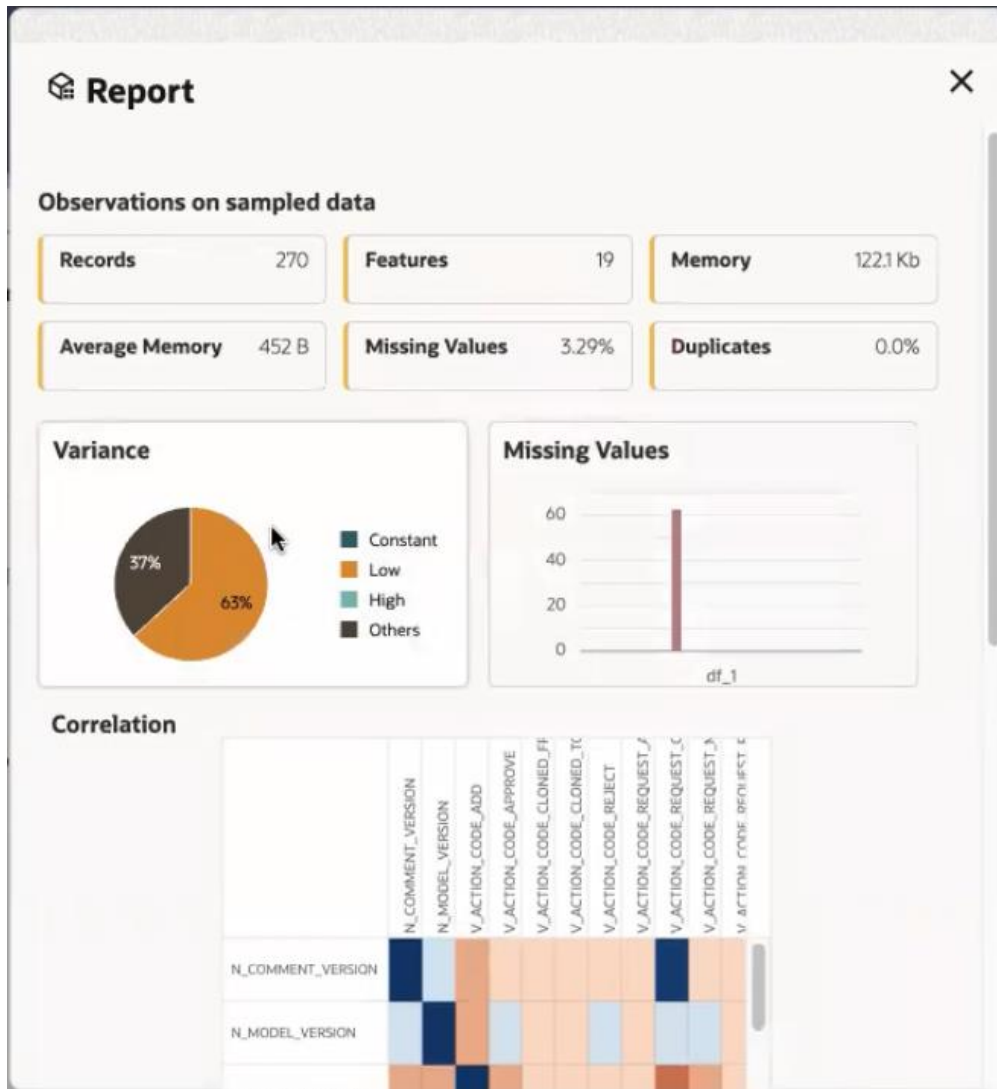
Enter the script

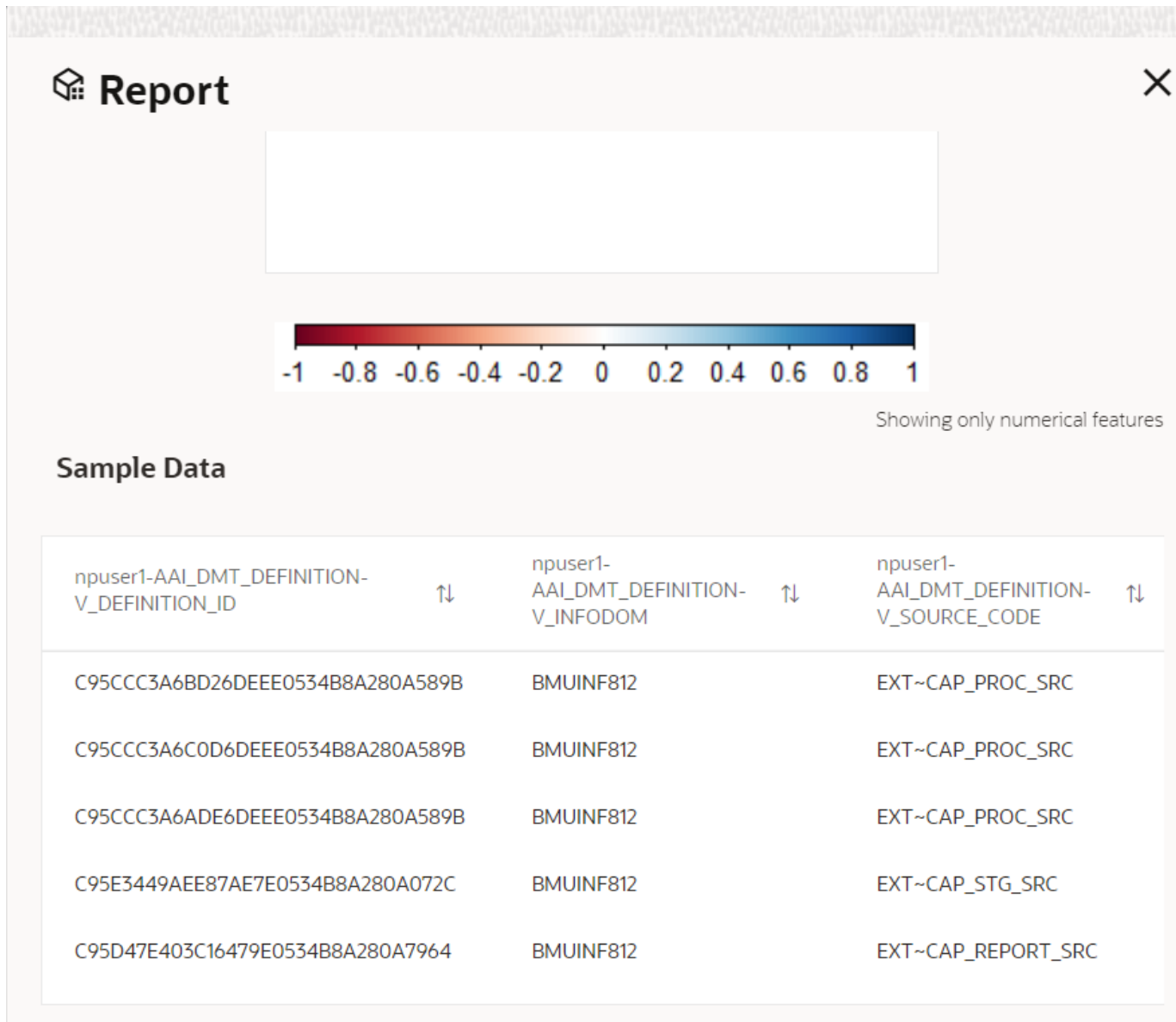
Below are Sample Custom Scripts

- 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)`

### 5.2.5.3 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.





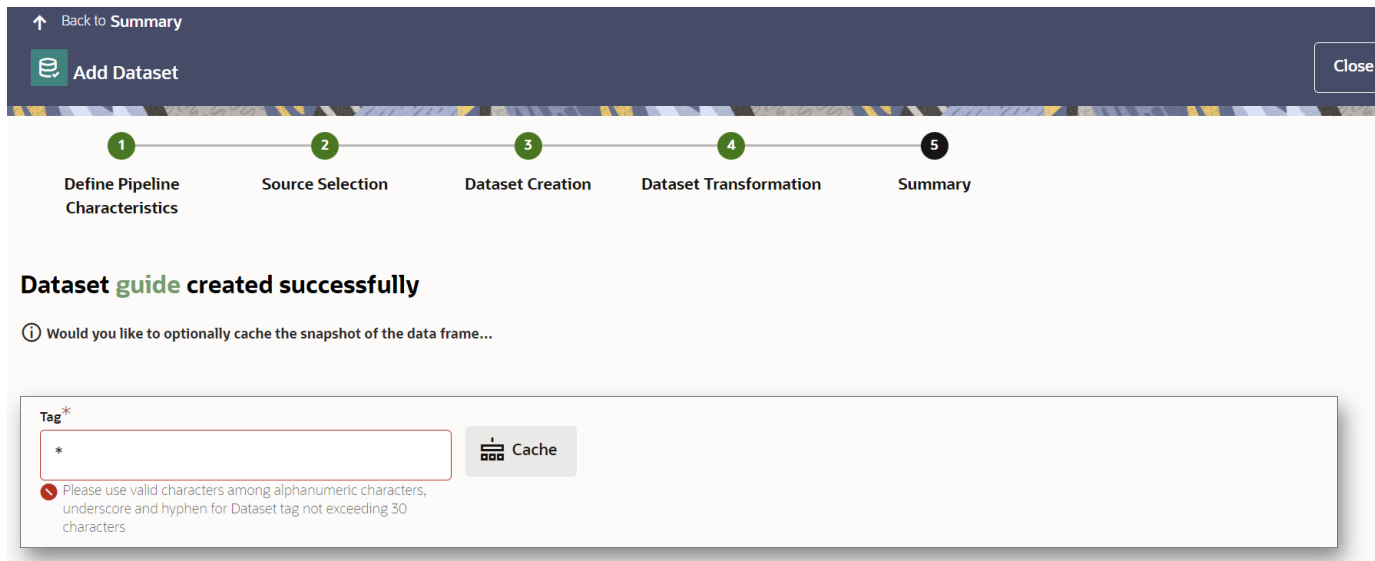
### 5.2.5.4 Re-ordering of Transformations

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.

### 5.2.6 Display Summary

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

Figure 43: Dataset Creation Summary



A confirmation message is displayed as “Dataset #DATASETNAME# is created successfully.”

Enter the cache (tag) name having alphanumeric char, underscore and hyphen not exceeding 30 characters and click on Cache.

## 5.3 Caching the Data



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.

**NOTE** Unset the https/http proxy details before starting the services or add the relevant entries in no\_proxy with mmg hosted server details.

## 5.4 View a Dataset



To edit a Dataset, follow these steps:

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

## 5.5 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.

## 5.6 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 .

## 5.7 Dataset Transformation Backend Details

### 5.7.1 Creating Dataset Metadata

Metadata for creating a dataset can be defined from UI. A new link has been created for this in the LHS panel.

### 5.7.2 Caching Dataset

- 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.

### 5.7.3 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

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

### 5.7.4 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

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

### 5.7.5 Listing all Datasets with Metadata saved from UI

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

### 5.7.6 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.

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

### 5.7.7 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.

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

### 5.7.8 Fetching Data Frame Cached from Notebook

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

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

### 5.7.9 List Tags of all Data frames Cached from Notebook

| API   | Notebook Script   | Notes/Input |
|---|---|-------------|
| List Tags of<br>Manually Cached<br>Datasets | <pre>from mmg.datasets import list_tags list_tags()</pre> |             |

## 5.7.10 Sample Custom Scripts

Below are few sample scripts which the users can refer to create transformations.

| No | Function                                 | Script  | Comments               |
|----|--|---|------------------------|
| 1. | Directly pass input data frame to output | df_out=df_prev  |                        |
| 2. | Drop first row of data frame             | df_out=df_prev.drop(0,axis=0) if not df_prev.empty else df_prev |                        |
| 3. | Drop column from data frame              | df_out= df_prev.drop('colname',axis=1)                          | FEATURE TRANSFORMATION |

## 5.7.11 Transformations

These are the various transformations which can be done from the UI.

| 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.<br>Physical Feature Name and Feature Name are the names of the new feature.<br>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.<br>'fmax ' denotes the maximum possible value of the cyclical feature data.  |
| 5.  | Impute Missing Data         | This function imputes missing data within a feature.<br>For numerical features, there are 4 methods for imputing missing data.<br>simple - imputes with mean, median, most_frequent values based on chosen arg value using the SimpleImputer in sklearn.<br>const - fills the missing values with the value given in the arg<br>knn - imputes using the KNNImputer in sklearn with k value given in arg<br>mice - imputes using the IterativeImputer in sklearn<br>For non-numerical data, missing values can be imputed using the 'const' method by replacing all missing values with the value given in arg |



| 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.<br>The number of output features can be specified using dim field.<br>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.<br>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<br>Operations allowed : >,>=,!=,<,<=,isin<br>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   |

## 6 Model Audit

At any time, you can audit the models from the Model Audit window. The Model Audit 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:



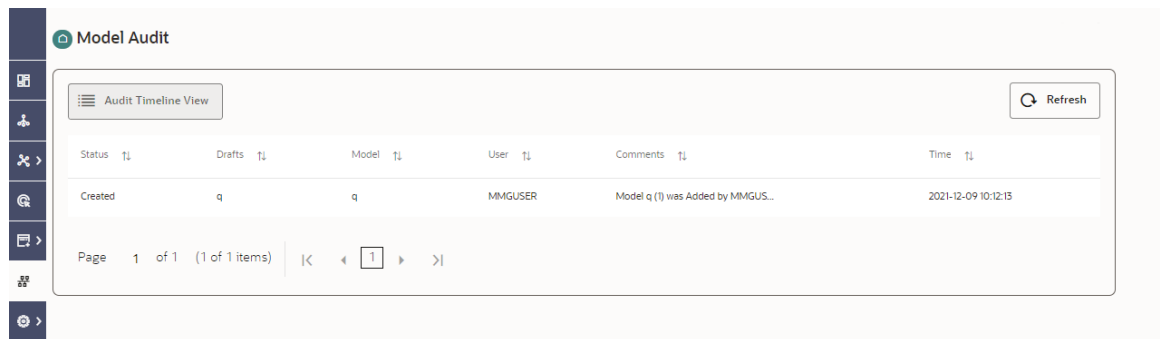
1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **MMG Dashboard** window with application configuration and model creation menu.
2. Click **Model Audit**  to view the time of the various actions performed on the model in the **Model Audit** window.

Figure 44: Model Audit Window



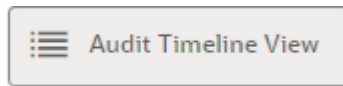
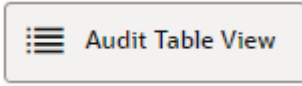
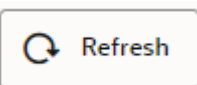
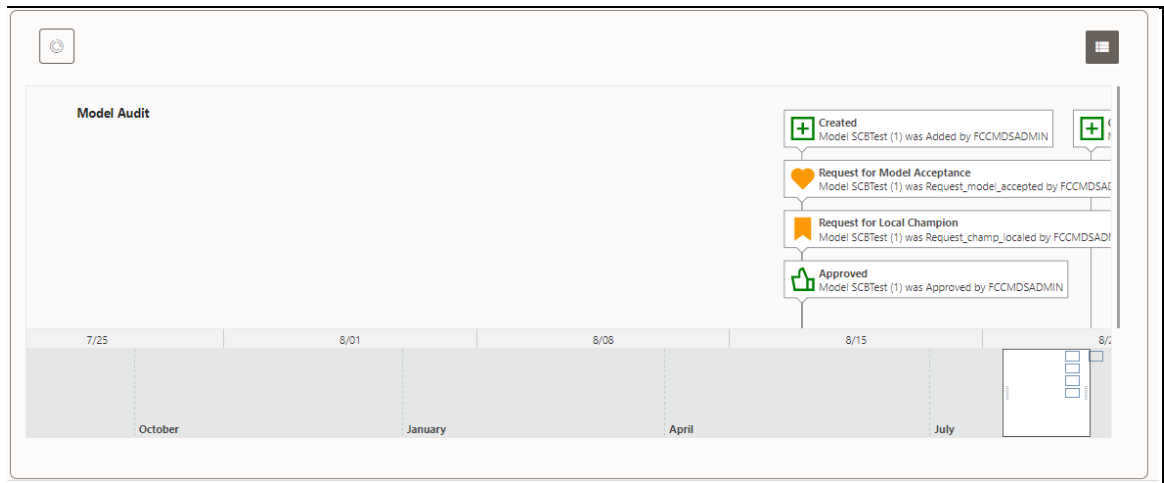
3. Click  for Timeline View. Click  to switch to the regular view. Click  to refresh the Model Audit window.



Figure 45: Model Audit Window Timeline View with Horizontal Time Axis

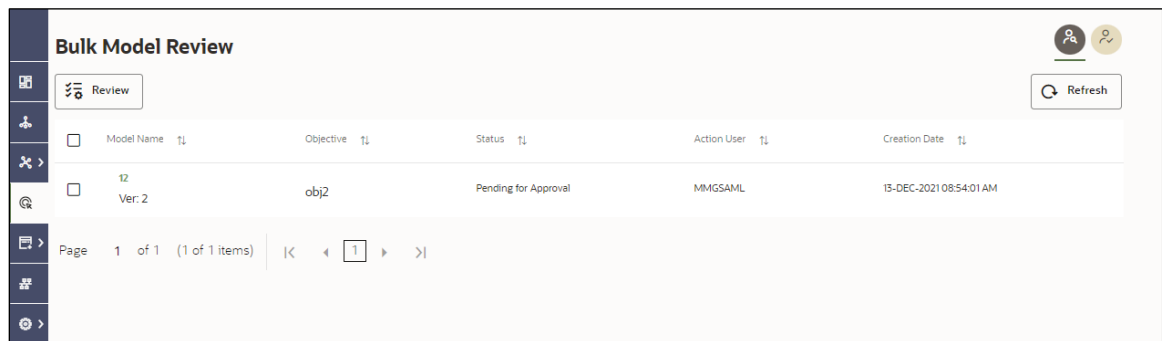


## 7 Model Actions

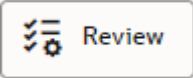
The Model Actions window allows you to view the list of models associated with the workspace.

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 model 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.

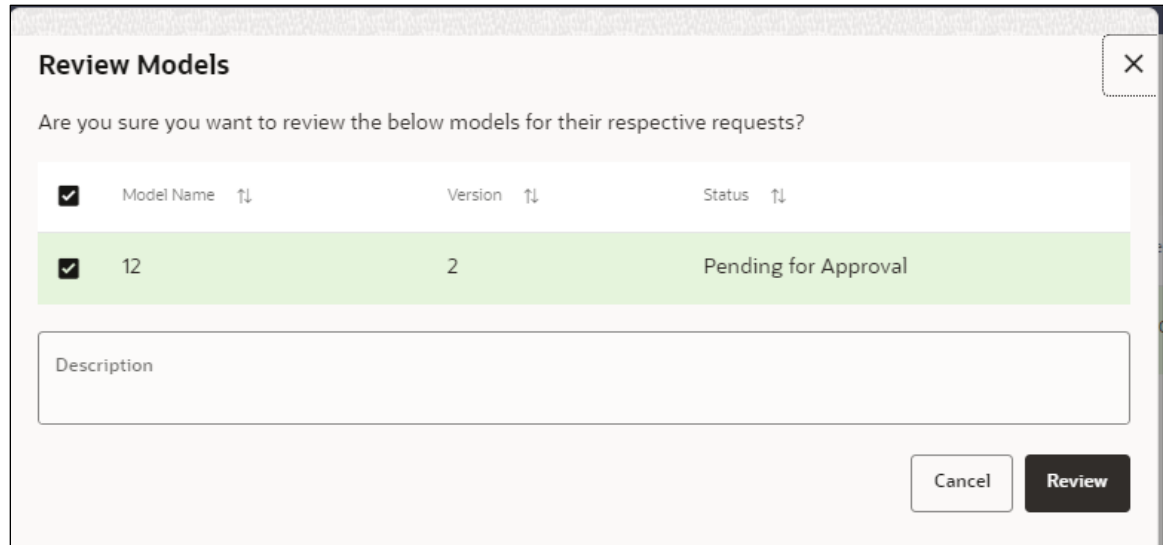
1. Click **Launch Workspace**  next to corresponding Workspace to Launch Workspace to display the **MMG Dashboard** window with application configuration and model creation menu.
2. Click **Model Actions**  to view the list Models pending for action. For a Reviewer, sample Model Review window is showing below:



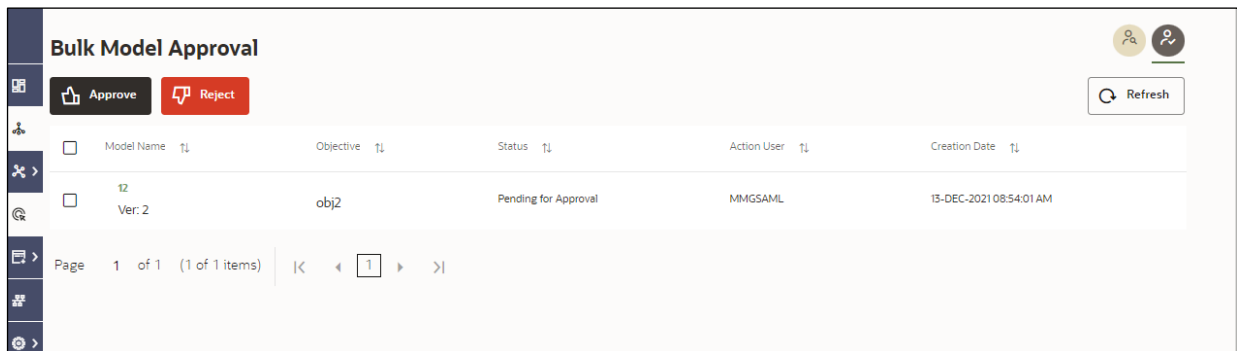
3. To review the model, follow these steps:

- 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 46: Review Models window**



4. For an Approver, sample Model Approve window is showing below:



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.

### Approve Models ✕

Are you sure you want to approve the below models for their respective requests?

| <input checked="" type="checkbox"/> | Model Name <span>↑↓</span> | Version <span>↑↓</span> | Status <span>↑↓</span> |
|-------------------------------------|----------------------------|-------------------------|------------------------|
| <input checked="" type="checkbox"/> | 12                         | 2                       | Pending for Approval   |

Description

Figure 47: Approve Models window

Approve Models ✕

Are you sure you want to approve the below models for their respective requests?

| <input checked="" type="checkbox"/> | Model Name | Version | Status               |
|-------------------------------------|------------|---------|----------------------|
| <input checked="" type="checkbox"/> | new        | 1       | Pending for Approval |

Comments \*

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- Are the examples correct? Do you need more examples?
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