Realize your vision

Samsung SDS Brightics Cloud v1.5 User Manual

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SAMSUNG SDS

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Before Use

This user manual contains information on the use and management of Brightics 3.0 Suite Visual Analytics.

Purpose

The purpose of this manual is to describe how to use Brightics 3.0 Suite Visual Analytics for analysis.

Audience Analysis

The audience of this manual is those who will perform analysis using Brightics 3.0 Suite Visual Analytics. Brightics 3.0 Suite Visual Analytics users need to familiarize themselves with using a web browser.

Structure of This Book

This manual consists of the following chapters

- Chapter 1 “Introduction” gives you an overview of Brightics 3.0 Suite Visual Analytics.
- Chapter 2 “Execution Environment”, describes an environment required to run Brightics 3.0 Suite Visual Analytics.
- Chapter 3 “Screen Components”, describes the components of Brightics 3.0 Suite Visual Analytics.
- Chapter 4 “Getting Started”, describes simple examples of analytics modeling using Brightics 3.0 Suite Visual Analytics.
- Chapter 5 “Tasks”, describes each functionality of Brightics 3.0 Suite Visual Analytics.
- Chapter 6 “References”, describes functions used for Brightics 3.0 Suite Visual Analytics.

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Constraint Definition

Below are constraints on Brightics 3.0 Suite Visual Analytics.

Restriction on Special Characters

Brightics 3.0 Suite Visual Analytics does NOT allow to use special characters (except for @, *, (,), _, +, ~, /, ‘, ‘) and space bar in all cases except for particular functions.

Restriction on Hangul, the Korean Alphabet

Entering Hangul in parameter input field of functions for I/O, Manipulation, Validation, Statistics, Transform, Extraction, Regression, Classification and Evaluation is NOT allowed in Brightics 3.0 Suite Visual Analytics.

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Glossary

Users must familiarize themselves with the following terms to understand this manual.

Brightics 3.0 Suite

Brightics 2.0 Suite is a foundation for Samsung SDS analytics solutions. It is tailored to characteristics of domain-specific analytics solutions and provides advanced business insights by collecting/analyzing massive data for prediction and creating data for decision making.

Big Data

Big data refers to a massive amount of data which is difficult to collect, store, search and analyze with traditional methods due to its excessively large scale in terms of data volume, velocity, and variety generated.
In this regard, big data is dubbed as 3Vs (Volume, Variety and Velocity) or 4V including the 4th characteristic, Value.

Hadoop

Hadoop is an open-source software of Apache License Version 2.0 developed for large-scale data processing. Hadoop was developed from 2006 funded by Yahoo, and currently its development is being led by the Apache Software Foundation.

HDFS (Hadoop Distributed File System)

HDFS, an abbreviation of Hadoop Distributed File System has Master/Slave architecture. Master (Name node) manages metadata of files, and actual data is distributed and stored across multiple Slaves (Data nodes).

Spark

Apache Spark is a general-purpose, high-performance cluster computing system. Spark offers advanced APIs written in Java, Scala and Python and is an optimal engine supporting general execution graphs.

Repository

Repository is an open-source in-memory distributed storage system. Repository can be used in a variety of open-source storage systems such as Spark, MapReduce, Flink and Presto.

JSON (JavaScript Object Notation)

JSON is an open standard format using human readable texts to deliver data objects with attribute-value pairs. It is a key data format for asynchronous browser/server communications (AJAJ) and replacing XML

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(used for AJAX) at large. In particular, it is known as a method for representing documents being exchanged over the internet. There is no special restriction on document type, and especially it is suitable for describing variables of computer programs.

Function

Function refers a unit of functions for analysis. Parameters can be set for each function.

Analytics Model

Analytics Model refers to a group of analytics functions that you have modelled, such as Data Flow, Control Flow, and Script Model.

Data Flow

Data Flow represents a flow of data inputs and outputs between respective sub-tasks performed to execute a single task.

Data Flow Model Editor

Brightics Data Flow Model Editor is equipped with a modeling functionality to create/verify analytics models with Data Flow to help effectively develop complex data analytics models.

Control Flow

Control Flow refers to a workflow to integrate multiple written Data Flow Models for execution.

Control Flow Model Editor

Brightics Control Flow Model Editor is equipped with a modeling functionality to control a written Data Flow.

Script Model

Script model refers to an analytics model written with scripts.

Script Model Editor

Brightics Script Model Editor offers functionalities to write/test Scala Scripts, create user-defined functions and write/test SQL Scripts for advanced users.

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Deep Learning Model

Deep learning model refers to an analytics model created based on deep learning.

Deep Learning Model Editor

Brightics' Deep Learning Model Editor offers modeling functionality to create/validate Flow-type analytics models for effective development of complicated deep learning analytics models.

Report

Report represents the outcome of integrating data generated from Brightics Analytics Model.

Report Editor

Brightics Report Editor is equipped with a modeling functionality to help easily write a report using data generated from analysis.

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1 Introduction

This chapter gives you an overview of Brightics 3.0 Suite Visual Analytics.

- Section 1.1 Overview
- Section 1.2 Characteristics
- Section 1.3 Key Features

1.1 Overview

Brightics 3.0 Suite Visual Analytics is a business solution capable of big data processing and advanced analytics. It can process big data using analytics functions and selectively load domain-specific reference analytics models. Brightics 3.0 Suite Visual Analytics is equipped with a GUI-based modeling to help develop analytics models effectively, and data flow created accordingly represents input/output data of each function enabling easier and faster analysis.

Brightics 3.0 Suite Visual Analytics extracts meaningful data from massive data in each domain with diverse analytics functions, detects issues and predicts the future aiming to offer a better service to customers.

1.2 Characteristics

Brightics 3.0 Suite Visual Analytics offers a high-performance business data analytics environment capable of analyzing large-scale data with ease.

1.2.1 High-performance Statistical Analysis Functions

Brightics 3.0 Suite Visual Analytics supports diverse analytics techniques encompassing basic statistical functions and advanced analytics functions.

1.2.2 Ready-to-Use Analytics Model

Brightics 3.0 Suite Visual Analytics offers frequently-used basic models ensuring fast implementation.

1.2.3 GUI-based Data Flow Modeling

Brightics 3.0 Suite Visual Analytics enables easy and fast data flow modeling with GUI-based Drag & Drop.

1.2.4 High-performance Big Data Framework

Statistical analysis functions are implemented through parallel processing thereby enabling big data analytics which was impossible before.

1.3 Key Features

Below are key features of Brightics 3.0 Suite Visual Analytics.

1.3.1 Data Flow Modeling

This feature enables to do modeling while looking at input/output data of each function.

1.3.2 Hadoop Analytics Engine

Hadoop Analytics Engine offers basic statistical functions and data processing capability in the Hadoop System.

1.3.3 Control Flow Modeling

This feature enables to do modeling by integrating multiple pre-written data flows.

1.3.4 Script Modeling

This feature enables advanced users to write/test Scala Scripts, create user-defined functions and write/test SQL Scripts.

1.3.5 Deep Learning Modeling

This feature enables to create a model by training with refined input data and load data into a trained model.

1.3.6 Report

Modeling functionality allows you to easily write a report using the data generated from analysis.

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2 Execution Environment

This chapter describes an execution environment for Brightics 3.0 Suite Visual Analytics.

- Section 2.1 System Requirements
- Section 2.2 Software Requirements
- Section 2.3 Run Brightics 3.0 Suite Visual Analytics

2.1 System Requirements

The following system requirements must be met in order to run Brightics 3.0 Suite Visual Analytics.

Name	Required Specification
Operating System	Any operating system using Windows (32-bit)
Network	To be installed on a network-connected computer
CPU	1-GHz or more
Memory	2 GB RAM or more
Disk Space	1GB or more disk space
Resolution	1920 * 1080

[Diagram 2.1-1] System Requirements

Note	Brightics 3.0 Suite Visual Analytics is dependent on the system constraints of a 3rd party product (Middleware, Database).

2.2 Software Requirements

The following software requirements must be met to run Brightics 3.0 Suite Visual Analytics.

Name	Required Specification
Chrome	Latest version recommended (Version 50.0 or higher)

[Diagram 2.2-1] Software Requirements

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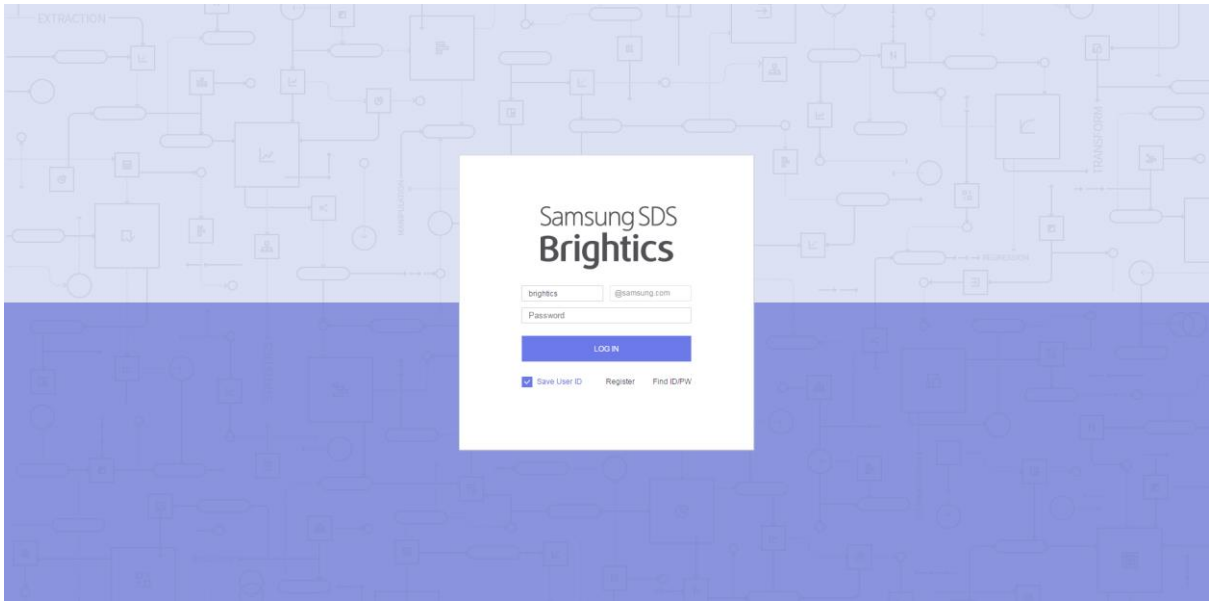
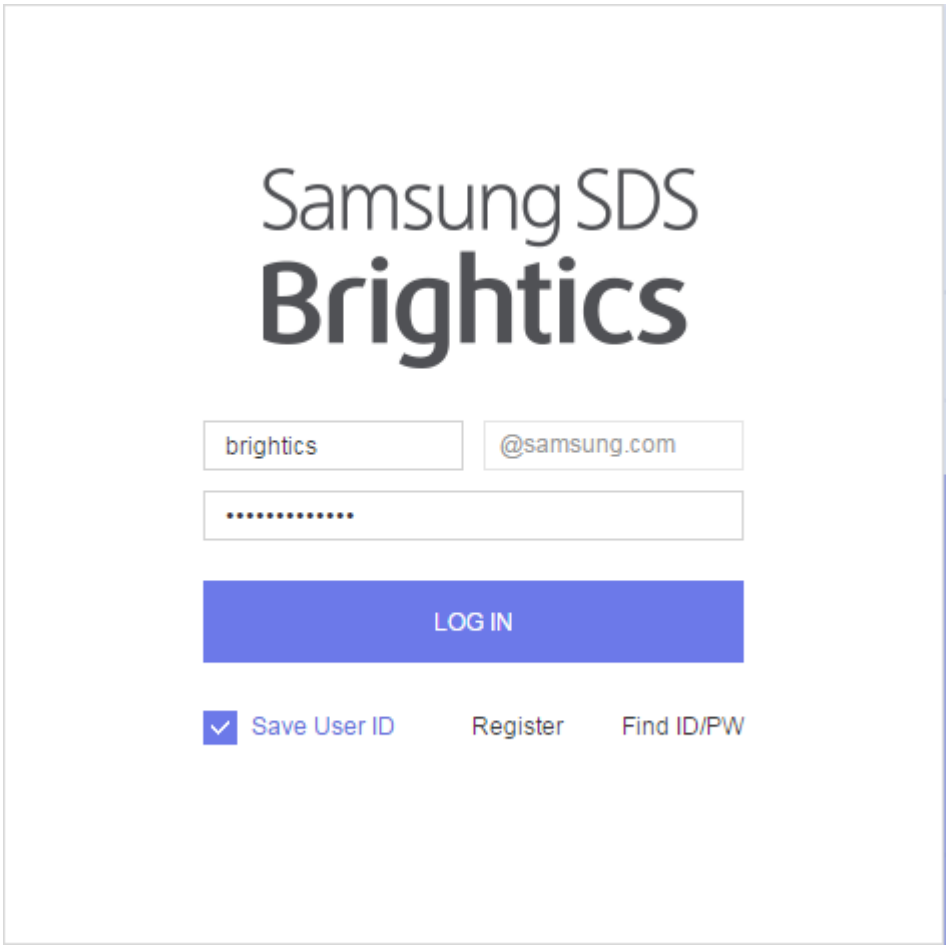
2.3 Run Brightics 3.0 Suite Visual Analytics



[Figure 2.3-1] Brightics 3.0 Suite Visual Analytics Main Screen

After completing the sign-up process through E-mail verification or administrator, access the main screen of Brightics 3.0 Suite Visual Analytics and log in with the ID you used to register.



[Figure 2.3-2] Login Screen of Brightics 3.0 Suite Visual Analytics

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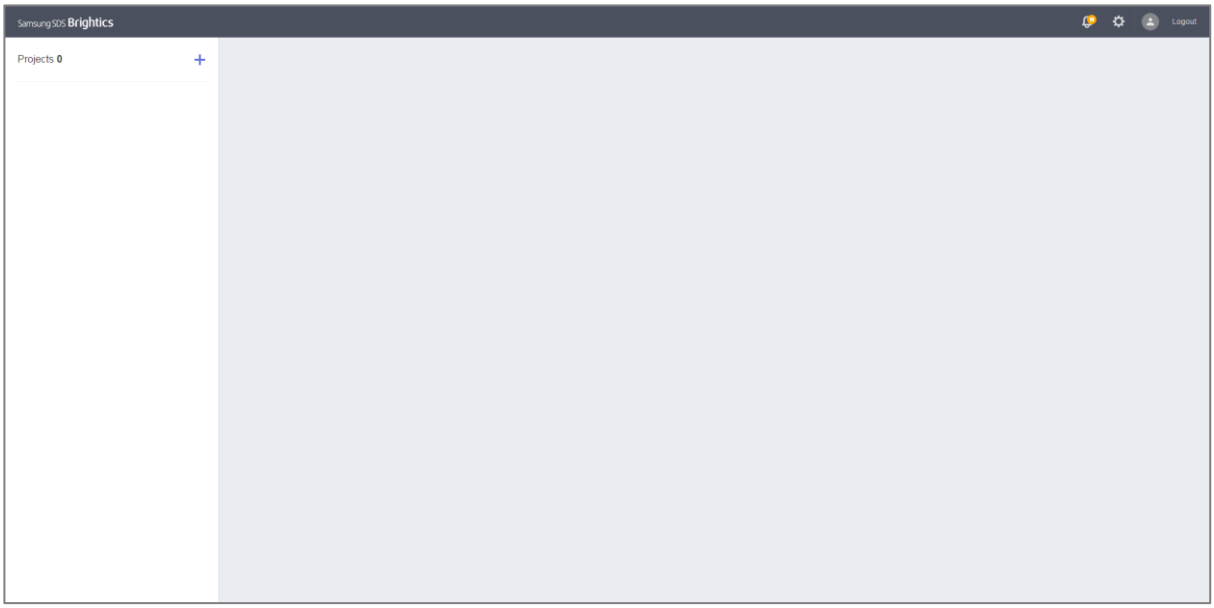
Brightics 3.0 Suite Visual Analytics Project View opens when the login is complete.



[Figure 2.3-3] Home Screen of Brightics 3.0 Suite Visual Analytics

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3 Screen Components

Brightics 3.0 Suite Visual Analytics consists of [Editor], [View], and [Menu] et al for editing/executing an analytics model.

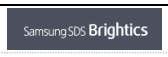
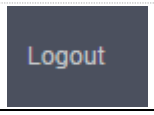
This chapter describes each component of Brightics 3.0 Suite Visual Analytics as below.

- Section 3.1 GNB (Global Navigation Bar)
- Section 3.2 Project View
- Section 3.3 Data Flow Model Editor
- Section 3.4 Control Flow Model Editor
- Section 3.5 Script Model Editor
- Section 3.6 Deep Learning Model Editor
- Section 3.7 Report Editor
- Section 3.8 Management

3.1 GNB (Global Navigation Bar)

GNB shows a currently running analytics model and a report in use in the form of a tab. GNB allows a user to go back to the Home screen, create/move a model and check any notice and user profile.

[Figure 3.1-1] GNB

Name	Icon	Description
Home (Brightics)		Go back to the Home screen of Brightics 3.0 Suite Visual Analytics
Model Tab		Display a currently running analytics model in a Tab
Open Model		Call *Open Model* popup window
Notice		Show the list and details of latest notices.
Settings		Call *Settings* Popup window
Profile		Call User *Profile* Popup window
Logout		Logout

[Diagram 3.1-1] GNB Components

3.1.1 Notice Dialog

If you click Notice icon in GNB, you can see notices made by an administrator.

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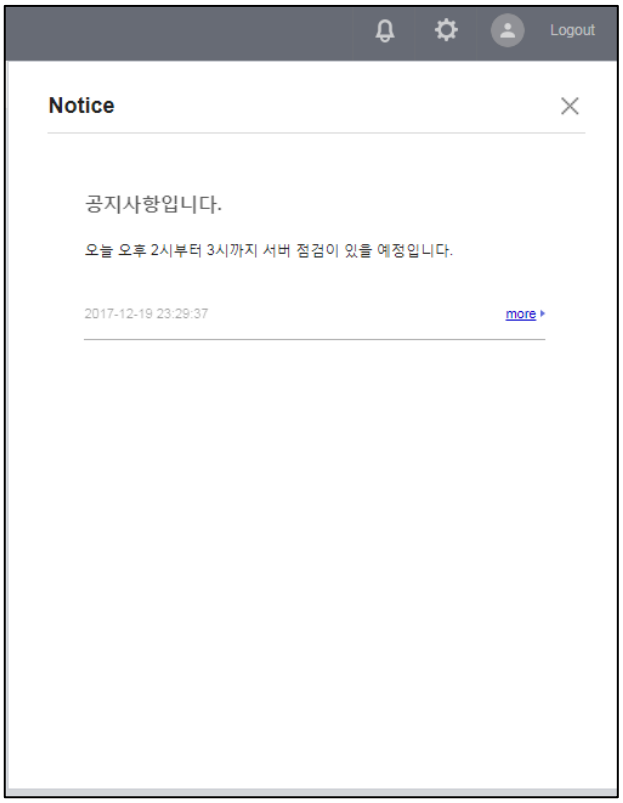

[Figure 3.1.2] Notice

If details of a notice are lengthy, click more at the bottom right corner to see the entire content in [Notice Detail] window.

[Figure 3.1.3] Notice Detail

3.1.2 Settings

If you click Settings button, Settings popup will appear as below.

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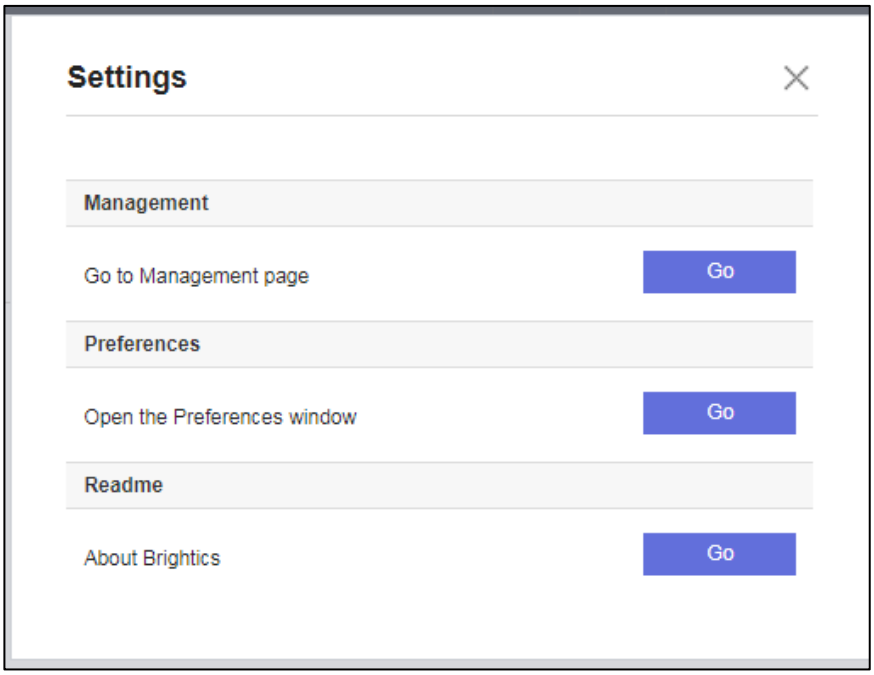
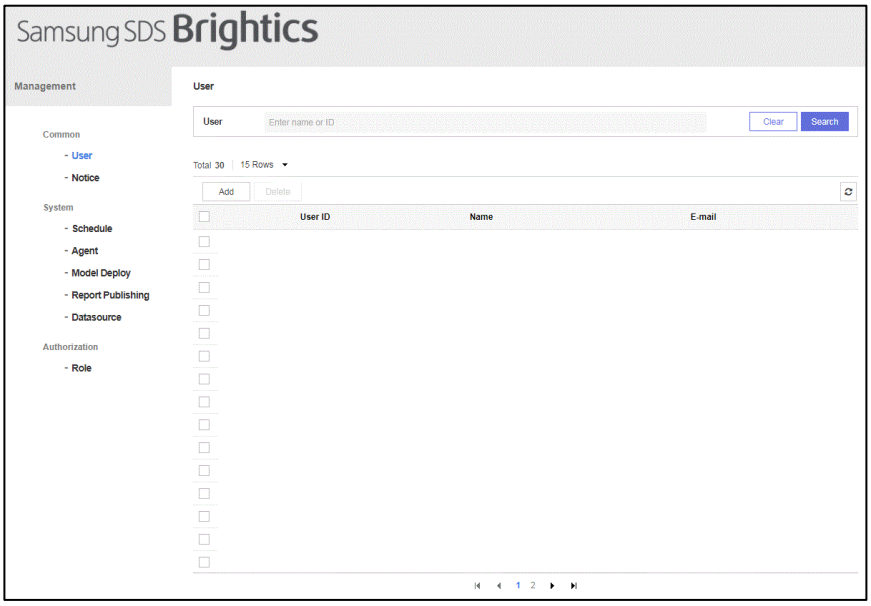


[Figure 3.1.4] Settings

If you click Go button next to [Go to Management page] under Management category, Management window will appear as below. This window allows an administrator to manage users easily such as user-specific permission and notice registration. Users are supposed to be listed up in the production environment, but are invisible in the below screen shot for the sake of privacy protection.



[Figure 3.1.5] Management

3.1.3 Preferences

If you click Go button next to [Open the Preferences window] under Preferences category, [Preferences] window will appear as below.

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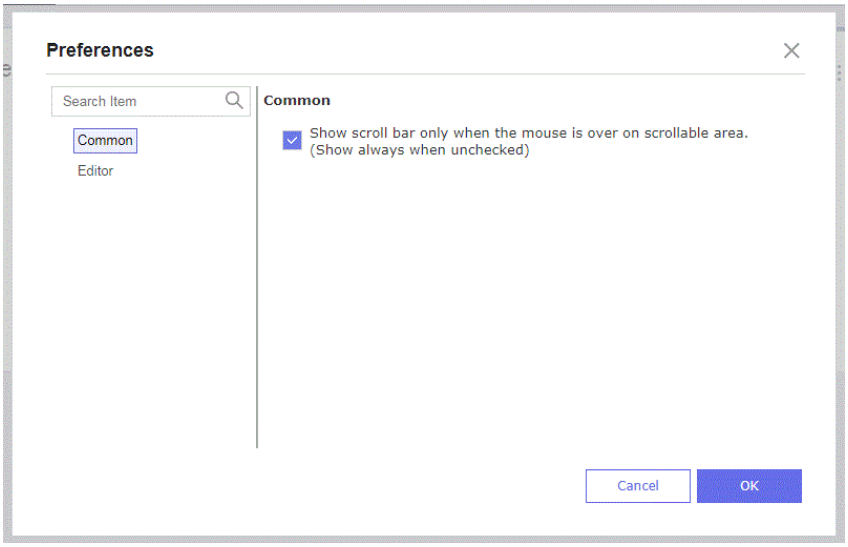

[Figure 3.1.6] Preferences

This is a kind of Brightics settings window. [Common] menu on the left allows you to decide whether or not to keep Scroll bar enabled, and [Editor] allows you to set minimap, double click, variable, or default row number. If you check a function you want to use or enter its value and click OK, user-defined settings will be applied.

3.1.4 Readme

If you click Go button next to [About Brightics] under Readme category, [Readme] window will appear. Readme window contains the description of Brightics version currently in use and its available functionality. Also, this page offers useful functionality, allowing users to easily check recently added features or whether defects from its previous version have been addressed.

3.1.5 Profile

If you click Profile icon, in GNB, the information of current log-in user will appear as below.

[Figure 3.1.7] Profile

If you click [Profile Settings] link, it will direct you to [Profile Settings] screen which allows you to modify user information.

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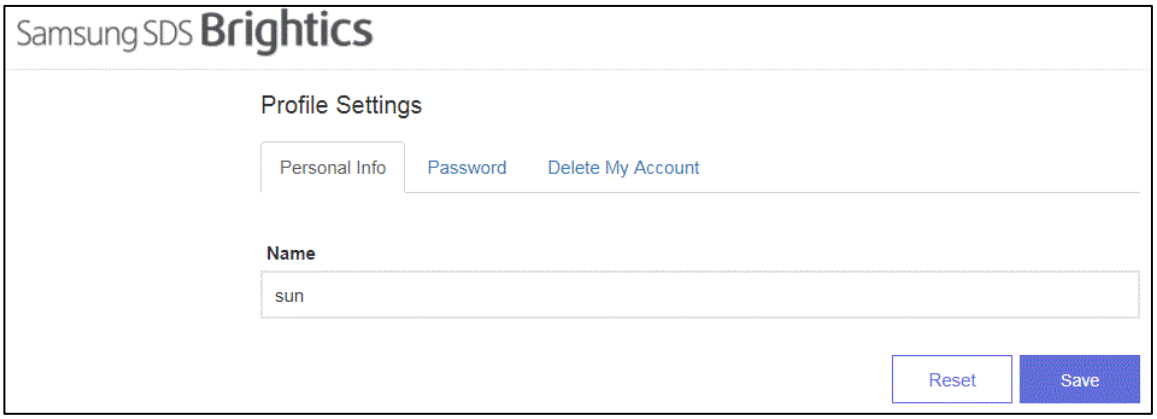
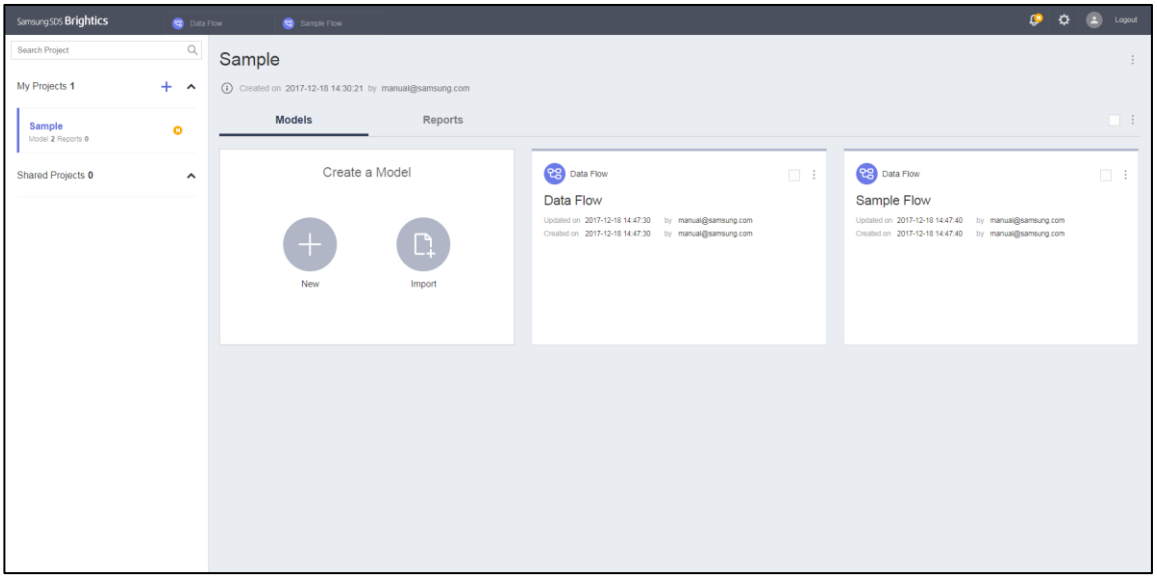


[Figure 3.1.8] Profile Settings

This screen allows you to change user's name and password or delete a user account.

3.2 Project View

Project View allows you to see Project list, analytics models by Project, and Report list.
Project View has menu buttons to create/modify/delete a Project, a Model, and a Report.



[Figure 3.2-1] Project View

3.2.1 Project List

Project List shows the list of projects accessible to login users. When you select a Project, analytics models and reports belonging to the project are displayed at the right-sided Model List.

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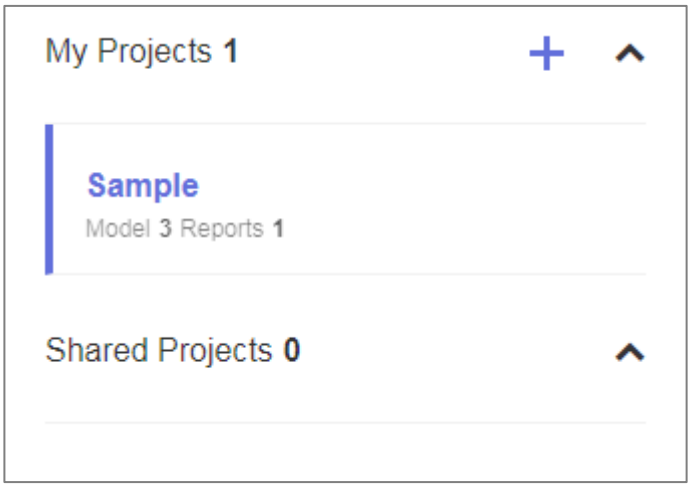
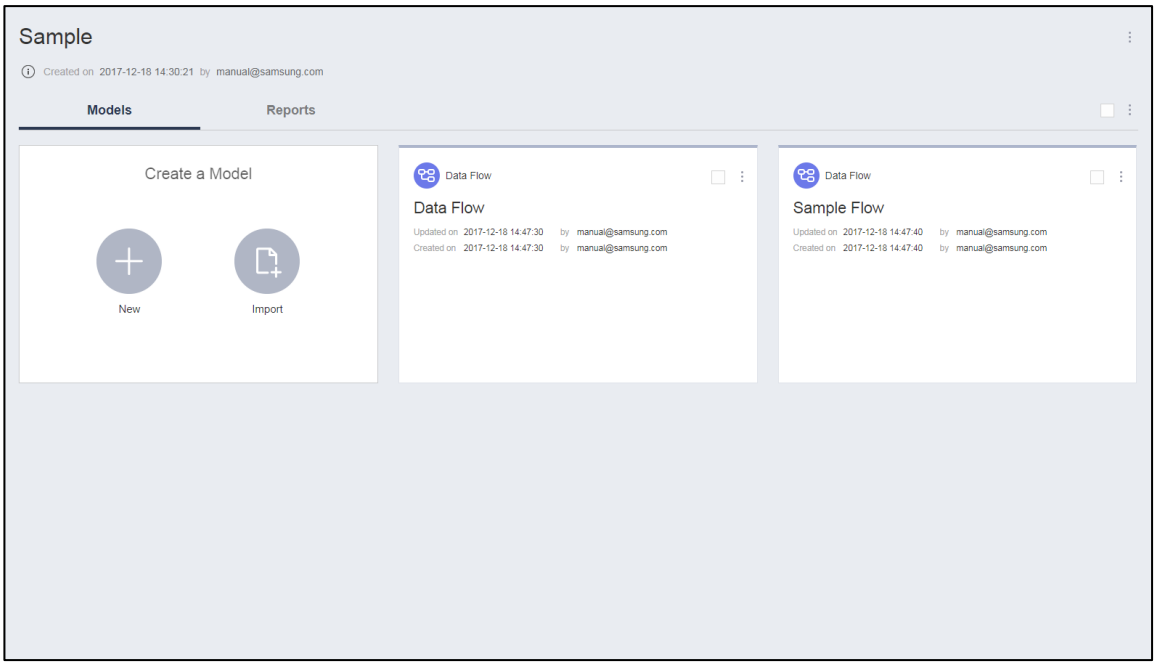


[Figure 3.2-2] Project List

3.2.2 Model List

Model List shows the list of analytics models and reports belonging to the selected project. Model List consists of menu to modify/delete a project and create/modify/delete a report.



[Figure 3.2-3] Model List

Below are the features of Model List accessible to a user.

Name	Icon	Description
Project Menu	-	Click at the top right of Model List to enable this feature; you can modify or delete a Project Name or enable Member management feature
New		Add a new analytics model or report to the selected Project

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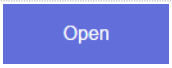
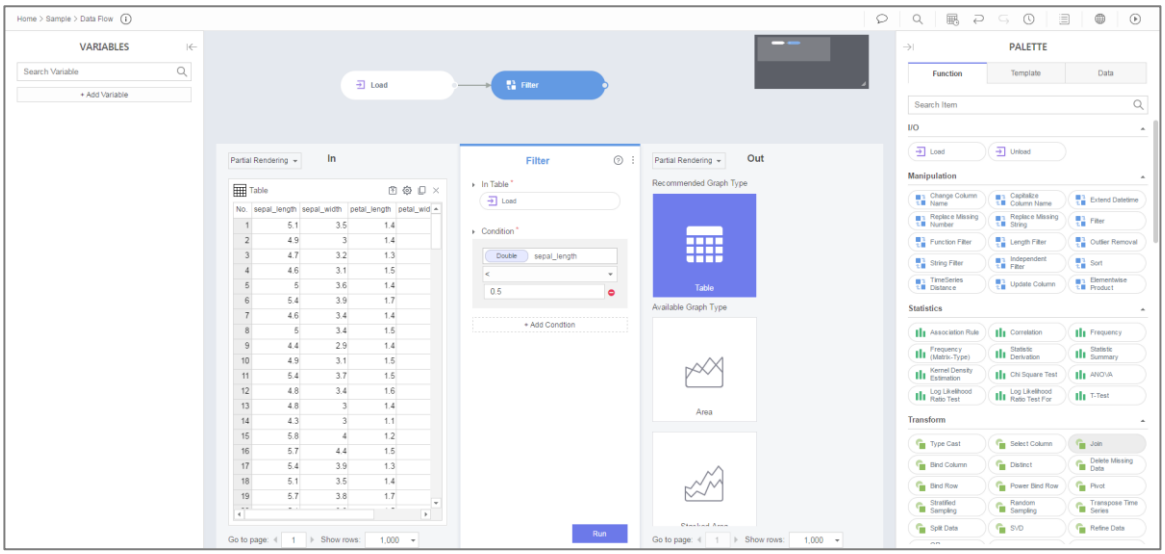
Name	Icon	Description
Import		Import an analytics model to the selected Project. You can select a model file (.json) from User PC
Model Menu	-	Click at the top right of each model to enable this feature. This feature allows you to modify/delete/copy/export/deploy the selected model. But some sub-menu is unavailable depending on a model.
Open		This button becomes visible when you mouse over a model. Click the button and open the model.

[Diagram 3.2-1] Model List Menu

3.3 Data Flow Model Editor

Data Flow Model Editor consists of [Editor] for analytics modeling, [View], and [Menu] to see available functions and data.



[Figure 3.3-1] Data Flow Model Editor

3.3.1 Toolbar

Below are the Toolbar items.

Name	Icon	Description
Model Info		Show a brief information of a currently running model
Function Clipboard		If you selectively choose a Diagram, a list of items added to the clipboard will be available. Then, you can drag and add to the Diagram.
Tooltip		Select and show a Tooltip for a function. It also allows a user to add a note.
Zoom		Zoom in/out diagram
Schedule		Enable Schedule option
Undo		Undo a task

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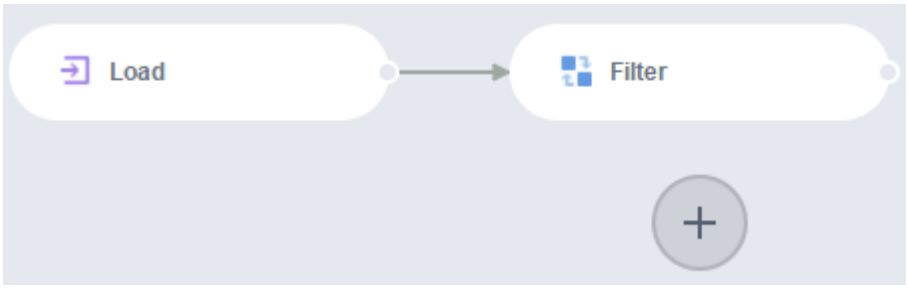
Name	Icon	Description
Redo		Redo a task
History		Call a popup window to show the history of tasks
Index		Offer index of Functions written in Diagram. Click to shift focus to a selected function
Variables		Enable [View] to enter a variable
Run		Run all the functions written in diagram in order

[Diagram 3.3-1] Toolbar Components

3.3.2 Diagram Editor

Diagram Editor allows a user to see the flow of an analytics model and add, modify, delete or selectively choose a function.



[Figure 3.3-2] Diagram Editor

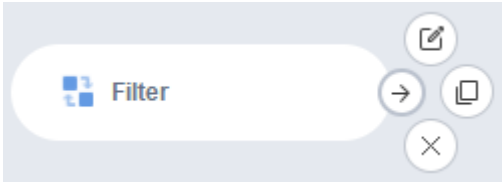
Below are the components of Diagram Editor.

Name	Icon	Description
Function	Load	If you select a function used for a model, the information of the selected function is displayed at Properties View, at the bottom of Diagram Editor.
Add Function		This icon becomes visible when you mouse over an empty space in Editor. Click the icon and call a Popup window to select a function.
Connection		This line connects a function with another function. The output of the starting point becomes the input of the arriving point. Multiple lines can be sent or received. (varying by function)

[Diagram 3.3-2] Diagram Editor Components

3.3.2.1 Function Mouse Over

Below components become visible when you mouse over a function created in the Diagram.



[Figure 3.3-3] Function Mouse-Over Menu

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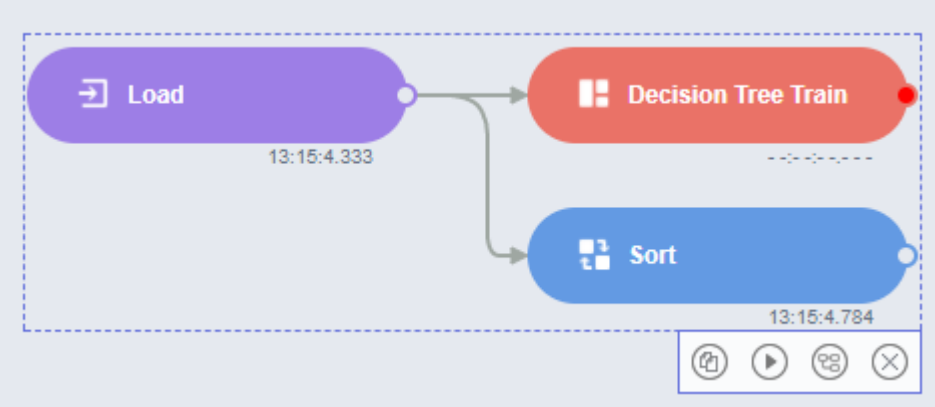
Name	Icon	Description
Select Function		Call a Popup window to change a selected function into another function
Connection		Connect a selected function to another function. Drag and drop to a function you want to connect to
Clone Function		Copy a selected function. Drag and drop to a desired location.
Remove Function		Delete a selected function

[Diagram 3.3-3] Function Mouse-Over Menu Components

Note	You can connect to functions on the right side ONLY

3.3.2.2 Selectively Choose Diagram

Below components appear when you selectively choose diagram in Diagram Editor.



[Figure 3.3-4] Selectively Chosen Diagram

Name	Icon	Description
Run		Run selected Functions
Add to Clipboard		Add selected functions to clipboard
Add Library		Add selected functions to the library
Remove		Delete selected functions

[Diagram 3.3-4] Menu Components for Selectively Chosen Diagram

3.3.3 Sheet Editor

Sheet Editor consists of [Data Panel] to show In/Out Data of a selected function and [Properties Panel] to enter parameters required to execute a function.

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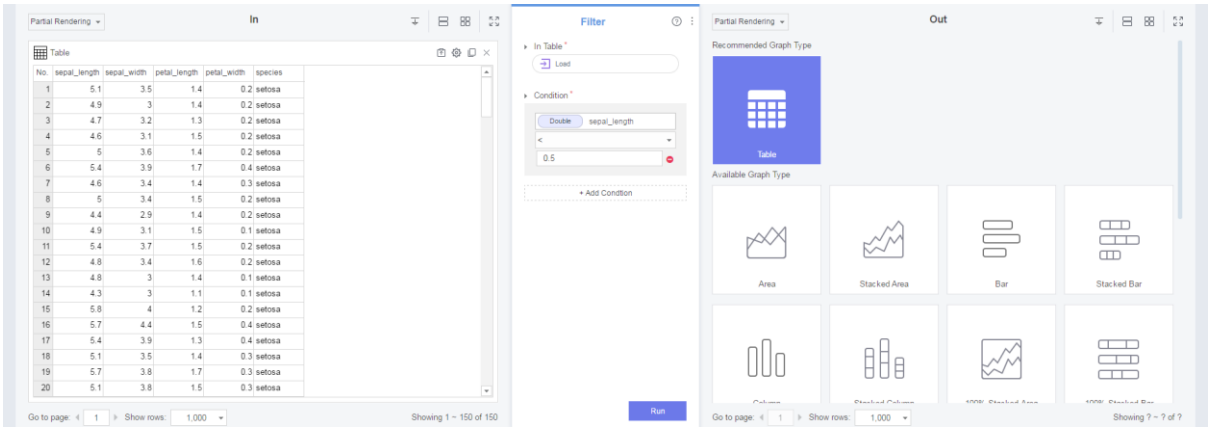
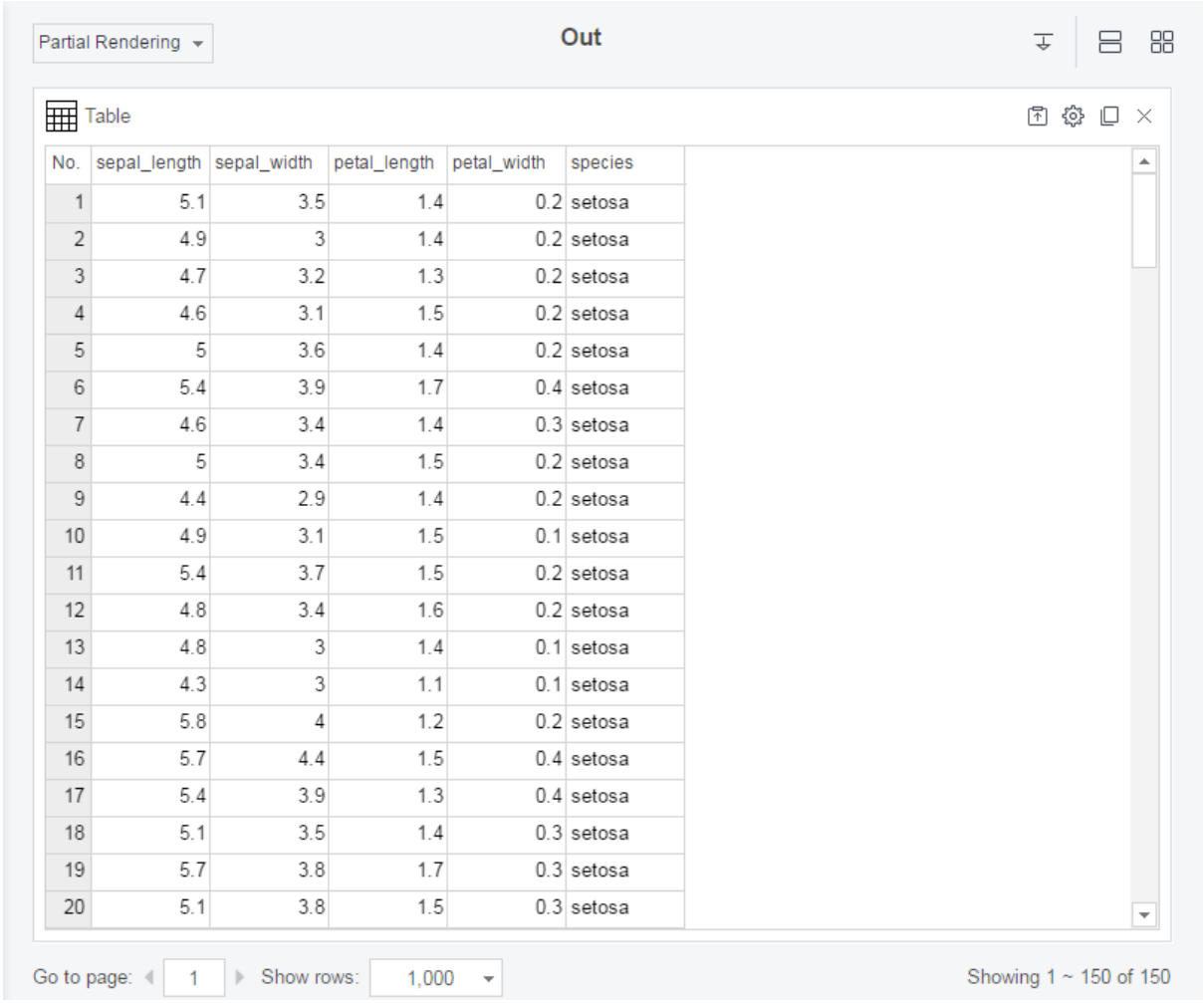


[Figure 3.3-5] Sheet Editor

3.3.3.1 Data Panel

Data Panel represents input/output data of each function. In other words, [In Data Panel] shows input data of respective functions, and [Out Data Panel] shows execution results of respective functions.



No.	sepal_length	sepal_width	petal_length	petal_width	species
1	5.1	3.5	1.4	0.2	setosa
2	4.9	3	1.4	0.2	setosa
3	4.7	3.2	1.3	0.2	setosa
4	4.6	3.1	1.5	0.2	setosa
5	5	3.6	1.4	0.2	setosa
6	5.4	3.9	1.7	0.4	setosa
7	4.6	3.4	1.4	0.3	setosa
8	5	3.4	1.5	0.2	setosa
9	4.4	2.9	1.4	0.2	setosa
10	4.9	3.1	1.5	0.1	setosa
11	5.4	3.7	1.5	0.2	setosa
12	4.8	3.4	1.6	0.2	setosa
13	4.8	3	1.4	0.1	setosa
14	4.3	3	1.1	0.1	setosa
15	5.8	4	1.2	0.2	setosa
16	5.7	4.4	1.5	0.4	setosa
17	5.4	3.9	1.3	0.4	setosa
18	5.1	3.5	1.4	0.3	setosa
19	5.7	3.8	1.7	0.3	setosa
20	5.1	3.8	1.5	0.3	setosa

Go to page: 1 Show rows: 1,000 Showing 1 ~ 150 of 150

[Figure 3.3-6] Data Panel

Note	Either [In Data Panel] or [Out Data Panel] is NOT available for particular functions such as Load/Unload.

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Below are the features of Sheet Editor's Data Panel accessible to users via screen.

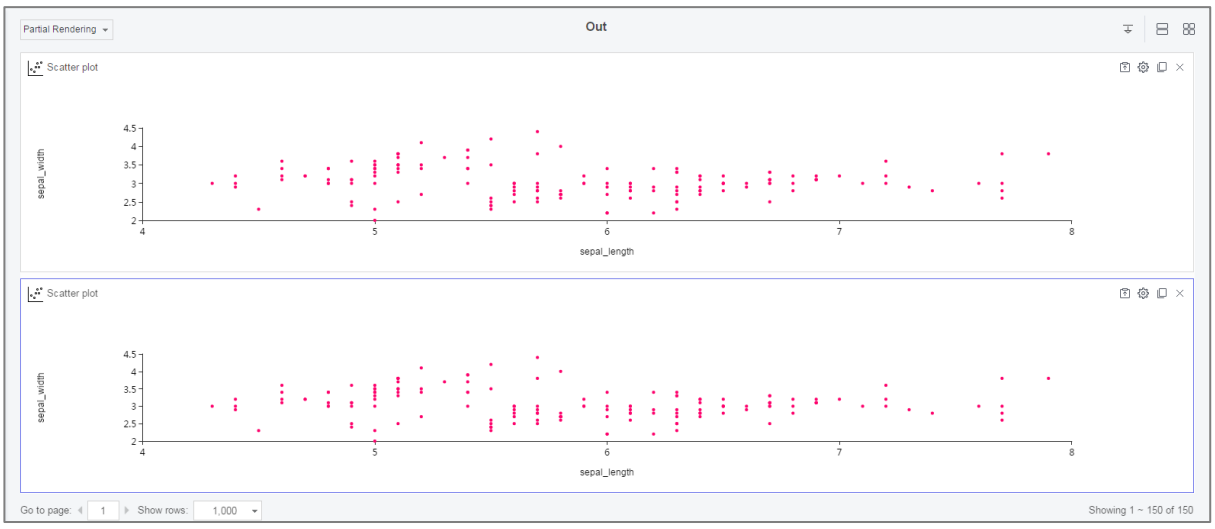
Name	Icon	Description
Horizontal		Lay out Chart/Table in Data Panel horizontally
Evenly		Lay out Chart/Table in Data Panel in grid
Maximize		Maximize Data Panel
Minimize		Minimize Data Panel
Download		Download data in Data Panel as CSV file
Pop up chart		Pop up Data Panel
Data Paging	-	In Partial Rendering mode, the entire data is displayed over multiple pages according to the pre-defined data size per a single page. So in this mode, you can move to another page and set the data size per each page.

[Diagram 3.3-5] Data Panel Toolbar Menu

In Partial Rendering mode, you can add/delete Chart/Table that can represent data in Data Panel. Below features are available for each Chart/Table.

Name	Icon	Description
Multichart		Call a new popup window to group multiple charts into a new chart
Create a Detail		Add a new chart for a selected area.
Add to Report		Add a selected Chart/Table to Report as Data Source Template
Chart Settings		Change the options of Chart/Table
Duplicate		Duplicate a selected Chart/Table to add
Close		Close Chart/Table

[Diagram 3.3-6] Chart/Table Toolbar Menu



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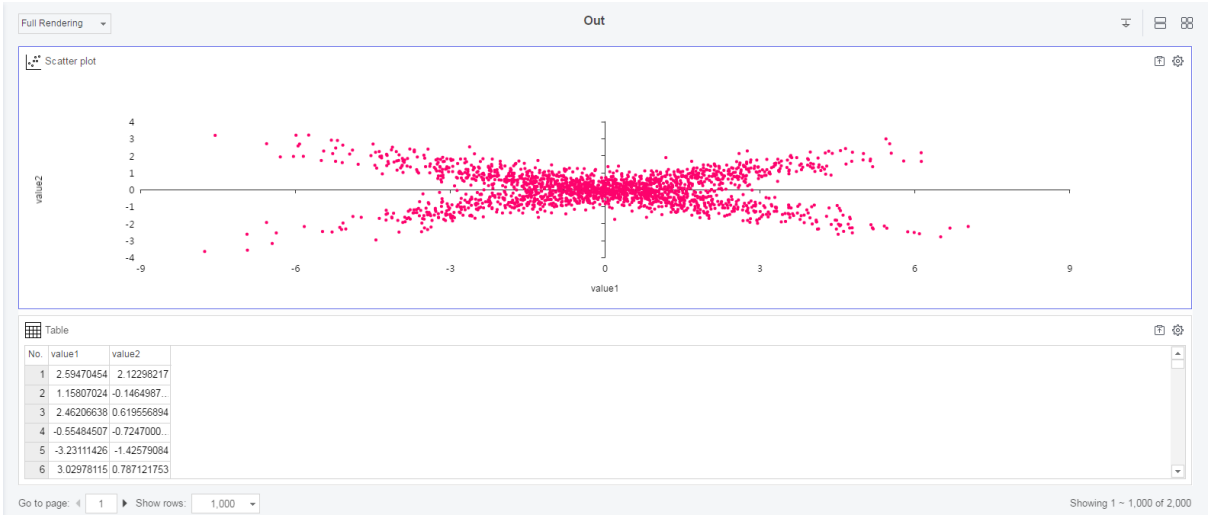
[Figure 3.3-7] Chart/Table Added in Data Panel's Partial Rendering Mode

In Full Rendering mode, Chart and Table are displayed at the top and the bottom respectively by default, and chart shows the entire data.



[Figure 3.3-8] Data Panel Full Rendering Mode

Note	Full Rendering mode has restrictions on some features including Chart Type Modification

3.3.3.2 Properties Panel

Properties Panel allows you to define each function's name and parameters.

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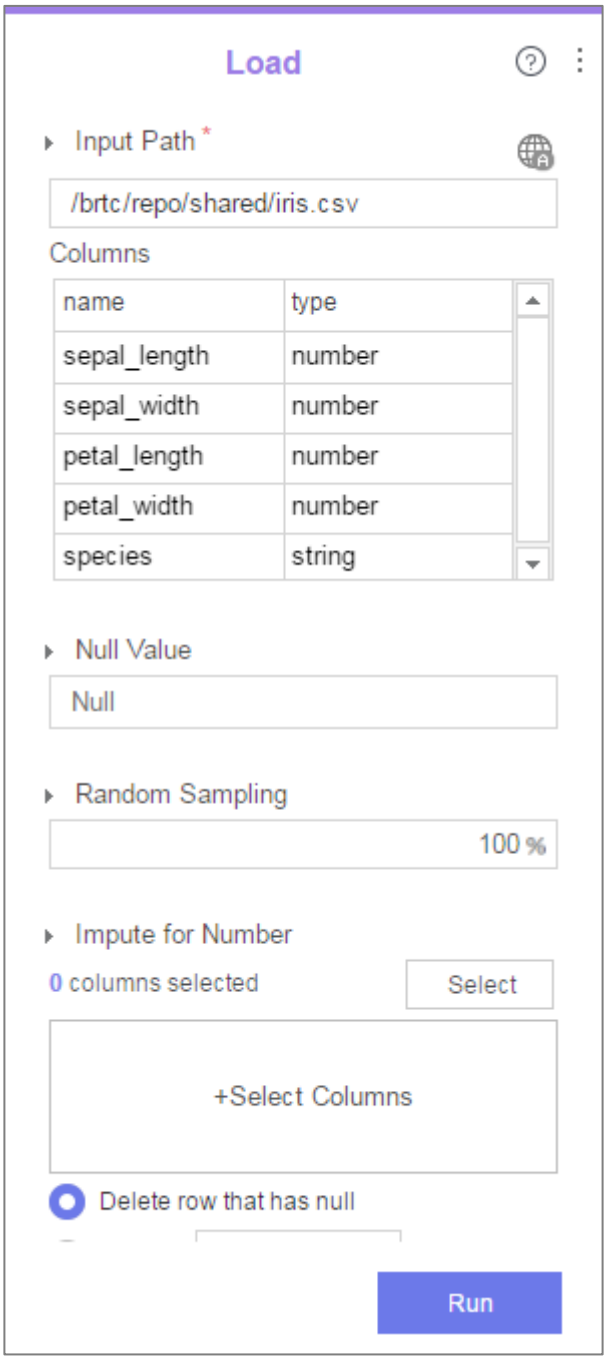

[Figure 3.3-9] Properties Panel

Name	Icon	Description
Function Menu	-	Click ⋮ at the top right of Properties Panel to enable this icon. You can modify the name/description of a function or change into another function.
Help	ⓘ	Show the description of a selected function
Set as variable	,	Replace a parameter with a defined variable. This feature is available for particular functions ONLY.

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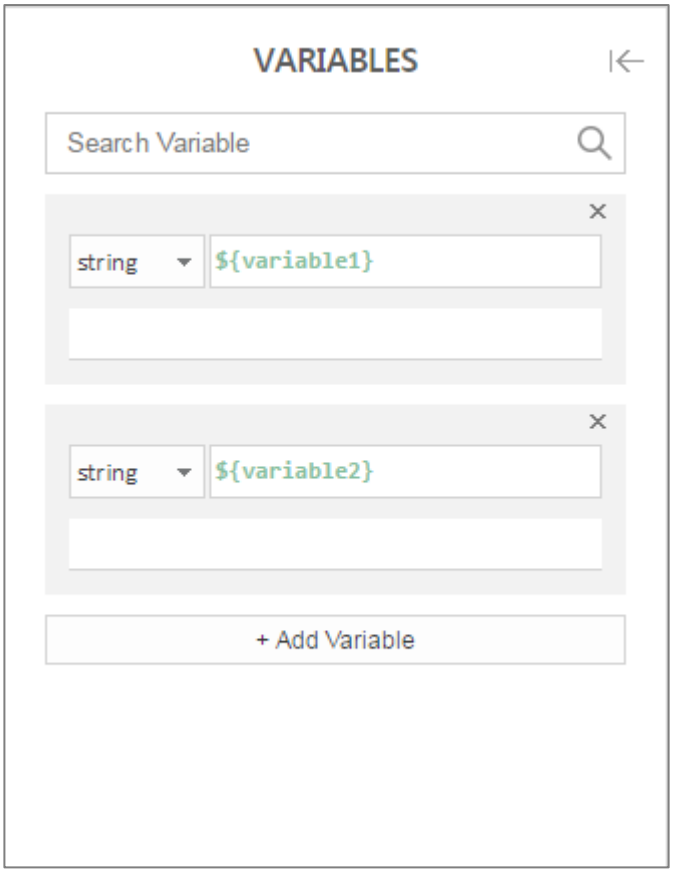
Name	Icon	Description
Run	Run	Run a function with the parameter you've entered. Its output data is displayed at the right-sided [Out Data Panel].

[Diagram 3.3-7] Properties Panel

3.3.4 Variables View

[Variables View] shows the list of variables used to dynamically change parameters in [Properties Panel] and allows you to add/modify/delete each variable.



[Figure 3.3-10] Variables View

3.3.5 Palette View

[Palette View] consists of [Function Tab] with the list of available functions for Diagram Editor, [Template Tab] with the list of templates that can be shared among models, and [Data Tab] with the list of data stored in the repository.

3.3.5.1 Function Tab

[Function Tab] shows the list of available functions for Diagram Editor. Enter a keyword to search a function you want. When you select a function and drag and drop to a desired location in Diagram Editor, a selected function will be created.

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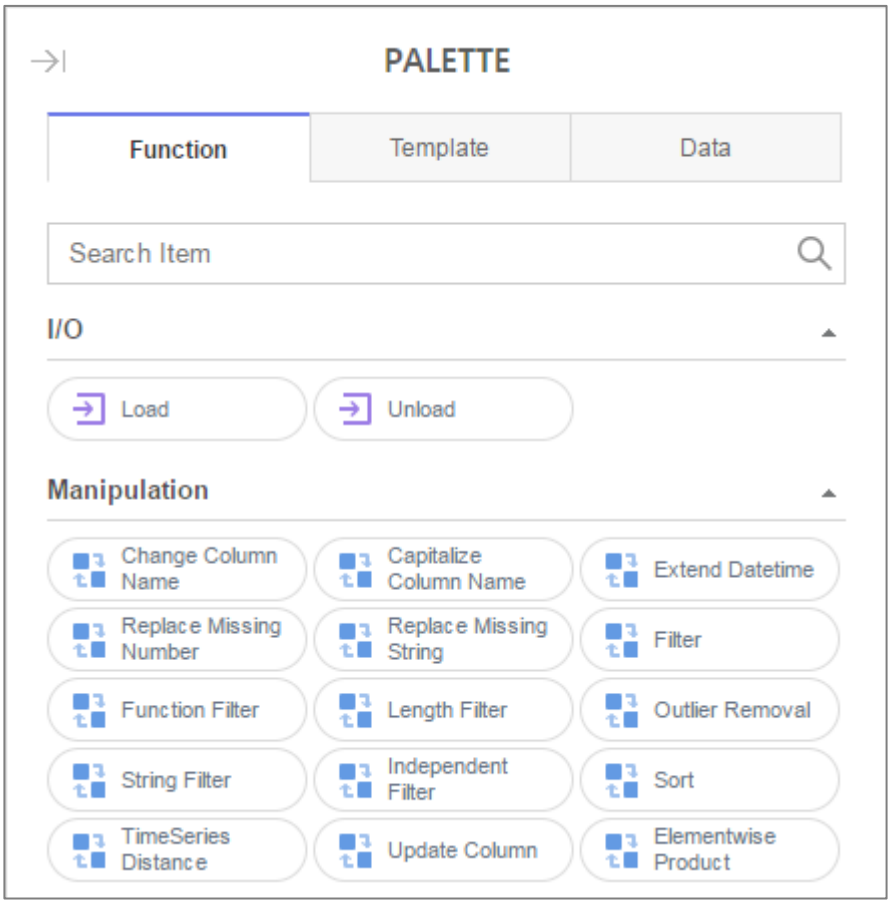

[Figure 3.3-11] Function Tab

Name	Icon	Description
Search Item	-	Enter a keyword to see the list of matching functions

[Diagram 3.3-8] Function Tab Components

3.3.5.2 Template Tab

Frequently used functions for a model can be stored at the Template repository for further use. You can drag & drop a stored template to add to the Diagram Editor.

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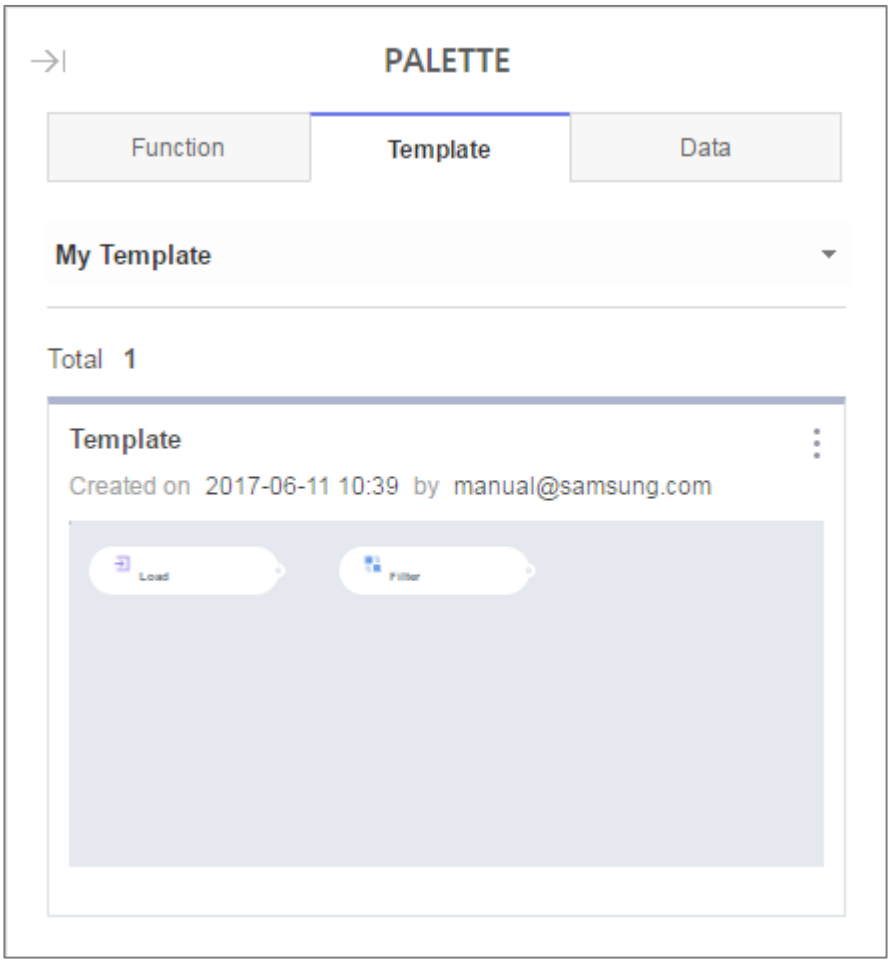

[Figure 3.3-12] Template Tab

Name	Icon	Description
Template Menu	-	Click ⋮ at the right side of each template to enable this feature. You can modify/delete a template.

[Diagram 3.3-9] Template Tab Components

3.3.5.3 Data Tab

[Data Tab] allows you to look up the information of data repository used for Brightics 3.0 Suite Visual Analytics. You can look up shared data and data by user.

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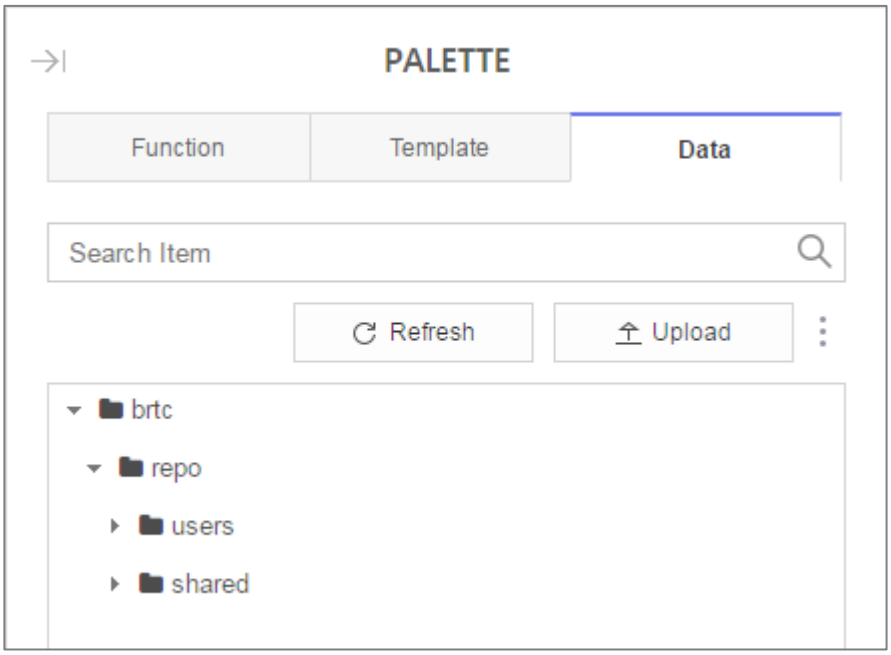


[Figure 3.3-13] Data Tab

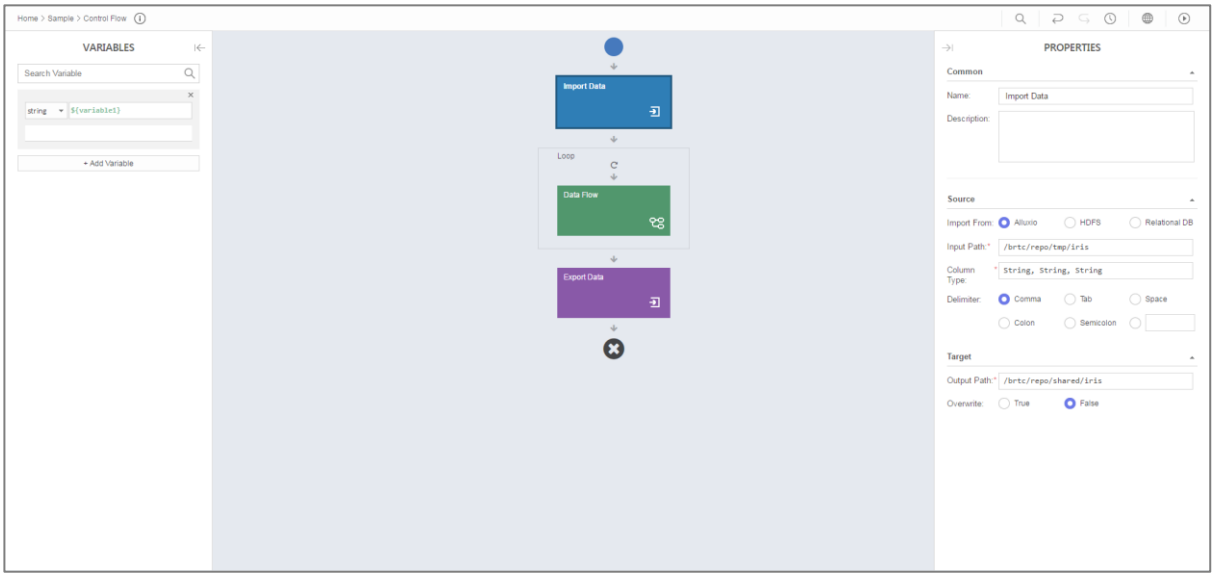
Below are Data Tab components.

Name	Icon	Description
Data Tree	-	Show Shared/User data
Search Item	-	Enter a keyword for data search
Refresh	Refresh	Refresh data list
Upload	Upload	Upload a local file
Data Tree Menu	-	Click at the top right of Data Tree to enable this feature. You can modify/delete data.

[Diagram 3.3-10] Data Tab Components

3.4 Control Flow Model Editor

[Control Flow Model Editor] consists of [Editor], [View], and [Menu] for control modeling.



[Figure 3.4-1] Control Flow Model Editor

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3.4.1 Toolbar

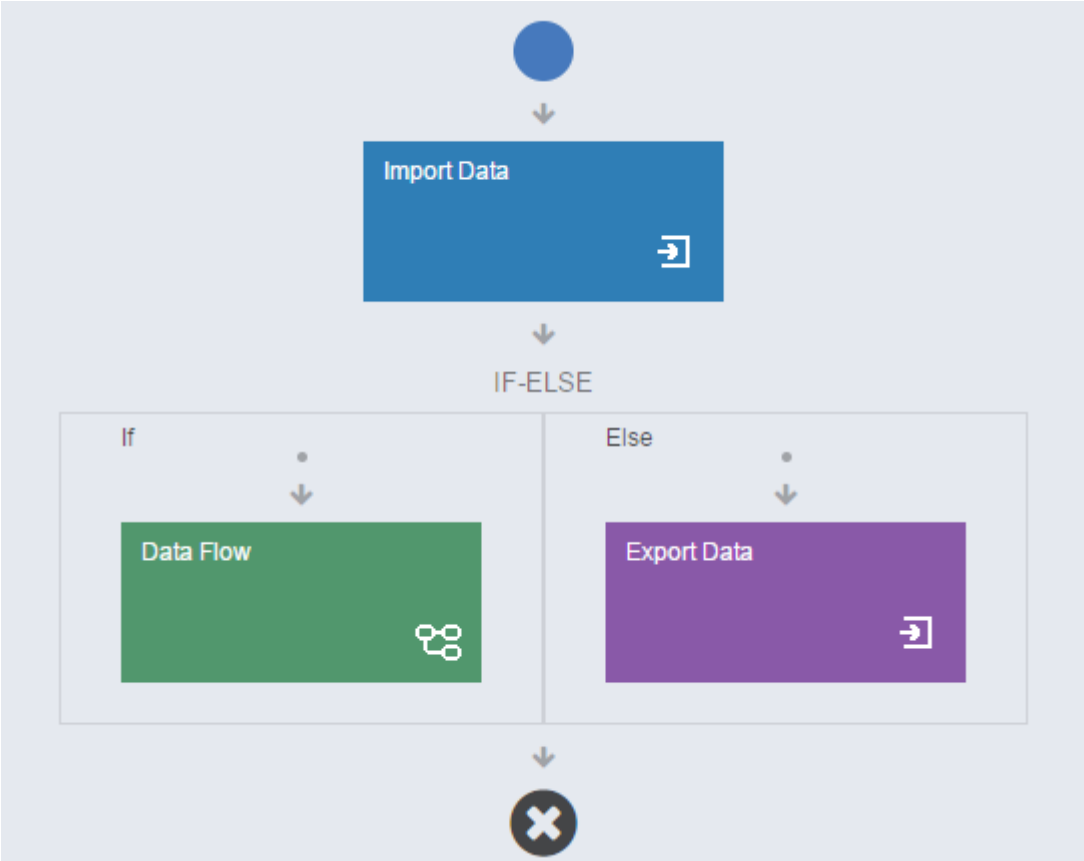
Below are Toolbar items.

Name	Icon	Description
Model Info		Show a brief information of a currently running model
Zoom		Zoom in/out diagram
Undo		Undo a task
Redo		Redo a task
History		Call a Popup window to show the history of tasks
Variables		Enable [View] to enter a variable
Run		Run all the functions written in diagram in order

[Diagram 3.4-1] Toolbar Menu

3.4.2 Diagram Editor

Diagram Editor allows you to see the flow of an analytics model and add, modify, delete or selectively choose a function.



[Figure 3.4-2] Diagram Editor

Below are the components of Diagram Editor.

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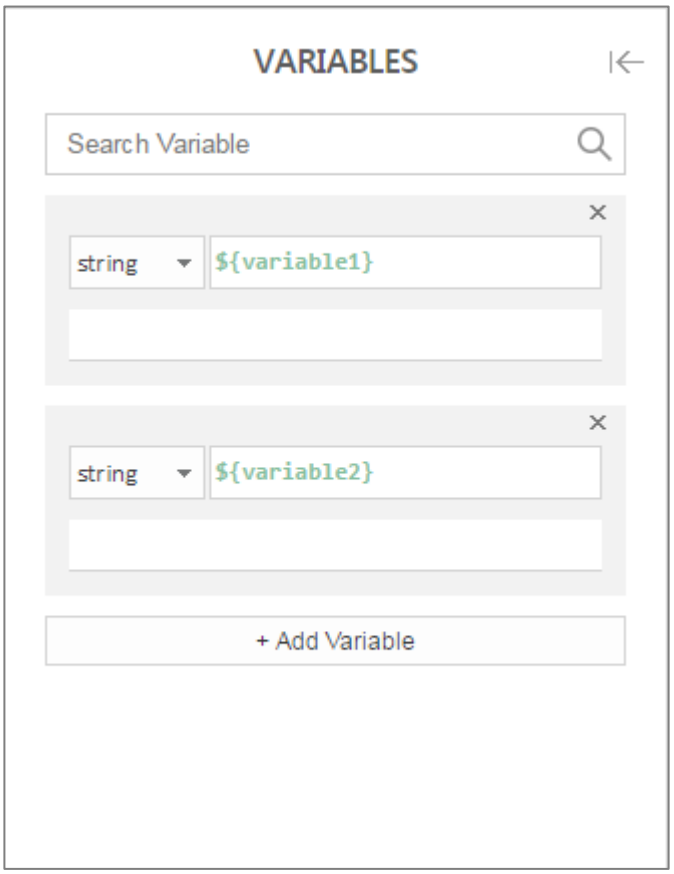
Name	Icon	Description
Insert Unit		Mouse over to enable this feature. Click this icon to see the list of functions you can choose
Remove Unit		Mouse over to enable this feature. Click this icon to delete a selected unit.

[Diagram 3.4-2] Diagram Editor Components

3.4.3 Variables View

[Variables View] shows the list of variables used in [Properties Panel] to dynamically change parameters and allows you to add/modify/delete each variable.



[Figure 3.4-3] Variable View

3.4.4 Properties View

When you select a function, [Properties View] is changed into the Properties window of the selected function, where you can define the name and parameters of the function.

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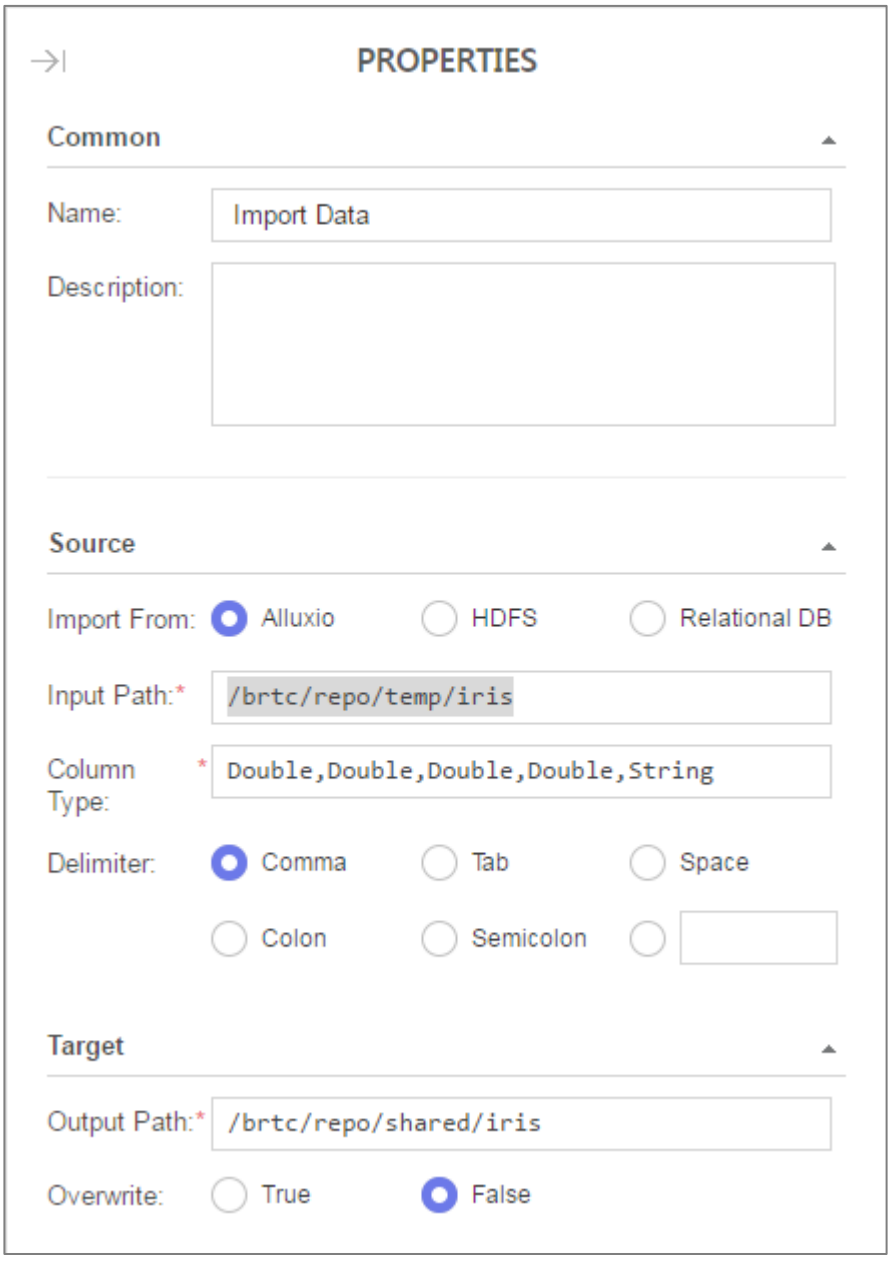

[Figure 3.4-4] Properties View

3.5 Script Model Editor

[Script Model Editor] consists of [Editor] to write Scala/Python/SQL scripts and [View] required to write a script. [Script Model Editor] is a script editor for advanced or general users, and allows you to test user-written Scala/Python/SQL Scripts as well as functions used in existing Dataflow. It also has a feature to create user-defined functions thereby enabling to use user-written Scala Scripts in Dataflow.

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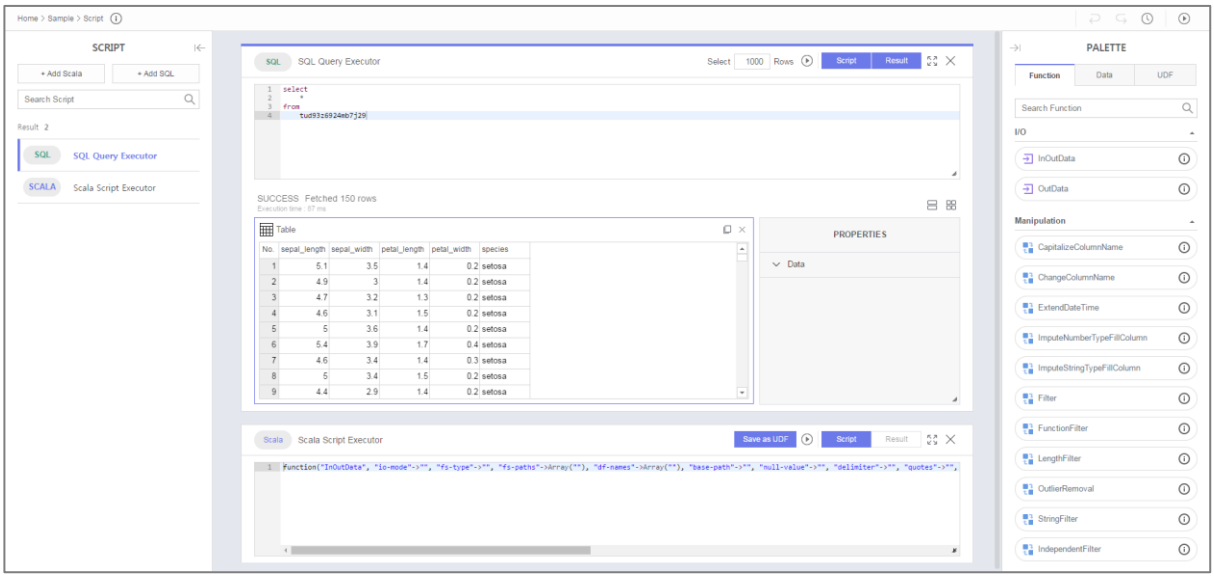

[Figure 3.5-1] Script Model Editor

1. Toolbar
2. Script Editor
3. Script View
4. Palette View

3.5.1 Toolbar

Below are Toolbar components.

Name	Icon	Description
Model Info		Show a brief information of a currently running model
Undo		Undo a task
Redo		Redo a task
History		Call a popup window to show the history of tasks
Run		Run all the functions written in diagram in order

[Diagram 3.5-1] Toolbar Components

3.5.2 Script Editor

Script Editor allows users to write, edit, and test scripts.

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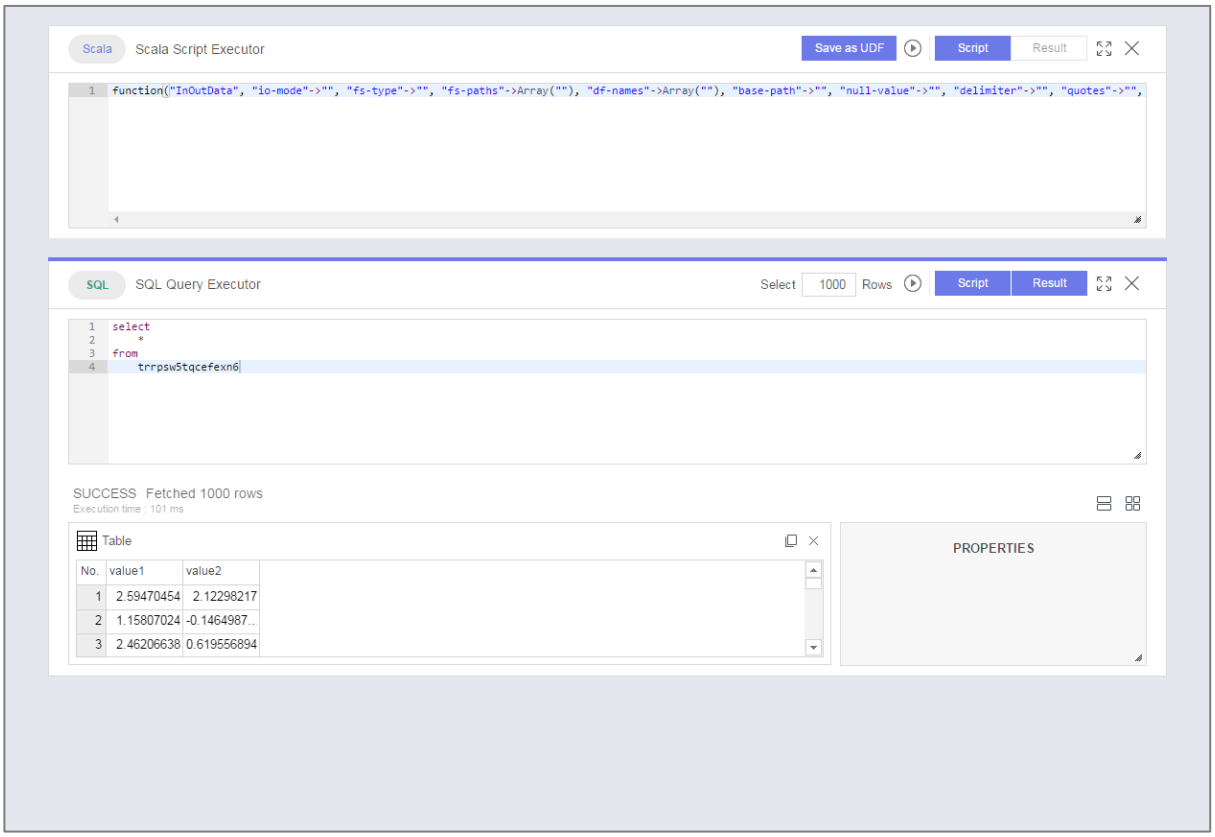
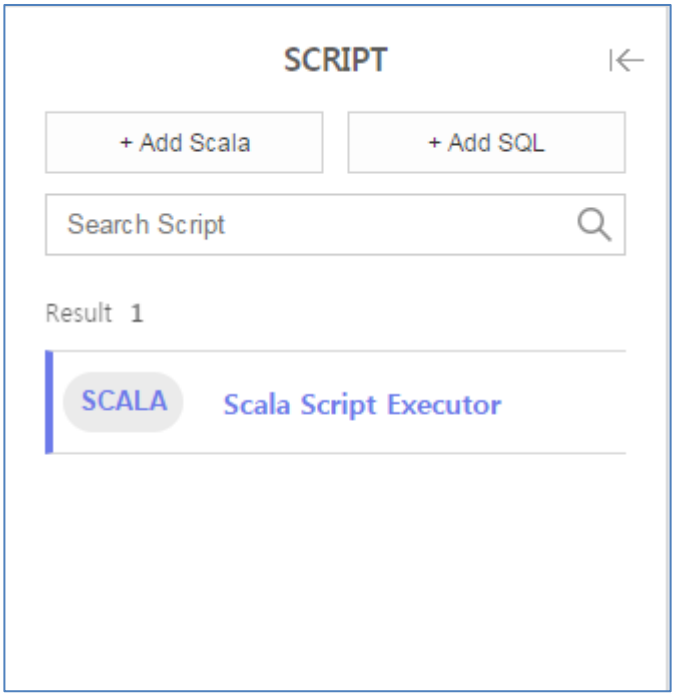


[Figure 3.5-2] Scala Script added to Script Editor

3.5.3 Script View

You can add or search SQL, Scala, Python Script in Script View.



[Figure 3.5-3] Script View

Below features are available for Scala View.

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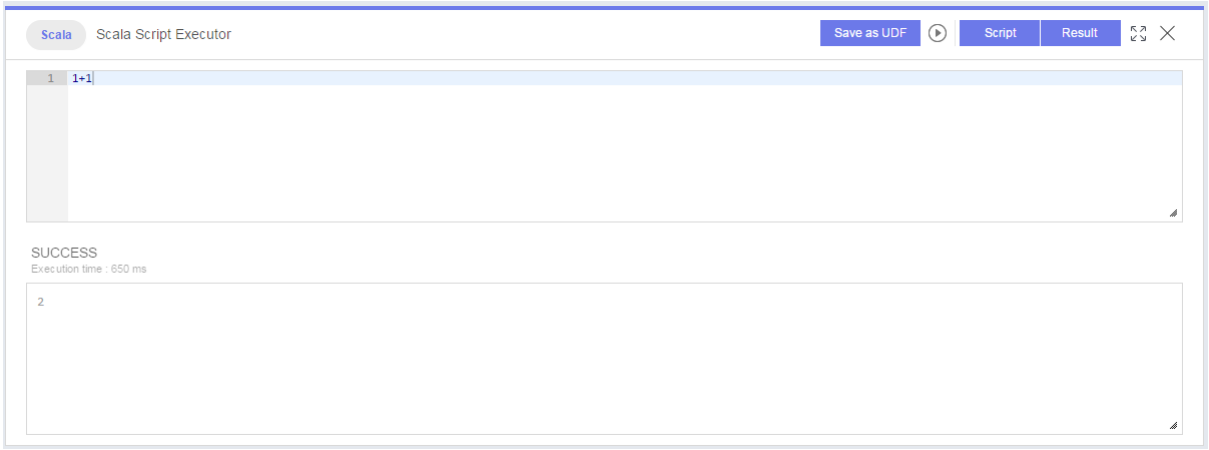
Name	Icon	Description
Add Scala	+ Add Scala	Add Scala Script
Add SQL	+ Add SQL	Add SQL Script
Search Script	-	Search a written Script

[Diagram 3.5-2] Script View Components

3.5.4 Scala Script

Users can write Scala scripts here.



[Figure 3.5-4] Running User-written Scala Script

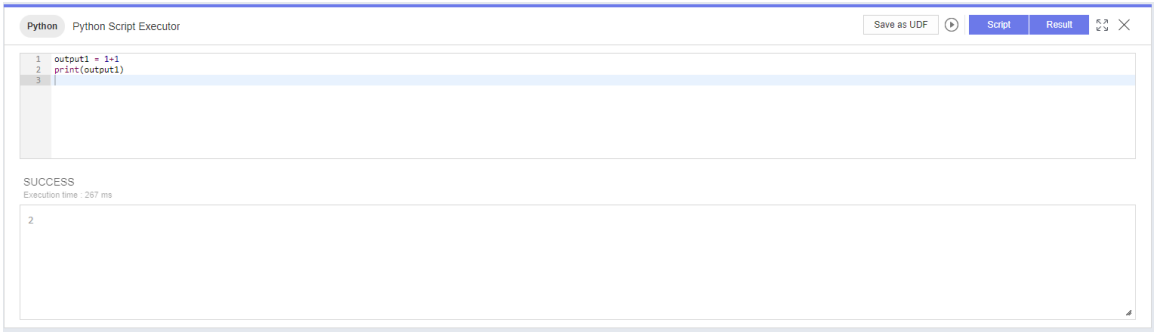
Below are Toolbar components of Scala Script.

Name	Icon	Description
Scala Script Name	-	The name of an added script is displayed and can be changed
Save as UDF	Save as UDF	Save a written Scala script as UDF
Run		Run a written script
Script	Script	Expand/Collapse Script space
Result	Result	Expand/Collapse Result space
Max/Min		Maximize/Minimize a selected script
Remove		Remove a selected script

[Diagram 3.5-3] Scala Script Toolbar Components

3.5.5 Python Script

This is where users can write Python Scripts.



[Figure 3.5-5] User-created Python Scripts in Execution

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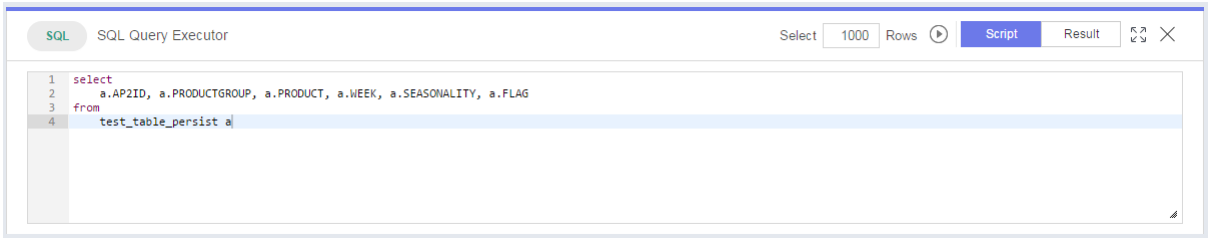
Below are the components of Python Script Toolbar.

Name	Icon	Description
Python Script Name	-	Display an added script's name which is editable
Save as UDF	Save as UDF	Save written Python Script as UDF
Run		Run written Script
Script	Script	Expand/Collapse Script area
Result	Result	Expand/Collapse Result area
Max/Min		Maximize/Minimize a selected Script
Delete		Delete a selected Script

[Diagram 3.5-4] Python Script Toolbar Components

3.5.6 SQL Script

Users can write SQL scripts here.



[Figure 3.5-6] User-written SQL Script

Below are Toolbar components of SQL Script.

Name	Icon	Description
SQL Script Name	-	The name of an added script is displayed and can be changed
Limit	Select 1000 Rows	Define the maximum number of [Select] clauses
Run		Run a written script
Script	Script	Expand/Collapse Script space
Result	Result	Expand/Collapse Result space
Max/Min		Maximize/Minimize a selected script
Remove		Remove a selected script

[Diagram 3.5-5] SQL Script Toolbar Components

3.5.7 Palette View

3.5.7.1 Function Tab

[Function Tab] shows a group of functions available for Scala Scripts. Drag & Drop a function to add to the Scala Script space. If you mouse over , syntax format of a corresponding function is displayed in the Tooltip. If you click the format, it will direct you to [Help Document Page] of the corresponding function.

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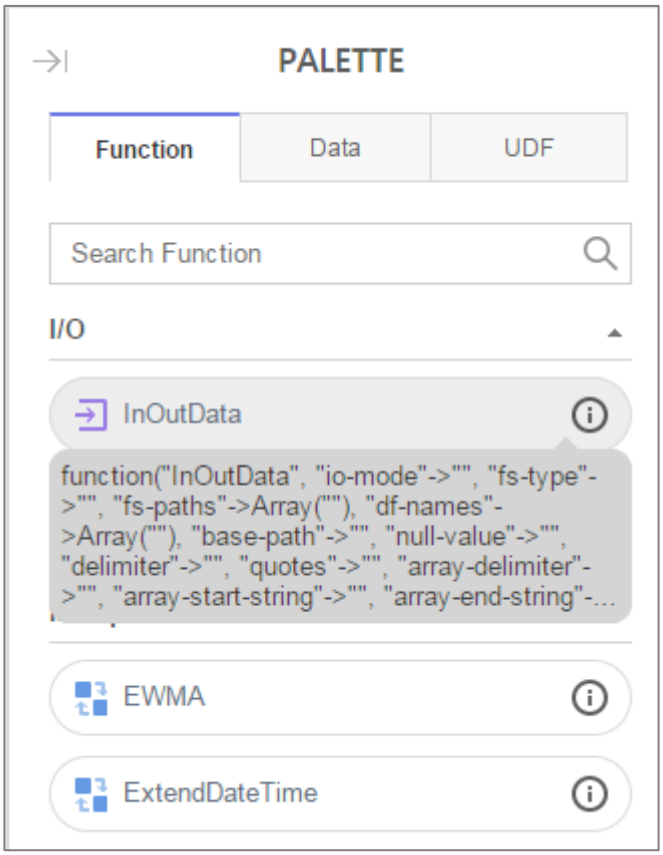
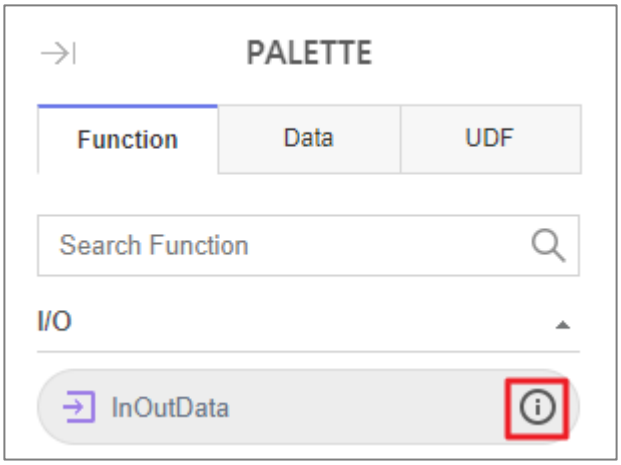


[Figure 3.5-7] Function Tab



[Figure 3.5-8] Link to Help

3.5.7.2 Data Tab

[Data Tab] shows the list of tables stored after running Scala / Python Scripts or Data Flow's Function.

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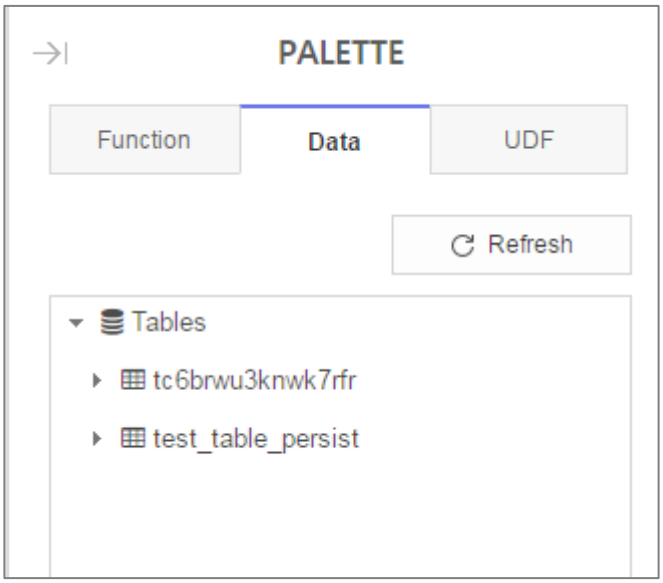
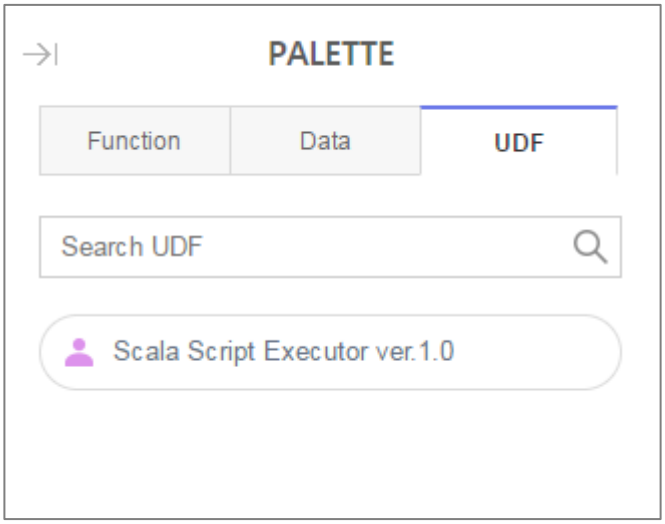


[Figure 3.5-9] Data Tab

3.5.7.3 UDF Tab

[UDF Tab] shows the list of UDFs when adding scripts written in Scala / Python Script as UDF.



[Figure 3.5-3] UDF Viewer

3.6 Deep Learning Model Editor

Deep Learning Model Editor allows you to create a model by training with refined input data and add data to a trained model.

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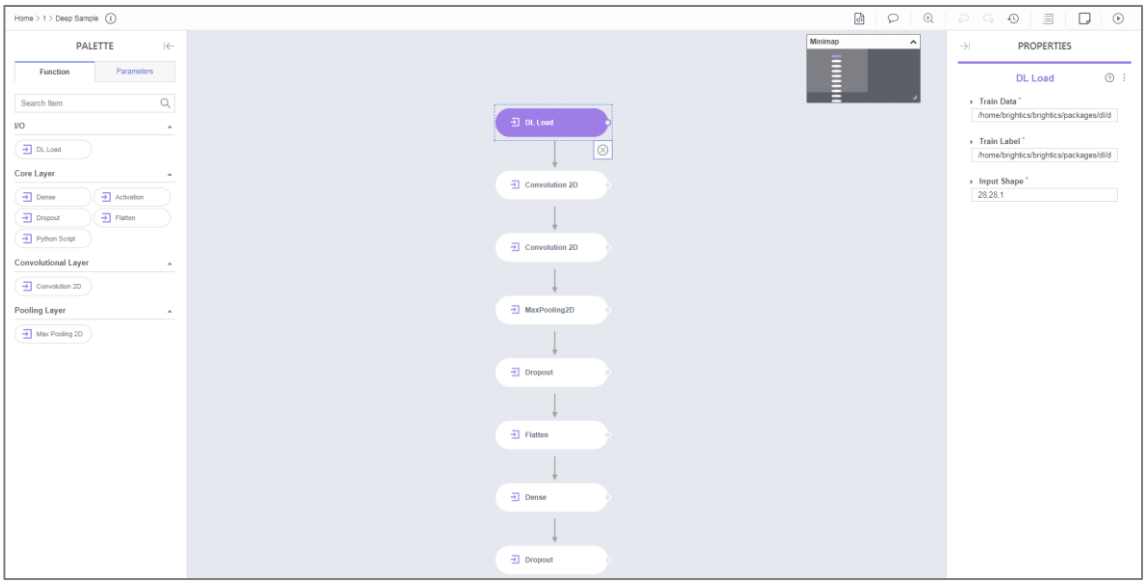

[Figure 3.6-1] Report Editor

3.6.1 Toolbar

Below are Toolbar components.

Name	Icon	Description
Export		Download a currently running model in .py file
Tooltip		When selected, offer a Tooltip to a function, which allows users to write a memo
Zoom		Zoom in/out a Diagram
Undo		Undo a task.
Redo		Redo a task
History		Call a popup to show the history of tasks
Index		Offer an index of a function written in Diagram. If you click it, focus is shifted to a selected function.
Summary		Display a layer of a currently running model and expected results
Run		Call a popup to execute a function written in Diagram. The called dialog allows you to run/stop a model and see current status and results.

[Diagram 3.6-1] Toolbar Components

3.6.1.1 Run

Click [Run] button at the bottom right corner to execute a written model.

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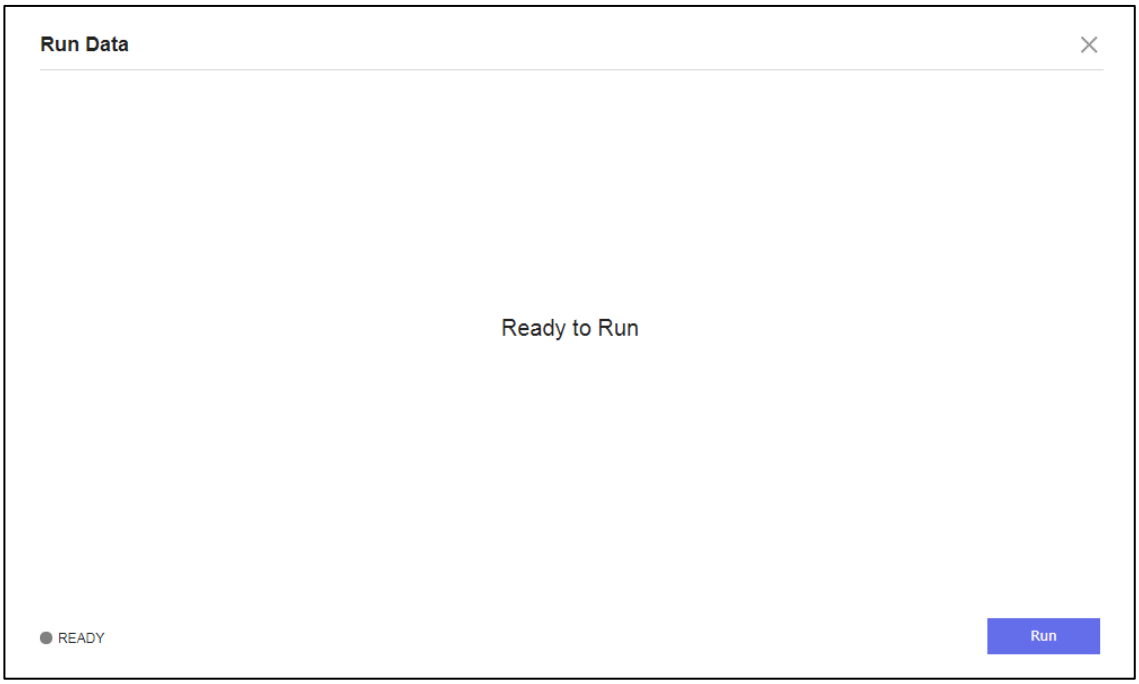
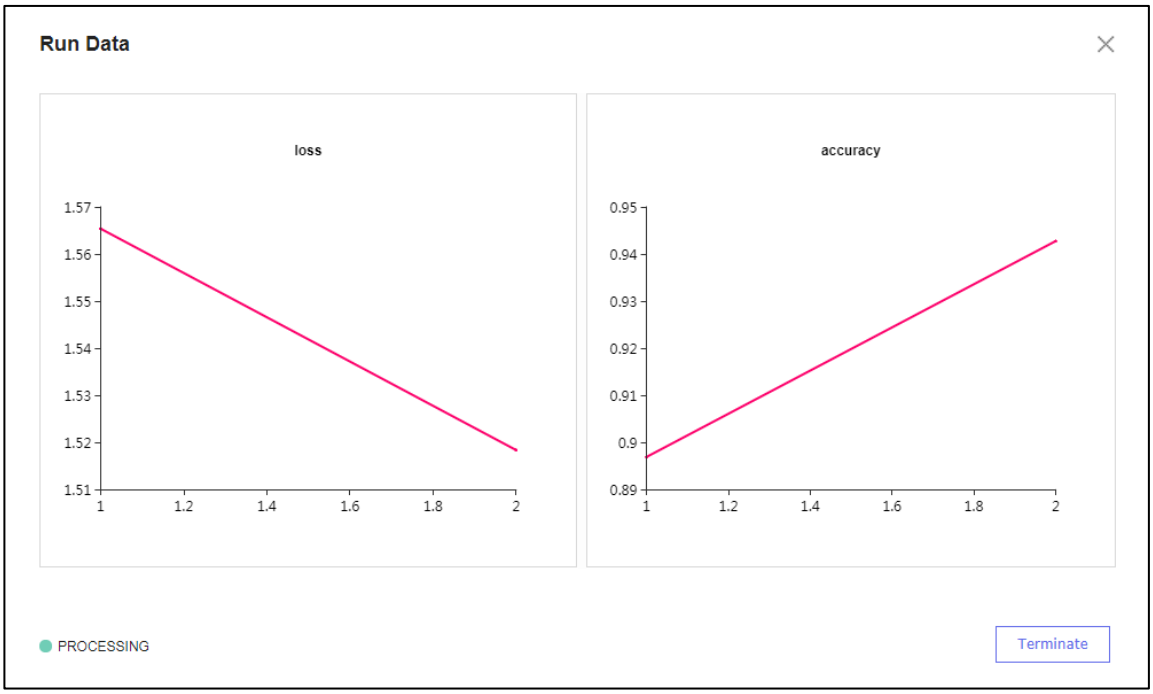


[Figure 3.6-2] RunData Dialog – Run

3.6.1.2 Stop

Click [Terminate] button at the bottom right corner to stop a currently running model



[Figure 3.6-3] RunData Dialog - Stop

3.6.1.3 Success

Users can see the results of model execution, its loss and accuracy. If you click [Run] button, you can execute it again.

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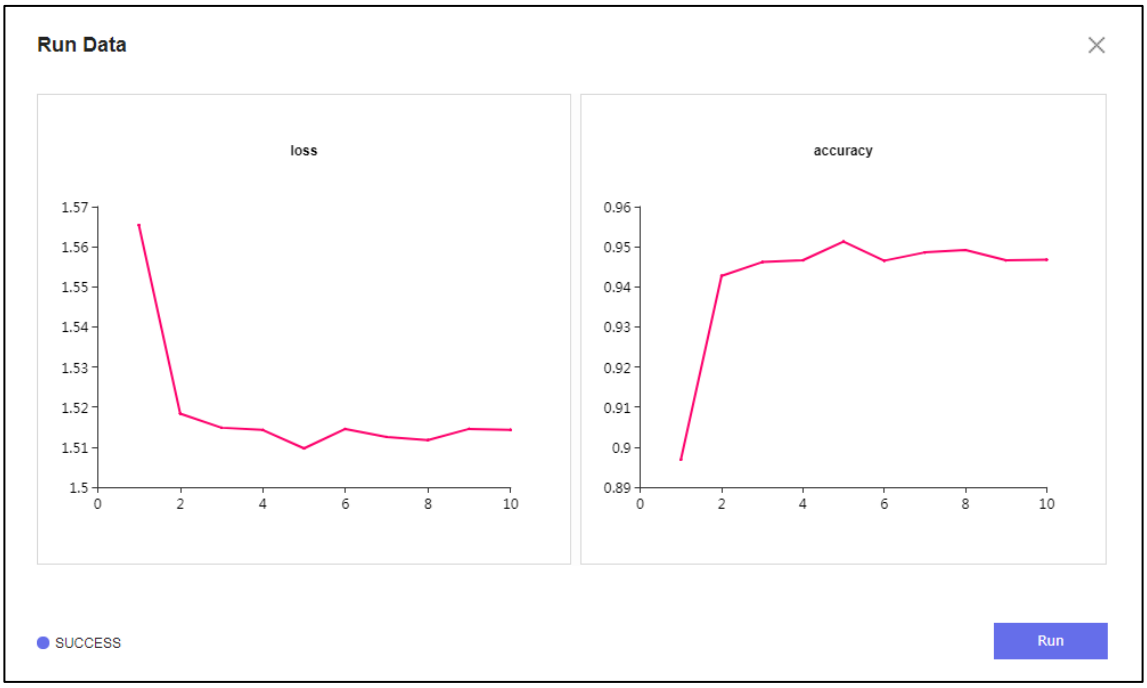

[Figure 3.6-4] RunData Dialog - Success

3.6.1.4 Fail

Below message is displayed when a model stopped due to a user request or an exception. Click [Detail] button to see more information of an error.

[Figure 3.6-5] RunData Dialog - Fail

3.6.2 Diagram Editor

Deep Learning Diagram Editor allows you to see the flow of an analytics model and add, modify, delete or selectively choose a Layer Function.

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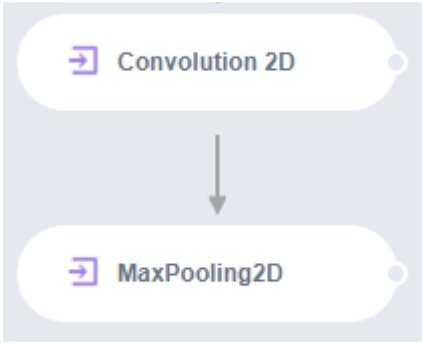
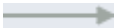


[Figure 3.6-6] Deep Learning Diagram Editor

Below are the components of Diagram Editor.

Name	Icon	Description
Function		If you select a function used for a model, the information on the selected function is displayed in [Properties View] on the left of [Deep Learning Diagram Editor] screen.
Add Function		This icon becomes visible when you mouse over an empty space in Editor. Call a popup to select a function by clicking the icon.
Connection		This line connects a function with another function. The output of the starting point becomes the input of the arriving point. Multiple lines can be sent or received. (varying by function)

[Diagram 3.6-2] Diagram Editor Components

3.6.2.1 Function Mouse Over

Below components become active when you mouse over a function created in the Diagram.

[Figure 3.6-7] Menu Available When Mousing Over a Function

Name	Icon	Description
Select Function		Call a Popup to change a selected function into another function
Connection		Connect a selected function to another function. Drag and drop to a function you want to connect to
Clone Function		Copy a selected function. Drag and drop to a desired location.
Remove Function		Delete a selected function

[Diagram 3.6-3] Menu Components for Function Mouse-Over

Note	Connection always goes from top to bottom ONLY.

3.6.2.2 Selectively Choose a Diagram

Below components appear when you selectively choose a diagram in [Deep Learning Diagram Editor].

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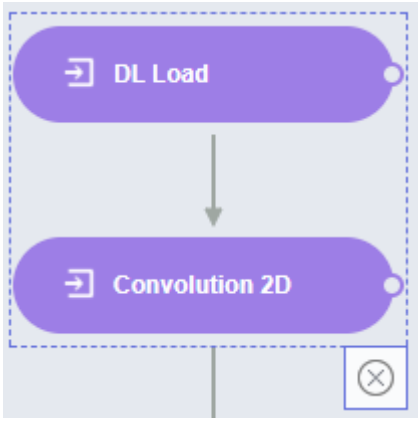


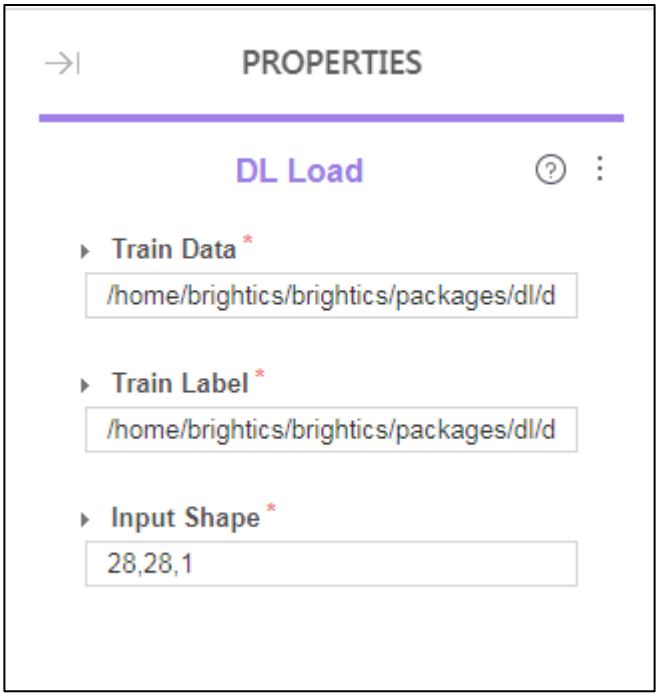
[Figure 3.6-8] Selectively Chosen Diagram

Name	Icon	Description
Remove		Delete selected functions

[Diagram 3.6-4] Menu Components for Selectively Chosen Diagram

3.6.3 Properties View

Properties View allows you to dynamically change parameters of a function.



[Figure 3.6-9] Properties View

3.6.4 Palette View

Palette View consists of [Function Tab] with the list of available functions for Deep Learning Model Editor and [Parameters Tab] with the list of common parameters.

3.6.4.1 Function Tab

[Function Tab] shows the list of available functions in Deep Learning Model Editor. You can find a desired function by entering a keyword. When you select a function and drag and drop to a desired location in Deep Learning Model Editor, a selected function will be created.

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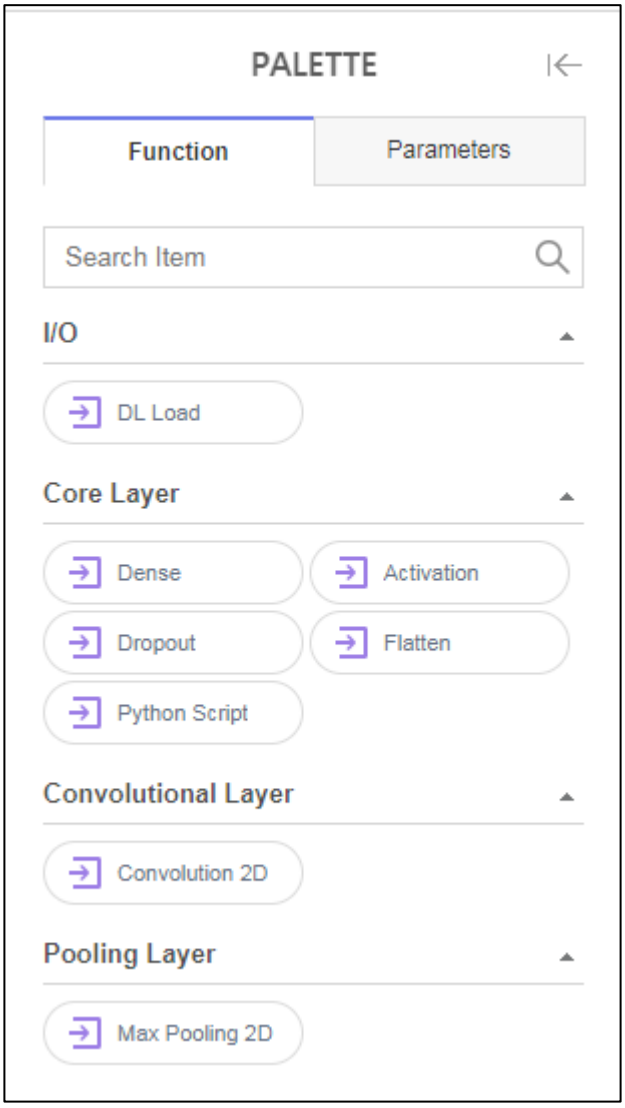

[Figure 3.6-10] Function Tab

Name	Icon	Description
Search Item	-	Enter a Keyword to see the list of matching functions

[Diagram 3.6-5] Function Tab Components

3.6.4.2 Parameters Tab

[Parameters Tab] shows the list of editable common parameters of Deep Learning Model.

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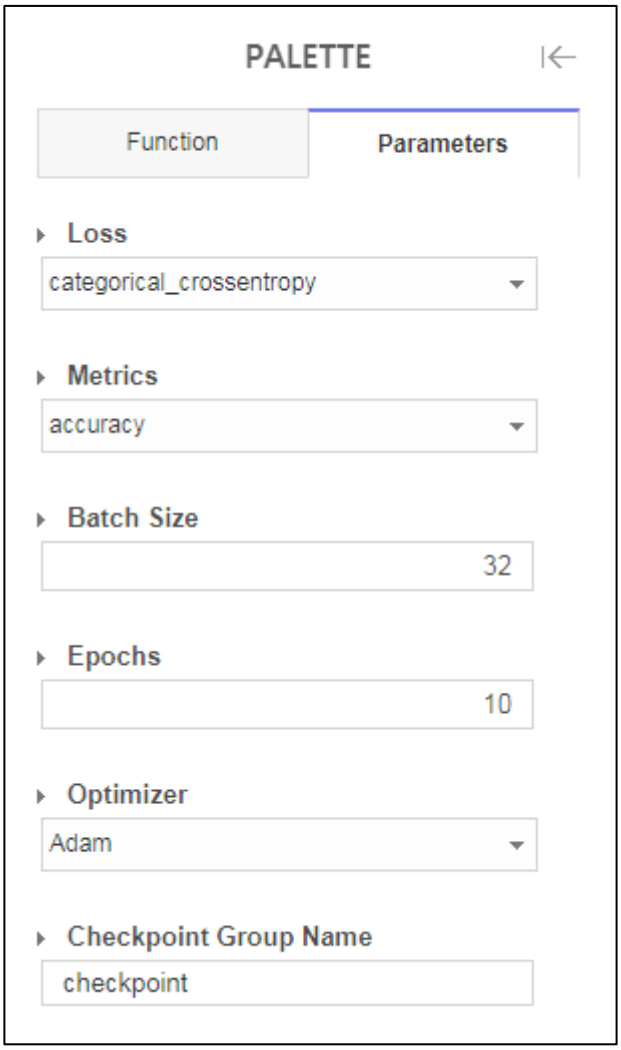

[Figure 3.6-11] Parameters Tab

3.7 Report Editor

[Report Editor] has Modeling functionality to help easily write a report using the data generated from analysis.

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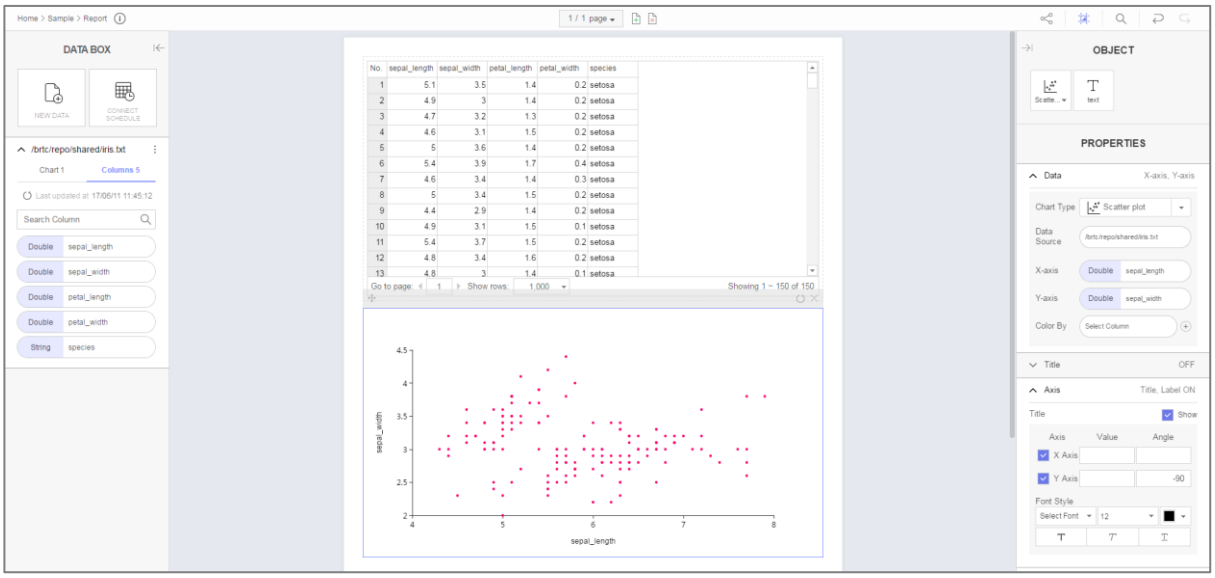

[Figure 3.7-1] Report Editor

3.7.1 Toolbar

Below are Toolbar Components.

Name	Icon	Description
Model Info		Show a brief information of a currently running model
Thumbnails	-	Thumbnails show the preview of each page and allow you to change the order of pages
Add Page		Add a page
Remove Page		Remove a page
Refresh		Refresh a report data
Publish		Publish a report
Content Outline		Change the outline settings of contents in the Report
Zoom		Change the diameter of diagram and display the result
Undo		Undo a task
Redo		Redo a task

[Diagram 3.7-1] Toolbar Components

3.7.2 Page Editor

In Report, you can add or edit chart, table and text unit in each added page.

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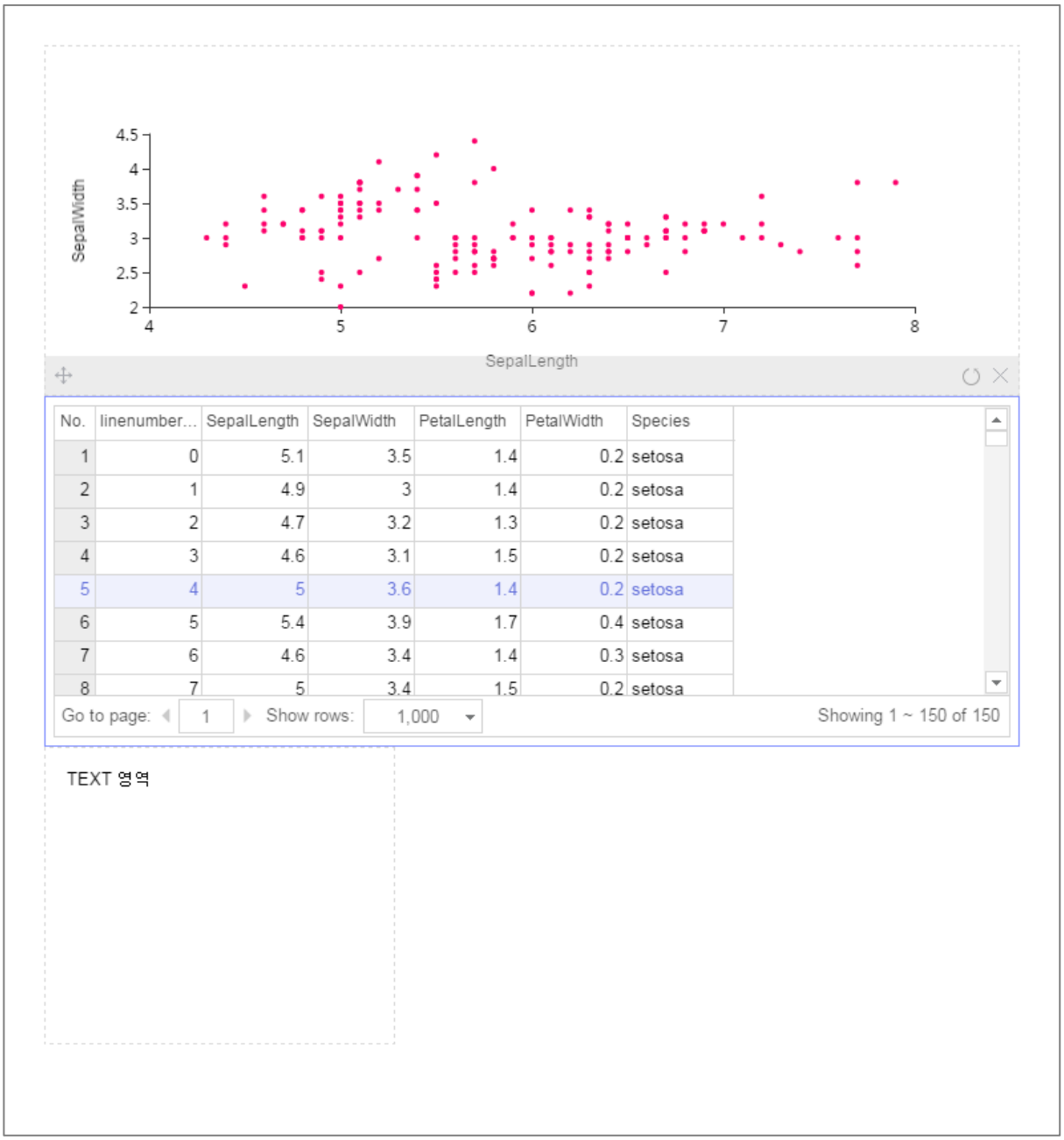

[Figure 3.7-2] Page Editor

Below are the components of Page Editor Content.

Name	Icon	Description
Refresh		Load data again from data source defined at [Content]
Remove		Remove a corresponding content

[Diagram 3.7-2] Page Editor Content Components

3.7.3 Data Box View

[Data Box View] shows the list of Data Sources linked to a report and allows you to add/modify the name/remove/refresh Data Source, remove Chart Template, and connect Data Source Schedule.

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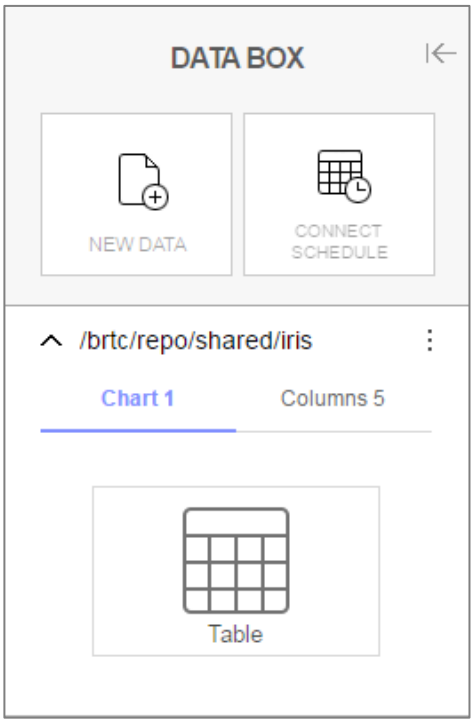

[Figure 3.7-3] Data Box View

Below are [Data Box View] components.

Name	Icon	Description
New Data		Create a new data source
Connect Schedule		Change created data sources into schedule data
Data Source Menu	-	Modify/remove the name of data source and/or connect schedule data

[Diagram 3.7-3] Data Box View Components

3.7.4 Object/Properties View

[Object/Properties View] allows you to add a new content or define options for a selected content. If a content is NOT selected, you can change Page properties.

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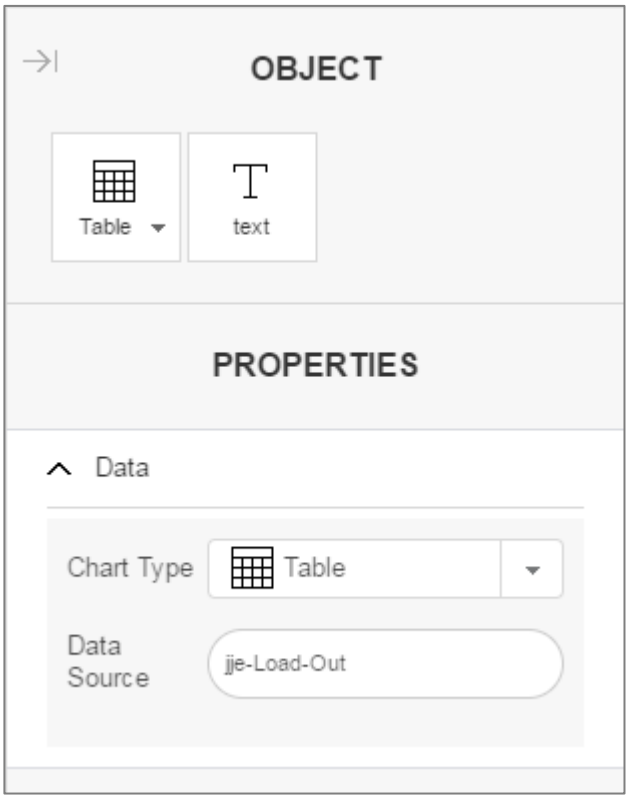


[Figure 3.7-4] Object/Properties View

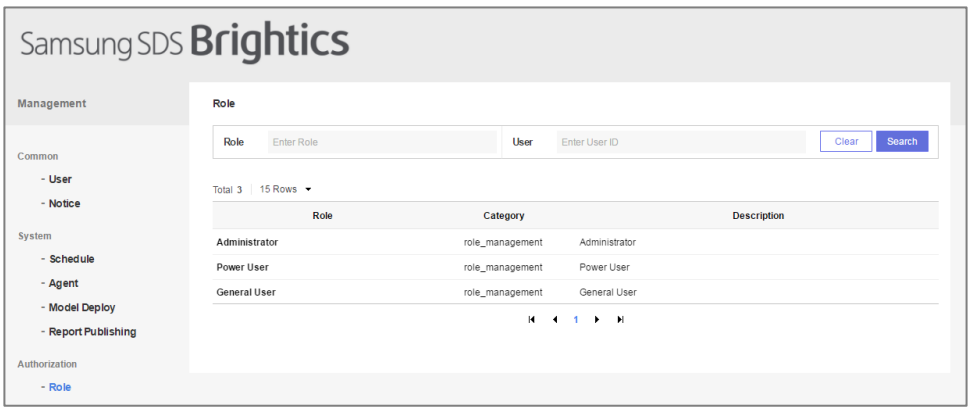
Below are the components of Object/Properties View.

Name	Icon	Description
Add Chart		If the selected content is a chart, the icon is changed to corresponding chart. You can open the list of charts and add a desired chart to the page.
Add Text		Add a text content to the page
Properties	-	Show the properties of a selected content. Any change you make is incorporated into the content.

[Diagram 3.7-4] Object/Properties View Components

3.8 Management

[Management] allows you to manage User, Notice, Schedule, (Spark) Agent, Deploy, Publish, Role, and Datasource.



[Figure 3.8-1] Management

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Name	Description
User	Show the list of users with features to add/modify/remove a user
Notice	Show the list of notices with features to add/modify/remove a notice
Schedule	Schedule List shows the status and the history of schedules, enabling to add/modify/remove a schedule
Agent	Show the list of agents with features to add/modify/delete an agent
Model Deploy	Show the list of deployments with features to remove/download a deployed model
Report Publishing	Show the list of published reports and you can copy a link and embed code
Role	Define the role of each user.
Datasource	Show the list of datasource with features to add/modify/delete a datasource

[Diagram 3.8-1] Management Components

Note	Access to a specific admin page can be restricted depending on the pre-defined user's role

4 Getting Started

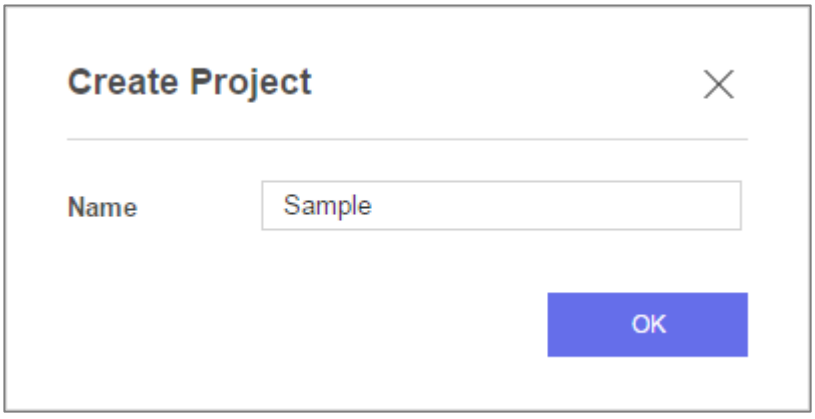
This chapter basically describes how to use Brightics 3.0 Suite Visual Analytics for analysis.

- Section 4.1 Create a Project
- Section 4.2 Create an Analytics Model
- Section 4.3 Create Data Load Function and Upload Data
- Section 4.4 Create and Run Manipulation Function
- Section 4.5 Create an Analytics Function and Display a Result

4.1 Create a Project

A. Click + in the Project View

B. Enter *Name* in [Create Project] window and click **OK** button



[Figure 4.1-1] Create Project

C. [Project List] shows the added project

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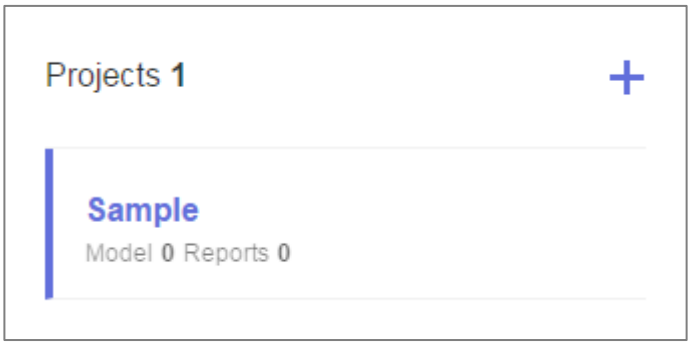
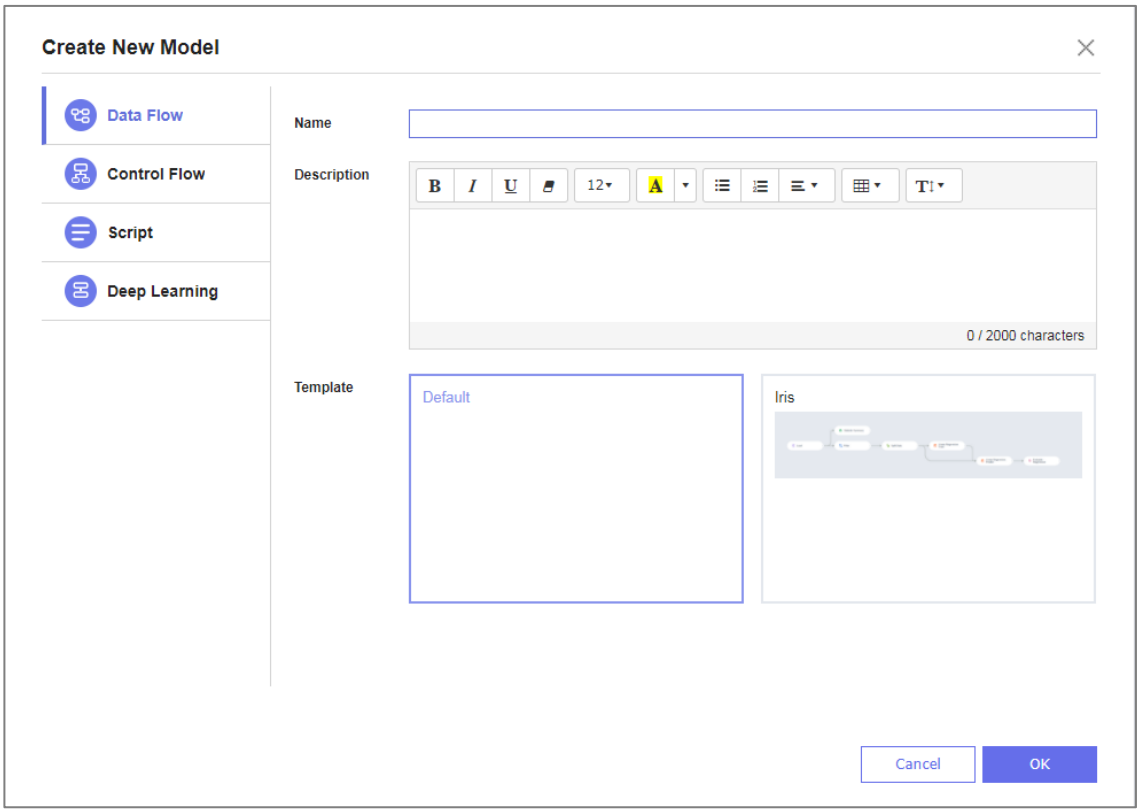


[Figure 4.1-2] Project List after Addition

4.2 Create an Analytics Model

A. Click button in the [Project View]

B. After selecting a model type, enter *Name* and click **OK** button.



[Figure 4.2-1] Create New Model

C. An Analytics model is created based on input data, and the screen is switched to [Model Editor].

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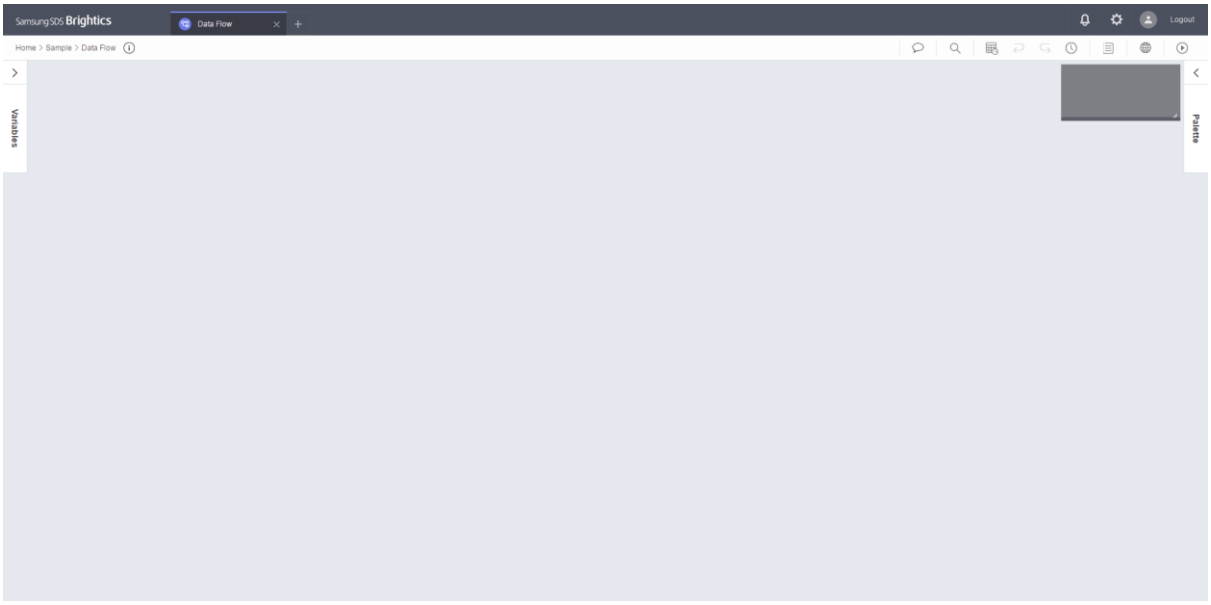

[Figure 4.2-2] Screen after Model Creation

4.3 Create Data Load Function and Upload Data

A. Open right-sided [Palette View] and create a Load Function with Drag and Drop.

[Figure 4.3-1] Create Load Function

B. Select a created Load Function to enable [Properties Panel]. Click **Input Path** to enable [Browse Repository] window.

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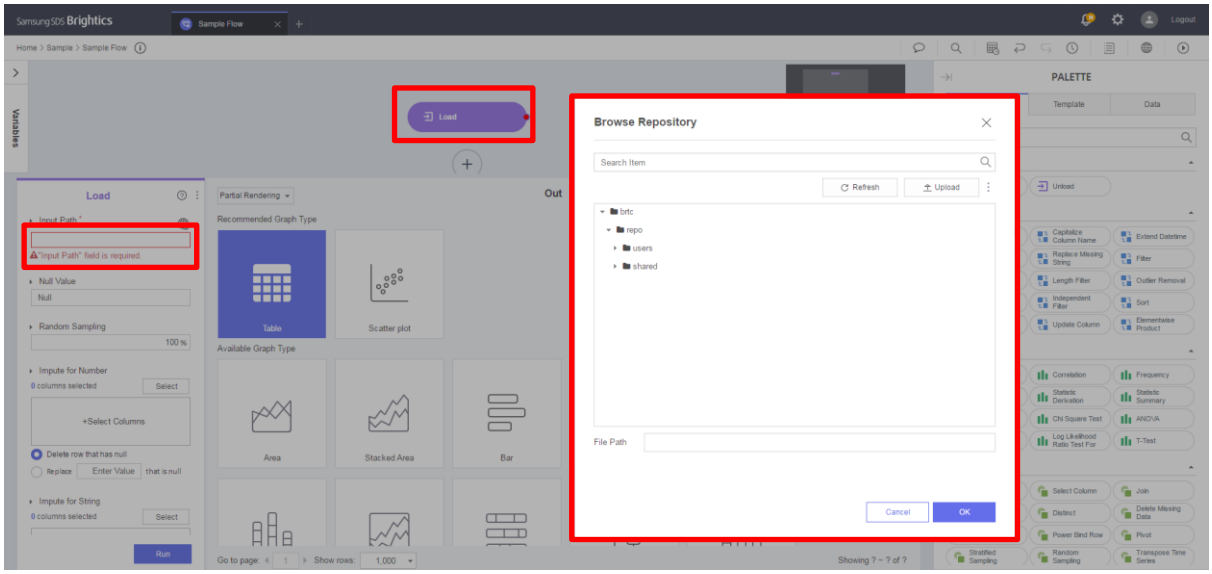
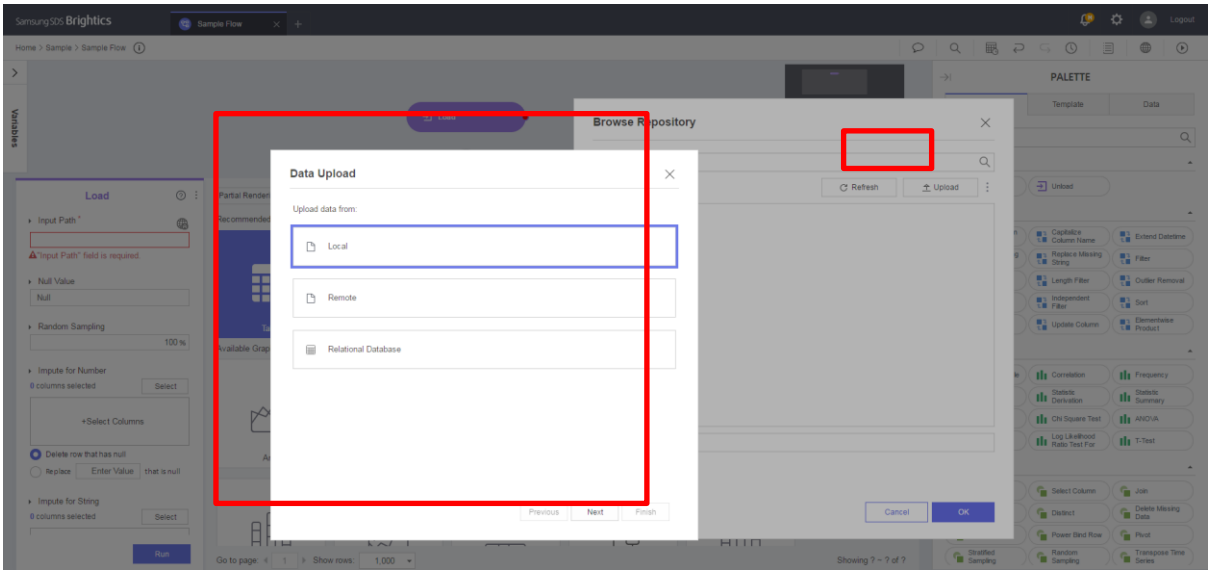


[Figure 4.3-2] Define Properties after Creating Load Function

C. Click [Data Upload] button to enable Data Upload Wizard.



[Figure 4.3-3] Data Upload Wizard

D. Select **Local** and click **Next** button. If you click **Local** button at [Select Data] phase and select a CSV file from user's PC, the preview of the selected data will appear. [Upload To] is set to User by default.

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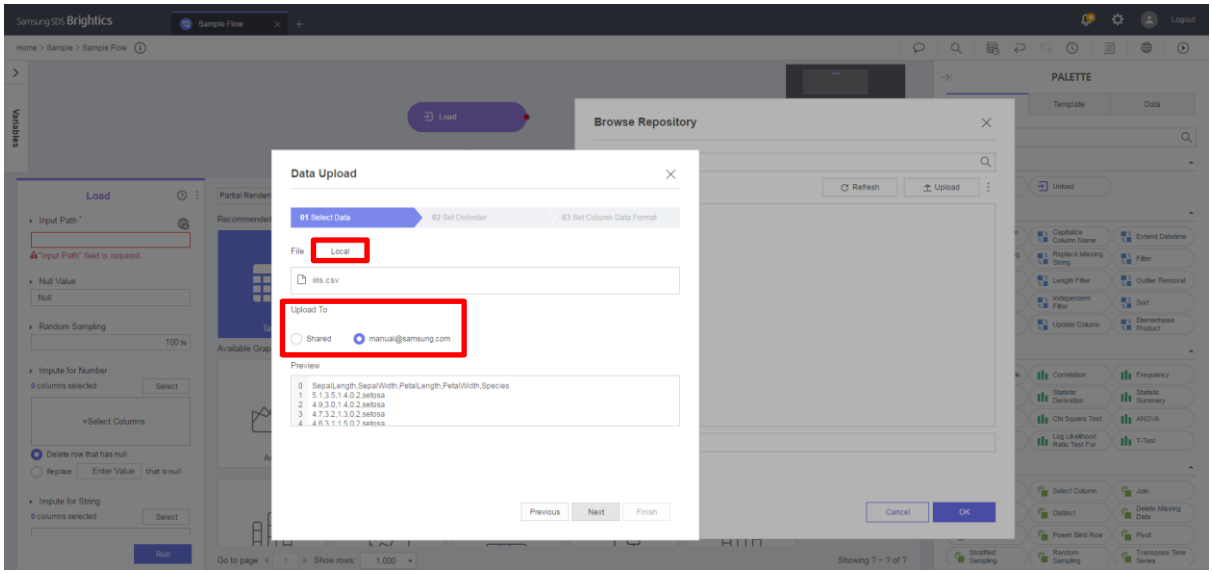
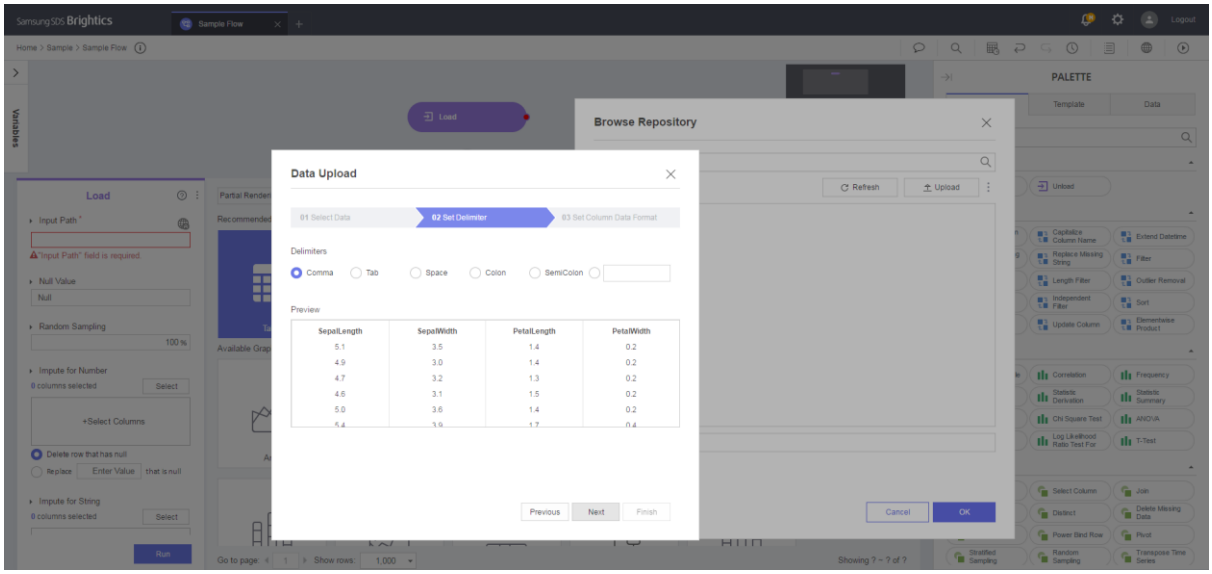


[Figure 4.3-4] Select Data

E. Click **Next** button to move to [Set Delimiter] phase. Select a proper delimiter to change the Preview.



[Figure 4.3-5] Set Delimiter

F. Click **Next** button and move to [Set Column Data Format] phase. You can change column type at [Set Column Data Format] phase.

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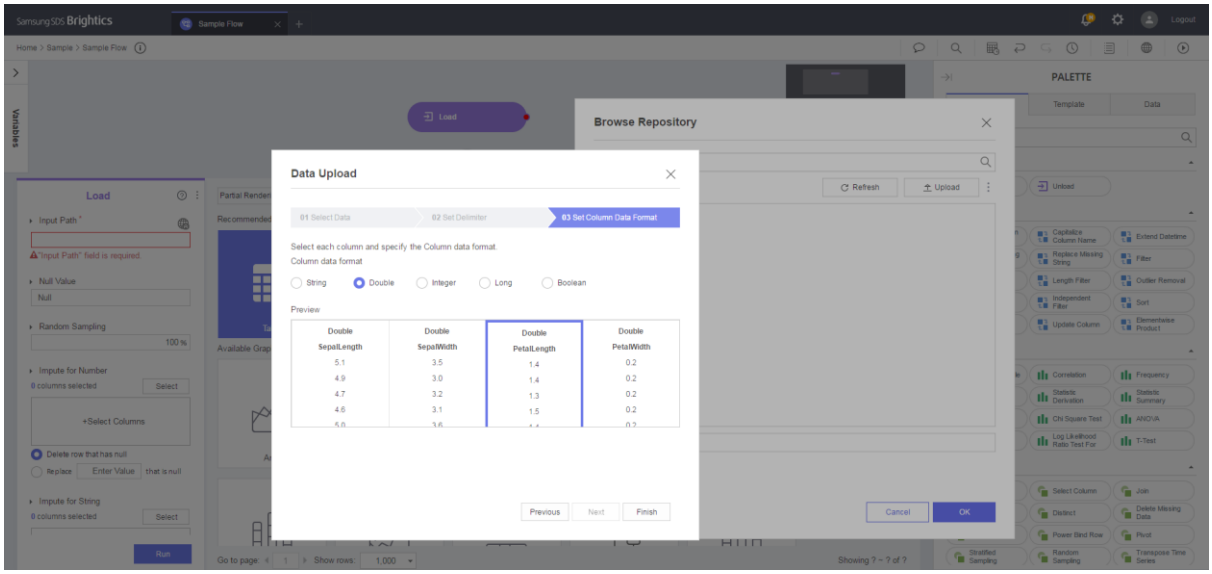
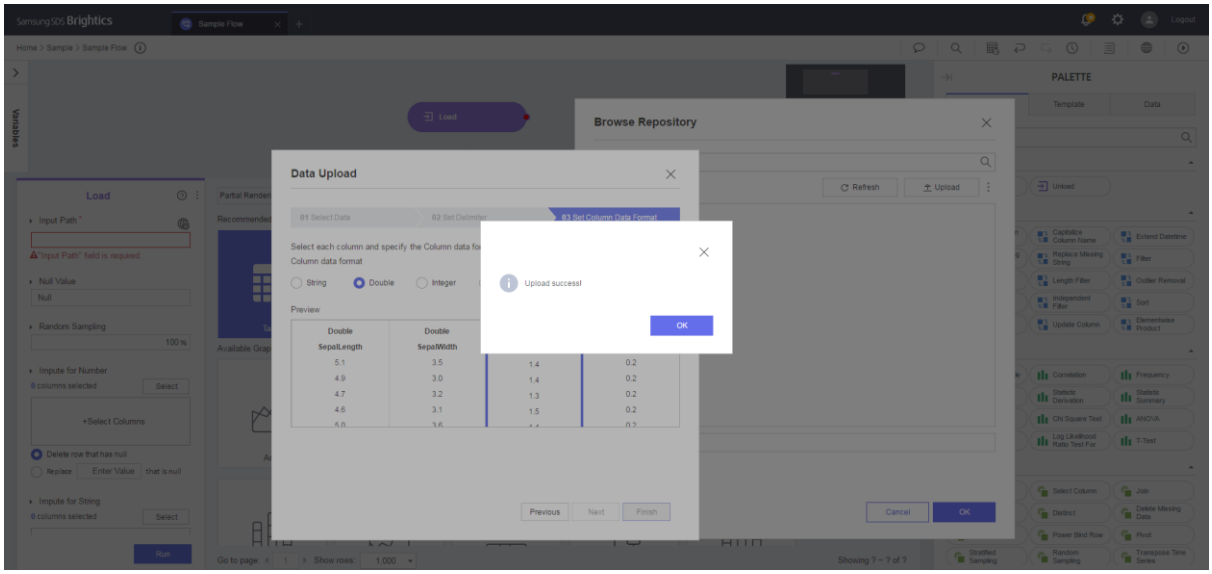


[Figure 4.3-6] Set Column Data Format

G. If you click **Finish** button upon completing configuration, data is uploaded.



[Figure 4.3-7] Data Upload Success

H. If you return to [Browse Repository] and view folders under Users, you will the list of uploaded data. Clikc the data and **OK** button.

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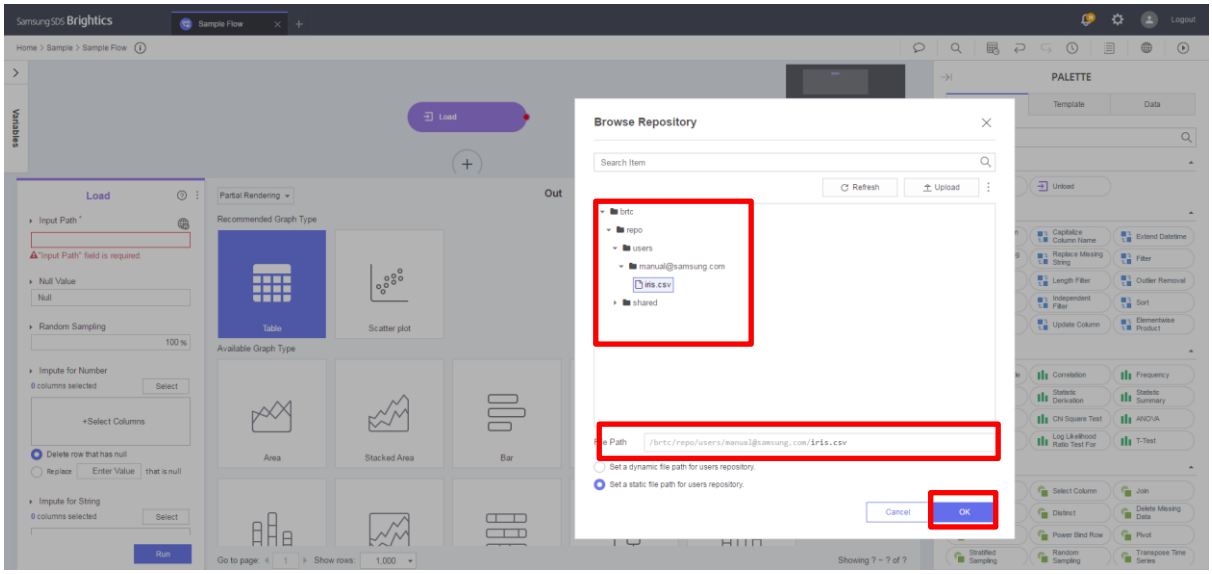
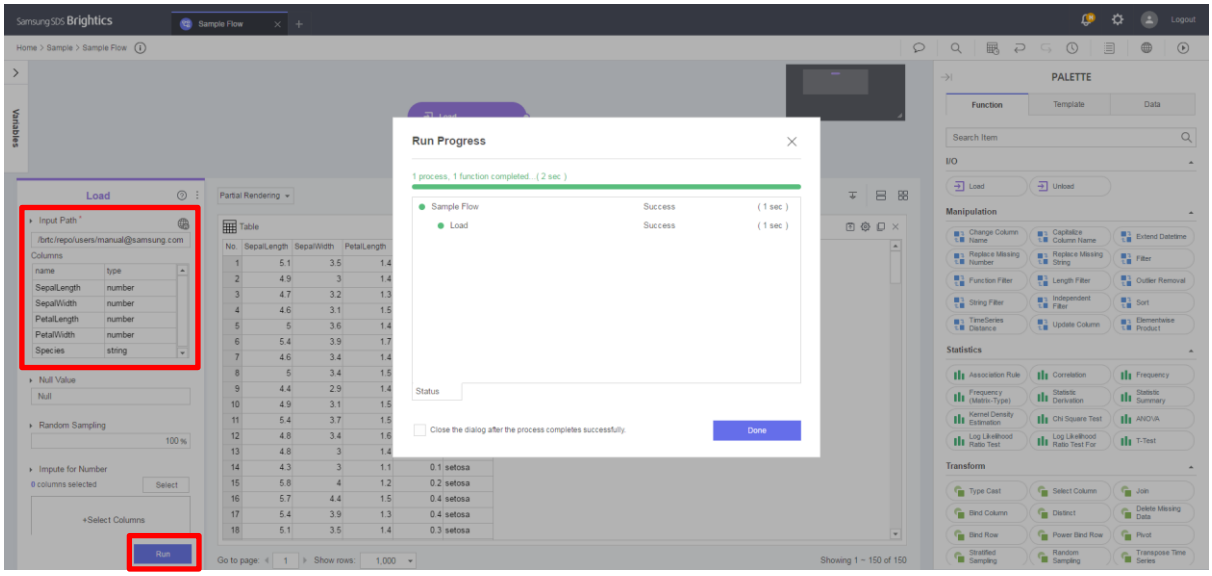


[Figure 4.3-8] Select Data

I. If Column is properly represented, Click **Run** button to load data. If properly run, corresponding data will be shown at the right-side Out Data Panel.



[Figure 4.3-9] Run Load Function

4.4 Create and Run Manipulation Function

A. Open right-sided [Palette View] and create Sort Function with Drag & Drop. If the function is created right behind Load Function, the two will be connected automatically. And if you select Sort Function, the output of the previous function will be shown as In(put) Data.

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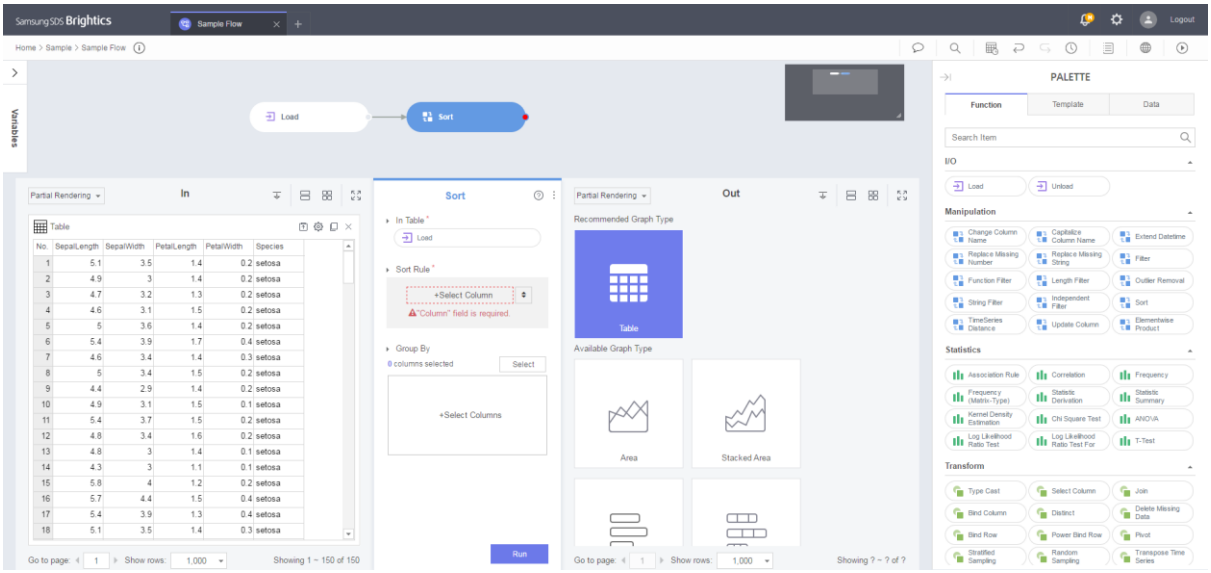
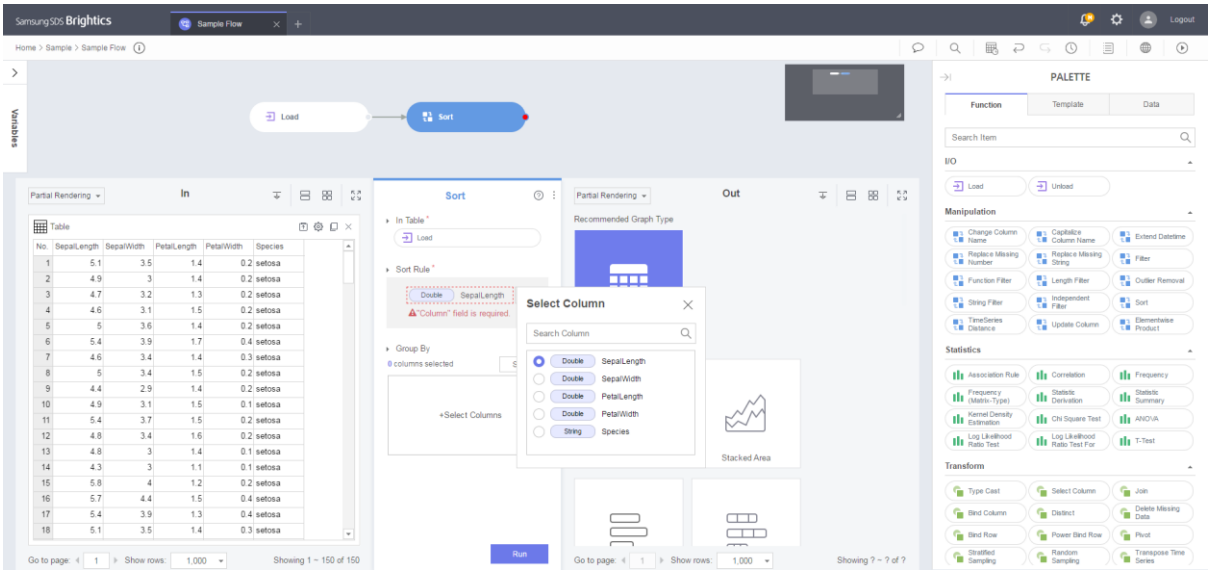


[Figure 4.4-1] Create Sort Function

B. Click **[Select Column]** and select a column to align from Column list



[Figure 4.4-2] Select a Column to Align

C. Click **Run** button to run a function.

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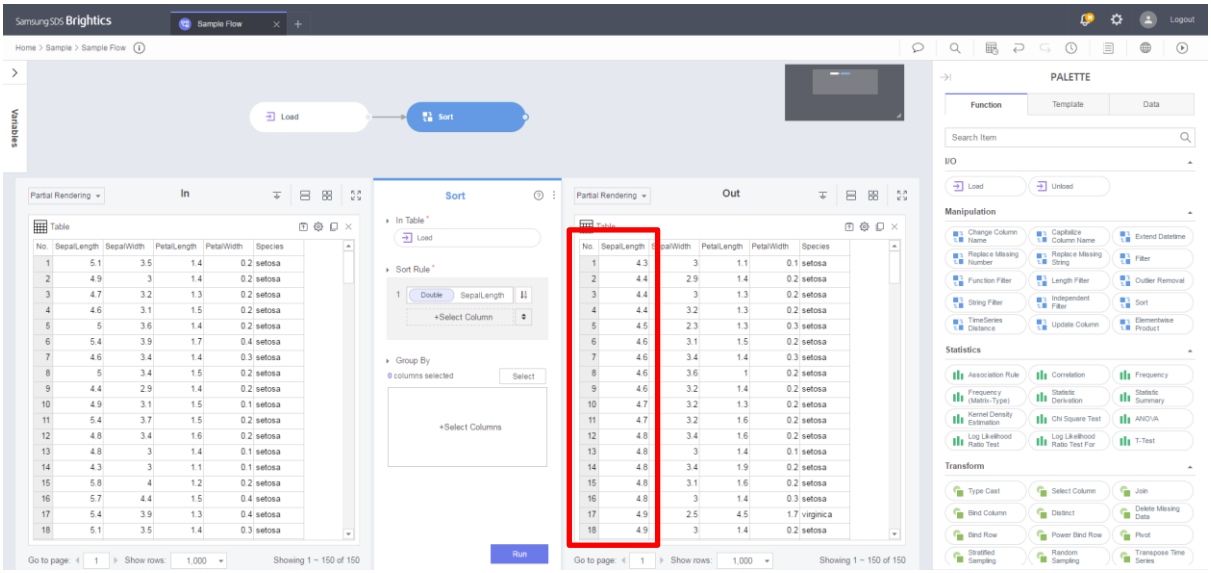
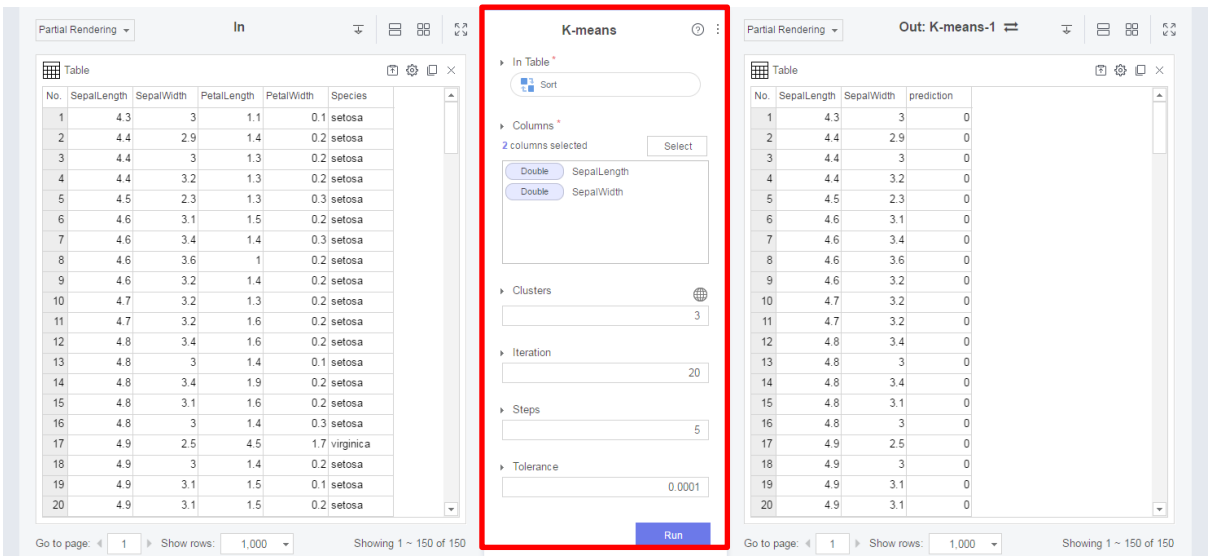


[Figure 4.4-3] Alignment Result

4.5 Create an Analytics Function and Display a Result

A. Create K-means Function from [Palette] and select ‘SepalLength’ and ’SepalWidth’ for *Columns* Parameter. Define *Clusters* Parameter as ‘3’and click **Run** button.



[Figure 4.5-1] K-means Parameter Definition and Execution Result

B. Click button in [Out Data Panel] to enable Option widnow. If you select *Chart Type* and ‘Scatter Plot’ afterwards, Table will be changed into Chart.

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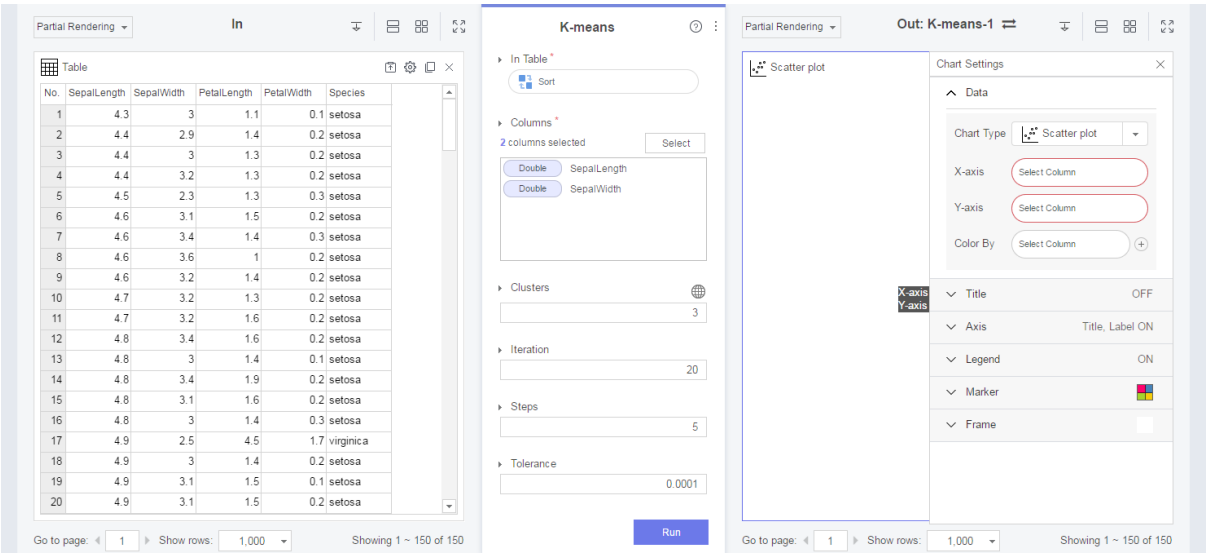
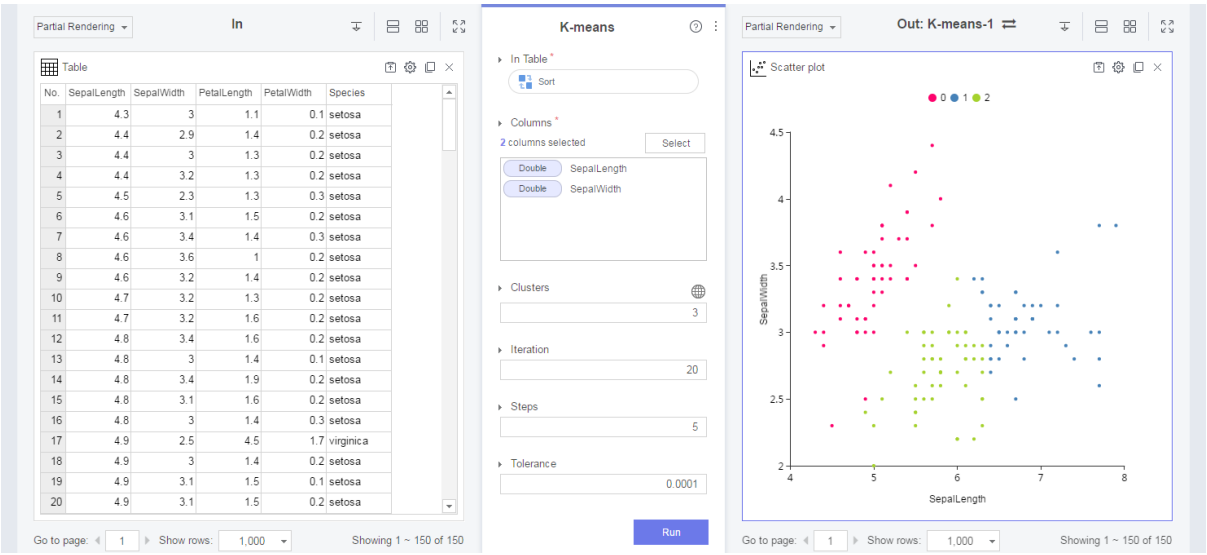


[Figure 4.5-2] Change Chart Type

C. If you set *X-axis, Y-axis and Color By* as ‘SepalLength’,‘SepalWidth’, and ‘Prediction’ respectively, you can see the clustering results in Scatter Chart.



[Figure 4.5-3] K-means Result

5 Tasks

This chapter describes how to use Brightics 3.0 Suite Visual Analytics features respectively.

- Section 5.1 Use Project View
- Section 5.2 Use Data Flow Model Editor
- Section 5.3 Use Control Flow Model Editor
- Section 5.4 Use Script Model Editor
- Section 5.5 Use Deep Learning Model Editor
- Section 5.6 Use Report
- Section 5.7 Use Management

5.1 Use Project View

Project View consists of [List] to see Project/Model list and [Menu] buttons to create, modify and remove a Project/Model.

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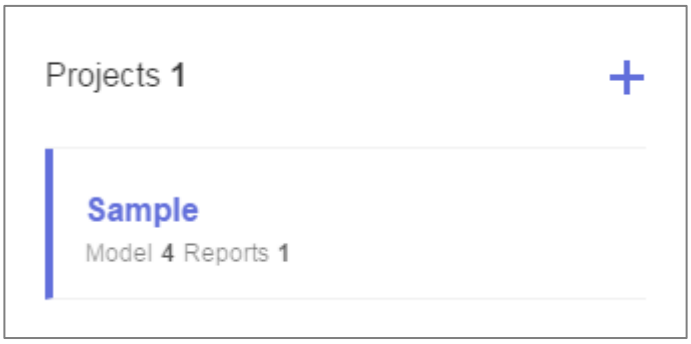
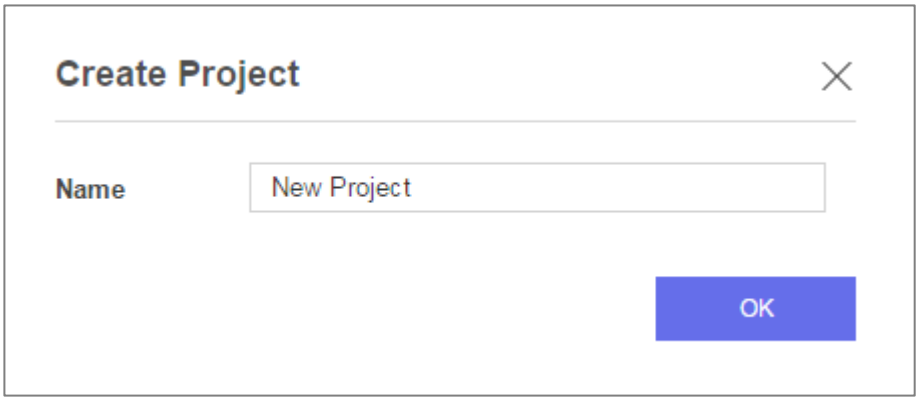
5.1.1 Create a Project

A. Click + from Project View.



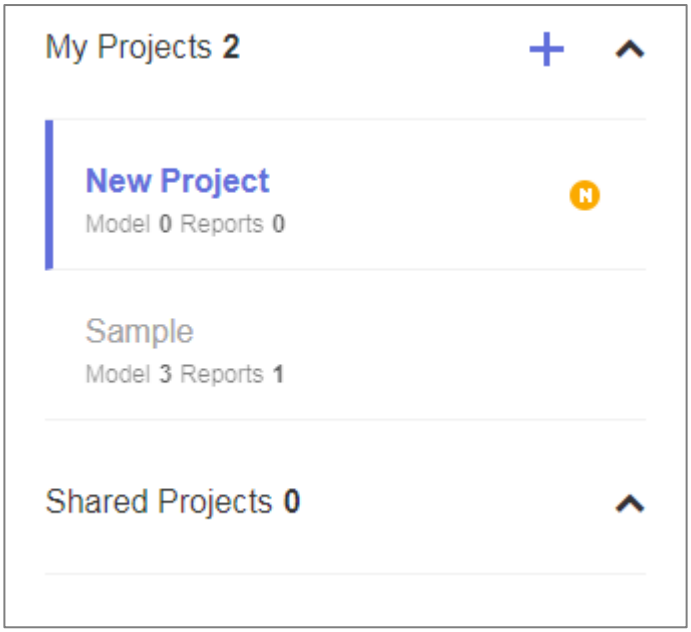
[Figure 5.1-1] Project

B. Enter a *Name* in [Create Project] window and click **OK** button.



[Figure 5.1-2] Create Project

C. Project List shows the project that you have entered.



[Figure 5.1-3] Project List after Addition

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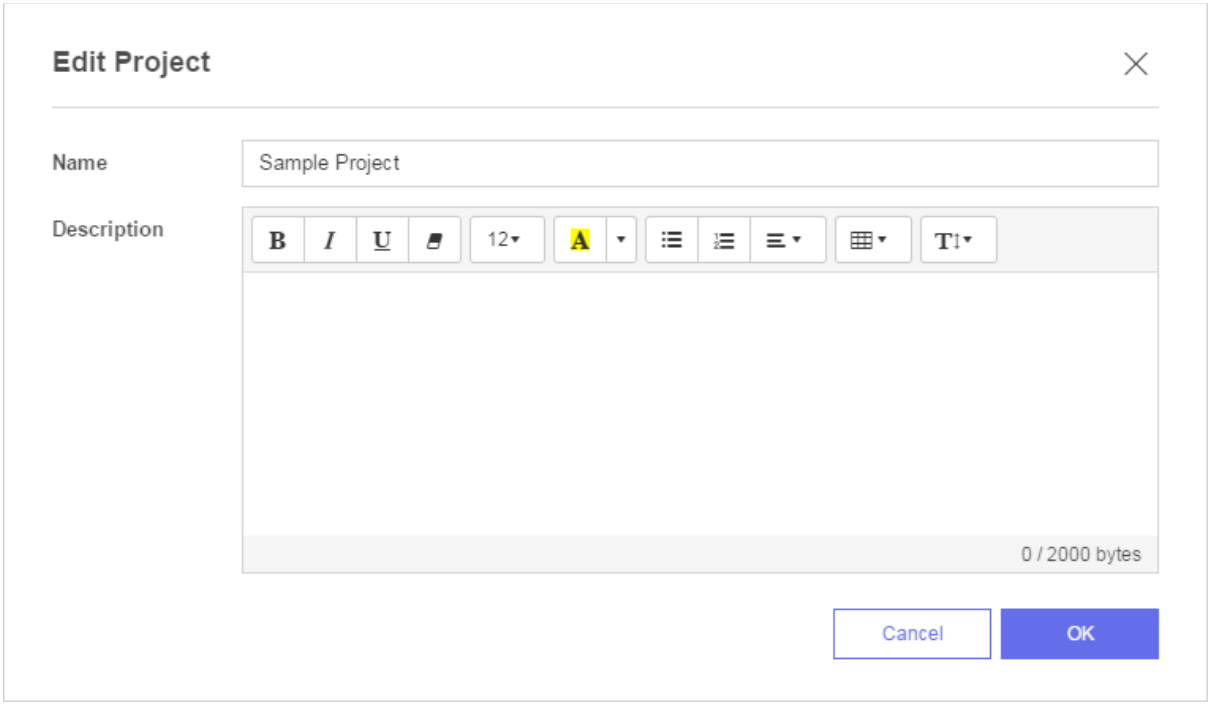
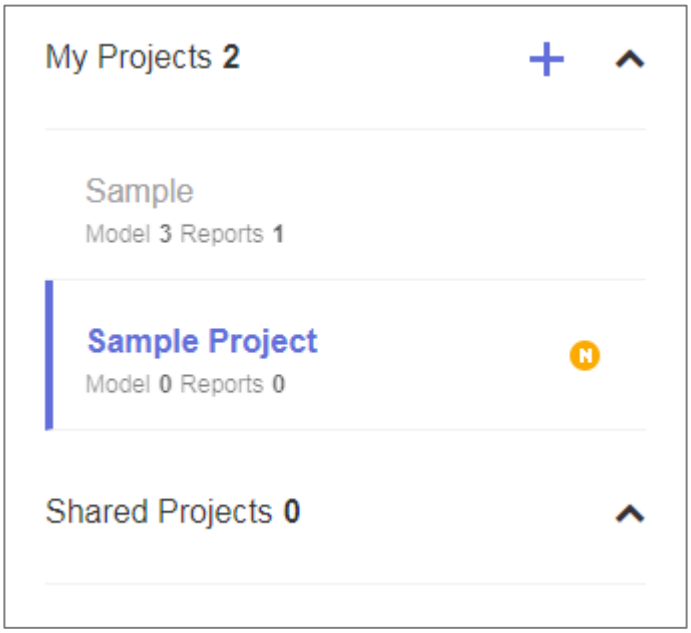
5.1.2 Modify a Project Name

A. Click button at the top right of [Project] window and select **Edit** button to enter a new *Name* for modification, then click **OK** button.



[Figure 5.1-4] Edit Project

B. Project List shows a modified project name.



[Figure 5.1-5] Project List after Modification

5.1.3 Delete a Project

A. Click button at the top right of [Project] window and select **Delete**.

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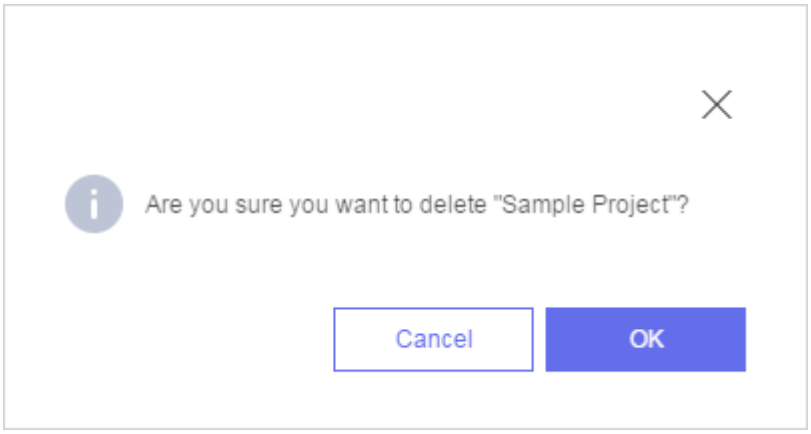
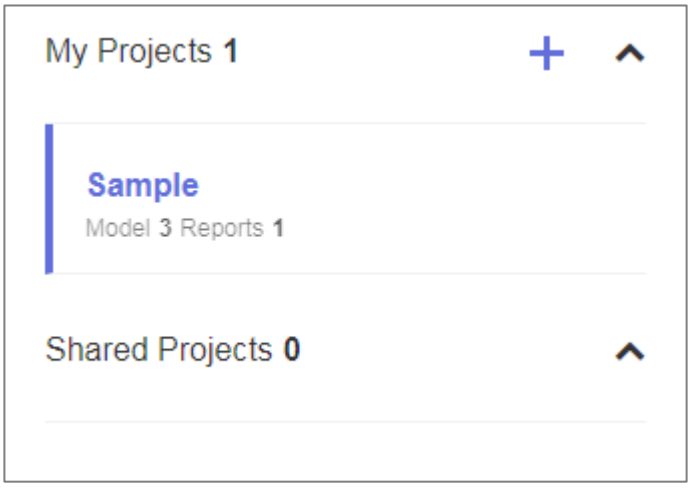


[Figure 5.1-6] Delete Project

B. Click **OK** button to delete the Project.



[Figure 5.1-7] Project List after deletion

5.1.4 Create an Analytics Model

A. Click button from Project View.

B. Select a model type and enter a *Name* then click **OK** button.

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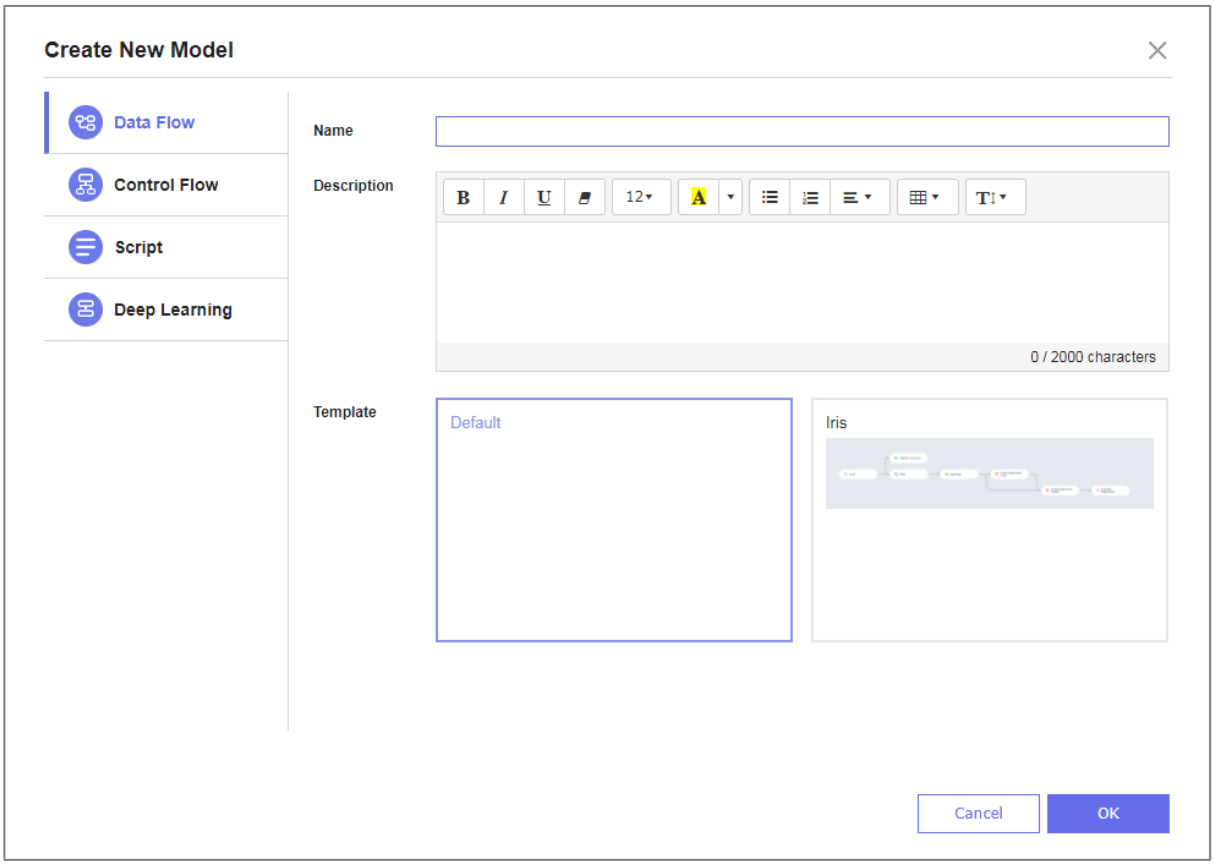
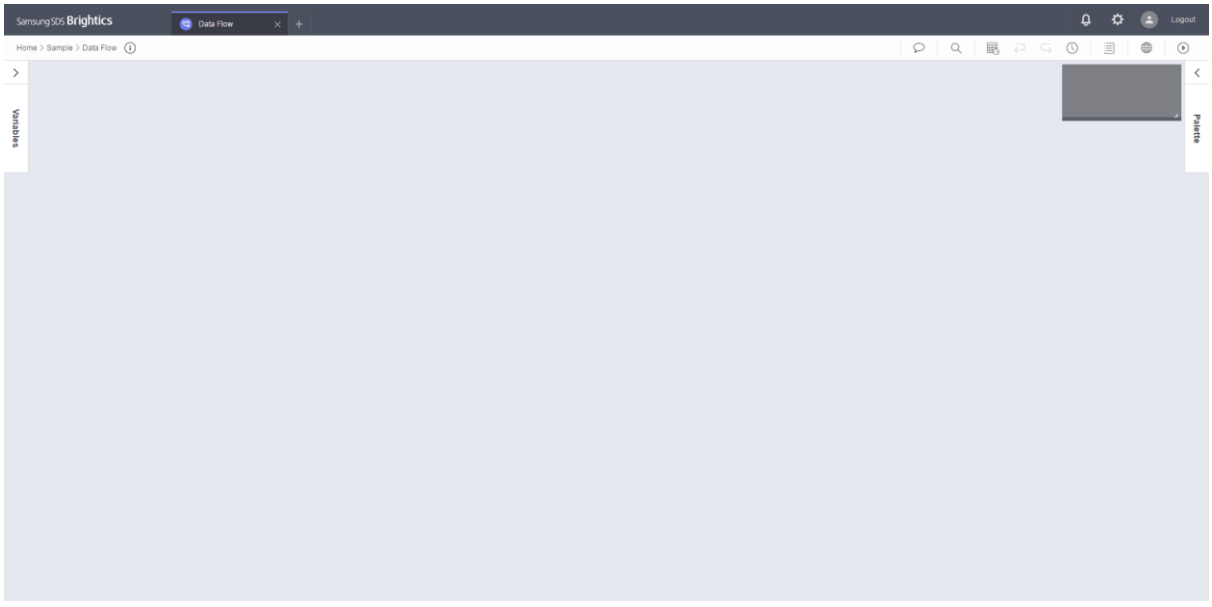


[Figure 5.1-8] Create New Model

C. An analytics model is created based on the data you've entered, and the window is changed to Model Editor.



[Figured 5.1-9] Screen after Model Creation

5.1.5 Modify an Analytics Model

A. Among analytics models displayed in [Project], click the menu at the top right of the model you want to modify, and select **Edit.**

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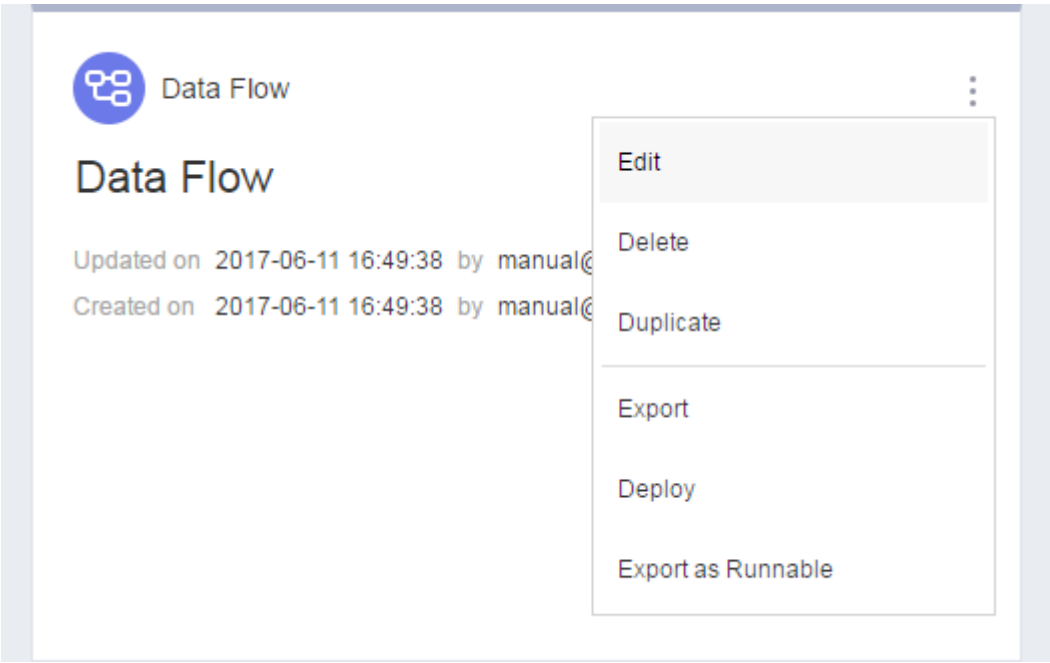
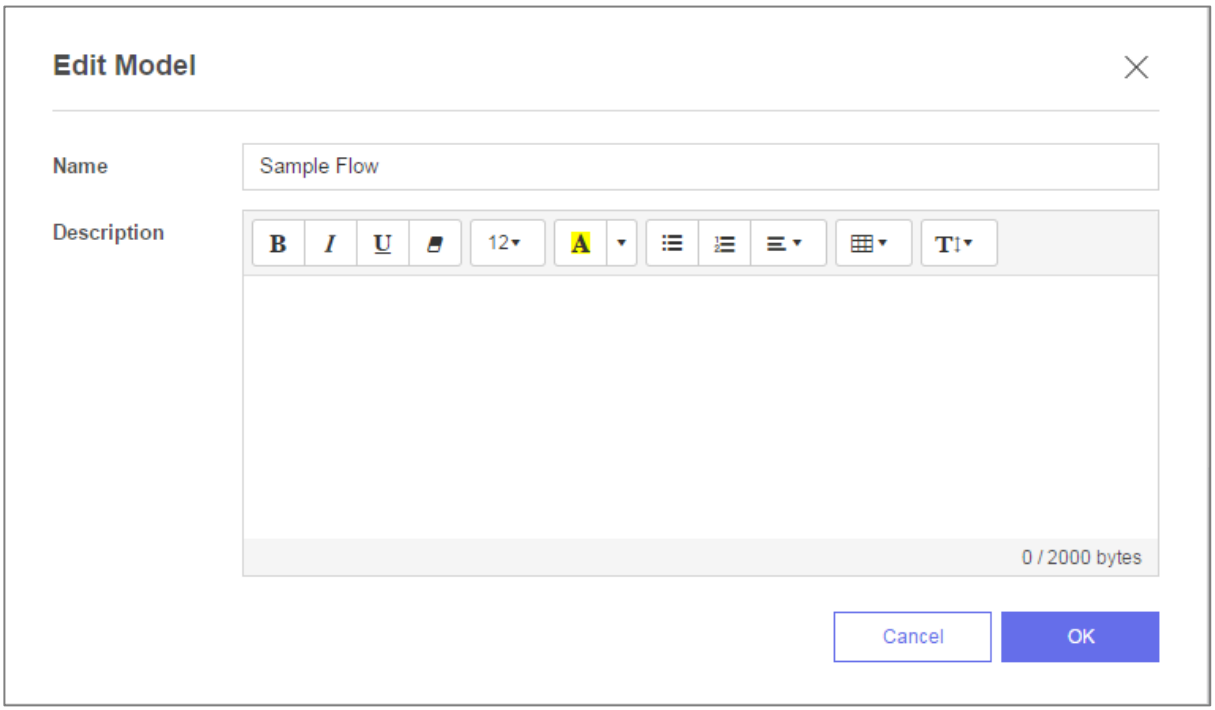


[Figure 5.1-10] Menu at the Top Right of an Analytics Model - Edit

B. Enter a new *Name* for modification and click **OK**.



[Figure 5.1-11] Edit Model

C. [Project] window shows the Model Name has changed.

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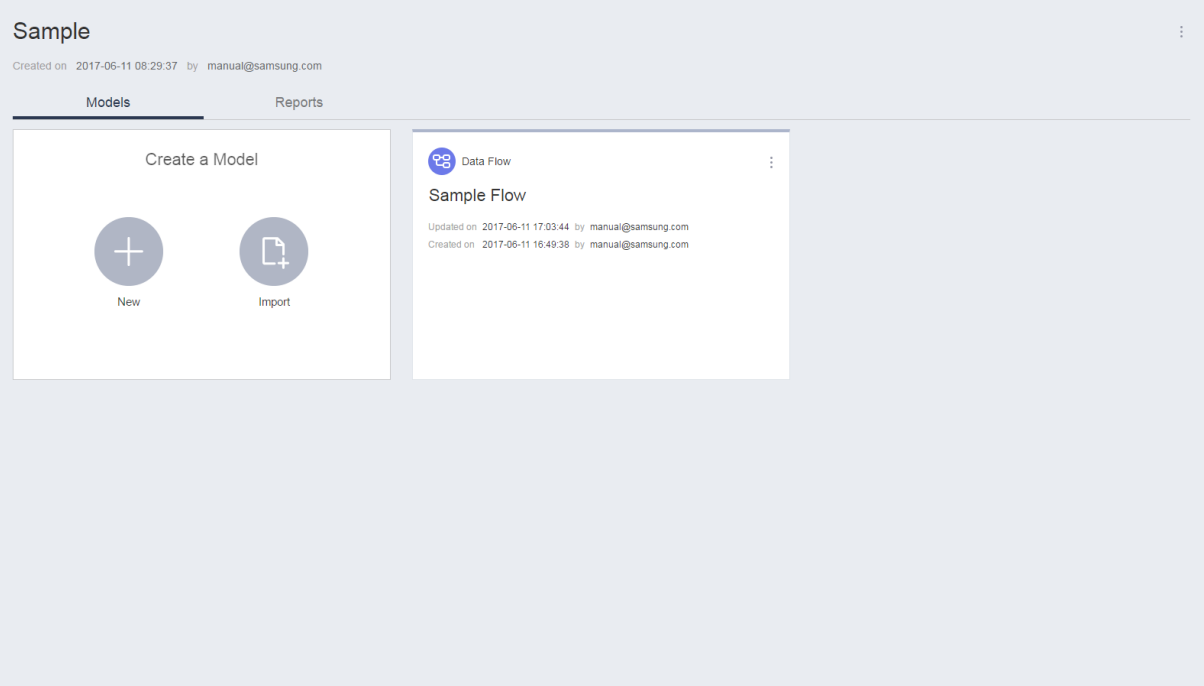
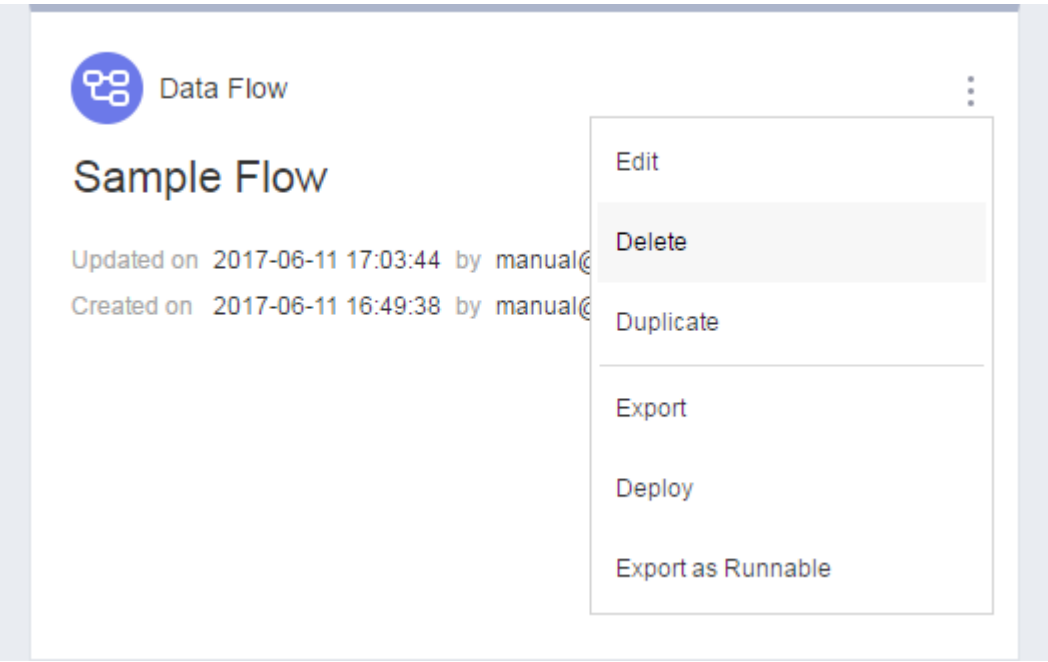


[Figure 5.1-12] Model Name has Changed

5.1.6 Delete an Analytics Model

A. Among the analytics models displayed in [Project], click Menu at the top right of the model you want to remove and select **Delete**.



[Figure 5.1-13] Menu at the Top Right of an Analytics Model - Delete

B. Click **OK** button when [Confirm Delete] window appears.
C. View [Project] to check the analytics model has been deleted.

5.1.7 Export an Analytics Model

A. Among the Analytics Models displayed in [Project], click Menu at the top right of the model you want to export and click **Export**.

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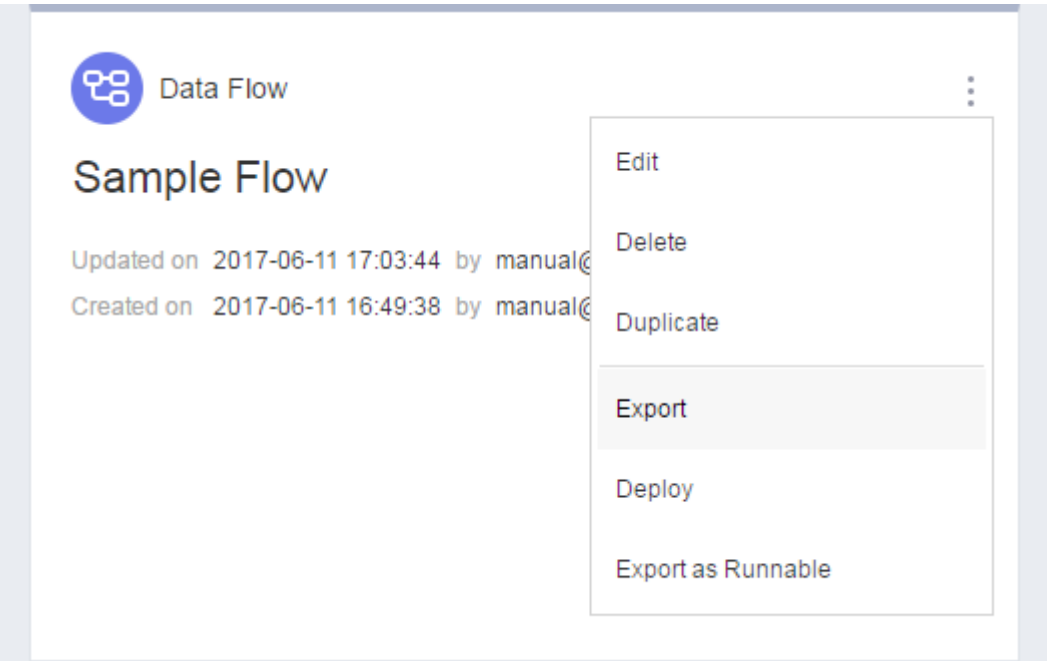
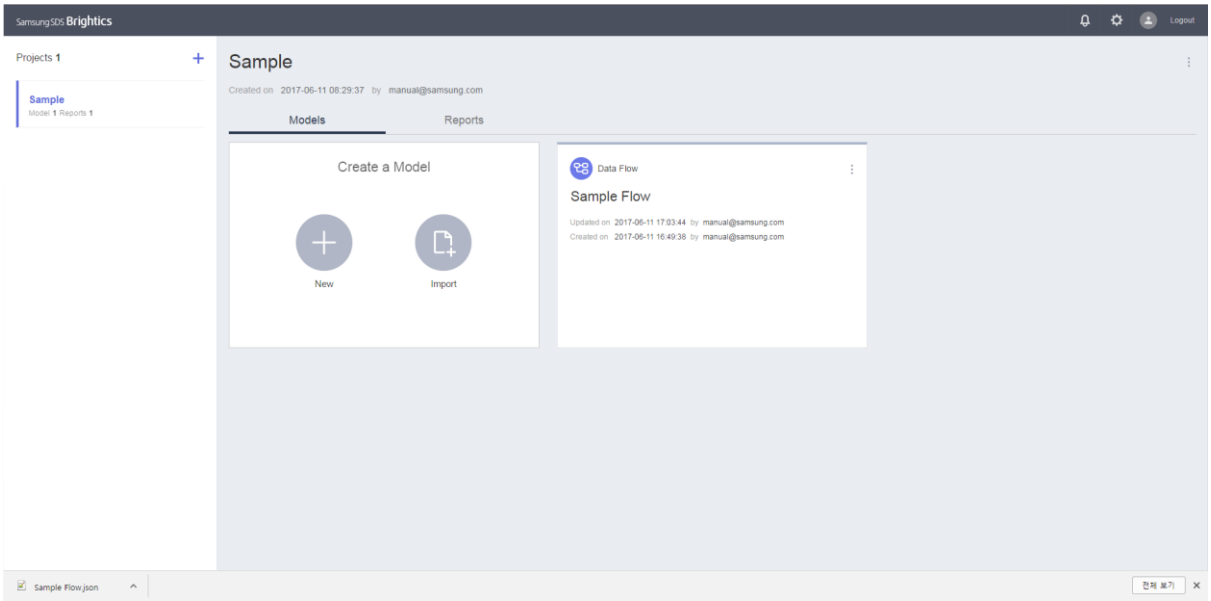


[Figure 5.1-14] Menu at the Top Right of an Analytics Model - Export

B. json file with the name of the selected analytics model is created , and then exported to Local.



[Figure 5.1-15] Analytics Model has been Exported

5.1.8 Deploy an Analytics Model

A. Among analytics models displayed in [Project], click menu at the top right of the model you want to export and select **Deploy**.

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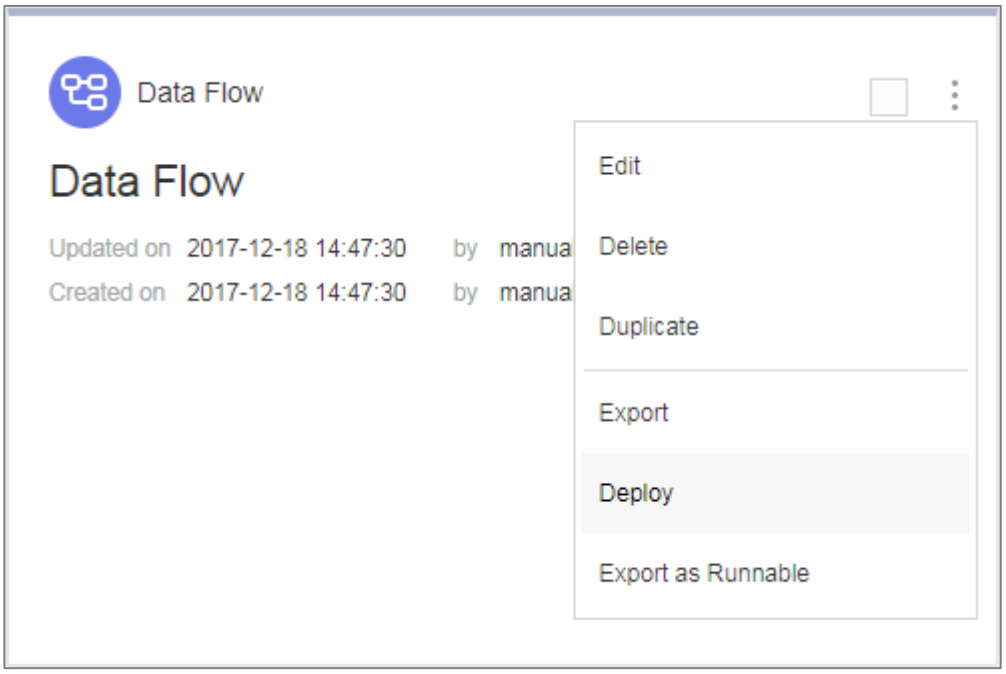
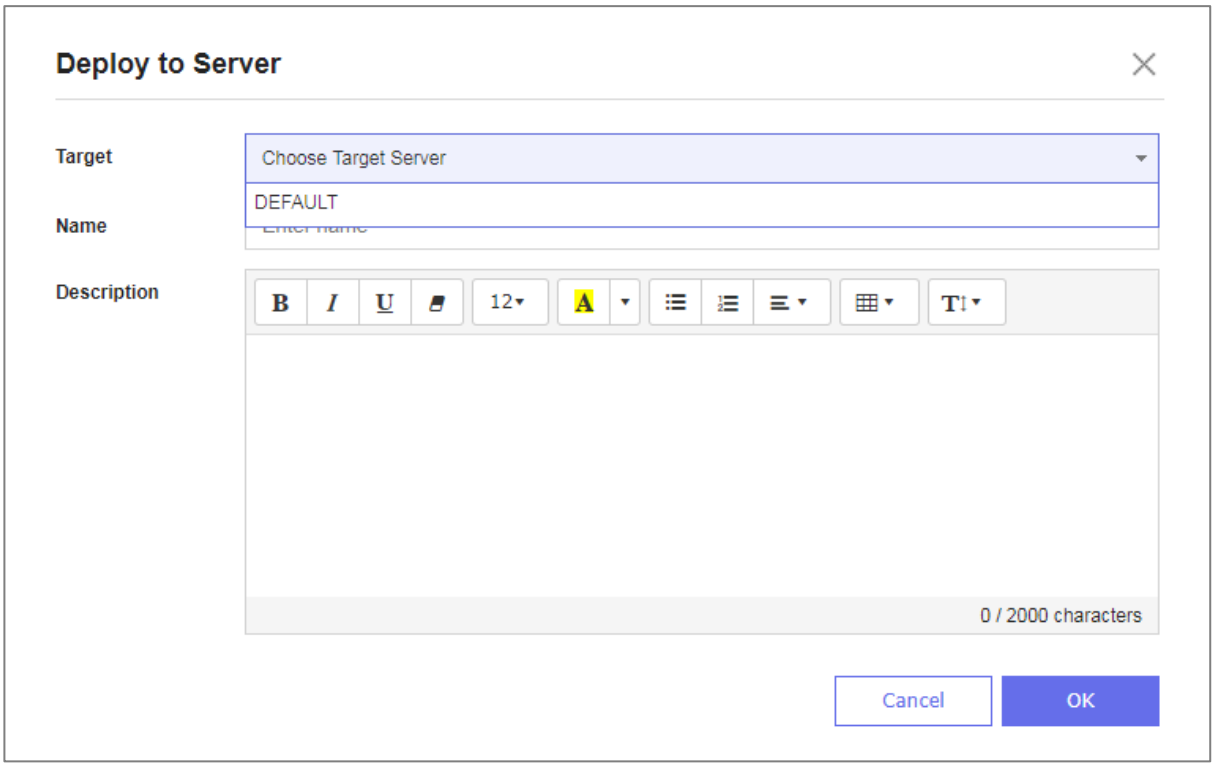


[Figure 5.1-16] Menu at the Top Right of an Analytics Model – Deploy

B. Choose Target Server to deploy and enter *Name* and *Description* and then click **OK** button.



[Figure 5.1-17] Choose Target Server to Deploy

C. If successfully deployed, details of deployment is displayed in Dialog. Users can execute a deployed analytics model by using [Deploy ID].

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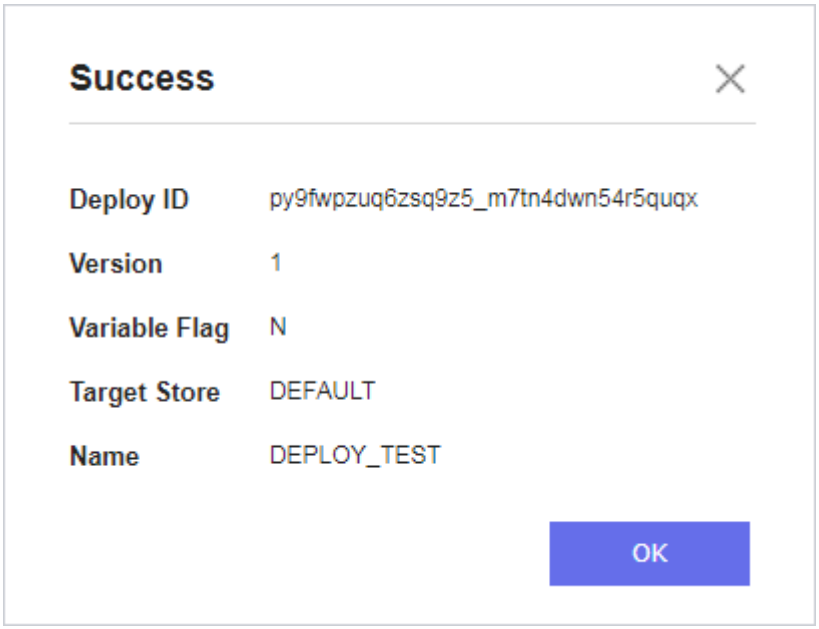
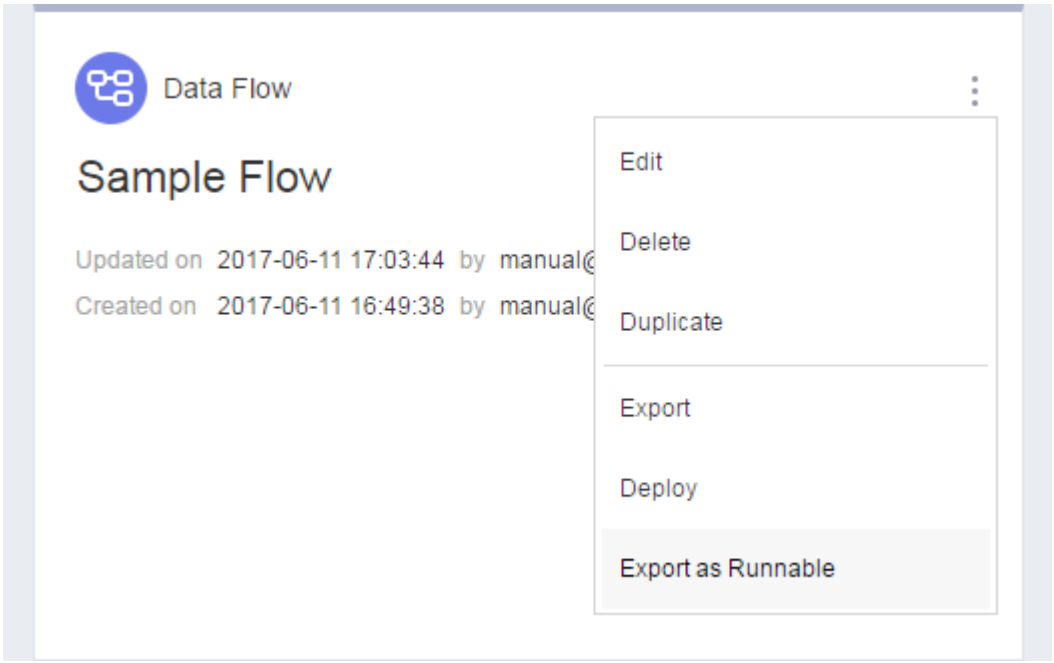


[Figure 5.1-18] Deployment Success

5.1.9 Export an Analytics Model as Runnable

A. Among the analytics models displayed in [Project], click Menu at the top right of the model you want to export and then select **Export as Runnable**.



[Figure 5.1-19] Menu at the Top Right of an Analytics Model – Export as Runnable

B. json file with the name of the selected analytics model is created and then exported to Local.

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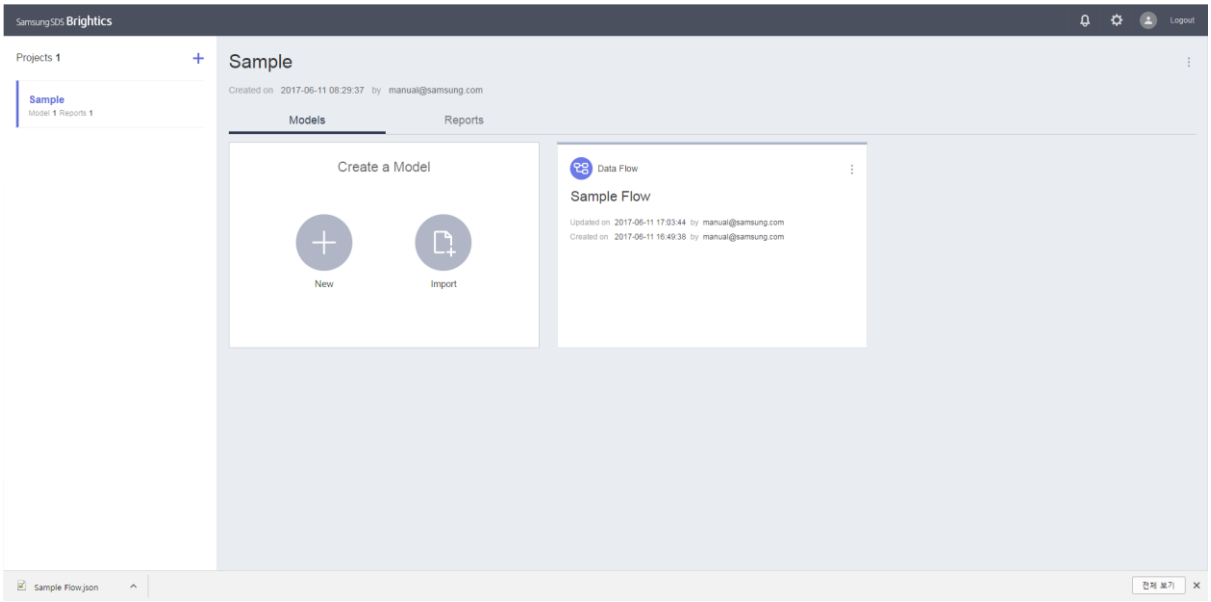
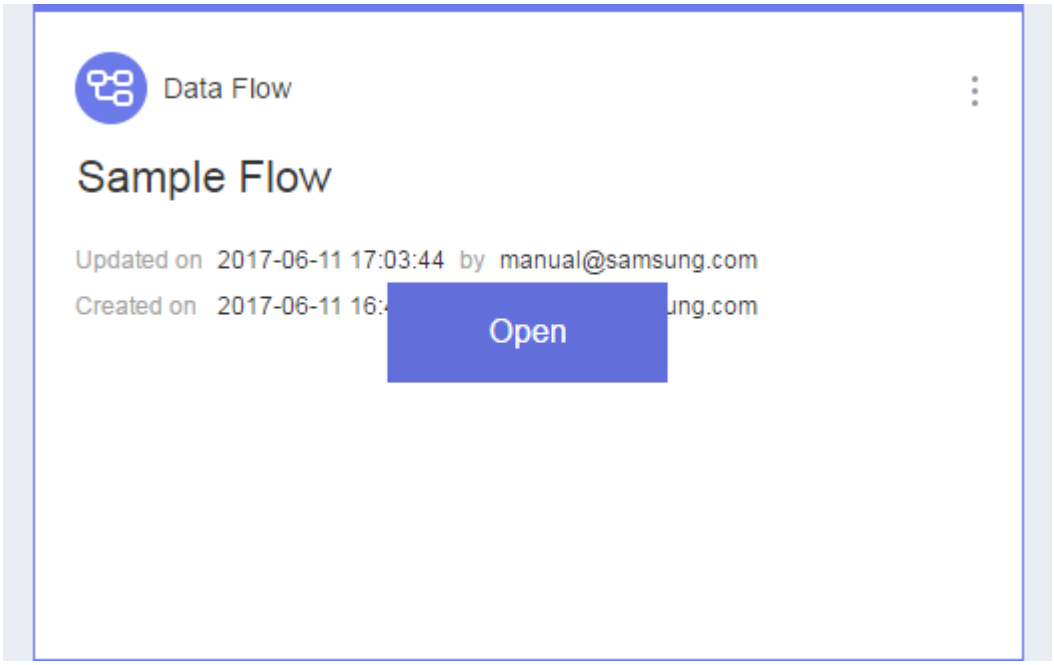


[Figure 5.1-20] An Analytics Model has been Exported

Note	Export / Export as Runnable / Deploy menu is ONLY available for particular analytics model types.

5.1.10 Open an Analytics Model

A. Mouse over an anlytics model in [Project] you want to open and click when **Open** button appears.



[Figure 5.1-21] Open Model

B. The selected analytics model is opened, and the screen is switched to Model Editor.

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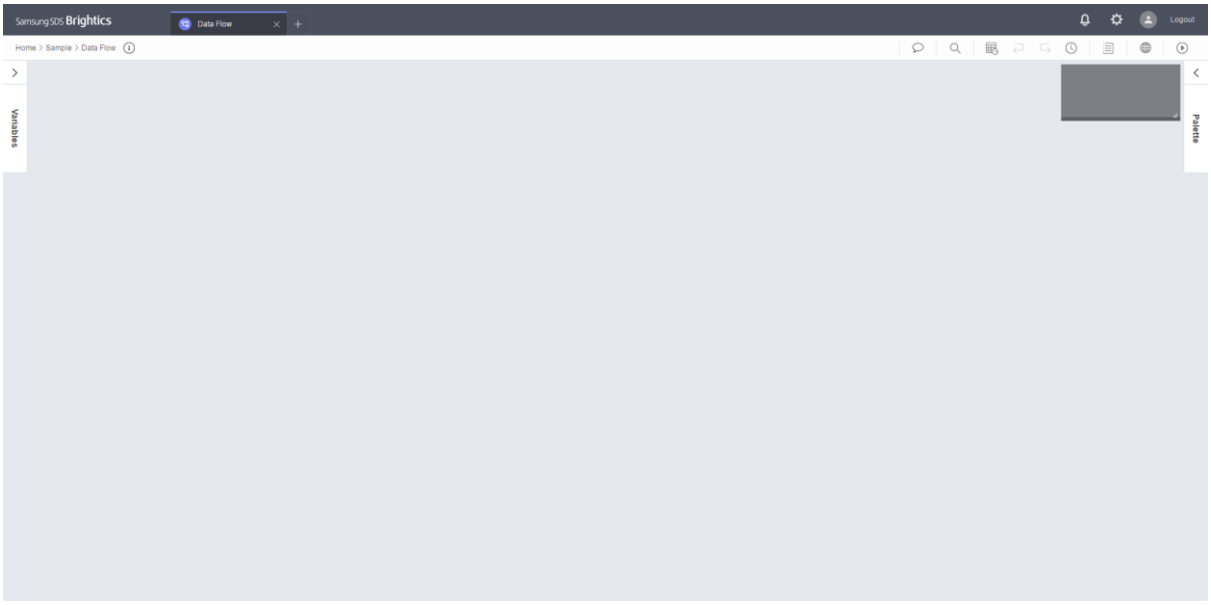
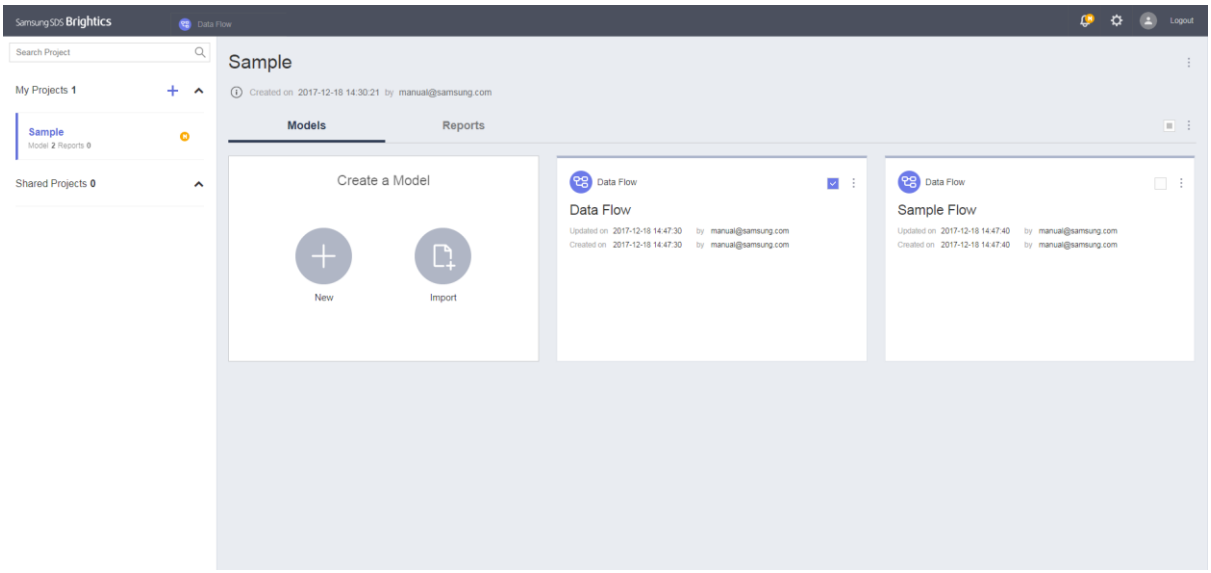


[Figure 5.1-22] Analytics Model has been Opened

5.1.11 Select Mutiple Analytics Models

A. Select respective models from Model List or select all by clicking the top right button of [Model List].



[Figure 5.1-23] Multiple Analytics Models Selection

B. Use the menu at the top right of the Model List to delete or export selected models.

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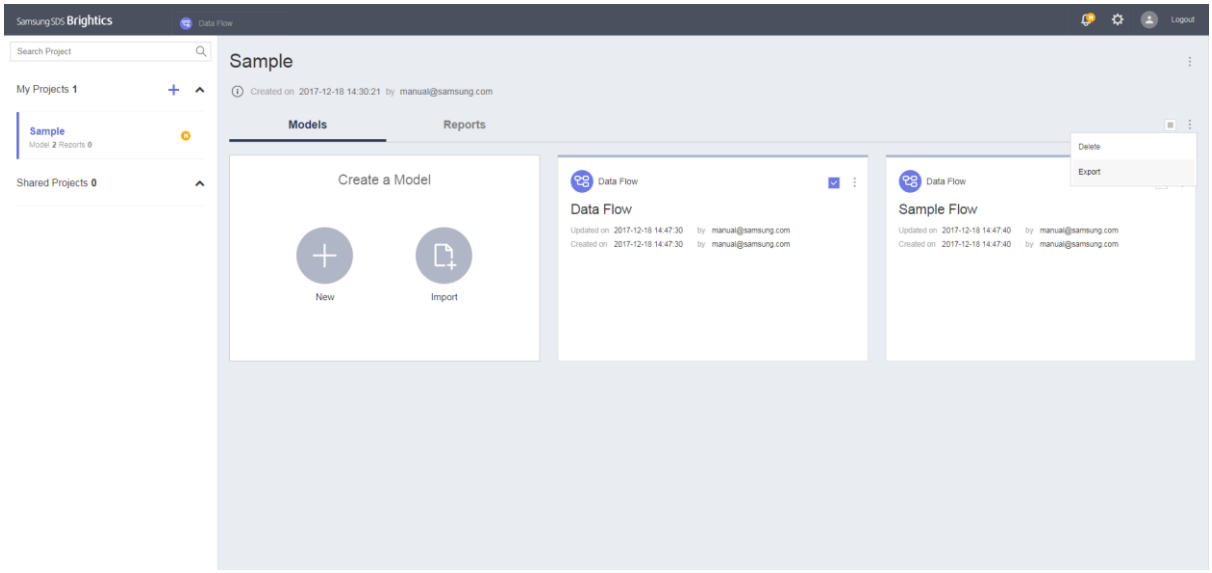
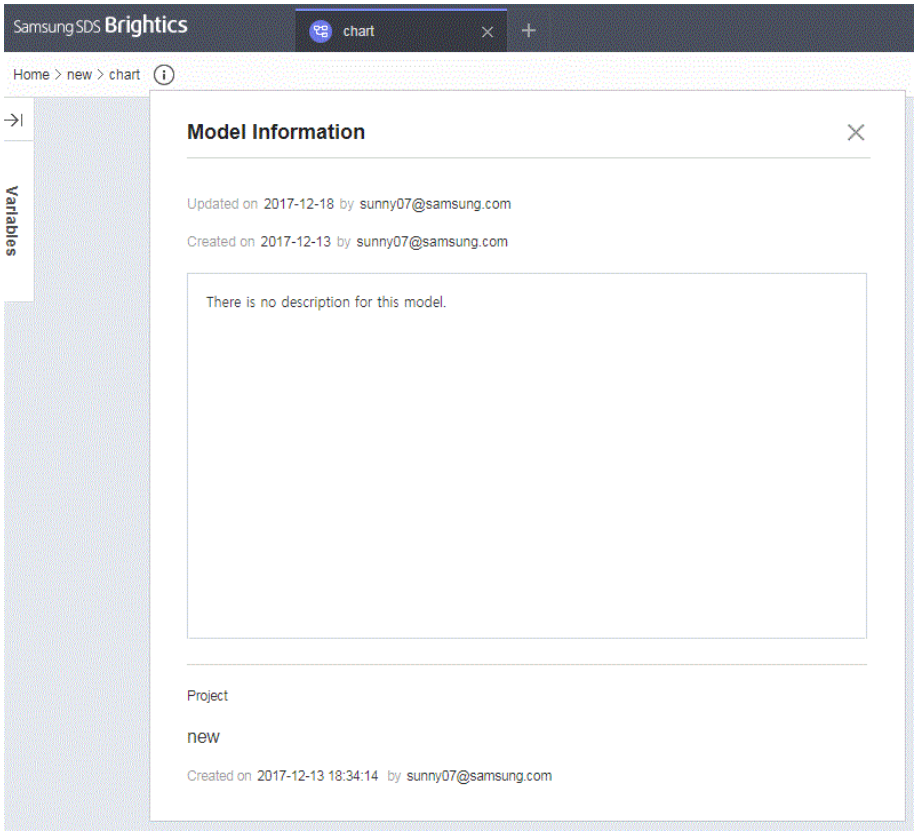


[Figure 5.1-24] Multiple Analytics Models Selection – Delete/Export

5.1.12 Analytics Model Detail Dialog

After creating a model, click an icon next to its name at the top left to see its detailed information.



[Figure 5.1-25] Analytics Model Details

5.2 Use Data Flow Model Editor

Diagram Editor allows a user to write a function to use for analytics model and Connection between each function. Toolbar Menu consists of Zoom function, function to verify job history, Undo/Redo function, function to make report and Run function to execute all functions of analytics model.

5.2.1 Create a Function

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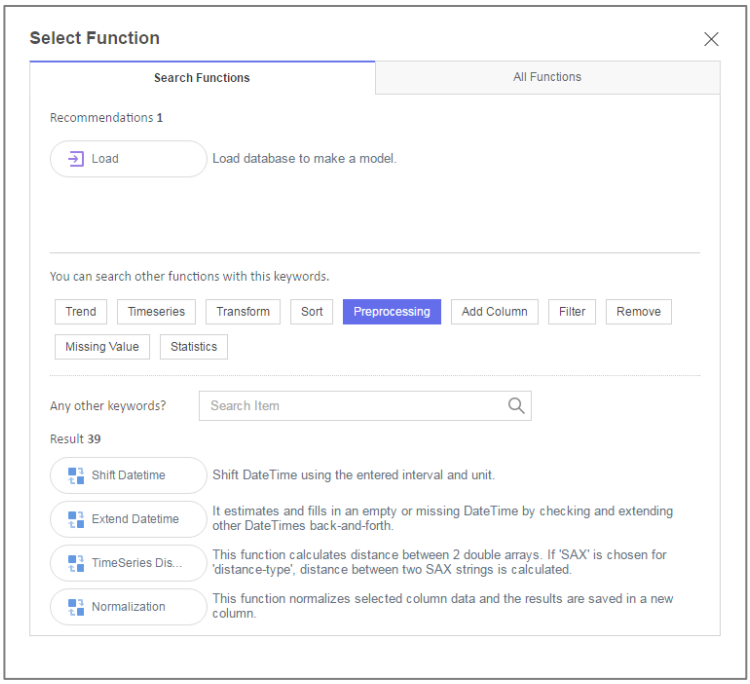
There are three ways to create a function.

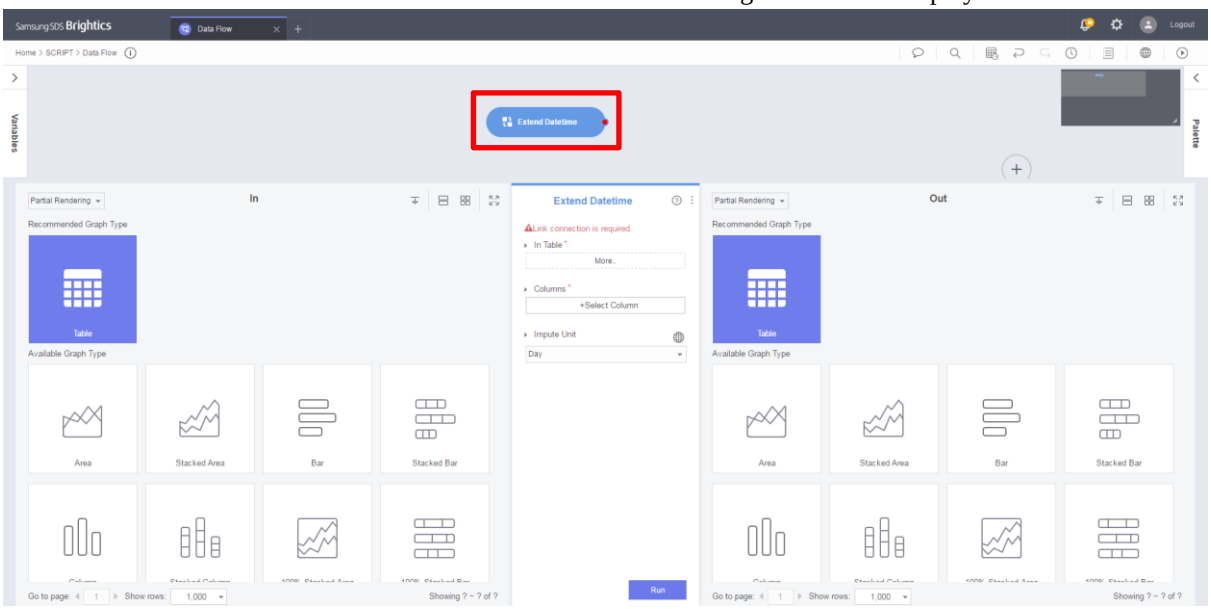
5.2.1.1 Create a New Function in Diagram Editor

A. Mouse over a location where you want to create a function in Diagram Editor. Once the button is enabled, click it and open a popup window to create a function.



[Figure 5.2-1] Select Function Window

B. Click the desired function to create. The function created in Diagram Editor is displayed.



[Figure 5.2-2] Function Created in Diagram Editor

5.2.1.2 Create a New Function by Selecting in Palette

A. Click Side Bar Expand Button to use Palette Viewer on the right side.
B. Drag the desired function and drop it to the desired location in Diagram Editor.

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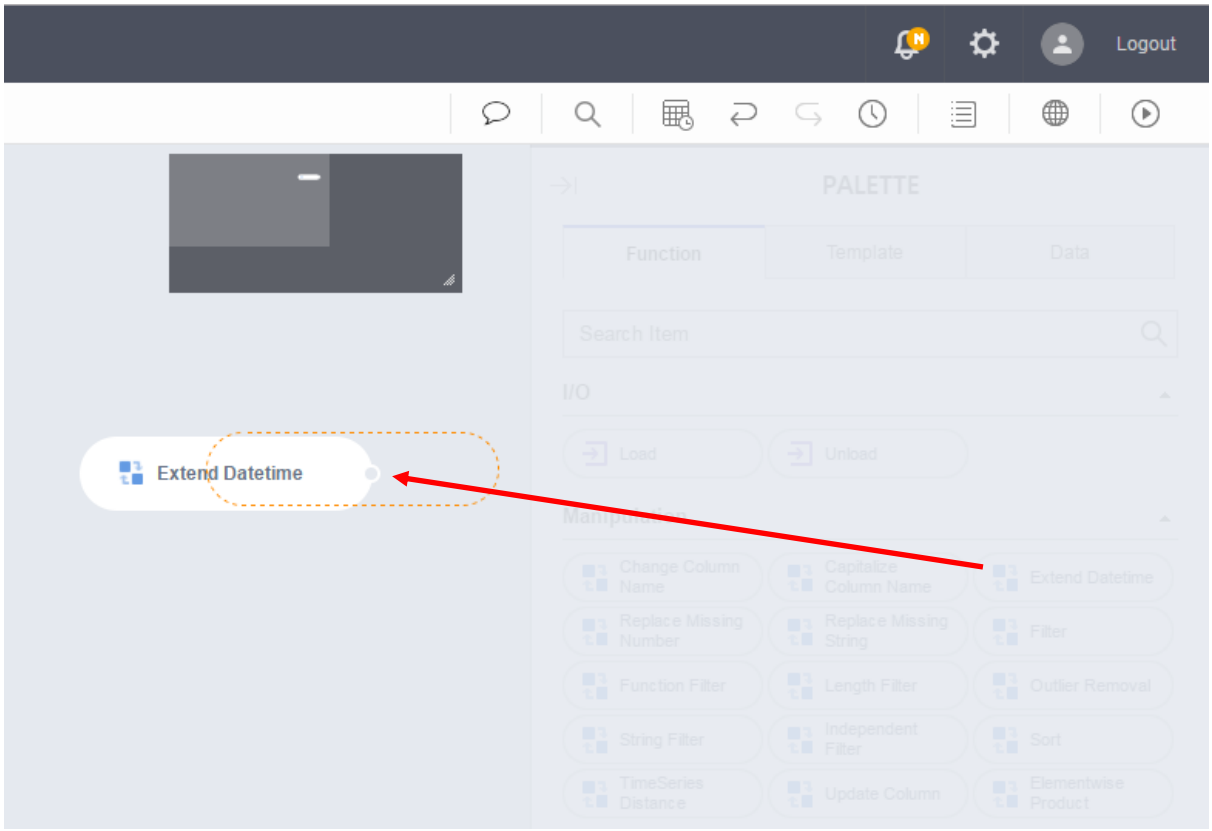
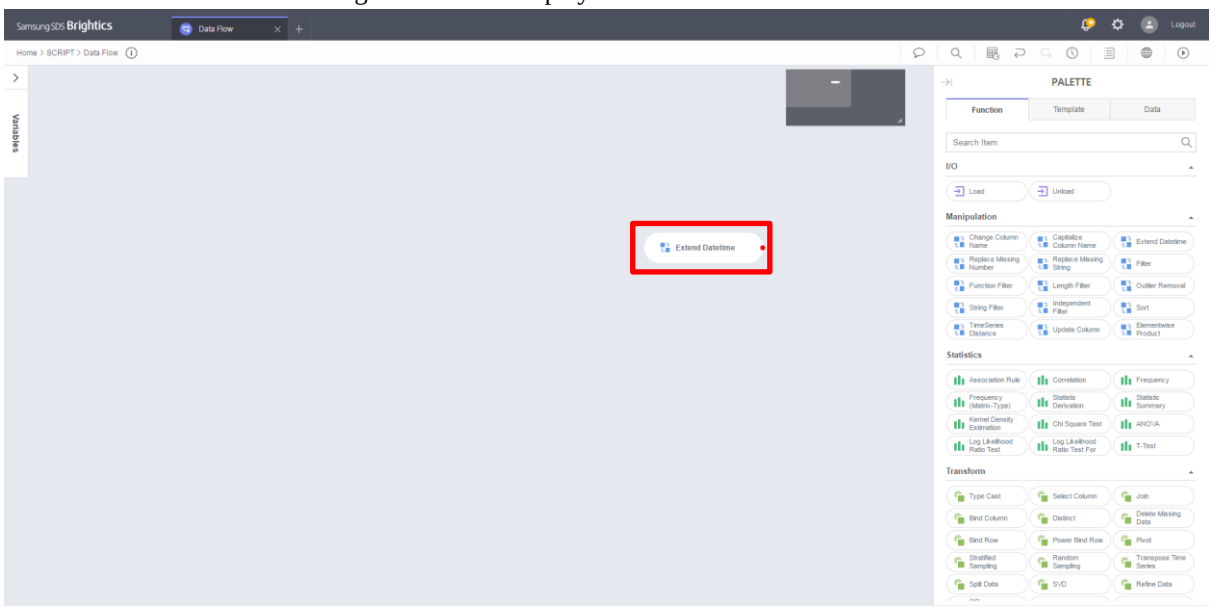


[Figure 5.2-3] Drag the Function from Palette and Drop it to Diagram Editor

C. The function created in Diagram Editor is displayed.



[Figure 5.2-4] The Function Created in Diagram Editor

5.2.1.3 Create a Function by Cloning the Selected Function

A. Mouse over the function to clone.

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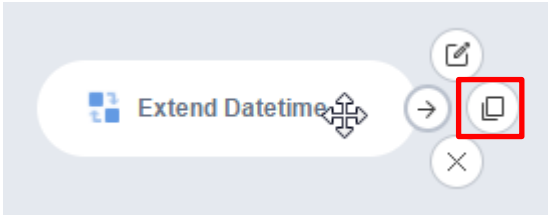
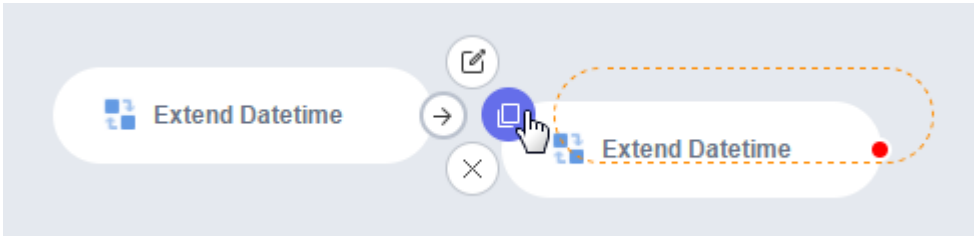


[Figure 5.2-5] Function Moused Over

B. Drag button and drop it to the desired location in Diagram Editor.



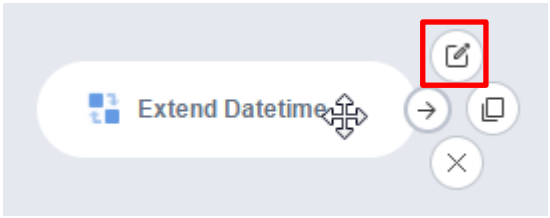
[Figure 5.2-6] Drag and Drop the Function to Diagram Editor

C. The Function created in Diagram Editor is displayed.

[Figure 5.2-7] Function Created in Diagram Editor

5.2.2 Change a Function

A. Mouse over the function to modify



[Figure 5.2-8] Function Moused Over

B. Call Select Function window which allows you to select the function by clicking button.

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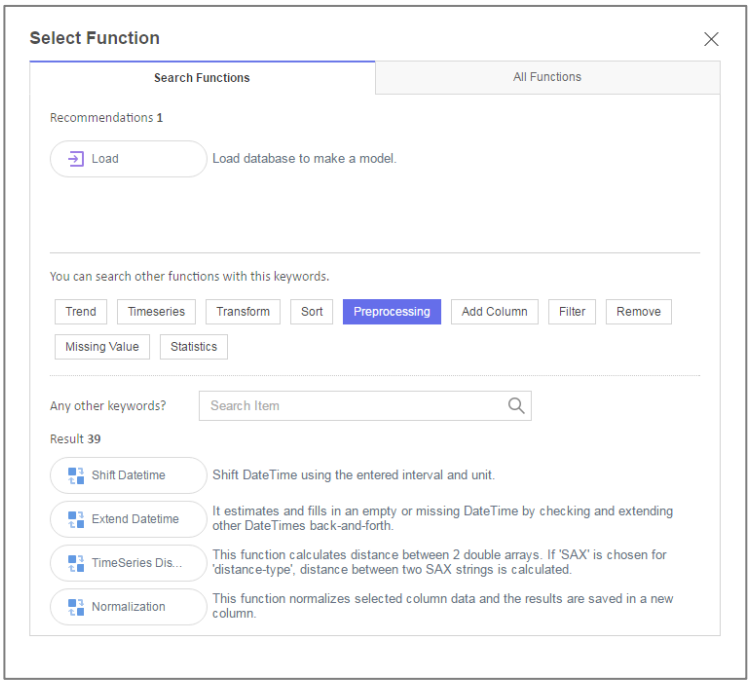


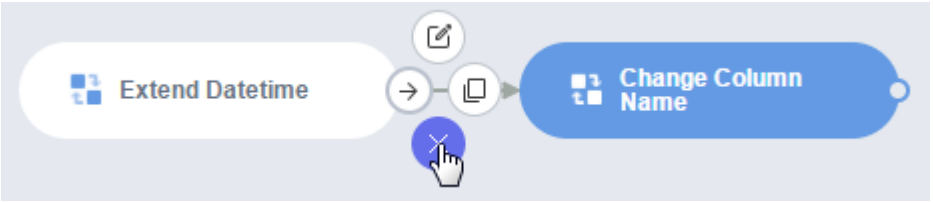
[Figure 5.2-9] Select Function

Select the function to modify. Modified function is displayed in Diagram Editor.

[Figure 5.2-10] Modified Function Displayed in Diagram Editor

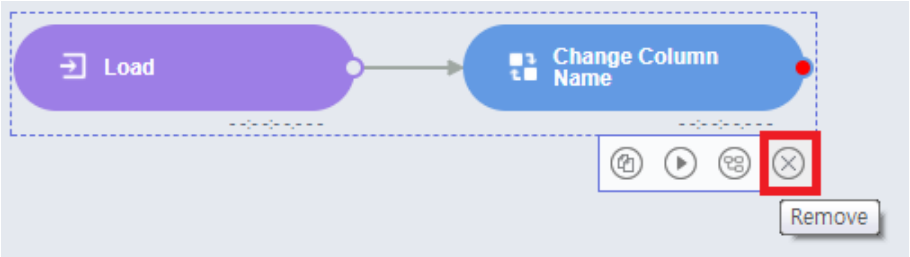
5.2.3 Delete a Function

A. Mouse over a function to delete and click button to delete the function.



[Figure 5.2-11] Function Moused Over

B. You can delete multiple functions at once. Drag a mouse to a function to delete and click button to delete functions.



[Figure 5.2-12] Function Mouse Over

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5.2.4 Use a connection

5.2.4.1 Create a Connection

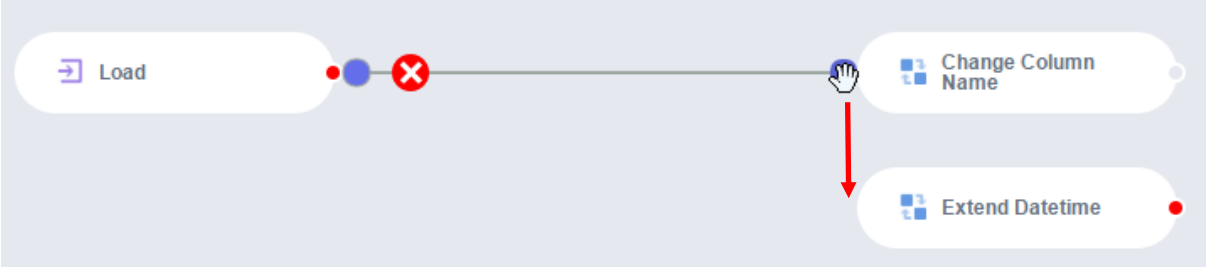
Connect functions so that the output data of the preceding function can be used as the input data of the next function.

A. Mouse over the preceding function to which you want to create a connection. Click and drag button, and drop the connection to the next function to which you want to create a connection.

[Figure 5.2-13] Function Moused Over

5.2.4.2 Modify a Connection

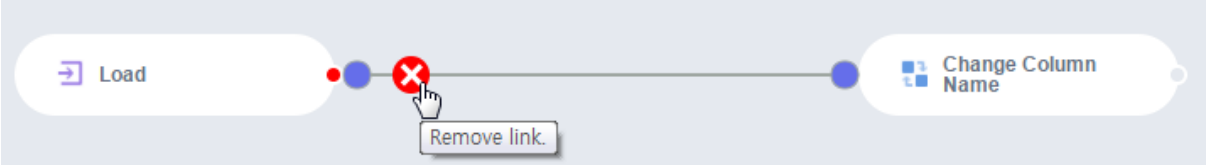
A. Mouse over a connection you want to modify. Click and drag button, and drop the connection to the to-be-modified function.



[Figure 5.2-14] Connection Moused Over

5.2.4.3 Delete a Connection

A. Mouse over a connection you want to delete. Click button to delete the connection.



[Figure 5.2-15] Connection Moused Over

5.2.5 Use Variables

5.2.5.1 Create a Variable

A. If you click Add Variable button in Variables View, variable is added to the bottom.

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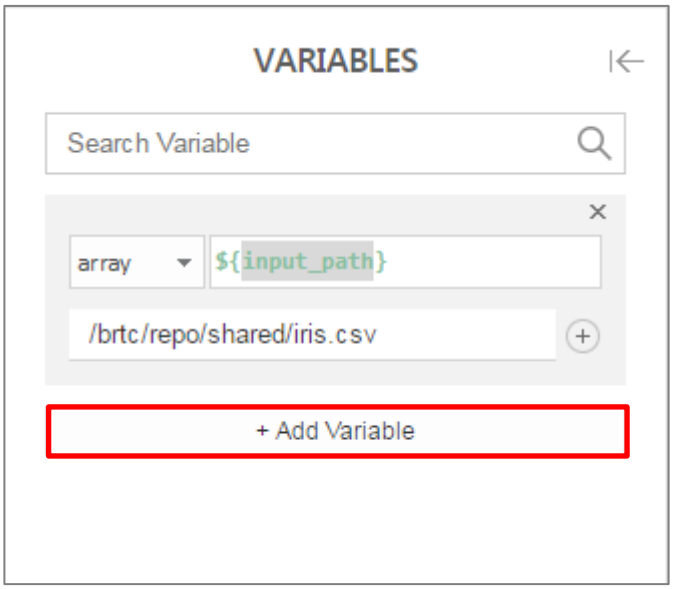
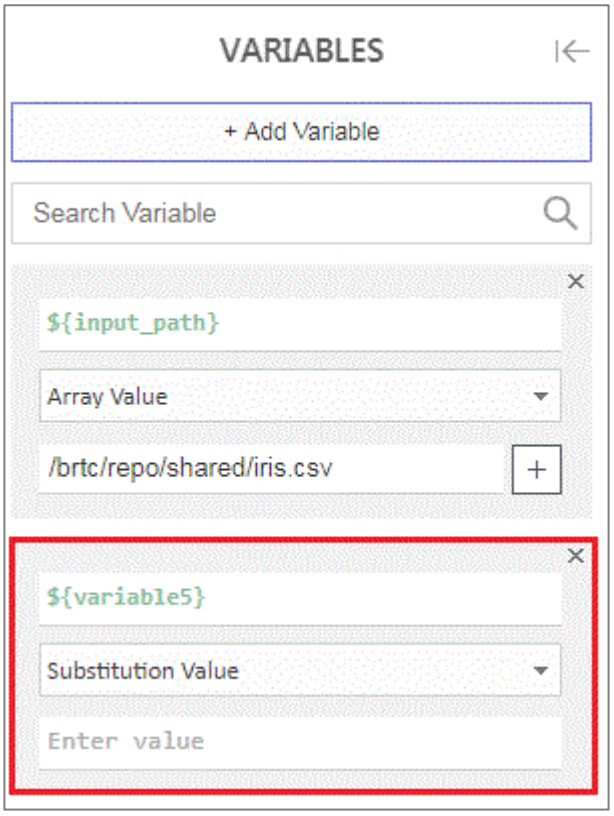


[Figure 5.2-16] Before Button Click



[Figure 5.2-17] After Button Click

5.2.5.2 Modify a Variable

A. Variable can be modified by entering for *Name, Value and chosen among Substitution value, Array Value and Calculation value.*

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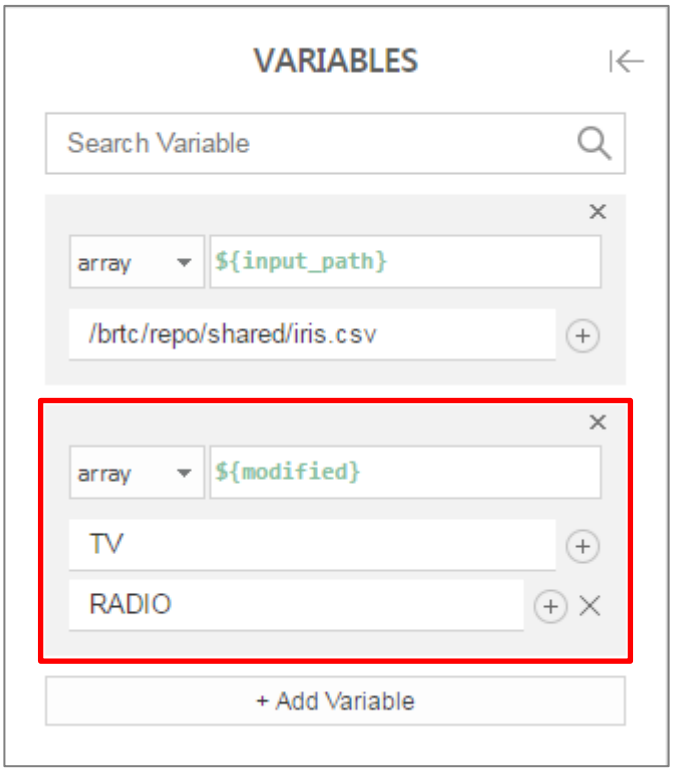
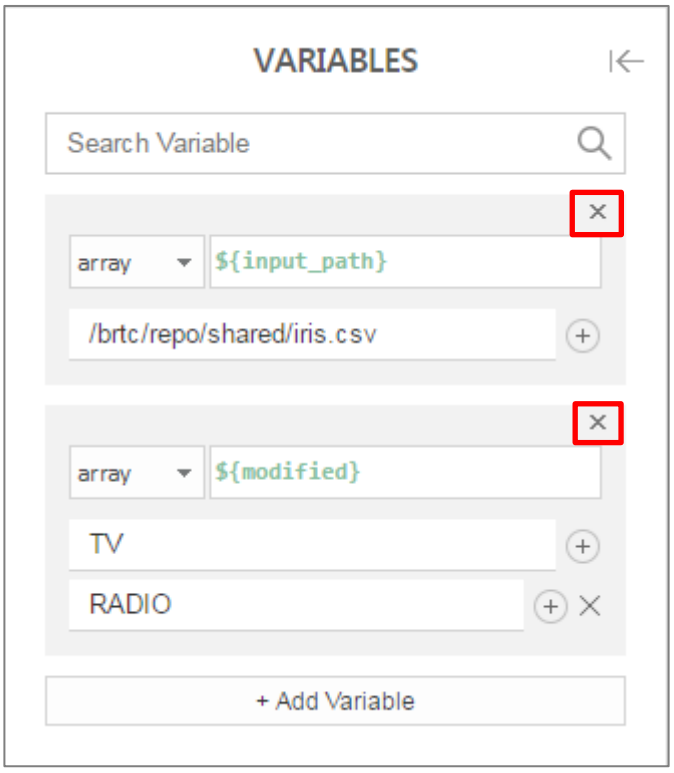


[Figure 5.2-18] Modified Variable

5.2.5.3 Delete Variables

A. Delete variable using the button on the top right side of each variable.



[Figure 5.2-19] Variable Deletion

5.2.6 Use History

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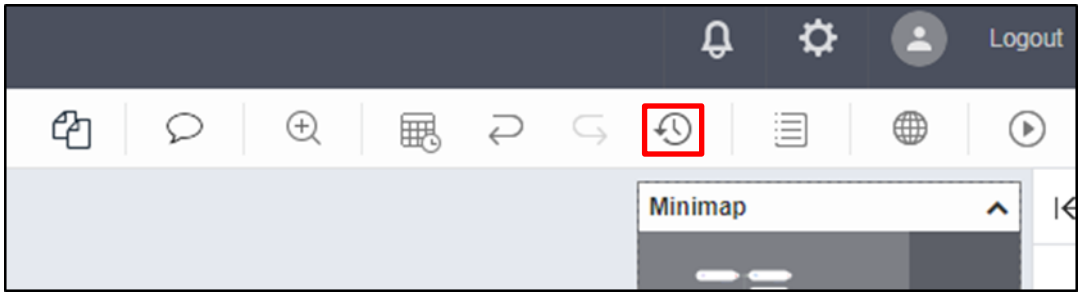
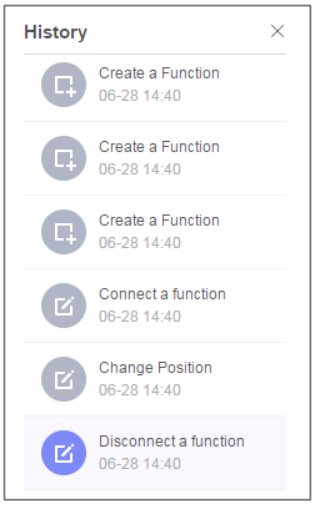
It records and shows the job history that user worked on. If you select a certain job history, you can be redirected to the job concerned. All the job history that was worked on is recorded in Diagram Editor and Sheet Editor. You can either click in Diagram Editor to directly select the timing of redirection, or click , button to redo or undo.

A. Click button in Diagram Editor.



[Figure 5.2-20] Click History Button in Diagram Editor

B. You can check the job history after History window pops up. If you select the job history that you want to move to in History window, you are redirected to the desired page.



[Figure 5.2-21] History

5.2.7 Use an Index

This window allows users to search functions they used easily and fast. A growing number of to-be-used functions and the increasing complexity of Digram Editor make it difficult to see and locate a previously-used function at once. So when users select a function from the index, the screen is switched accordingly to find the function for user convenience.

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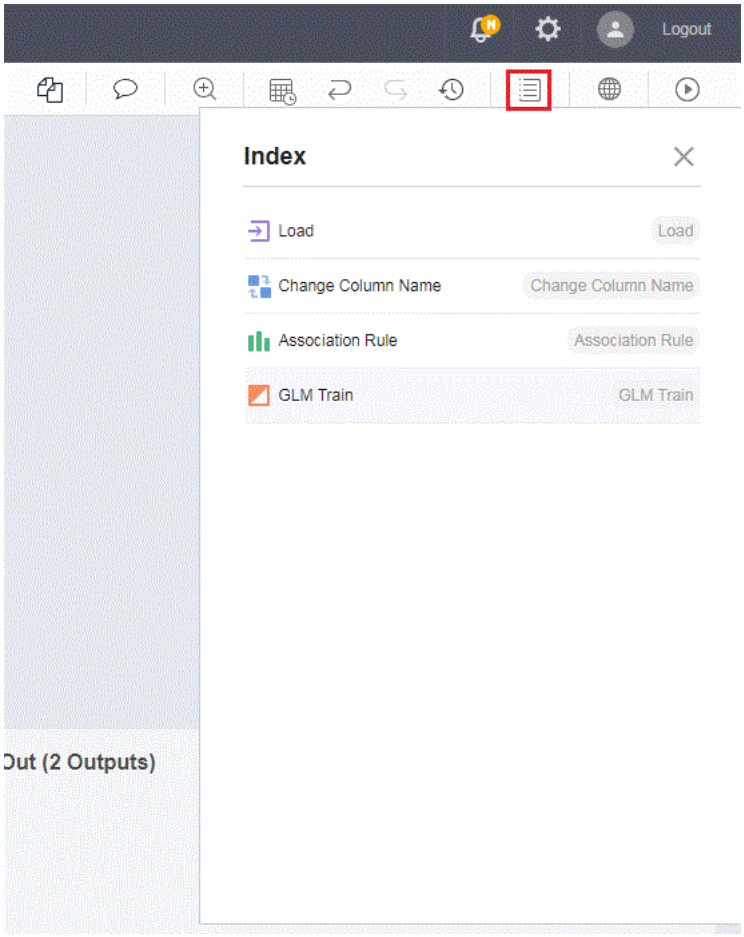
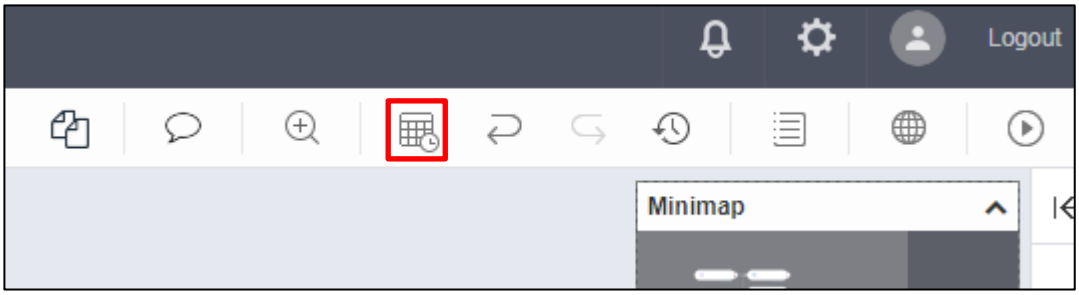


[Figure 5.2-22] Index

5.2.8 Use a Schedule

Add or modify/detele a schedule of a model open in Diagram Editor.

A. Click button in [Diagram Editor].



[Figure 5.2-23] Click Schedule Icon in Diagram Editor

B. Schedule list appears so that you can check the schedule list.

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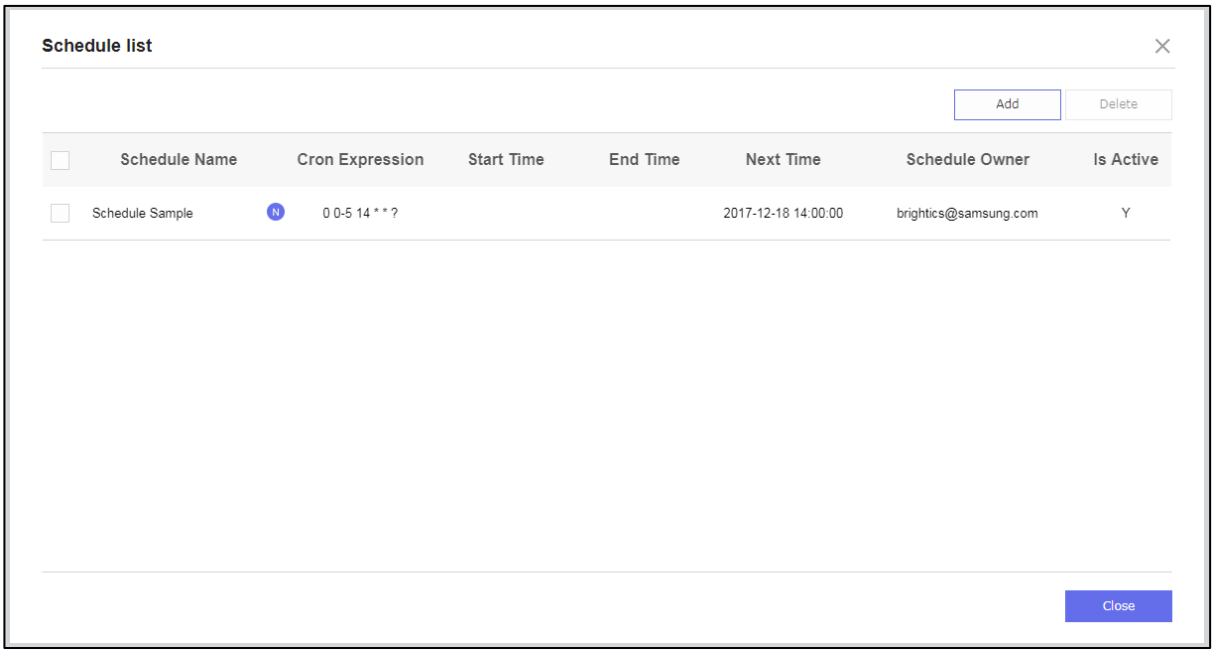

[Figure 5.2-24] Schedule List

5.2.8.1 Add a Schedule

Add when a corresponding model will be executed.

A. Click Add button in [Schedule list].

[Figure 5.2-25] Button to Add a Schedule

B. Fill in Schedule Name, Cron Expression (Cadence), Is Active (Wheter to be active), and Dependency Id (Previous schedule that must happen beforehand) and then click **OK** button.

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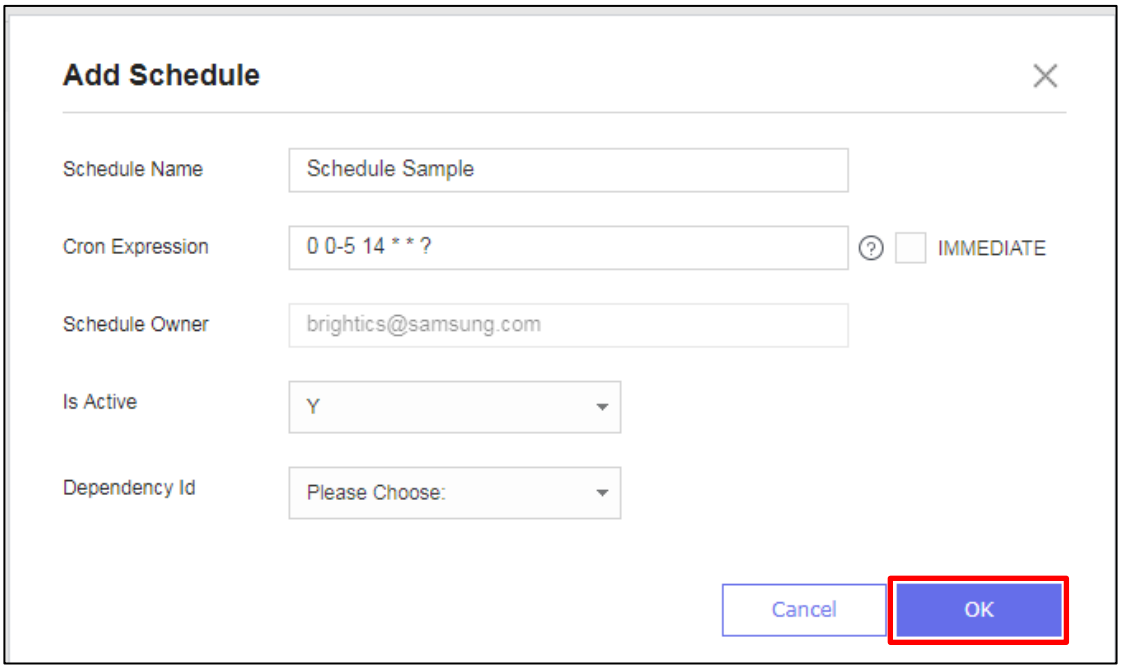
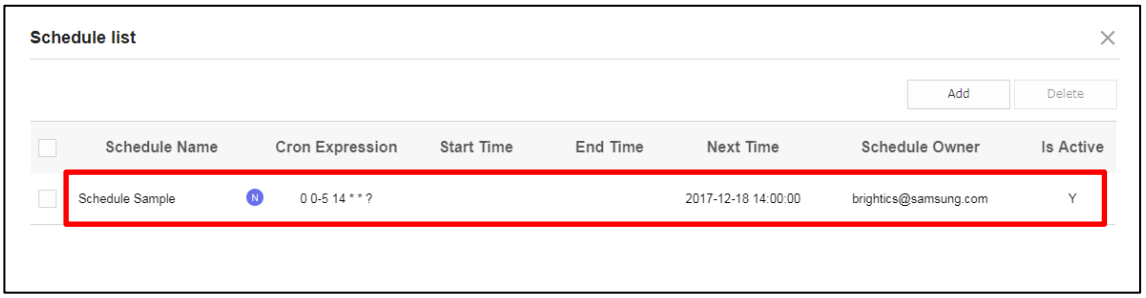


[Figure 5.2-26] Add a Schedule

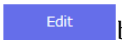
5.2.8.2 Modify a Schedule

Modify existing Cron Expression (Cadence), Is Active (Whether to be active) and Dependency Id (Previous schedule that must happen beforehand) that were previously entered for a corresponding model.

A. Select one from [Schedule list].



[Figure 5.2-27] Schedule List

B. Click  button in [Schedule Detail] window.

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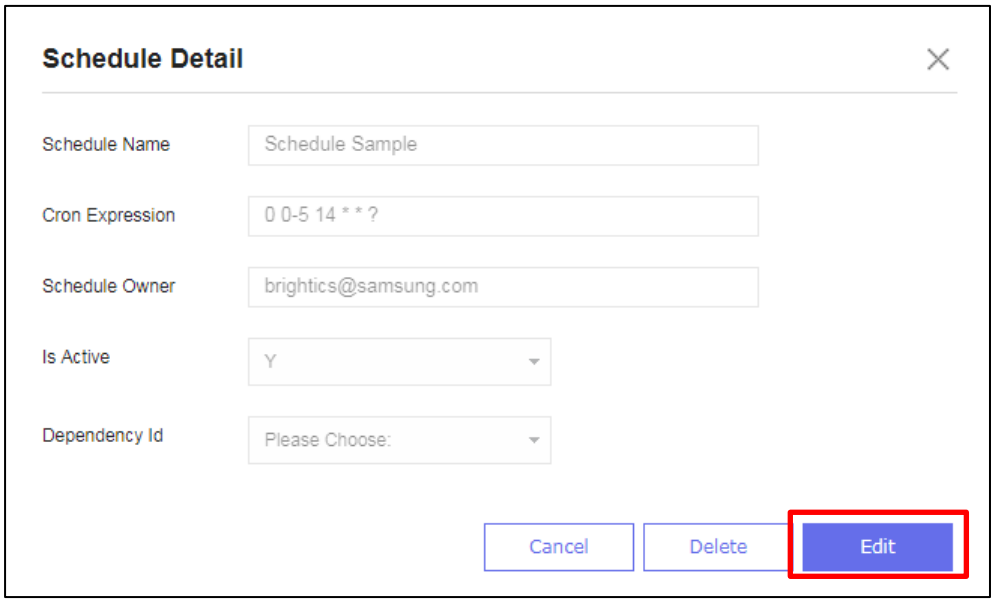
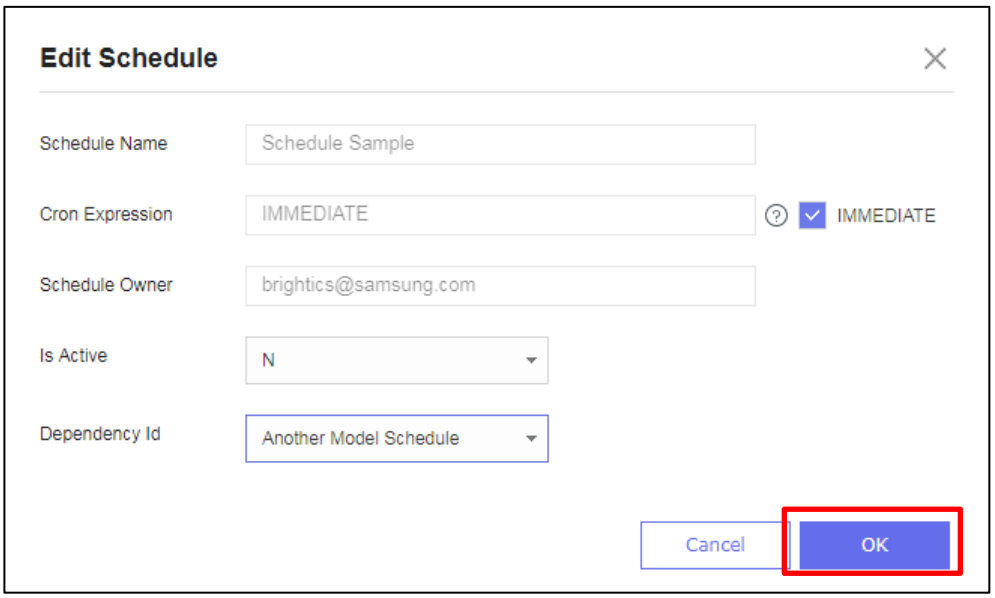


[Figure 5.2-28] Schedule Detail

C. Click **OK** button after modifying the schedule.



[Figure 5.2-29] Edit Schedule

5.2.8.3 Delete a Schedule

Delete one or multiple schedules added to a corresponding model.

A. Select one from [Schedule list].

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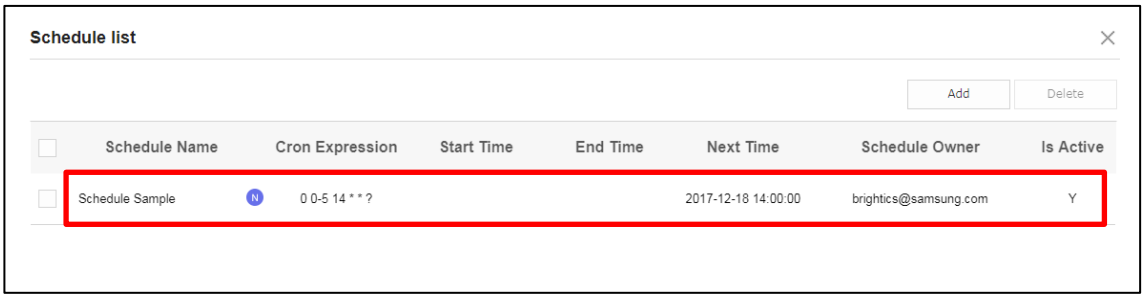
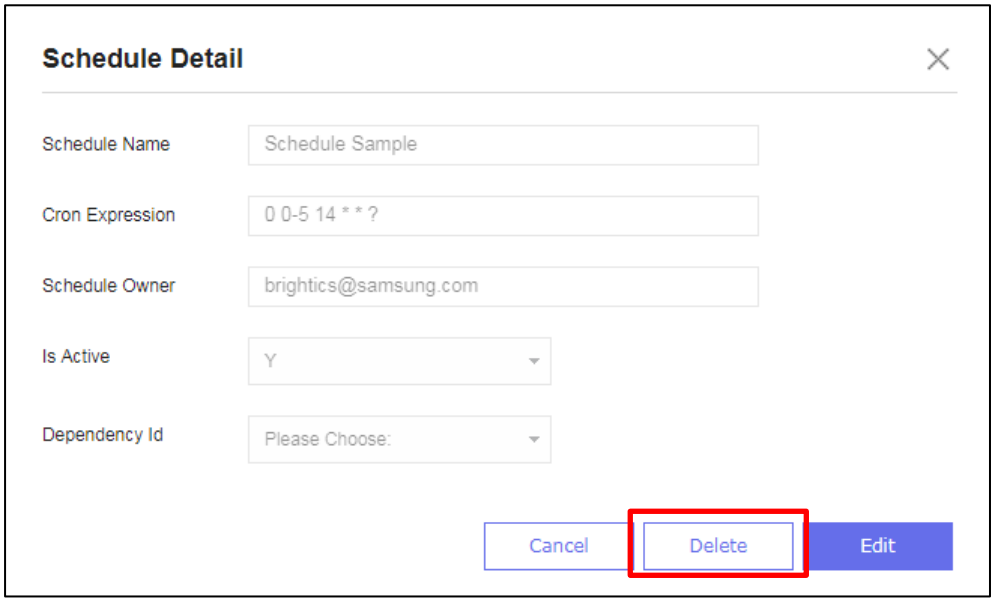


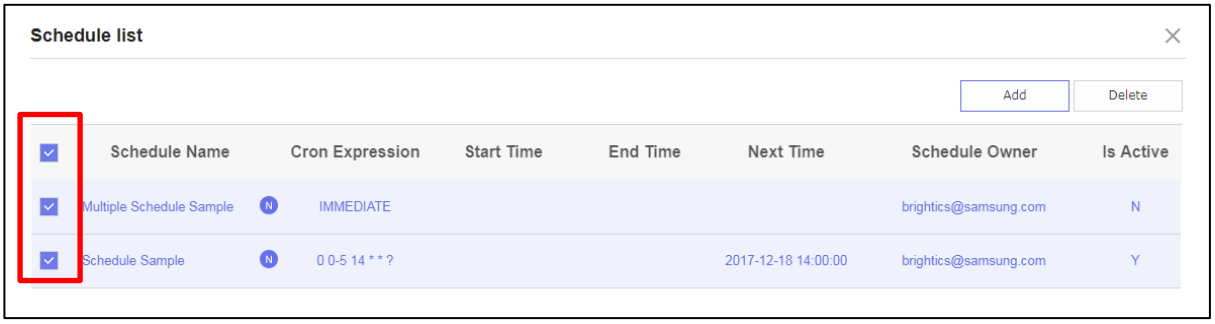
[Figure 5.2-30] Schedule List

B. Click Delete button in [Schedule Detail] window.



[Figure 5.2-31] Schedule Detail

C. Select multiple schedule from [Schedule list] and click an active Delete button.



[Figure 5.2-32] Delete Multiple Schedules

5.2.9 Use Zoom

Zoom in/out Diagram Editor using Zoom button.

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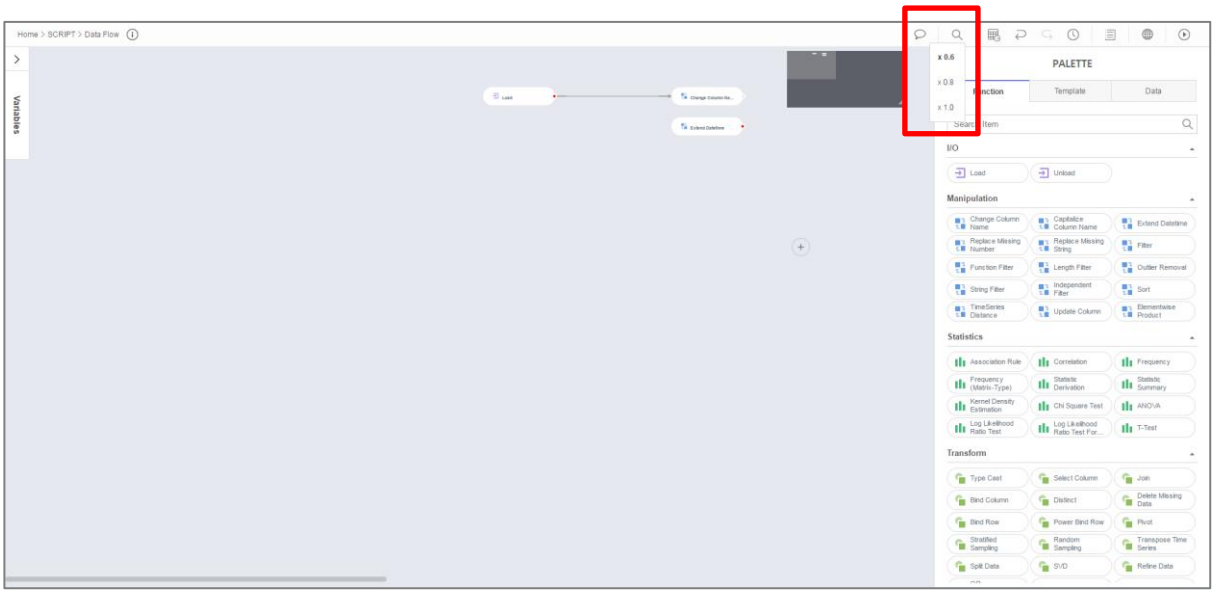
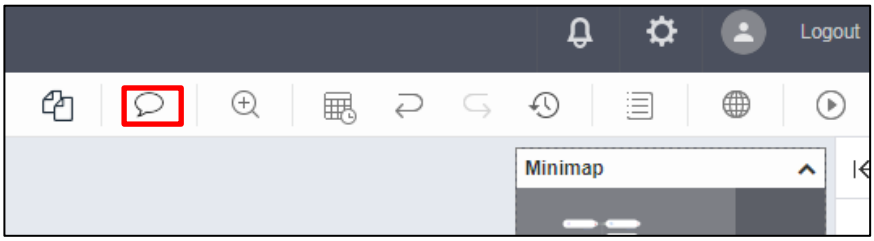


[Figure 5.2-33] Click Zoom x0.6

5.2.10 Use Tooltip

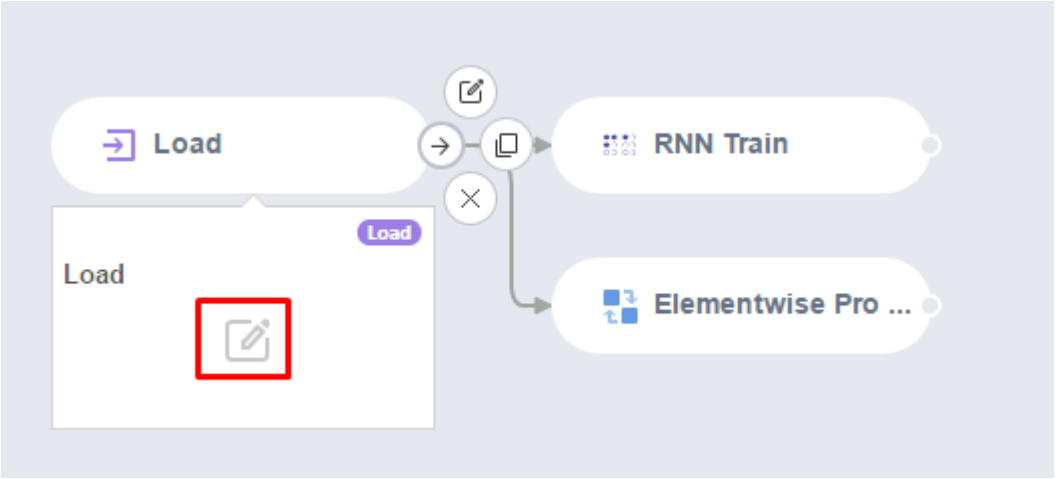
Enter memo in Diagram Editor Function. If the function is moused over in Diagram, it is shown as tooltip. You can enable/disable it using Tooltip button at the top right.

A. Click Tooltip enable button.



[Figure 5.2-34] Click Tooltip Button

B. Click Edit button and enter memo.



[Figure 5.2-35] Click Edit Button

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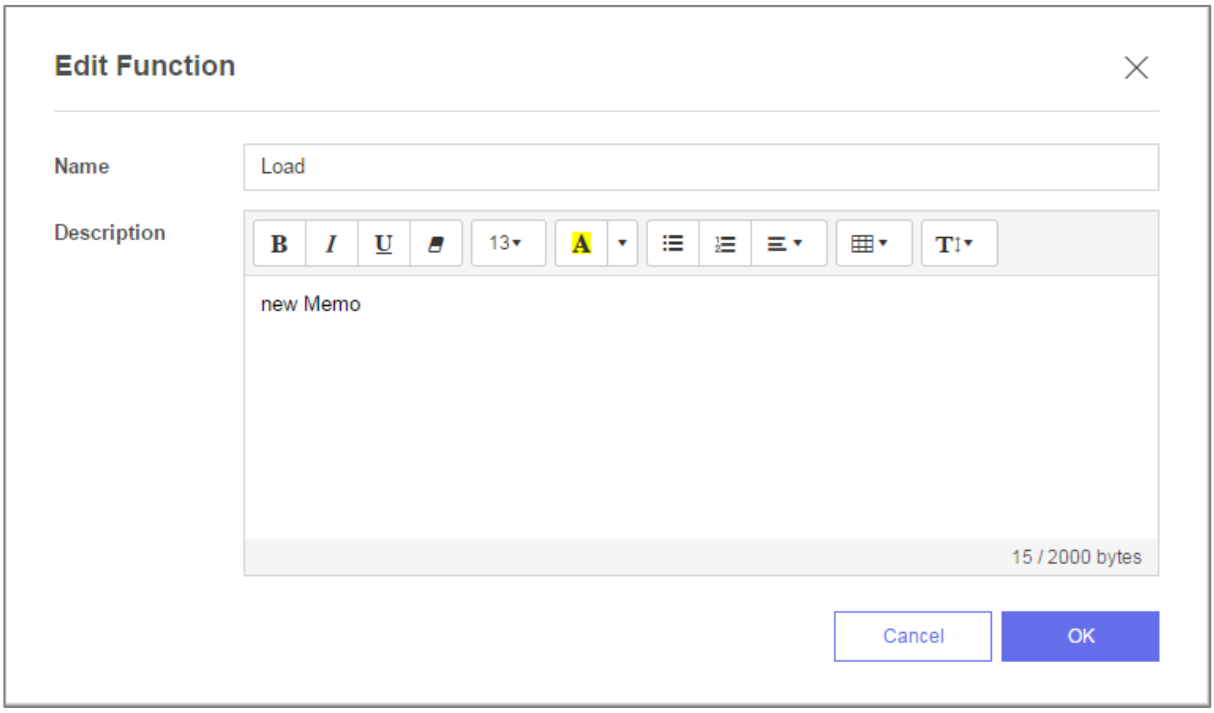
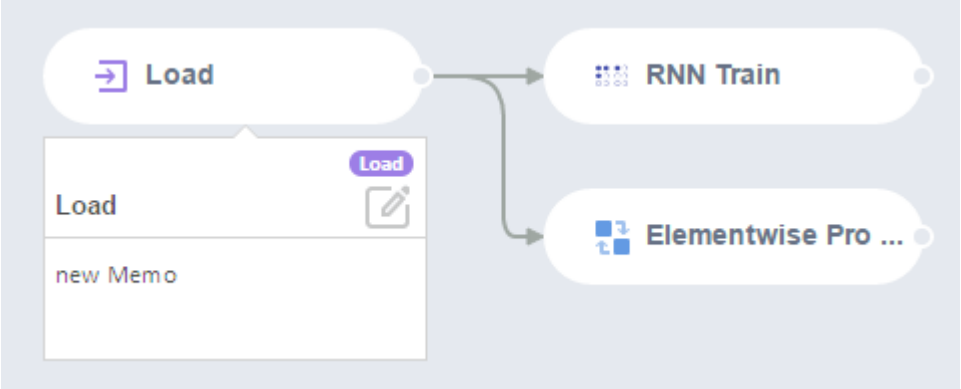


[Figure 5.2-36] Enter Tooltip Memo



[Figure 5.2-37] Verify Tooltip

5.2.11 Use Minimap

Minimap is a representation of [Diagram Editor] to give users a glance of all the functions they created in [Diagram Editor]. Like [Index] functionaitliy described earlier, Minimap allows users to see models easily and fast at once considering a growing number of to-be-used functions and the increasing complexitiy of Digram Editor in the future.

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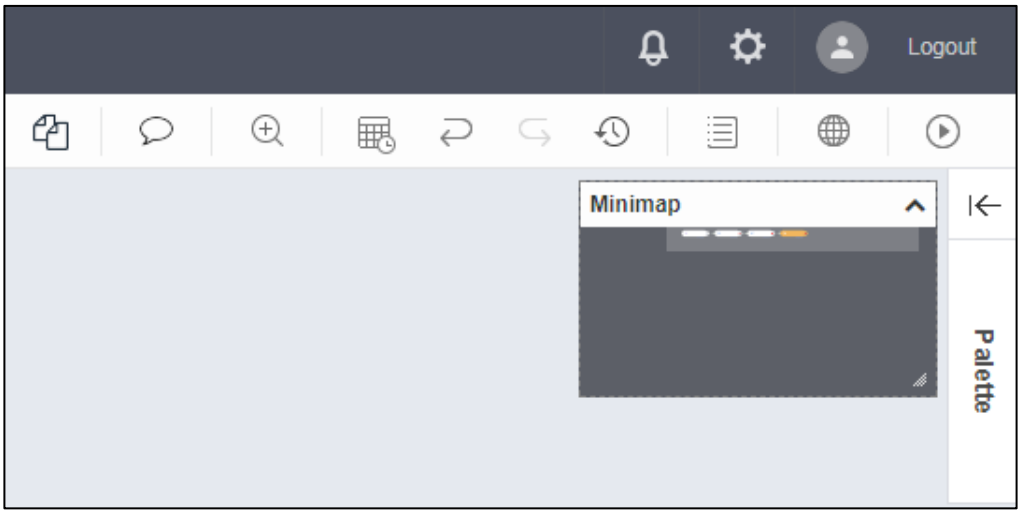


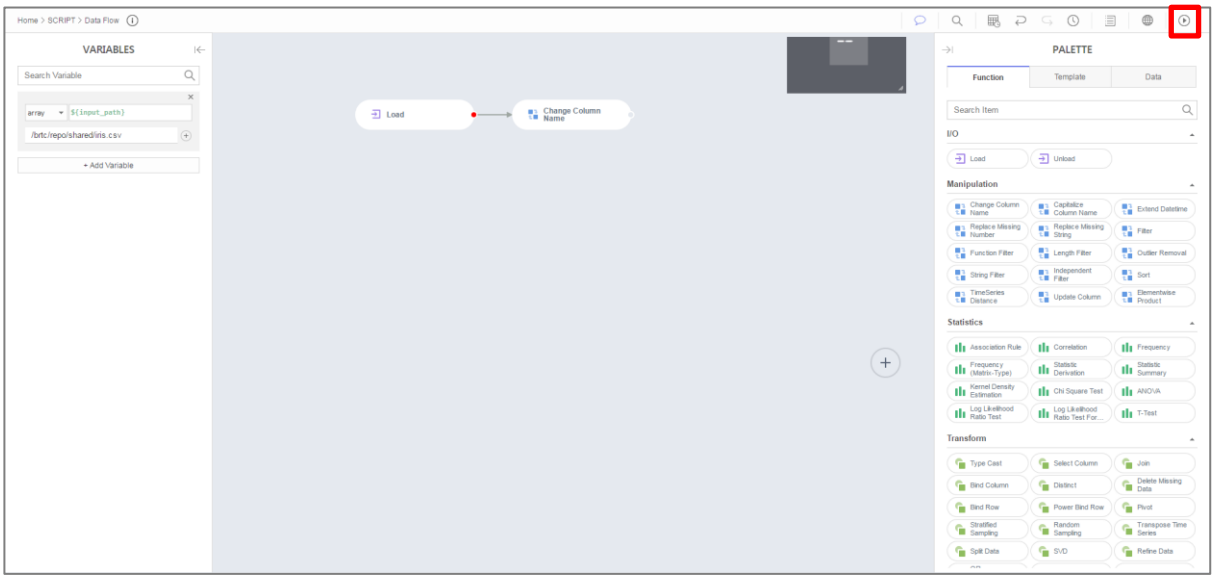
[Figure 5.2-38] Minimap Window

Drag a mouse to move Minimap window from a previou location. And click button to collapse the Minimap. And if you drag area, you can resize it.

5.2.12 Execute Entire Functions

A user executes all functions written in Diagram Editor in the order of connection. When there is a registered Global Variable, change the parameter value to new one and execute so that the function is executed based on the changed value.

A. Click button in Diagram Editor.



[Figure 5.2-39] Run Button in Diagram Editor

B. Enter variable value to be used for Run and click **OK** button. (input window appears only when parameter is registered in variable)

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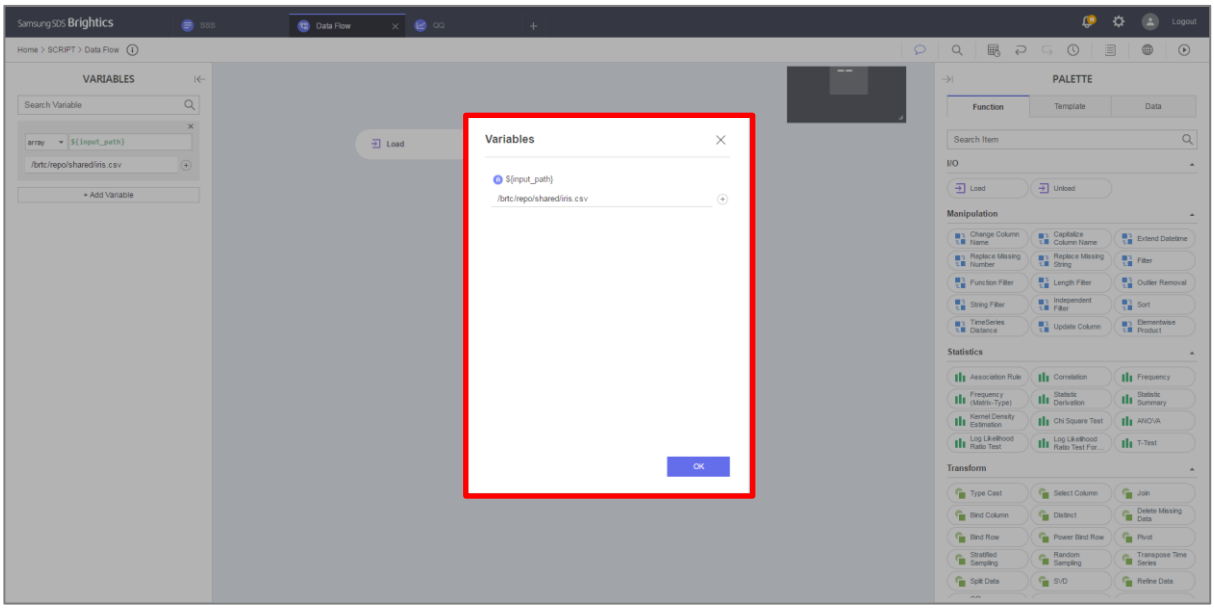
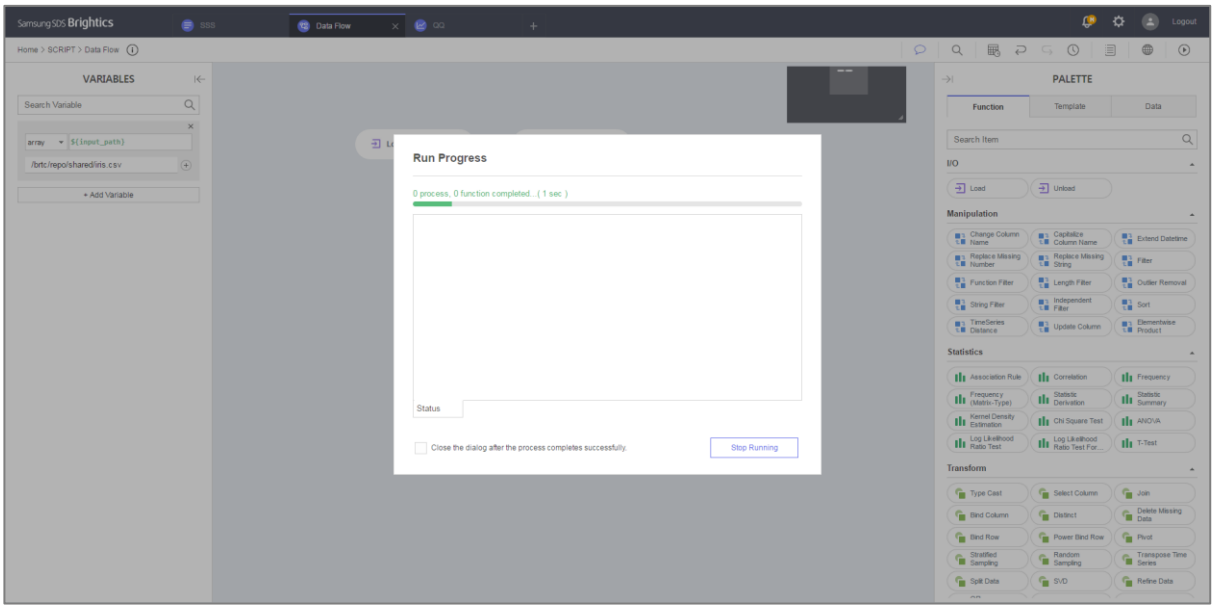


[Figure 5.2-40] Variable Entered to be Used for Run

C. When the Run is executed, the list of currently running function is displayed which allows you to know which function is running.



[Figure 5.2-41] Run being Executed

D. When the execution is completed, Done button is displayed. When you click the button, the window is closed.

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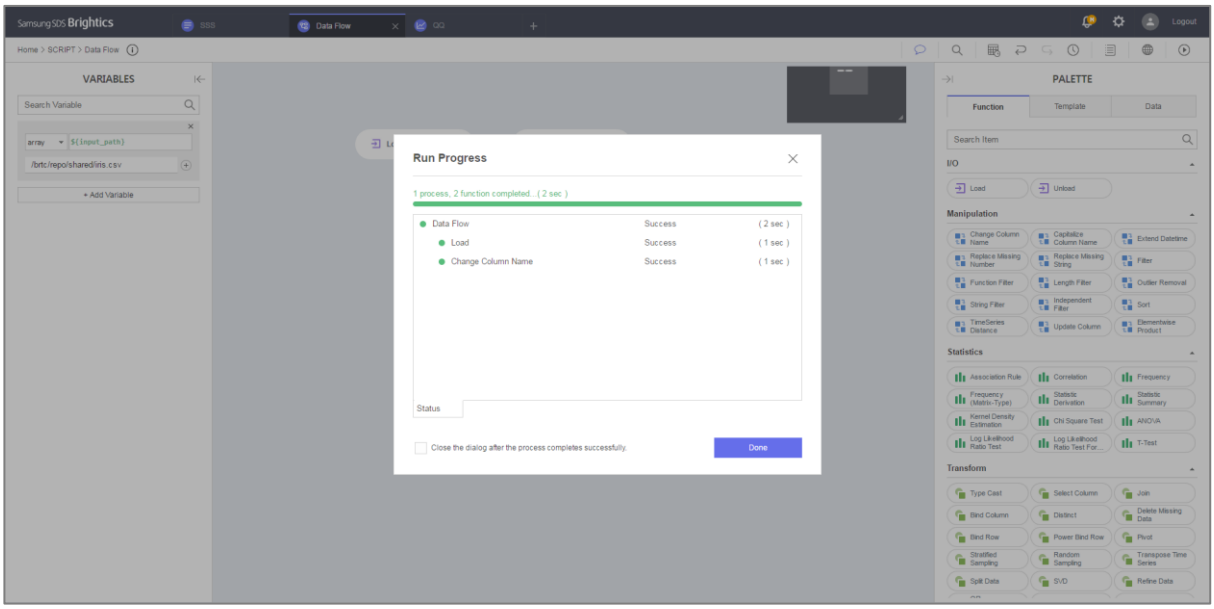
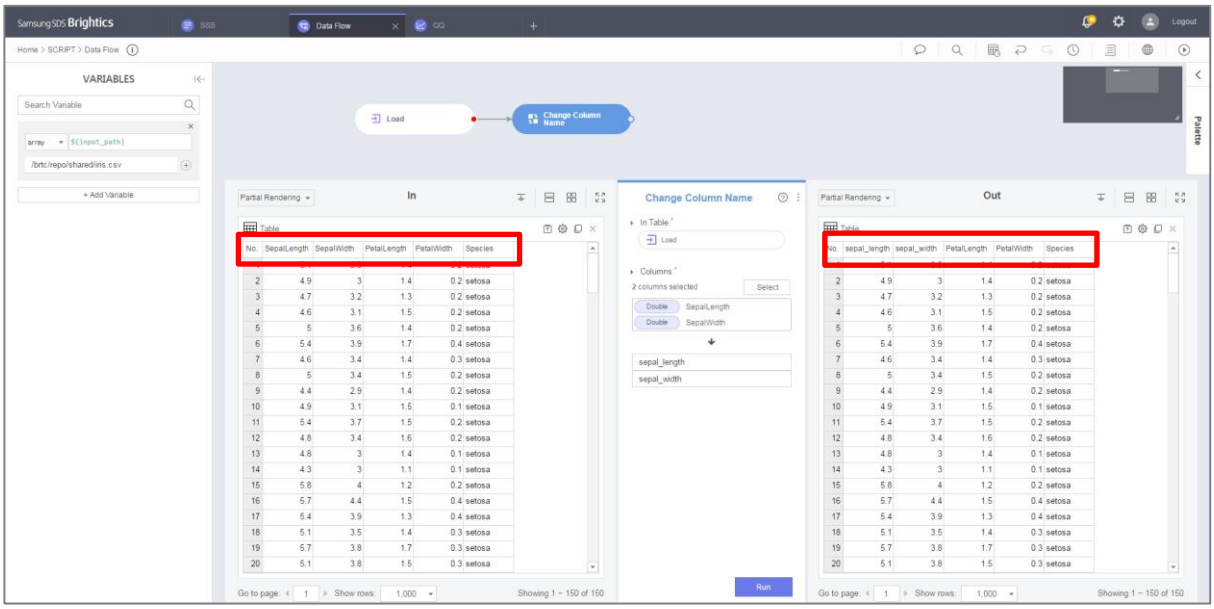


[Figure 5.2-42] Run Execution Completed

E. Click one of the functions and check IN/OUT Data Panel to verify whether or not it has been executed normally.



[Figure 5.2-30] Run Normally Executed and Displayed in Data Panel

5.2.13 Use Clipboard/Template

You can save frequently used functions in [Clipboard] or [Template] repository for further use. And drag and drop a saved function to add to [Diagram Editor].

5.2.13.1 Clipboard

Save one or multiple functions temporaily in [Clipboard] and add to another model. Saved content will disappear when you log out or open a new browser window.

A. Click button that becomes visible when you drag and select a function.

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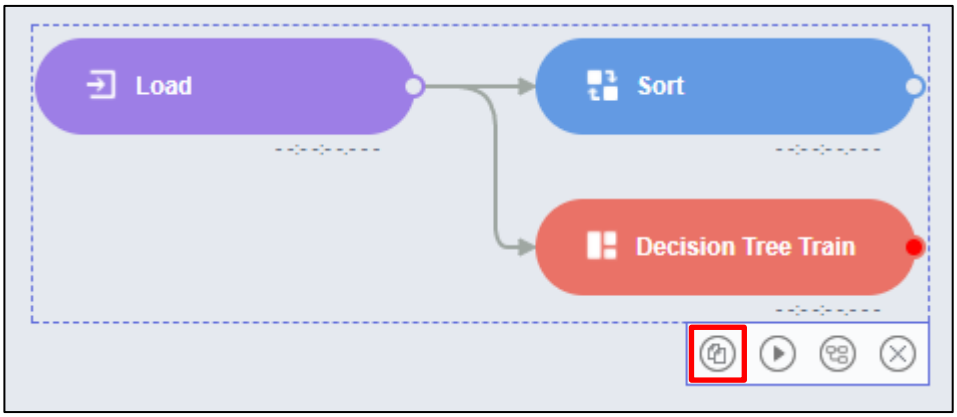
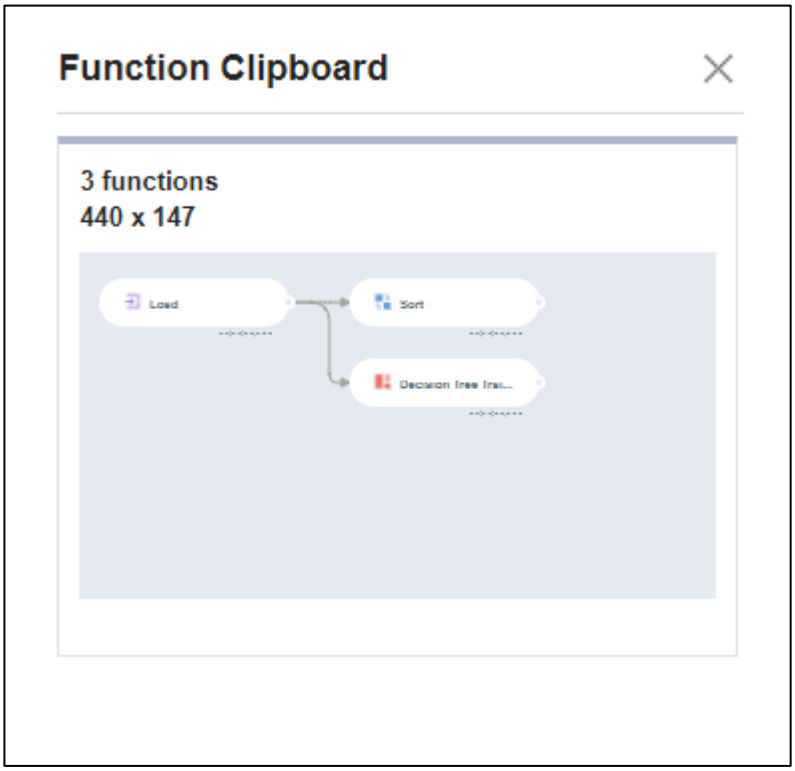


[Figure 5.2-44] Clipboard Button

B. [Function Clipboard] window shows you the list of selected functions.
(Use button in [Toolbar] to open [Function Clipboard].)



[Figure 5.2-45] Function Clipboard

C. Drag Clipboard content and add to a corresponding or another model.

5.2.13.2 Template

Save one or multiple functions in [Template] to add to another model. As long as it is not deleted from an account, it can be used permanently.

A. Click button that becomes visible when you drag and select a function.

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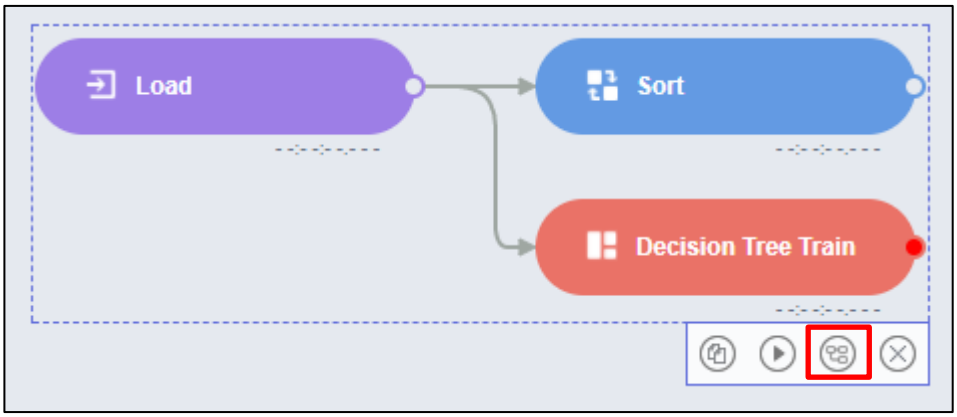
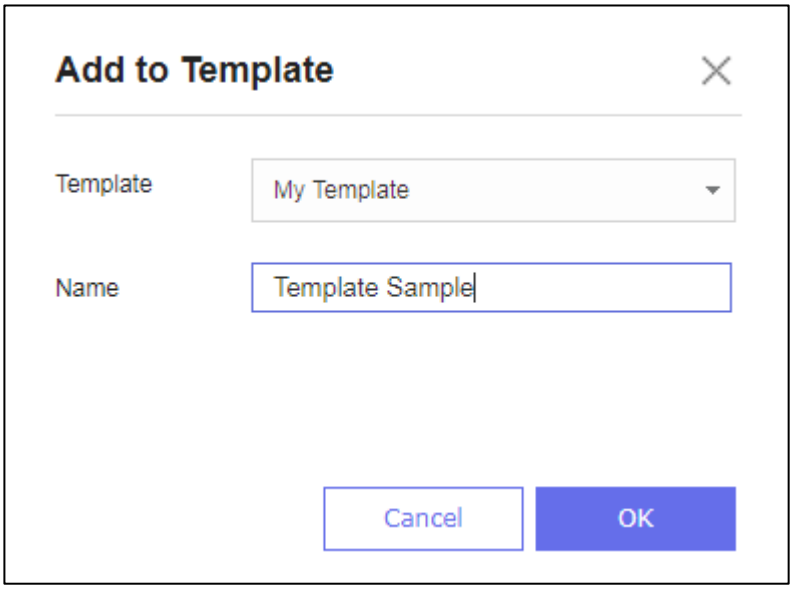


[Figure 5.2-46] Template Button

B. Enter Template name and click **OK** button.



[Figure 5.2-47] Add to Template

C. You can see an added content in [Template] category under [Palette View].

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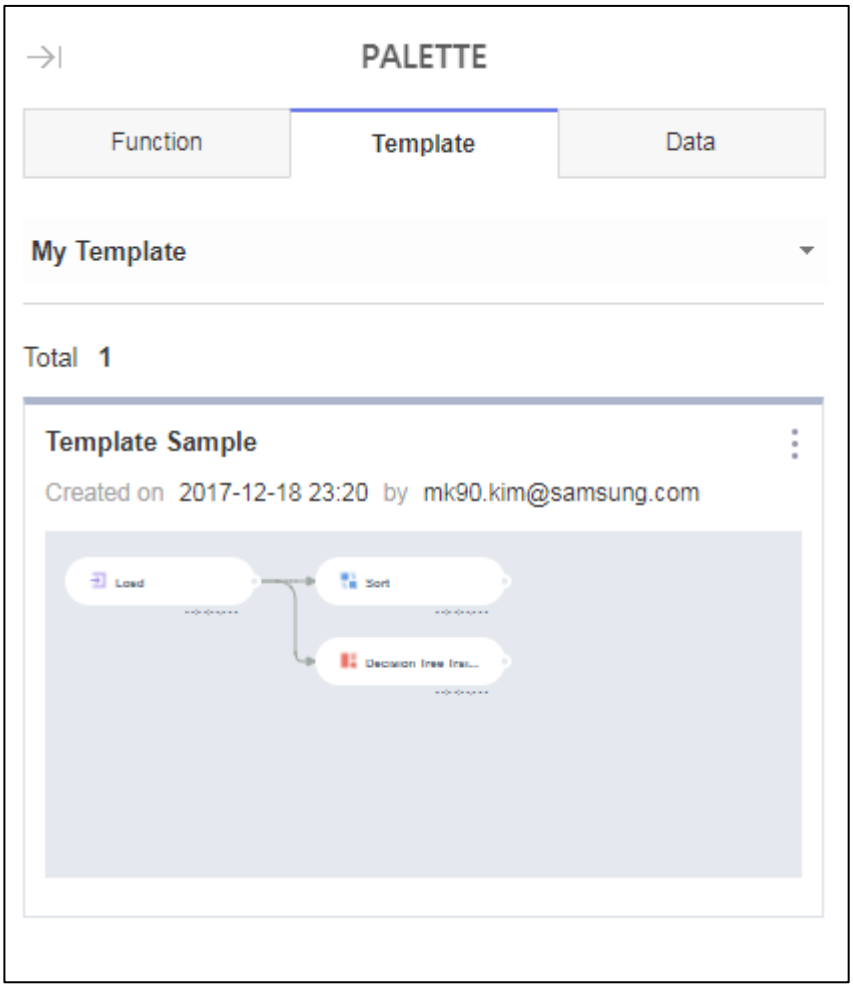


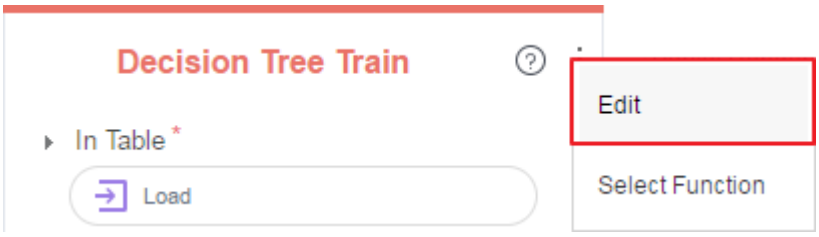
[Figure 5.2-48] Added to Template

5.2.14 Use Properties Panel

In Properties Panel, you can define the parameters of each function and execute Run. And you can also change the name of the function, change the function and register variable.

5.2.10. 1 Change a Function Name

A. Click ⋮ button on the top right side of the Properties Panel, select **Edit**, enter the new *Name* of the function, and click **OK** button.



[Figure 5.2-49] Function Edit Button

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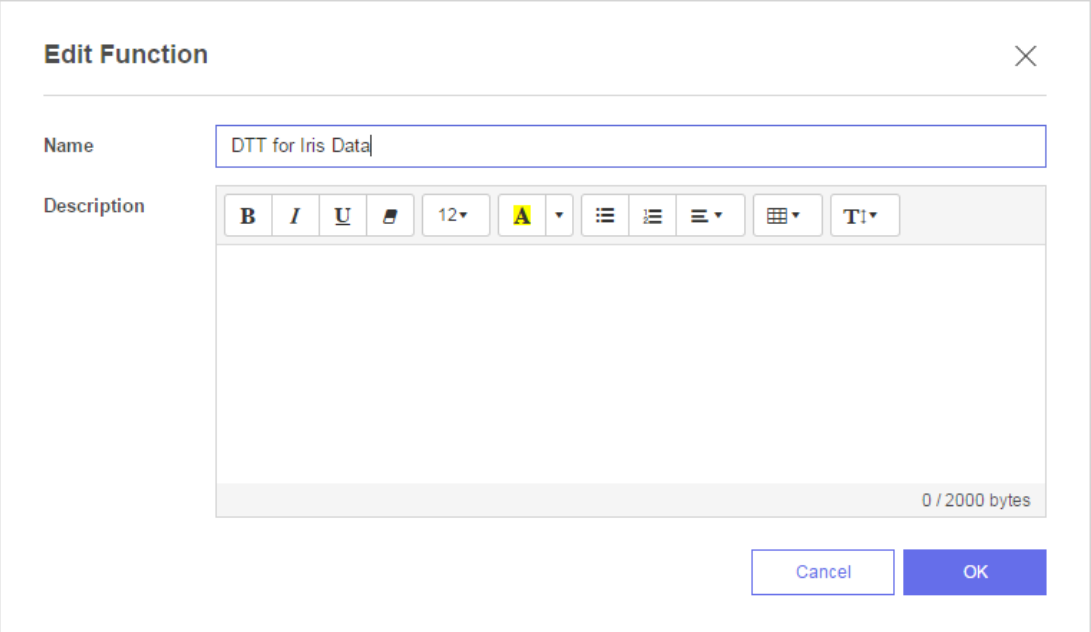
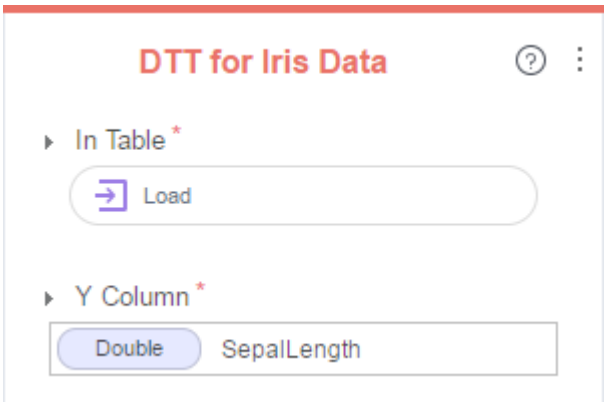


[Figure 5.2-50] Edit Function

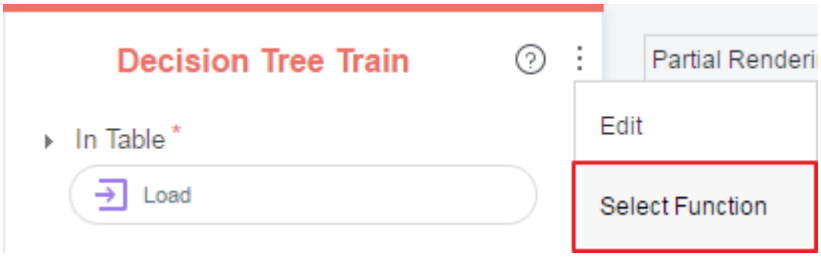
B. Function name in Properties Panel is changed.



[Figure 5.2-51] Changed Function Name

5.2.14.2 Change a Function

A. Click ⋮ button on the top right side of Properties Panel, choose **Select Function**, select to-be-changed *function* and click **OK** button.



[Figure 5.2-52] Select Function Button

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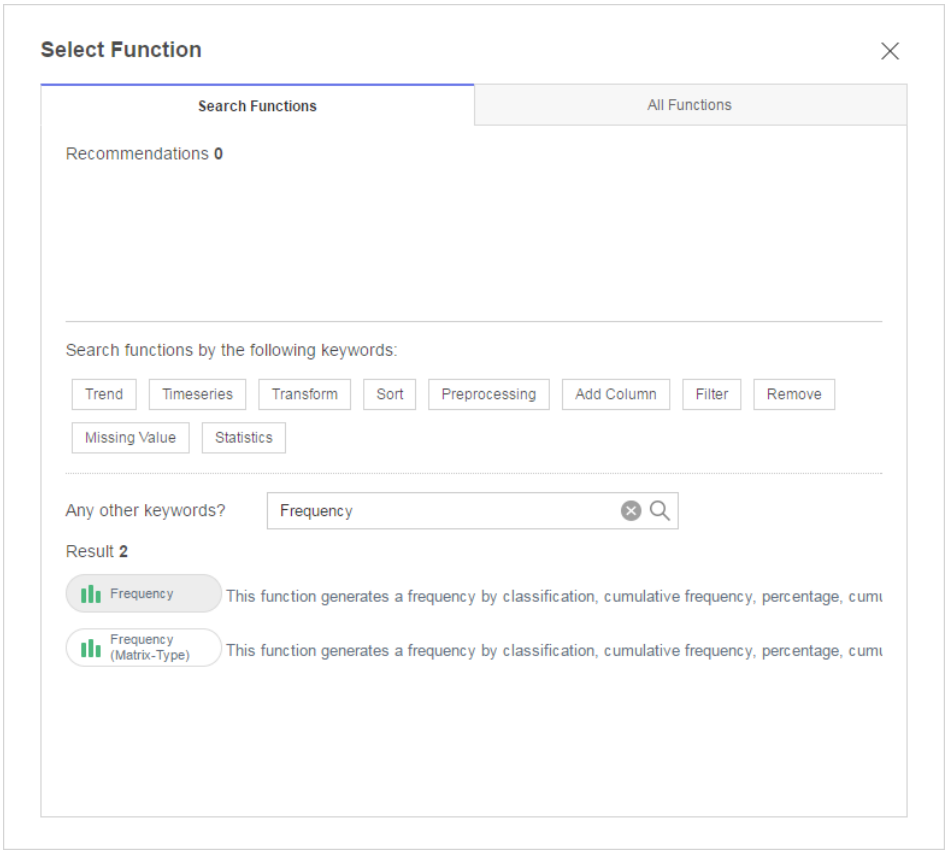
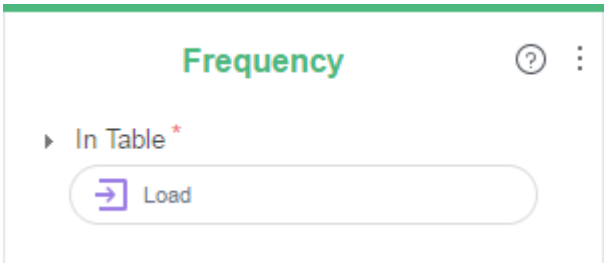


[Figure 5.2-53] Select a Function

B. You can verify the changed function in Properties Panel.



[Figure 5.2-54] Changed to the Selected Function

5.2.14.3 Define a Parameter

You can define the parameter of each function in Properties Panel. In Table, you can set the Table connected to the function concerned and also define the parameter using Control such as Input Box, Select Box and Combo Box. You can define the column using Column Selector when you have to select the column in the Table connected to the function as parameter. * Mark of the parameter which should be set as required value of function is located on the right-hand side of the Parameter Label and if it is not set, Validation Message is displayed.

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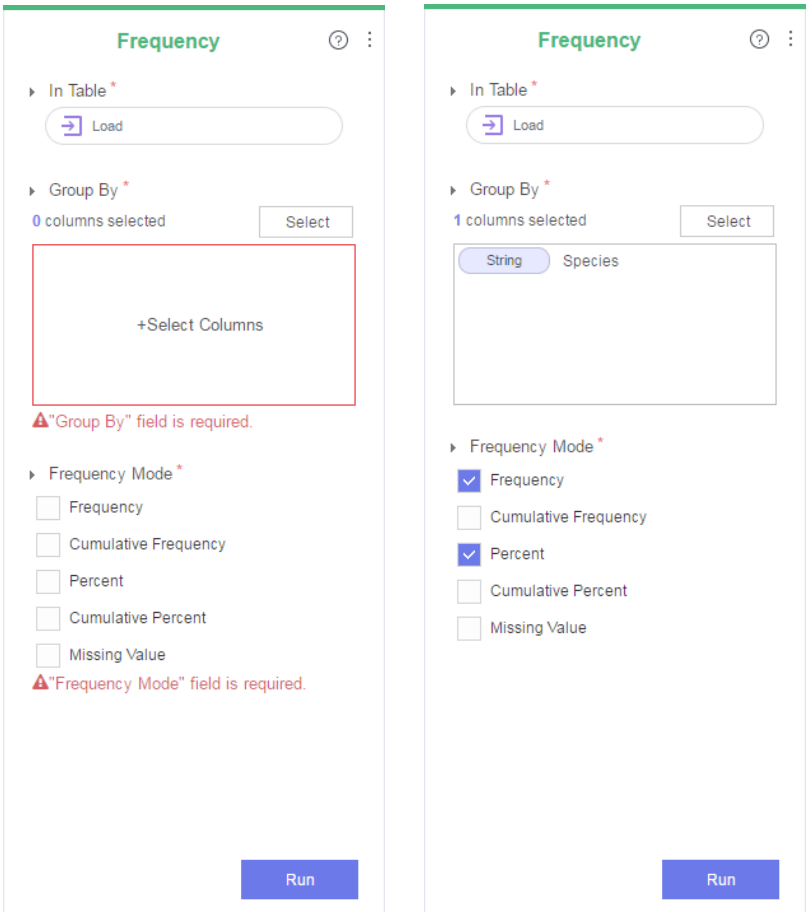
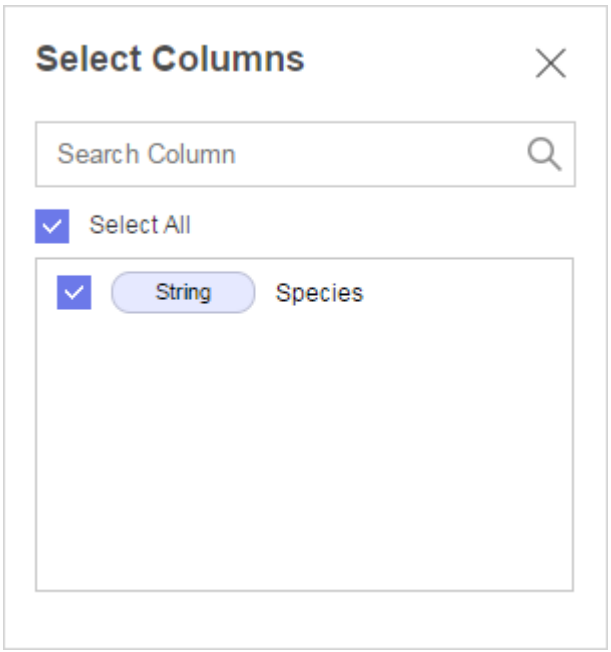


[Figure 5.2-55] Before/After Defining Frequency Function's Parameter



[Figure 5.2-56] Column Selector to Select the Column in the Connected Table

5.2.14.4 Register Variables

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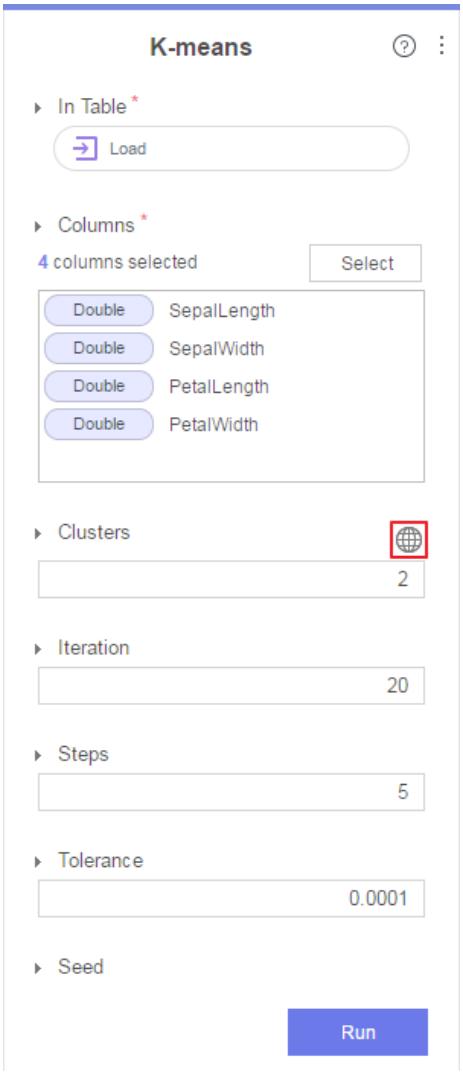
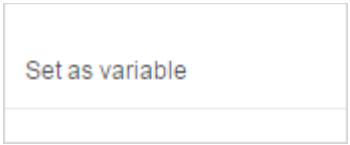
A. You can register variable by clicking button in Properties Panel.



[Figure 5.2-57] Click Variables Button in Properties Panel

B. Context menu is called and [Set as variable] and other currently registered variables are displayed.



[Figure 5.2-58] Context Menu

C. Click [Set as variable] to register variable. Once it is normally registered, the color of variables icon is changed.

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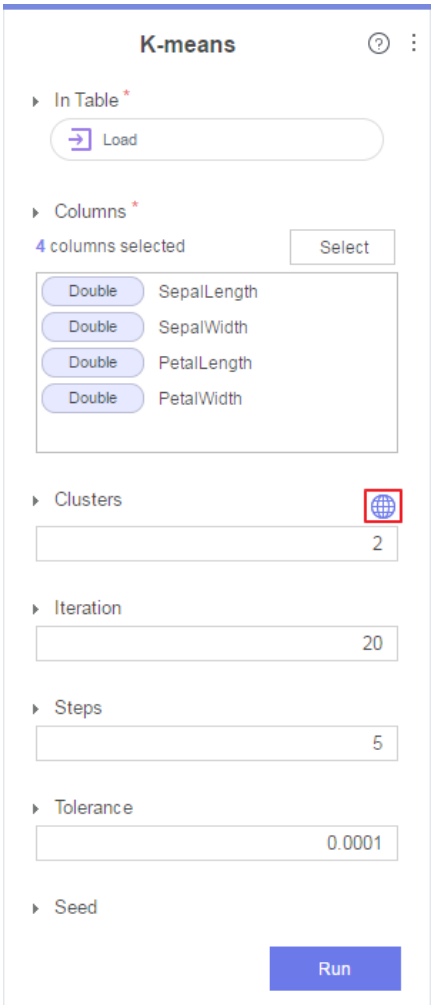
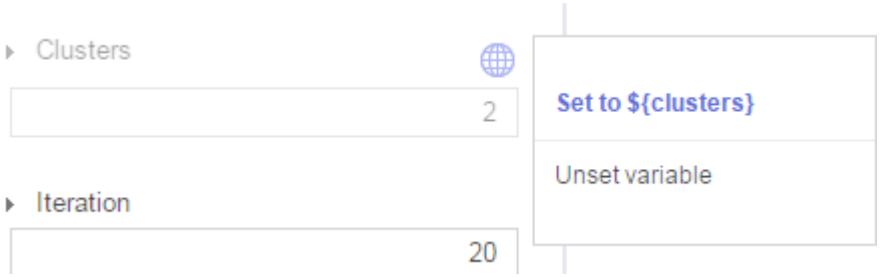


[Figure 5.2-59] Properties Panel with Variables Registered



[Figure 5.2-60] Context Menu with Variables Registered

D. You can verify the registered variable in Variables View.

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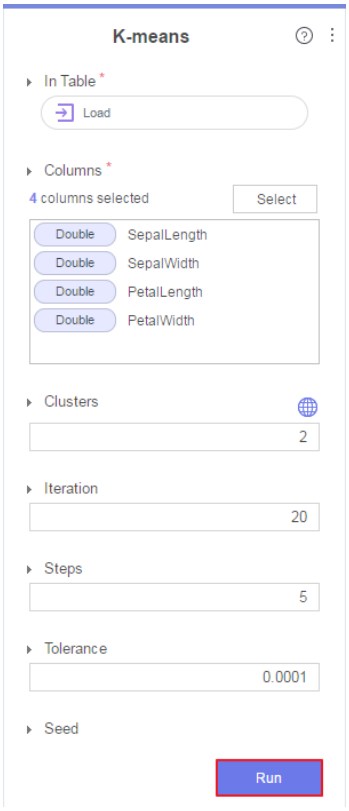
[Figure 5.2-61] Variables Registered Normally

5.2.14.5 Execute a Function

Click Run button at the bottom of Properties Panel to execute a function. If a variable is set, Variable Window is displayed before execution, where you can set the variable. You can check the progress of the Run execution via Run Progress while the function is running. After the function execution is completed, function execution result is displayed in Out Data Panel.



[Figure 5.2-62] Properties Panel Run Button

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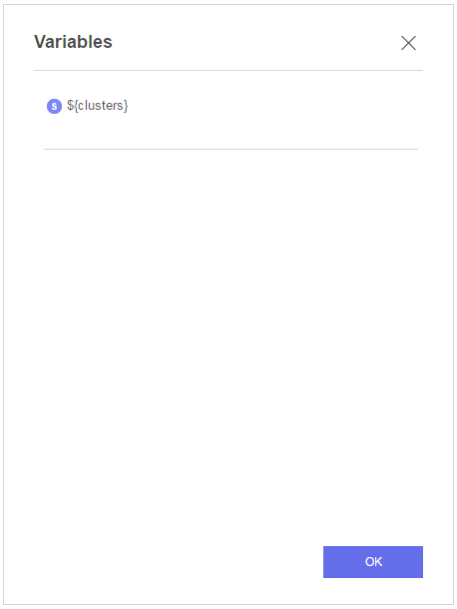
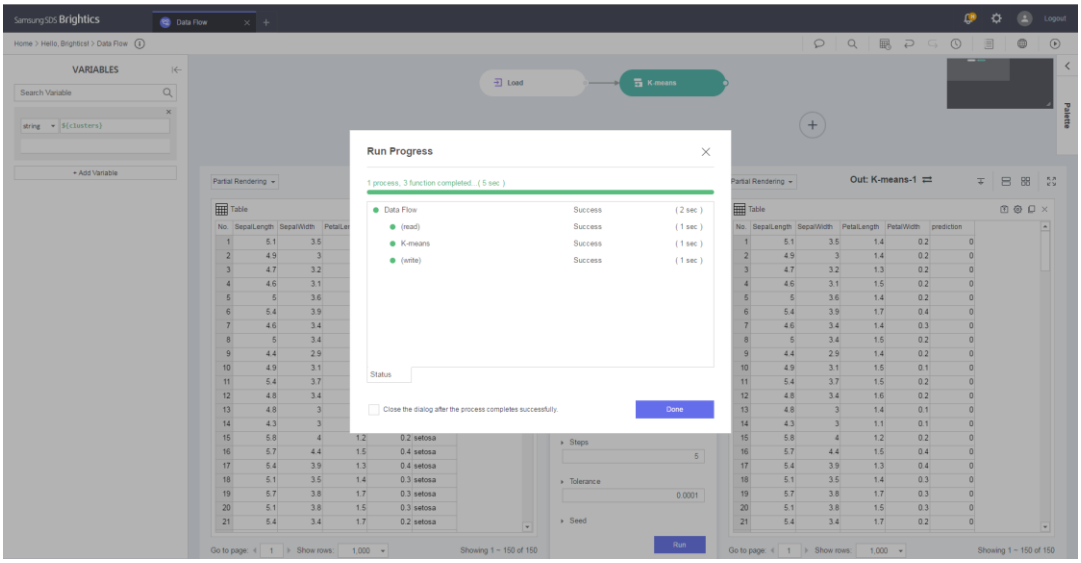


[Figure 5.2-63] Variable Settings Screen after Run Button Click



[Figure 5.2-64] Run Progress Window and Function Result Screen

5.2.15 Use Data Panel

Data Panel is a panel that allows you to verify the data generated from the execution result of the function created in Diagram Editor and visualize them in various charts.

5.2.15.1 Change Rendering Mode

A. Partial Rendering is a panel that allows you to decide which row to look up among target data, confirm partial data and see them in various charts.

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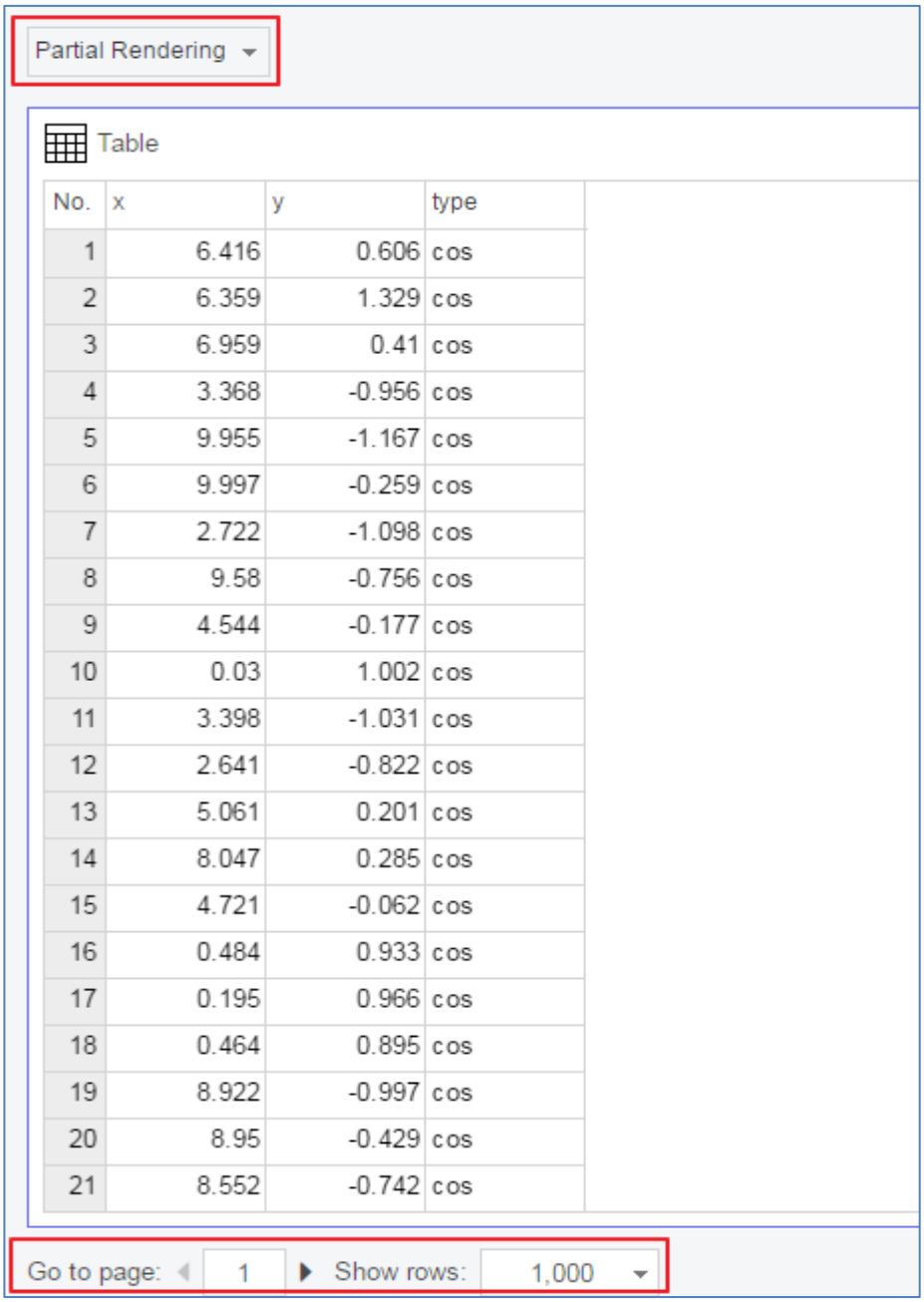

[Figure 5.2-65] Partial Rendering Set as Rendering Mode

Go to Page" option is available for 1000+ rows of data.

Name	Icon	Description
Go to page	Go to page: 2	Move to a desired page
Show rows	Show rows: 1000	Select the number of rows to display in the table per page
	Showing 1,001 ~ 2,000 of 100,000,000	Show the total number of rows and page information displayed in the Table

[Diagram 5.2-1] Table Paging

B. Full Rendering offers a function that allows you to look up all data by converting entire data into compressed data in a server. Data is provided both in chart and table at the same time.

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[Figure 5.2-66] Full Rendering Set as Rendering Mode

5.2.15.2 Change Layout

A. Lay out each chart in a horizontal manner using Horizontal button located in the header of Data Panel.

[Figure 5.2-67] Layout Set Horizontally

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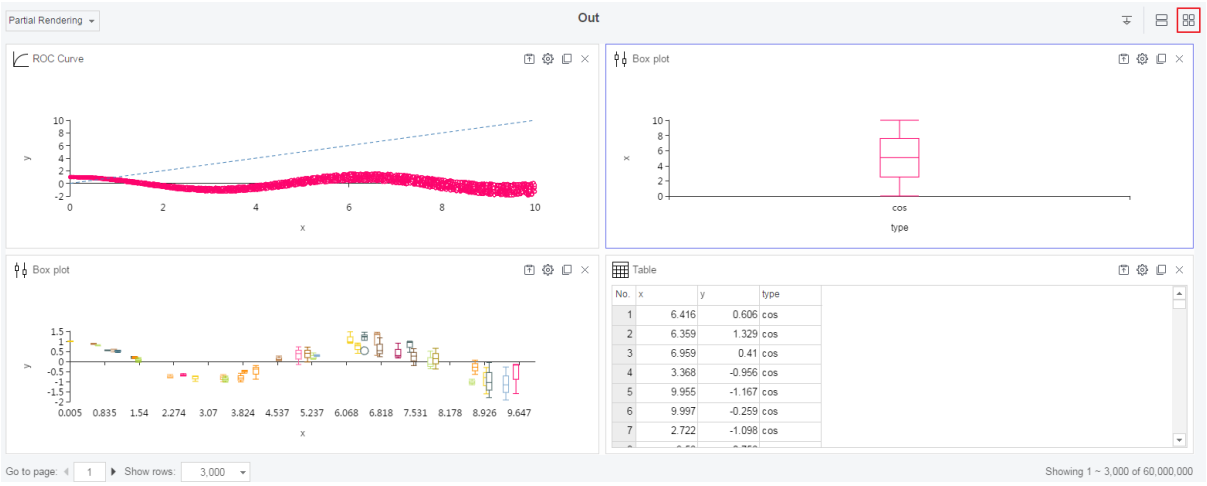
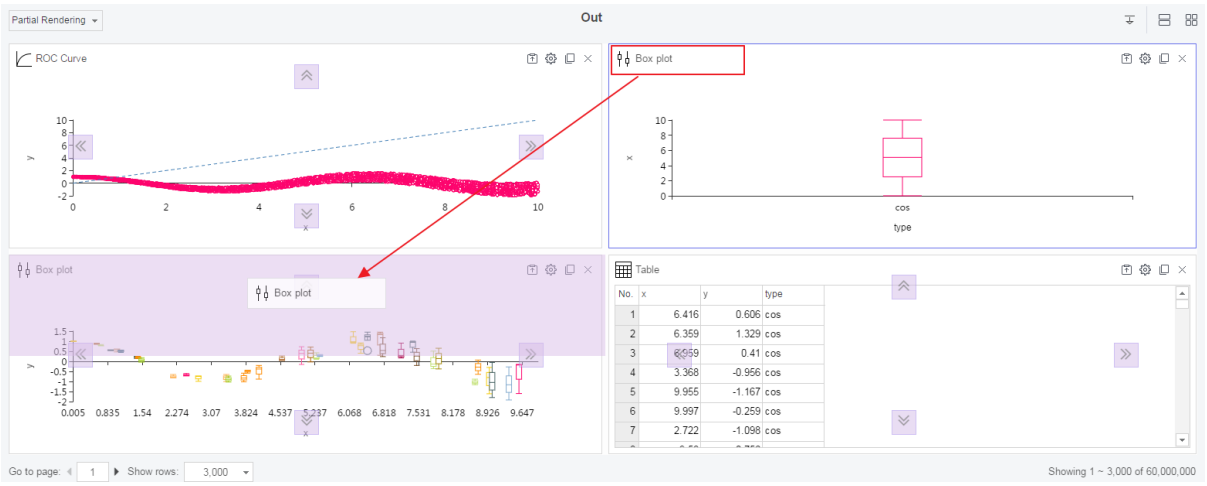
B. Lay out each chart on a grid pattern using Evenly button located in the header of Data Panel.

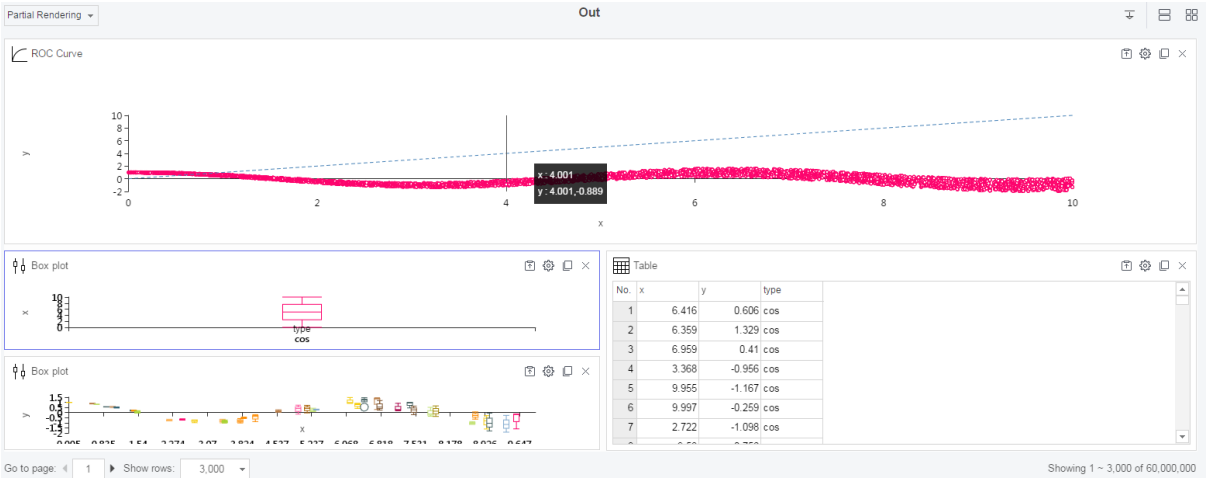


[Figure 5.2-68] Layout Set on a Grid Pattern

C. A user directly drags & drops the header of the chart to change the layout of the chart.



[Figure 5.2-69] The Header of the Chart Has Been Dragged and Remaining Stationary at Target Location



[Figure 5.2-70] Chart has been Dragged and Dropped

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5.2.15.3 Popup Chart

Popup Chart is a new window to show charts created in [Data Panel].You can use [PROPERTIES] category to modify options of each chart and [FILTERS] to filter data and see the charts of filtered data. However, you cannot save what you worked in [Popup Chart].

A. Use button in Data Panel's header to open a new window.

[Figure 5.2-71] Popup Chart

Data Box shows data name and column information which has been fed as input.

B. Click [Chart] to modify data source and chart option in [PROPERTIES].

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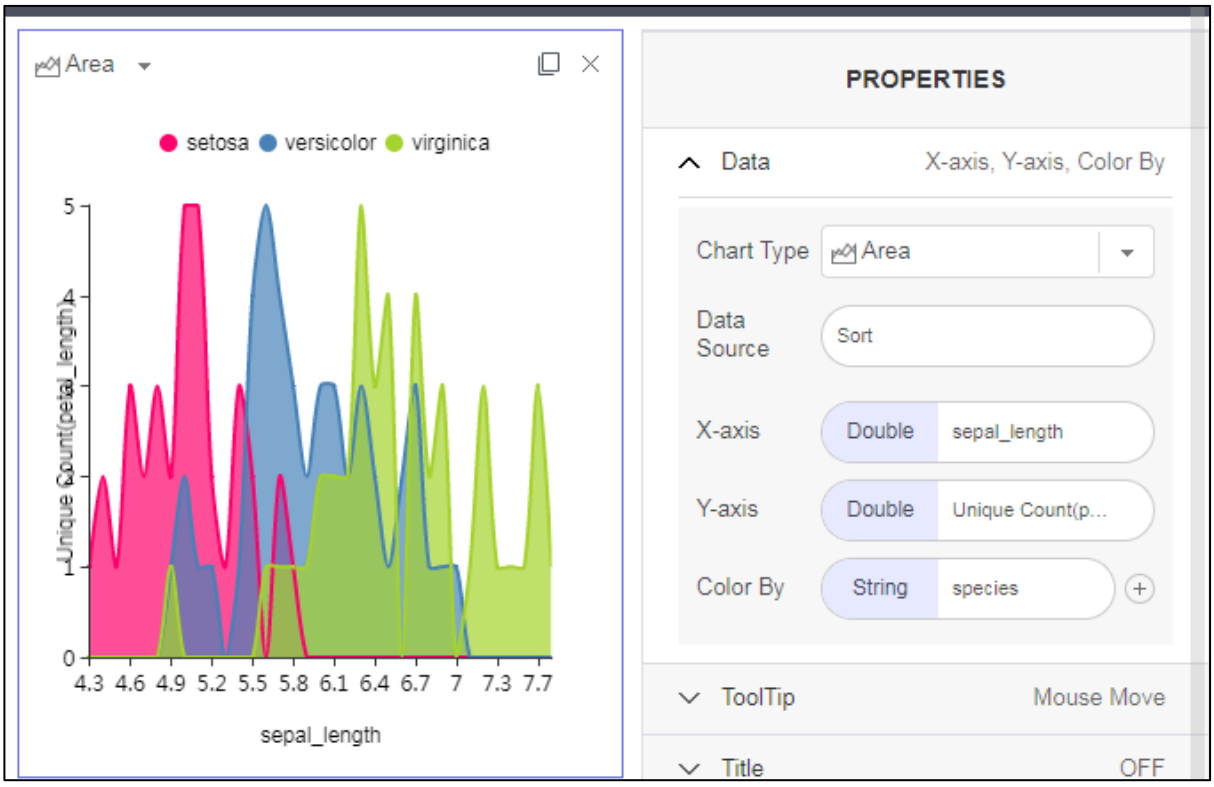
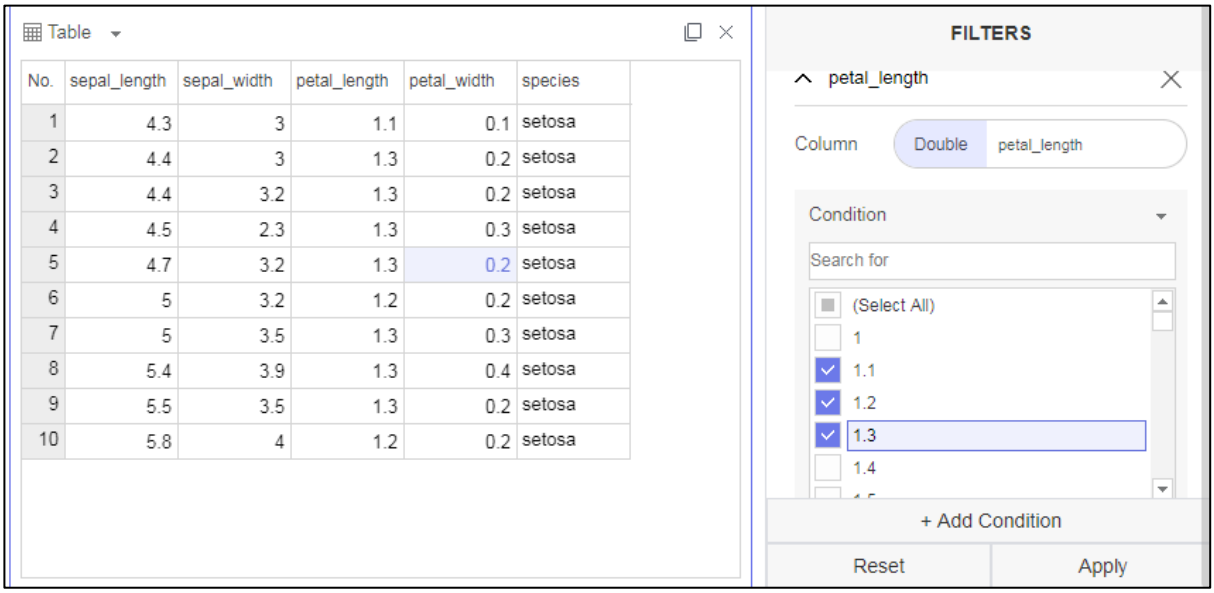


[Figure 5.2-72] Popup Chart PROPERTIES

C. Click [Chart] to filter data in [FILTERS] and then create a chart



No.	sepal_length	sepal_width	petal_length	petal_width	species
1	4.3	3	1.1	0.1	setosa
2	4.4	3	1.3	0.2	setosa
3	4.4	3.2	1.3	0.2	setosa
4	4.5	2.3	1.3	0.3	setosa
5	4.7	3.2	1.3	0.2	setosa
6	5	3.2	1.2	0.2	setosa
7	5	3.5	1.3	0.3	setosa
8	5.4	3.9	1.3	0.4	setosa
9	5.5	3.5	1.3	0.2	setosa
10	5.8	4	1.2	0.2	setosa

[Figure 5.2-73] Popup Chart FILTERS

5.2.15.4 Configure Chart Option

A. Call Chart Settings screen by clicking Chart settings button.

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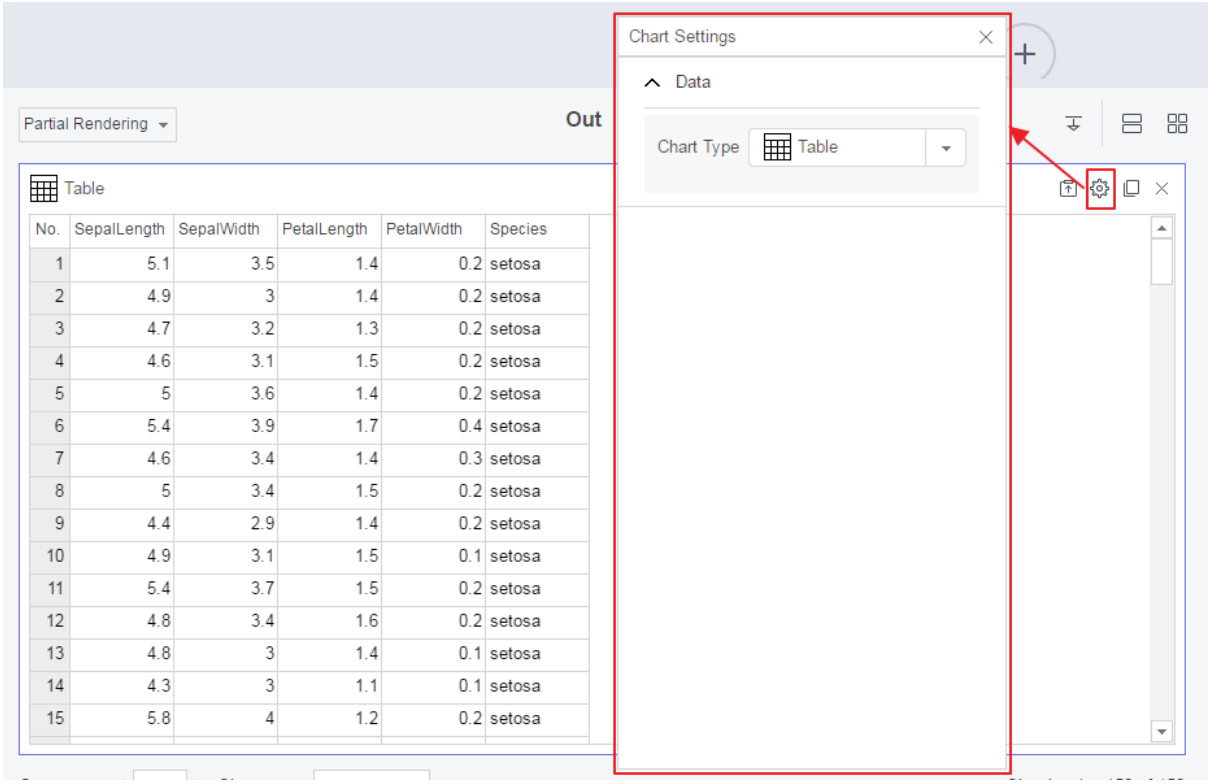
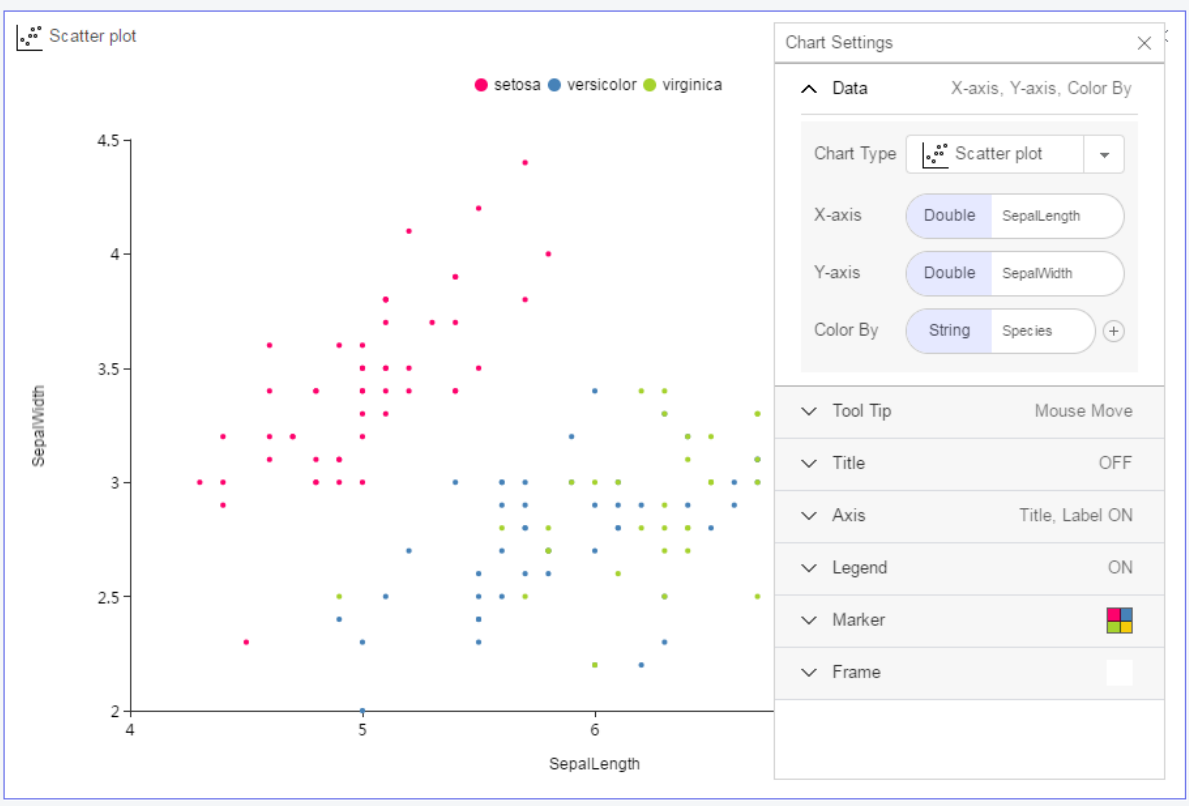


No.	SepalLength	SepalWidth	PetalLength	PetalWidth	Species
1	5.1	3.5	1.4	0.2	setosa
2	4.9	3	1.4	0.2	setosa
3	4.7	3.2	1.3	0.2	setosa
4	4.6	3.1	1.5	0.2	setosa
5	5	3.6	1.4	0.2	setosa
6	5.4	3.9	1.7	0.4	setosa
7	4.6	3.4	1.4	0.3	setosa
8	5	3.4	1.5	0.2	setosa
9	4.4	2.9	1.4	0.2	setosa
10	4.9	3.1	1.5	0.1	setosa
11	5.4	3.7	1.5	0.2	setosa
12	4.8	3.4	1.6	0.2	setosa
13	4.8	3	1.4	0.1	setosa
14	4.3	3	1.1	0.1	setosa
15	5.8	4	1.2	0.2	setosa

[Figure 5.2-74] Chart Settings Window

B. Change Chart Option to represent the data on a desired chart.



[Figure 5.2-75] Chart Option Changed to Scatter Chart

5.2.15.5 Add To Report

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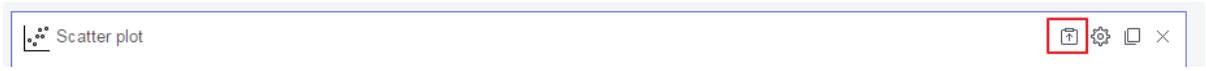
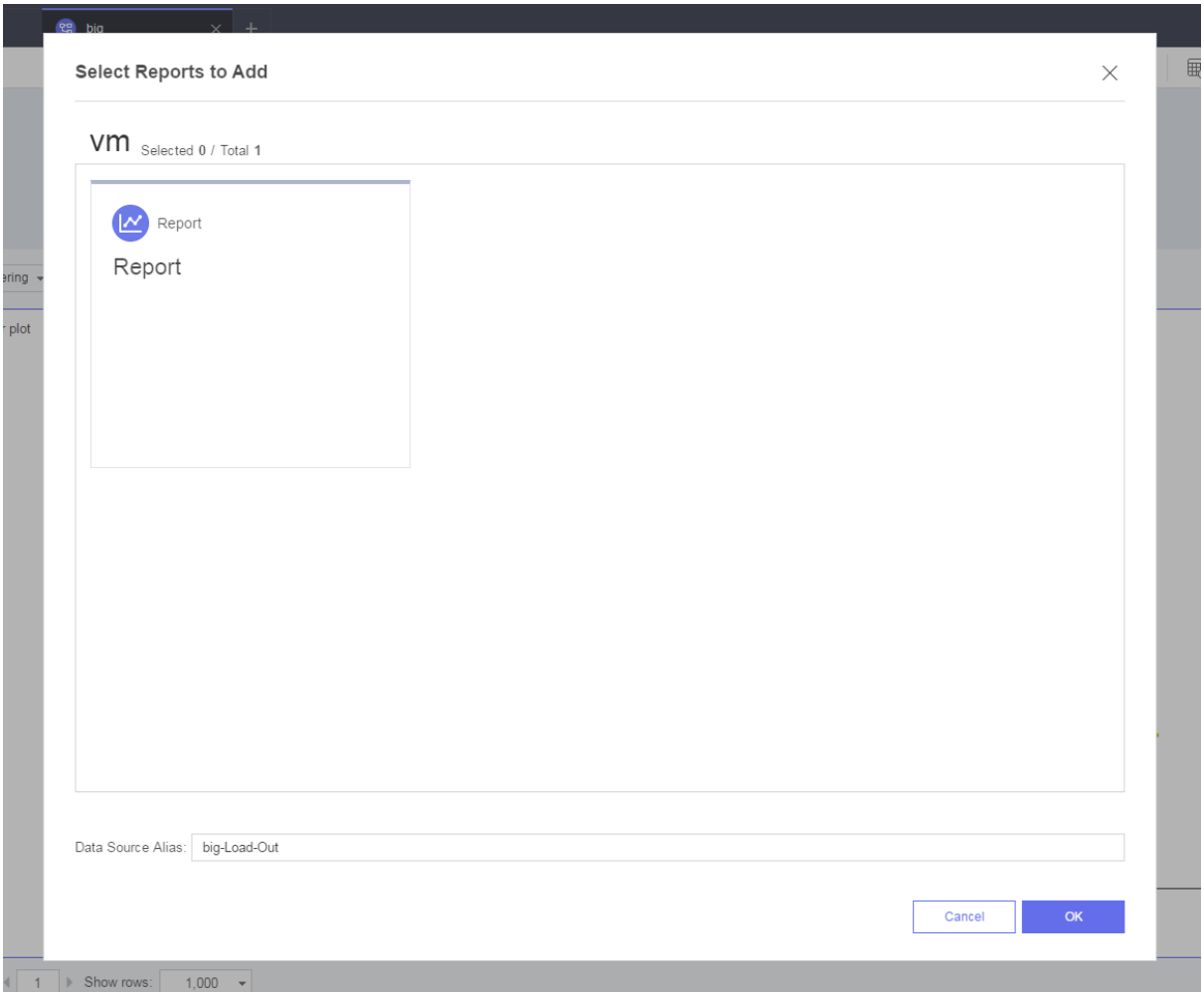
A. Click Report Add button in the Header of the chart that you want to represent as Report.



[Figure 5.2-76] Add to Report Button

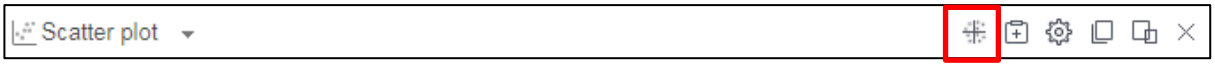
B. Select the Report to which you want to add the concerned chart.



[Figure 5.2-77] Window to Select Reports to Add

5.2.15.6 Multi Chart

A. Click [Multichart] icon for corresponding charts to group them into a new chart.



[Figure 5.2-78] Multi Chart Icon

B. When Multichart window appears, select [Group By] category in Properties on the right to set a base column for grouping. You can resize each chart in Width/Height field.

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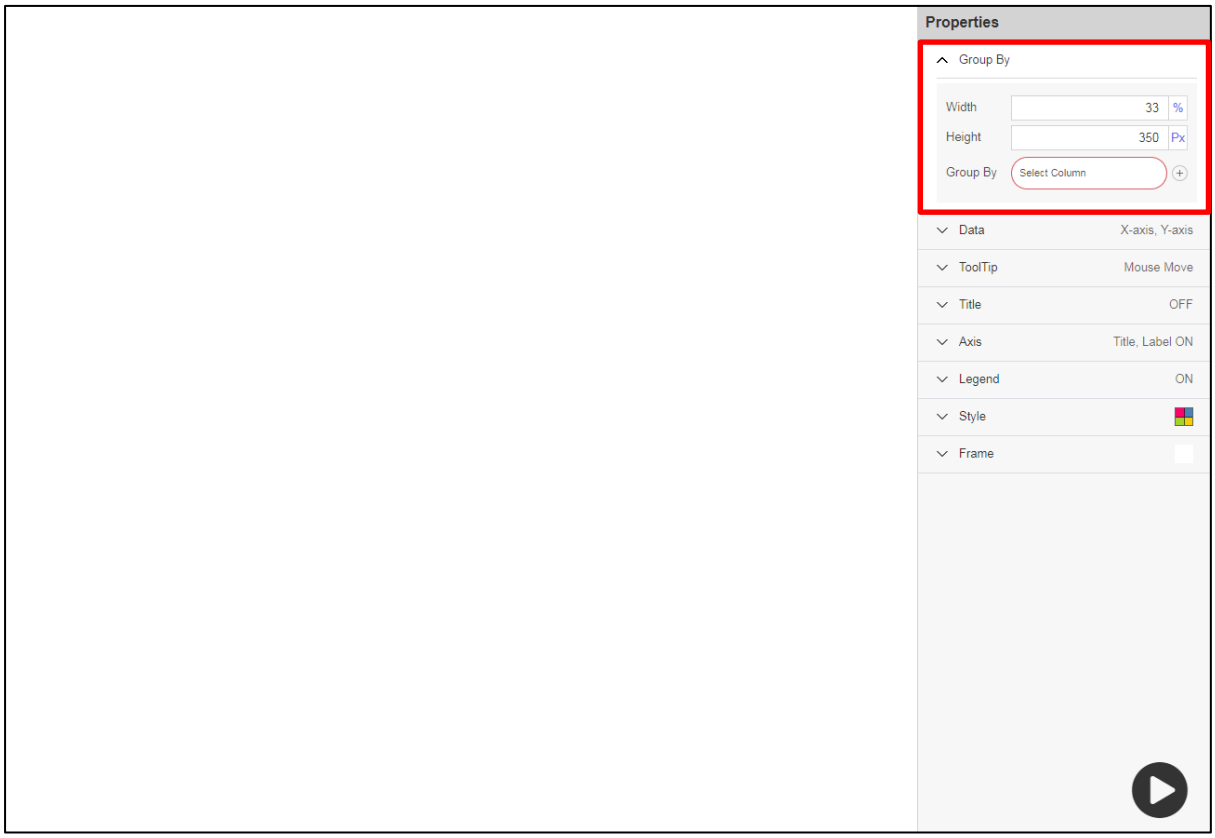
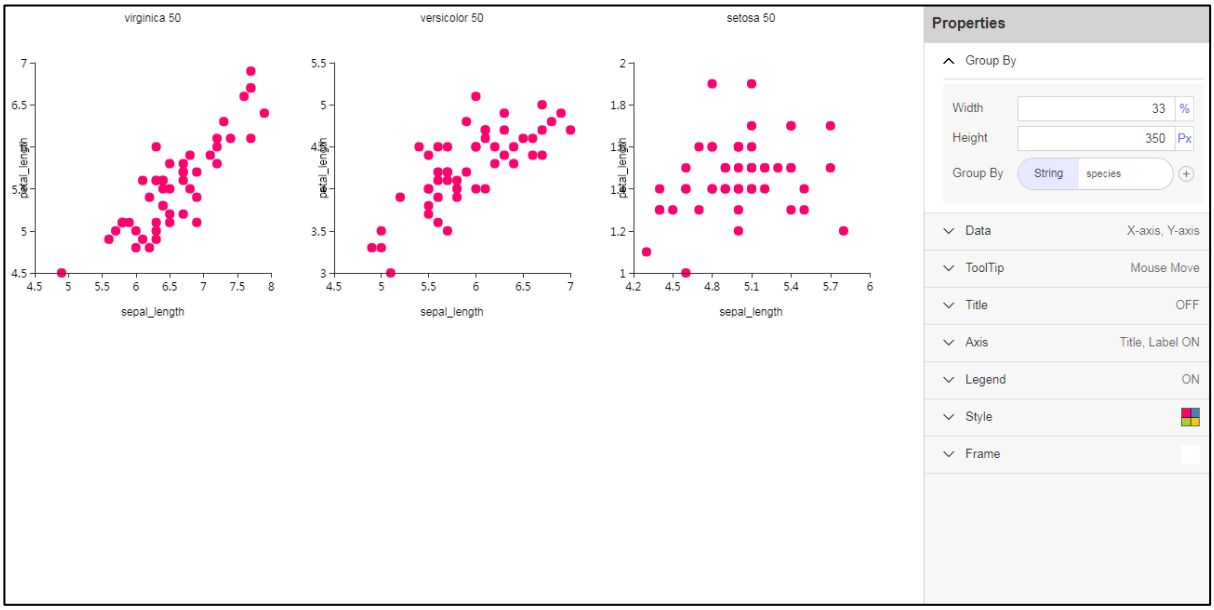


[Figure 5.2-79] Multi Chart Settings

C. Click button at the bottom right corner to see the results.



[Figure 5.2-80] Multi Chart Viewer

5.3 Use Control Flow Model Editor

In Control Flow Model Editor, you can add a function to use in Control Model. Toolbar Menu consists of a function to adjust the size of the Editor, a function to verify and Undo/Redo the job history, Full Run function to perform all functions of Control Model and a function to enable Variable screen. The use of Variable, History, Zoom and Full Run function is basically the same as Diagram Editor.

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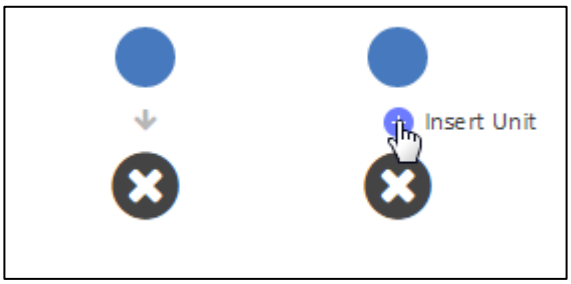
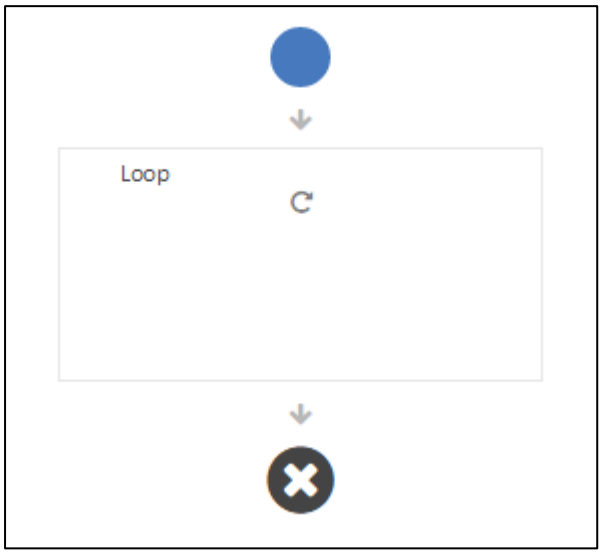
5.3.1 Create a Function

Mouse over the downwards arrow to enable Insert Unit function. When it is enabled, click it to create a Function Creation Popup window.



[Figure 5.3-1] Insert Unit Function Enabled

If you mouse over Loop, IF-ELSE Function, an arrow will be additionally created at the end of the Function. If you click a function that you want to see created within the popup window, the function concerned becomes visible in Controlflow Editor.



[Figure 5.3-2] Function Created in Controlflow Editor

Note	If you add Else-If inside IF-ELSE Function, click ⊕ that becomes visible when you mouse over IF-ELSE function.

5.3.2 Move a Function

If you mouse over the upper part of the function that you want to move, Mouse cursor is changed into move mode. If you drag the corresponding function, all arrows in droppable area are highlighted.

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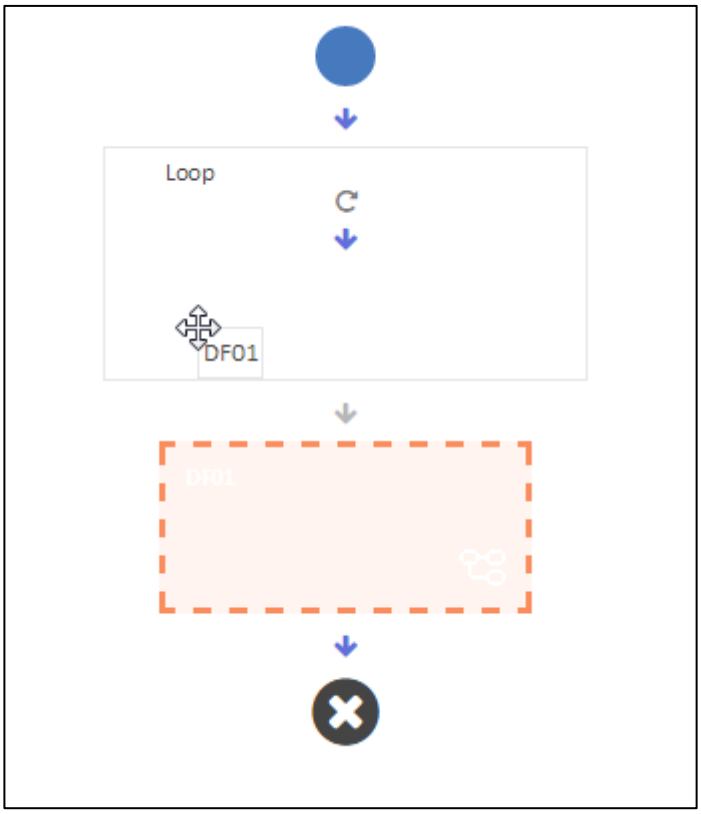
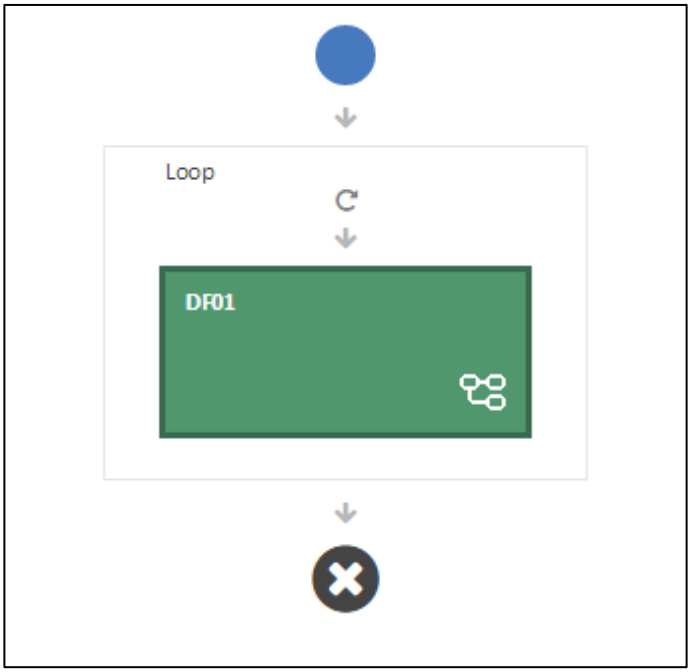


[Figure 5.3-3] Arrows in Droppable Area Highlighted by Dragging the Function in Dotted Line

If you drag and drop to the arrow in droppable area, the function moves to the corresponding location.



[Figure 5.3-4] Function Move Completed

In case of Loop, IF-ELSE, lower-part function included is also moved.

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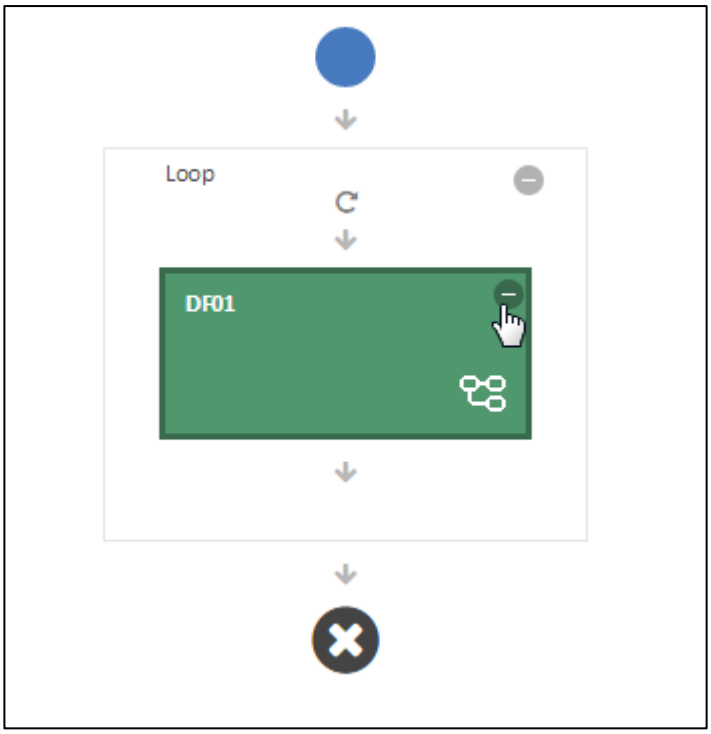
5.3.3 Delete a Function

If you mouse over the function you want to delete, button appears. If you click that button, the function is deleted.



[Figure 5.3-5] Delete Button Enabled

In case of Loop, IF-ELSE, lower-part function included is also deleted.

5.3.4 Use Properties View

If you select the function, [Properties] is enabled on the right-hand side of the Editor which allows you to enter the properties necessary to run the corresponding function. Basically, the name and description of all functions can be entered.

5.3.4.1 Import

Use this function to import the data from Repository, HDFS and relational database for analysis.

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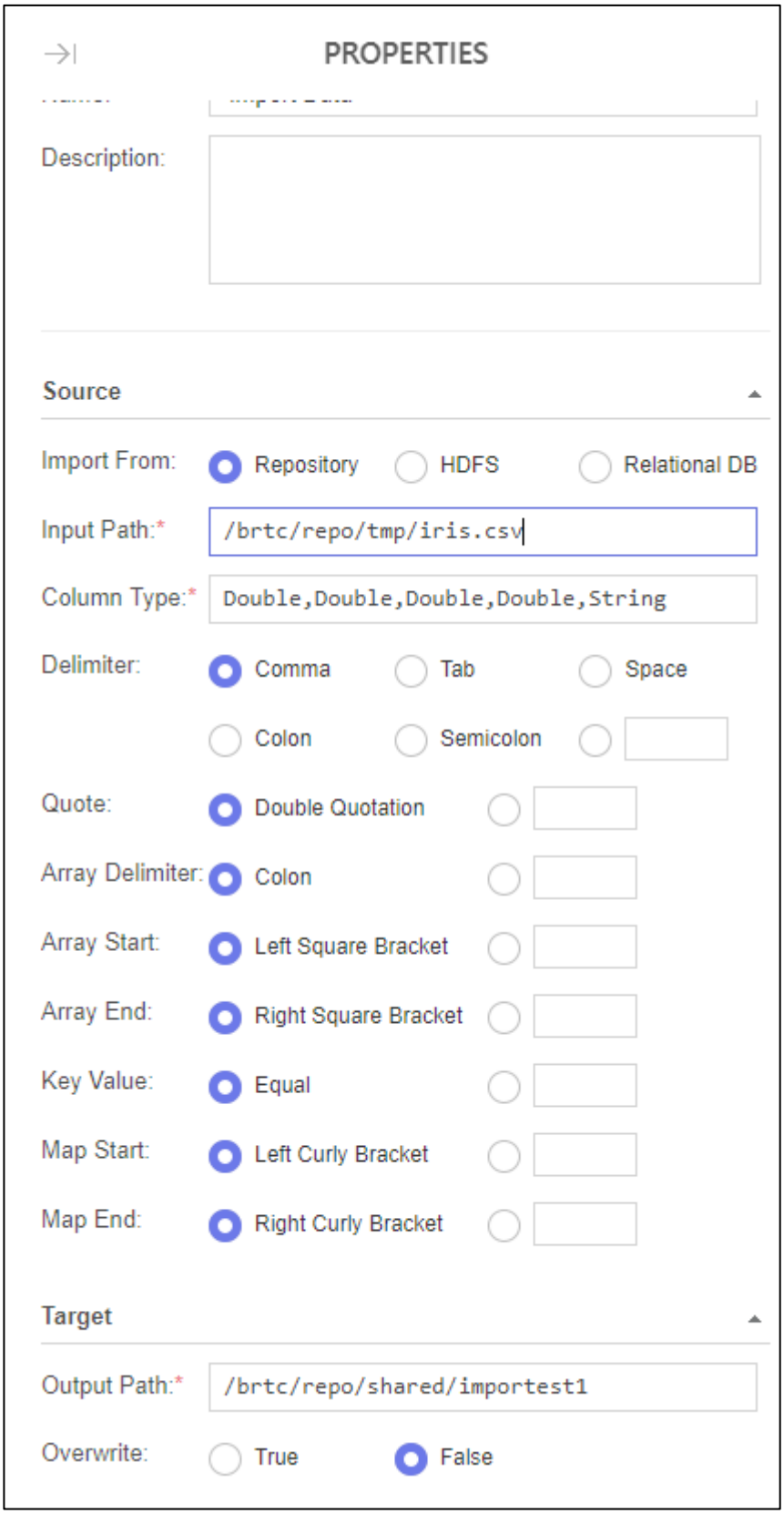

[Figure 5.3-6] Import Properties

Name	Description
Import From	Select the source type to import.

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Name	Description
Input Path	Enter the path of the data to be imported. It can be replaced with variable. (Do not enter the path if you select relational DB)
Column Type	Enter the column type of the data to be imported using comma. If you enter CTRL + Space, enterable column type is given as a hint, which you can also select. (List of enterable column type: Int, Long, String, Double, Boolean)
IP	Enter IP of HDFS to import (Enabled when selecting HDFS)
Port	Enter the port of HDFS to import (Enabled when selecting HDFS)
Delimiter	Select a delimiter of the data to be imported. (Do not enter delimiter if you select relational DB)
Delimeter	Enter the location where imported data is stored. It can be replaced with variable.
Quote	Select a character that encloses a string (DO NOT enter when selecting Relational DB)
Array Delimiter	Select a delimiter of array elements (DO NOT enter when selecting Relational DB)
Array Start	Select a character that represents the start of the array (DO NOT enter when selecting Relational DB)
Array End	Select a character that represents the end of the array (DO NOT enter when selecting Relational DB)
Key Value	Select a character that separates Keys and Values of the map (DO NOT enter when selecting Relational DB)
Map Start	Select a character that represents the start of the Map (DO NOT enter when selecting Relational DB)
Map End	Select a character that represents the end of the Map (DO NOT enter when selecting Relational DB)
Overwrite	Choose whether or not to overwrite.
Datasource	Select the Datasource to import. (It is enabled if you select relational DB)
Table Name	Enter the Table Name to import from the selected datasource. (It is enabled if you select relational DB)
Connection Timeout	Enter the Connection Timeout. Default value is 600 seconds, with 0 meaning infinity. (It is enabled if you select relational DB)
Execution Timeout	Enter the Execution Timeout. Default value is 600 seconds, with 0 meaning infinity. (It is enabled if you select relational DB)

[Diagram 5.3-1] Explanation on Import Properties Input Value

5.3.4.2 Export

Use the function to export the analysis results stored in Repository to Repository, HDFS and relational Database.

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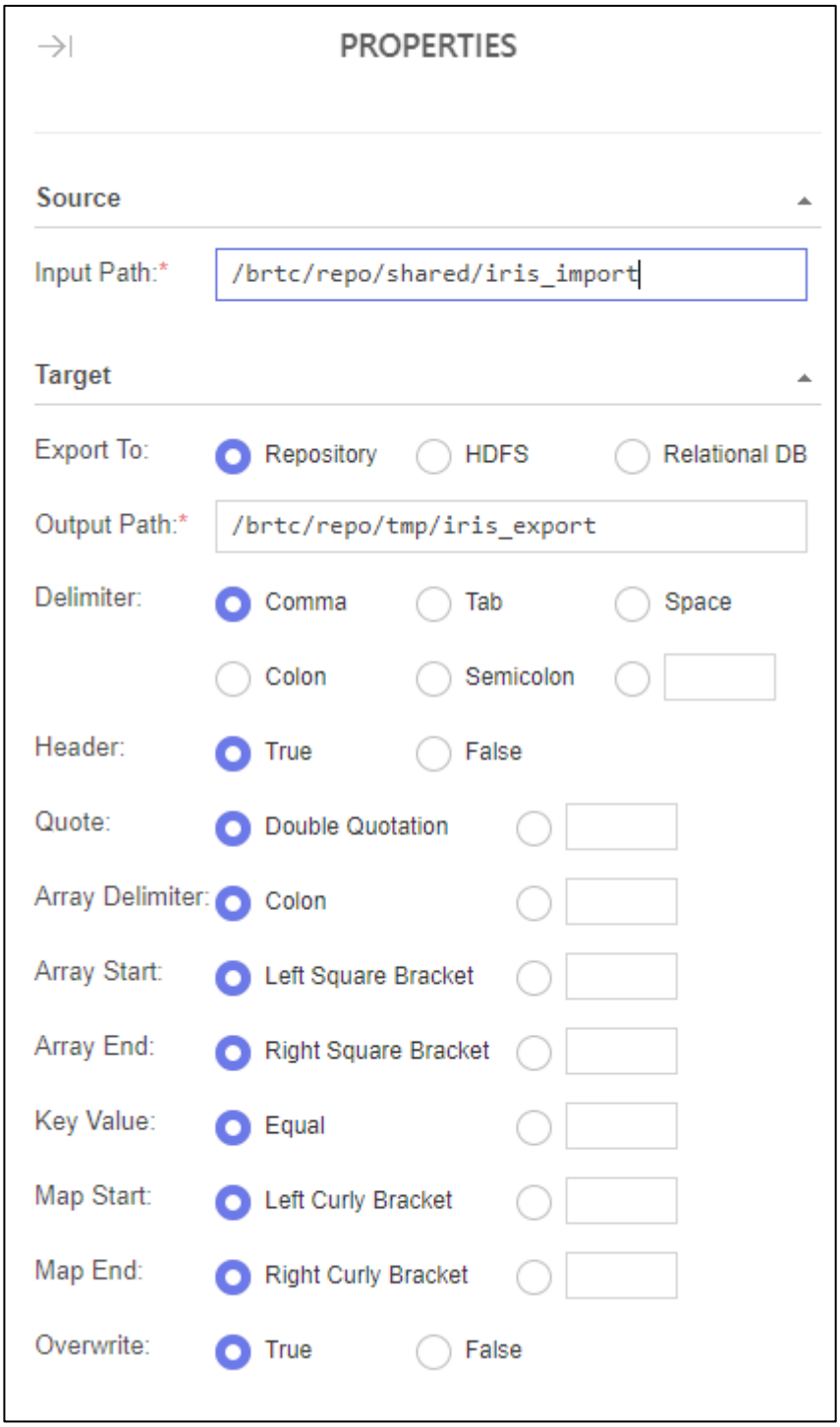

[Figure 5.3-7] Export Properties

Name	Description
Input Path	Enter the path of data to export, which can be replaced with Variable.
Export To	Select a target format to export
IP	Select the IP of HDFS to export (Enabled when selecting HDFS)
Port	Enter the port of HDFS to export (Enabled when selecting HDFS)
Output Path	Enter the path to save exported data

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Name	Description
Delimiter	Select the delimiter of data to export (Do not enter delimiter if you select relational DB)
Header	Select whether to include a header.
Quote	Select a character that encloses a string (DO NOT enter when selecting Relational DB)
Array Delimiter	Select a delimiter of array elements (DO NOT enter when selecting Relational DB)
Array Start	Select a character that represents the start of the array (DO NOT enter when selecting Relational DB)
Array End	Select a character that represents the end of the array (DO NOT enter when selecting Relational DB)
Key Value	Select a character that separates Keys and Values of the map (DO NOT enter when selecting Relational DB)
Map Start	Select a character that represents the start of the Map (DO NOT enter when selecting Relational DB)
Map End	Select a character that represents the end of the Map (DO NOT enter when selecting Relational DB)
Overwrite	Select whether to overwrite
Connection Timeout	Enter the Connection Timeout duration. Default value is 600 seconds, with 0 meaning infinity. (Enabled when selecting HDFS)
Login Timeout	Enter the Login Timeout duration. Default value is 600 seconds, with 0 meaning infinity. (Enabled when selecting HDFS)
Socket Timeout	Enter the Socket Timeout duration. Default value is 600 seconds, with 0 meaning infinity. (Enabled when selecting HDFS)
Lock Timeout	Enter the Lock Timeout duration. Default value is 600 seconds, with 0 meaning infinity. (Enabled when selecting HDFS)

[Diagram 5.3-2] Explanation on Export Properties Input Value

5.3.4.3 Loop

Perform functions to be executed repeatedly.

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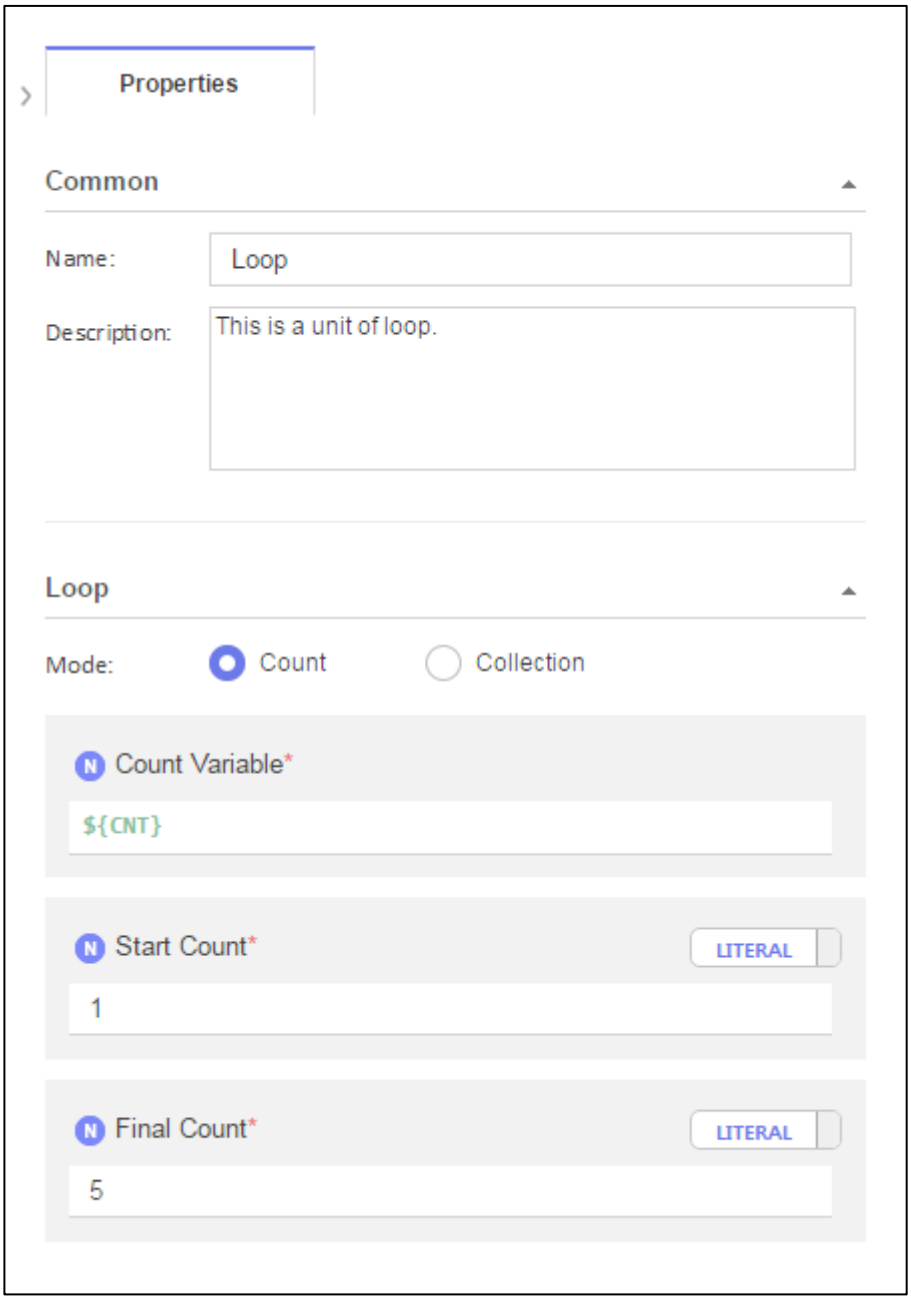

[Figure 5.3-8] Loop Properties

Name	Description
Mode	Select the mode in which Loop is performed.
Count Variable	Enter variable to execute repeatedly. (It is enabled when you select CountMode)
Start Count	Enter end value by selecting Literal and Expression. (It is enabled when you select CountMode)
Final Count	Enter end value by selecting Literal and Expression. (It is enabled when you select CountMode)
Collection Variable	Enter the variable of Array Type. (It is enabled when you select CollectionMode)
Element Variable	Enter variable to assign Collection Element. (It is enabled when you select CollectionMode)

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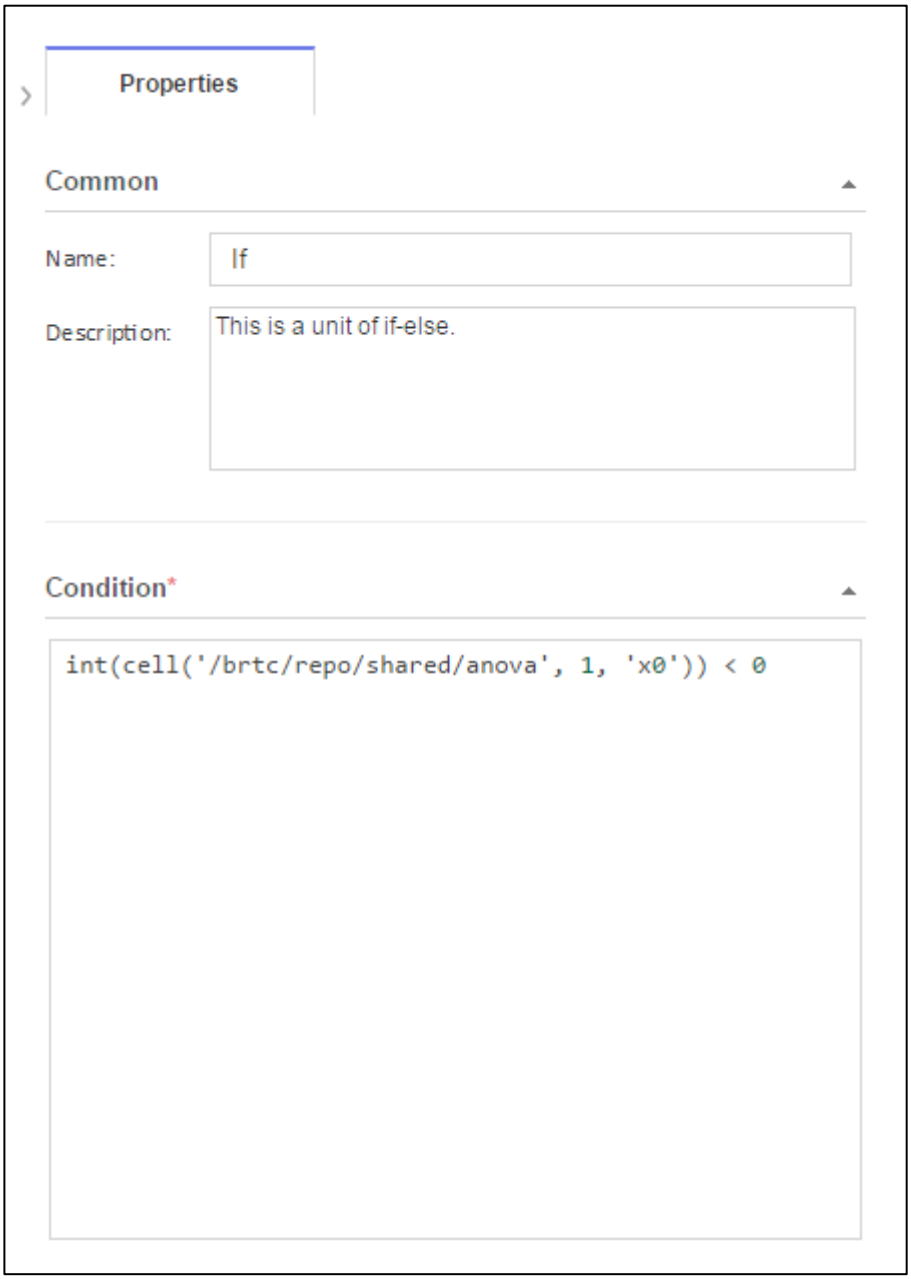
Name	Description
Index Variable	Enter variable to assign Collection Index value. (It is enabled when you select CollectionMode)

[Diagram 5.3-3] Explanation on Loop Properties Input Value

5.3.4.4 IF-ELSE

Perform different computations or actions depending on the condition.



[Figure 5.3-9] IF-ELSE Properties

In condition field of IF-ELSE, enter Boolean Expression using Expression Function and Variable below.

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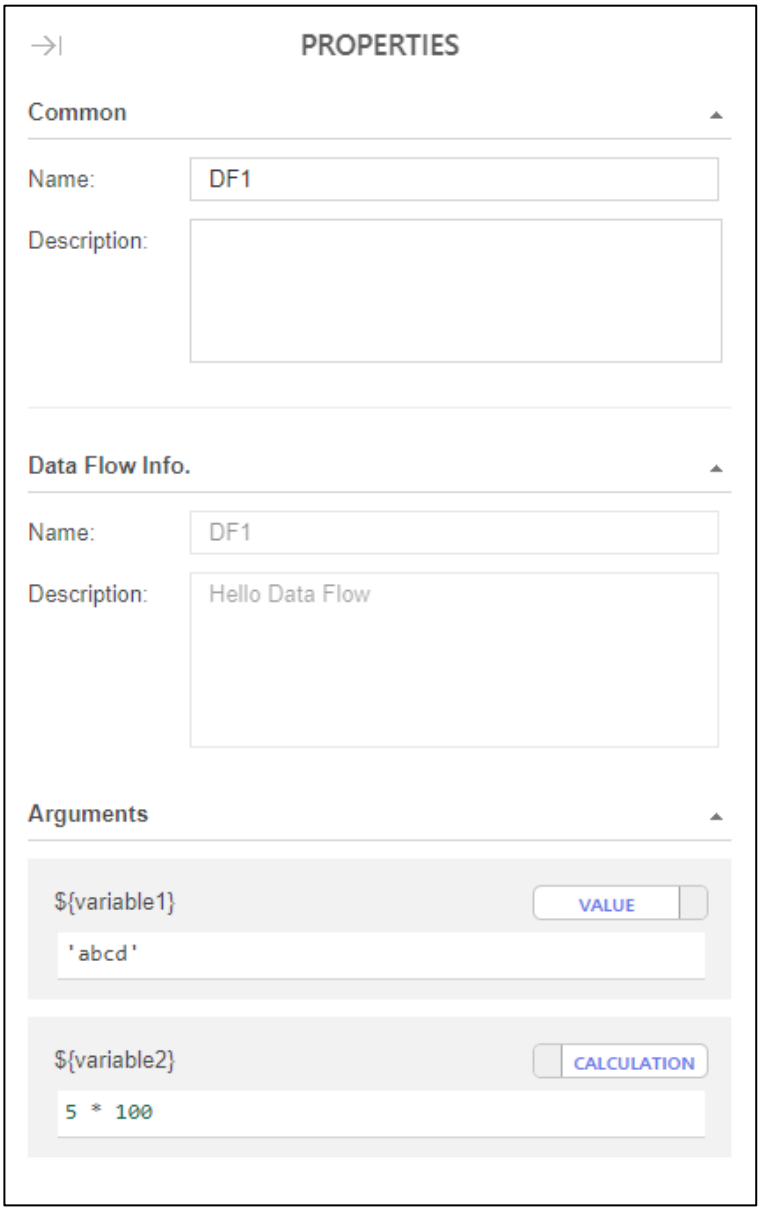
Name	Arguments	Description
cell	1. Path(String) 2. Row Index(Int) 3. Column Name(String)	Return the value that corresponds to Row Index, Column from the data that corresponds to the entered path. (Row Index > 0) Ex) cell('/brtc/repo/tmp/iris', 1, 'SepalLength')
int	1. Data(String)	Convert into Integer Ex) int(cell('/brtc/repo/tmp/iris', 1, 'SepalLength'))
double	1. Data(String)	Convert into Double Ex) double(cell('/brtc/repo/tmp/iris', 1, 'SepalLength'))

[Diagram 5.3-4] Expression Function

5.3.4.5 Dataflow

Use the function to carry out the stored Dataflow. You can enter the variable value which was used in the Dataflow. The variable which was added in the Dataflow becomes visible in Arguments. And if you enter the appropriate value by selecting Value, Calculation it is conveyed when the Dataflow is conducted.



[Figure 5.3-10] Dataflow Properties

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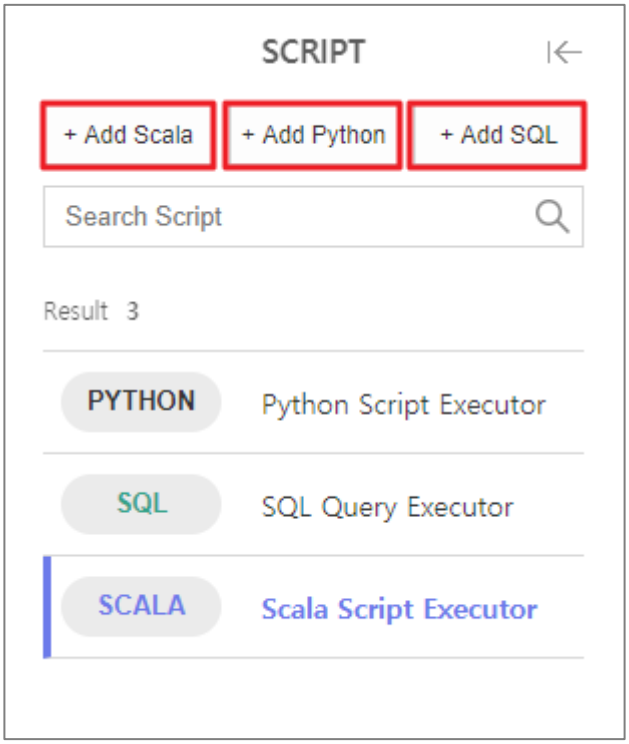
5.4 Use Script Model Editor

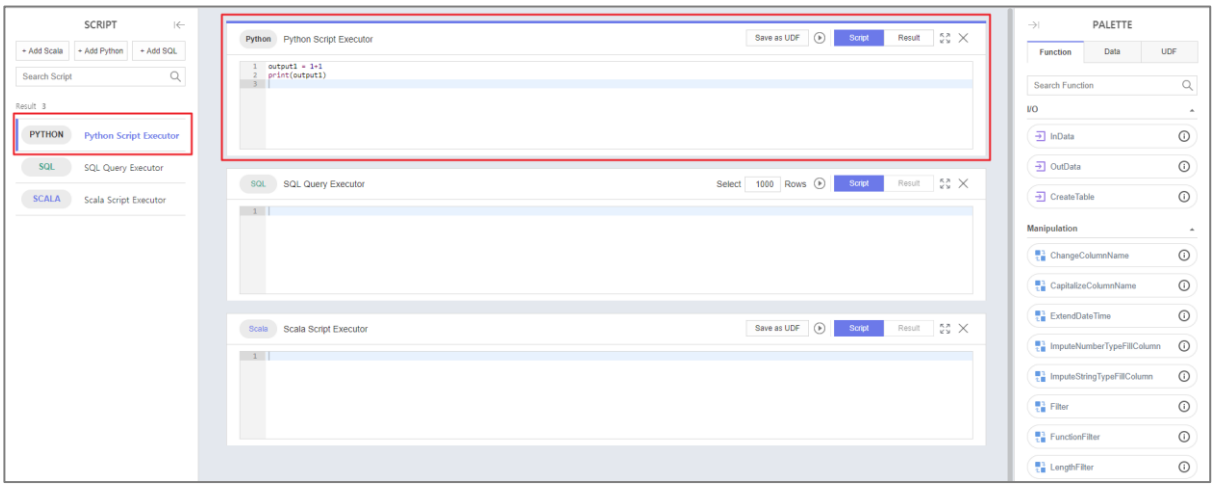
5.4.1 Add Unit

A. Click **Add Scala** or **Add SQL or Add Python** button on the left hand side of Script View.



[Figure 5.4-1] Script View

B. You can confirm that a new unit is created next to the selected unit in Script Editor and Script View.



[Figure 5.4-2] Unit Created

5.4.2 Execute Unit

A. Enter information into Scala/Python/SQL Script and click button.

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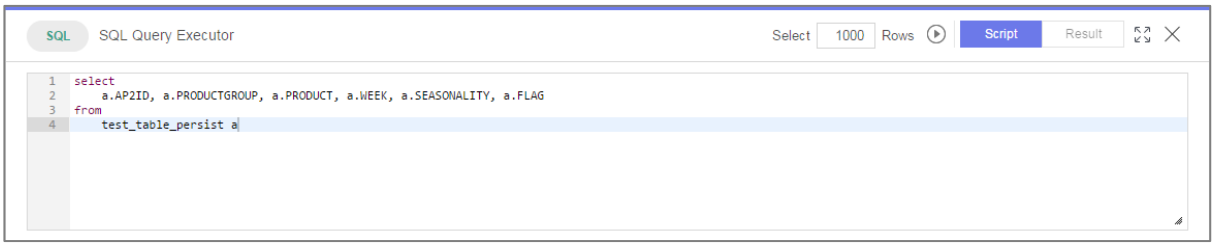


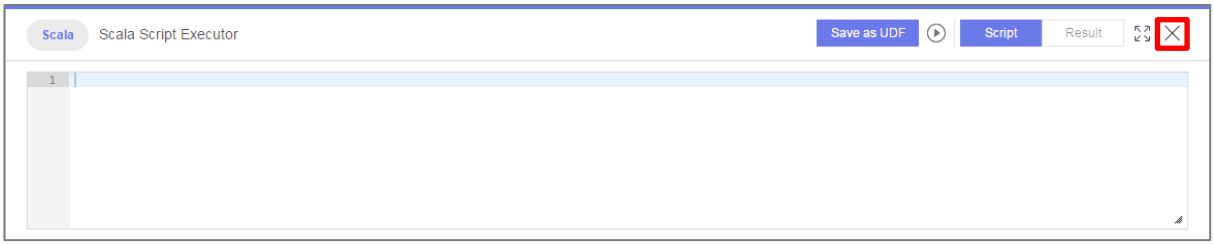
[Figure 5.4-3] Execute SQL Script Unit

B. When the execution is complete, results are updated at the bottom.

[Figure 5.4-4] Execute SQL Script Unit

5.4.3 Delete Unit

A. Click ✕ button in Scala/Python/SQL Script.

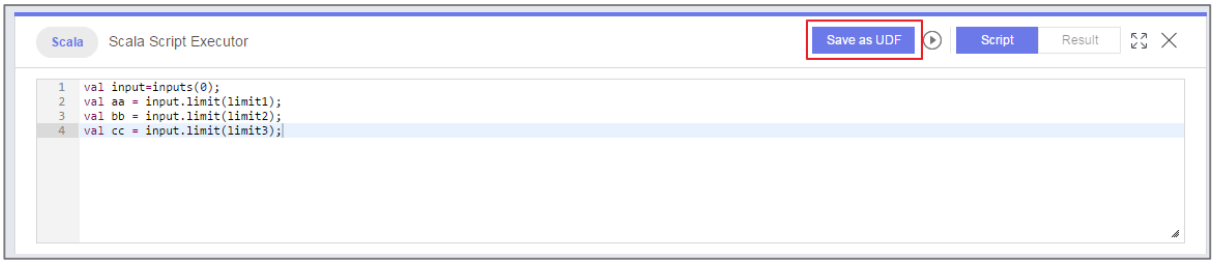


[Figure 5.4-5] Delete Scala Script Unit

5.4.4 Create User Defined Function

You can create a User Defined Function (UDF) using the Script created in Scala Script of Script Model.

A. Click [Save as UDF] button in Scala/Python Script.



[Figure 5.4-6] Create UDF in Scala Script

B. Enter necessary information including UDF Name, Description, Input Variables, Script, Out Alas in [Save as UDF Dialog], and click Save button.

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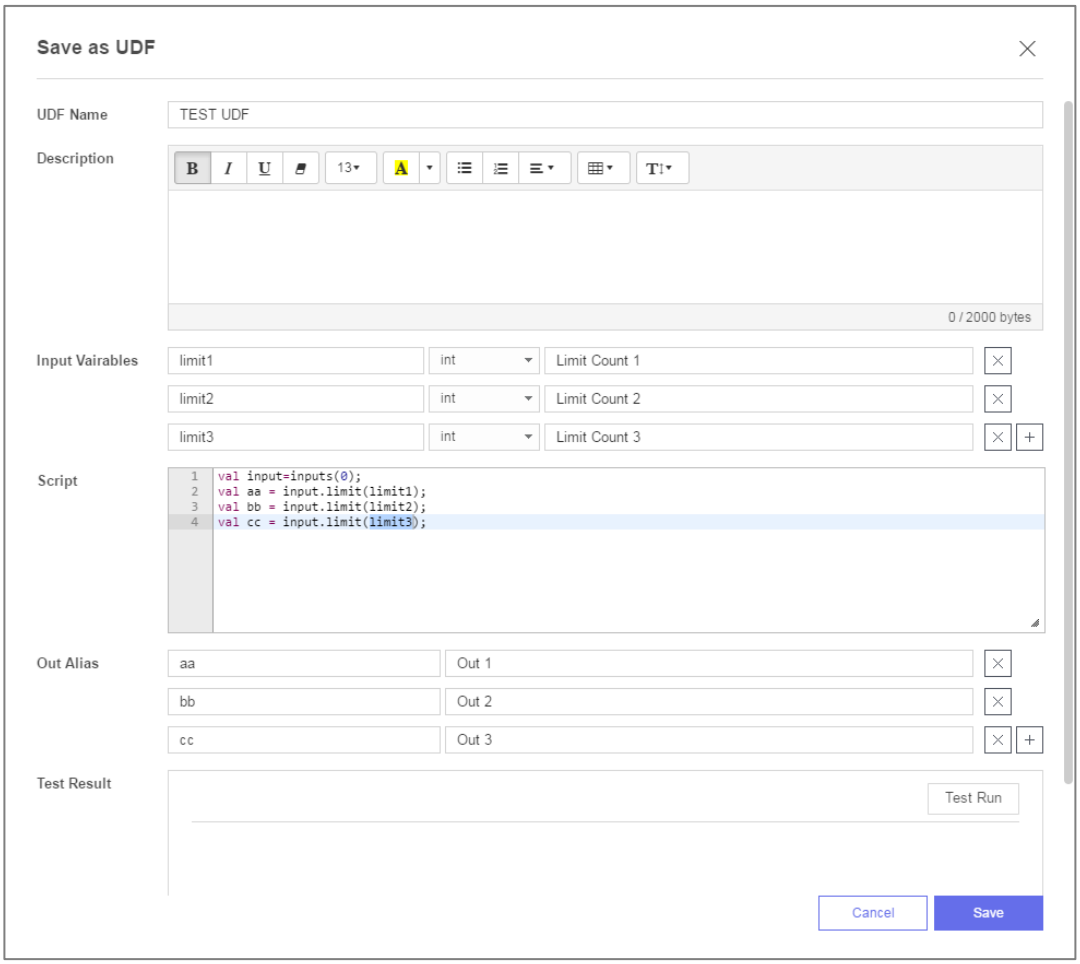
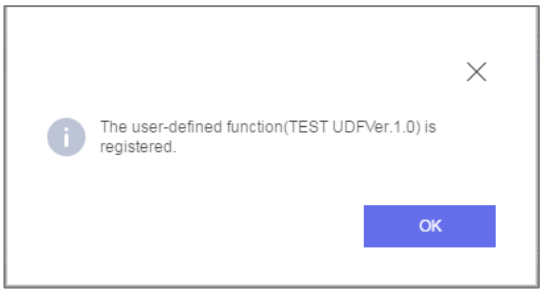


[Figure 5.4-7] Necessary Information Entered into [Save as UDF]

Note	There must exist more than 1 (one) Output in order to use User Defined Function in Dataflow. *Input (0)* format must be used for Input Data in the same way as Scala Scrip Function in Dataflow.

C. If you click Save button, User Defined Function is created.



[Figure 5.4-8] Popup Showing User Defined Function Created

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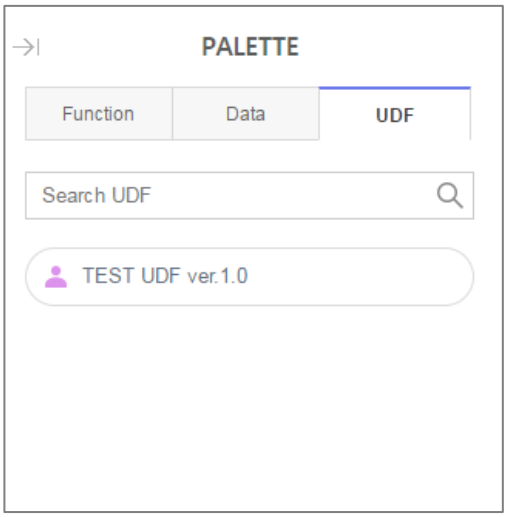
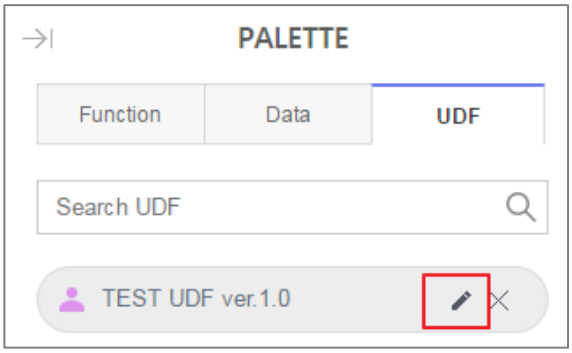


[Figure 5.4-9] Function Added to Script Model UDF Viewer

5.4.5 Edit User Defined Function

You can upgrade the version of User Defined Function created.

A. If you mouse over the User Defined Function created in UDF Viewer, editable menus are displayed.



[Figure 5.4-10] Update Menu Displayed when Mouse is over UDF Viewer

B. Call [Update as UDF Popup] by clicking Update button.

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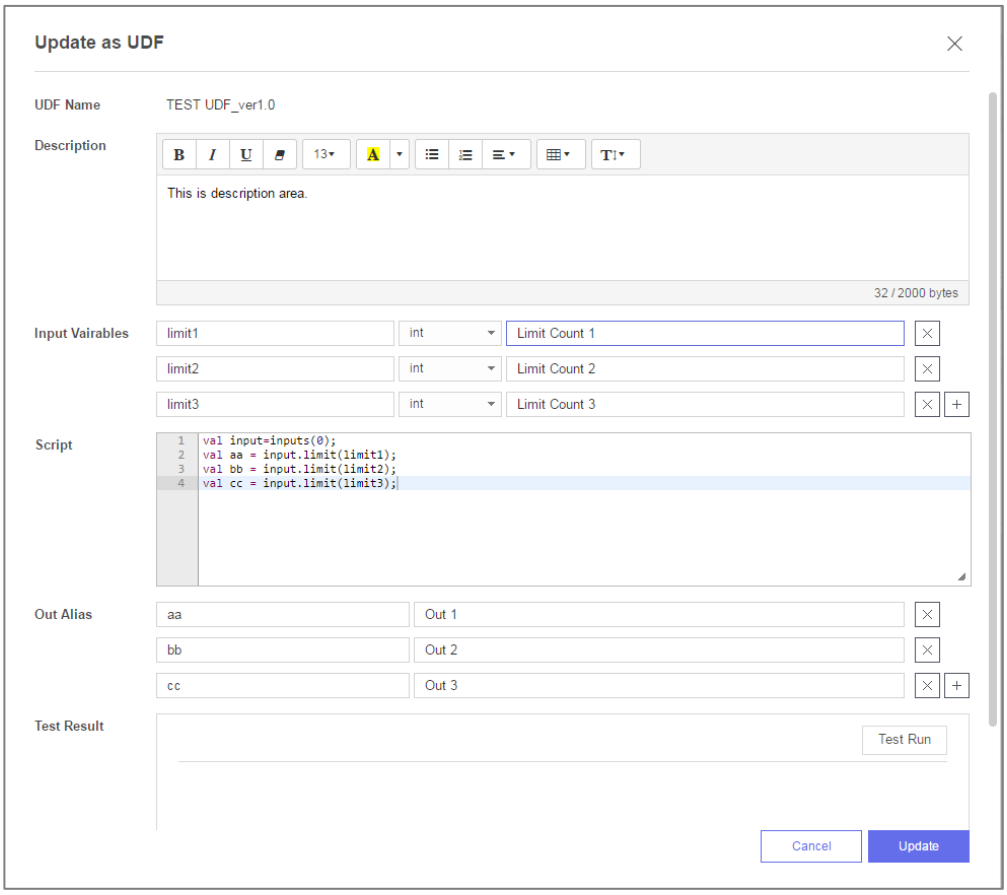

[Figure 5.4-11] Update as UDF Popup Window

C. Revise the information that needs modification and click Update button.

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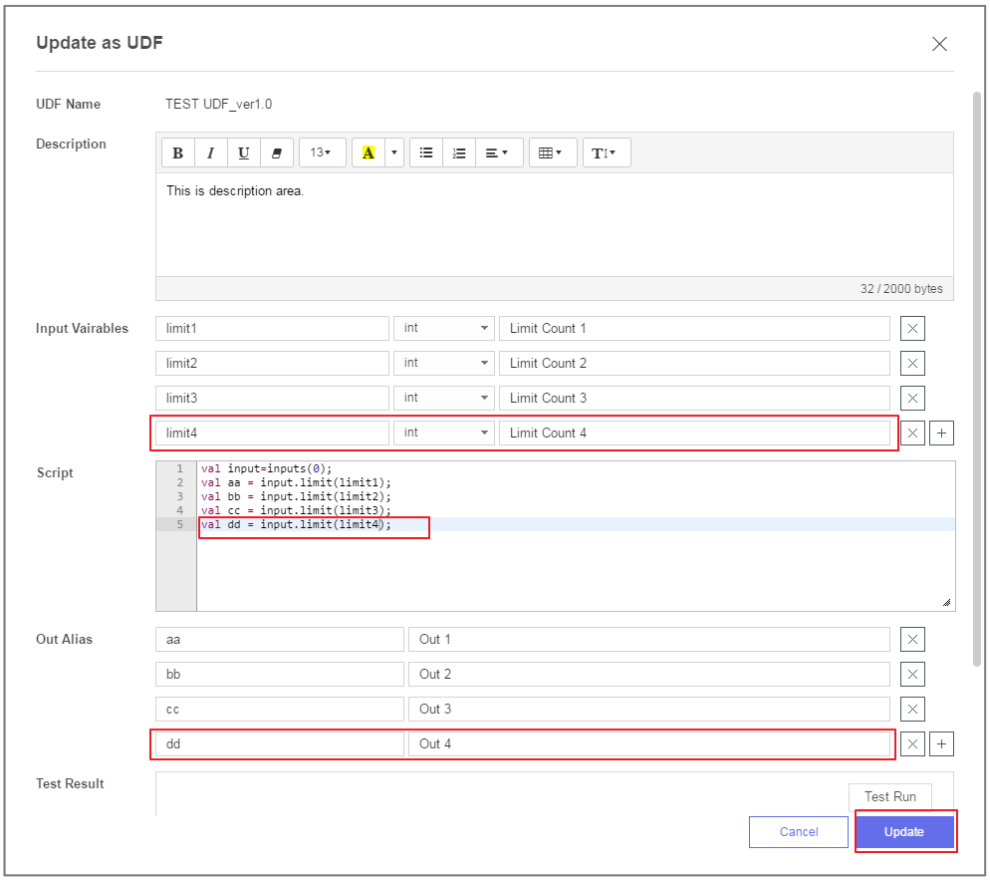
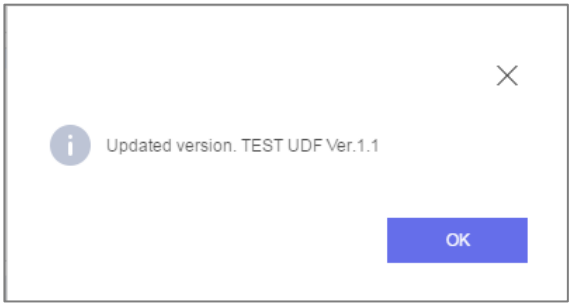
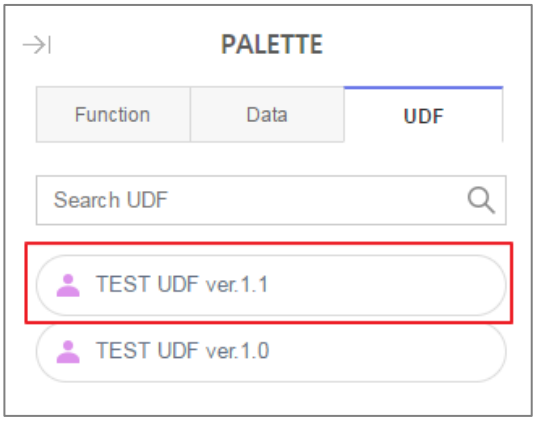


[Figure 5.4-12] Input Variables Added, Script Changed, and Out Alias Added

D. A new version of User Defined Function with the same name is added.



[Figure 5.4-13] Message Box indicating Successful Update



[Figure 5.4-14] UDF Version Control

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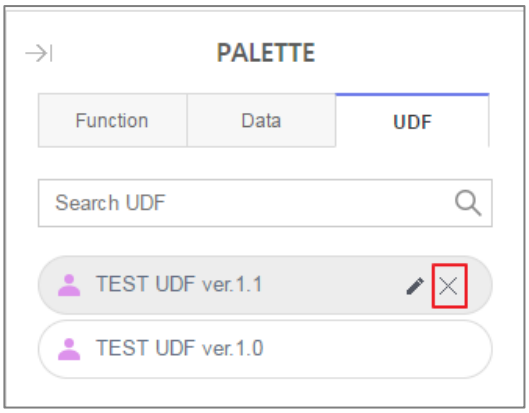
5.4.6 Delete User Defined Function

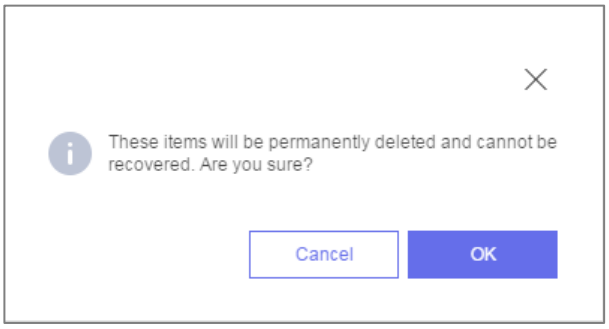
Remove the User Defined Function created.

A. If you mouse over the User Defined Function created in UDF Viewer, deletable menu is displayed.

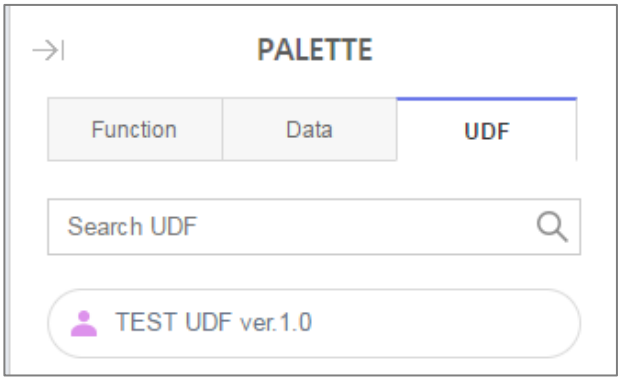


[Figure 5.4-15] Deletable Menu Displayed when the Mouse is Over UDF Viewer.

B. Delete User Defined Function by clicking Delete menu.



[Figure 5.4-16] Confirmation Window shown when Deletable Menu is clicked



[Figure 5.4-17] Menu Deleted in UDF Viewer

5.4.7 Test User Defined Function

This function allows you to test the User Defined Function concerned when creating or editing User Defined Function.

A. Click Test Run button after entering necessary information either in [Save as UDF] or [Update as UDF].

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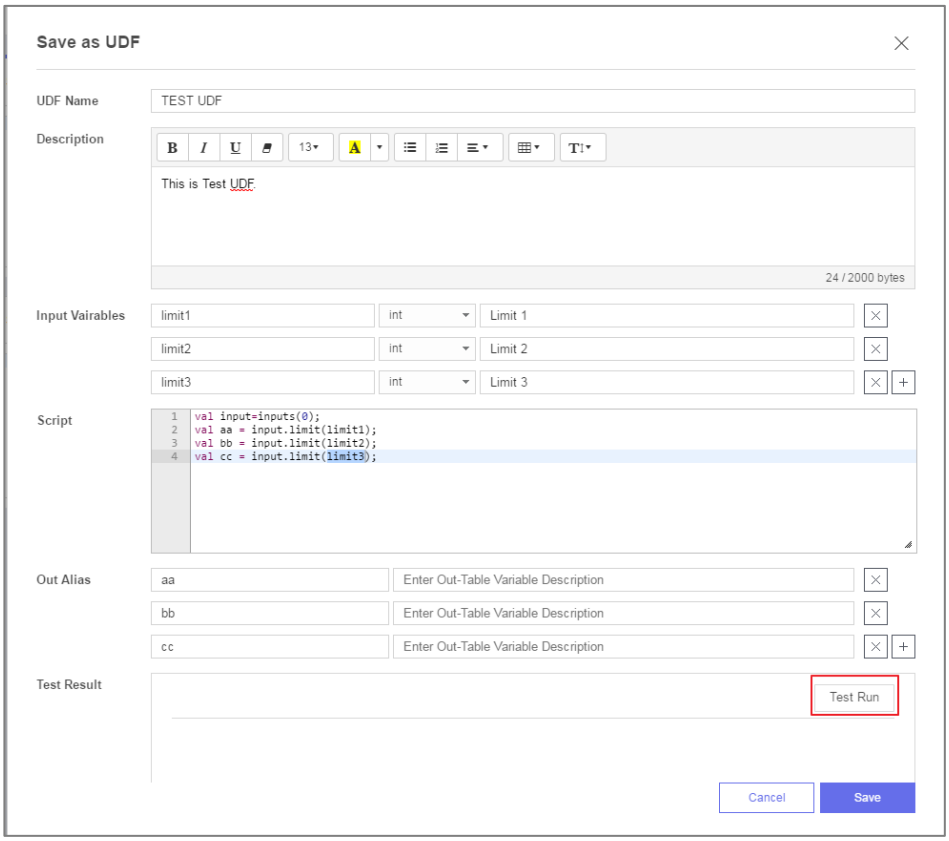
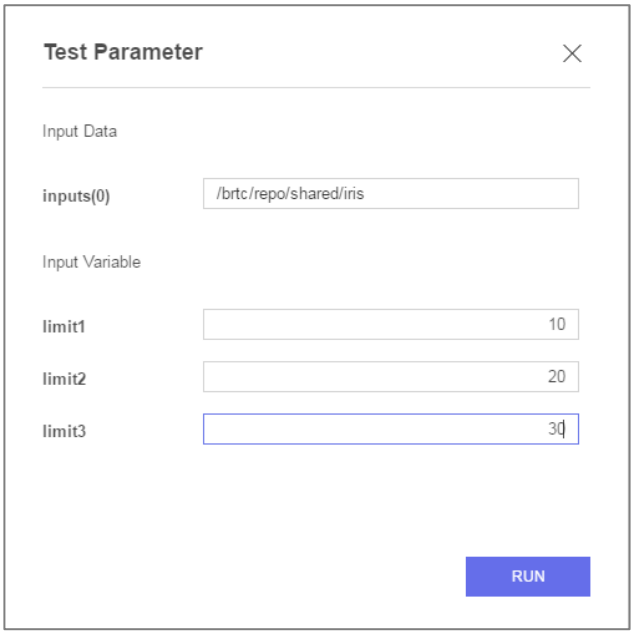


[Figure 5.4-18] Test Run Function in [Save as UDF]

B. Enter necessary information of Test parameter by clicking Test Run button.



[Figure 5.4-19] Parameter Value Entered in Test Parameter Input Window during the Test Run

C. Enter values in Input Data and Input Variable and click Run button in order to test User Defined Function.

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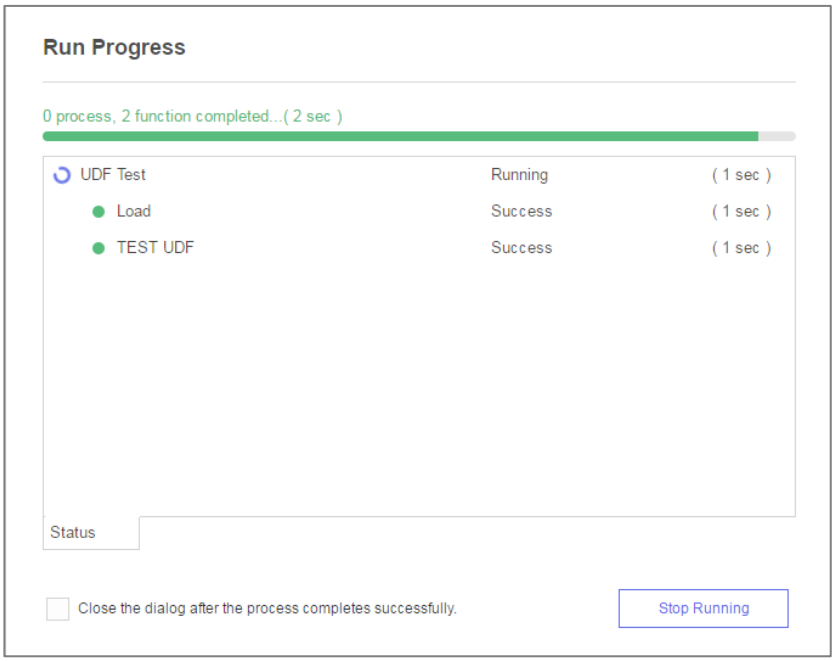
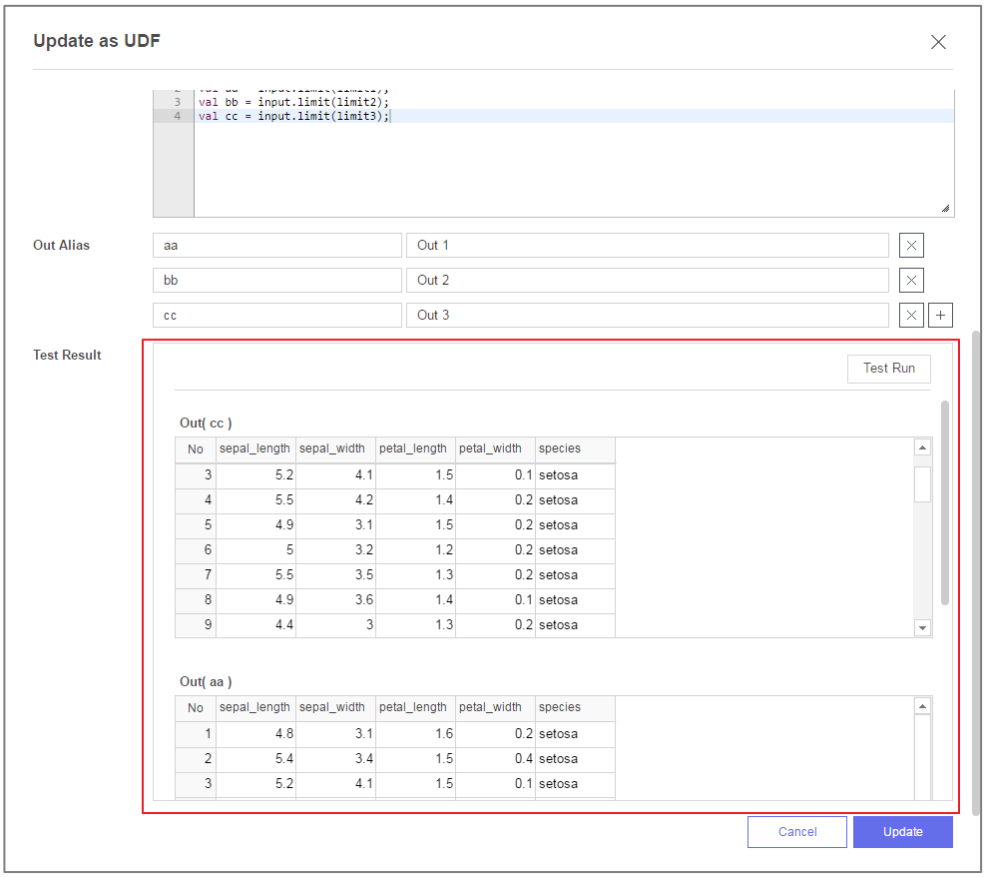


[Figure 5.4-20] Popup Showing Ongoing UDF Test

D. After the Test is complete, execution results of the User Defined Function concerned are displayed in Test Results area.



[Figure 5.4-21] Test Results Screen after UDF Test

5.4.8 Leverage User Defined Function

Newly added User Defined Function can be used in Data Flow.

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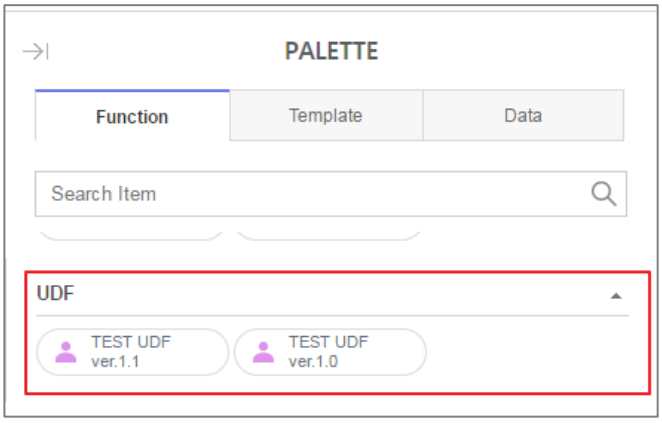
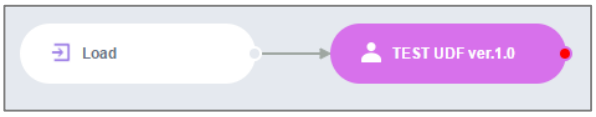
A. When a new User Defined Function is added, it is displayed in Palatte Function of Data Flow.



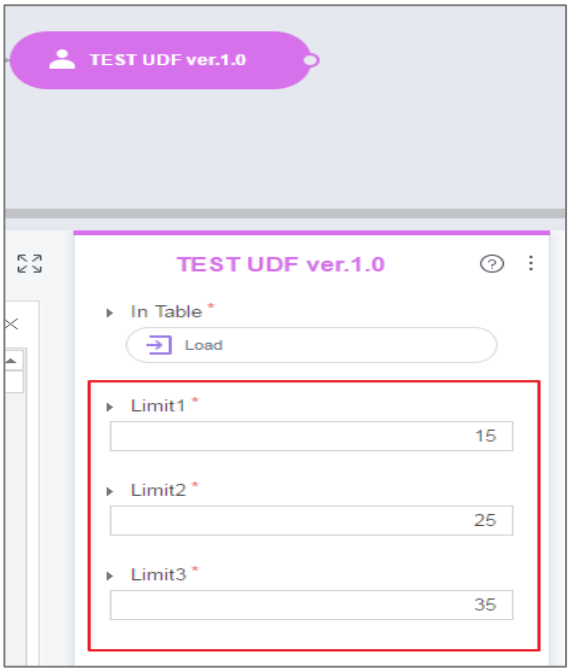
[Figure 5.4-22] User Defined Function Displayed in Data Flow Palette Function

B. Drag and drop User Defined Function to add to Data Flow Diagram.



[Figure 5.4-23] User Defined Function Added in Data Flow Diagram

C. Click the User Defined Function concerned and enter value in Properties panel.



[Figure 5.4-24] User Defined Function's Parameter Value Entered

D. Click Run button, execute User Defined Function and verify execution result.

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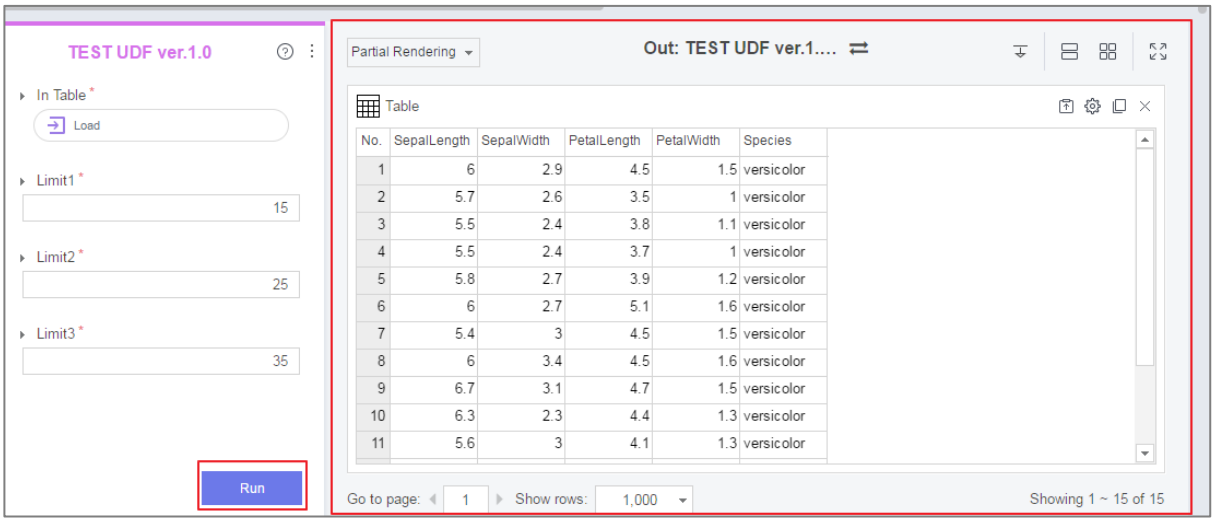

[Figure 5.4-25] Out Data Displayed after User Defined Function Execution

5.5 Use Deep Learning Model Editor

In Deep Learning Model Editor, you can create Function to be used for analysis model and Connection between each Function. Toolbar Menu consists of Export Function that allows you to download the file in Python, Summary Function that allows you to see execution information of the model, Zoom Function, Undo/Redo Function that allows you to verify job history and Run Function that executes analysis Model.

5.5.1 Create a Function

There are three ways to create a Function.

5.5.1.1 Create a New Function in Diagram Editor

A. Mouse Over a location where you want to create a Function in Deep Learning Model Editor. When button is enabled, click it and open a Popup window to create a Function.

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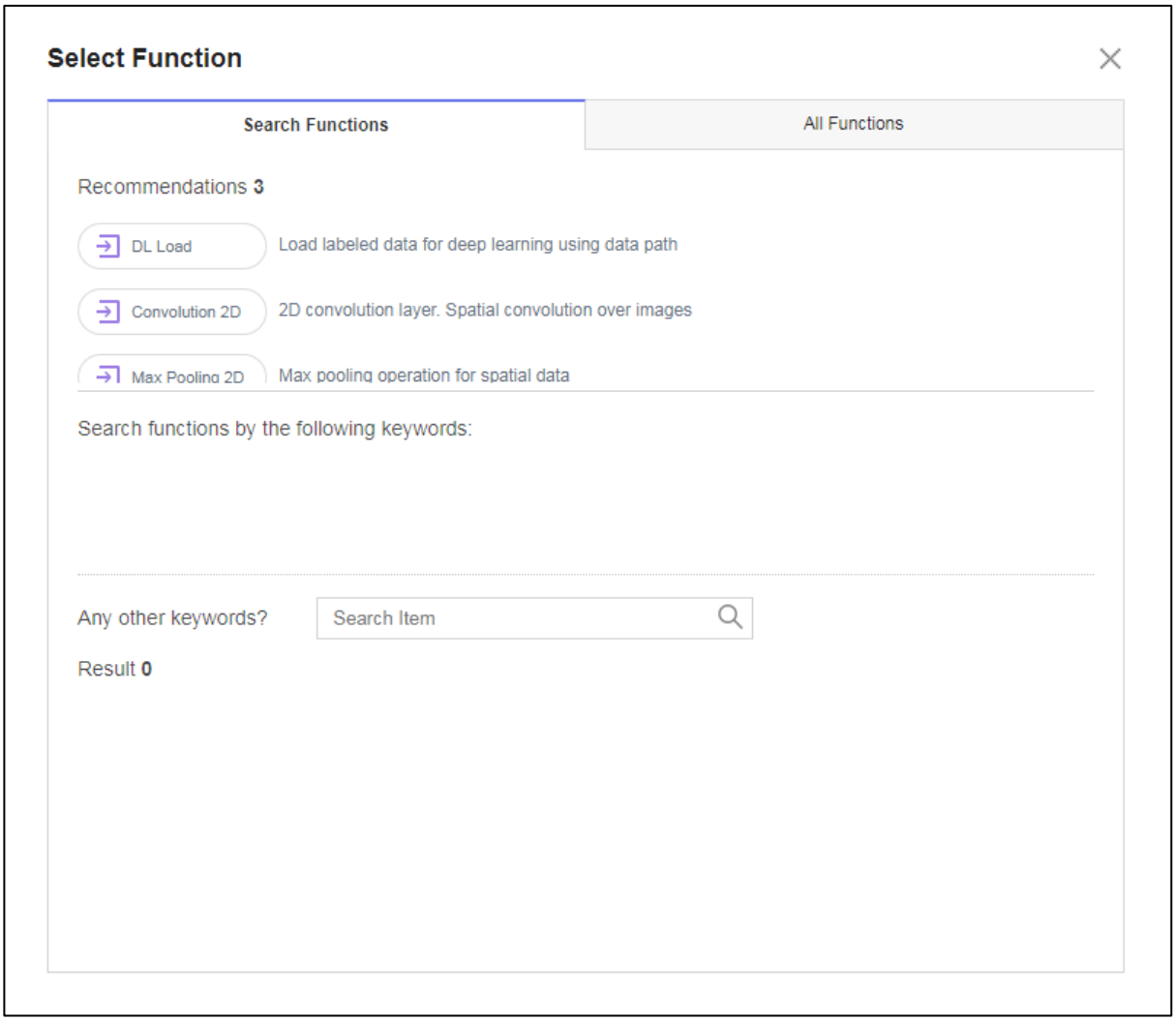
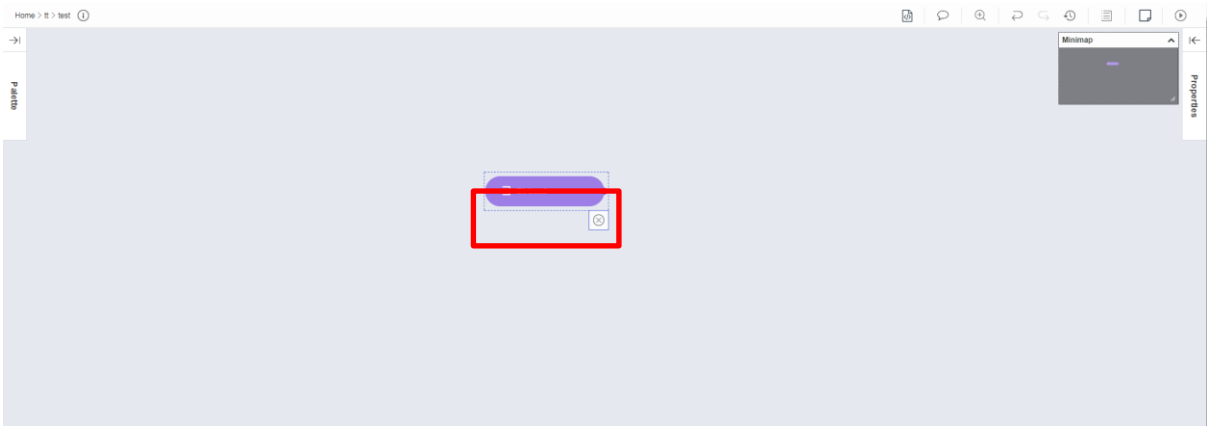


[Figure 5.5-1] Select Function Window

B. Create a Function by clicking the desired Function. Created Function is displayed in Deep Learning Model Editor.



[Figure 5.5-2] Created Function Displayed in Deep Learning Model Editor

5.5.1.2 Create a New Function through Selection from Palette

A. Click Side Bar Expand Button in order to use Pallette Viewer on the left.

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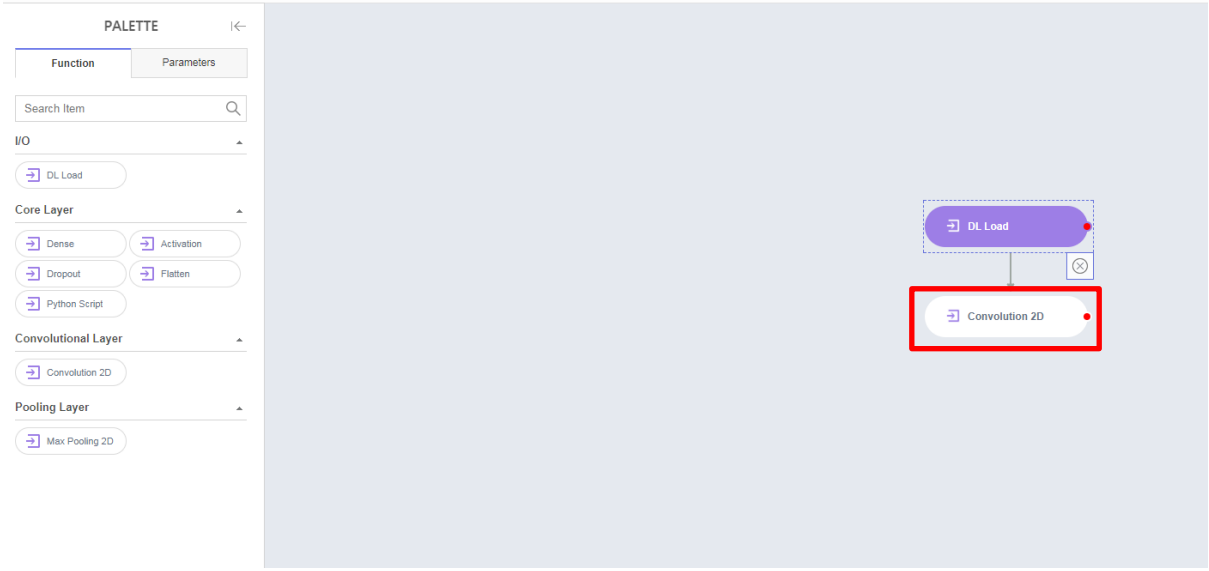
B. Drag the desired Function and drop it to the desired location in Deep Learning Model Editor.

[Figure 5.5-3] Function Dragged from Palette and Droped to Deep Learning Model Editor

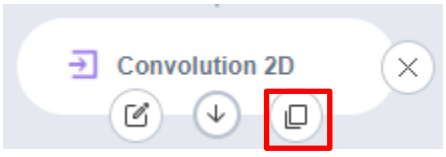
C. Function created is displayed in Deep Learning Model Editor.



[Figure 5.5-4] Function Created in Deep Learning Model Editor

5.5.1.3 Create a Function by Cloning the Selected Function

A. Mouse over the Function you want to Clone.



[Figure 5.5-5] Function Moused Over

B. Drag button and Drop to the desired location in Deep Learning Model Editor.

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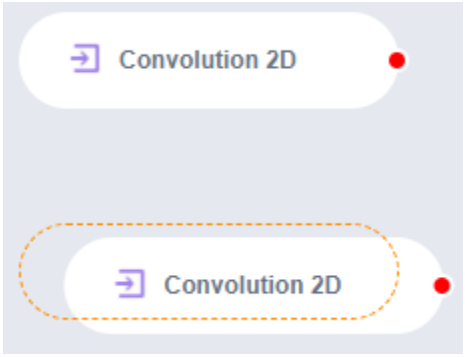
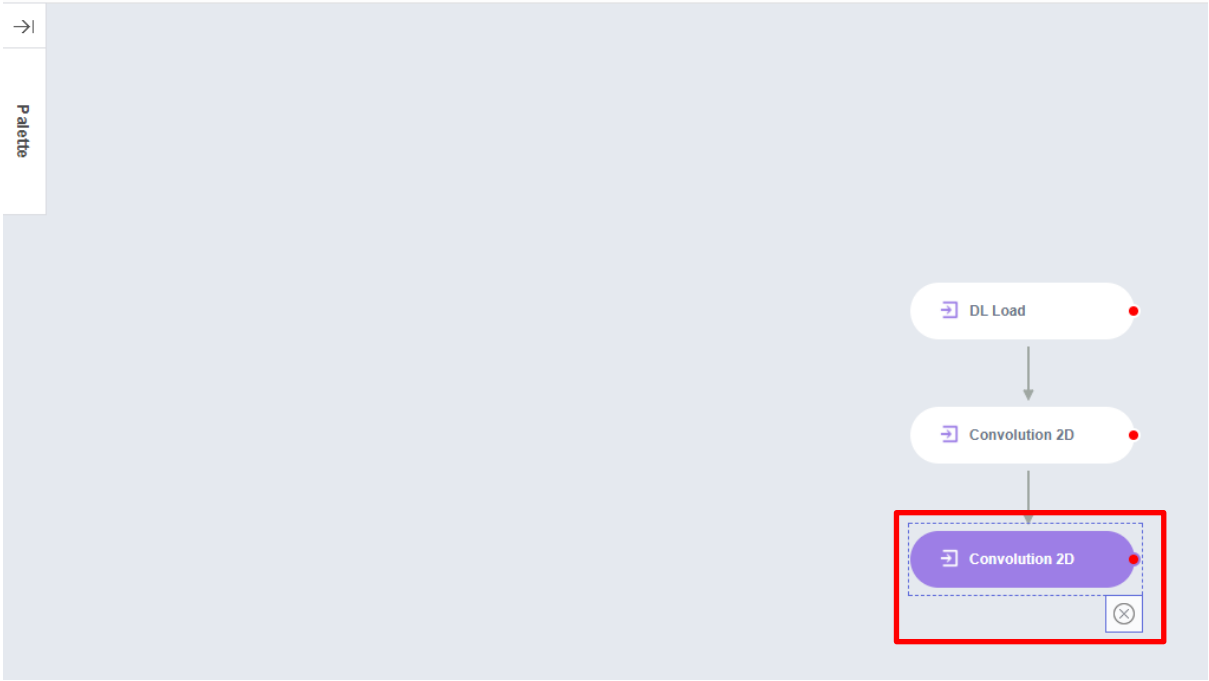


[Figure 5.5-6] Drag the Function and Drop to Deep Learning Model Editor

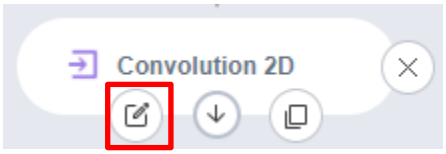
C. Function created is displayed in Deep Learning Model Editor.



[Figure 5.5-7] Function Created in Deep Learning Model Editor

5.5.2 Change a Function

A. Mouse Over a Function that you want to change.



[Figure 5.5-8] Function Moused Over

B. Call Select Function window to select the Function by clicking button.

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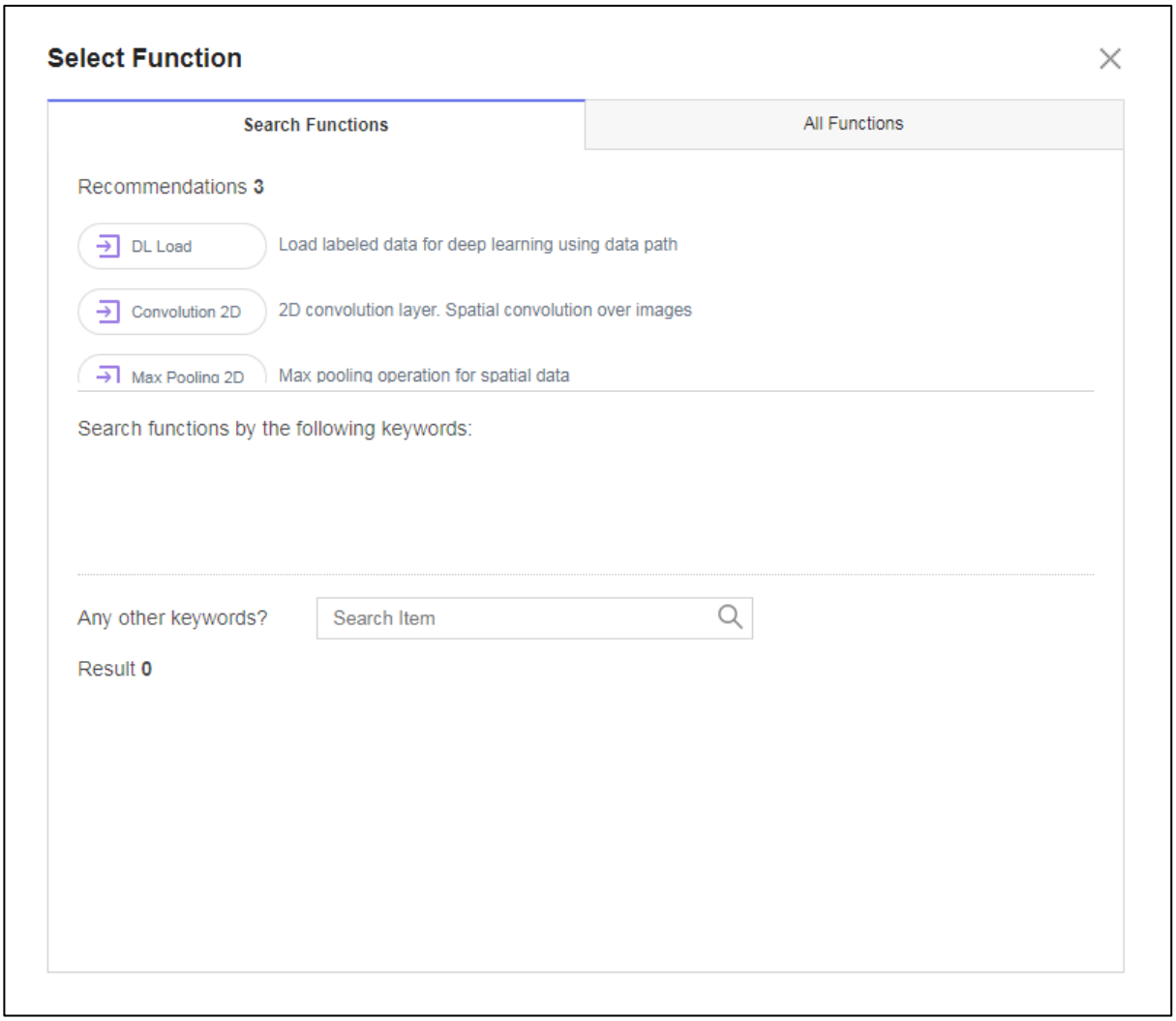

[Figure 5.5-9] Select Function

Select the Function you want to change. Changed Function is dislayed in Deep Learning Model Editor.

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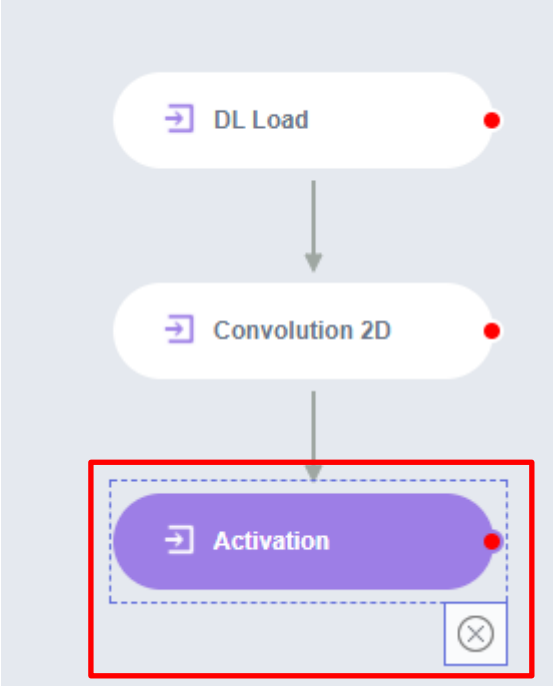
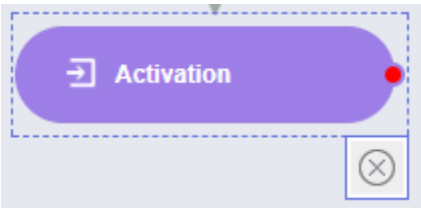


[Figure 5.5-10] Changed Function Displayed in Deep Learning Model Editor

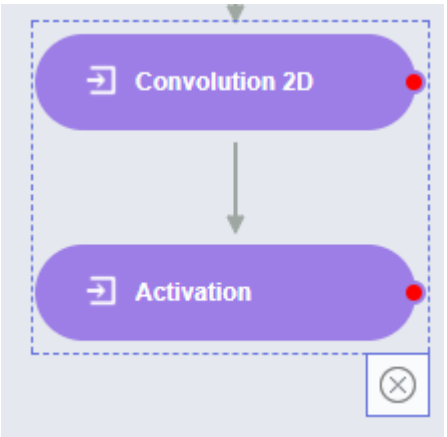
5.5.3 Remove a Function

A. Mouse Over the Function you want to remove. Click button to remove the Function.



[Figure 5.5-11] Function Moused Over

C. You can also remove multiple Functions. Drag the Mouse over the Function you want to remove and click button to remove it.



[Figure 5.5-12] Function Moused Over

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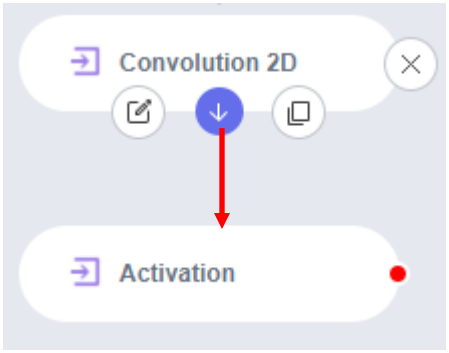
5.5.4 Use a Connection

5.5.4.1 Create a Connection

Create a Connection to allow Output Data of the leading Function to be used as trailing Input Data by connecting the Functions.

D. Mouse Over the leading Function where you want to create a Connection. Click and Drag button, and Drop to the trailing Function where you will create a Connection.



[Figure 5.5-13] Function Moused Over

5.5.4.2 Delete a Connection

E. Mouse Over the Connection that you want to remove. Click button to remove the Connection.

[Figure 5.5-14] Connection Moused Over

5.5.5 Use Parameters

5.5.5.1 Create Parameters

A. Modify the Parameter in Parameters View.

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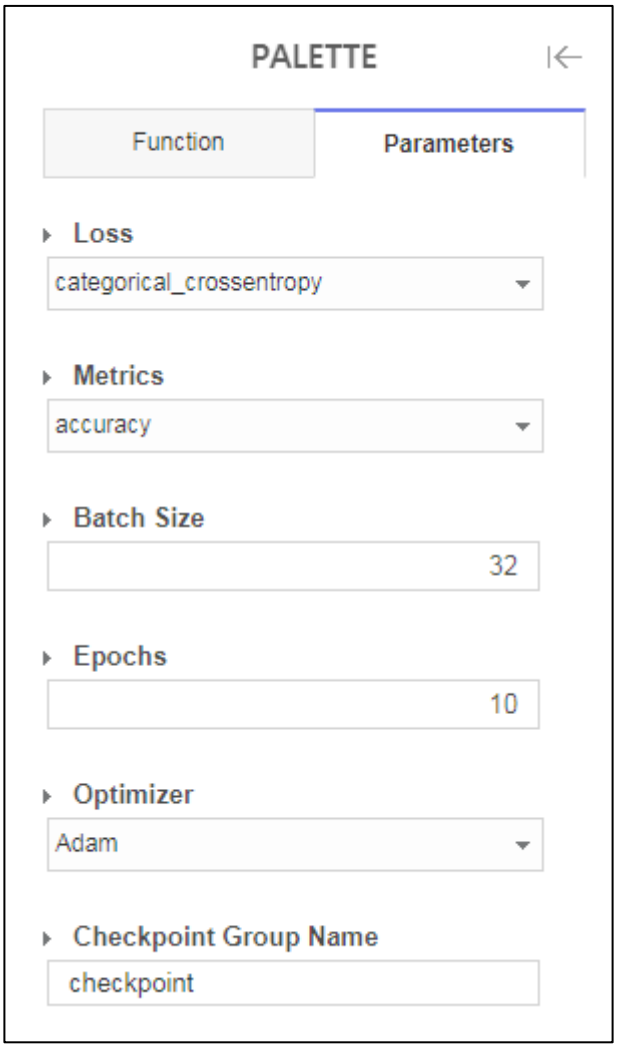
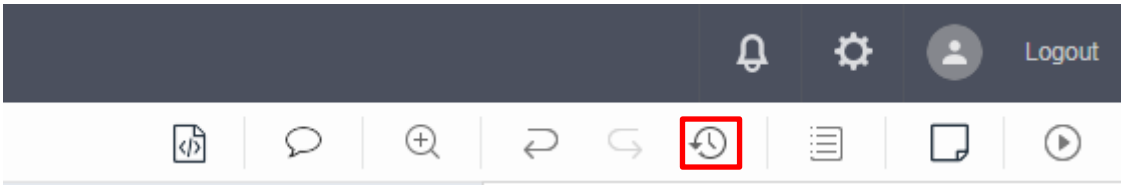


[Figure 5.5-15] Parameters View

5.5.6 Use History

If a user records the job that he/she worked on, you can be redirected to that job by selecting the job history. All the job history is recorded in Deep Learning Model Editor and Sheet Editor. You can either directly select the timing of the job by clicking button in Deep Learning Model Editor, or Redo, Undo by clicking , button.

A. Click button in Deep Learning Model Editor.



[Figure 5.5-16] Click History Button in Deep Learning Model Editor

B. When History window pops up, you can verify the job history. If you select the job history that you want to move to in History Window, you are redirected to the job history you selected.

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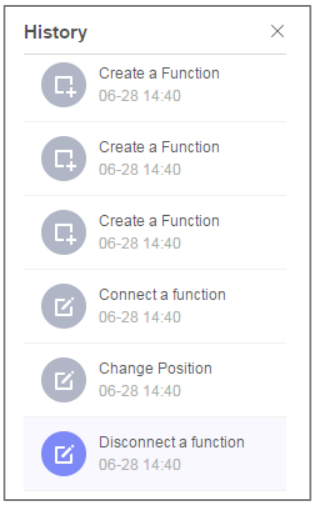

[Figure 5.5-17] History

5.5.7 Use Index

This window allows users to search functions they used easily and fast. A growing number of to-be-used functions and the increasing complexity of Deep Learning Model Editor make it difficult to see and locate a previously-used function at once. So when users select a function from the index, the screen is switched accordingly to find the function for user convenience.

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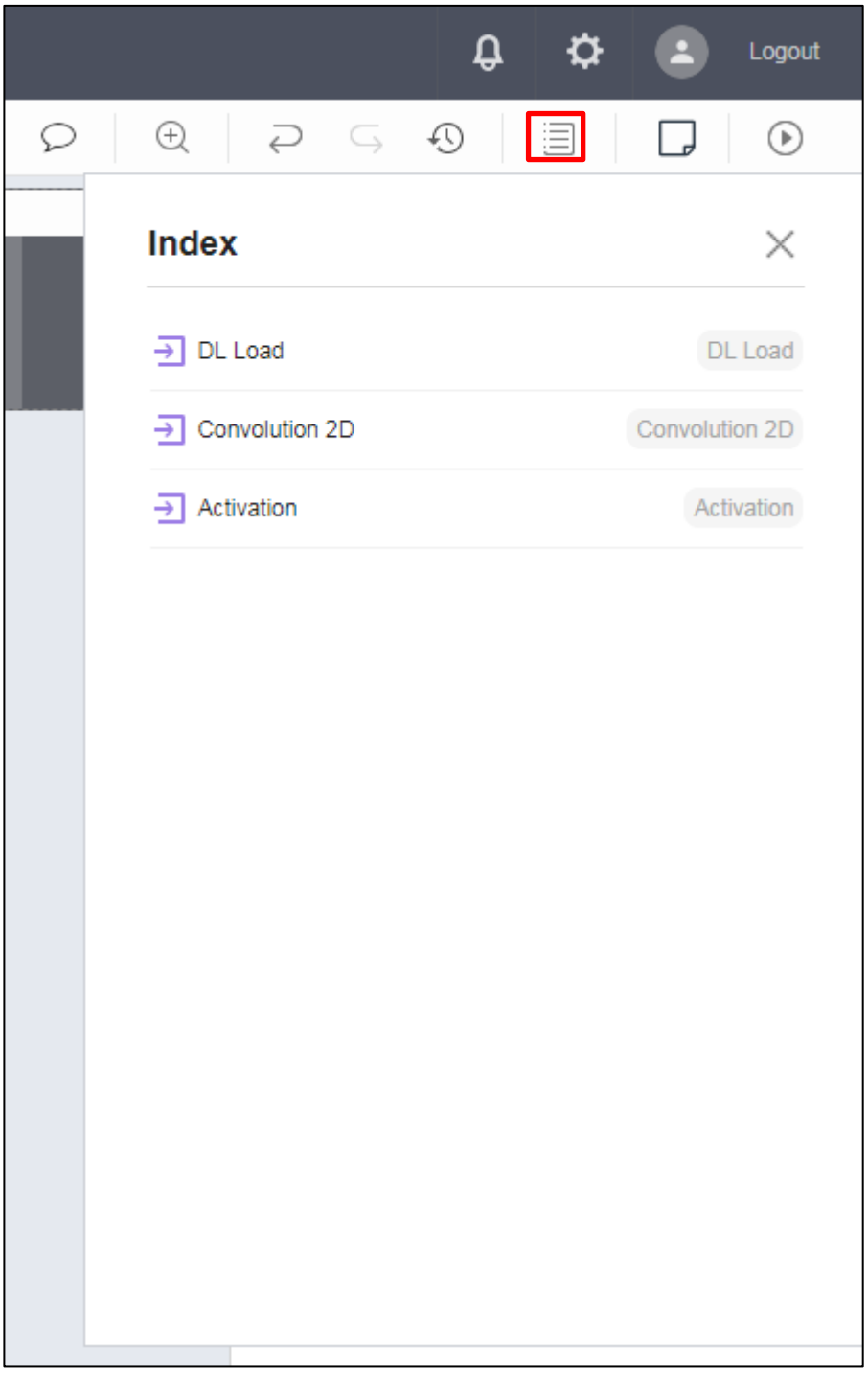

[Figure 5.5-18] Index Screen

5.5.8 Use Export

Download the model that remains open in Deep Learning Model Editor in Python file.

A. Click button in Deep Deep Learning Model Editor.

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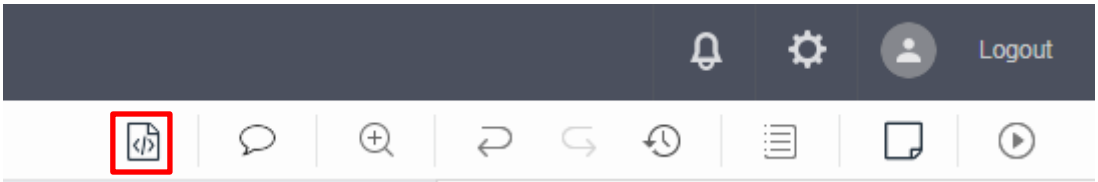
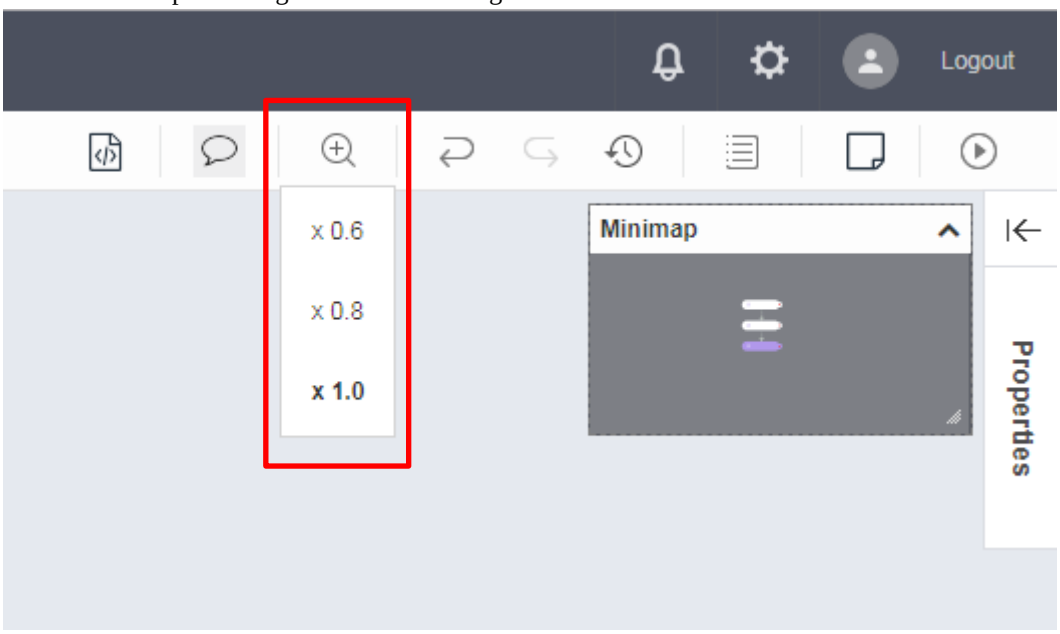


[Figure 5.5-19] Click Schedule Button in Deep Learning Model Editor

5.5.9 Use Zoom

Zoom in/out Deep Learning Model Editor using Zoom button.

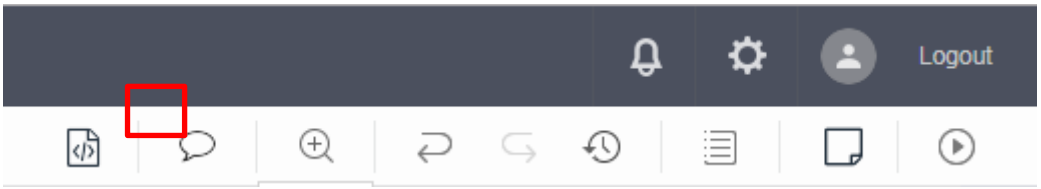


[Figure 5.5-20] Zoom x1.0 Clicked

5.5.10 Use Tooltip

Enter memo in Deep Learning Model Editor function. If a function is Moused Over in Diagram, it is displayed as tooltip. You can enable/disable it using Tooltip button on the upper right-hand side of the screen.

A. Click button to enable Tooltip.



[Figure 5.5-21] Click Tooltip Button

It is thumbnail image of Deep Learning Model Editor that shows all Functions that a user created in Deep Learning Model Editor at a glance. It is functionality similar to Index described earlier that allows a user to locate a model easily as the number of functions to be used in the future increases and Deep Learning Model Editor becomes more complex.

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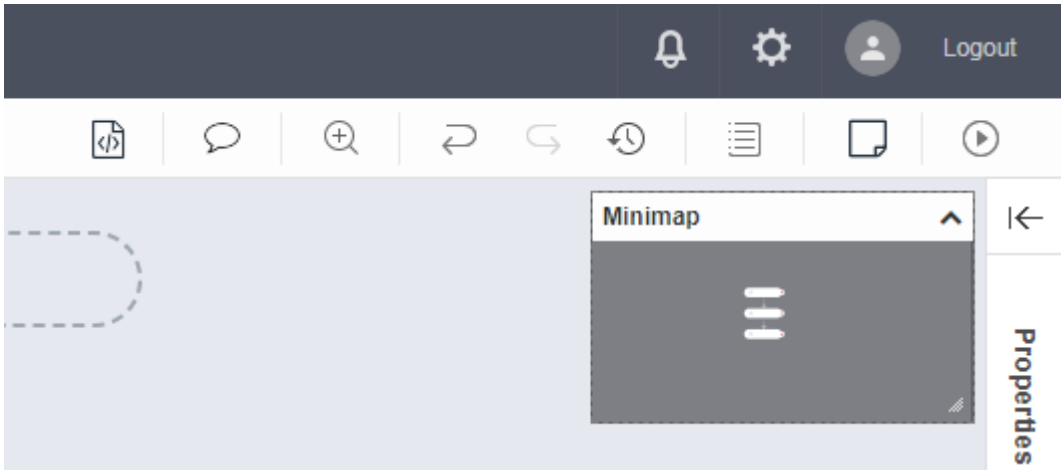


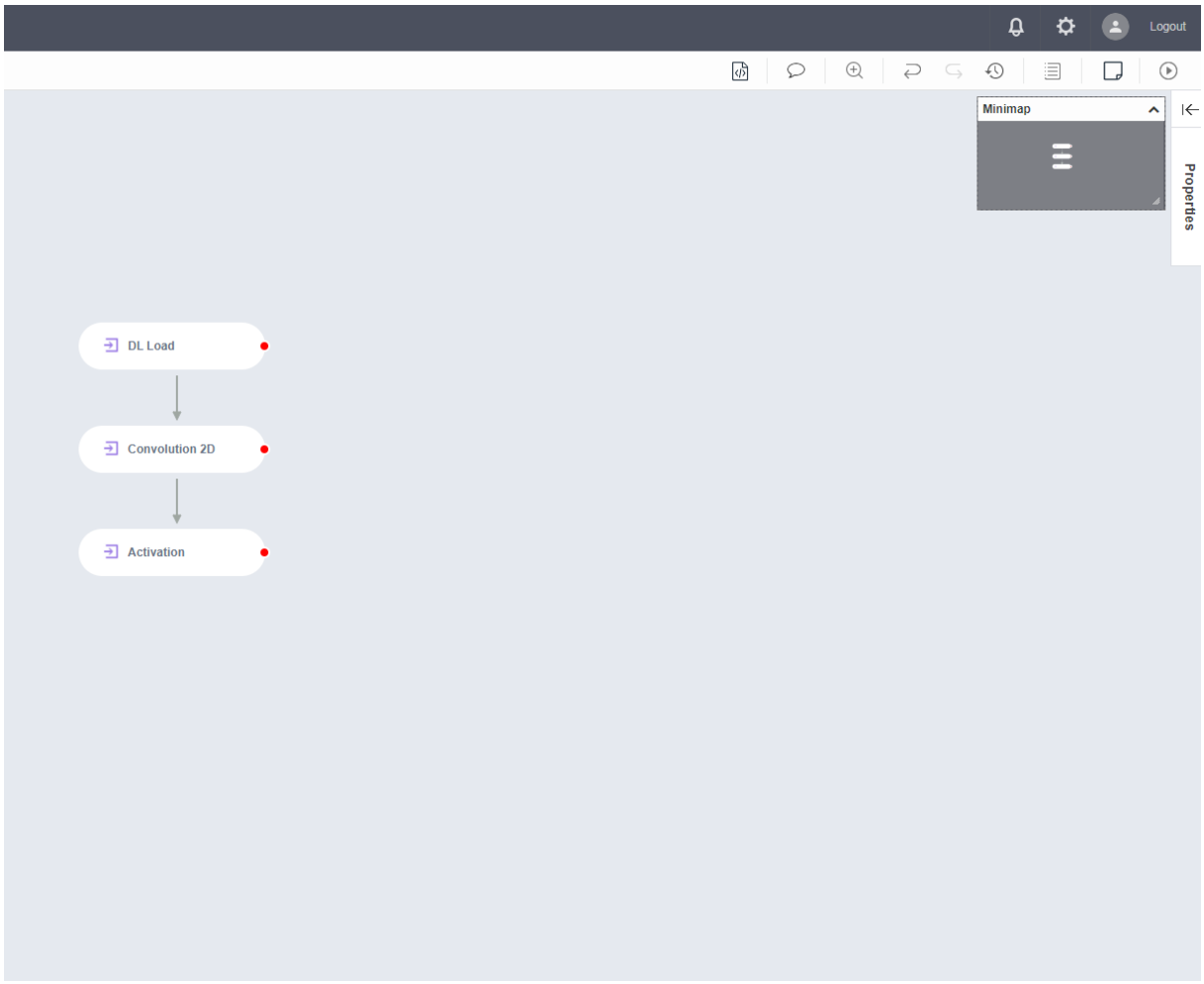
[Figure 5.5-22] Minimap Window

Drag a mouse to move Minimap window from a previous location. And click button to collapse the Minimap. And if you drag area, you can resize it.

5.5.11 Execute a Model

Execute Functions created using Deep Learning Model Editor in order of Layer.

A. Click button in Deep Learning Model Editor.



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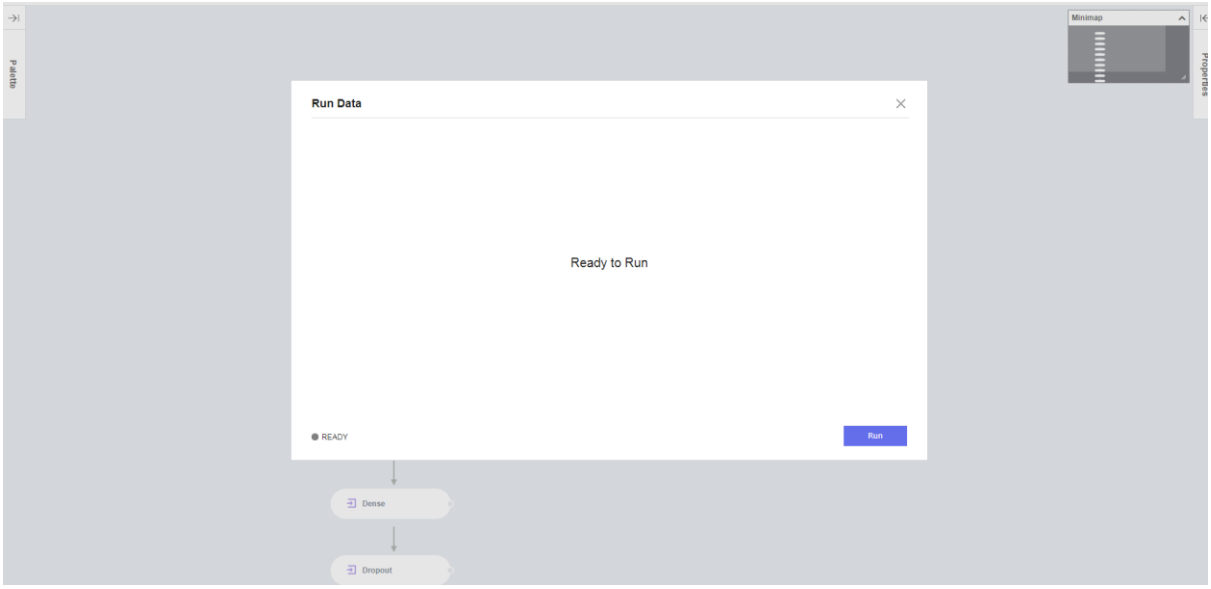
[Figure 5.5-23] Run Button in Deep Learning Model Editor

B. When Run is executed, Run Data Dialog is displayed. And you can verify model execution and status.



[Figure 5.5-24] Run Data Dialog

5.6 Use Report Editor

Report function allows you to effectively communicate the message and intuitively analyze the data through visualization of data. It allows you to not only present the analyzed data in a chart but also write the description of the chart by adding text content. It can also connect the data to Report via Data Box View and can either add chart or text, or change the configuration using Object/Properties View. In toolbar Menu of the Report, you can use diverse functions such as Publish function, a function to indicate the boundary of the content, a function to zoom in/out the screen, and Undo/Redo function.

5.6.1 Add a Page

You can add a page by pressing Page Add button on the upper side of the Report.

[Figure 5.6-1] Page Add Button

5.6.2 Move to Another Page

You can move to another page by clicking Page View button on the upper side of the Report and selecting the Page you want to move to.

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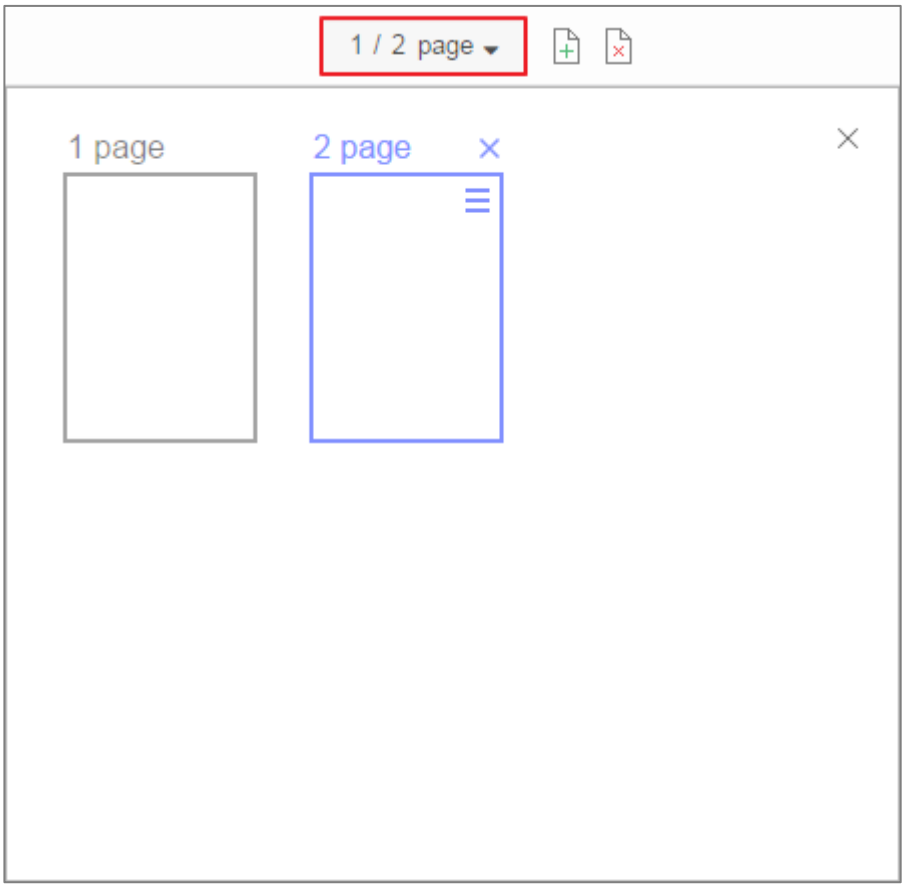

[Figure 5.6-2] Page View

5.6.3 Delete a Page

You can delete a page by either clicking Page Delete button on the upper side of the Report or clicking ✕ button in Page View.

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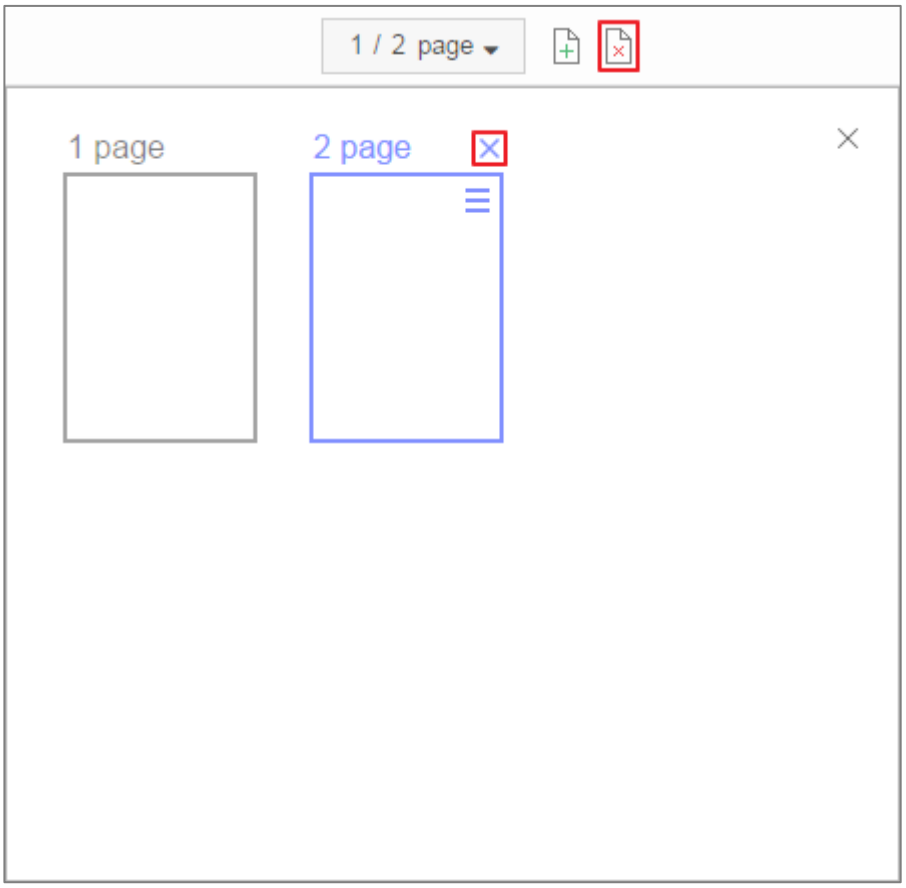


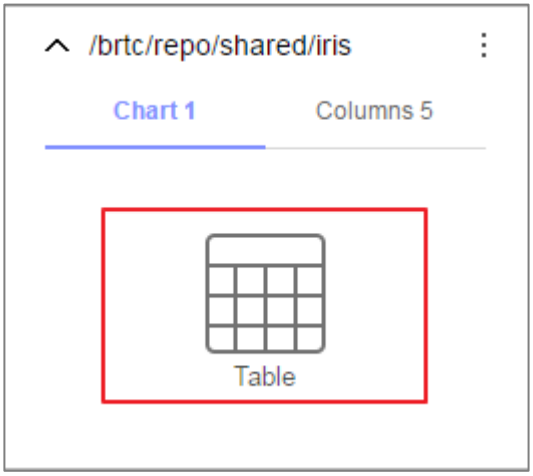
[Figure 5.6-3] Page Delete Button

5.6.4 Add Content

You can add content to Report Page via Data Box View and Object View.

5.6.4.1 Add Chart Using Data Box View

A. Click Chart Template in Chart Tab of Data Source in Data Box View.



[Figure 5.6-4] Chart Template

B. Selected Chart/Table is added to Report.

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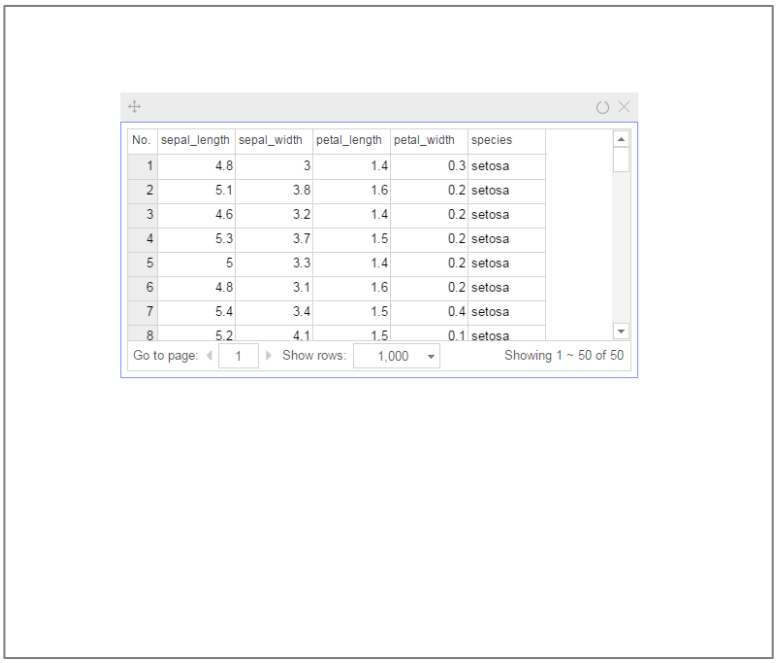
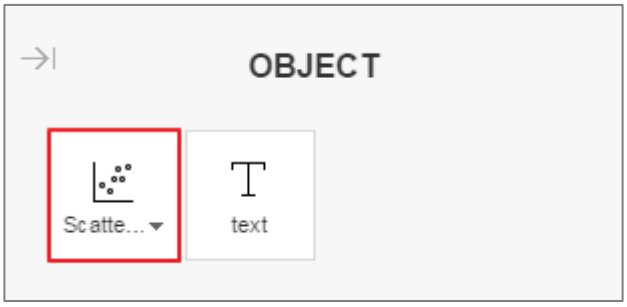


[Figure 5.6-5] Table Added to the Report

5.6.4.2 Add Chart using Object View

A. Either click **Chart** button in Object View, or ▼ button to select the Chart type.



[Figure 5.6-6] Chart Unit Add Button

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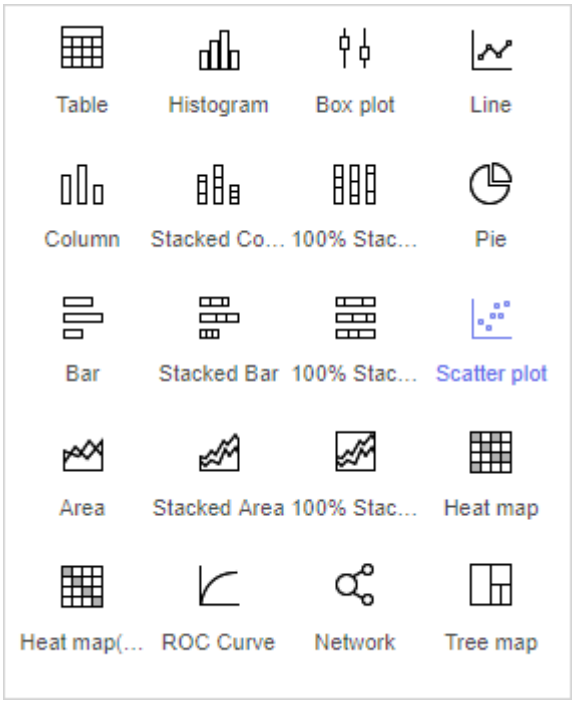

[Figure 5.6-7] Chart Type Select Window

B. Selected chart is added to the Report as chart content.

[Figure 5.6-8] Chart Added to the Report

5.6.4.3 Add Text using Object View

A. Click **Text** button in Object View.

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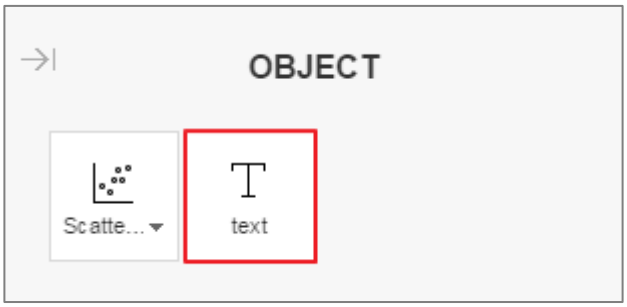
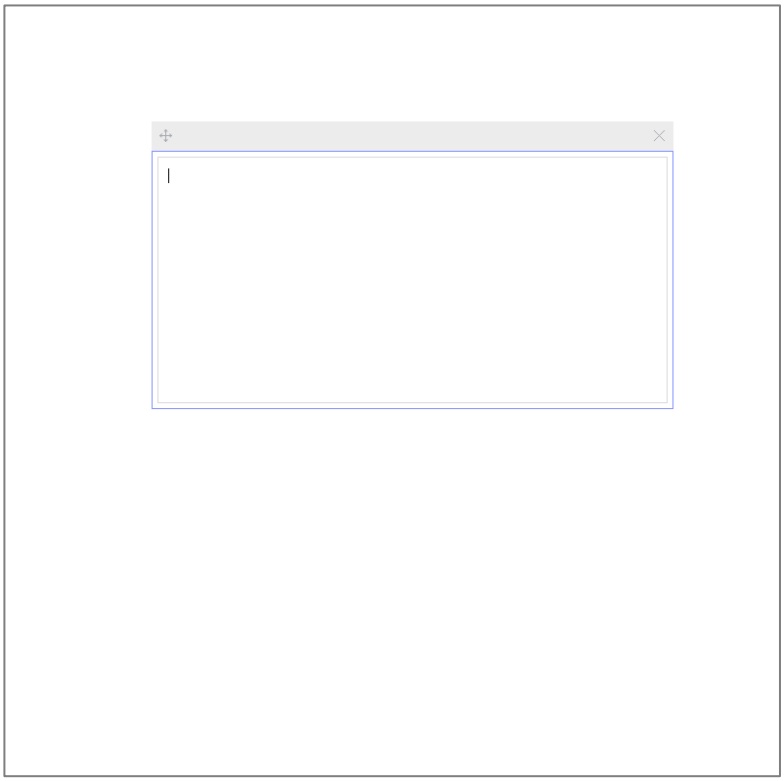


[Figure 5.6-9] Text Content Add Button

B. Text content is added to the Report.



[Figure 5.6-10] Text Content Added to the Report

5.6.5 Move Content

If you select the content that you want to move, Toolbar is displayed on the upper side of the content. You can move the content by dragging the Toolbar.

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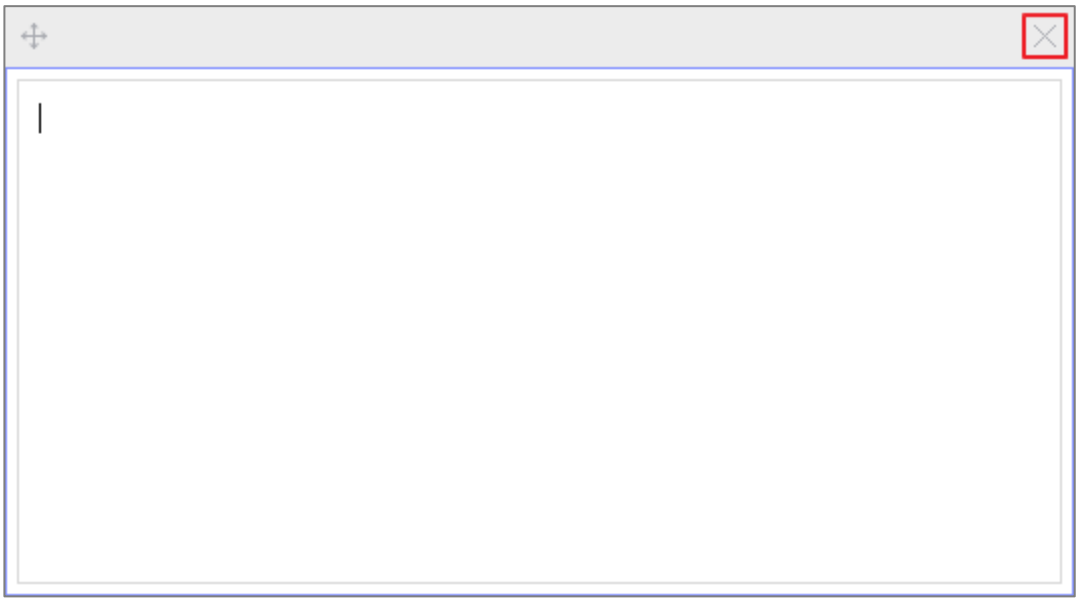
[Figure 5.6-11] Text Content Toolbar

5.6.6 Delete Content

You can delete the content by selecting the content to delete and clicking button on the right-hand side of the Toolbar.



[Figure 5.6-12] Content Delete Button

5.6.7 Refresh Content

You can refresh the content by clicking button on the right-hand side of Tool Bar of Chart Content and redraw the chart.

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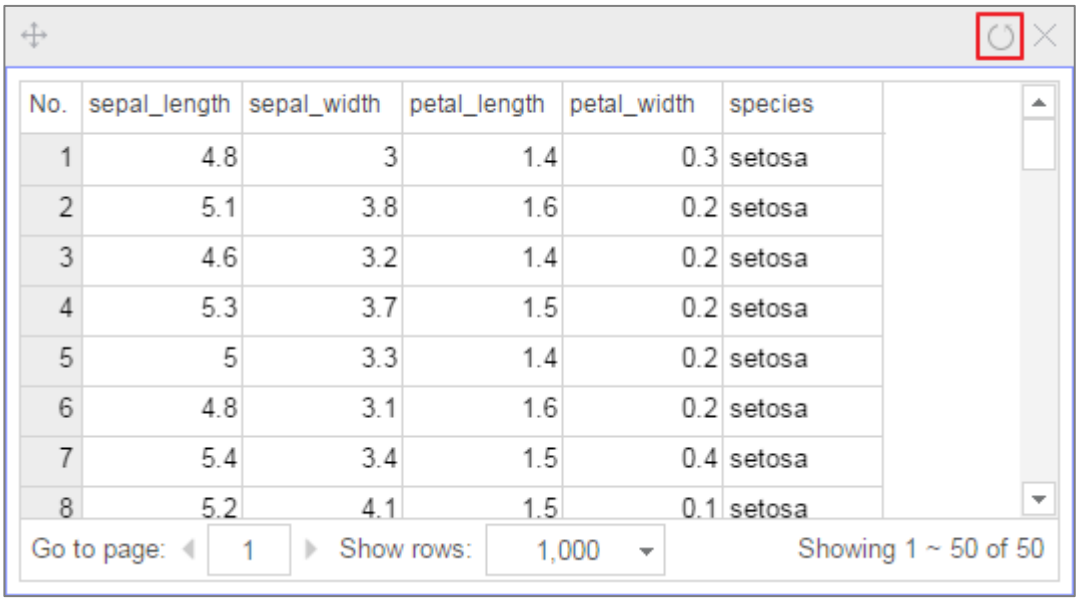

No.	sepal_length	sepal_width	petal_length	petal_width	species
1	4.8	3	1.4	0.3	setosa
2	5.1	3.8	1.6	0.2	setosa
3	4.6	3.2	1.4	0.2	setosa
4	5.3	3.7	1.5	0.2	setosa
5	5	3.3	1.4	0.2	setosa
6	4.8	3.1	1.6	0.2	setosa
7	5.4	3.4	1.5	0.4	setosa
8	5.2	4.1	1.5	0.1	setosa

[Figure 5.6-13] Content Refresh Button

5.6.8 Configure Content Properties

You can configure the option for the content selected in Properties View. You can configure the properties of the page in case the content was not selected.

5.6.8.1 Configure Data Source / Column

Data source and column in Chart Content can either be directly selected in Properties View or configured by dragging the column from Data Box View. In case you configure the column in the chart by dragging the column from Data Box View, Data source of the chart is configured as the Data source of the column dragged.

[Figure 5.6-14] Chart Content that Requires Data Source and Column Configuration

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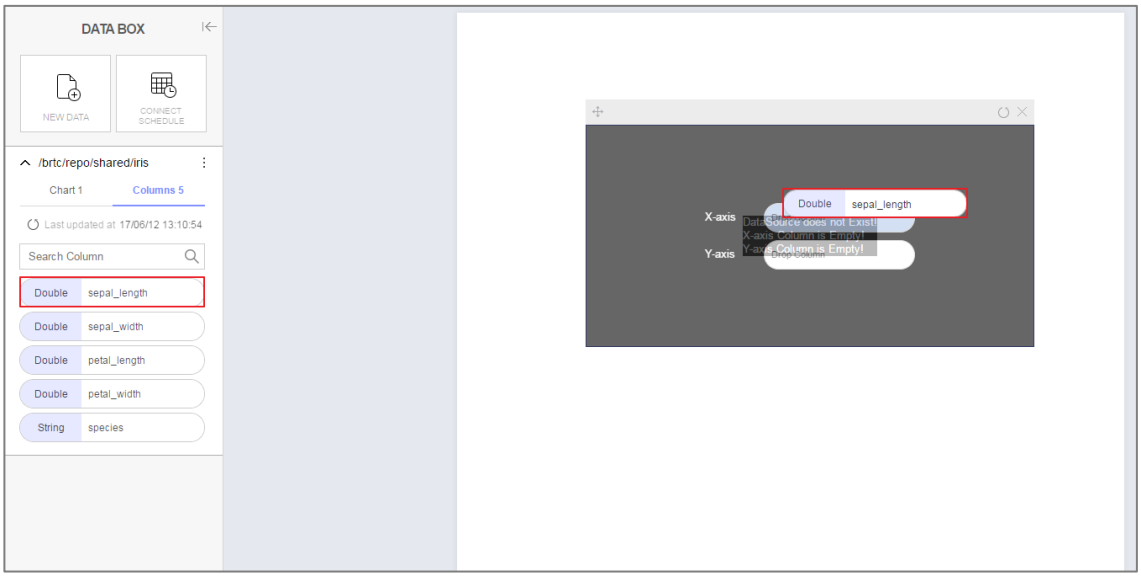
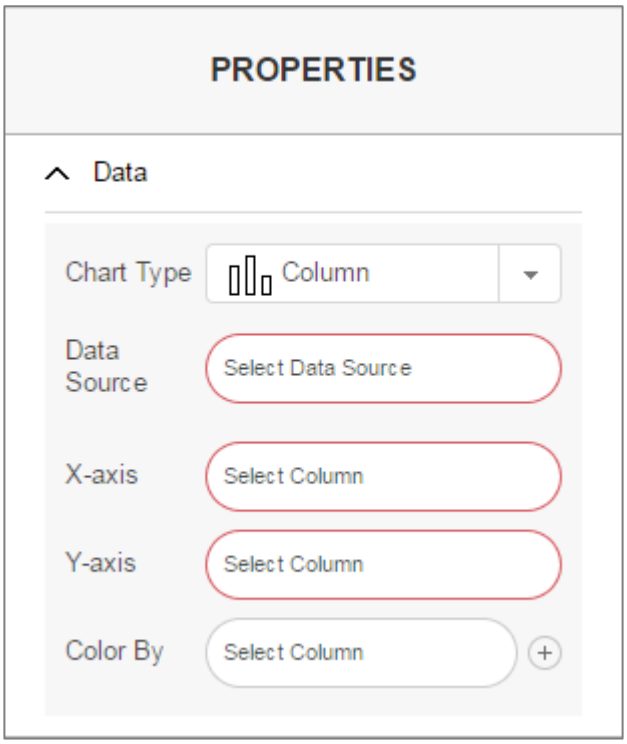


[Figure 5.6-15] Define Data Source and Column by Dragging the Column from Data Box View



[Figure 5.6-16] Define Data Source and Column in Properties View

5.6.8.2 Configure Option

You can configure the option for both Text Content and Chart Content in Properties View. For Text Content, you can set the style, size, color and layout of the text. Chart Content has different options for different charts, and Chart Title, Axis, Legend and Marker are configurable.

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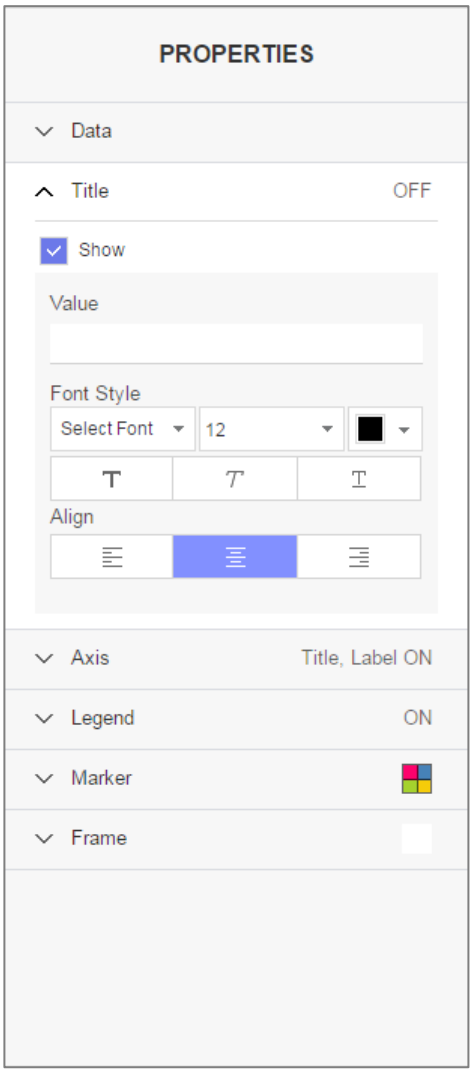
[Figure 5.6-17] Option for Text Content



[Figure 5.6-18]Option for Column Chart among Chart Contents

5.6.9 Use Data Box View

In Data Box View, you can check the list of Data Sources connected to the Report, and you can also add/change the name of/delete/refresh the Data Source, delete Chart Template and connect Data Source Schedule.

5.6.9.1 Add Data Source

A. Click **New Data** button in Data Box View.

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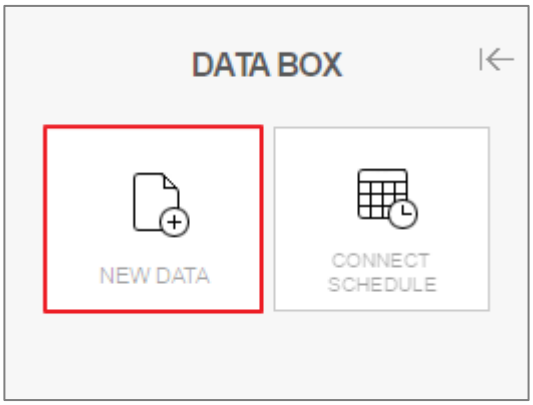
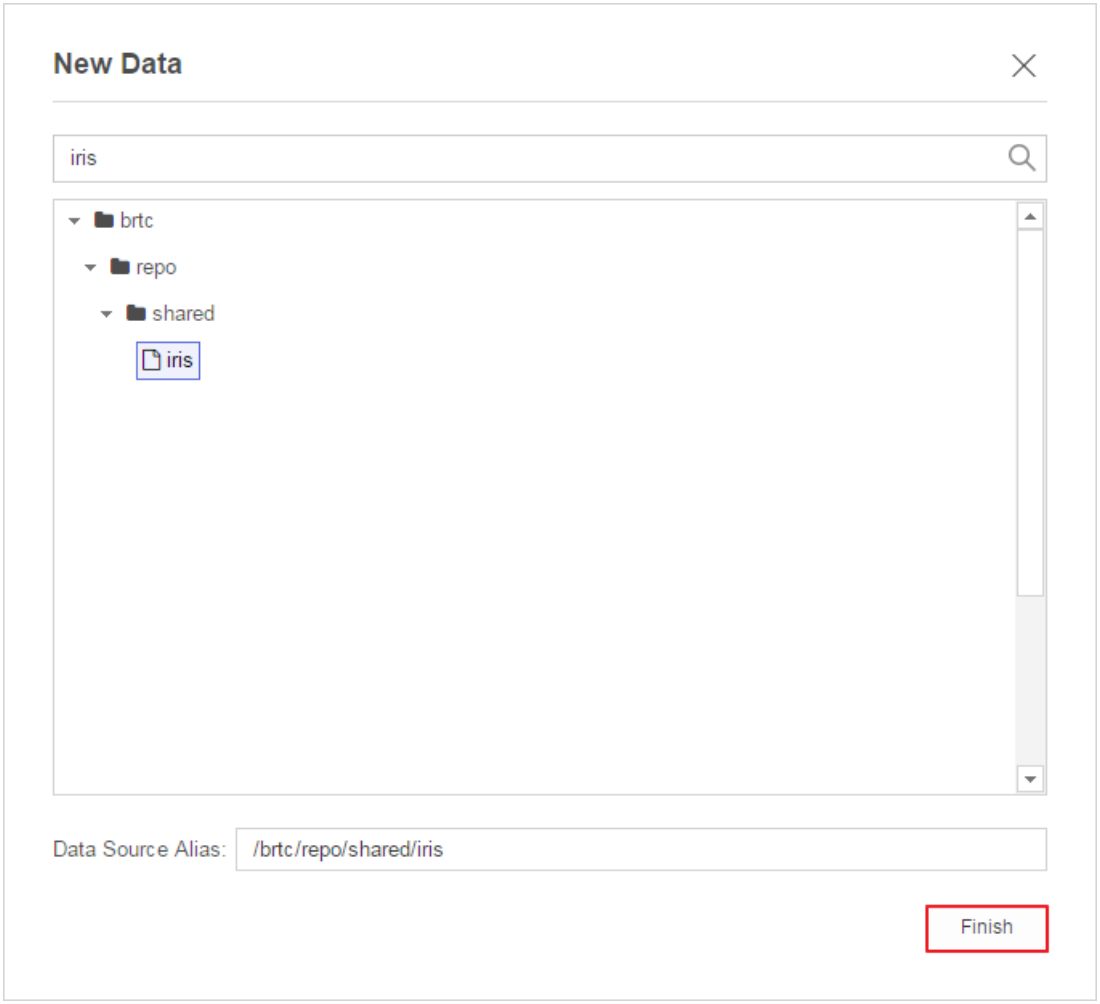


[Figure 5.6-19] New Data Button in Data Box

B. Select the *Data* in New Data window and click **Finish** button.



[Figure 5.6-20] New Data Window

C. After Run Progress is proceeded, Data Source which was added to Data Box View is displayed. You can verify Chart Template of the Data Source in Chart Tab of the Data Source. You can also verify the Column of the Data Source in Columns Tab where Data Source Refresh button is located.

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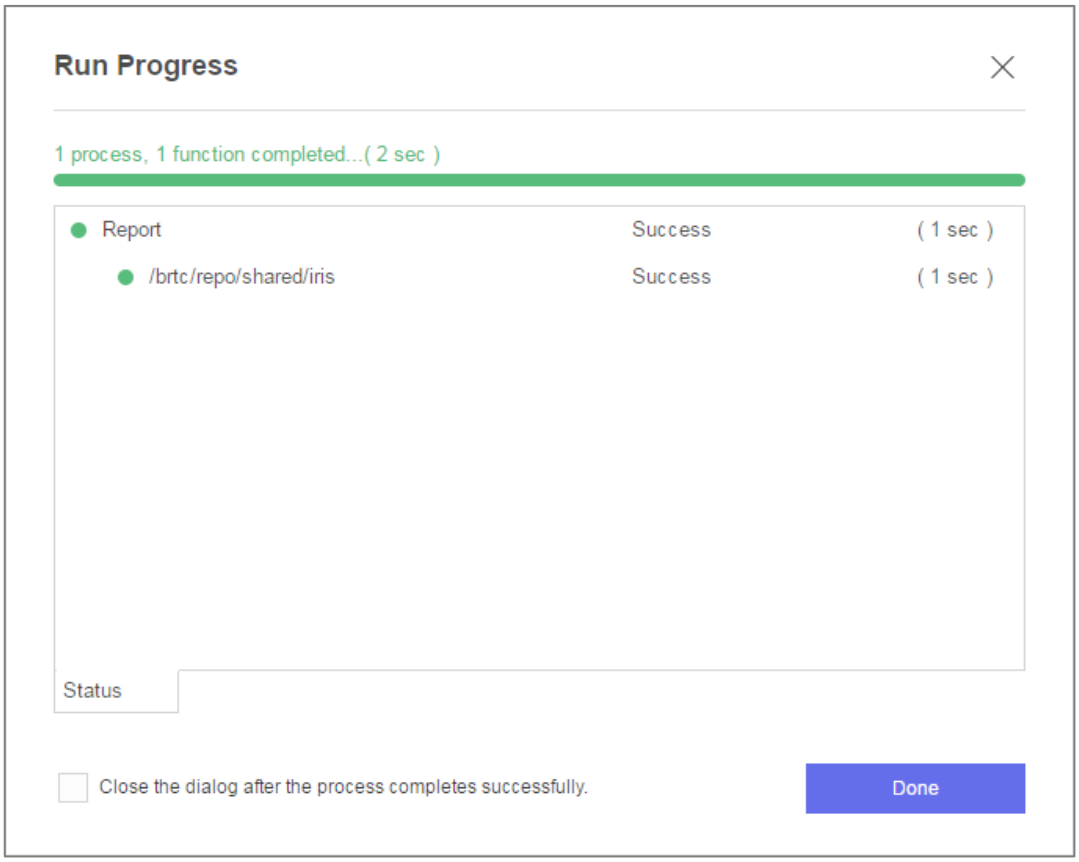
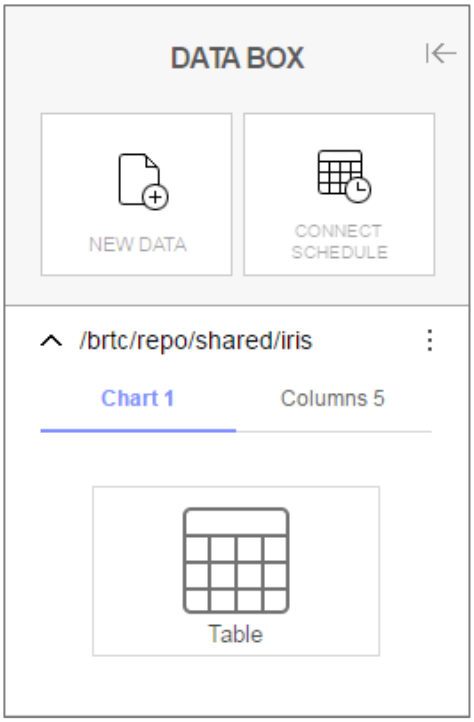


[Figure 5.6-21] Run Progress to Add Data Source



[Figure 5.6-22] Data Source Added to Data Box

5.6.9.2 Change Data Source Name

C. Click ⋮ button of the Data Source whose name you want to change in Data Box View and select **Edit**.

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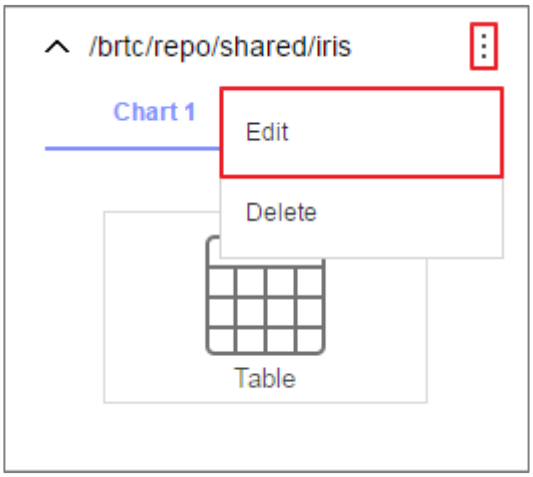
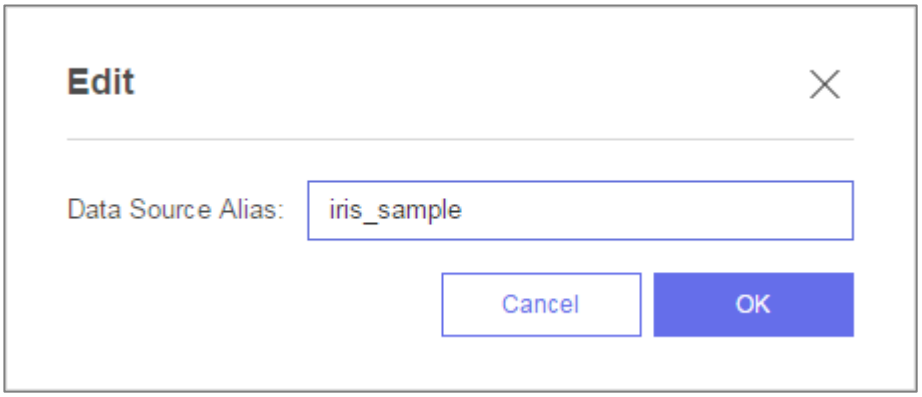


[Figure 5.6-23] Data Source Edit Button

D. Enter *Data Source Alias* in Edit window and click **OK** button.



[Figure 5.6-24] Data Source Edit Window

E. The name of the Data Source is changed.

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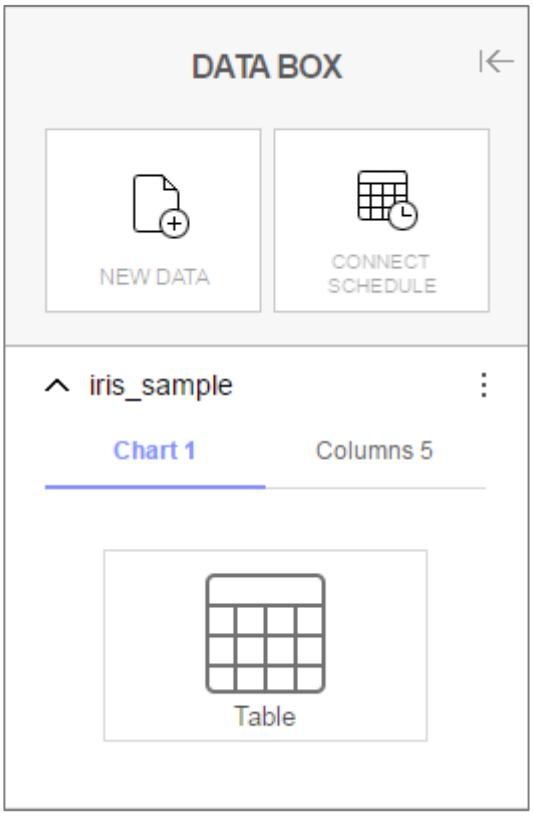
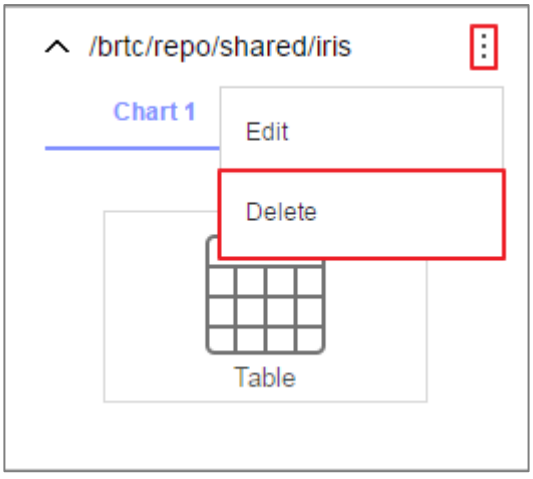


[Figure 5.6-25] Data Source with Changed Name

5.6.9.3 Delete Data Source

A. Click ⋮ button of the Data Source that you want to delete in Data Box View and select **Delete.**



[Figure 5.6-26] Data Source Delete Button

B. If you click **OK** button, Data Source is deleted.

5.6.9.4 Refresh Data Source

A. Click ↻ button in Columns Tab of the Data Source.

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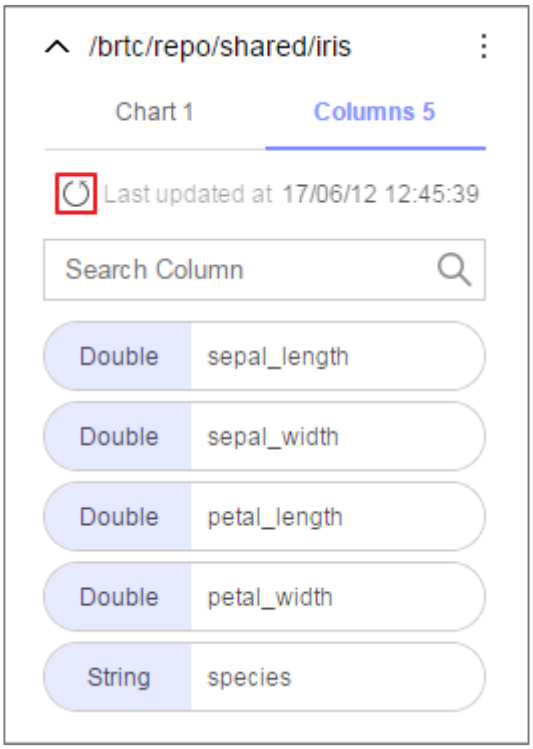
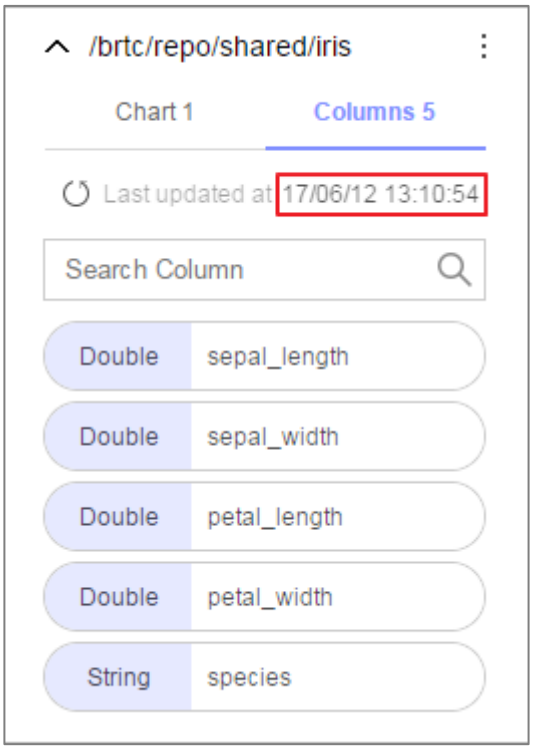


[Figure 5.6-27] Data Source Refresh Button

B. After Run Progress is proceeded, Last Updated Time is changed. In case the column of the Data Source is changed, the changed column is applied.



[Figure 5.6-28] Refreshed Data Source

5.6.9.5 Delete Chart Template

A. Click ✕ button of Chart Template that you want to delete in Chart Tab of the Data Source.

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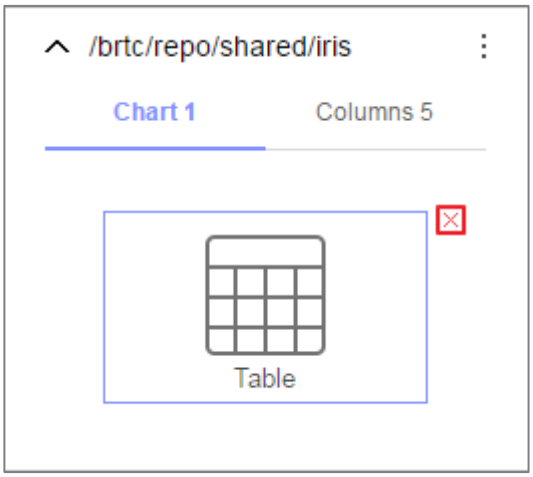
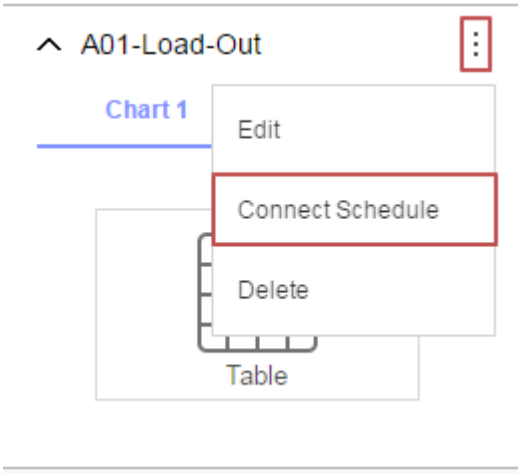


[Figure 5.6-29] Chart Template Delete Button

B. If you click **OK** button, Chart Template is deleted.

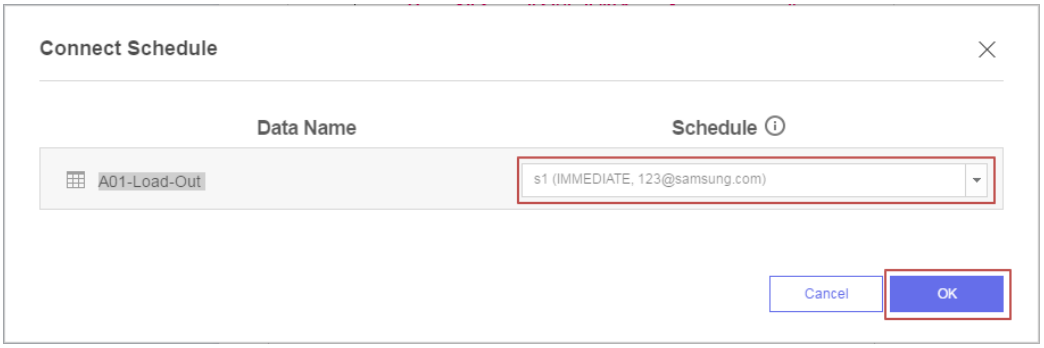
5.6.9.6 Connect Data Source Schedule

A. Click ⋮ button of the Data Source that you want to connect to Schedule and select **Connect Schedule**.



[Figure 5.6-30] Data Source Schedule Connect Button

B. Select Schedule in Connect Schedule window and click **OK button.**



[Figure 5.6-31] Data Source Schedule Connect Window

C. Selected Schedule is connected to the Data Source.

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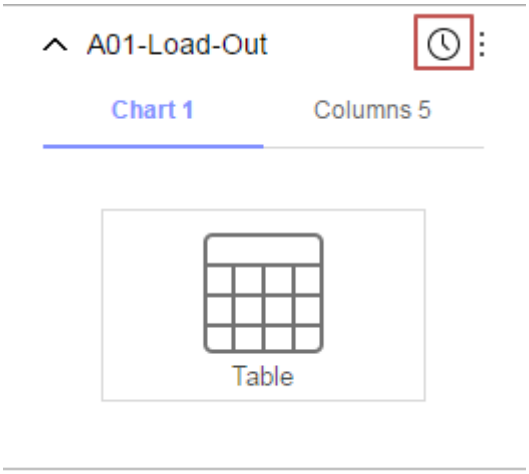
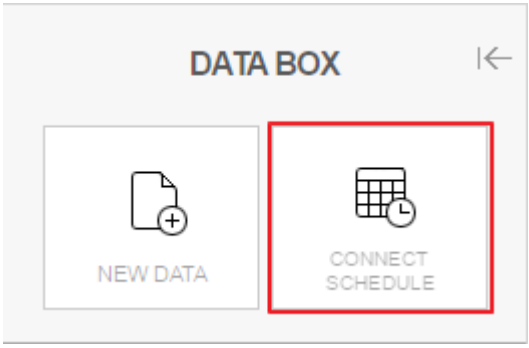


[Figure 5.6-32] Verify Data Source Schedule Connection

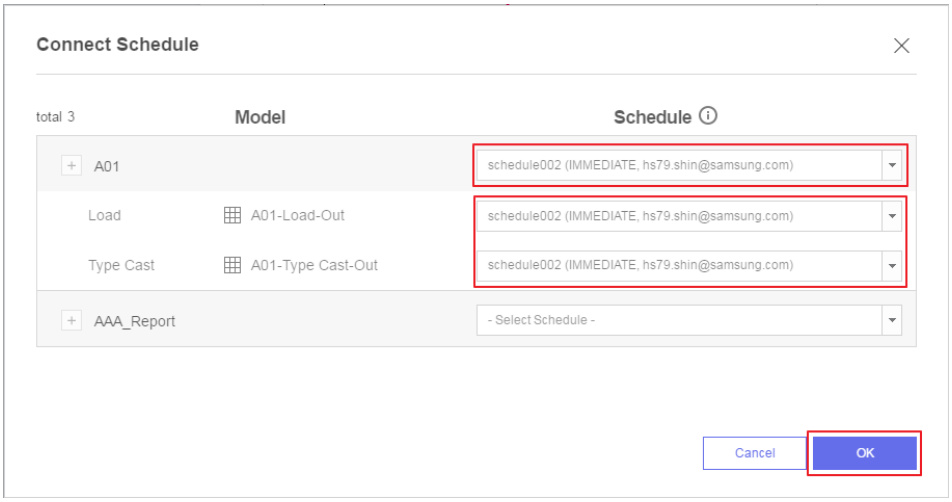
5.6.9.7 Batch Connection of Data Source Schedule

A. Click **CONNECT SCHEDULE** button in Data Box View.



[Figure 5.6-33] Batch Connect Button for Data Source Schedule

B. Select the schedule of the parent model in Batch Connect Schedule window and click **OK** button.



[Figure 5.6-34] Batch Connect Window for Data Source Schedule

C. Selected Schedule is connected to all data sources of the same model.

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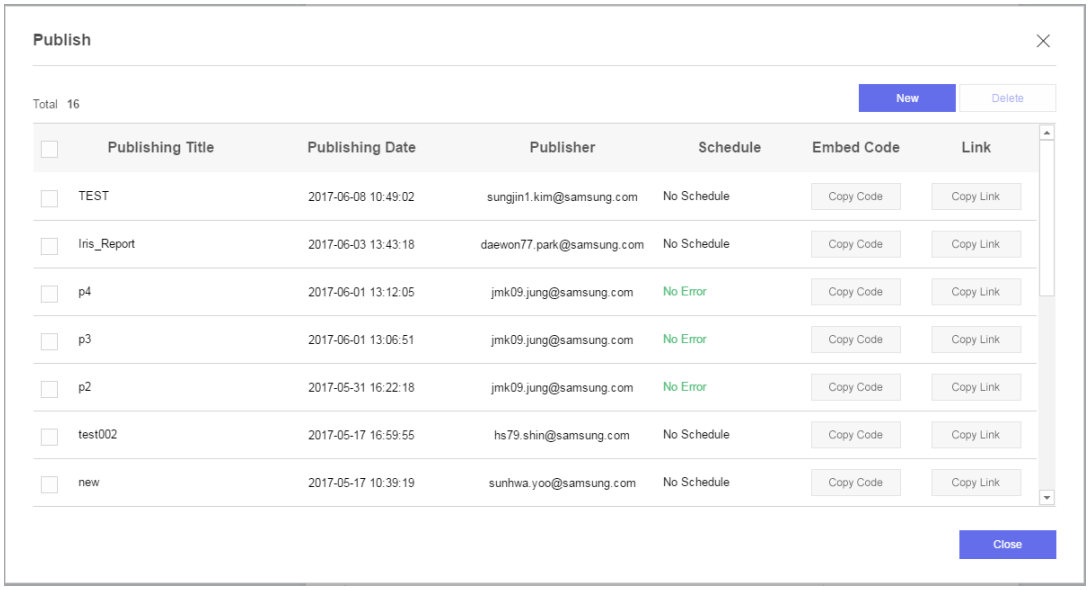
5.6.10 Publish

This function allows you to look up/create/delete Publish Report so that the written Report can be shared with others. You can share Publish Report via Embed Code or URL Link.

5.6.10.1 Look up Publish Report

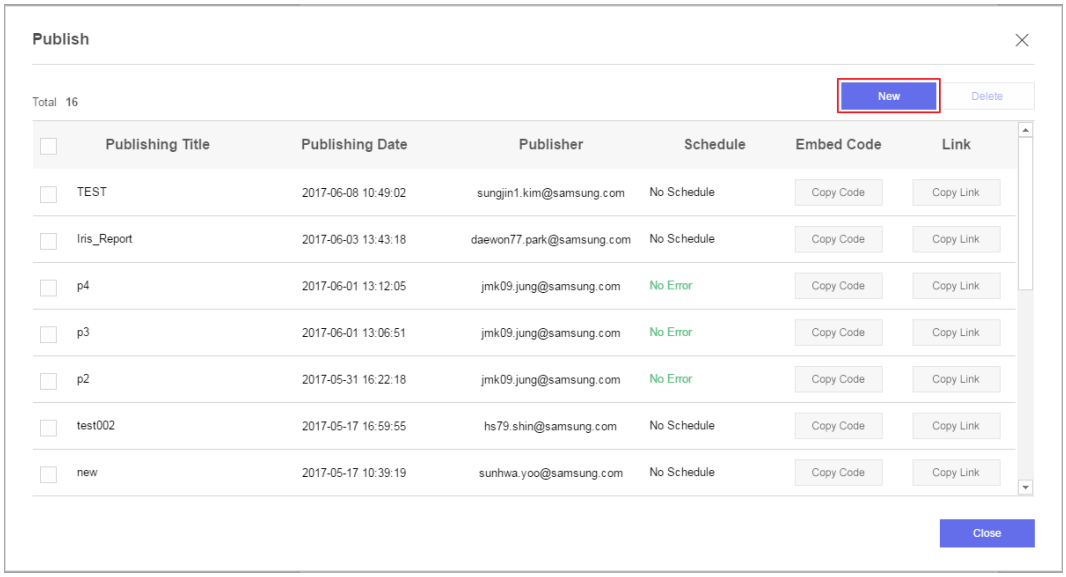
A. If you click button in Diagram Editor, you can look up the Publish Report.



[Figure 5.6-35] Publish Report Lookup Screen

5.6.10.2 Create Publish Report

A. Click **New** button in Publish Report lookup screen.



[Figure 5.6-36] Publish Report New Button

B. Enter Publishing Title in Publish Report create screen and click **OK** button.

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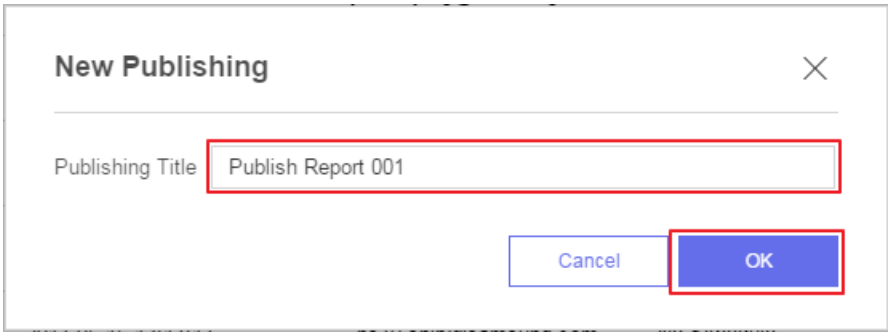
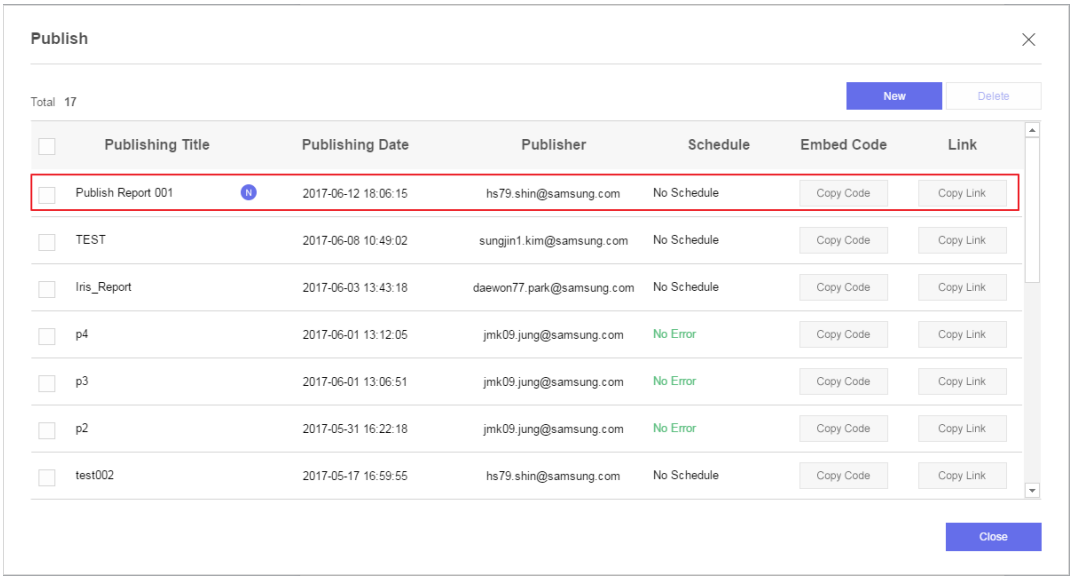


[Figure 5.6-37] Publish Report Create Screen

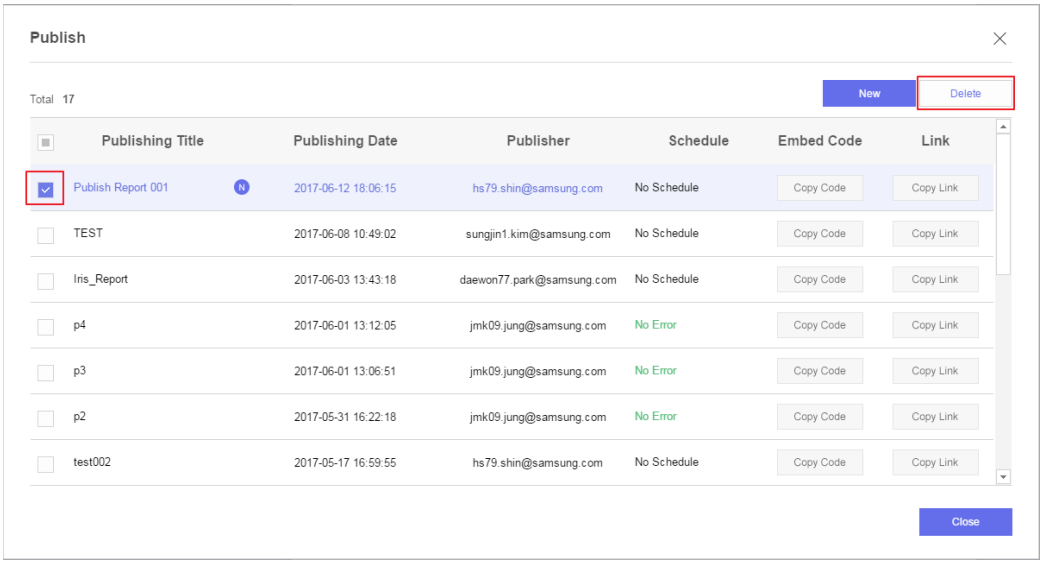
C. Verify the Publish Report created.



[Figure 5.6-38] Verify Publish Report Created

5.6.10.3 Delete Publish Report

A. Select the Publish Report to be deleted in Publish Report lookup screen and click **Delete** button.



[Figure 5.6-39] Publish Report Delete Button

B. If you click **OK** button, selected Publish Report is deleted.

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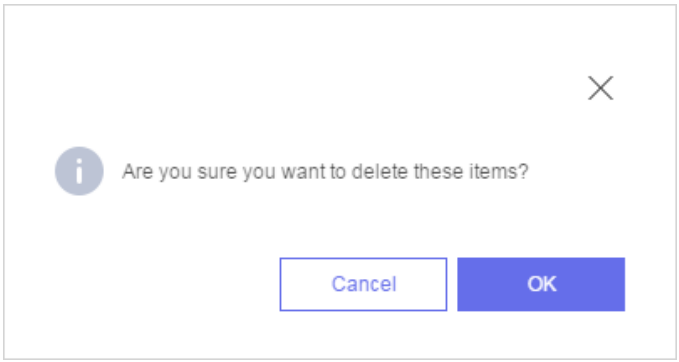
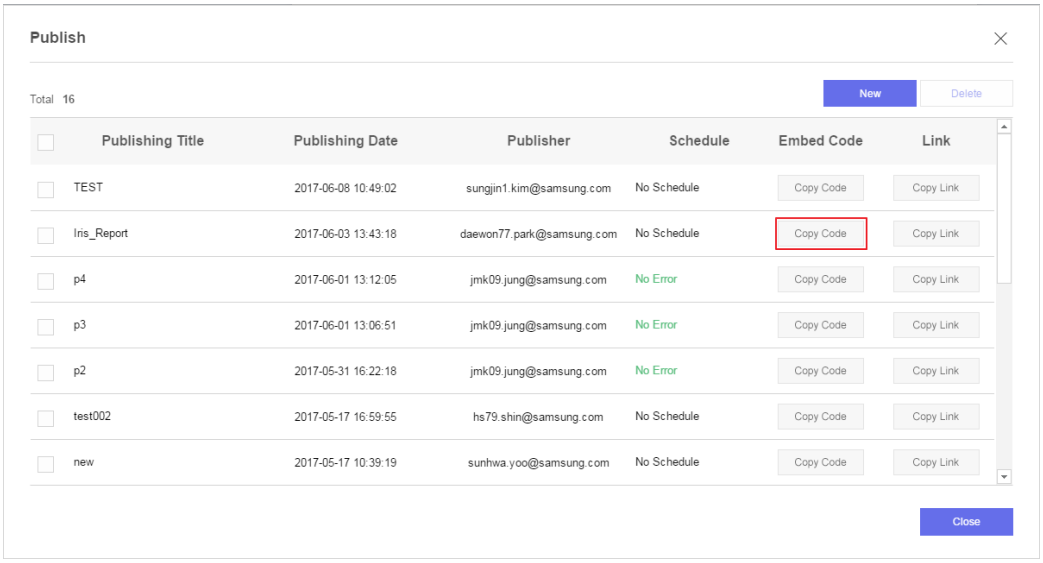


[Figure 5.6-40] Verify Publish Report Deleted

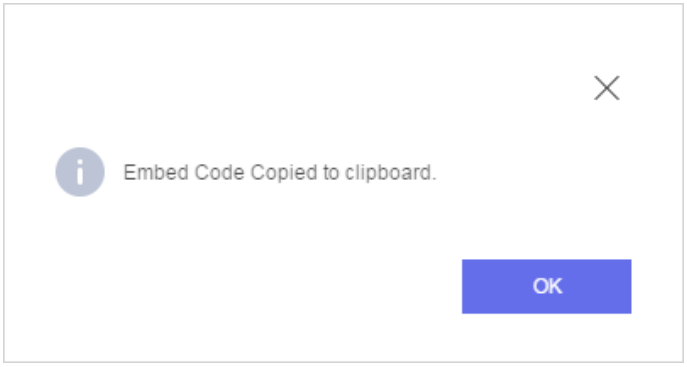
5.6.10.4 Embed Code in Publish Report

A. Click **Copy Code** button of Embed Code in Publish Report that you want to share in Publish Report lookup screen.



[Figure 5.6-41] Publish Report Embed Code Copy Button

B. Embed Code in an iframe in the selected Publish Report is copied.



[Figure 5.6-42] Verify Publish Report Embed Code Copied

5.6.10.5 URL Link in Publish Report

A. Click **Copy Code** button in URL Link of Publish Report that you want to share in Publish Report lookup screen.

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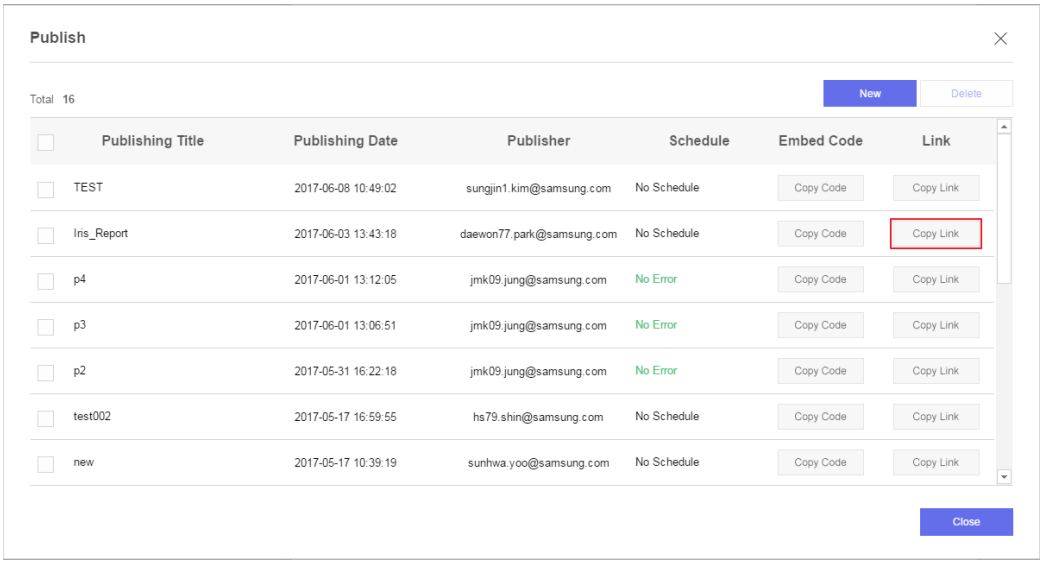
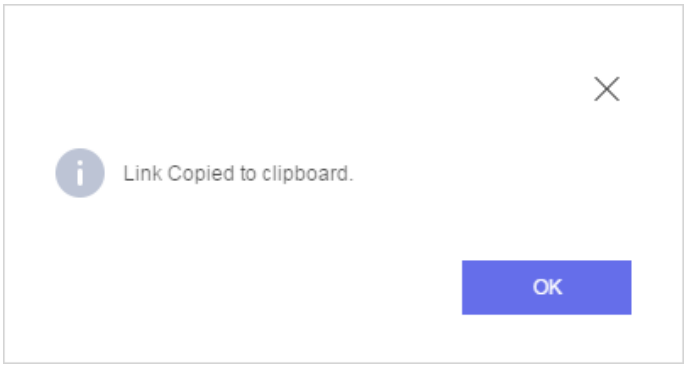


[Figure 5.6-43] Publish Report URL Link Copy Button

B. URL link of the selected Publish Report is copied.



[Figure 5.6-44] Verify Publish Report URL Link

5.7 Use Management

Management consists of a screen that allows you to manage User, Notice, Schedule, (Spark) Agent, Deploy, Publish and Role.

Click **Settings** button on the top right side of the screen and click **Go** button to move to Management screen.

5.7.1 User

5.7.1.1 Create a User

A. Click **Add** button in User Management screen.

[Figure 5.7-1] Move to User Create Screen by Clicking **Add** button

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B. Enter user information and click **Save** button.

[Figure 5.7-2] Create User by Clicking **Save** Button

5.7.1.2 Look up a User

A. Enter a user that you want to look up in User Management screen.

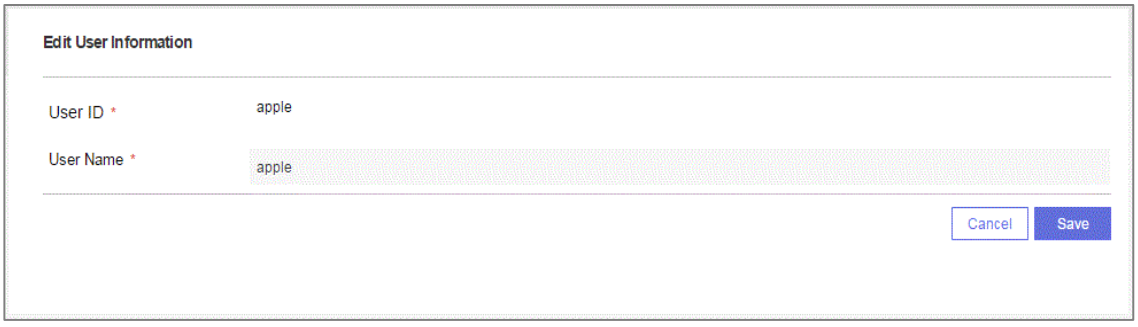
[Figure 5.7-3] User Search Screen

B. Click the searched user and verify the information concerned.

[Figure 5.7-4] User Information Detail Screen

5.7.1.3 Modify a User

A. If you select a particular user row in the User screen, you are redirected to User Information Detail screen, in which you click **Edit** button.



[Figure 5.7-5] Click **Edit** Button

B. Modify *User Name* and click **Save** button.

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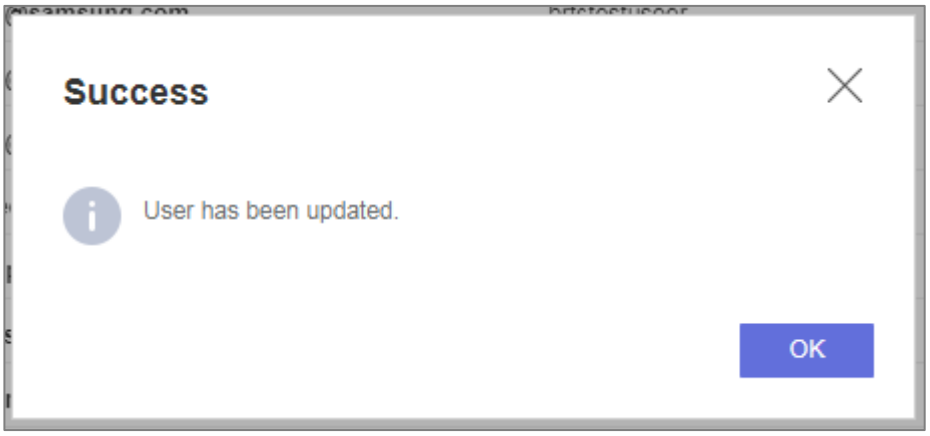
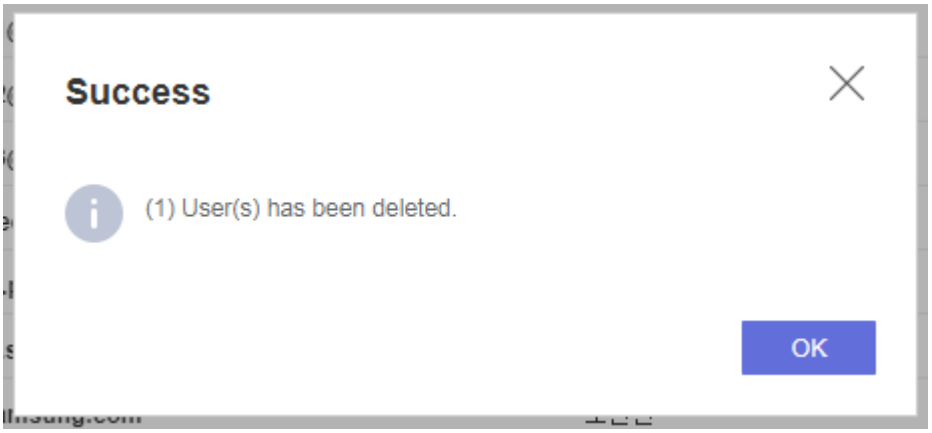


[Figure 5.7-6] Screen to Verify Modified User

5.7.1.4 Delete a User

A. If you select a particular user in the User screen, you are redirected to [Figure 5.1-4]. If you click **Delete** button in that screen, delete confirmation alert window is enabled.



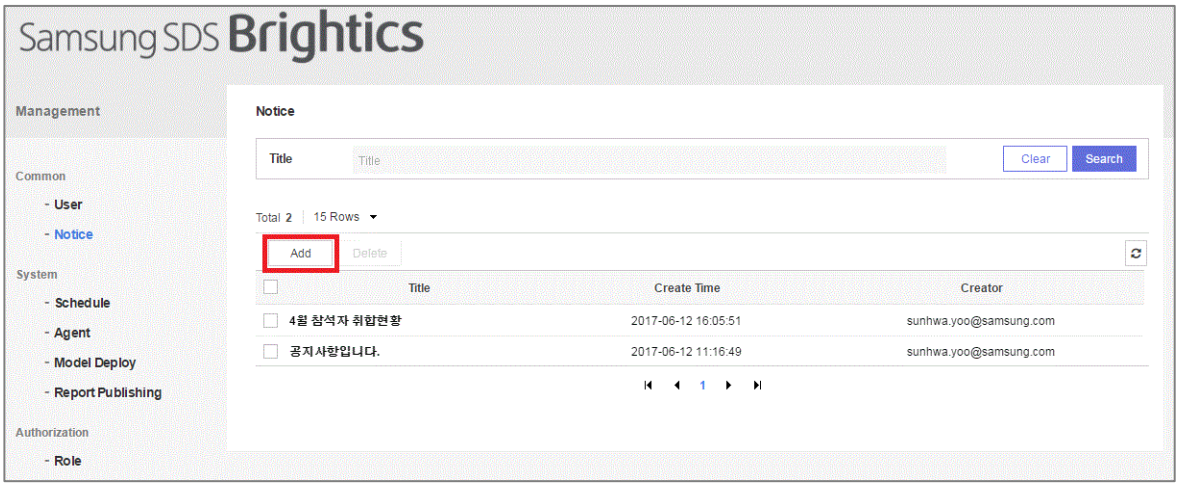
[Figure 5.7-7] Click **OK Button**

B. If you click **OK** button, the concerned user is deleted.

5.7.2 Notice

5.7.2.1 Create Notice

A. Click **Add** button in Notice management screen.



[Figure 5.7-8] Move to Notice Create Screen by Clicking **Add** Button

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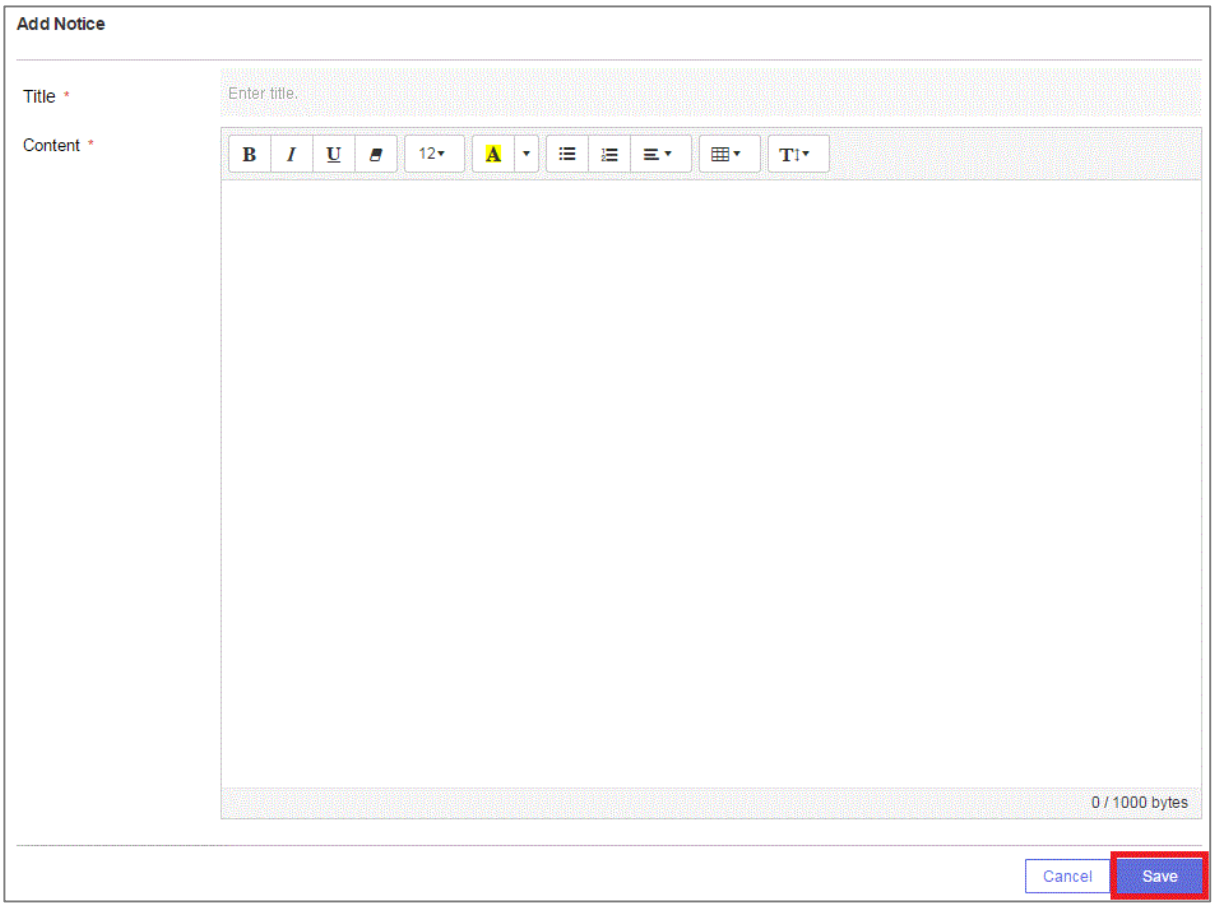
B. Enter *Title* and *Content* and click **Save** button.



[Figure 5.7-9] Create Notice by Clicking **Save** Button

5.7.2.2 Look up Notice

A. Enter Notice that you want to look up into search window of Notice management screen.

[Figure 5.7-10] Notice Search Screen

B. Click the Notice information searched and verify the information concerned.

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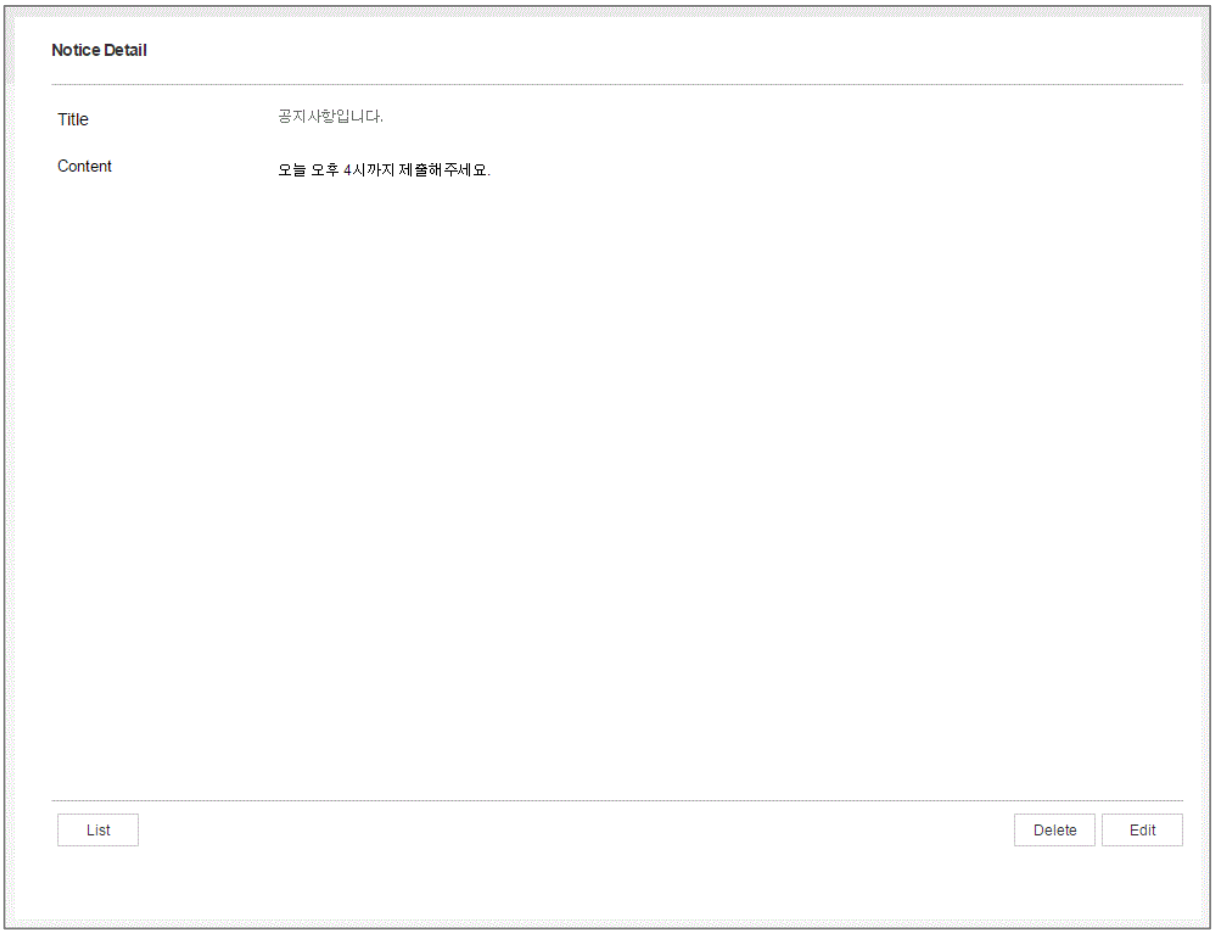

[Figure 5.7-11] Notice Detail Screen

5.7.2.3 Modify Notice

A. If you select a particular Notice row in Notice screen, you are redirected to Notice Detail screen in which you click **Edit** button.

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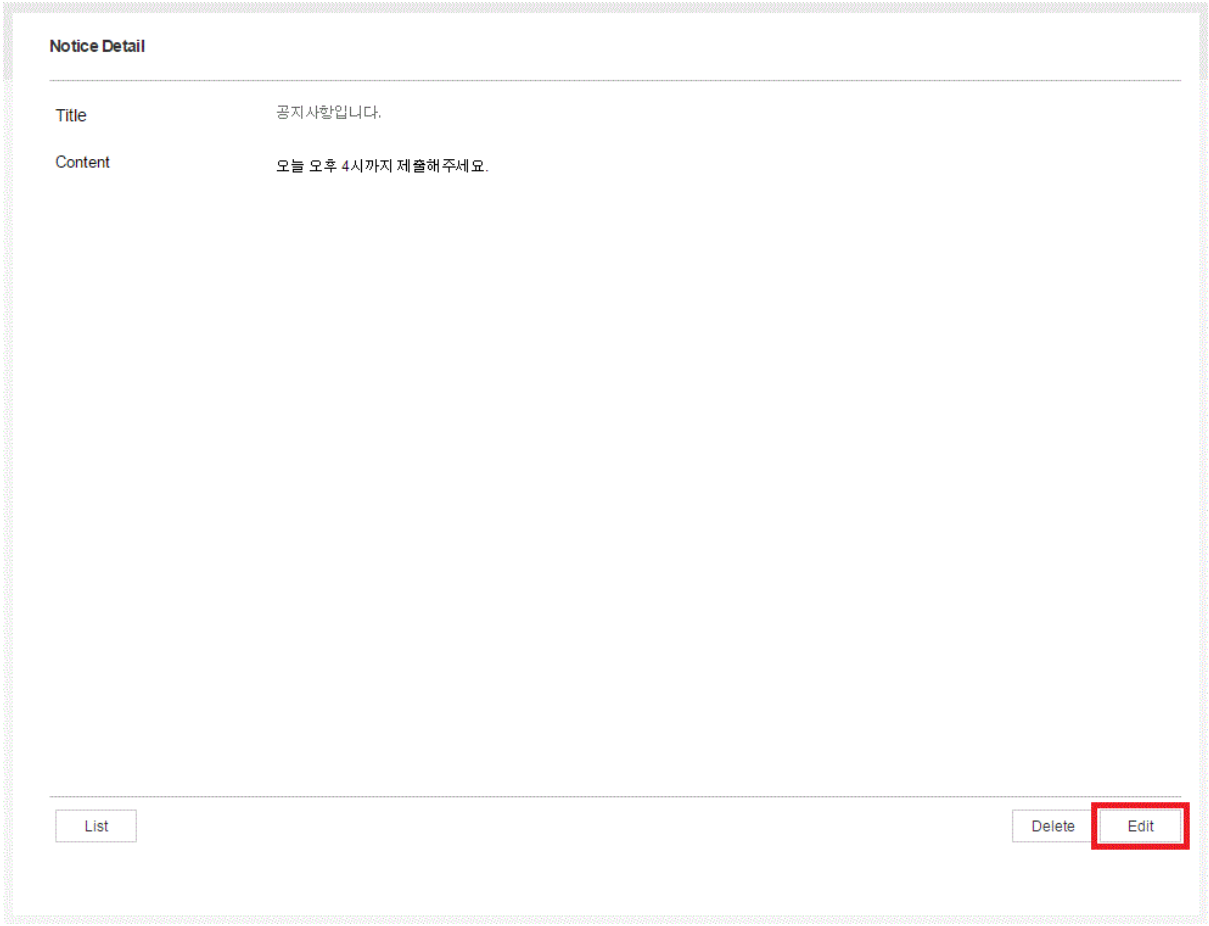
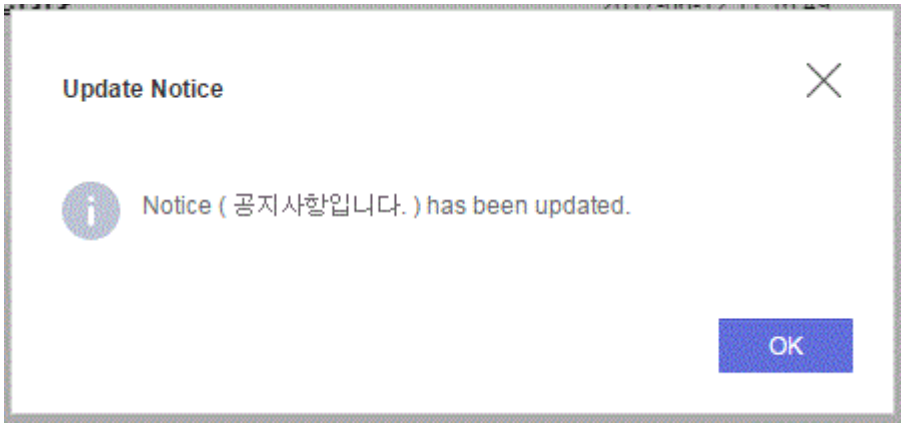


[Figure 5.7-12] Click **Edit** Button

B. Modify *Notice Title* or *Content* and click **Save** button.



[Figure 5.7-13] Screen to Verify Modified Notice

5.7.2.4 Delete Notice

A. Select the notice that you want to delete in Notice Screen.

B. If you click **Delete** button, delete confirmation alert window is enabled. And if you click **OK** button, the concerned notice is deleted.

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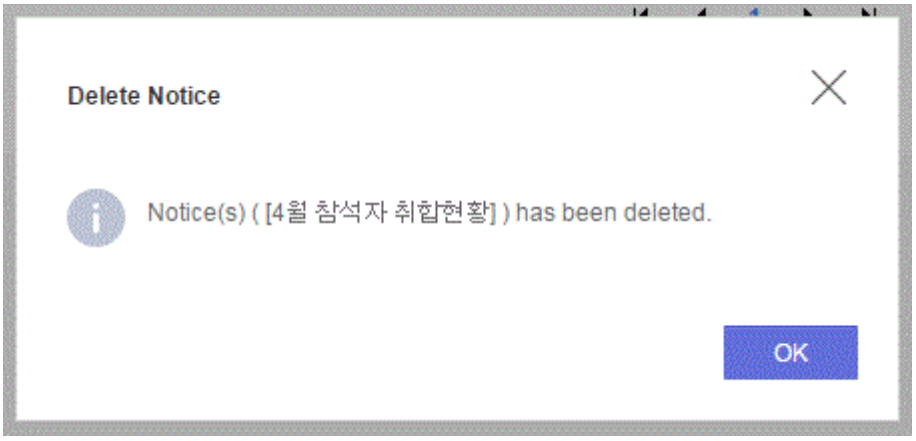
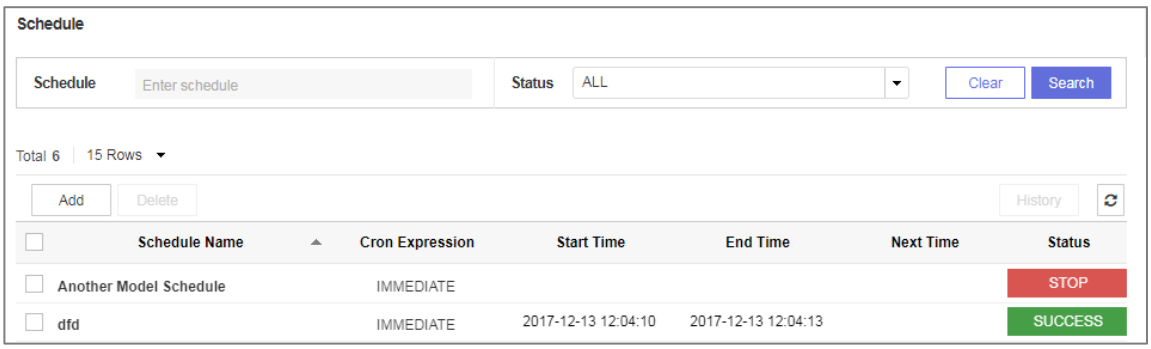


[Figure 5.7-14] Click **OK** Button

5.7.3 Schedule

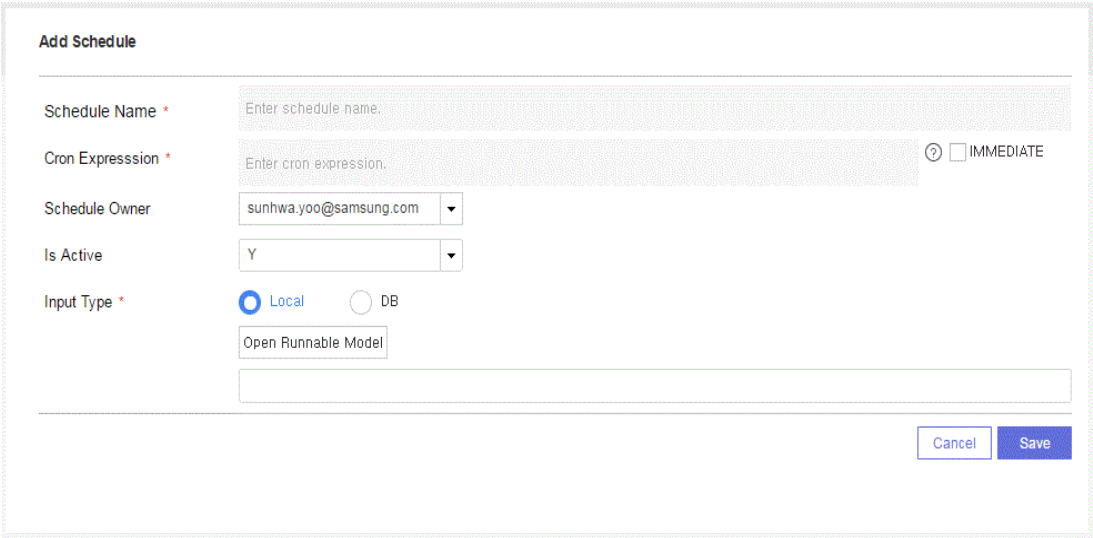
5.7.3.1 Create a Schedule

A. Click **Add** button in Schedule Management screen.



[Figure 5.7-15] Move to Schedule Create Screen by Clicking **Add** Button

B. Enter schedule information and click **Save** button.



[Figure 5.7-16] Create a Schedule by Clicking **Save** Button

5.7.3.2 Look up a Schedule

A. Enter schedule that you want to look up into search window of Schedule Management screen.

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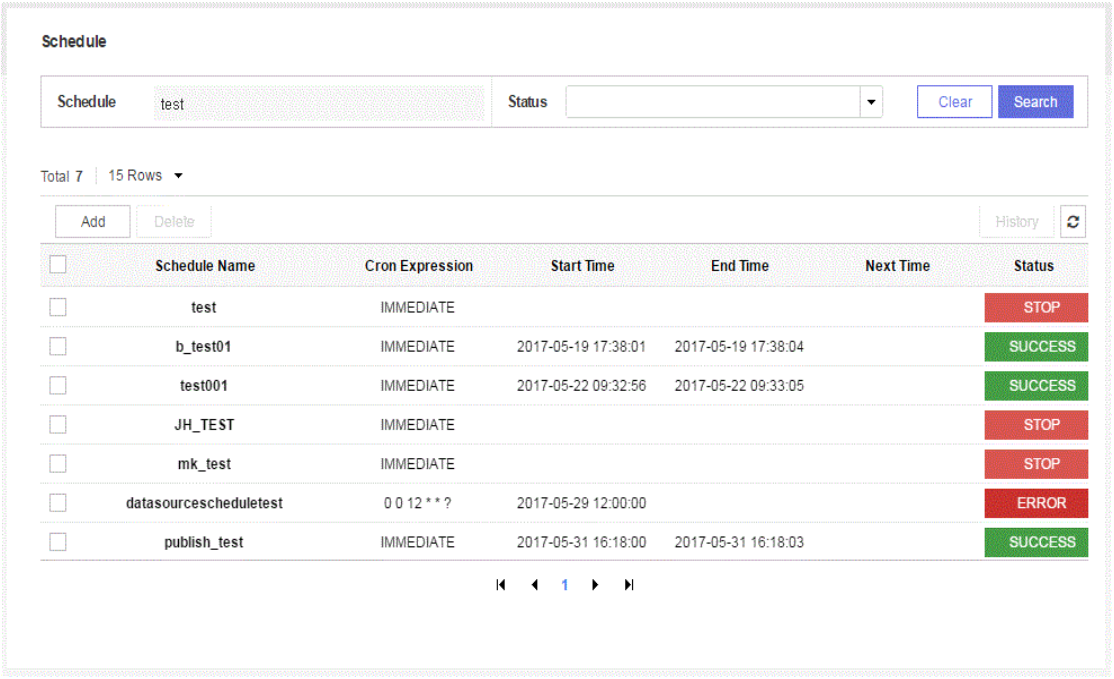
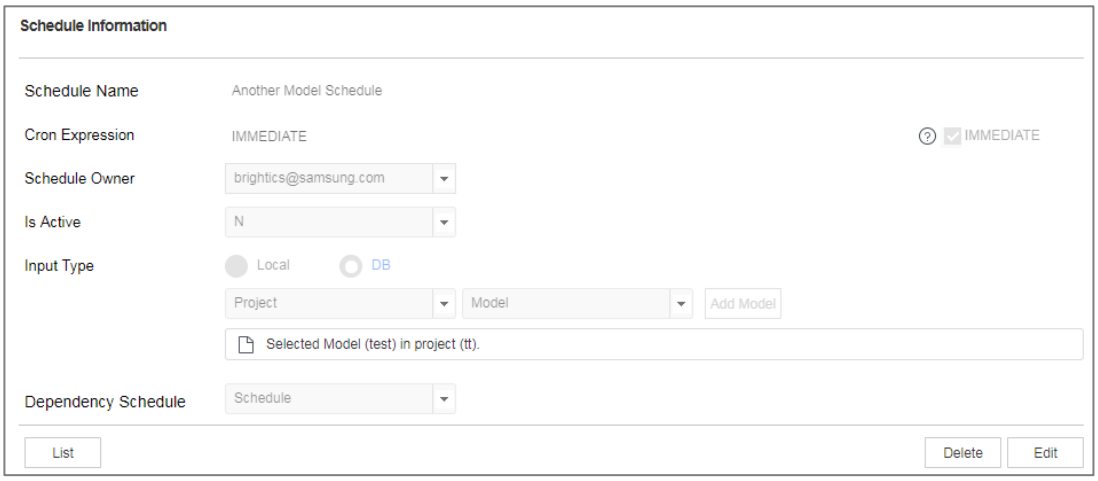


[Figure 5.7-17] Schedule Search Screen

B. Click the schedule searched and verify the information concerned.



[Figure 5.7-18] Schedule Detail Screen

5.7.3.3 Modify a Schedule

A. If you select a particular schedule row in Schedule screen, you are redirected to Schedule Information screen in which you click **Edit** button.

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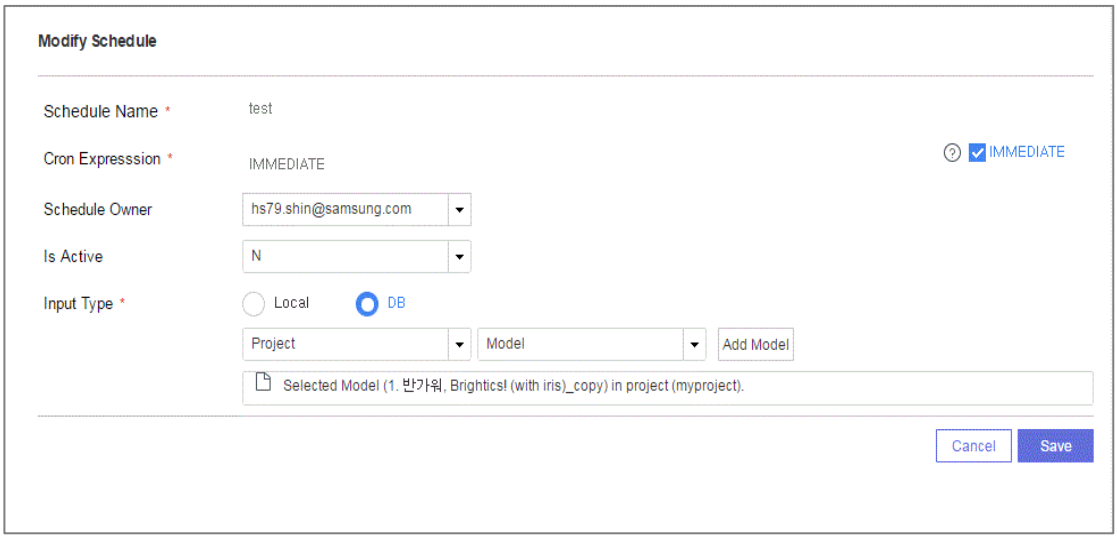
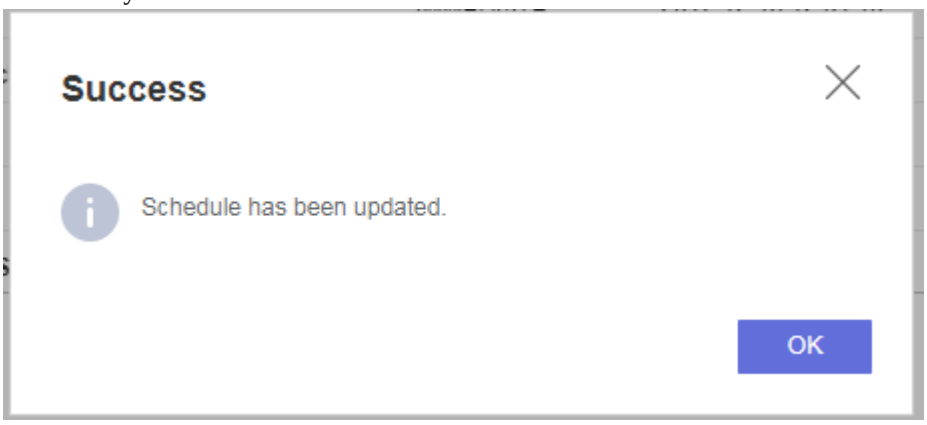


[Figure 5.7-19] Click **Edit** Button

B. Modify the content and click **Save** button.



[Figure 5.7-20] Screen to Verify Modified Schedule

5.7.3.4 Delete a Schedule

A. Click check box of the to-be-deleted schedule in Schedule sceen and click **Delete** button.

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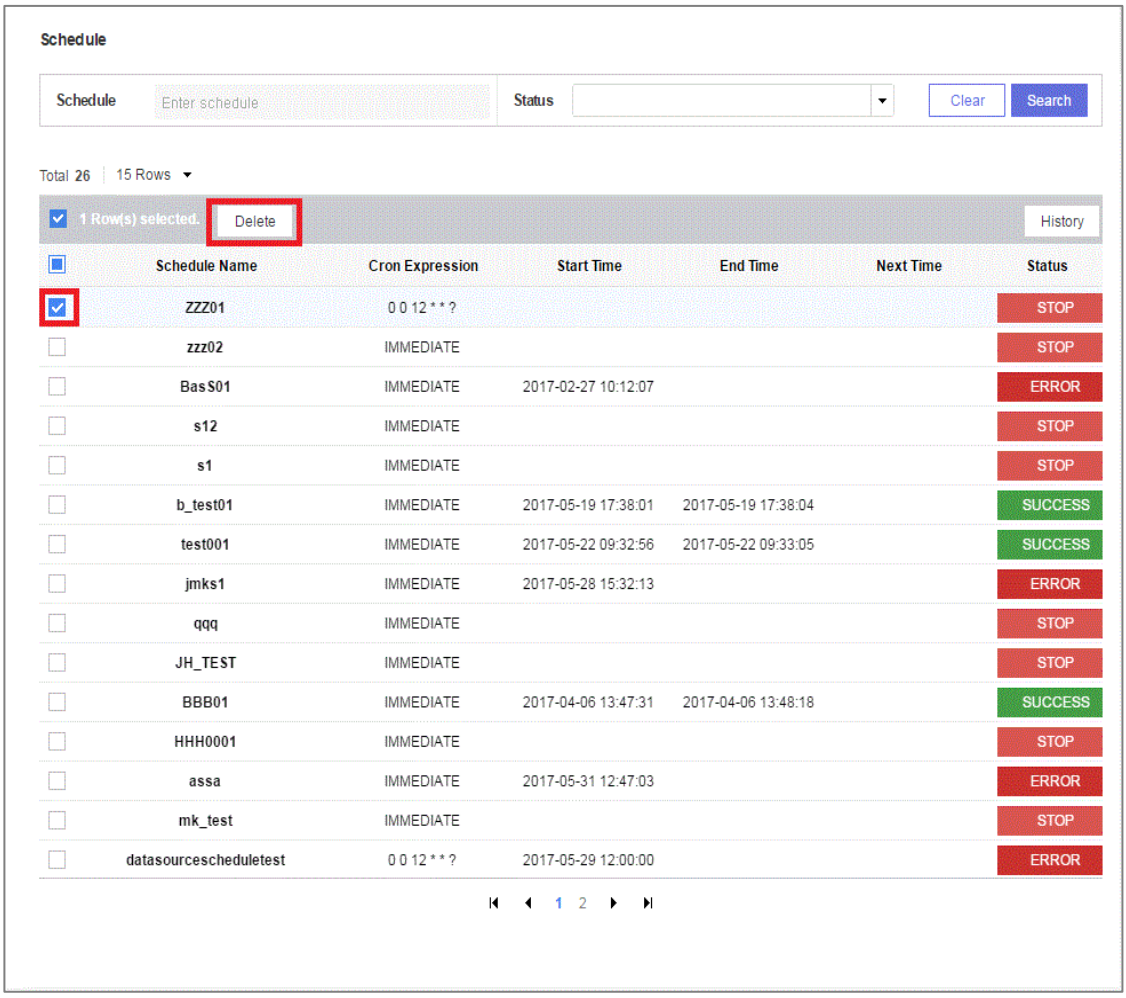
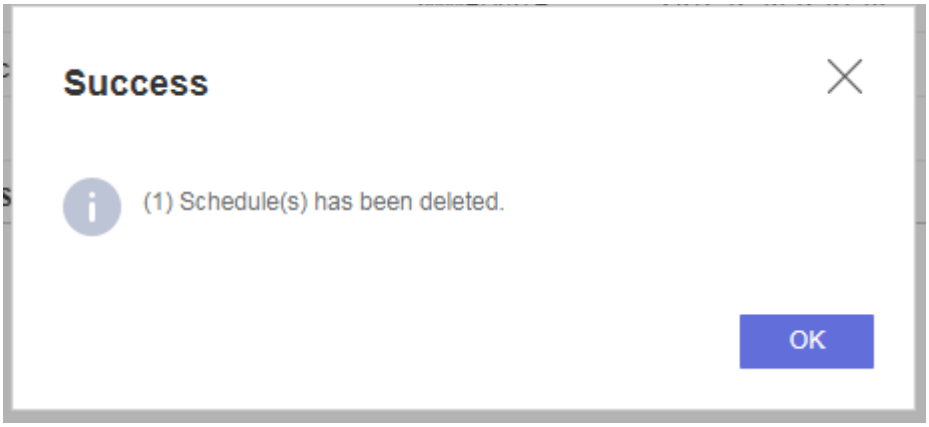


[Figure 5.7-21] Select to-be-deleted Schedule and Click **Delete** Button

B. If you click **Delete** button, delete confirmation alert widow pops up. And if you click **OK** button, the concerned schedule is deleted.



[Figure 5.7-22] Click **OK** Button

5.7.4 Agent

5.7.4.1 Create an Agent

A. Click **Add** button in Agent management screen.

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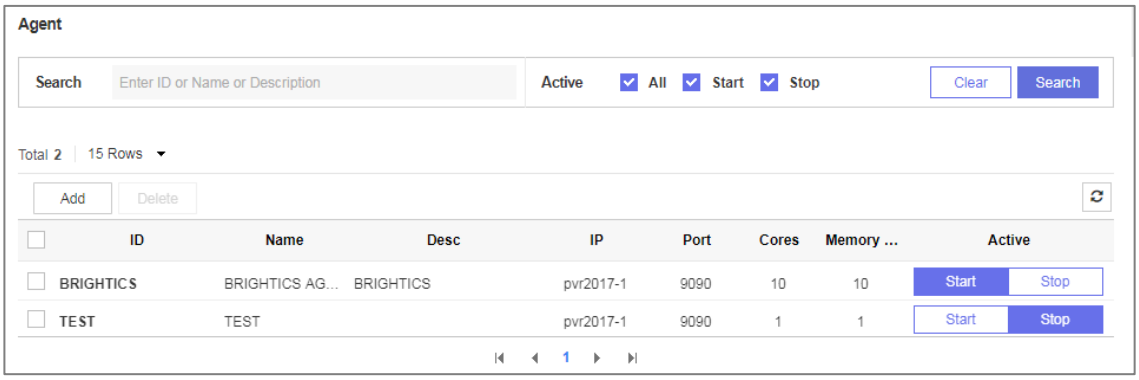


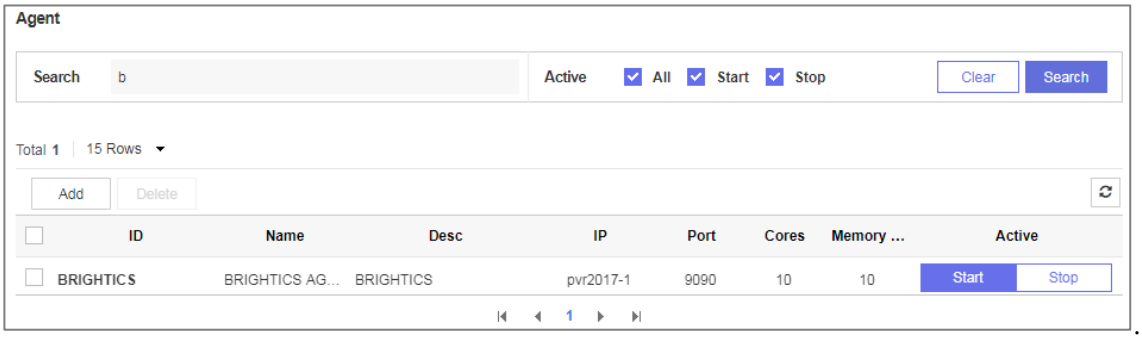
[Figure 5.7-23] Move to Agent Create Screen by Clicking **Add** Button

B. Enter the detailed information of the agent and click **Save** button.

[Figure 5.7-24] Create Agent by Clicking **Save** Button

5.7.4.2 Look up an Agent

A. Enter the agent that you want to look up into search window of Agent management screen.



[Figure 5.7-25] Agent Search Screen

B. Click the agent searched and verify the information concerned.

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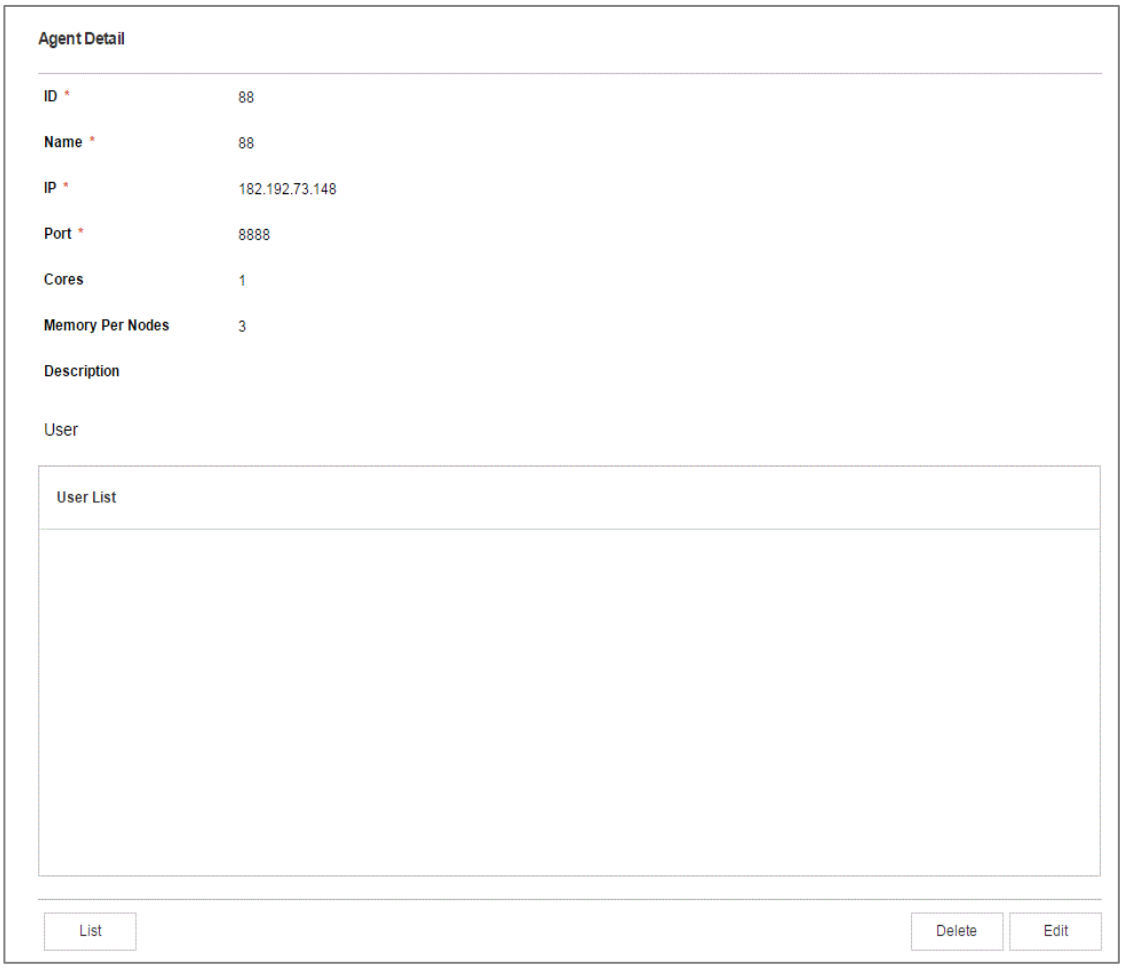

[Figure 5.7-26] Agent Detail Screen

5.7.4.3 Modify an Agent

A. If you select a particular agent in Agent screen, you are redirected to Agent Detail screen. Click **Edit** button in the corresponding screen, modify the content, and click **Save** button.

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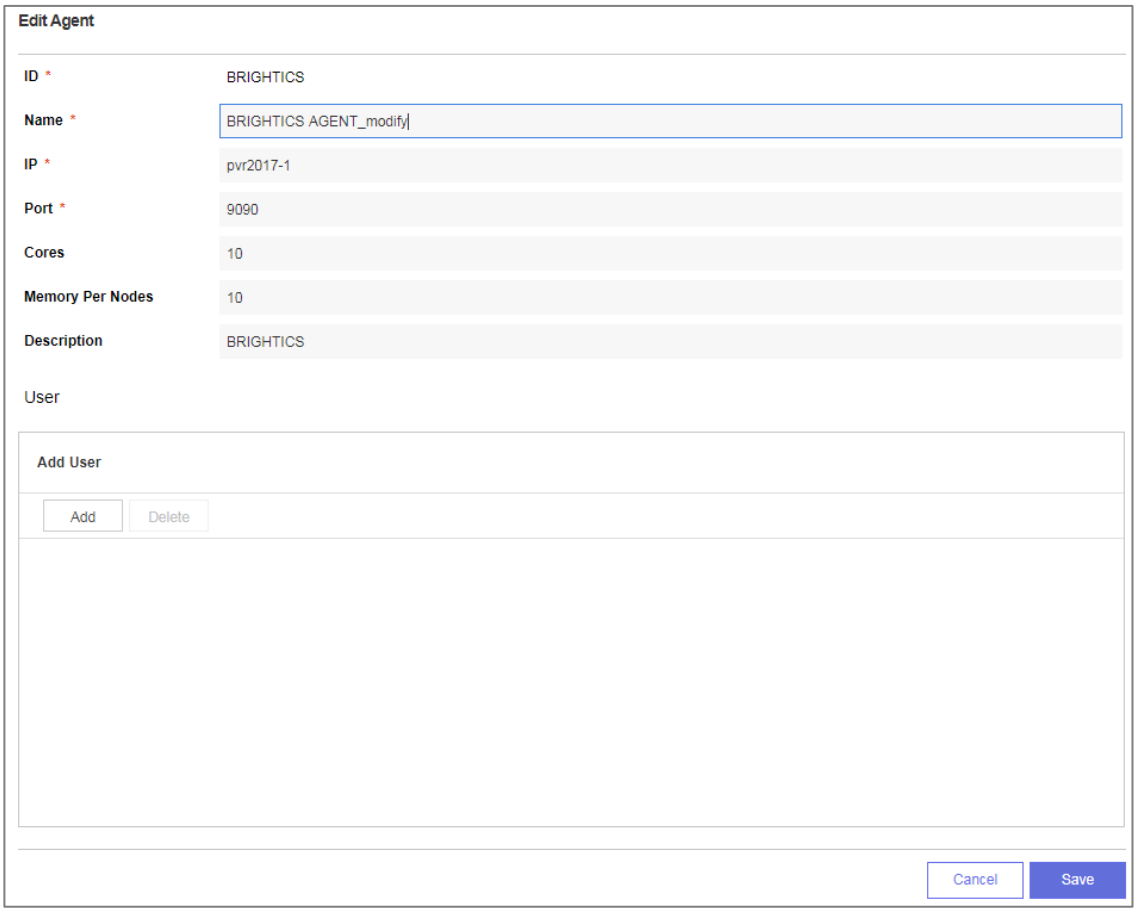
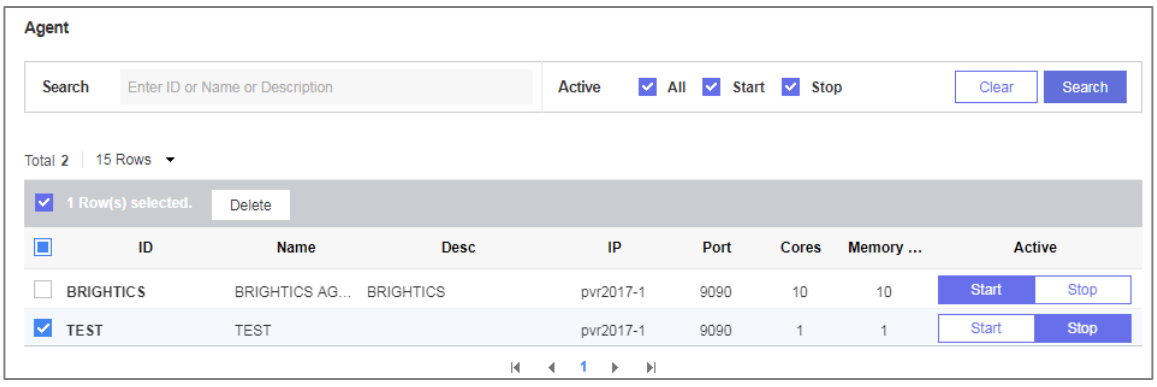


[Figure 5.7-27] Edit Agent Screen

5.7.4.4 Delete an Agent

A. Click the check box of the to-be-deleted agent in Agent screen and click **Delete** button.



[Figure 5.7-28] Select to-be-deleted Agent and Click **Delete** Button

B. If you click **Delete** button, delete confirmaton alert window pops up. If you click **OK** button, the concerned agent is deleted.

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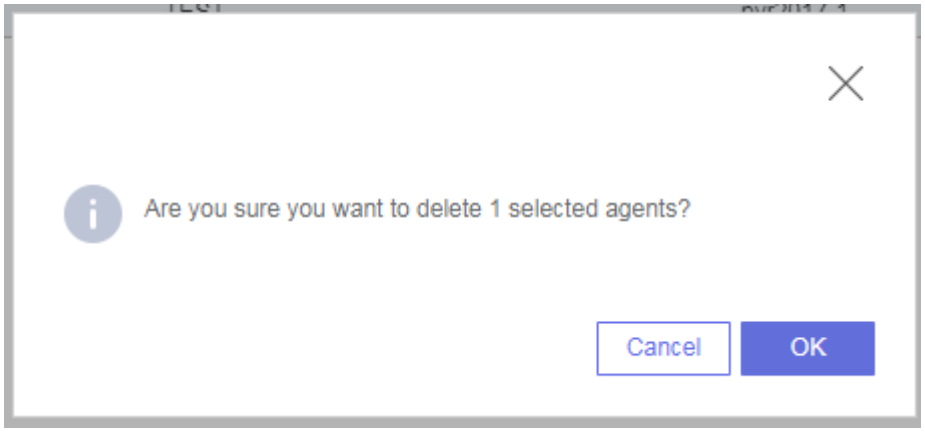
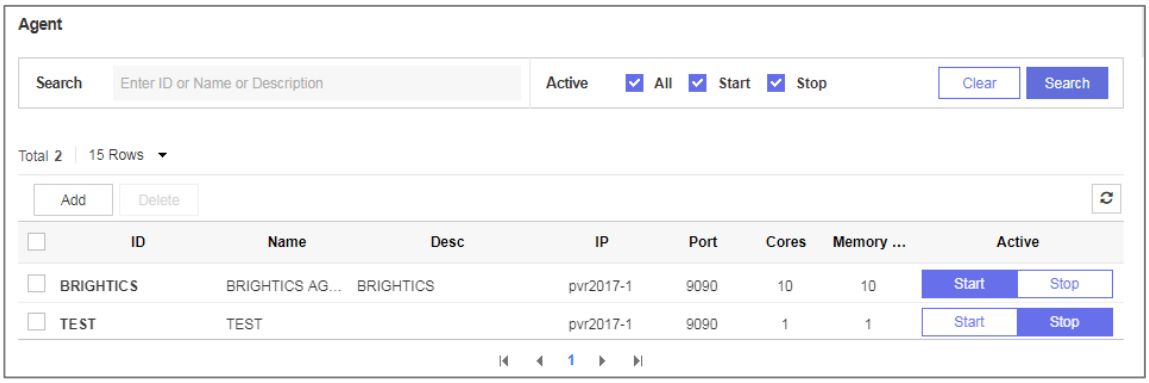


[Figure 5.7-29] Click **OK** Button

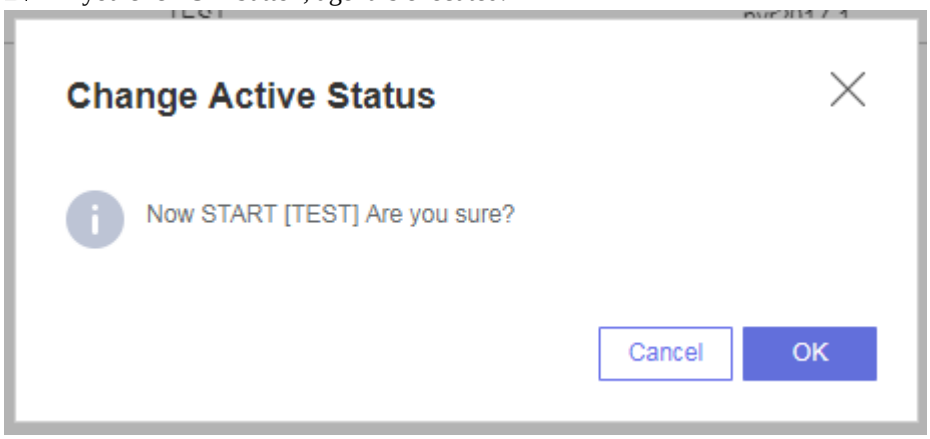
5.7.4.5 Execute an Agent

A. Click **Start** button of the agent which is currently in STOP mode.



[Figure 5.7-30] Click **Start** Button

B. If you click **OK** button, agent is executed.



[Figure 5.7-31] Click **OK** button

5.7.4.6 Stop an Agent

A. Click **Stop** button of the agent which is currently in START mode

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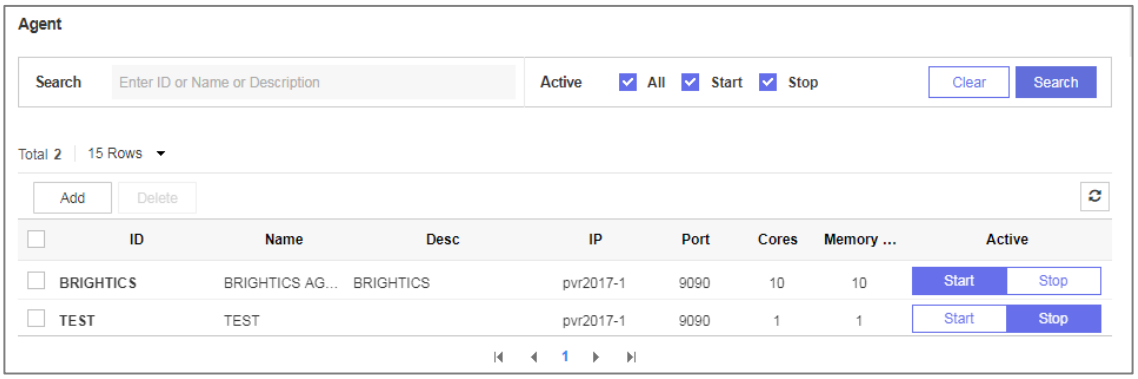
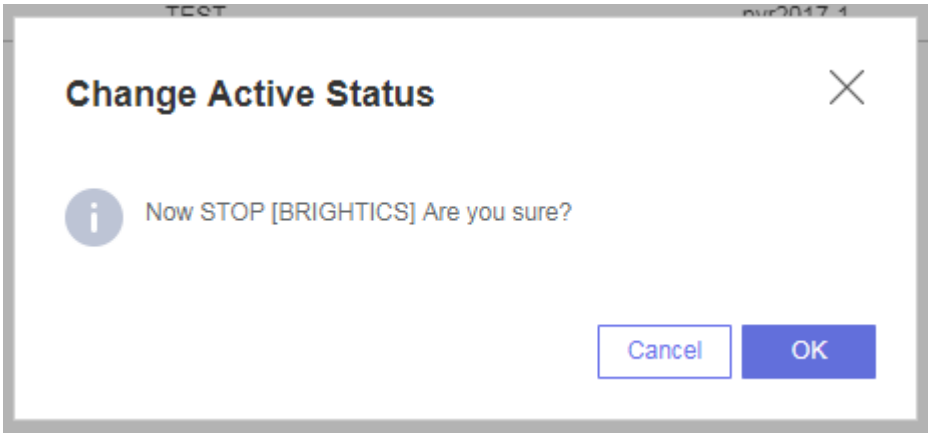


[Figure 5.7-32] Click **Stop** Button

B. If you click **OK** button, agent is stopped.



[Figure 5.7-33] Click **OK** Button

5.7.5 Model Deploy

5.7.5.1 Delete Deploy

A. Click the check box of to-be-deleted deploy in Deploy screen and click **Delete** button.

[Figure 5.7-34] Select to-be-deleted Deploy and Click **Delete** Button

B. If you click **OK** button, it is deleted

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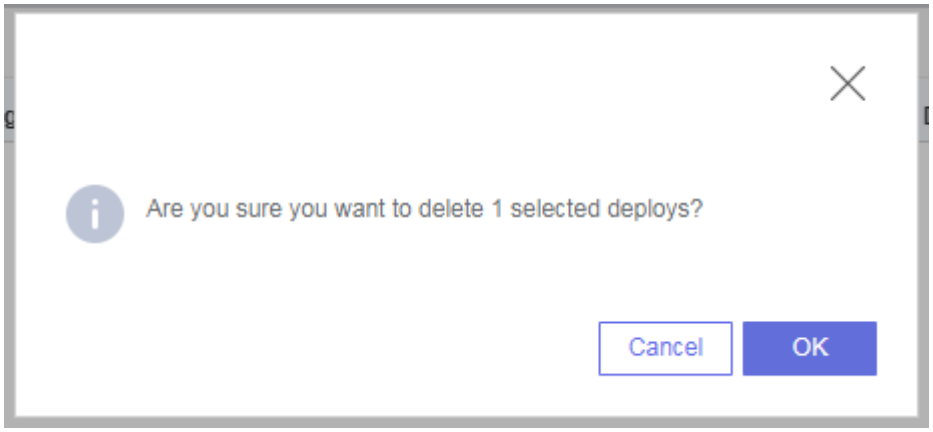
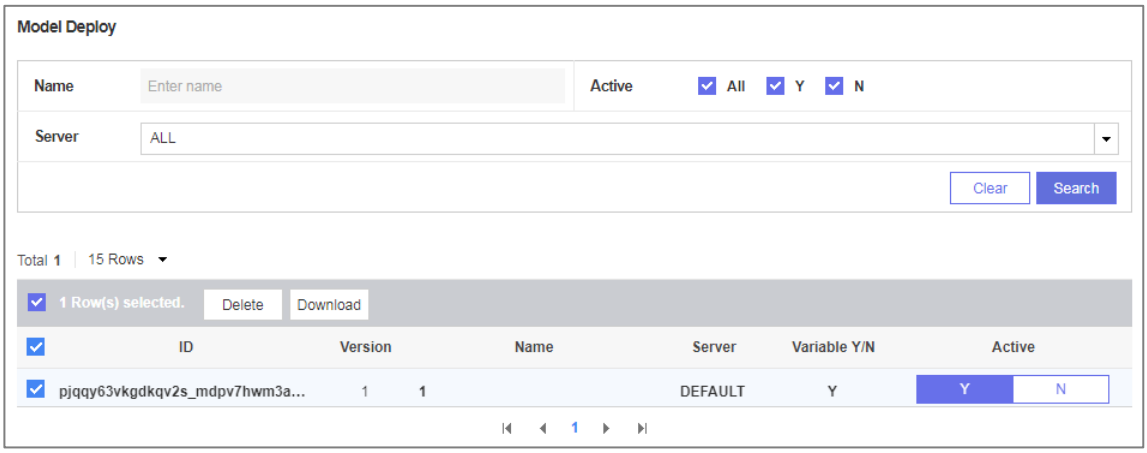


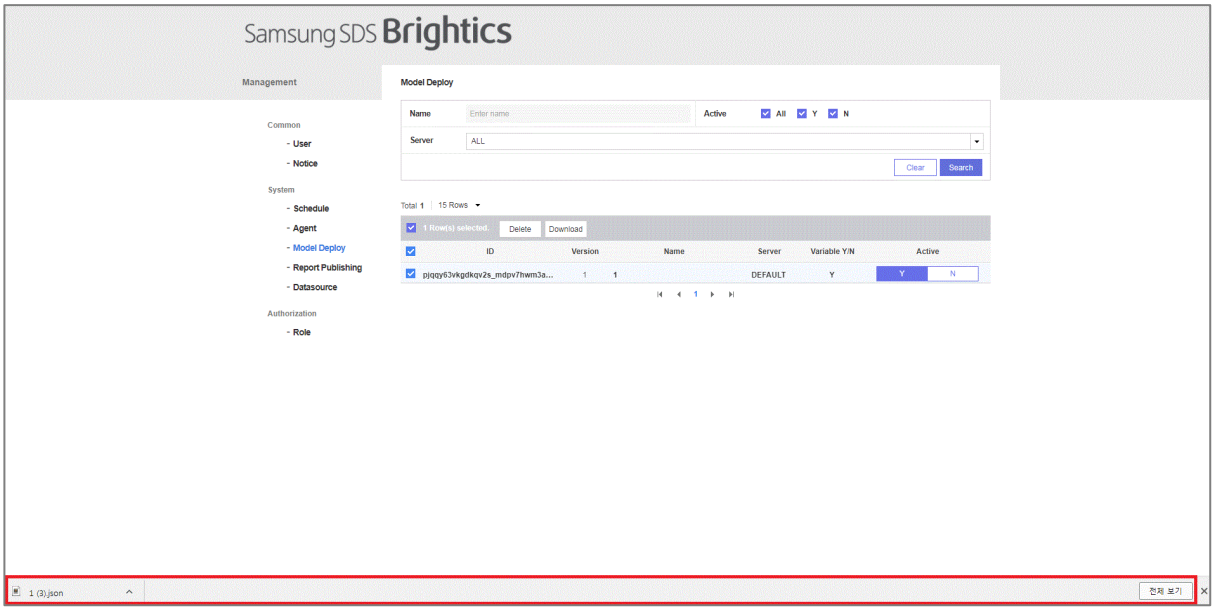
[Figure 5.7-35] Click **OK** Button

5.7.5.2 Download Deploy

A. Click the check box of to-be-downloaded deploy in Deploy screen and click **Download** button.



[Figure 5.7-36] Select to-be-downloaded Deploy and Click **Download** Button



[Figure 5.7-37] Verify the Downloaded JSON File

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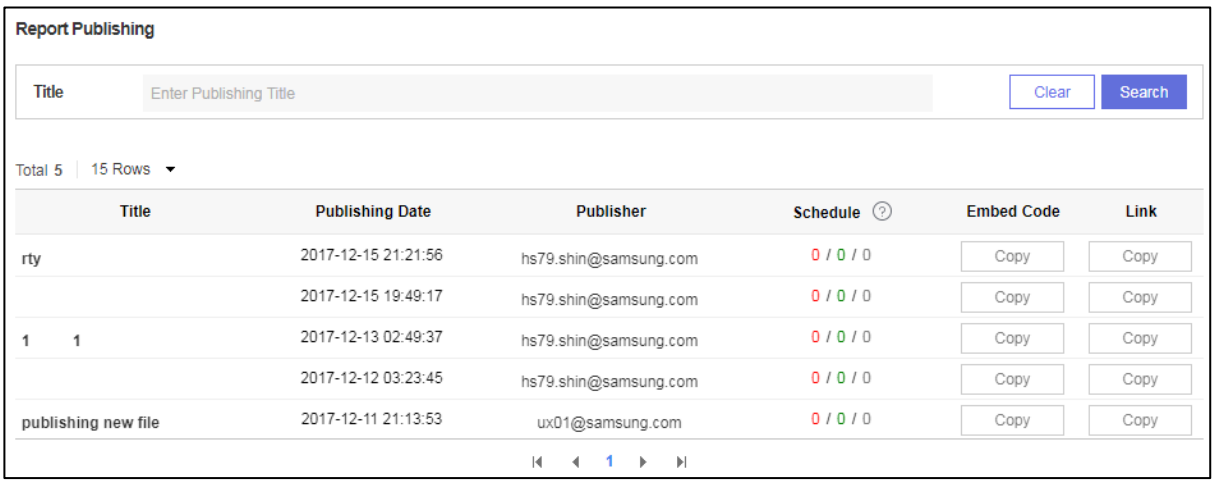
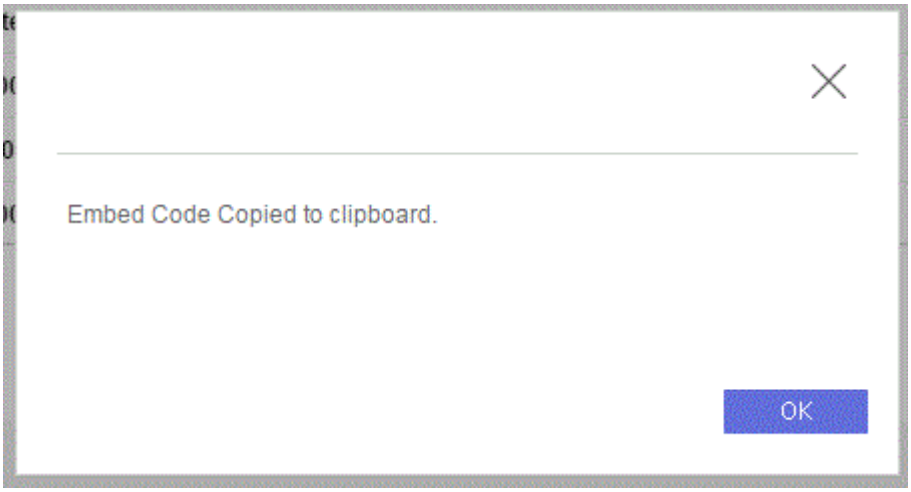
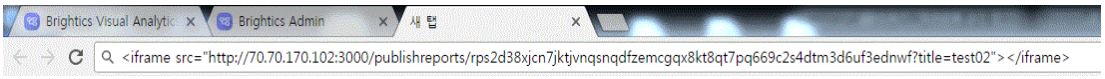
5.7.6 Publish



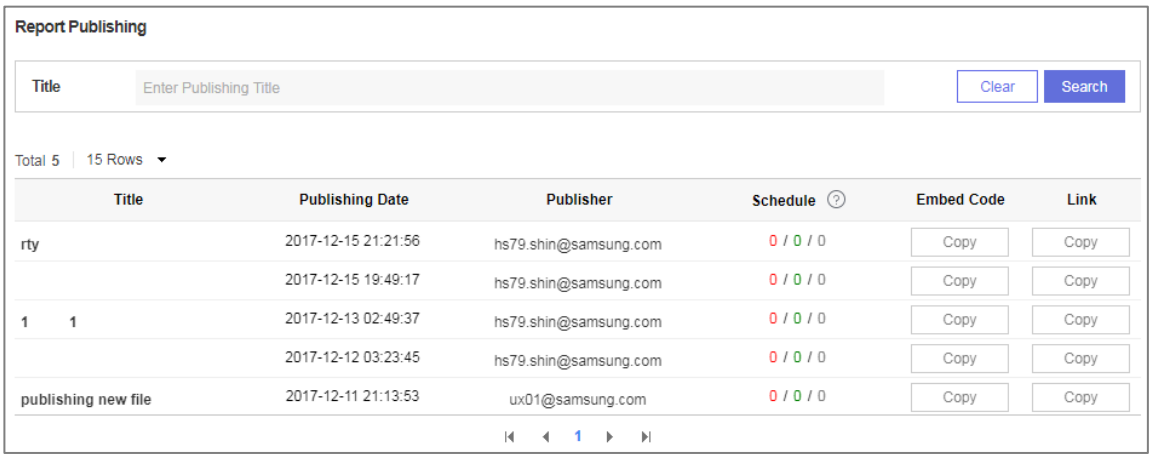
[Figure 5.7-38] Click **Embed Code** in Report Publish Screen



[Figure 5.7-39] Window to Confirm Embed Code Click



[Figure 5.7-40] Verify Embed Code Copied onto Clipboard with Ctrl + V either in New Tab or Memo Pad



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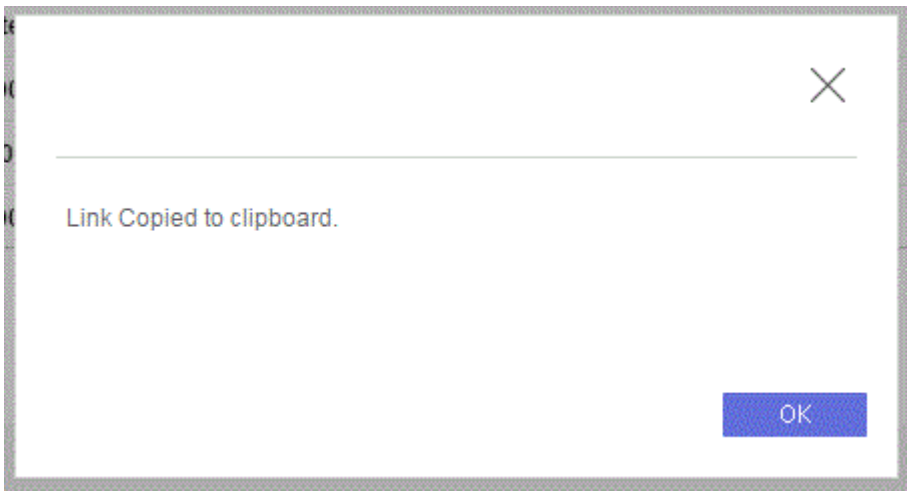
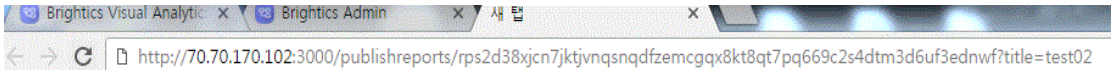
[Figure 5.7-41] Click **Link** Button in Report Publish Screen



[Figure 5.7-42] Window to Confirm Copied Link

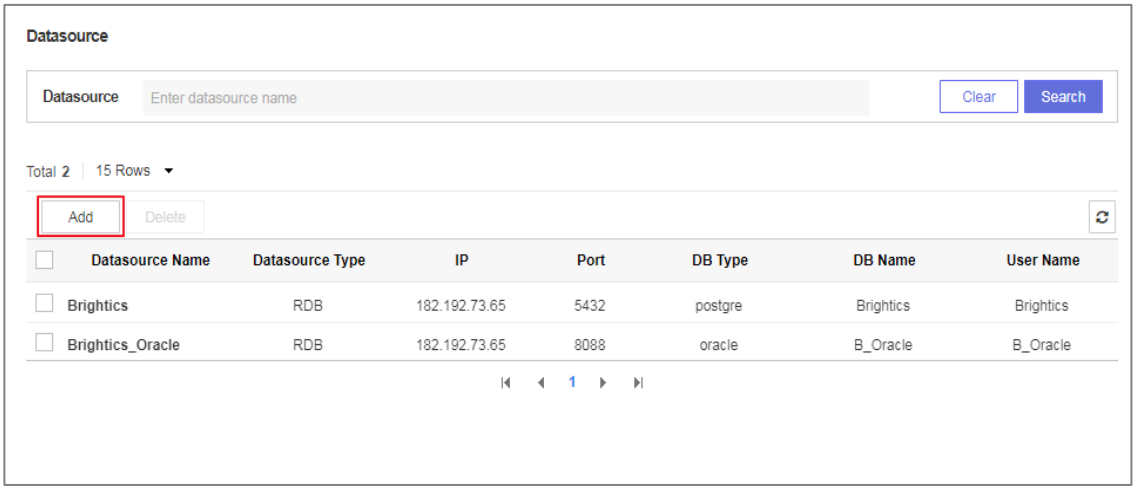


[Figure 5.7-43] Confirm the Link Copied onto Clipboard with Ctrl + V in the New Tab

5.7.7 Datasource

5.7.7.1 Create Datasource

A. Click **Add** button in Datasource management screen.



[Figure 5.7-43] Click **Add** Button to Move to Datasource Create Screen

B. Enter details of Datasource and click **Save** button.

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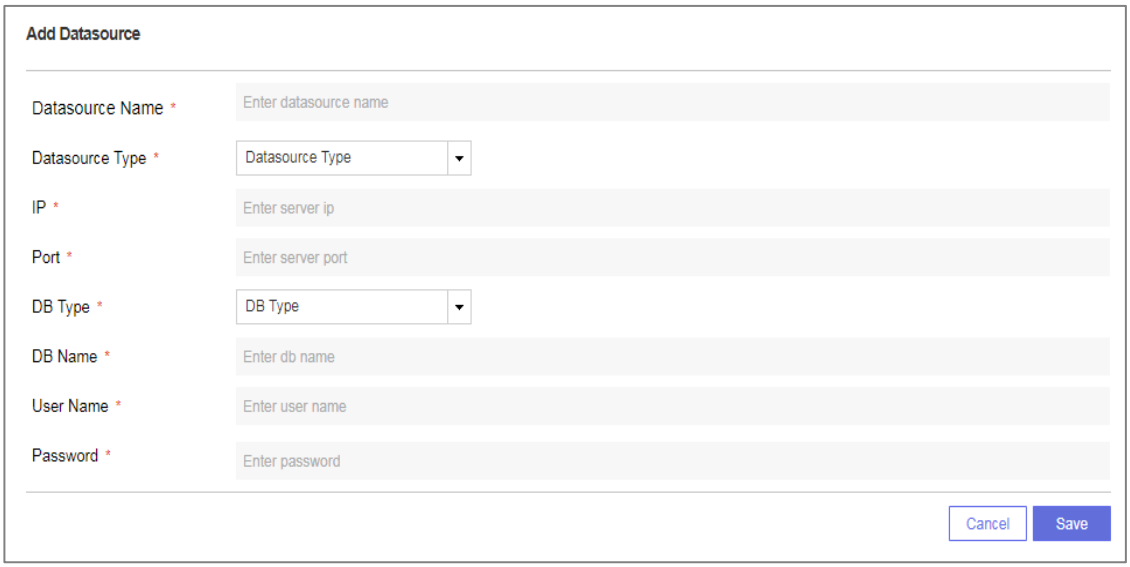
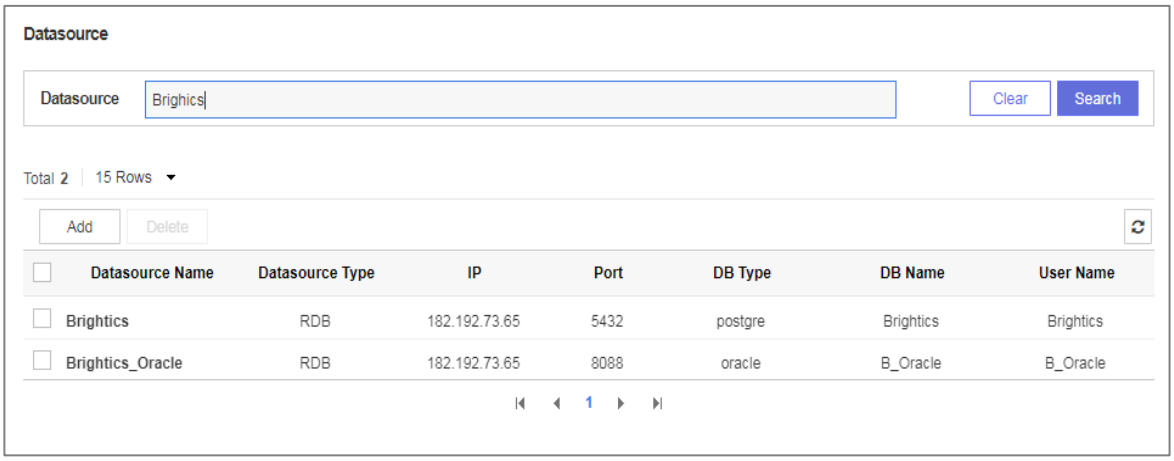


[Figure 5.7-44] Click **Save** Button to Create Datasource

5.7.7.2 Lookup Datasource

A. Enter Datasource you want to look up in search window of Datasource management screen.



[Figure 5.7-45] Datasource Search Screen

B. Click the searched Datasource and verify the Datasource information concerned.

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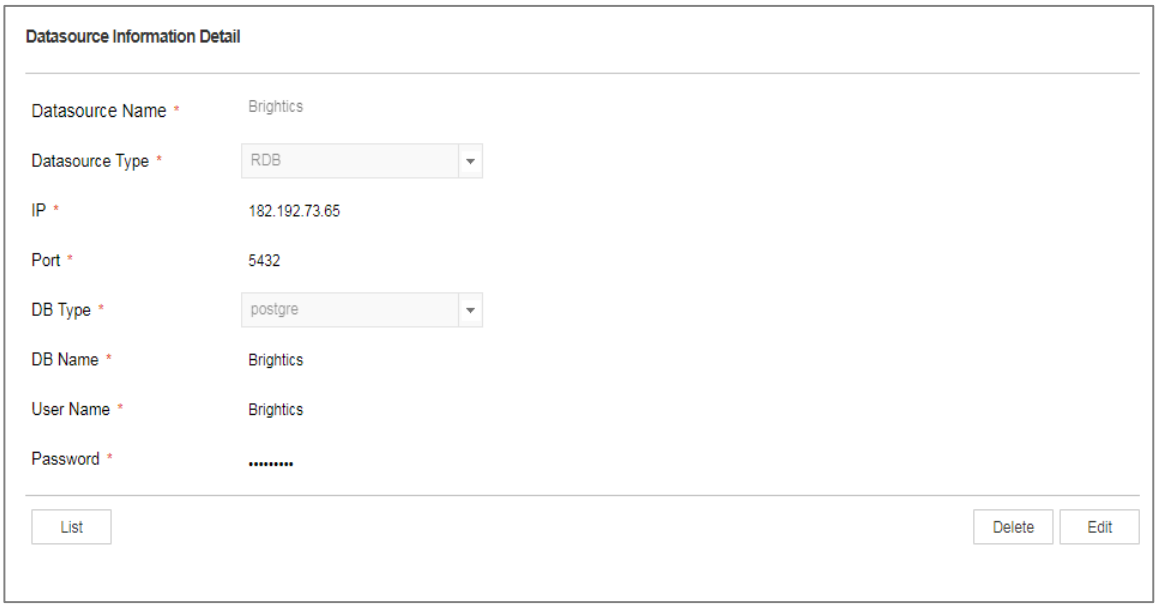
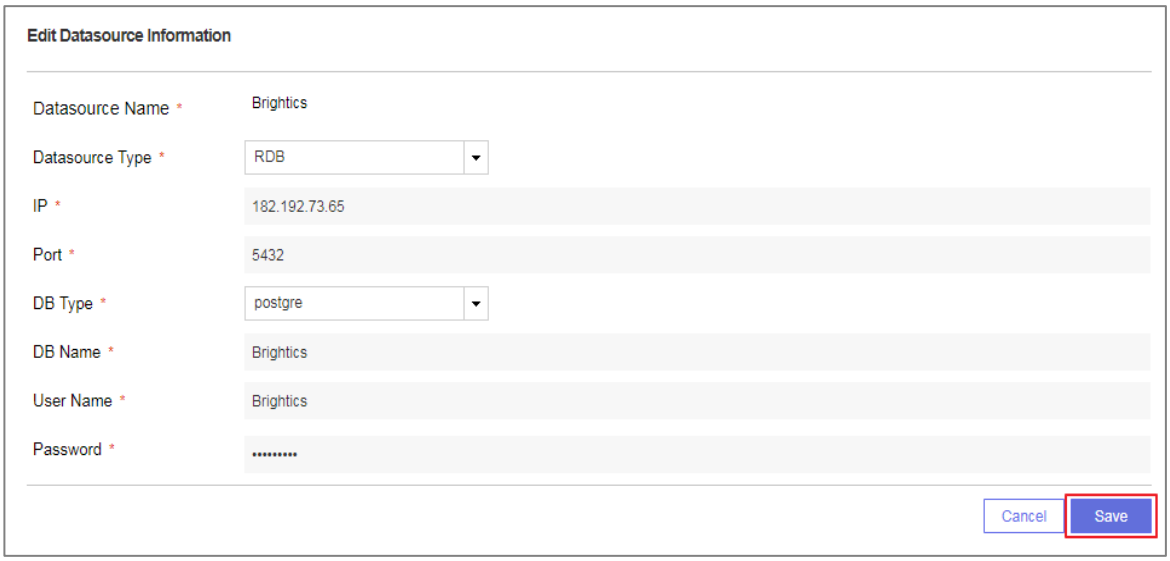


[Figure 5.7-46] Datasource Detail Screen

5.7.7.3 Modfiy Datasource

A. If you select a particular Datasource in Datasource screen, you are redirected to Datasource Detail screen. Click **Edit** button in that corresponding screen. Modify the contents and click **Save** button.



[Figure 5.7-47] Edit Datasource Screen

5.7.7.4 Delete Datasource

C. Click the checkbox of to-be-deleted Datasource in Datasource screen, and click **Delete** button.

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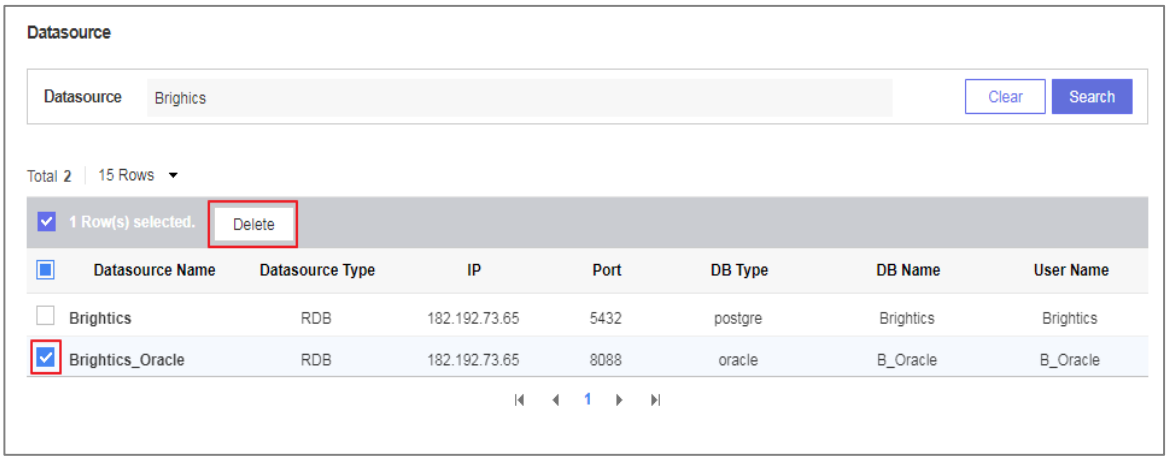
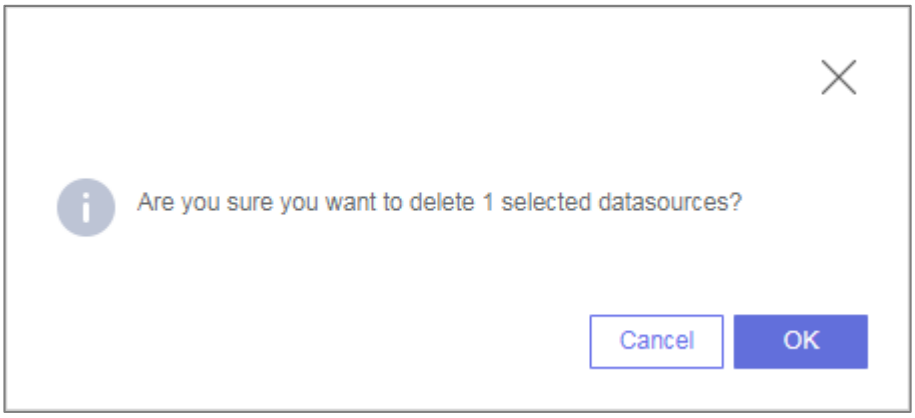


[Figure 5.7-48] When To-be-deleted Datasource is Selected and **Delete** Button is Clicked

D. If you click **Delete** button, alert window to confirm the deletion appears. If you click **OK** button, corresponding Datasource is deleted.



[Figure 5.7-49] **OK** 버튼을 클릭할 경우 When **OK** Button is Clicked

5.7.8 Role

5.7.8.1 Create a Role

A. Select one privilege among Administrator/Power User/General User that you want to add to Role management screen

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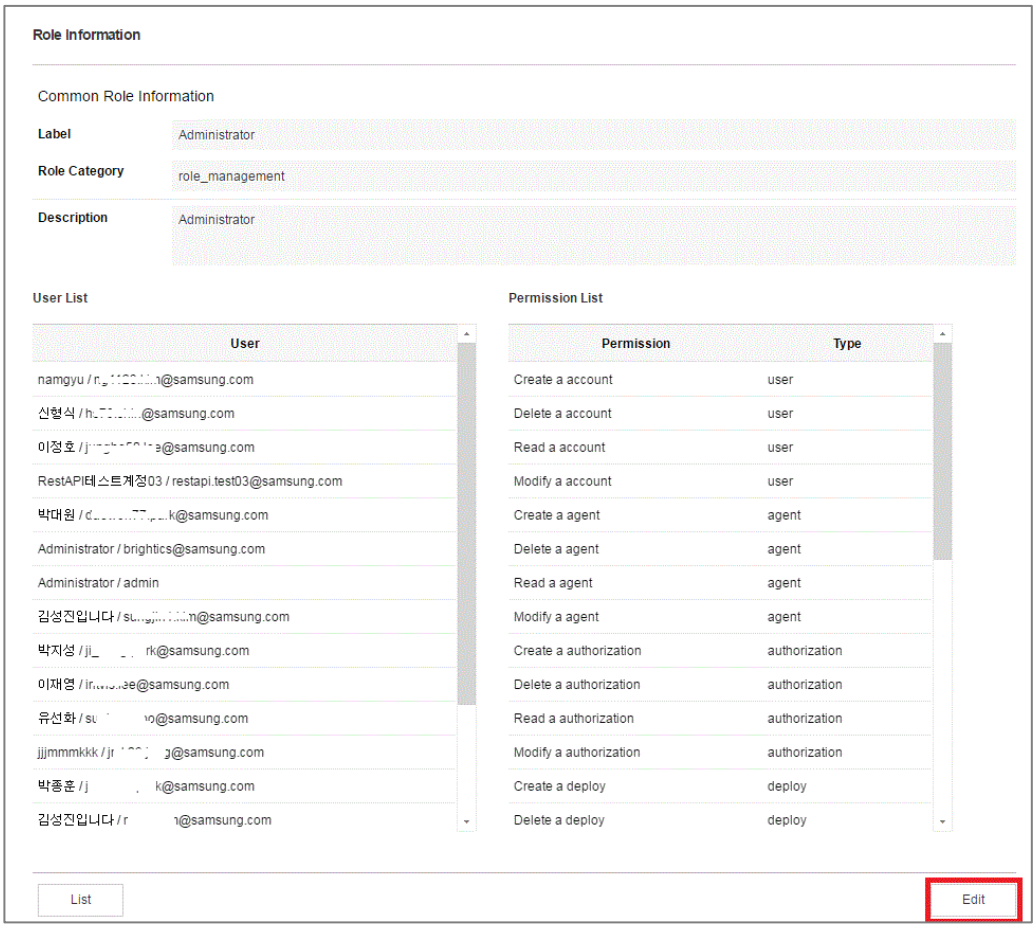
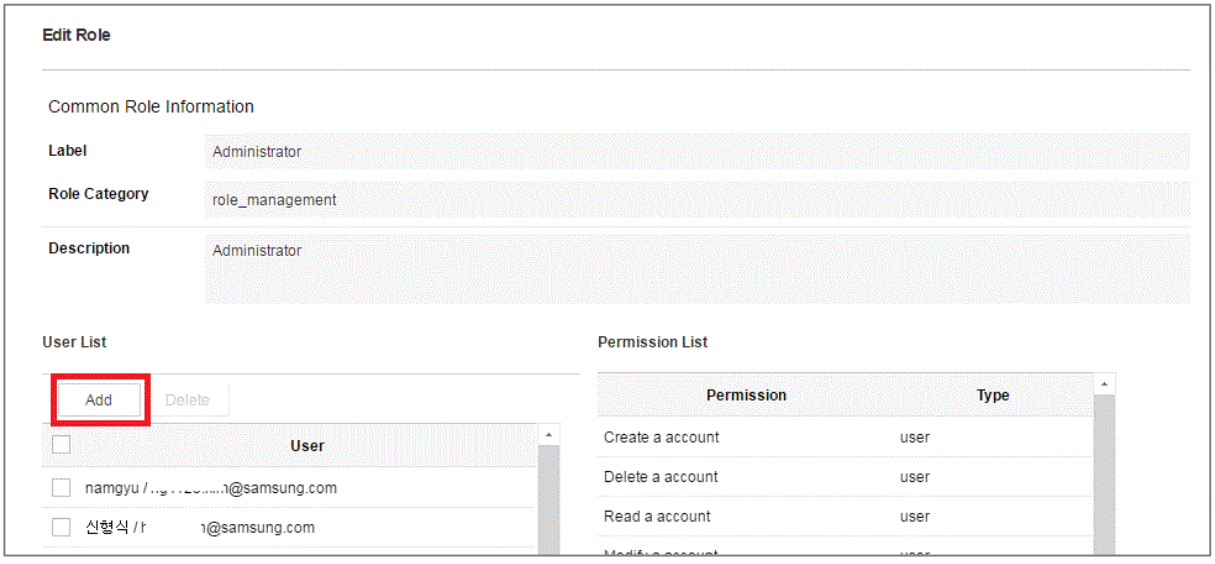


[Figure 5.7-50] Screen Shown When You Click Administrator in Role Management Screen

B. Click **Edit** button.



[Figure 5.7-51] Screen Shown When You Click **Edit** Button

C. Click **Add** button in Edit Role screen where Administrator privilege can be given. Look up the user that you want to give a privilege to and click **Add** button again.

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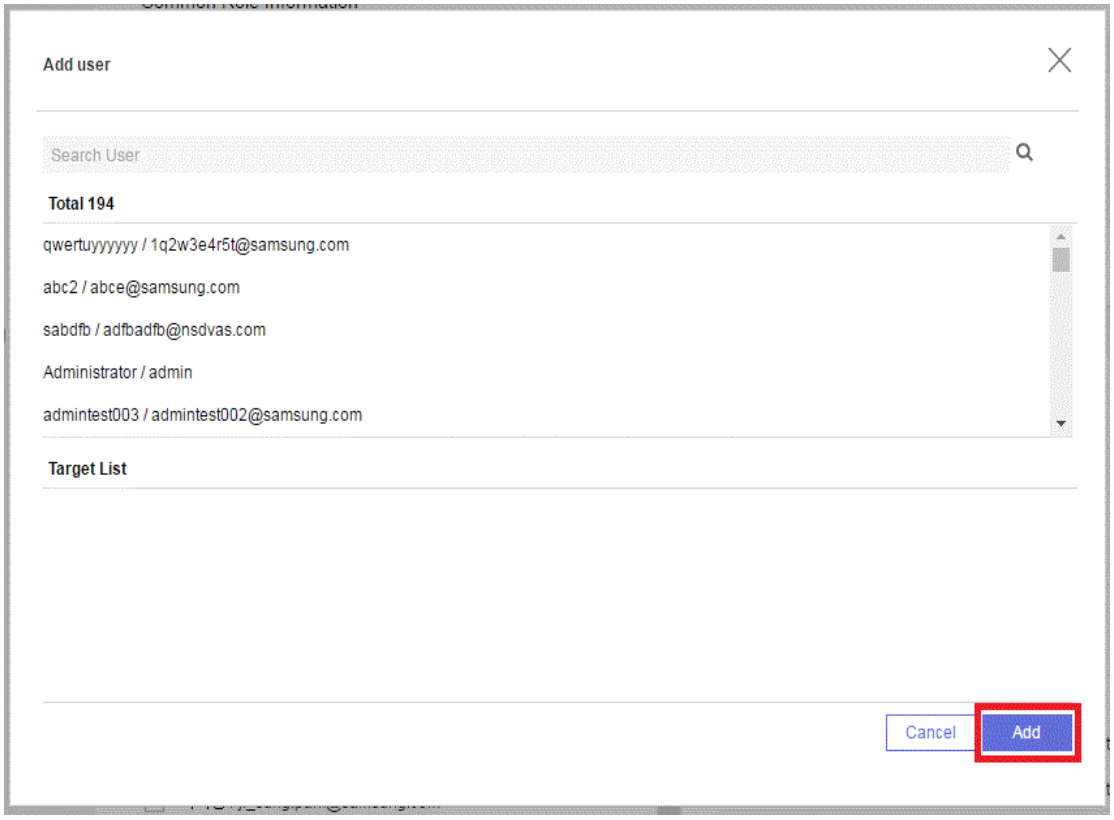
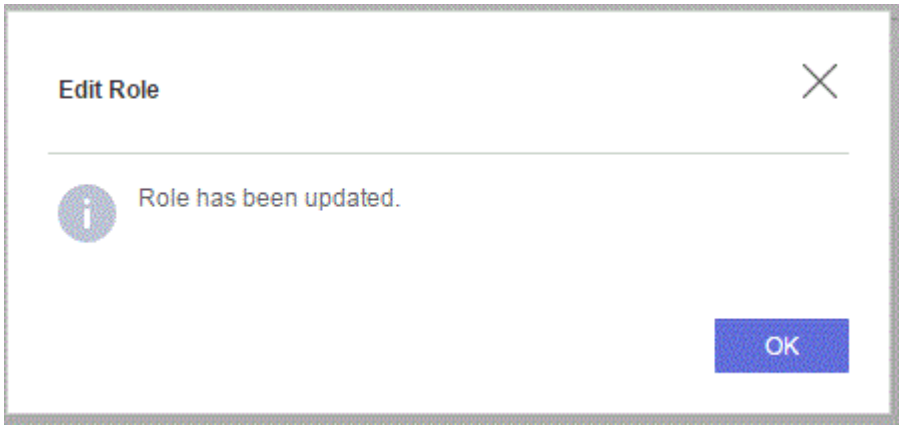


[Figure 5.7-52] Add User Screen

D. If you click **Save** button, update confirmation window pops up. Click **OK** button.



[Figure 5.7-53] Role Save Complete Screen

Note	Privilege creation method is identical for Administrator/Power User/General User.

5.7.8.2 Delete a Role

A. If you select the user whose role you want to delete in Edit Role window, **Delete** button is enabled.

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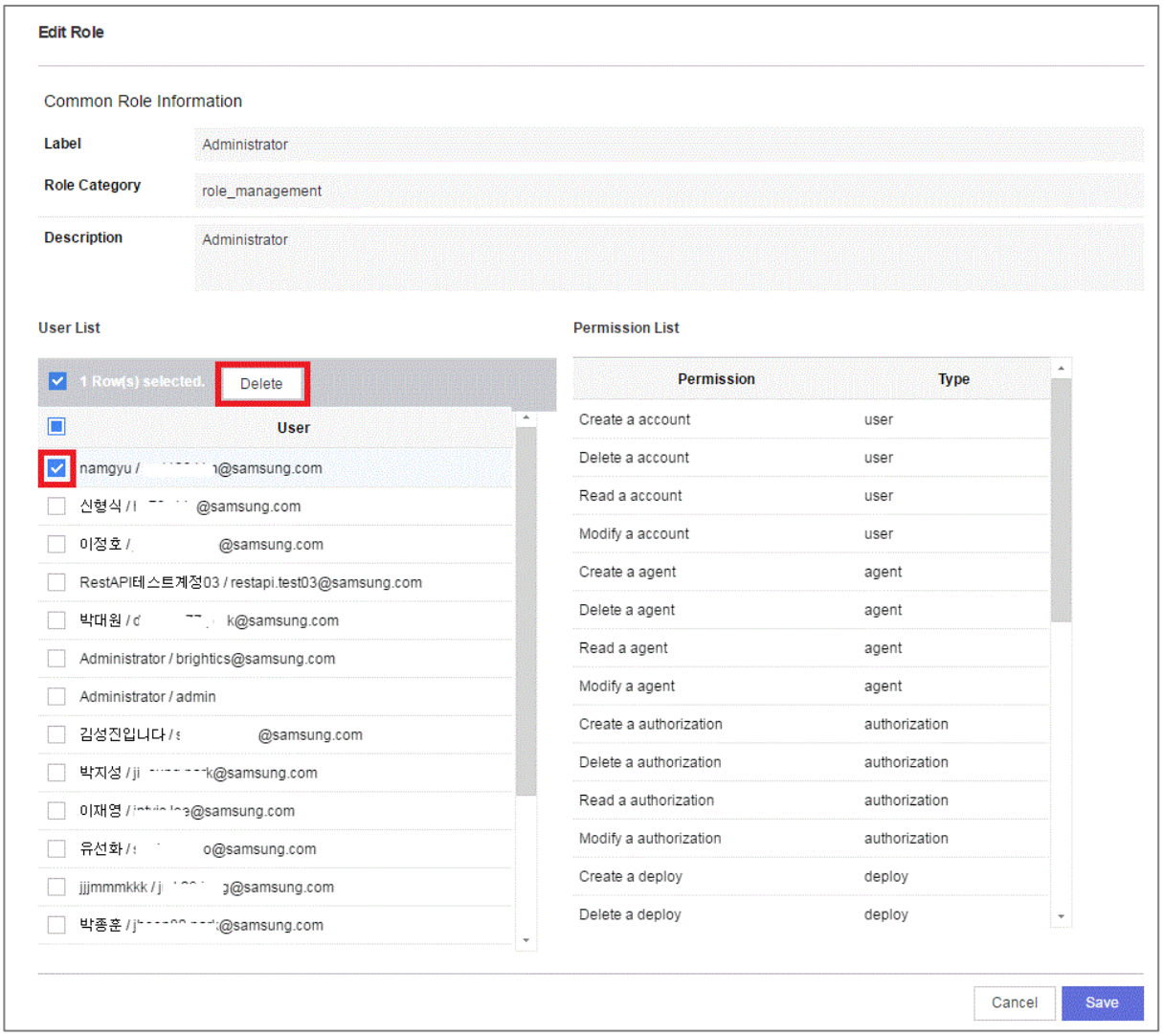

[Figure 5.7-54] Screen Shown When the User whose Privilege will be Deleted is Selected

B. After clicking **Delete** button, click **Save** button to save changes.

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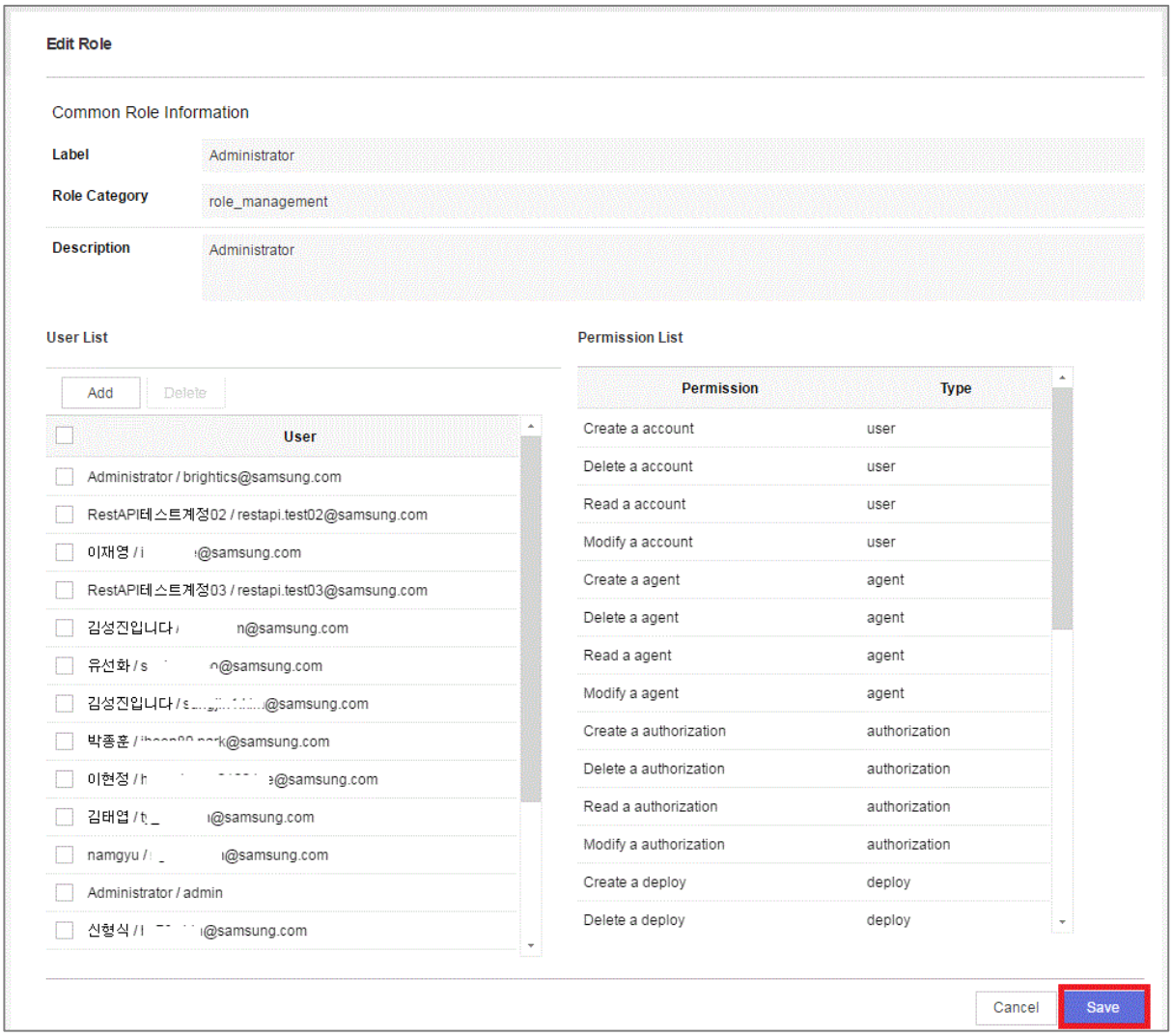
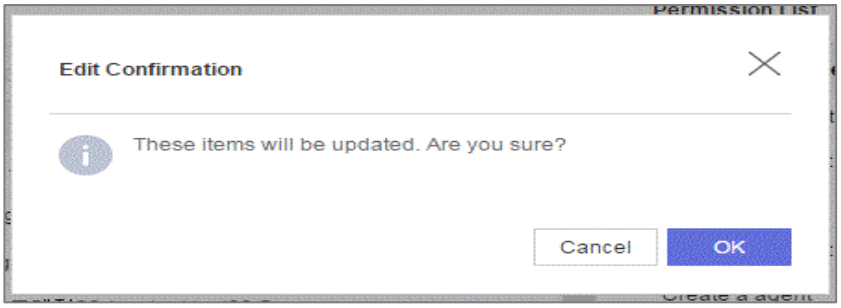


[Figure 5.7-55] Screen shown when **Delete** Button is Clicked

C. You have to click **Save** button in order to finally reflect the changes. When delete confirmation window appears, click **OK** button to complete the deletion.



[Figure 5.7-56] Edit Confirmation Window

6 References

This chapter provides an overview of functions of Brightics 3.0 Suite Visual Analytics. For detailed explanation and examples, please refer to Help part of each function. (Click ⓘ button of Property Panel)

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6.1 I/O Functions

Name	Description
Load	Load Data
Unload	Upload Data
Create Table	Create Data from input values

[Diagram 6.1-1] I/O Function List

6.2 Manipulation Functions

Name	Description
Change Column Name	Change the Column name.
Capitalize Column Name	Change the Column name either to upper case or lower case.
Extend Datetime	In case there is non-continuous Datetime value for the entered unit among Datatime column in ascending order, fill a new row by estimating the Datetime value to ensure that Datetime has continuous values before and behind.
Replace Missing Number	Fill missing values (support Number Type)
Replace Missing String	Fill missing values (support String Type)
Filter	Select the Data that meets conditions.
Function Filter	Count the frequency of one-dimensional or two-dimensional (matrix) variables
Length Filter	Select the Data that meets String length condition.
Outlier Removal	Remove outliers.
String Filter	Select a particular string data.
Independent Filter	Leave only the columns that have no linear correlation among given columns and delete rest of the columns (ex: overlapping column)
Sort	Lay out designated columns in ascending/descending order.
Time Series Distance	Calculate the distance between time series through various methods.
Update Column	Update the selected column data value for the row that meets the condition with designated value.
Elementwise Product	Calculate Hadamard product either by entering two matrices or one matrix and vector.

[Diagram 6.2-1] Manipulation Function List

6.3 Statistics Functions

Name	Description
Association Rule	Analyze the relationship between the two items
Correlation	Analyze whether two variables have any linear relationship.
Frequency	Calculate frequency and percentage of Group By-designated column by class
Frequency (Matrix-Type)	Count the frequency of one-dimensional or two-dimensional (matrix) variables
Statistic Derivation	Add the statistics information of the column selected in the Table as derived variable
Statistic Summary	Show the summarized version of the statistics information of the column selected in the Table
Kernel Density Estimation	Use the kernel function of the given data to calculate the probability density function.

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Name	Description
Chi Square Test	Confirm whether the Data has an existing assumed distribution or whether two variables are independent of each other through Chi-Square distribution
ANOVA	Analyze the differences among group means and their associated procedures (such as “variation” among and between groups)
Log Likelihood Ratio Test	Conduct a test for the accuracy of the model created by Generalized Linear Model (GLM) function using loglikelihood value.
Log Likelihood Ratio Test For LR	A function to test the accuracy of the model created by Generalized Linear Model (GLM) function using loglikelihood value, which is applicable only to Logistic Regression model and pre-defined particular input table format.
T-Test	Validate whether pair columns of the Data has the same mean through T-distribution.

[Diagram 6.3-1] Statistics Function list

6.4 Transform Functions

Name	Description
Type Cast	Change the Type (String, Double, Integer) of the designated column.
Select Column	Re-configure and create a table in the order of the column entered.
Join	Join two tables. Support joining of Inner, left_outer, right_outer, full_outer, left_exclude, and right_exclude. Baseline column used for join has alias value as prefix and located in the first column.
Bind Column	Create a table by arranging two tables in a horizontal manner. (So that the number of column increases). It is similar to cbind of R.
Distinct	Select the deduplicated Data.
Delete Missing Data	Convert abnormal value into entered value.
Bind Row	Create a table by arranging n number of table in a vertical manner. (So that the number of row increases). It is similar to rbind of R.
Power Bind Row	Create a table by arranging two tables in a vertical manner. (So that the number of row increases). It is different from BindRow in that it is possible to Bind two tables with different columns because all values for the column is filled with null value unless column in the other table exists in one table.
Pivot	Summarize the Data using Pivot Table. You can change vertically-arranged Data into horizontally-arranged Data.
Stratified Sampling	Divide the population into several strata to avoid overlap and extract the sample from each stratum.
Random Sampling	In simple random sampling, sample is extracted in a way in which each element or case of the population has an identical chance of being selected as a sample.
Transpose Time Series	Put values of double columns or double array column in a certain order and combine them into one long time series data.
Split Data	Create multiple tables by splitting the table according to the ratio entered. The Data is selected on a random basis during the Split process.
SVD	Calculate the SVD of the given matrix.
Refine Data	Pre-process the Data through Add Column, Change Value, Select Column, Simple Filter, Advanced Filter, Sorter, and Group-by function.
QR Decomposition	Calculate QR-decomposition of the given matrix.
PCA	Carry out PCA (principal component analysis) for the given data.
Transpose	Transpose Data frame.

[Diagram 6.4-1] Transform Function List

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6.5 Extraction Functions

Name	Description
Column To Array	Change Column to array.
Array To Columns	Change Array to column.
Bucketizer	Change continuous Data into discrete Data expressed as ‘n’ number of bucket using split information.
Index To String	Re-convert a column of label indices into a column containing the original labels as strings.
Discretize Quantile	Sort particular column values in ascending order and discretize them into bucket-number.
Remove String Variable	Remove the designated string within the selected column and add derived column
Replace Numeric Variable	Change number type column value according to the designated method
Replace String Variable	Change string type column value according to the designated method
Trim Variable	Get rid of the null empty value from the selected column value.
Capitalize Variable	Change the name of the selected column to upper/lower case.
Add String Length	Create string length of the selected String type column value as derived column.
Add Function Column	Derived variable values are configured according to predefined formula and added as a new column
Add Row Number	Derived variable to which Row Index was assigned is added.
Add Column	Derived variable values are configured according to conditional expression and added as a new column
Decompose Datetime	Year/month/date/hour/week values are extracted from Datetime value and added as a derived variable.
Datetime Formatter	Change the format of the column with Datetime format to another format.
Compare Datetime	Calculate the difference in years, months, days, weeks and milliseconds between the column with a particular Datetime format that exists in the table, column with another Datetime format or value with a Datetime format that the User entered, and add the difference as derived variable.
One Hot Encoder	Change the value of index label column into the column format of binary vector in which the value corresponding to the index is 1.
EWMA	Calculate exponential weighted moving average of the selected column and add it as a derived variable
Moving Average	Calculate Moving Average value and store it into the new column
Normalization	Normalize the Data value in the selected column and add it as a derived variable
Shift Datetime	Shift to entered Datetime.
Polynomial Expansion	Perform polynomial expansion of degree 2 in a polynomial space.
String Indexer	Assign a number to each string starting with 0 (zero) and increasing by 1 (one) according to the frequency of the string.
Binarizer	Compare the entered column values with threshold value. If it is greater than the threshold, calculate 1, and if it is less than or equal to the threshold, calculate 0. And add it as derived variable.
String Split	Split the string with delimiter and change it into array type or multi-column.
Add Lead Lag	Provide Lead and Lag function of SQL.

[Diagram 6.5-1] Extraction Function List

6.6 Regression Functions

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Name	Description
Linear Regression Train	Produce the modeling result for linear correlation between dependent variable y and more than one independent variable X (or explanatory variable)
Linear Regression Predict	Accept input of LinearRegressionTrain result, which is regression analysis method that creates a model for linear correlation between dependent variable y and more than one independent variable X, and predict based upon it.
Isotonic Regression Train	Create Isotonic Regression model for the given data.
Isotonic Regression Predict	Predict result value of the data using the model created in Isotonic Regression Train.
GLM Train	Predict the result of relationship between dependent variable y and more than one independent variable X based upon Gaussian, Binomial and Poisson model.
GLM Train For Logistic Regression	As a GLM function to process Logistic Regression's input file in special format, it predicts the result of Binomial model.

[Diagram 6.6-1] Regression Function List

6.7 Classification Functions

Name	Description
Decision Tree Train	Produce Decision tree model leveraging Decision tree method.
Decision Tree Predict	Predict the result of new data using decision tree learning-based model.
Decision Tree Cart Train	Conduct classification or regression training based upon CART method.
Decision Tree Cart Predict	Predict class or value using Decision Tree Cart Train result.
K-nearest neighbors	K-nearest neighbors. As one of the classification methods, it estimates to which class a given feature vector belongs. Find out the distance between the feature vector of test data and feature vectors of all train data, and take a look at the classes to which k-number of train-feature vectors that are near to this test-feature vector belong. Assume that the most frequent class value is the class value of this test-feature vector.
Naive Bayes Train	As one of the classification methods, it estimates the class value of feature vector through probability classifier obtained through addition of assumption that all feature vectors are mutually independent of one another on top of Bayes' theorem's conditional probability. NaiveBayesTrain creates NaiveBayesModel from NaiveBayerTest by entering Train data.
Naive Bayes Predict	Estimate the class value of test-feature vector by entering test data into NaiveBayes Model obtained from NaiveBayesTrain.
Logistic Regression Train	Produce a model that predicts whether a certain event will happen or not leveraging linear combination of independent variables.
Logistic Regression Predict	Predict the result of new Data by leveraging the model produced from Logistic regression train.
SVM Train	Support Vector Machine. Produce a model that decides which category the new data belongs to based upon the given data set.
SVM Predict	Support Vector Machine. Decides which category the new data belongs to based upon the given data set.
Random Forest Train	Produce multiple Decision Trees from the given Data.
Random Forest Predict	Predict the result based upon the model created from multiple Decision Trees configured during the training process.
One vs Rest LR Classifier Train	Produce multi-class classification model by extending Logistic Regression through One-vs-Rest method.
One vs Rest LR Classifier Predict	Classify new Data using OneVsRestLRClassifierTrain modeling result.

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[Diagram 6.7-1] Classification Function List

6.8 Evaluation Functions

Name	Description
Evaluate Regression	Regression analysis is used to predict continuous input variable from independent variable
Evaluate Binary Classification	Accuracy can be checked through comparison of score (probability) resulting from Binary Classification with actual output (0/1).
Evaluate Multiclass Classification	Accuracy can be checked through comparison of categorical data resulting from Classification with actual output.
Duncan Test	This function is used to verify and decide whether there is a significant difference between the average of a particular data set and the average of other Data group.
Evaluate Ranking Algorithm	Evaluate the result produced from Ranking Algorithm. (calculate precision at k, MAP, ndcg at k value)

[Diagram 6.8-1] Evaluation Function list

6.9 Clustering Functions

Name	Description
Gaussian Mixture Train	Represent probability distribution of entire group using multiple Gaussian distribution.
Gaussian Mixture Predict	Predict the result from the model which used multiple Gaussian distributions configured during training process.
K-means	Analyze cluster through K-means algorithm.
Hierarchical Clustering	Conduct Hierarchical Clustering in which the nearest-neighbor clusters are combined in a bottom-up manner.
Hierarchical Clustering Post Process	Check the Hierarchical Clustering result and put cluster label in line with the desired number of cluster.
Power Iteration Clustering	Calculate the cluster value of each dot by clustering similar dots based upon similarity value between dots

[Diagram 6.9-1] Clustering Function list

6.10 Recommendation Functions

Name	Description
ALS Train	Calculate the result of recommended model (calculate latentfactors value) using ALS (alternating least squares) algorithm.
ALS Recommend	Either recommend a list of top-N item by User leveraging ALS modeling result or predict rating of the given User-item.

[Diagram 6.10-1] Recommendation Function List

6.11 Time Series Functions

Name	Description
Auto ARIMA Train	Automatically extract ARIMA model of the time series Data concerned.
Auto ARIMA Predict	Predict the following Data leveraging automatically extracted ARIMA model.
ARIMA Train	Extract ARIMA model of the time series Data concerned.
ARIMA Predict	Predict the following data leveraging the extracted ARIMA model.
Kalman Filter	A filter which recursively processes the input data that includes noise can conduct an optimal statistical prediction of the current state
Holt-Winters Train	Create an optimal Holt-Winters model for the time series data given.

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Name	Description
Holt-Winters Predict	Predict the result value of the data leveraging the model created in HoltWintersTrain.
Time Series LR Train	If you enter one column and integer d, the column is interpreted as d-dimensional time series data and linear regression model is created accordingly.

[Diagram 6.11-1] Time Series Function List

6.12 Text Analytics Functions

Name	Description
Elastic Indexing	Store (Indexing) the table in ElasticSearch.
Elastic Search	Create a table of results searched in ElasticSearch.
Elastic RegExp Search	Create a table of regular expression results searched in ElasticSearch.
Elastic Query Executer	Create a table of strings showing the results of ElasticSearch API requests.
Latent Dirichlet Allocation	Classify the text through frequency analysis of the topic in text data.
NGram	Extract ngram from the listed strings.

[Diagram 6.12-1] Text Analytics Function List

6.13 Script Functions

Name	Description
Query Executer	Write and execute SQL.
Scala Script	Write and execute Scala Script.
Group By	Run the entered R script in each group data.
R Script	Write and execute R Script.
Flat Map	Flatten the Data in grouped data or array format into a table of Scala values.

[Diagram 6.13-1] Script Function List

6.14 Deep Learning Functions

Name	Description
MLP Train	Multilayer Perceptron. Create a feedforward artificial neural network model based on the given data.
MLP Predict	Multilayer Perceptron. Predict the result from feedforward artificial neural network model created based upon the given Data.

[Diagram 6.14-1] Deep Learning Function List

6.15 Prescriptive Functions

Name	Description
Feature Encoding	Feature encoding. Encode features extracted based upon the given Data.
Linear UCB Train	Linear Upper Confidence Bound. Create a model that suggests where the new Data should belong based upon the given Data group.
Linear UCB Prescribe	Linear Upper Confidence Bound. Suggest where the new Data should belong based upon the given Data group.
QLearning Train	Q-Learning. Create a model to select the optimal behavior of the new Data based upon the state of the given Data.
QLearning Prescribe	Q-Learning. Select the optimal behavior of the new Data based upon the state of the given Data.
Sarsa Train	State-Action-Reward-State-Action. Create a model to select the optimal behavior of the new Data based upon the state of the given Data.

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Name	Description
Sarsa Prescribe	State-Action-Reward-State-Action. Select the optimal behavior of the new Data based upon the state of the given Data.
Thomson Sampling Train	Thompson Sampling. Create a model to suggest where the new Data should belong based upon the group of the given Data.
Thomson Sampling Prescribe	Thompson Sampling. Suggest where the new Data should belong based upon the group of the given Data.
ValueIteration Train	Value Iteration markov decision process. Create a model to select the optimal behavior of the new Data based upon the state of the given Data.
ValueIteration Prescribe	Value Iteration markov decision process. Select the optimal behavior of the new Data based upon the state of the given Data.

[Diagram 6.15-1] Prescriptive Function List

6.16 RealTime Functions

Name	Description
Streaming Read	Create DStream after receiving Stream Data on a particular topic from Kafka.
Streaming Write	Write DStream either to Repository or HDFS.
Streaming Filter	Select only those records that meet a particular condition in DStream.
Streaming Union	Merge two DStream into one DStream.
Streaming Join	Join two streams. Support Inner, left-outer, right_outer and full_outer.
Streaming KMeans	Analyze the Cluster for the entered DStream through K-means algorithm.
Streaming Linear Regression	Predict the model result for the new DStream by creating and updating linear regression model for the entered DStream.
Streaming Linear Regression Predict	Predict the model result for the entered DStream leveraging linear regression model already analyzed through linear regression Train.
Streaming Update State By Key	Calculate the statistical value of the DStream (count, sum, max, min, average) for the selected key.
Streaming Window	Modify DStream in accordance with the configured sliding window.
Streaming Feature Encoding	Create context data by modifying DStream in accordance with feature extraction method.
Streaming Linear UCB Train	Linear Upper Confidence Bound. Create a model to suggest where the new DStream should belong based upon the entered DStream.
Streaming Linear UCB Prescribe	Linear Upper Confidence Bound. Suggest where the new DStream should belong based upon the entered DStream.
Streaming Thompson SamplingTrain	Thompson Sampling. Create a model to suggest where the new DStream should belong based upon the entered DStream.
Streaming Thompson Sampling Prescribe	Thompson Sampling. Suggest where the new DStream should belong based upon the entered DStream.
Streaming Kafka Send	Transmit DStream to the designated kafka topic.
Streaming Start	Start Streaming process.

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Customer Support Information

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