Dataiku DSS Teradata Vantage Analytic Functions Plugin User Guide

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I. Introduction

Dataiku Data Science Studio (DSS) is a collaborative platform that enables teams of people with different data expertise, such as data engineers, data scientists and analysts, to work together efficiently. Dataiku DSS provides a set of built-in recipes or operations that can be applied to transform or analyze a dataset. It also allows users to create their own recipes in Python, SQL or R. The DSS plugins are custom reusable recipes that can only be written in Python.

The present guide outlines installation and usage of 2 DSS plugins that enable you to interact with Teradata Vantage systems; namely, the Teradata Vantage Analytic Functions Plugin, and the SCRIPT Table Operator Plugin.

Teradata Vantage Analytic Functions Plugin

The Teradata Vantage Analytic Functions Plugin for Dataiku DSS integrates about 180 of the Vantage Machine Learning Engine (MLE) analytic functions, by providing a user-friendly, easy-to-use, no-SQL interface for the functions in the Dataiku DSS environment. The Vantage analytic functions can be accessed through the [`+RECIPE`] menu of the FLOW view of a Dataiku project, and are grouped into nine categories:

- Time Series, Path and Attribution Analysis
- Ensemble Methods
- Text Analysis
- Naïve Bayes
- Graph Analysis
- Association Analysis
- Statistical Analysis
- Cluster Analysis
- Data Transformation

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SCRIPT Table Operator Plugin

The SCRIPT Table Operator Plugin allows the execution of R or Python scripts inside the Teradata Database. The plugin will take an R or Python script within a DSS notebook, or an R or Python script uploaded to the plugin and install the scripts and other related files (i.e. saved models in RDS or pickle files) on the Advanced SQL Engine.

Similar to the Teradata Vantage Analytic Functions Plugin, the SCRIPT Table Operator Plugin translates the user-requested tasks in the plugin into SQL queries, which are then sent to a connected Vantage system to set up and invoke the SCRIPT Table Operator.

II. Requirements

1. **Dataiku Data Science Studio version 5.1.2 or later**

   Dataiku DSS enterprise edition is required to import datasets from Vantage tables. Dataiku offers both downloadable and online options which can be obtained from the Dataiku website. The downloadable option can be configured to use the free or the enterprise edition, while the online option only comes in enterprise edition with free trial for a period of 14 days. A comparison between the two editions can be seen in the features table for Dataiku DSS Editions.

   Teradata Vantage Analytic Functions plugin has been tested on Dataiku DSS version 5.1.2.

2. **Plugin**

   To use the Teradata Vantage Analytic Functions plugin, you need the compressed file "TeradataVantageFunctionsPlugin.zip" that contains the Teradata Vantage Analytic Functions plugin software and metadata.

   To use the SCRIPT Table Operator plugin, you need the compressed file "TeradataVantageScriptTOPlugin.zip" that contains the SCRIPT Table Operator plugin software and metadata.

3. **Access Credentials**

   To use the plugins, you will need 2 different kinds of credentials, that is, one set for DSS and a second one for Vantage. Specifically:

   i. Dataiku DSS user credentials allow a user to login to a DSS instance. Your DSS server administrator can provide you with these credentials.

   ii. Vantage credentials allow a user to connect to the Advanced SQL Engine Database of a Vantage system, and, with appropriate permissions, read and write tables into the Advanced SQL Engine. Your Vantage database administrator (DBA) can provide you with credentials and suitable permissions for one or more databases on a Vantage system.

   Use your DSS user credentials to log on to a DSS instance, and then use your Vantage credentials to establish a connection between DSS and a Vantage system. Section III ("Creating A Vantage Connection") provides instructions on how to setup a DSS connection to a Vantage Advanced SQL Engine Database. It is suggested to create one connection per each database for which you intend to store output tables in.

4. **Teradata JDBC Driver**

   The Teradata JDBC Driver 16.20 or later is required to establish a connection between DSS and a Vantage System.

5. **Teradata Vantage Version 1.1** Both plugins require a connection to a Teradata Vantage system that minimally comprises of a Advanced SQL Engine. **Teradata Vantage Analytic Functions Plugin** The Teradata Vantage Analytic Functions Plugin for Dataiku DSS integrates about 180 of the Teradata Vantage Analytic Functions Plugin further requires a Vantage System v.1.1. For this plugin, if your Vantage v.1.1 system only has a Advanced SQL Engine, then only the analytic functions built into the Advanced SQL Engine will be available to the plugin, and namely, the following functions:

   - Attribution

- nPath
- Sessionize
- DecisionTreePredict
- DecisionForestPredict
- GLMPredict
- SVMSparsePredict
- NaiveBayesPredict
- NaiveBayesTextClassifierPredict The Machine Learning and Graph engine is required to completely leverage all capabilities of the Teradata Vantage Analytic Functions Plugin. **SCRIPT Table Operator Plugin**

  To use the SCRIPT Table Operator Plugin with a Vantage system Advanced SQL Engine and execute R and Python scripts in the Advanced SQL Engine nodes, one of the following R and/or Python bundles need to be installed directly on each node of the Advanced SQL Engine:

PID	Product name	Database version
9687-2000-0120	R Interpreter and Add-on Pkg on Teradata NewSQL	16.20
9687-2000-0121	R Interpreter and Add-on Pkg on Teradata Database	15.10, 16.10
9687-2000-0122	Python Interpreter and Add-on Pkg on Teradata NewSQL	16.20
9687-2000-0124	Python Interpreter and Add-on Pkg on Teradata Database	15.10, 16.10

  Moreover, your DBA must grant you in advance the additional following privileges:

- `EXECUTE` Function privilege on `TD_SYSFNLIB.SCRIPT` This is needed in order to invoke the SCRIPT Table Operator.
- `EXECUTE` privilege on the functions `SYSUIF.INSTALL_FILE` , `SYSUIF.REMOVE_FILE` , and `SYSUIF.REPLACE_FILE` .

III. Creating a Vantage Connection

1. Follow the instructions in the Dataiku Reference Document for Installing Database Drivers. In summary, one needs to execute from the command line of a DSS server:

   a. Stop the Data Science Studio server, where `DATA_DIR` is the data directory where Data Science Studio is installed:

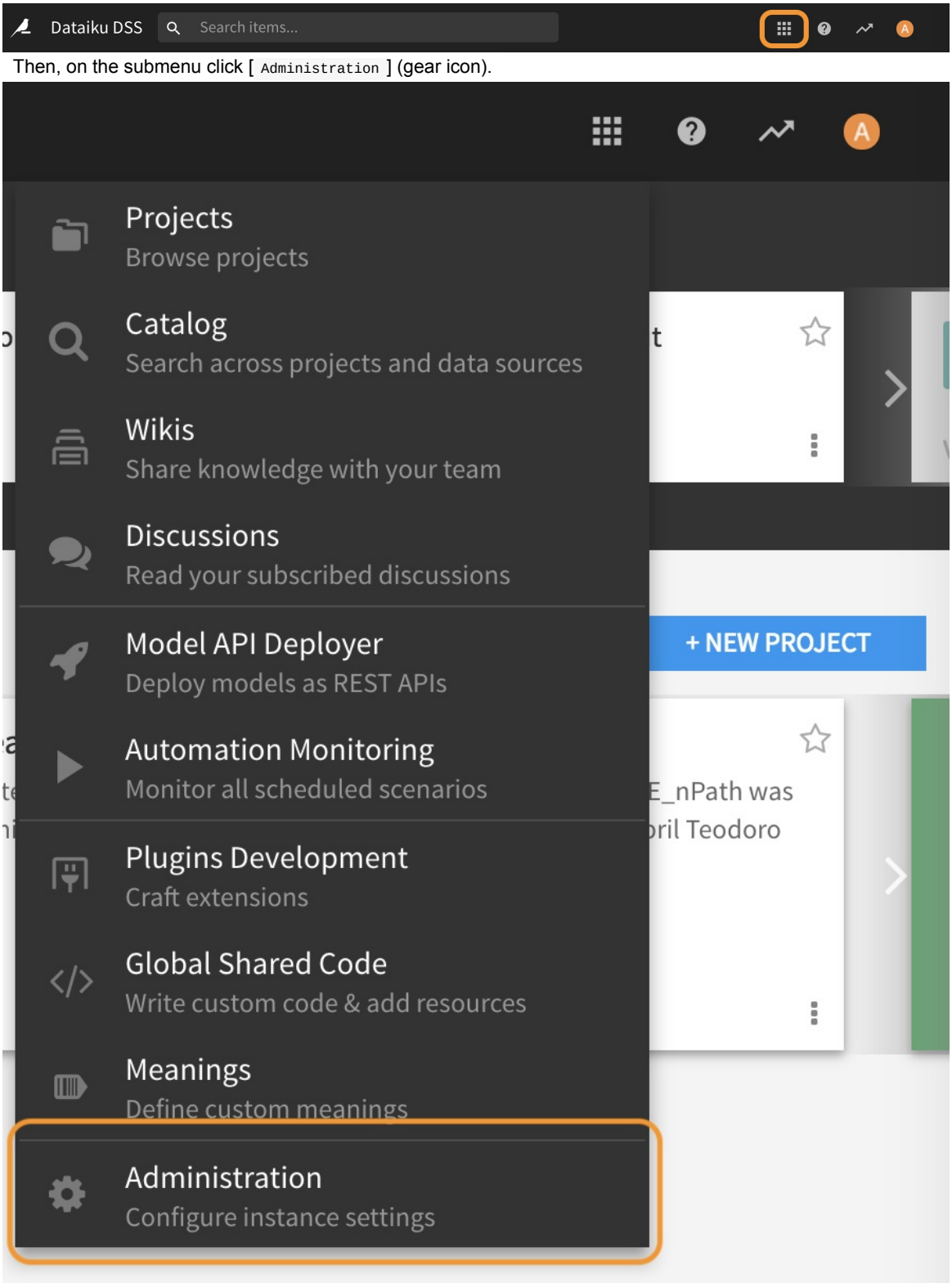
   ```
   DATA_DIR/bin/dss stop
   ```

   b. Copy the Teradata JDBC driver to the `DATA_DIR/lib/jdbc` directory.

   c. Restart Data Science Studio

   ```
   DATA_DIR/bin/dss start
   ```

2. Access Dataiku DSS on a browser. Then, on the Dataiku DSS home page click on Apps.



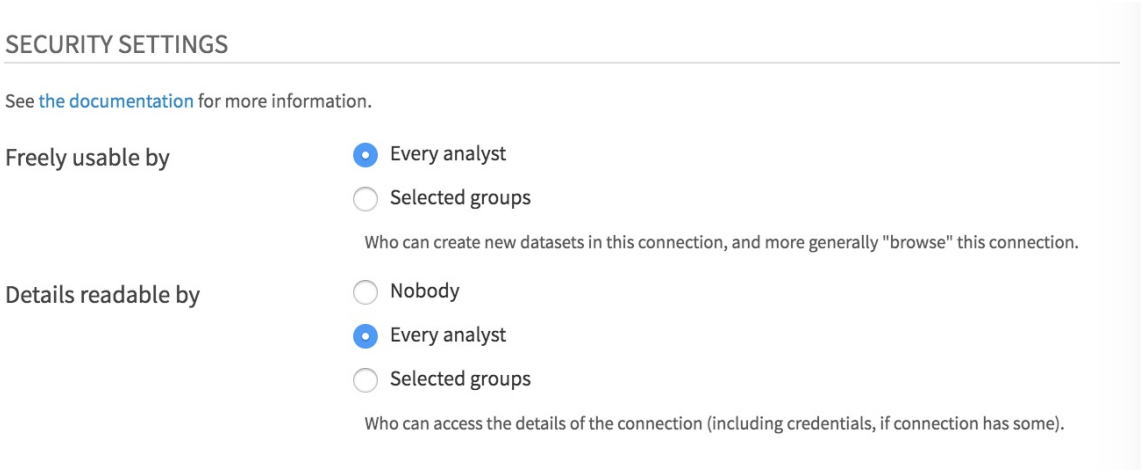
Then, on the submenu click [`Administration`] (gear icon).

Alternatively, you can go to `http://dataikuhost:port/admin/` .

3. On the DSS settings page, go to the [`Connections`] tab. Click on [`NEW CONNECTION`]. Choose [`Teradata`] among the options that will be presented.

4. Fill up the fields as needed:
   Basic Params Host: < `database.host.name` >
   User: < `Username` >
   Password: < `User_password` >
   Default Database: < `default_database` >
   Advanced JDBC properties:
   ```
   CHARSET: UTF8
   TMODE: TERA
   ```
   All other fields can be left as-is.

5. Modify “Details readable by” to either `Every Analyst` or `Selected Groups` .



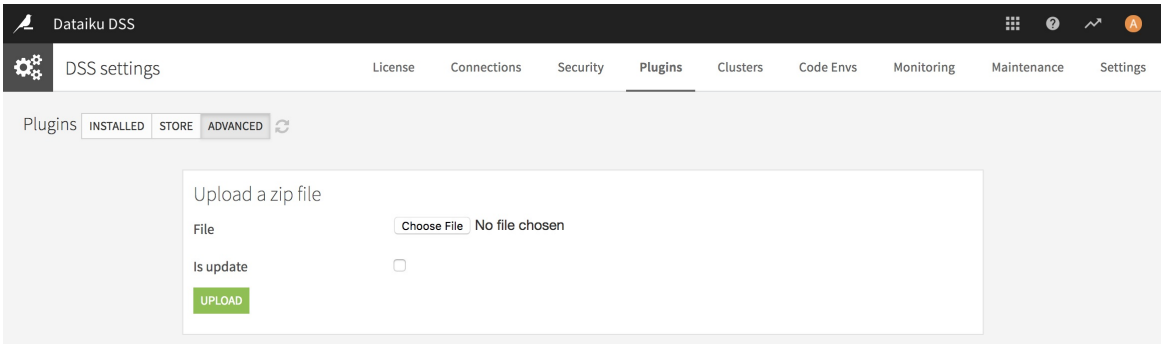
6. Click on the [`Test`] button to verify that connection details provided are valid.

7. Finally, click on the [`Save`] button.

IV. Teradata Vantage Analytic Functions Plugin Installation

The steps to install the Teradata Vantage Analytic Functions or the SCRIPT Table Operator plugins are as follows:

1. Assume that the zip file of the plugin you want to install is stored in your local filesystem.
2. In DSS Settings page (accessible through the Admin Tools button), select the [`Plugins`] tab, then select the [`ADVANCED`] option.



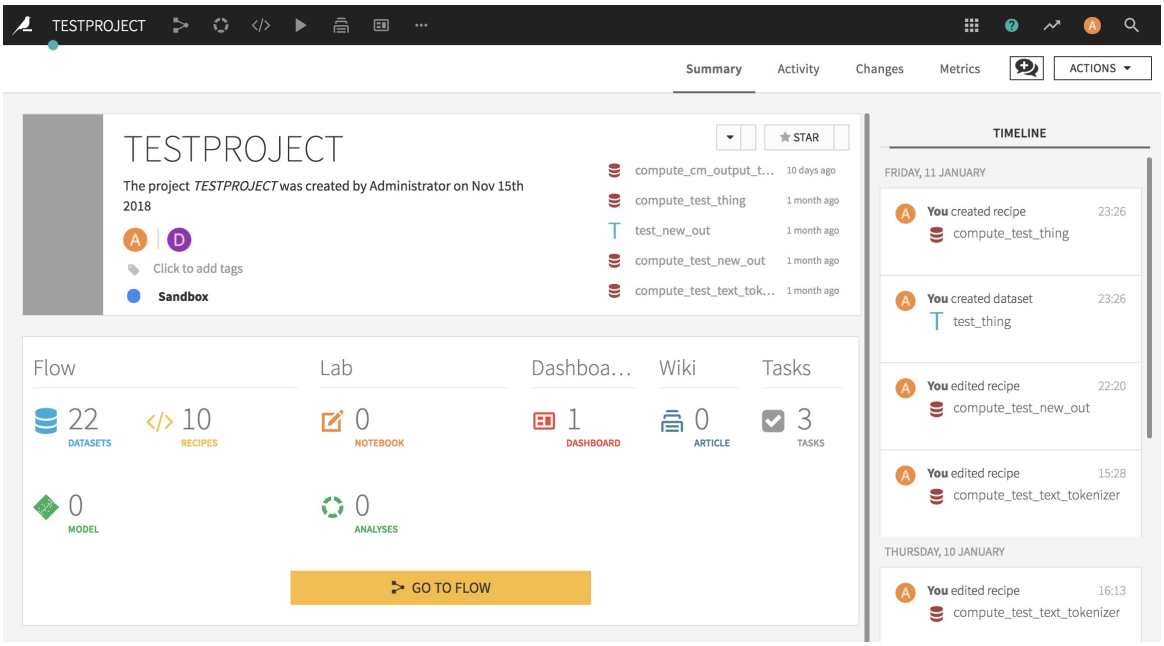
3. Click on [`Choose File`] and navitage to the location of the plugin zip file in your local filesystem.
4. If a previous installation of the Teradata Vantage Analytic plugin exists, check "Is update".
5. Click on the [`UPLOAD`] button.
6. When the upload succeeds, click on the [`Reload`] button, or do a hard refresh (Ctrl + F5) on all open Dataiku browsers for the change to take effect.
7. Repeat process, if you want to install a different plugin.

V. Using the Teradata Vantage Analytic Functions Plugin

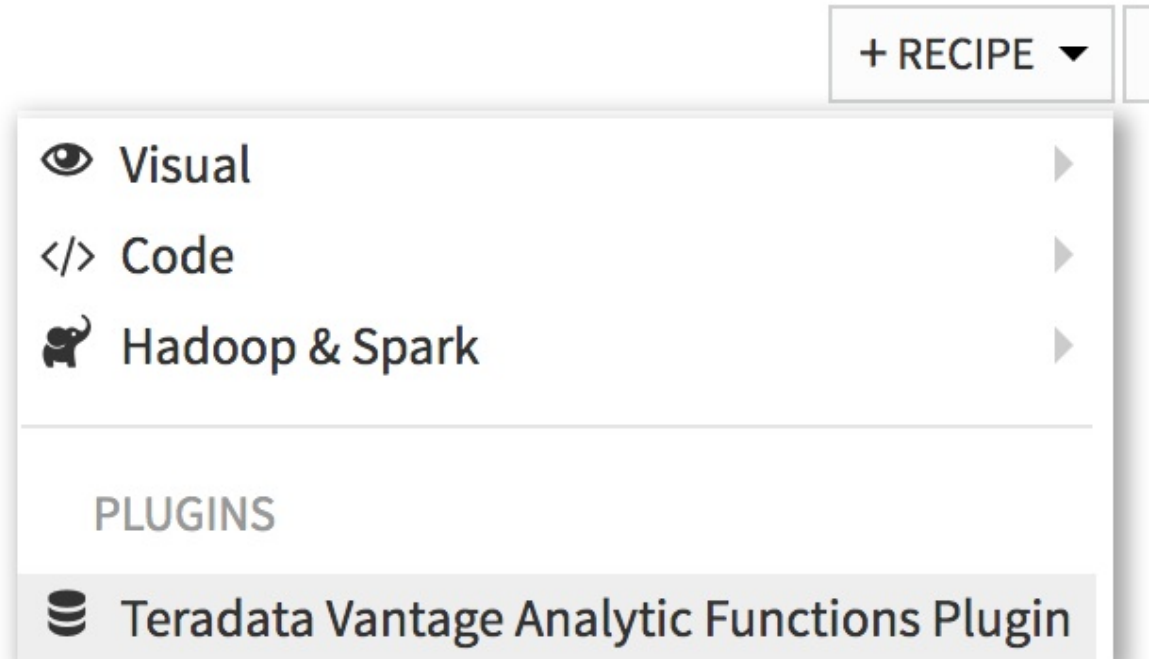
Usage

This section assumes that a Dataiku DSS project already exists, and input datasets have already been imported. Note that recipes need a non-empty dataset as input to run.

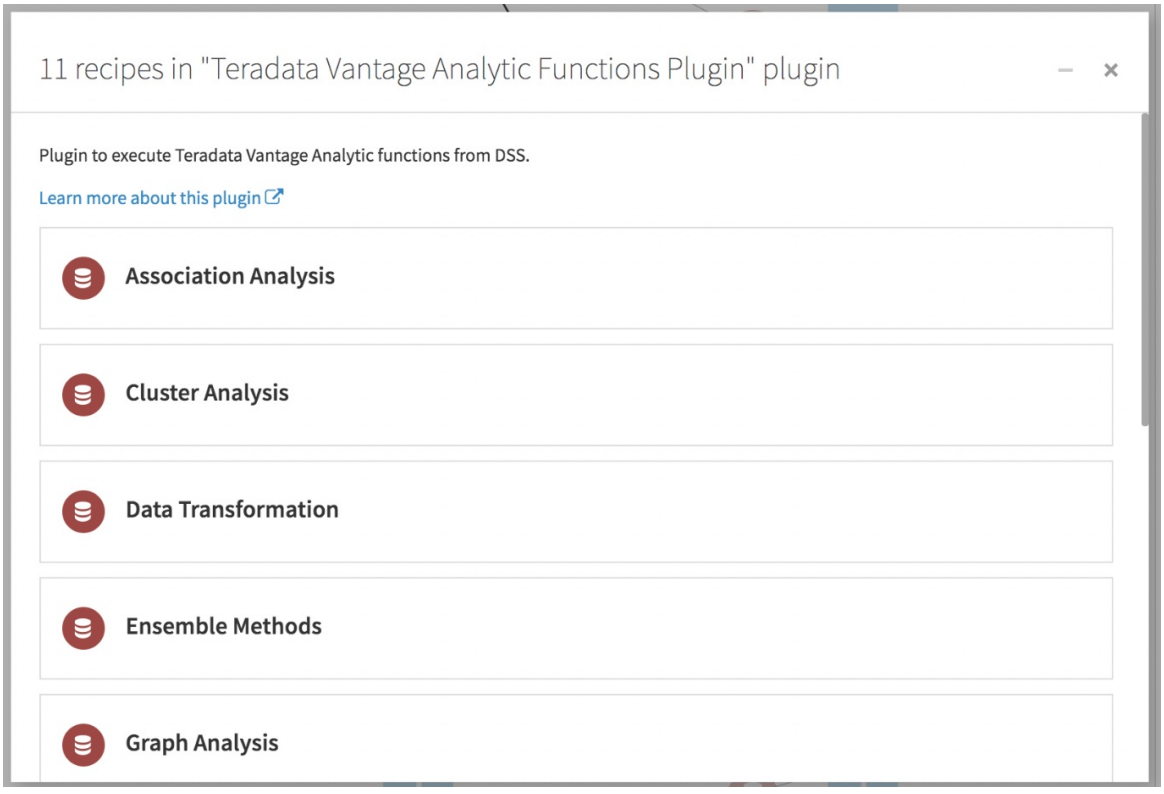
1. Go to the flow view of the Dataiku project, where the recipe is to be created, by clicking on the [`GO TO FLOW`] button or by clicking on the flow icon in the project menu.



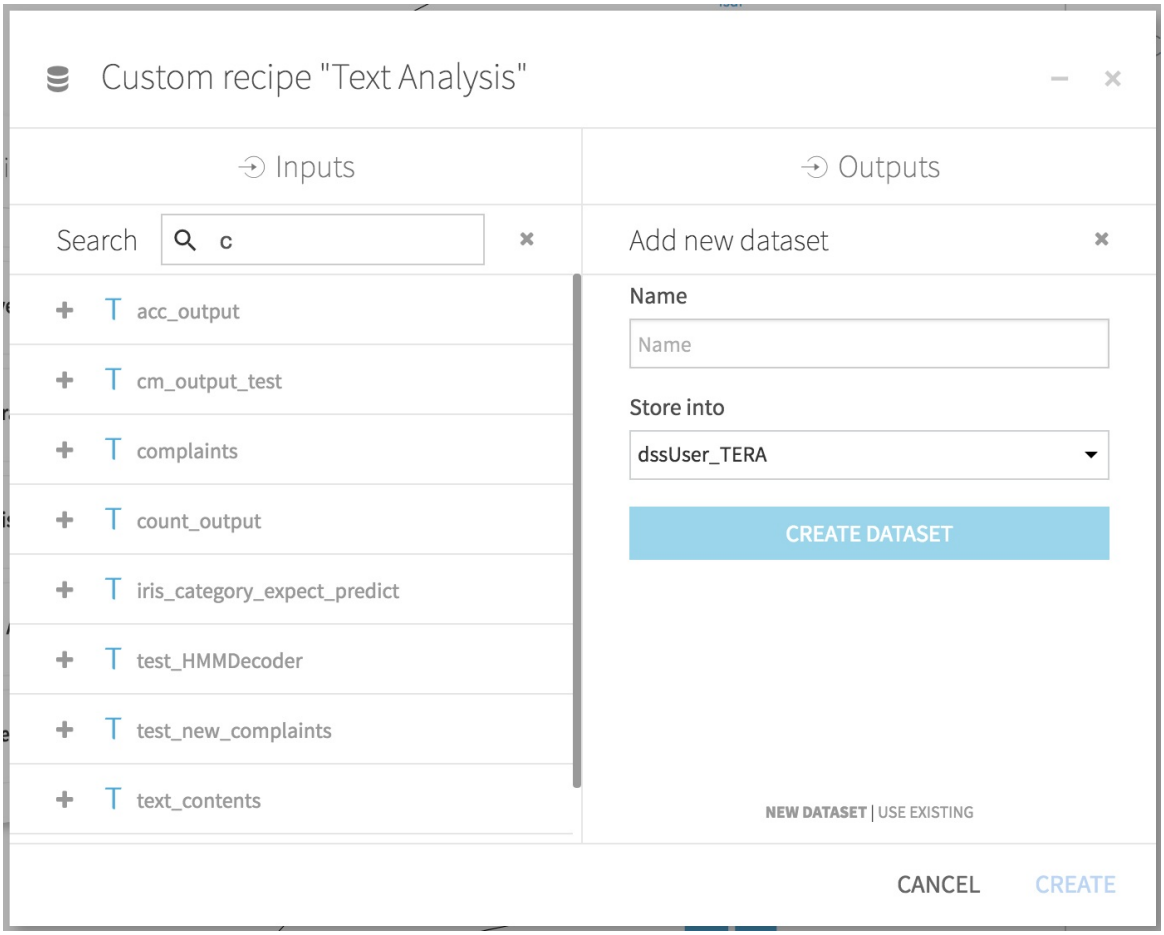
2. In the Flow view, click on the [`+RECIPE`] button, then select the [`Teradata Vantage Analytic Functions Plugin`] and further desired the recipe.



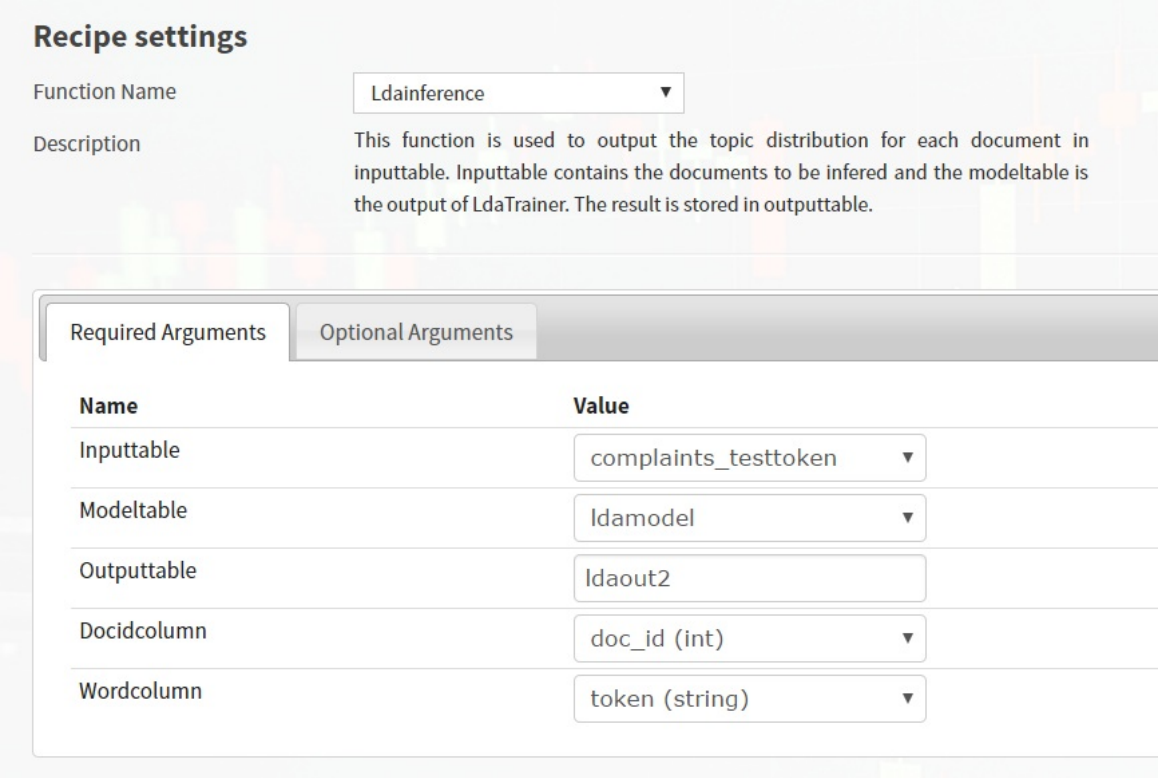
The available recipe names correspond to the different categories of Teradata Vantage Analytic Functions.



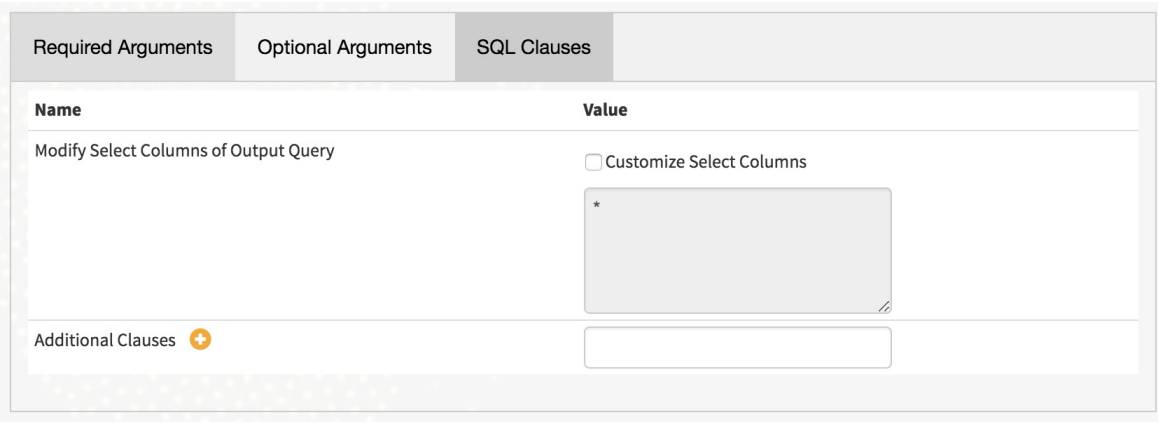
3. In the [`New custom recipe`] popup, specify the input and output datasets. There can be more than one input dataset, as in the case of multiple-input analytic functions. The same is also the case for MLE Functions with multiple output datasets. The output dataset will be stored in the database and schema corresponding to the connection selected in the [`Store into`] field. Click on [`CREATE DATASET`] button when done.



4. In the recipe settings, one can select the most suitable function for the manipulation or analysis of the input dataset. Configure the chosen analytic recipe by specifying parameters such as the input tables, partition and order attributes, and arguments. A recipe's required and optional fields are separated into different tabs.



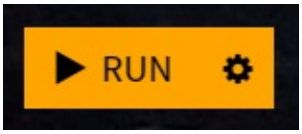
5. The [`SQL Clauses`] tab allows the user to explicitly modify the query to be executed.



The field next to " `Modify Select Columns of Output Query` " enables the user to modify the SELECT clause of the query. The field next to " `Additional Clauses` " enables the user to append additional SQL clauses to the query such as WHERE, ORDER BY, GROUP BY, and other similar clauses. These fields have equivalent effects as if the query were modified as:

```
SELECT {modified select} FROM function_name(
    ...
    )
    {additional clauses}
```

1. Click on the [`RUN`] button or save the recipe settings for later use.



Usage Notes

Functions with multiple output datasets will normally require an output dataset for the functions' output message/result alongside any other output tables/datasets specified in the recipe. Please note that the output dataset/s name/s should also match the name within the recipe's settings.