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| A picture of a winding road and trees  Azure Databricks - smartsheet to synapse  Load Smartsheet data to Synapse Table | Abstract  This document would describe how to use Azure Databricks to load smartsheet data to Azure Synapse using Smartsheet API  Ashish Sinha  Senior Data Engineer |

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# Introduction

This document would go through the process and code to connect to your smartsheet and load the data in it to Azure Synapse table for data analysis.

The scheduling and running the Databricks notebook would be done using parametrized Azure Data Factory pipeline.

## Requirement and Issue

1. The requirement is pretty simple but the issue is sometimes the data in your smartsheet would have unwanted characters such as comma (,) that would break the rows into multiple rows if you convert it to csv and load it using Azure Data Factory.
2. I also tried using excel and load the data from it. The records in synapse were breaking into multiple rows and all the data was messed up.
3. PDF file would not have worked for this scenario.

## Process Description

1. In Azure Databricks (ADBS), we would create a generic template that would be used to load any smartsheet data to any Azure Synapse table.
2. We would use widgets in notebook to pass parameters from ADF Pipeline.
3. Parameters would include Smartsheet Access Token, Sheet ID and Synapse Schema and Table name.
4. We would connect with Smartsheet API and Synapse using JDBC Connectors respectively.
5. We would dynamically extract columns and data from smartsheet and create a pandas data frame from it, which would be loaded to Synapse table.

***The process to run ADBS notebook from ADF with parameter is described in the*** [***link***](https://docs.microsoft.com/en-us/azure/data-factory/transform-data-using-databricks-notebook) ***here.***

# Code Steps and Process

## Create ADBS widgets

Create required widgets so as to pass parameters from ADF pipeline.

The parameters would be Smartsheet Access Token, Smartsheet Sheet ID, Synapse Schema and Table Name.

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## Get the Access token and Sheet Id from ADF Pipeline

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dbutils**.**widgets**.**text**(**"access\_token"**,** ""**,**""**)**

access\_token **=** dbutils**.**widgets**.**get**(**"access\_token"**)**

**print** **(**"Parameter Access token :"**)**

**print** **(**access\_token**)**

dbutils**.**widgets**.**text**(**"sheetId"**,** "" **,**""**)**

sheetId **=** dbutils**.**widgets**.**get**(**"sheetId"**)**

**print** **(**"Parameter Sheet ID :"**)**

# Convert sheet ID to interger type

sheetid **=** **int(**sheetId**)**

**print** **(**sheetId**)**

dbutils**.**widgets**.**text**(**"tableSchema"**,** ""**,**""**)**

tableSchema **=** dbutils**.**widgets**.**get**(**"tableSchema"**)**

**print** **(**"Parameter Table Schema :"**)**

**print** **(**tableSchema**)**

dbutils**.**widgets**.**text**(**"tableName"**,** ""**,**""**)**

tableName **=** dbutils**.**widgets**.**get**(**"tableName"**)**

**print** **(**"Parameter Table Name :"**)**

**print** **(**tableName**)**

table **=** tableSchema **+** "." **+** tableName

**print(**table**)**

## Import Libraries and Connect to Smartsheet

Import required libraries to be used and make a connection with smartsheet with the access token and sheet id passed from variable above.

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## Import Required Libraries

#####################################################################

**import** smartsheet

**import** pandas **as** pd

# Initialize client

smartsheet\_client **=** smartsheet**.**Smartsheet**(**access\_token **=** access\_token**)**

# Make sure we don't miss any errors

smartsheet\_client**.**errors\_as\_exceptions**(True)**

#####################################################################

## Get the sheet

#####################################################################

sheet **=** smartsheet\_client**.**Sheets**.**get\_sheet**(**sheetId**)**

## Get Smartsheet Data and load it to Pandas Dataframe

####################################################################### Get Column Id and Name from sheet.columns

#####################################################################

column\_id **=** **[**i**.id** **for** i **in** sheet**.**columns**]**

column\_name **=** **[**i**.**title **for** i **in** sheet**.**columns**]**

#####################################################################

## Map column id and its corresponding name and present it in a dataframe

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dict\_columns **=** **{**"columnId"**:**column\_id**,** "Name"**:**column\_name**}**

df\_columns **=** pd**.**DataFrame**.**from\_dict**(**dict\_columns**)**

**print(**df\_columns**.**head**())**

#####################################################################

## created an empty list "rows" to store the cells data in sheet rows after converting it to a dictionary. Append the dictionary data into above list

#####################################################################

rows**=[]**

**for** i **in** sheet**.**rows**:**

data **=** i**.**to\_dict**()**

rows**.**append**(**data**[**"cells"**])**

#####################################################################

## create a dict with keys as the column id and value as an empty list.

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data **=** **{**i**:[]** **for** i **in** column\_id**}**

**print(**data**)**

#####################################################################

## Loop through data in rows. Each row in rows has column id and value of the cell. If value is not present then it is to be considered empty else fetch the value from row dictionary. Append this value into the list of values for the key present in the data dictionary.

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# rows is the list of dictionary.

**for** row **in** rows**:**

**for** key **in** row**:**

**if** 'value' **not** **in** key**:**

value **=** **None**

**else:**

value **=** key**[**'value'**]**

data**[**key**[**'columnId'**]].**append**(**value**)**

#print(sample\_dict)

#####################################################################

## Load the data in dataframe and rename the columns

#####################################################################

df **=** pd**.**DataFrame**(**data**)**

df**.**columns **=** column\_name

df**.**fillna**(**""**,** inplace**=True)**

**print(**df**.**tail**())**

## Function to clean data and create Spark Dataframe from Pandas Dataframe

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## Function to find rows with data as None in all columns

#####################################################################

**def** cleaned\_df**(**df**):**

**for** index**,** rows **in** df**.**iterrows**():**

row **=** **[]**

**for** i **in** df**.**columns**:**

row**.**append**(**rows**[**i**])**

##### create a set to get only unique values

row\_set **=** **set(**row**)**

**if** **len(**row\_set**)** **==** 1**:**

df**.**drop**(**index**,** inplace **=** **True)**

**return** df

# call the function

df **=** cleaned\_df**(**df**)**

**print(**df**.**tail**())**

# replace unwanted characters from the columns and rename them

cols **=** **[**i**.**replace**(**"."**,**""**).**replace**(**"("**,**""**).**replace**(**")"**,**""**).**replace**(**"/"**,**""**).**replace**(**" "**,**"\_"**).**replace**(**","**,**""**).**replace**(**";"**,**""**).**replace**(**"{"**,**""**).**replace**(**"}"**,**""**).**replace**(**"\n"**,**""**).**replace**(**"\t"**,**""**).**replace**(**"="**,**""**)** **for** i **in** df**.**columns**]**

df**.**columns **=** cols

# convert column to string. This is so that it is easy to convert the df to sparkDF

**for** i **in** df**.**columns**:**

**if** df**[**i**].**dtype **==**'object'**:**

df**[**i**]** **=** df**[**i**].**astype**(**'str'**)**

**print(**df**.**tail**())**

# convert pandas to sparkdf

spark**.**conf**.set(**"spark.sql.execution.arrow.enabled"**,**"true"**)**

sparkDF**=**spark**.**createDataFrame**(**df**)**

display**(**sparkDF**)**

## Load to Synapse

Now finally load data to synapse

blob\_account\_name **=** ""

blob\_container\_name **=** ""

blob\_folder\_name **=** ""

blob\_account\_key **=** ""

#connection details for synapse analytics

dwServer **=** ""

dwPort **=** "1433"

dwDBName **=** ""

#Retrieve sql username and passwrod from key vault scope

dwUserName **=** dbutils**.**secrets**.**get**(**scope **=** "synapse-secret-scope"**,** key **=** "sqluser"**)**

dwPassword **=** dbutils**.**secrets**.**get**(**scope **=** "synapse-secret-scope"**,** key **=** "sqlpassword"**)**

#Create link to connect with the Synapse via JDBC url

tempDir **=** "wasbs://" **+** blob\_container\_name **+** "@" **+** blob\_account\_name **+** ".blob.core.windows.net/" **+** blob\_folder\_name

dwUrl **=** "jdbc:sqlserver://"**+**dwServer**+**":"**+**dwPort**+**";database="**+**dwDBName**+**";user="**+**dwUserName**+**";password="**+**dwPassword**+**";encrypt=true;trustServerCertificate=true;hostNameInCertificate=\*.sql.azuresynapse.net;loginTimeout=30;"

#connection string for blob

connection\_string **=** "DefaultEndpointsProtocol=https;AccountName=%s;AccountKey=%s;EndpointSuffix=core.windows.net" **%** **(**blob\_account\_name**,**blob\_account\_key**)**

# Set up the Blob storage account access key in the notebook session conf.

spark**.**conf**.set(**

"fs.azure.account.key.bgnesynapse.blob.core.windows.net"**,**

blob\_account\_key**)**

########################################################################

## Write Dataframe to Synapse table

########################################################################

sparkDF**.**write \

**.format(**"com.databricks.spark.sqldw"**)** \

**.**option**(**"url"**,** dwUrl**)** \

**.**option**(**"forwardSparkAzureStorageCredentials"**,** "true"**)** \

**.**option**(**"dbTable"**,** table**)** \

**.**option**(**"tempDir"**,** tempDir**)** \

**.**option**(**"truncate"**,**"true"**)** \

**.**option**(**"maxStrLength"**,** "4000" **)** \

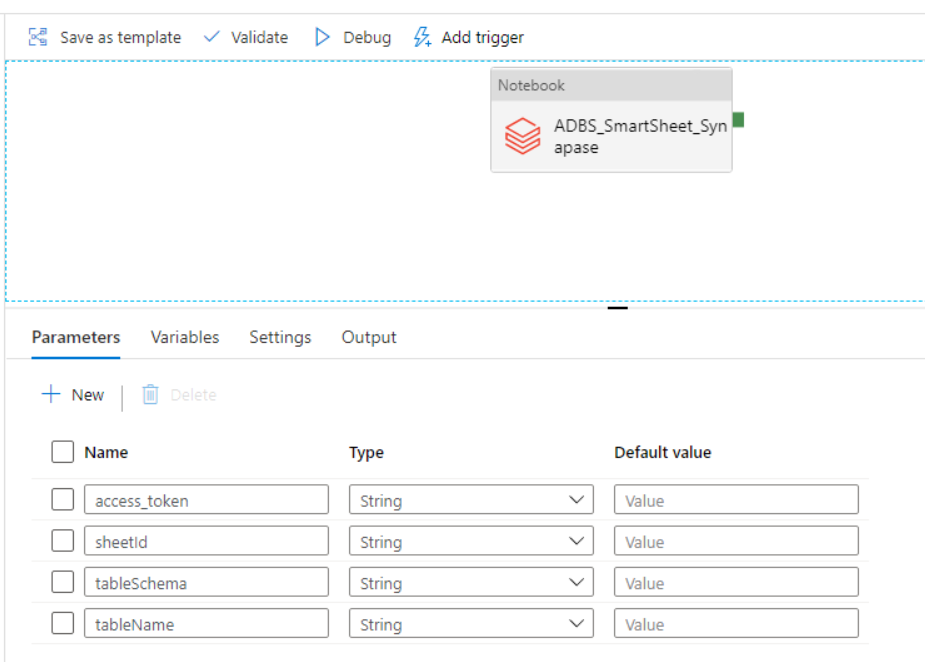
**.**mode**(**"overwrite"**)** \

**.**save**()**

## Running from Azure Data Factory

Here are the screenshots on how to run notebook from ADF pipeline.

1. Parameters created in ADF Pipeline



1. Passing there parameters in ADBS notebook from Base Parameters

