Lab: Data Sources in DSXL

Jun 2018

Author: Parminder Kaur parminder.kaur@ibm.com

Table of contents

Contents

Overview

In this lab, you will learn how to create data source and remote dataset definition that can be used to pull data into DSXL.

DSXL v1.2 packages Big SQL, Db2, Db2 for z/OS, dashdb, Hive, HDFS, Informix, Netezza and Oracle databases. However, customer can also work with other JDBC databases that are not prepackaged by using custom JDBC data source feature. In this lab, you will learn how to work with a packaged data source, custom JDBC and HDP data sources.

This lab has been divided into three parts:

Part 1 - where you will add a dashdb built-in/packaged data source to DSXL

Part 2 – where you will add a PostgreSQL custom data source to DSXL

Part 3 – where you will add HDP data sources to DSXL

What You Should Be Able to Do

- Pull data from external data sources explicitly supported or packaged by DSXL
- Configure DSXL to work with custom JDBC data sources
- Share data sources and remote datasets definitions with project collaborators
- Browse and Preview HDP and Hive remote datasets
- Use insert-to-code to read/fetch data from defined remote datasets

Required software, access, and files

- To complete this lab, you will need access to a DSX Local cluster v1.2.0.2 with Internet connectivity.

Part 1: Add dashdb built-in/packaged data source

1. Create a new blank project, follow instruction in documentation https://content-

dsxlocal.mybluemix.net/docs/content/local/projects.html#create-a-project.

2. Create dashdb data source and remote data set definitions by following instructions in documentation https://content-dsxlocal.mybluemix.net/docs/content/local/createdatasources.html.

   You can use below mentioned dashdb test server for this lab.

```
JDBC URL: jdbc:db2://dashdb-entry-yp-dal09-07.services.dal.bluemix.net:50000/BLUDB
Username: dash10765
Password: j1S(m{sWv7ZB
schema: SAMPLES
table: EDUCATION
```

   Note that, there is a Shared checkbox option in add data source page. This option allows you to share your data source credential information with all the project collaborators. However, if you want to keep your credential private, leave it unchecked. The collaborators may see the data source definition and related dataset, but they would not see credential information and should provide a valid credential to access the data source.

3. Pull data from above created dashdb remote asset using insert-to-code.

   3.1. Create a blank Jupyter notebook. Go to Notebooks -> add notenook. Select Jupyter with Python 2.7, Scala 2.11, R 3.4.3, Spark 2.0.2.

   3.2. Click on `Find data` icon 10 01 . Select `Remote` and click `inset to code` on your `dashdb` remote dataset. Select `Insert Pandas DataFrame` from the dropdown, this will insert a code snippet in a new jupyter cell.

   3.3. Run the cell by clicking Cell -> Run All. After successful cell execution, you would see data frame from your `dashdb` table as output.

Part 2: Add PostgreSQL custom data source

To work with custom JDBC, admin needs to upload JDBC driver jar to DSXL so that DSX users can add custom data sources and remote data sets and access data from them.

Follow instructions in documentation https://content-dsxlocal.mybluemix.net/docs/content/local/drivers.html to first import

PostgresSQL driver jar, create a custom data source and a remote data set, and finally access data using `Insert Pandas DataFrame` insert-to-code option from a Jupyter with Python 2.7, Scala 2.11, R 3.4.3, Spark 2.0.2 notebook.

For this lab, you can download PostgresSQL driver jar from https://ibm.box.com/s/cjdhf403snni14dvo6bu02ijx038x4ge and use following PostgreSQL test server.

```
Data source type: custom jdbc
JDBC URL: jdbc:postgresql://sl-us-south-1-portal.8.dblayer.com:27422/compose
JDBC driver class name: org.postgresql.Driver
Username: admin
Password: TMFZJHGBDSLWMXIU
schema: public
table: cars
```

Part 3: Add HDFS and Hive HDP data sources

Pre-requites:

- You need to have a HDP cluster with DSXHI (DSX Hadoop Integration Service) installed on Hadoop edge node. Already covered in `Hadoop Integration` training session. Here is the documentation https://content-dsxlocal.mybluemix.net/docs/content/local/hdp.html.

- If you choose not to install DSXHI on your HDP cluster, then follow steps mentioned in documentation https://content-dsxlocal.mybluemix.net/docs/content/local/hdp.html#option-2-set-up-a-hdp-cluster-without-dsxhi. (also follow steps from 3.2)

3.1. For HDP DSXHI cluster,

1. Register DSXHI cluster to DSXL. Follow documentation https://content-dsxlocal.mybluemix.net/docs/content/local/hadoopintegration.html.

2. Once you are done with registration, the HDFS and Hive data sources will automatically get populated in your existing project or new project. You can browse HDFS and Hive data sources and preview their remote data sets.

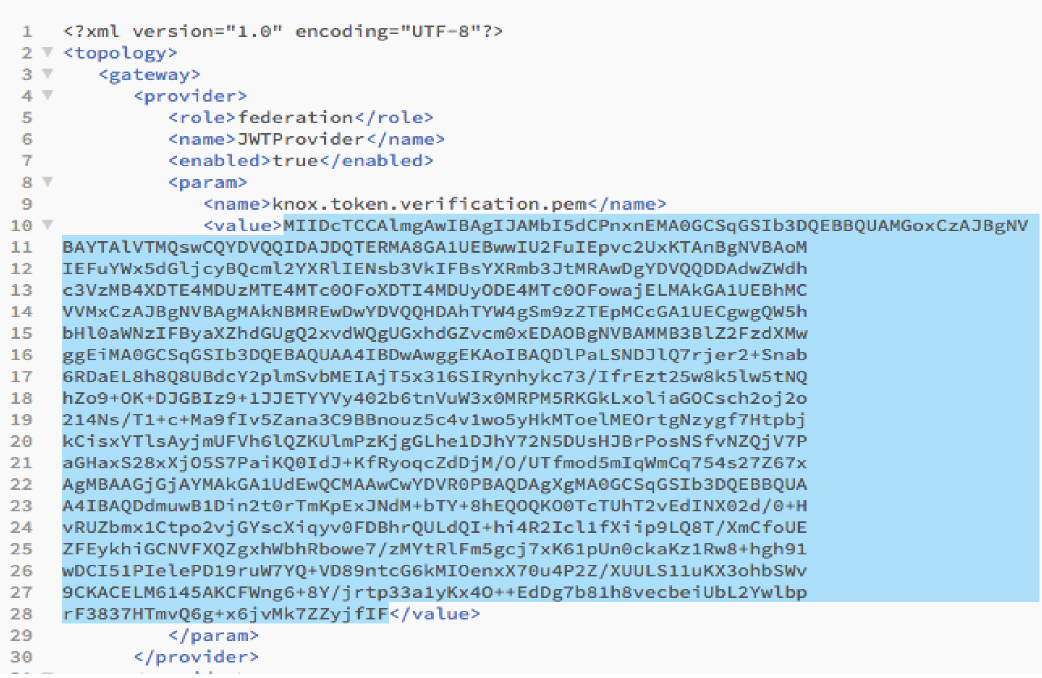
3. Access data using `Insert Pandas DataFrame` insert-to-code option on HDFS data set from a Jupyter with Python 2.7, Scala 2.11, R 3.4.3, Spark 2.0.2 notebook. Note that insert-to-code is not supported for Hive remote data

sets. Documentation on Hive https://content-dsxlocal.mybluemix.net/docs/content/local-dev/hadoop-secure_hive_data.html (beyond the scope of this lab).

3.2. For HDP non-DSXHI cluster,

1. Download topology xml file from https://ibm.box.com/s/d14hcxc8qgzur13tugwgztobpxirjq6v.

2. Replace `knox.token.verification.pem` property value with the token generated by your DSXL cluster. To retrieve token, run `curl -k https://<your-cluster-ip>/auth/jwtcert` on command line or terminal.



```
<?xml version="1.0" encoding="UTF-8"?>
<topology>
    <gateway>
        <provider>
            <role>federation</role>
            <name>JWTProvider</name>
            <enabled>true</enabled>
            <param>
                <name>knox.token.verification.pem</name>
                <value>MIIDcTCCAlmgAwIBAgIJAMbI5dCPnxnEMA0GCSqGSIb3DQEBBQUAMGoxCzAJBgNV
BAYTAlVTMQswCQYDVQQIDAJDQTERMA8GA1UEBwwIU2FuIEpvc2UxKTAnBgNVBAoM
IEFuYWx5dGljcyBQcml2YXRlIENsb3VkIFBsYXRmb3JtMRAwDgYDVQQDDAdwZWdh
c3VzMB4XDTE4MDUzMTE4MTc0OFoXDTI4MDUyODE4MTc0OFowajELMAkGA1UEBhMC
VVMxCzAJBgNVBAgMAkNBMREwDwYDVQQHDAhTYW4gSm9zZTEpMCcGA1UECgwgQW5h
bHl0aWNzIFByaXZhdGUgQ2xvdWQgUGxhdGZvcm0xEDAOBgNVBAMMB3BlZ2FzdXMw
ggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQDlPaLSNDJlQ7rjer2+Snab
6RDaEL8h8Q8UBdcY2plmSvbMEIAjT5x316SIRynhykc73/IfrEzt25w8k5lw5tNQ
hZo9+OK+DJGBIz9+1JJETYYVy402b6tnVuW3x0MRPM5RKGkLxoliaGOCsch2oj2o
214Ns/T1+c+Ma9fIv5Zana3C9BBnouz5c4v1wo5yHkMToelMEOrtgNzygf7Htpbj
kCisxYTlsAyjmUFVh6lQZKUlmPzKjgGLhe1DJhY72N5DUsHJBrPosNSfvNZQjV7P
aGHaxS28xXjO5S7PaiKQ0IdJ+KfRyoqcZdDjM/O/UTfmod5mIqWmCq754s27Z67x
AgMBAAGjGjAYMAkGA1UdEwQCMAAwCwYDVR0PBAQDAgXgMA0GCSqGSIb3DQEBBQUA
A4IBAQDdmuwB1Din2t0rTmKpExJNdM+bTY+8hEQOQKO0TcTUhT2vEdINX02d/0+H
vRUZbmx1Ctpo2vjGYscXiqyv0FDBhrQULdQI+hi4R2Icl1fXiip9LQ8T/XmCfoUE
ZFEykhiGCNVFXQZgxhWbhRbowe7/zMYtRlFm5gcj7xK61pUn0ckaKz1Rw8+hgh91
wDCI51PIelePD19ruW7YQ+VD89ntcG6kMIOenxX70u4P2Z/XUULS11uKX3ohbSWv
9CKACELM6145AKCFWng6+8Y/jrtp33a1yKx4O++EdDg7b81h8vecbeiUbL2Ywlbp
rF3837HTmvQ6g+x6jvMk7ZZyjfIF</value>
            </param>
        </provider>
```

Give your xml file a unique name so that it does not conflict with others lab work.

3. Copy your topology xml file to HDP cluster. For this lab, use following cluster: (Note this cluster would expire on Jun14)

```
prmndr-hdp1-fyre.ibm.com
password: Temp4lab!

// ***use below command for copy***
scp ./dsx-yourname.xml root@prmndr-hdp1.fyre.ibm.com:/usr/hdp/current/knox-
server/conf/topologies
```

4. Once you have configured your HDP cluster by adding a new topology for DSX, create HDFS and Hive data sources and remote data sets manually.

```
Data source type: HDFS - HDP
HDFS host: prmndr-hdp1-fyre.ibm.com
HDFS port: 8020
WebHDFS URL: https://prmndr-hdp1.fyre.ibm.com:8443/gateway/<dsx-yourname>/webhdfs/v1
```

```
Data source type: Hive - HDP
WebHCat URL: https://prmndr-hdp1.fyre.ibm.com:8443/gateway/<dsx-
yourname>/templeton/v1
WebHDFS URL: https://prmndr-hdp1.fyre.ibm.com:8443/gateway/<dsx-yourname>/webhdfs/v1
Livy URL: https://prmndr-hdp1.fyre.ibm.com:8443/gateway/<dsx-yourname>/livy2/v1
```

5. You can browse and preview on HDFS and Hive assets. Also, you can access data from insert-to-code. Note, insert-to-code on Hive remote data set is not yet supported.