Sqoop crash course Project

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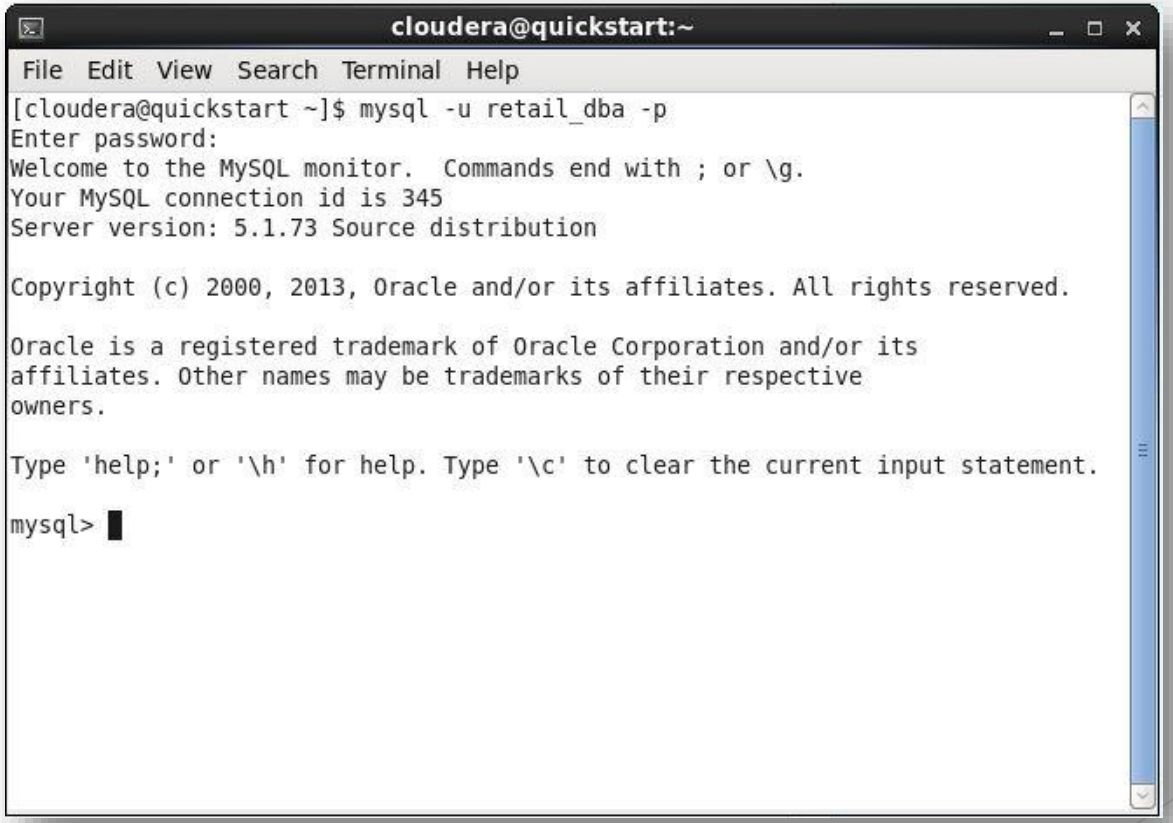
Description:

Problem Statement

- List databases: list tables and validate that you can connect to database using Sqoop with JDBC URL. As part of validation you should query from one of the tables in MySQL
- Create a HR_db Database in MySql and creat an Employee table (feel free to add fields, populate some sample data with a good amount of records)
- Eval connection with Sqoop command
- Importing HR_db tables to HDFS i- avro data file format to Hive
- Use 8 parallel threads (mappers)

Procedure: Part 1
List databases

First start mysql CLI from cloudera terminal.



Use “show databases” command to view all available databases.

```
cloudera@quickstart:~
File  Edit  View  Search  Terminal  Help
[cloudera@quickstart ~]$ mysql -u retail_dba -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 345
Server version: 5.1.73 Source distribution

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| retail_db          |
+--------------------+
2 rows in set (0.00 sec)

mysql>
```

Retail database will be used for this test. So we use the “use retail_db” command to set our working database and “show tables” command to view all available tables from our database.

```
cloudera@quickstart:~
File  Edit  View  Search  Terminal  Help
| information_schema |
| retail_db          |
+--------------------+
2 rows in set (0.00 sec)

mysql> use retail_db;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> show tables;
+---------------------+
| Tables_in_retail_db |
+---------------------+
| categories          |
| customers           |
| departments         |
| order_items         |
| orders              |
| products            |
+---------------------+
6 rows in set (0.00 sec)

mysql>
```

Finally for testing purposes a select query was execute to see all data available on the departments table.

```
cloudera@quickstart:~
File  Edit  View  Search  Terminal  Help
|     68878 | 2014-07-08 00:00:00 |              6753 | COMPLETE        |
|     68879 | 2014-07-09 00:00:00 |               778 | COMPLETE        |
|     68880 | 2014-07-13 00:00:00 |              1117 | COMPLETE        |
|     68881 | 2014-07-19 00:00:00 |              2518 | PENDING_PAYMENT |
|     68882 | 2014-07-22 00:00:00 |             10000 | ON_HOLD         |
|     68883 | 2014-07-23 00:00:00 |              5533 | COMPLETE        |
+----------+---------------------+-------------------+-----------------+
68883 rows in set (0.12 sec)

mysql> select * from departments
    -> ;
+---------------+-----------------+
| department_id | department_name |
+---------------+-----------------+
|             2 | Fitness         |
|             3 | Footwear        |
|             4 | Apparel         |
|             5 | Golf            |
|             6 | Outdoors        |
|             7 | Fan Shop        |
+---------------+-----------------+
6 rows in set (0.00 sec)

mysql>
```

Procedure: Part 2 create databases

To create a new database in mysql just execute “CREATE DATABASE <name>;” In this case our database will be named “HR_db”.

```
cloudera@quickstart:~
File  Edit  View  Search  Terminal  Help
mysql> HR_db;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that
corresponds to your MySQL server version for the right syntax to use near 'HR_db
' at line 1
mysql> CREATE DATABASE HR_db;
Query OK, 1 row affected (0.00 sec)

mysql> show databases
    -> ;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| HR_db              |
| cm                 |
| firehose           |
| hue                |
| metastore          |
| mysql              |
| nav                |
| navms              |
| oozie              |
| retail_db          |
| rman               |
| sentry             |
+--------------------+
13 rows in set (0.00 sec)

mysql>
```

Now that we have our database we'll create a table using the "CREATE TABLE <name>" command and also inserting data into it using "INSERT INTO <table> VALUES(var1,var2,va3);"

```
cloudera@quickstart:~
File  Edit  View  Search  Terminal  Help
| sentry             |
+--------------------+
13 rows in set (0.00 sec)

mysql> CREATE TABLE EMPLOYEE(
    -> EMP_ID int NOT NULL,
    -> EMP_LASTNAME varchar(100),
    -> EMP_NAME varchar(100),
    -> EMP_AGE int,
    -> EMP_ROLL varchar(100),
    -> PRIMARY KEY (EMP_ID)
    -> );
ERROR 1046 (3D000): No database selected
mysql> use HR_db;
Database changed
mysql> show tables;
Empty set (0.00 sec)

mysql> CREATE TABLE EMPLOYEE(
    -> EMP_ID int NOT NULL,
    -> EMP_LASTNAME varchar(100),
    -> EMP_NAME varchar(100),
    -> EMP_AGE int,
    -> EMP_ROLL varchar(100),
    -> PRIMARY KEY (EMP_ID)
    -> );
Query OK, 0 rows affected (0.02 sec)

mysql>
```

Let’s view our created table using the “show tables” command and also view it’s respective records using the “SELECT * FROM <table>” command.

```
cloudera@quickstart:~
File  Edit  View  Search  Terminal  Help
    -> PRIMARY KEY (EMP_ID)
    -> );
Query OK, 0 rows affected (0.02 sec)

mysql> SHOW TABLES;
+-----------------+
| Tables_in_HR_db |
+-----------------+
| EMPLOYEE        |
+-----------------+
1 row in set (0.01 sec)

mysql> INSERT INTO EMPLOYEE VALUES(1,"QUINTANILLA","ARTURO",22,"DATA SCIENTIST"),(2,"SANCHEZ","PEDRO",22
,"DATA SCIENTIST"),(3,"WU","JACK",20,"FULLSTACK DEV"),(4,"PEKIN","NIKITA",22,"ETHICAL HACKER");
Query OK, 4 rows affected (0.02 sec)
Records: 4  Duplicates: 0  Warnings: 0

mysql> SELECT * FROM EMPLOYEE;
+--------+--------------+----------+---------+----------------+
| EMP_ID | EMP_LASTNAME | EMP_NAME | EMP_AGE | EMP_ROLL       |
+--------+--------------+----------+---------+----------------+
|      1 | QUINTANILLA  | ARTURO   |      22 | DATA SCIENTIST |
|      2 | SANCHEZ      | PEDRO    |      22 | DATA SCIENTIST |
|      3 | WU           | JACK     |      20 | FULLSTACK DEV  |
|      4 | PEKIN        | NIKITA   |      22 | ETHICAL HACKER |
+--------+--------------+----------+---------+----------------+
4 rows in set (0.00 sec)

mysql>
```

Now let’s make a sqoop evaluation using the special key word “eval” with it’s respective configuration and query which in this case it’s going to be a “SELECT * FROM <table>”.

```
cloudera@quickstart:~
File  Edit  View  Search  Terminal  Help
[cloudera@quickstart ~]$ sqoop eval --connect "jdbc:mysql://quickstart.cloudera:3306/HR
_db" --username=root --password=cloudera --query="SELECT * FROM EMPLOYEE"
Warning: /usr/lib/sqoop/../accumulo does not exist! Accumulo imports will fail.
Please set $ACCUMULO_HOME to the root of your Accumulo installation.
18/05/06 14:55:36 INFO sqoop.Sqoop: Running Sqoop version: 1.4.6-cdh5.13.0
18/05/06 14:55:36 WARN tool.BaseSqoopTool: Setting your password on the command-line is
 insecure. Consider using -P instead.
18/05/06 14:55:36 INFO manager.MySQLManager: Preparing to use a MySQL streaming results
et.
------------------------------------------------------------------------------------
-----------
| EMP_ID      | EMP_LASTNAME         | EMP_NAME             | EMP_AGE     | EMP_ROLL
          |
------------------------------------------------------------------------------------
-----------
| 1           | QUINTANILLA          | ARTURO               | 22          | DATA SCIENT
IST       |
| 2           | SANCHEZ              | PEDRO                | 22          | DATA SCIENT
IST       |
| 3           | WU                   | JACK                 | 20          | FULLSTACK D
EV        |
| 4           | PEKIN                | NIKITA               | 22          | ETHICAL HAC
KER       |
------------------------------------------------------------------------------------
-----------
[cloudera@quickstart ~]$
```

Now let's import our recently created table "EMPLOYEE" as an avro data file using 8 mappers.

cloudera@quickstart:~

File Edit View Search Terminal Help

```
[cloudera@quickstart ~]$ sqoop import --connect "jdbc:mysql://quickstart.cloudera:3306/HR_db" --use
rname=root --password=cloudera --table EMPLOYEE --m=8 --as-avrodatafile
Warning: /usr/lib/sqoop/../accumulo does not exist! Accumulo imports will fail.
Please set $ACCUMULO_HOME to the root of your Accumulo installation.
18/05/06 15:26:51 INFO sqoop.Sqoop: Running Sqoop version: 1.4.6-cdh5.13.0
18/05/06 15:26:51 WARN tool.BaseSqoopTool: Setting your password on the command-line is insecure. C
onsider using -P instead.
18/05/06 15:26:52 INFO manager.MySQLManager: Preparing to use a MySQL streaming resultset.
18/05/06 15:26:52 INFO tool.CodeGenTool: Beginning code generation
18/05/06 15:26:53 INFO manager.SqlManager: Executing SQL statement: SELECT t.* FROM `EMPLOYEE` AS t
 LIMIT 1
18/05/06 15:26:53 INFO manager.SqlManager: Executing SQL statement: SELECT t.* FROM `EMPLOYEE` AS t
 LIMIT 1
18/05/06 15:26:53 INFO orm.CompilationManager: HADOOP_MAPRED_HOME is /usr/lib/hadoop-mapreduce
Note: /tmp/sqoop-cloudera/compile/8b7b1734ddd3900d24bdcd44201b72b2/EMPLOYEE.java uses or overrides
a deprecated API.
Note: Recompile with -Xlint:deprecation for details.
18/05/06 15:27:00 INFO orm.CompilationManager: Writing jar file: /tmp/sqoop-cloudera/compile/8b7b17
34ddd3900d24bdcd44201b72b2/EMPLOYEE.jar
18/05/06 15:27:00 WARN manager.MySQLManager: It looks like you are importing from mysql.
18/05/06 15:27:00 WARN manager.MySQLManager: This transfer can be faster! Use the --direct
18/05/06 15:27:00 WARN manager.MySQLManager: option to exercise a MySQL-specific fast path.
18/05/06 15:27:00 INFO manager.MySQLManager: Setting zero DATETIME behavior to convertToNull (mysql
)
18/05/06 15:27:00 INFO mapreduce.ImportJobBase: Beginning import of EMPLOYEE
18/05/06 15:27:00 INFO Configuration.deprecation: mapred.job.tracker is deprecated. Instead, use ma
```

The importing was successful!

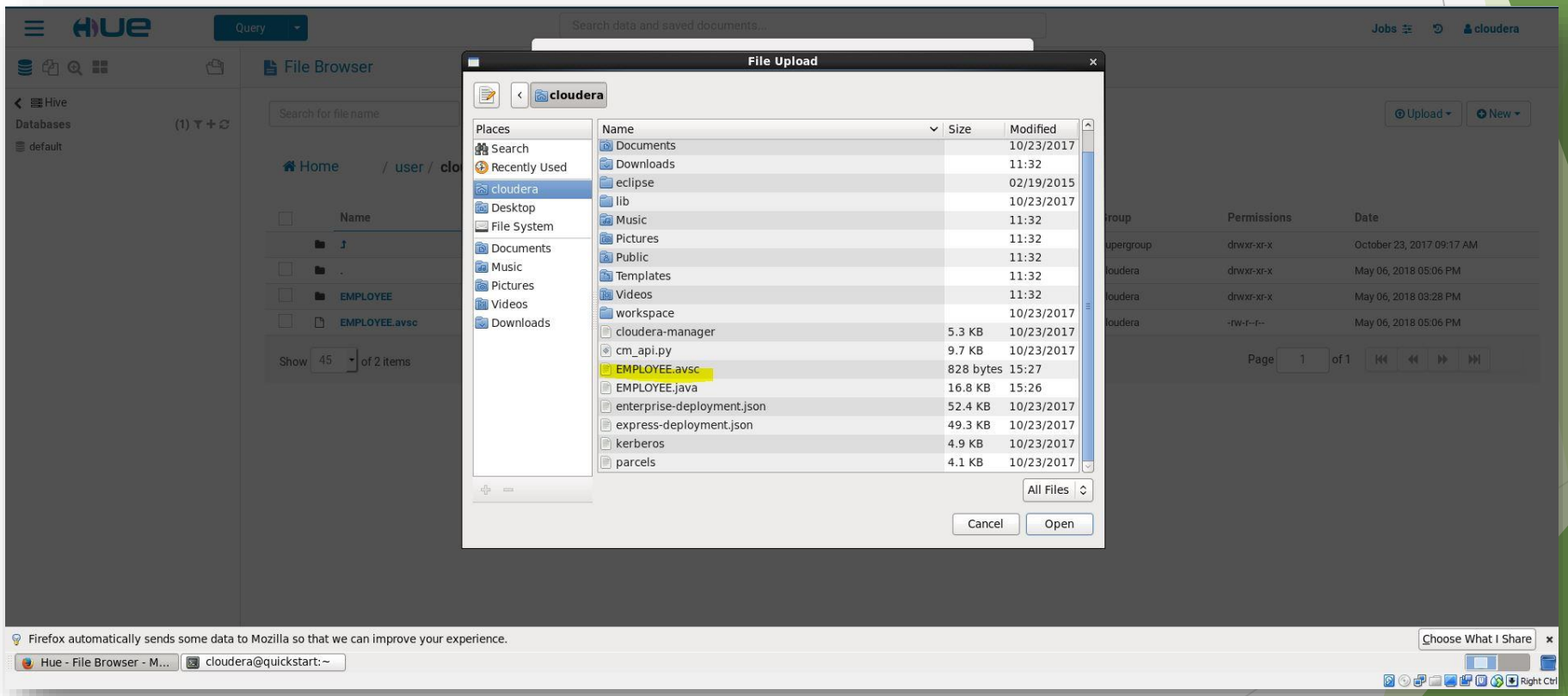
```
cloudera@quickstart:~
File  Edit  View  Search  Terminal  Help
                Other local map tasks=4
                Total time spent by all maps in occupied slots (ms)=143677
                Total time spent by all reduces in occupied slots (ms)=0
                Total time spent by all map tasks (ms)=143677
                Total vcore-milliseconds taken by all map tasks=143677
                Total megabyte-milliseconds taken by all map tasks=147125248
        Map-Reduce Framework
                Map input records=4
                Map output records=4
                Input split bytes=425
                Spilled Records=0
                Failed Shuffles=0
                Merged Map outputs=0
                GC time elapsed (ms)=2286
                CPU time spent (ms)=6220
                Physical memory (bytes) snapshot=838471680
                Virtual memory (bytes) snapshot=6277976064
                Total committed heap usage (bytes)=664797184
        File Input Format Counters
                Bytes Read=0
        File Output Format Counters
                Bytes Written=2721
18/05/06 15:28:18 INFO mapreduce.ImportJobBase: Transferred 2.6572 KB in 72.5817 seconds (37.4888 b
ytes/sec)
18/05/06 15:28:18 INFO mapreduce.ImportJobBase: Retrieved 4 records.
[cloudera@quickstart ~]$
```

Finally let’s view our imported mysql table in HDFS.

```
cloudera@quickstart:~
File  Edit  View  Search  Terminal  Help
[cloudera@quickstart ~]$ hadoop fs -ls
Found 1 items
drwxr-xr-x   - cloudera cloudera          0 2018-05-06 15:28 EMPLOYEE
[cloudera@quickstart ~]$ hadoop fs -ls /EMPLOYEE
ls: `/EMPLOYEE': No such file or directory
[cloudera@quickstart ~]$ hadoop fs -ls EMPLOYEE
Found 5 items
-rw-r--r--   1 cloudera cloudera          0 2018-05-06 15:28 EMPLOYEE/_SUCCESS
-rw-r--r--   1 cloudera cloudera        686 2018-05-06 15:28 EMPLOYEE/part-m-00000.avro
-rw-r--r--   1 cloudera cloudera        681 2018-05-06 15:28 EMPLOYEE/part-m-00001.avro
-rw-r--r--   1 cloudera cloudera        674 2018-05-06 15:28 EMPLOYEE/part-m-00002.avro
-rw-r--r--   1 cloudera cloudera        680 2018-05-06 15:28 EMPLOYEE/part-m-00003.avro
[cloudera@quickstart ~]$
```

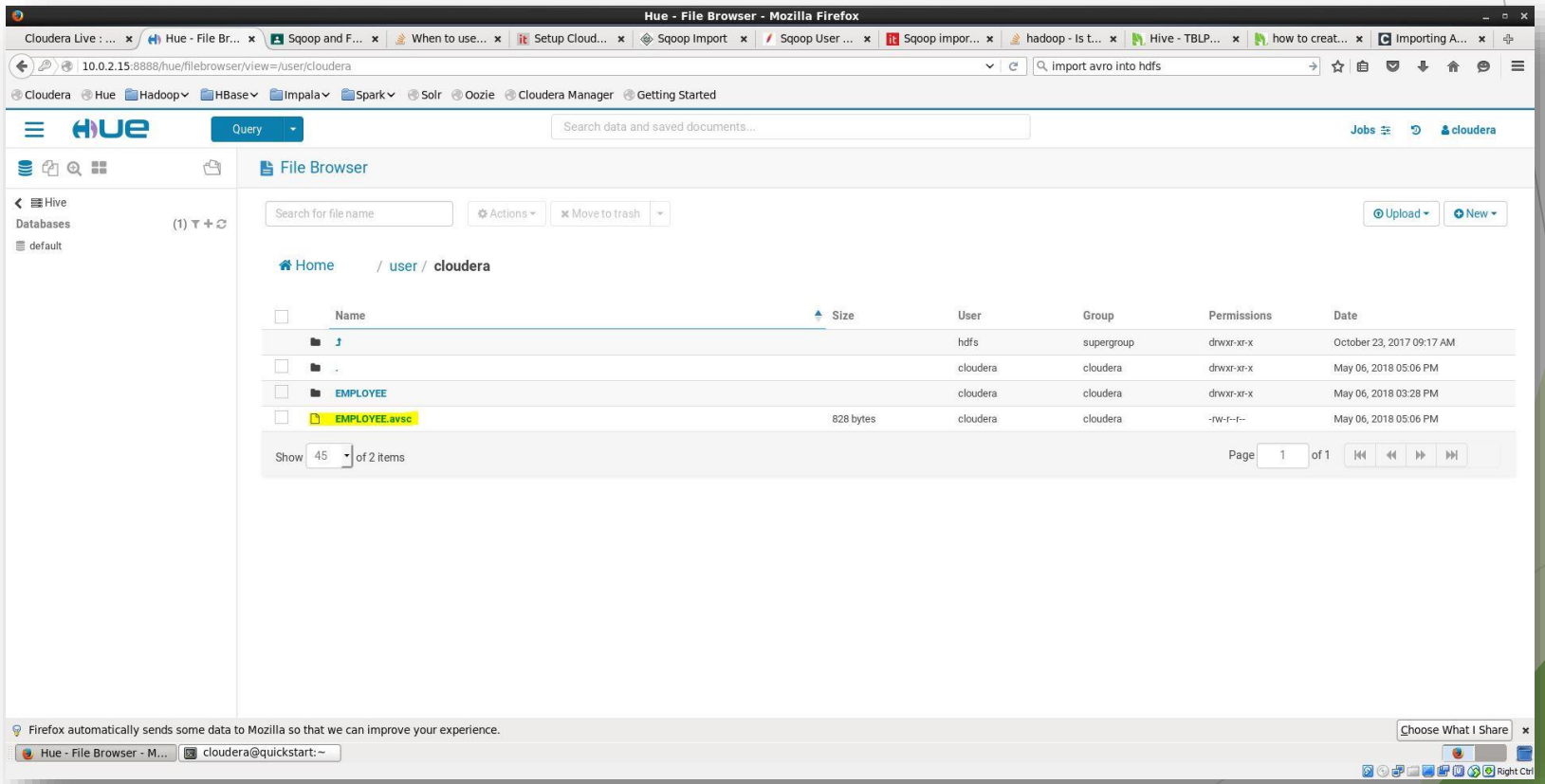
Procedure: Part 3 import avro data to hive

Once our table was imported from mysql to HDFS into avro format now we need to move it into our HDFS working directory.
We can do the following by opening HUE in our cloudera browser and clicking the navbar and selecting files option. Finally click on the upload button to upload your file into HDFS.
This is done because sqoop imported our table data into HDFS but we need the avsc schema file which was saved on the home folder in cloudera file system.

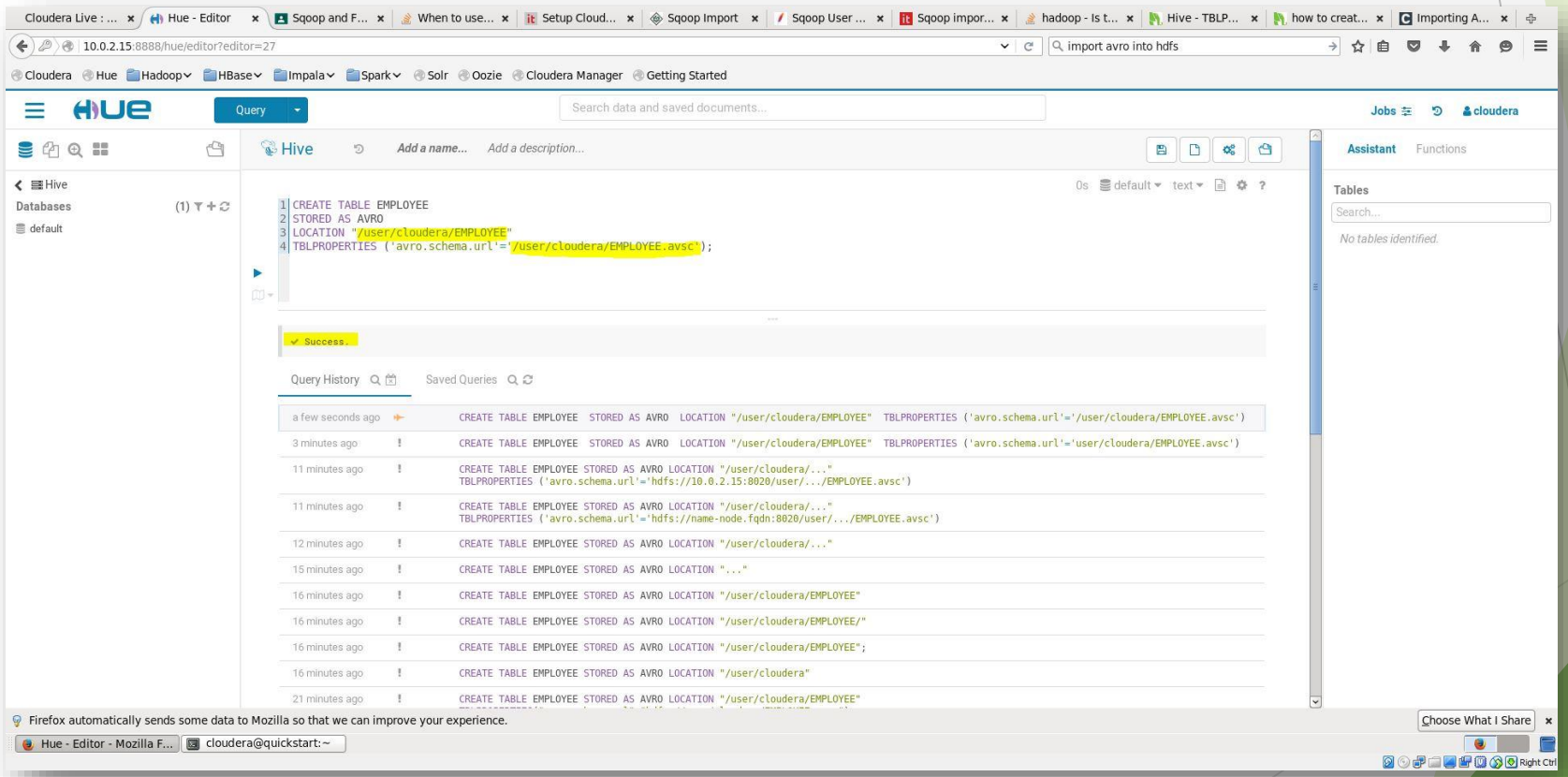


Now we have access to our EMPLOYEE schema which will be used to import our avro data files to hive.

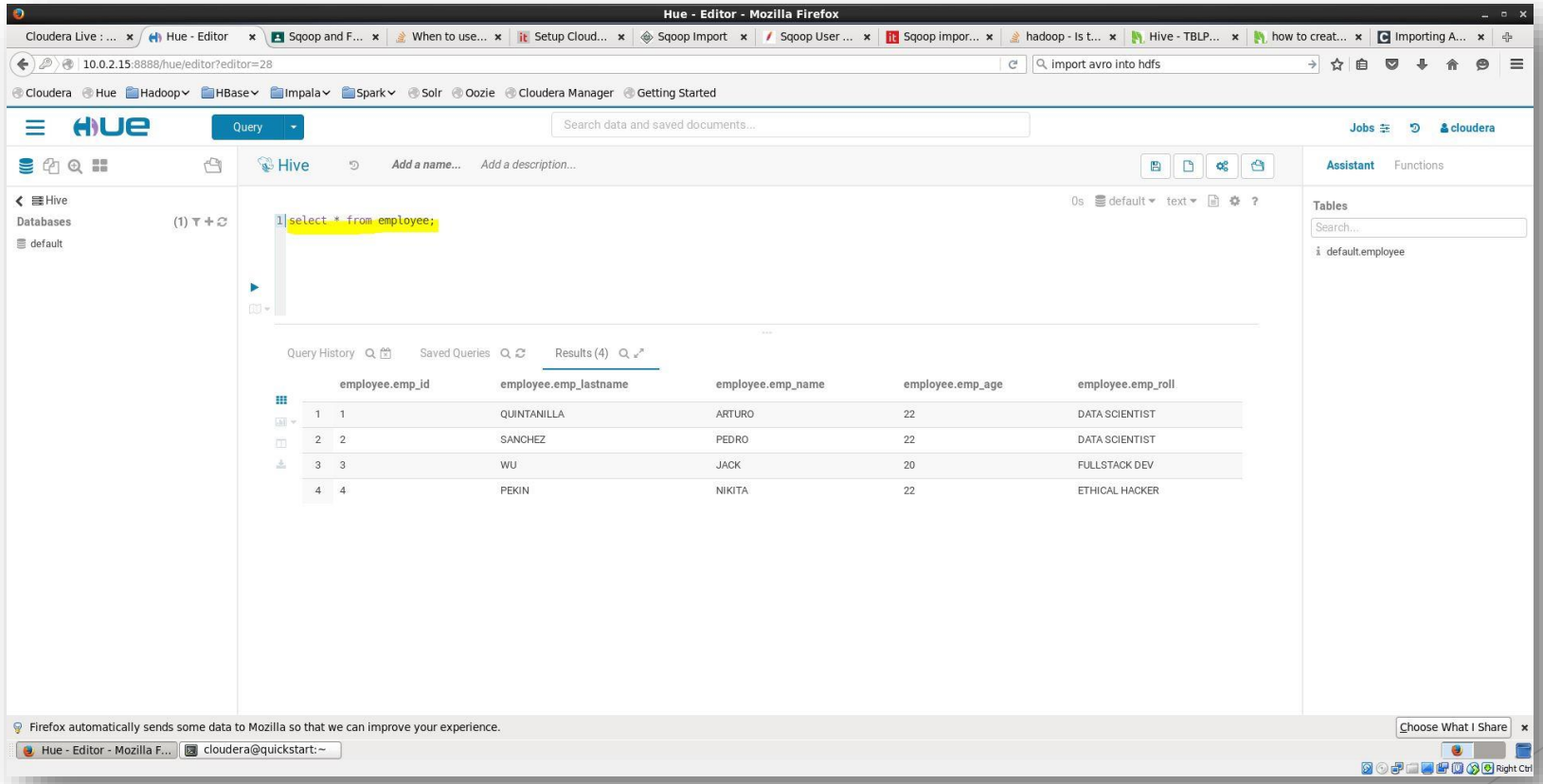
NOTE: *This is done because the flag "--hive-import" is not compatible with avro or sequence data files.*



Now we execute the following query to create a new employee table where we are going to reference our data in hive.



Finally let’s retrieve data from our recently created hive table.



References

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- https://community.hortonworks.com/questions/32385/how-to-create-and-store-the-avro-files-in-hive-tab.html
- https://community.hortonworks.com/questions/15868/hive-tblproperties.html
- https://stackoverflow.com/questions/21539694/is-there-an-equivalent-to-pwd-in-hdfs?utm_medium=organic&utm_source=google_rich_qa&utm_campaign=google_rich_qa
- http://discuss.itversity.com/t/sqoop-import-into-hive-as-avro-datafile/7146/2
- https://sqoop.apache.org/docs/1.4.2/SqoopUserGuide.html#_importing_data_into_hive
- https://www.tutorialspoint.com/sqoop/sqoop_import.htm
- http://www.itversity.com/topic/setup-cloudera-quickstart-vm/
- https://stackoverflow.com/questions/31515498/when-to-use-sqoop-create-hive-table