Querying the Data interactively

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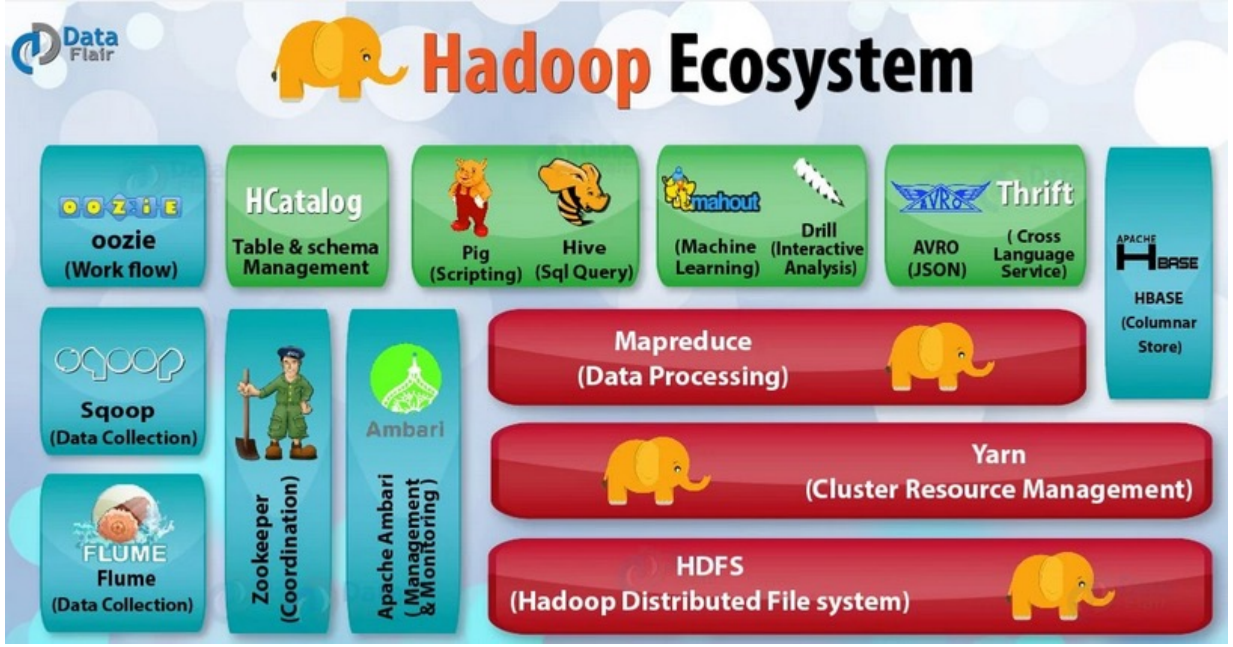
allow us to execute SQL quesries :)

Core Hadoop Ecosystem



https://bit.ly/2JgZwjx

External Data Storage

AC

CP

Query Engines

analyzing the data

develop by fb

Apache Drill – SQL for NoSQL

- A SQL query engine for a variety of non-relational databases and data files
  - *Hive, MongoDB, HBase*

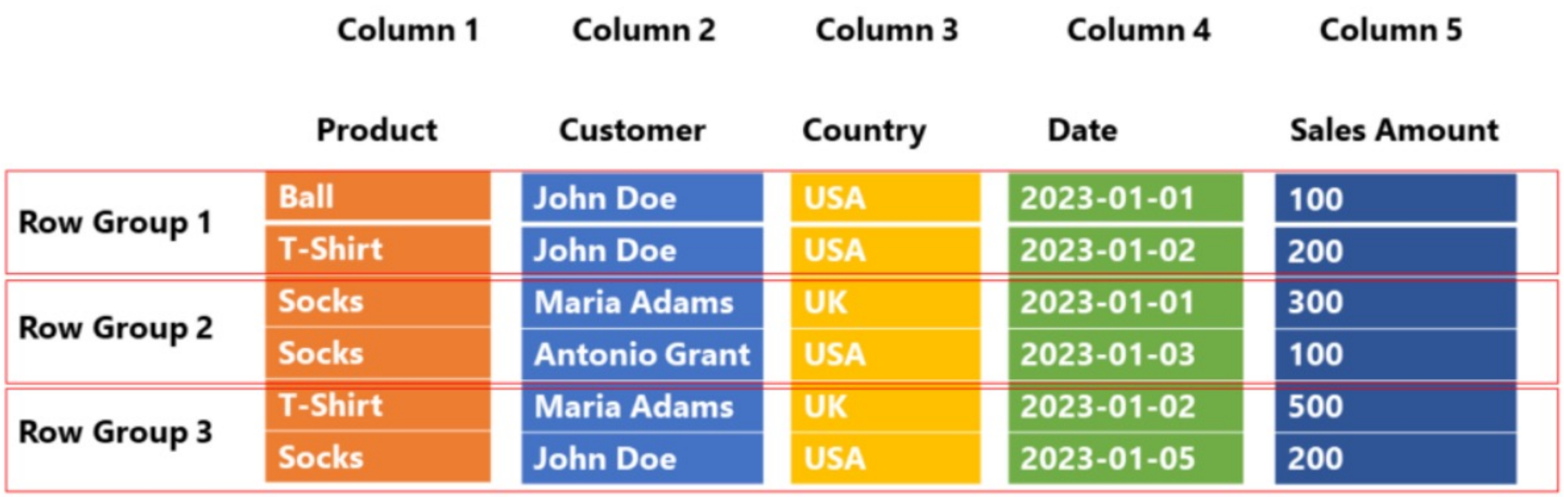
    wh
  - *Flat JSON or Parquet files on HDFS, S3, Azure, Google Cloud, local file system*
- Based on Google's Dremel

- **let us execute actual SQL**

Parquet – columnar format

more efficient in term of storage compared to csv. Different format

- stores the data in row group



	Column 1	Column 2	Column 3	Column 4	Column 5
	Product	Customer	Country	Date	Sales Amount
Row Group 1	Ball	John Doe	USA	2023-01-01	100
	T-Shirt	John Doe	USA	2023-01-02	200
Row Group 2	Socks	Maria Adams	UK	2023-01-01	300
	Socks	Antonio Grant	USA	2023-01-03	100
Row Group 3	T-Shirt	Maria Adams	UK	2023-01-02	500
	Socks	John Doe	USA	2023-01-05	200

https://shorturl.at/efno0

It’s real SQL

- Not SQL-like
- And it has ODBC (Microsoft) / JDBC (Sun Microsystems) driver so other tools can connect to it just like any relational database

  - allow connection to external tools such as Tableau

Drill - Fast and easy to set up

- Still non-relational databases under the hood
- Allow SQL analysis of disparate data sources without having to transform and load
  - *Internally data is represented as JSON and so has no fixed schema*
- Doing JOINS across different database technologies or with JSON files that are sitting around in HDFS
- **having a SQL without a schema**

Let’s Drill

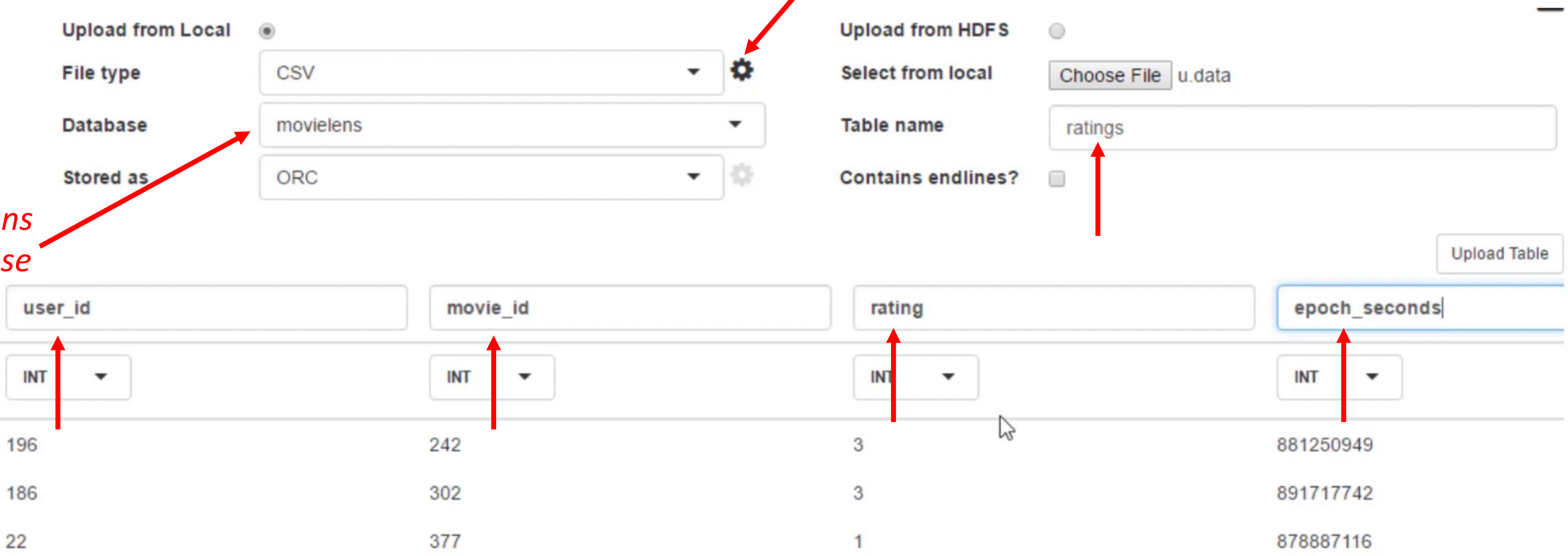
- Import data into Hive (movie ratings) and MongoDB (movie users) – MovieLens datasets
- Set up Drill on top of both
- And do some queries

Setting up Drill

1. Import *u.user* into MongoDB
2. Upload *u.data* into Hive
    - *Login to Ambari as admin*
    - *Start MongoDB*

- Navigate to Hive View to create a new database
    - *CREATE DATABASE movielens;*
- upload u.data into movielens database

Upload data into Hive



Upload from Local ●

File type: CSV

Database: movielens

Stored as: ORC

Upload from HDFS ○

Select from local: Choose File u.data

Table name: ratings

Contains endlines? □

Upload Table

user_id	movie_id	rating	epoch_seconds
INT	INT	INT	INT
196	242	3	881250949
186	302	3	891717742
22	377	1	878887116

tab delimiter

movielens database

Import data into MongoDB

- Log into puTTY as root:

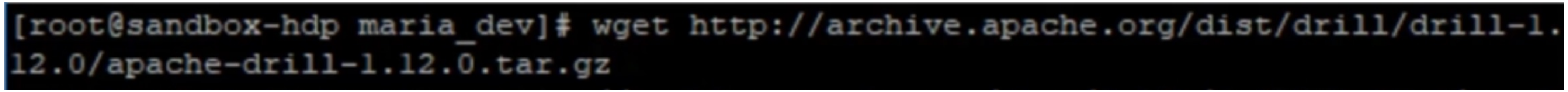
  su root

- run the previous *MongoSpark.py* script to import *u.user* data into mongoDB database [make sure the ~~u.ser~~ ***u.user*** data is still in the ml-100k folder in HDFS]
- submit the script using the following command

  spark-submit --packages org.mongodb.spark:mongo-spark-connector_2.11:2.3.2 MongoSpark.py

Installing Drill

- Not a built-in part of Ambari on Hortonworks platform
- Need to get specific version of *Drill: version 1.12*



```
[root@sandbox-hdp maria_dev]# wget http://archive.apache.org/dist/drill/drill-1.
12.0/apache-drill-1.12.0.tar.gz
```

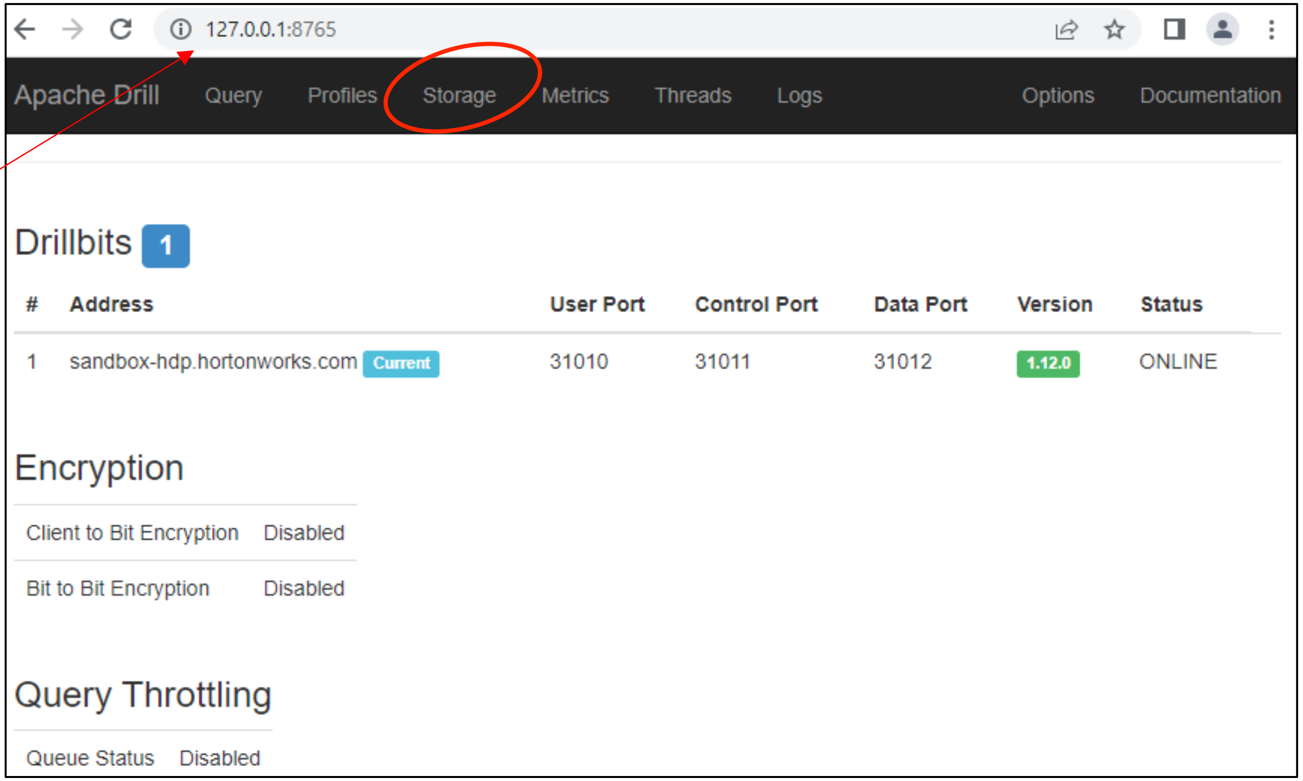
- Decompress the downloaded file
  - *tar –xvf apache-drill-1.12.0.tar.gz*

- To start running Drill, run the following script [open the port 8765]
  - *cd apache-drill-1.12.0*
  - *bin/drillbit.sh start –Ddrill.exec.http.port=8765*

this is to start Drill

Connect Drill through browser

- Log into browser address specific for Drill
  - *127.0.0.1:8765*



Drillbits 1

#	Address	User Port	Control Port	Data Port	Version	Status
1	sandbox-hdp.hortonworks.com Current	31010	31011	31012	1.12.0	ONLINE

Encryption

Client to Bit Encryption	Disabled
Bit to Bit Encryption	Disabled

Query Throttling

Queue Status	Disabled

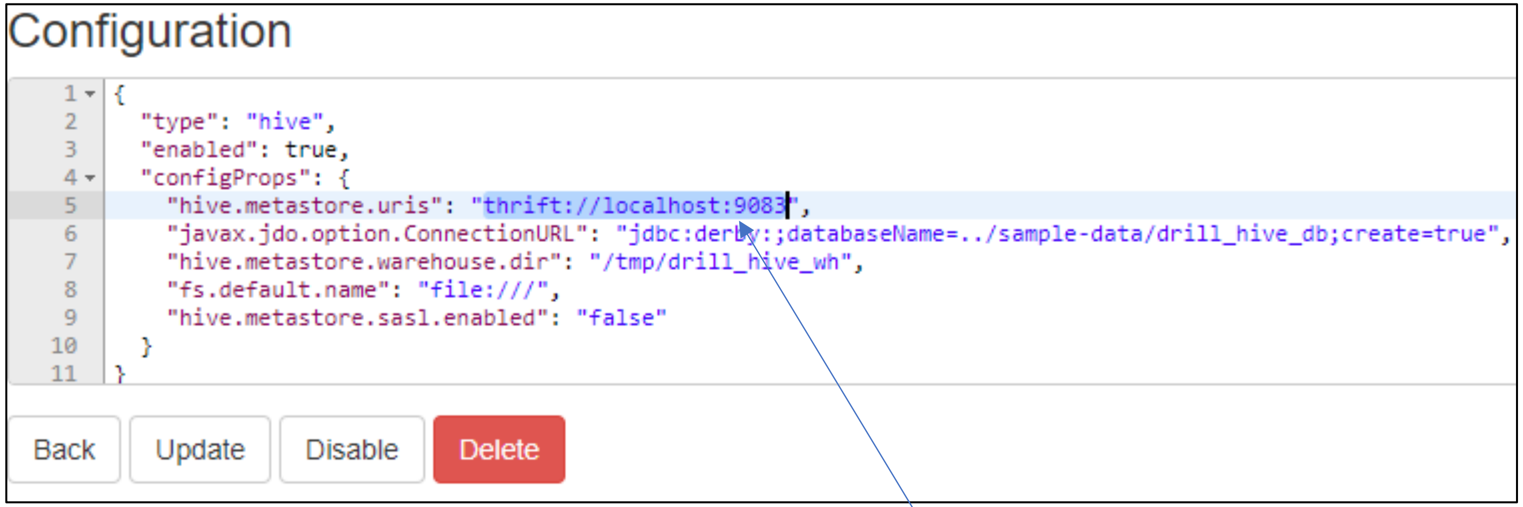
Key in the Drill address

Connect Drill to Hive and MongoDB

- Click ***Storage*** tab
- ***Enable*** both ***mongo and hive***
- Update both hive and mongo

Configure Hive

- Update ***hive.metastore.uris***

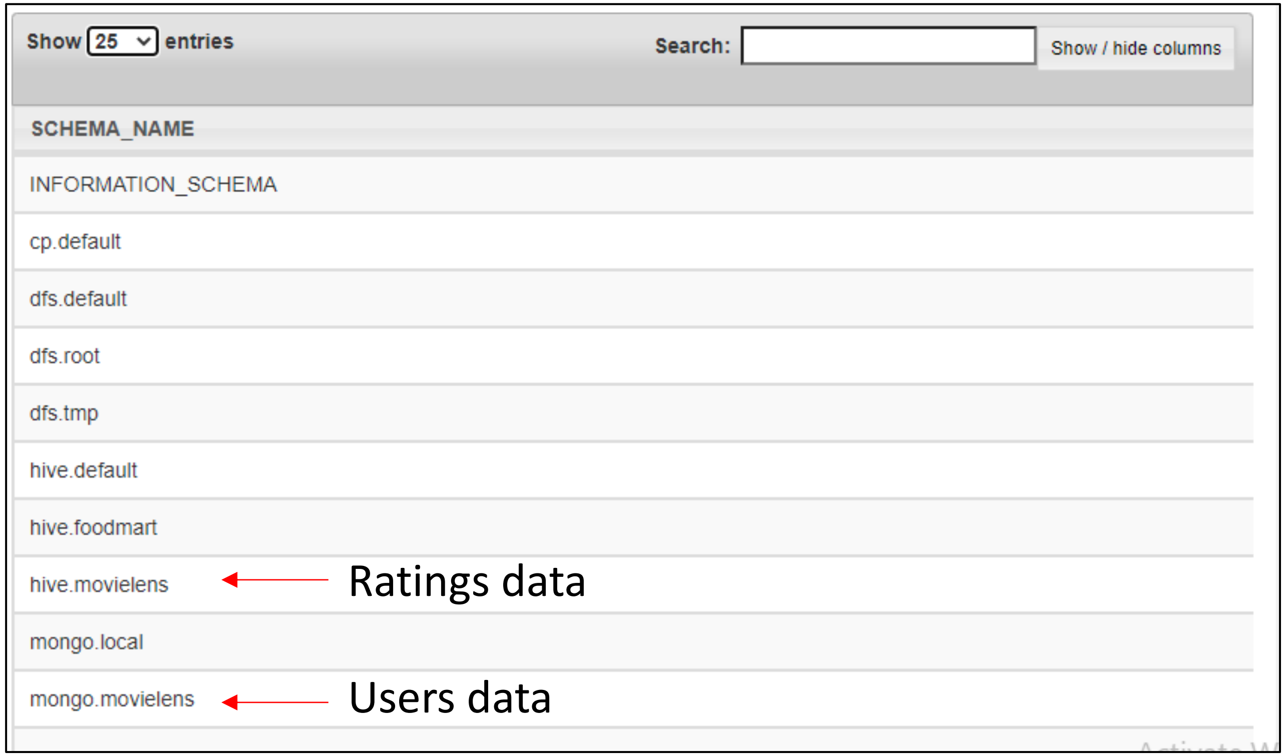


```
{
  "type": "hive",
  "enabled": true,
  "configProps": {
    "hive.metastore.uris": "thrift://localhost:9083",
    "javax.jdo.option.ConnectionURL": "jdbc:derby:;databaseName=../sample-data/drill_hive_db;create=true",
    "hive.metastore.warehouse.dir": "/tmp/drill_hive_wh",
    "fs.default.name": "file:///",
    "hive.metastore.sasl.enabled": "false"
  }
}
```

Update hive metastore accordingly: thrift://localhost:9083

Start querying across multiple databases using Drill

- *SHOW DATABASES;*



Show 25 entries

Search:

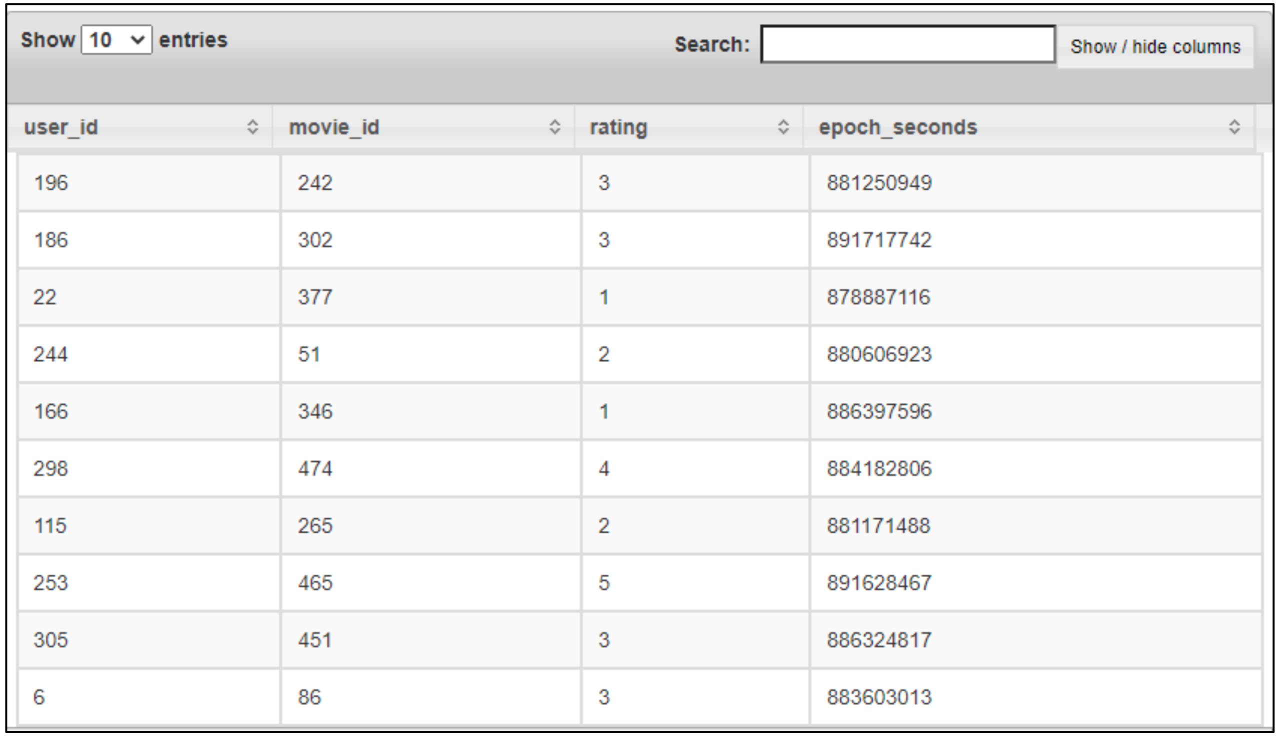
SCHEMA_NAME
INFORMATION_SCHEMA
cp.default
dfs.default
dfs.root
dfs.tmp
hive.default
hive.foodmart
hive.movielens
mongo.local
mongo.movielens

Ratings data

Users data

Start querying (cont…)

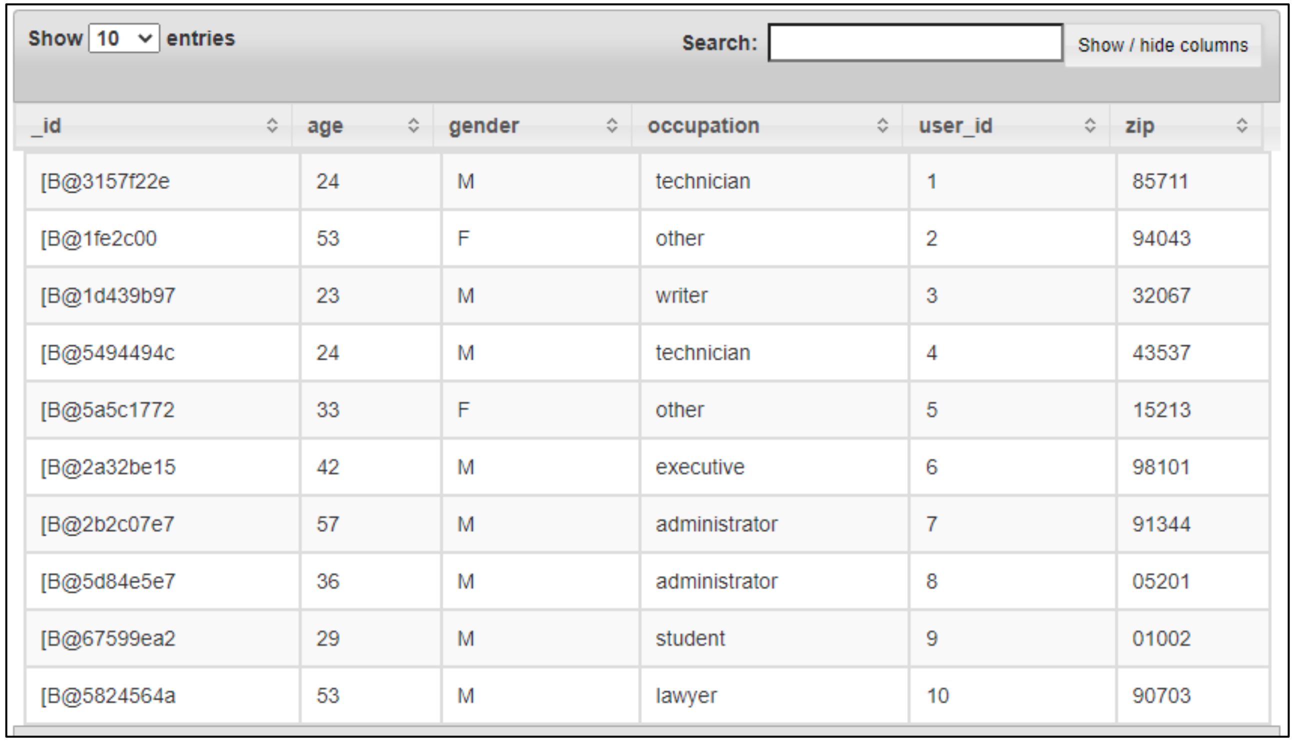
- *SELECT * FROM hive.movielens.ratings LIMIT 10;*



user_id	movie_id	rating	epoch_seconds
196	242	3	881250949
186	302	3	891717742
22	377	1	878887116
244	51	2	880606923
166	346	1	886397596
298	474	4	884182806
115	265	2	881171488
253	465	5	891628467
305	451	3	886324817
6	86	3	883603013

Start querying (cont…)

- *SELECT * FROM mongo.movielens.users LIMIT 10;*

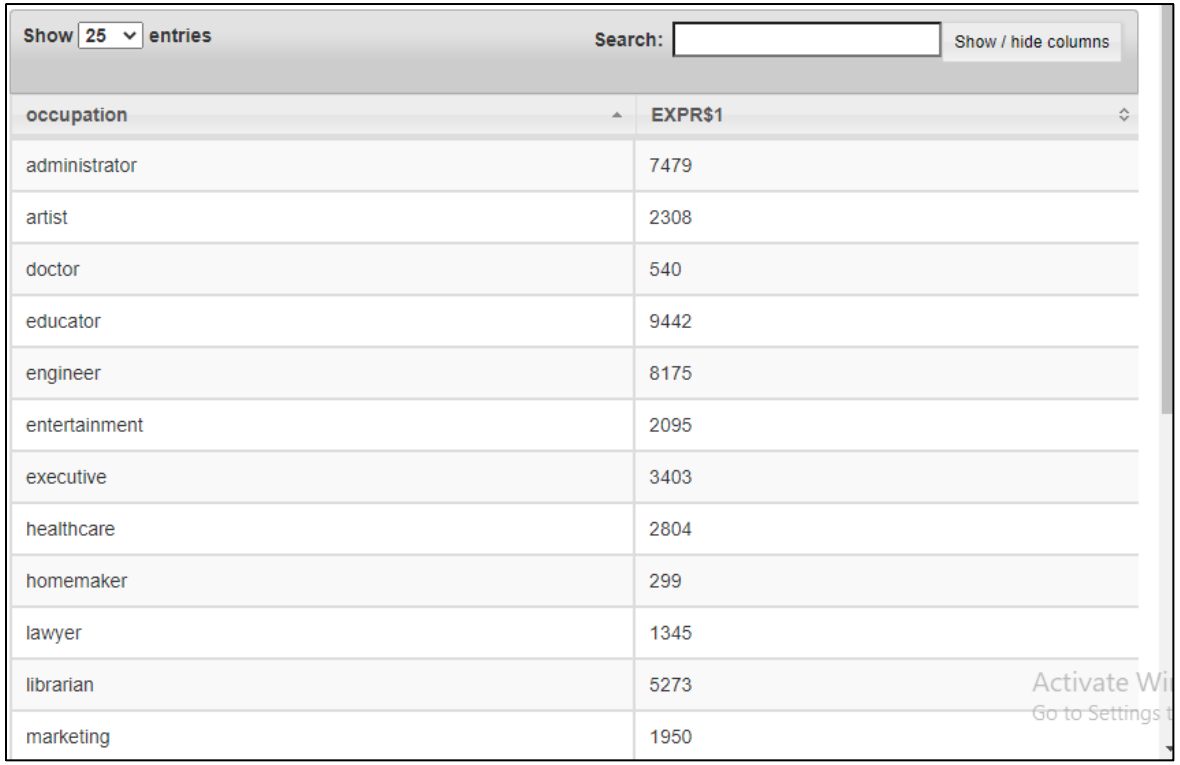


_id	age	gender	occupation	user_id	zip
[B@3157f22e	24	M	technician	1	85711
[B@1fe2c00	53	F	other	2	94043
[B@1d439b97	23	M	writer	3	32067
[B@5494494c	24	M	technician	4	43537
[B@5a5c1772	33	F	other	5	15213
[B@2a32be15	42	M	executive	6	98101
[B@2b2c07e7	57	M	administrator	7	91344
[B@5d84e5e7	36	M	administrator	8	05201
[B@67599ea2	29	M	student	9	01002
[B@5824564a	53	M	lawyer	10	90703

Start querying (cont…)

- *SELECT u.occupation, COUNT(*) FROM hive.movielens.ratings r JOIN mongo.movielens.users u ON r.user_id = u.user_id GROUP BY u.occupation;*

How many ratings were provided by each occupation?



occupation	EXPR$1
administrator	7479
artist	2308
doctor	540
educator	9442
engineer	8175
entertainment	2095
executive	3403
healthcare	2804
homemaker	299
lawyer	1345
librarian	5273
marketing	1950

Remember to clean up the mess!!!

# Stop drillbit

- bin/drillbit.sh stop
- Stop mongoDB in Ambari
- Exit from puTTY and VirtualBox

this is to stop Drill