APACHE HIVE BASICS

Hive

- Large datasets [Equi joins, more built in function,Row level updates,deletes as special case]
- Parallel computations – Distributed systems with multiple machines
- High Latency – Fetching a row will run a mapreduce that might take minutes
- Read Operations – Data can be sourced into Hive tables for schema on read

- Hive is an Abstraction/Layer on top of Map Reduce
- Hive is an open source Data warehouse and part of Larger Hadoop ecosystem
- Hive runs on top of distributed computing framework
- Hive stores the data in HDFS
- Hive runs all processes in the form of MR jobs

Hive Metastore holds schema[metadata]

Warehouse directory : Data stored in Hdfs

Hive Metastore

- Metastore is the bridge between data stored In HDFS as files and the tables exposed to users.
- Stores metadata for all the tables in Hive .
- Maps the files and directories in Hive to tables.
- Any database with JDBC driver can be used as Metastore
- Derby database can be used for Dev environments

Default location :
/user/hive/warehouse
Check out : hive-site.xml

Hive has 2 parts :

1. Data – It is stored in the form of Files
2. Schema or metadata

Schema :
Emp_name
Emp_id

Data :
Ram Kumar 25362
Ashik 25566

Hive Metastore stores all Metadata in Derby database and MYSQL is preferred choice

Hive Complex datatypes

- Array[collection datatype with no fixed size and only arrays of primitive types were allowed]
- Map[unordered collection of pairs & no fixed Size. Each entity is key & value pair]
- Struct [Logical grouping of data and can have different data types]

Hive Built in functions

- UDF – User defined functions [works on single row an d output also single row] ex: trim(),concat(),length(),round(),floor()

- UDAF- User defined aggregate functions [works on multiple rows and output is single row() ex : count(*),sum(),avg()

- UDTF- User defined table generating functions [works on single and outputs multiple row] ex: explode(),posexplode()]

Hive explode function

- Flatten the data in arrays & maps

Manager_Name	Team members
suren	[Karthik,anish,suja]
Arun	[kamini,suresh, arjun]

Karthik
anish
suja
kamini
suresh
arjun

Lateral View

1.Virutal table formed by exploded view which can be joined with the original tables to allow complex queries

Manager_Name	Team members
suren	[Karthik,anish,suja]
Arun	[kamini,suresh,arjun]

Team members
Karthik
anish
suja
kamini
suresh
arjun

Types of Tables

1.Internal Tables or Managed Tables [If you drop the table both data and metadata will be gone]
2.External Tables[If we drop the table only metadata will be gone and data will still be available in HDFS location

Hive set operations

- Union & Union All
- Minus
- Intersect

- Subqueries [IN/NOT IN]
  [Exists/non Exists]
- views

How to create table and See the schema in Hive:

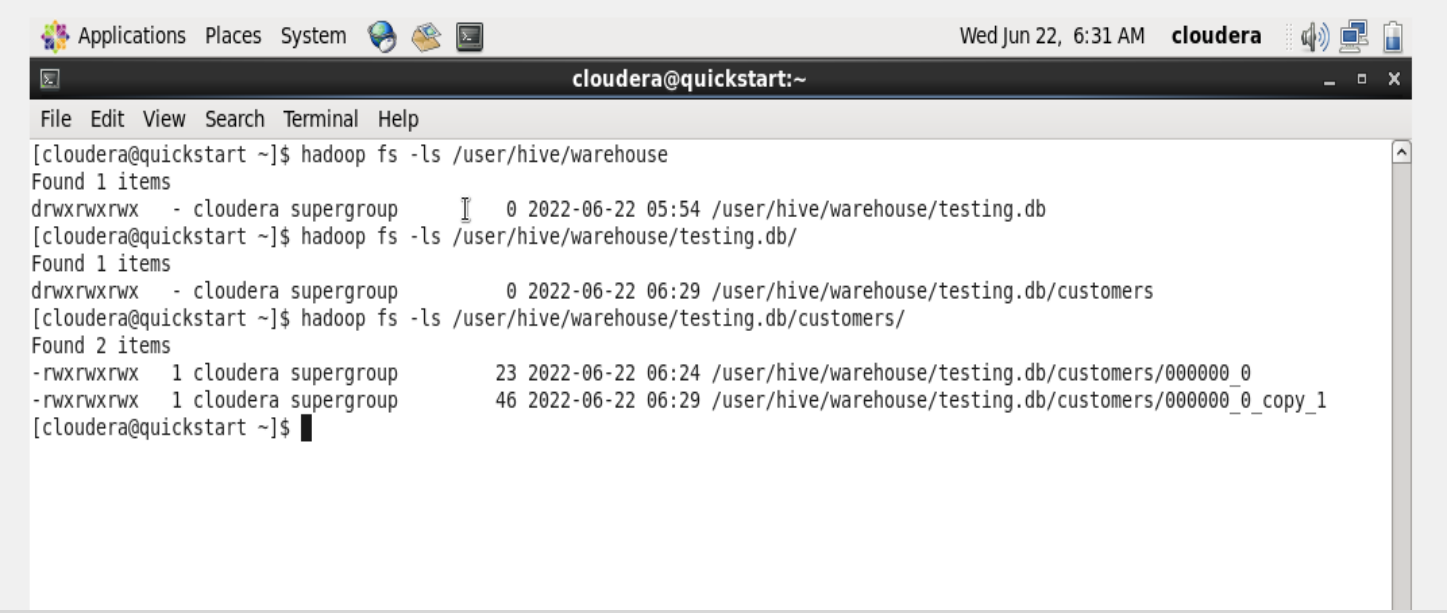
```
hive>
    >
    > create table customers
    > (
    > id bigint,
    > name string,
    > address string);
OK
Time taken: 1.269 seconds
hive> describe customers;
OK
id                      bigint
name                    string
address                 string
Time taken: 0.791 seconds, Fetched: 3 row(s)
hive>
```

```
hive> describe formatted customers;
OK
# col_name              data_type               comment

id                      bigint
name                    string
address                 string

# Detailed Table Information
Database:               testing
Owner:                  cloudera
CreateTime:             Wed Jun 22 05:54:55 PDT 2022
LastAccessTime:         UNKNOWN
Protect Mode:           None
Retention:              0
Location:               hdfs://quickstart.cloudera:8020/user/hive/warehouse/testing.db/customers
Table Type:             MANAGED_TABLE
Table Parameters:
        transient_lastDdlTime   1655902495

# Storage Information
SerDe Library:          org.apache.hadoop.hive.serde2.lazy.LazySimpleSerDe
InputFormat:            org.apache.hadoop.mapred.TextInputFormat
OutputFormat:           org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat
Compressed:             No
Num Buckets:            -1
Bucket Columns:         []
Sort Columns:           []
Storage Desc Params:
        serialization.format    1
Time taken: 0.247 seconds, Fetched: 28 row(s)
hive>
```

New Tab - Mozilla Firef... | cloudera@quickstart:~ | cloudera@quickstart:~

Data stored in Warehouse directory & Look for the data inserted :

Database : Testing
Tables: customers



Use Beeline to see data in structured Tabular format:

beeline –u jdbc:hive2://

```
[cloudera@quickstart ~]$ beeline -u jdbc:hive2://
scan complete in 6ms
Connecting to jdbc:hive2://
Connected to: Apache Hive (version 1.1.0-cdh5.13.0)
Driver: Hive JDBC (version 1.1.0-cdh5.13.0)
Transaction isolation: TRANSACTION_REPEATABLE_READ
Beeline version 1.1.0-cdh5.13.0 by Apache Hive
0: jdbc:hive2://> select * from testing.customers limit 2;
OK
+---------------+----------------+--------------------+--+
| customers.id  | customers.name | customers.address  |
+---------------+----------------+--------------------+--+
| 232252        | sunitha        | Newyork            |
| 232952        | hasan          | London             |
+---------------+----------------+--------------------+--+
2 rows selected (1.9 seconds)
0: jdbc:hive2://>
```

Running beeline query from Terminal:

beeline –u jdbc:hive2:// -e "select * from testing.customers limit 2"

```
[cloudera@quickstart ~]$ beeline -u jdbc:hive2:// -e "select * from testing.customers limit 2"
scan complete in 1ms
Connecting to jdbc:hive2://
Connected to: Apache Hive (version 1.1.0-cdh5.13.0)
Driver: Hive JDBC (version 1.1.0-cdh5.13.0)
Transaction isolation: TRANSACTION_REPEATABLE_READ
OK
+--------------+----------------+-------------------+--+
| customers.id | customers.name | customers.address |
+--------------+----------------+-------------------+--+
| 232252       | sunitha        | Newyork           |
| 232952       | hasan          | London            |
+--------------+----------------+-------------------+--+
2 rows selected (2.288 seconds)
Beeline version 1.1.0-cdh5.13.0 by Apache Hive
Closing: 0: jdbc:hive2://
[cloudera@quickstart ~]$
```

Run a HQL script through Beeline:

beeline –u jdbc:hive2:// -f /home/cloudera/sample.hql

Applications Places System

cloudera@quickstart:~

File Edit View Search Terminal Help

```
[cloudera@quickstart ~]$ gedit sample.hql
[cloudera@quickstart ~]$ beeline -u jdbc:hive2:// -f /home/cloudera/sample.hql
scan complete in 2ms
Connecting to jdbc:hive2://
Connected to: Apache Hive (version 1.1.0-cdh5.13.0)
Driver: Hive JDBC (version 1.1.0-cdh5.13.0)
Transaction isolation: TRANSACTION_REPEATABLE_READ
0: jdbc:hive2://> show databases;
OK
+----------------+--+
| database_name  |
+----------------+--+
| default        |
| testing        |
+----------------+--+
2 rows selected (1.183 seconds)
0: jdbc:hive2://> use testing;
OK
No rows affected (0.143 seconds)
0: jdbc:hive2://> select * from testing.customers limit 3;
OK
+---------------+-----------------+--------------------+--+
| customers.id  | customers.name  | customers.address  |
+---------------+-----------------+--------------------+--+
| 232252        | sunitha         | Newyork            |
| 232952        | hasan           | London             |
| 232452        | amaran          | Kula lumpur        |
+---------------+-----------------+--------------------+--+
3 rows selected (0.703 seconds)
0: jdbc:hive2://>
0: jdbc:hive2://>
Closing: 0: jdbc:hive2://
[cloudera@quickstart ~]$
```

Thank You !!!!!!!!!!!!