

**Exp5: Installation of Hive on Ubuntu****Aim:**

To Download and install Hive, Understanding Startup scripts, Configuration files.

**Procedure:****Step 1: Download and extract it**

Download the Apache hive and extract it use tar, the commands given below:

```
$wgethttps://downloads.apache.org/hive/hive-3.1.3/apache-hive-3.1.3-bin.tar.gz
```

```
$ tar -xvf apache-hive-3.1.3-bin.tar.gz
```

**Step 2: Place different configuration properties in Apache Hive**

In this step, we are going to do two things ○

Placing Hive Home path in bashrc  
file

```
$nano .bashrc
```

*And append the below lines in it*

```
export HIVE_HOME=/home/hadoop/apache-hive-3.1.2-bin
export PATH=$PATH:$HIVE_HOME/bin
export HADOOP_USER_CLASSPATH_FIRST=true
```

2. Exporting **Hadoop path in Hive-config.sh** (To communicate with the Hadoop ecosystem we are defining Hadoop Home path in hive config field) **Open the**

**hiveconfig.sh as shown in below** *\$cd apache-hive-3.1.2-bin/bin*

```
$cp hive-env.sh.template hive-env.sh
```

```
$nano hive-env.sh
```

*Append the below commands on it export*

```
HADOOP_HOME=/home/Hadoop/Hadoop
```

```
export HIVE_CONF_DIR=/home/Hadoop/apache-hive-3.1.2/conf
```

```
# Set HADOOP_HOME to point to a specific hadoop install directory
# HADOOP_HOME=${bin}/../.. /hadoop
export HADOOP_HOME=/home/hadoop/hadoop

# Hive Configuration Directory can be controlled by:
# export HIVE_CONF_DIR=
export HIVE_CONF_DIR=/home/hadoop/apache-hive-3.1.2-bin/conf
# Folder containing extra libraries required for hive compilation/execution can be controlled by:
```

**Step 3: Install mysql**

1. Install mysql in Ubuntu by running this command:

```
$sudo apt update
```

```
$sudo apt install mysql-server
```

2. *Alter username and password for MySQLby running below commands:*

```
$sudomysql
```

Pops command line interface for MySQL and run the below SQL queries to change username and set password

*mysql> SELECT user, host, plugin FROM mysql.user WHERE user = 'root';*

```
vishva-a@vishva-a-VirtualBox: ~  
vishva-a@vishva-a-VirtualBox:~$ mysql --version  
mysql Ver 8.0.39-0ubuntu0.24.04.2 for Linux on x86_64 ((Ubuntu))  
vishva-a@vishva-a-VirtualBox:~$ sudo mysql  
[sudo] password for vishva-a:  
Sorry, try again.  
[sudo] password for vishva-a:  
Welcome to the MySQL monitor.  Commands end with ; or \g.  
Your MySQL connection id is 8  
Server version: 8.0.39-0ubuntu0.24.04.2 (Ubuntu)  
  
Copyright (c) 2000, 2024, Oracle and/or its affiliates.  
  
Oracle is a registered trademark of Oracle Corporation and/or its  
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 |  
| mysql |  
| performance_schema |  
| sys |  
+-----+  
4 rows in set (40.15 sec)
```

```
vishva-a@vishva-a-VirtualBox:~$ mysql -u root -p  
Enter password:  
Welcome to the MySQL monitor.  Commands end with ; or \g.  
Your MySQL connection id is 17  
Server version: 8.0.39-0ubuntu0.24.04.2 (Ubuntu)  
  
Copyright (c) 2000, 2024, Oracle and/or its affiliates.  
  
Oracle is a registered trademark of Oracle Corporation and/or its  
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> SELECT user, host, plugin FROM mysql.user WHERE USER='root';  
+-----+  
| user | host | plugin |  
+-----+  
| root | localhost | mysql_native_password |  
+-----+  
1 row in set (0.17 sec)  
  
mysql> ALTER USER 'root'@'localhost' IDENTIFIED WITH 'mysql_native_password' BY 'db1234';  
Query OK, 0 rows affected (0.42 sec)
```

*mysql> ALTER USER 'root'@'localhost' IDENTIFIED WITH 'mysql\_native\_password' BY 'your\_new\_password';*

*mysql> FLUSH PRIVILEGES;*

#### Step 4: Config hive-site.xml

Config the hive-site.xml by appending this xml code and change the username and password according to your MySQL.

*\$cd apache-hive-3.1.2-bin/bin*

*\$cp hive-default.xml.template hive-site.xml*

*\$nano hive-site.xml*

*Append these lines into it*

*Replace root as your username of MySQL*

*Replace your\_new\_password as with your password of MySQL*

```
<configuration>
<property>
  <name>javax.jdo.option.ConnectionURL</name>
  <value>jdbc:mysql://localhost/metastore?createDatabaseIfNotExist=true</value>
</property>

<property>
  <name>javax.jdo.option.ConnectionDriverName</name>
  <value>com.mysql.cj.jdbc.Driver</value>
</property>

<property>
  <name>javax.jdo.option.ConnectionUserName</name>
  <value>root</value>
</property>

<property>
  <name>javax.jdo.option.ConnectionPassword</name>
  <value>your_new_password</value>
</property>

<property>
  <name>datanucleus.autoCreateSchema</name>
  <value>true</value>
</property>

<property>
  <name>datanucleus.fixedDatastore</name>
  <value>true</value>
</property>

<property>
  <name>datanucleus.autoCreateTables</name>
  <value>True</value>
</property>

</configuration>
```

#### **Step 5: Setup MySQL java connector:**

*First, you'll need to download the MySQL Connector/J, which is the JDBC driver for MySQL. You can download it from the below link*

[https://drive.google.com/file/d/1QFhB7Kvcat7a4LzDRe6GcmZva1yAxKz/view?usp=drive\\_link](https://drive.google.com/file/d/1QFhB7Kvcat7a4LzDRe6GcmZva1yAxKz/view?usp=drive_link)

Copy the downloaded MySQL Connector/J JAR file to the Hive library directory. By default, the Hive library directory is usually located at *path/to/apache-hive-3.1.2/lib* on Ubuntu. Use the following command to copy the JAR file:

*\$sudo cp /path/to/mysql-connector-java-8.0.15.jar /path/to/apache-hive-3.1.2/lib/ Replace /path/to/ with the actual path to the JAR file.*

### Step 6: Initialize the Hive Metastore Schema:

*Run the following command to initialize the Hive metastore schema:*

*\$\$HIVE\_HOME/bin/schematool -initSchema -dbTypemysql*

```
vishva-a@vishva-a-VirtualBox: ~/mysql-connector-j-9.0.0
vishva-a@vishva-a-VirtualBox:~$ cd mysql-connector-j-9.0.0
vishva-a@vishva-a-VirtualBox:~/mysql-connector-j-9.0.0$ ls
build.xml  INFO_BIN  LICENSE  README
vishva-a@vishva-a-VirtualBox:~/mysql-connector-j-9.0.0$ sudo cp mysql-connector-j-9.0.0.jar /usr/share/java/mysql-connector.jar
vishva-a@vishva-a-VirtualBox:~/mysql-connector-j-9.0.0$ sudo cp mysql-connector-j-9.0.0.jar
cp: missing destination file operand after 'mysql-connector-j-9.0.0.jar'
Try 'cp --help' for more information.
vishva-a@vishva-a-VirtualBox:~/mysql-connector-j-9.0.0$ sudo cp mysql-connector-j-9.0.0.jar //home/vishva-a/apache-hive-3.1.3-bin/lib/mysql-connector.jar
vishva-a@vishva-a-VirtualBox:~/mysql-connector-j-9.0.0$ ls
build.xml  CHANGES  INFO_BIN  INFO_SRC  LICENSE  mysql-connector-j-9.0.0.jar  README  src
vishva-a@vishva-a-VirtualBox:~/mysql-connector-j-9.0.0$ ls $HIVE_HOME/bin/schematool
/home/vishva-a/apache-hive-3.1.3-bin/bin/schematool
vishva-a@vishva-a-VirtualBox:~/mysql-connector-j-9.0.0$ schematool -initSchema -dbType mysql --verbose
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/home/vishva-a/apache-hive-3.1.3-bin/lib/log4j-slf4j-impl-2.17.1.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/home/vishva-a/hadoop-3.3.6/share/hadoop/common/lib/slf4j-reload4j-1.7.36.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.apache.logging.slf4j.Log4jLoggerFactory]
Metastore connection URL:      jdbc:mysql://localhost/metastore?createDatabaseIfNotExist=true
Metastore Connection Driver :   com.mysql.cj.jdbc.Driver
Metastore connection User:      root
Starting metastore schema initialization to 3.1.0
Initialization script hive-schema-3.1.0.mysql.sql
Connecting to jdbc:mysql://localhost/metastore?createDatabaseIfNotExist=true
Connected to: MySQL (version 8.0.39-0ubuntu0.24.04.2)
Driver: MySQL Connector/J (version mysql-connector-j-9.0.0 (Revision: e0e8e3461e5257ba4aa19e6b3614a2685b298947))
Transaction isolation: TRANSACTION_READ_COMMITTED
0: jdbc:mysql://localhost/metastore> !autocommit on
```

```
vishva-a@vishva-a-VirtualBox: ~/mysql-connector-j-9.0.0
0: jdbc:mysql://localhost/metastore> CREATE TABLE RUNTIME_STATS ( RS_ID bigint primary key, CREATE_TIME bigint NOT NULL, WEIGHT bigint NOT NULL, PAYLOAD blob ) ENGINE=InnoDB DEFAULT CHARSET=latin1
No rows affected (0.077 seconds)
0: jdbc:mysql://localhost/metastore> CREATE INDEX IDX_RUNTIME_STATS_CREATE_TIME ON RUNTIME_STATS(CREATE_TIME)
No rows affected (0.055 seconds)
0: jdbc:mysql://localhost/metastore> INSERT INTO VERSION (VER_ID, SCHEMA_VERSION, VERSION_COMMENT) VALUES (1, '3.1.0', 'Hive release version 3.1.0')
1 row affected (0.019 seconds)
0: jdbc:mysql://localhost/metastore> /*!40101 SET character_set_client = @saved_cs_client */
No rows affected (0.008 seconds)
0: jdbc:mysql://localhost/metastore> /*!40103 SET TIME_ZONE=@OLD_TIME_ZONE */
No rows affected (0.005 seconds)
0: jdbc:mysql://localhost/metastore> /*!40101 SET SQL_MODE=@OLD_SQL_MODE */
No rows affected (0.002 seconds)
0: jdbc:mysql://localhost/metastore> /*!40014 SET FOREIGN_KEY_CHECKS=@OLD_FOREIGN_KEY_CHECKS */
No rows affected (0.007 seconds)
0: jdbc:mysql://localhost/metastore> /*!40014 SET UNIQUE_CHECKS=@OLD_UNIQUE_CHECKS */
No rows affected (0.007 seconds)
0: jdbc:mysql://localhost/metastore> /*!40101 SET CHARACTER_SET_CLIENT=@OLD_CHARACTER_SET_CLIENT */
No rows affected (0.003 seconds)
0: jdbc:mysql://localhost/metastore> /*!40101 SET CHARACTER_SET_RESULTS=@OLD_CHARACTER_SET_RESULTS */
No rows affected (0.002 seconds)
0: jdbc:mysql://localhost/metastore> /*!40101 SET COLLATION_CONNECTION=@OLD_COLLATION_CONNECTION */
No rows affected (0.002 seconds)
0: jdbc:mysql://localhost/metastore> /*!40111 SET SQL_NOTES=@OLD_SQL_NOTES */
No rows affected (0.002 seconds)
0: jdbc:mysql://localhost/metastore> !closeall
Closing: 0: jdbc:mysql://localhost/metastore?createDatabaseIfNotExist=true
beeline>
beeline> Initialization script completed
schemaTool completed
vishva-a@vishva-a-VirtualBox:~/mysql-connector-j-9.0.0$
```



### Step 7: Start hive:

You can test Hive by running the Hive shell: Copy code hive You should be able to run Hive queries, and metadata will be stored in your MySQL database. *\$hive*

```
vishva-a@vishva-a-VirtualBox:~$ cd mysql-connector-j-9.0.0
vishva-a@vishva-a-VirtualBox:~/mysql-connector-j-9.0.0$ hive
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/home/vishva-a/apache-hive-3.1.3-bin/lib/log4j-slf4j-impl-2.17.1.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/home/vishva-a/hadoop-3.3.6/share/hadoop/common/lib/slf4j-reload4j-1.7.36.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.apache.logging.slf4j.Log4jLoggerFactory]
Hive Session ID = d30910e4-18c9-4aa2-a7cf-d8e388d660d6

Logging initialized using configuration in jar:file:/home/vishva-a/apache-hive-3.1.3-bin/lib/hive-common-3.1.3.jar!/hive-log4j2.properties Async: true
Hive-on-MR is deprecated in Hive 2 and may not be available in the future versions. Consider using a different execution engine (i.e. spark, tez) or using Hive 1.X releases.
Hive Session ID = e7b53f6e-54ae-4713-9a65-d66ebdf97952
hive> show databases;
OK
default
Time taken: 1.843 seconds, Fetched: 1 row(s)
hive> █
```

### Result:

Thus, the Apache Hive installation is completed successfully on Ubuntu.

## **Exp5a: Design and test various schema models to optimize data storage and retrieval Using Hive.**

### **Aim:**

To Design and test various schema models to optimize data storage and retrieval Using Hbase.

### **Procedure:**

#### **Step 1: Start Hive**

Open a terminal and start Hive by running:

**\$hive**

#### **Step 2: Create a Database**

Create a new database in Hive: **hive>CREATE**

**DATABASE financials;**

```
hive> CREATE DATABASE financials;
```

```
OK
```

```
Time taken: 0.063 seconds
```

#### **Step 3: Use the Database:**

Switch to the newly created database: **hive>use**

**financials;**

```
hive> use financials;
```

```
OK
```

```
Time taken: 0.066 seconds
```

#### **Step 4: Create a Table:**

Create a simple table in your database:

**hive>CREATE TABLE finance\_table( id INT, name STRING );**

```
hive> CREATE TABLE finance_table (  
  > id INT,  
  > name STRING  
  > );
```

```
OK
```

```
Time taken: 0.768 seconds
```

#### **Step 5: Load Sample Data:**

You can insert sample data into the table:

**hive>INSERT INTO finance\_tableVALUES (1, 'Alice'), (2, 'Bob'), (3, 'Charlie');**

```
hive> INSERT INTO finance_table VALUES
> (1, 'Alice'),
> (2, 'Bob'),
> (3, 'Charlie');
Query ID = hadoop_20231028192937_fdebeb4e-abf7-4bad-a248-ac908246e3c1
Total jobs = 3
Launching Job 1 out of 3
Number of reduce tasks determined at compile time: 1
In order to change the average load for a reducer (in bytes):
  set hive.exec.reducers.bytes.per.reducer=<number>
In order to limit the maximum number of reducers:
  set hive.exec.reducers.max=<number>
In order to set a constant number of reducers:
  set mapreduce.job.reduces=<number>
Job running in-process (local Hadoop)
2023-10-28 19:29:41,158 Stage-1 map = 0%,  reduce = 0%
```

### **Step 6: Query Your Data**

Use SQL-like queries to retrieve data from your table:

*hive>CREATE VIEW myview AS SELECT name, id FROM finance\_table;*

### **Step 7: View the data:**

To see the data in the view, you would need to query the view *hive>SELECT\*FROM myview;*

```
hive> SELECT * FROM myview;
OK
Alice    1
Bob      2
Charlie  3
Time taken: 0.238 seconds, Fetched: 3 row(s)
```

### **Step 8: Describe a Table:**

You can describe the structure of a table using the DESCRIBE command:

*hive>DESCRIBE finance\_table;*

```
hive> DESCRIBE finance_table;
OK
id                int
name              string
Time taken: 0.081 seconds, Fetched: 2 row(s)
```

### **Step 9: Alter a Table:**

You can alter the table structure by adding a new column: *hive>ALTER TABLE finance\_table ADD COLUMNS (age INT);*

```
hive> ALTER TABLE finance_table ADD COLUMNS (age INT);
OK
Time taken: 0.165 seconds
```

### **Step 10: Quit Hive:**

To exit the Hive CLI, simply type: *hive>quit;*

**Result:**

Thus, the usage of various commands in Hive has been successfully completed.