EXP 4: Create UDF in PIG

Step-by-step installation of Apache Pig on Hadoop cluster on Ubuntu

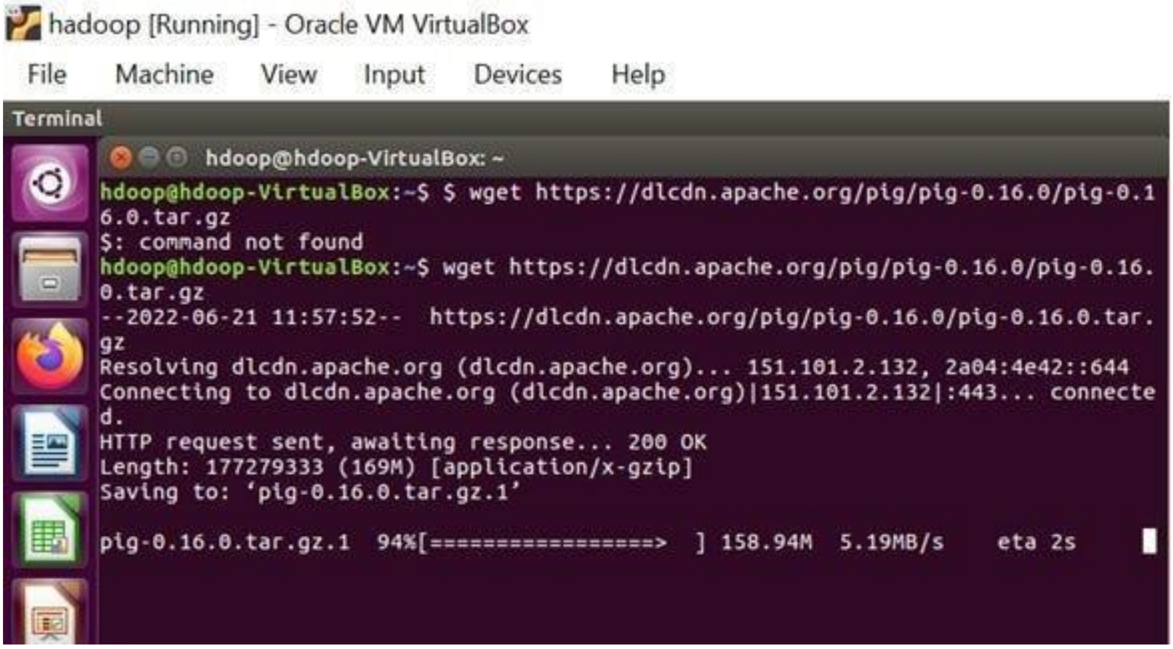
Pre-requisite:

· Ubuntu 16.04 or higher version running (I have installed Ubuntu on Oracle VM (Virtual Machine) VirtualBox),

· Run Hadoop on ubuntu (I have installed Hadoop 3.2.1 on Ubuntu 16.04). You may refer to my blog "How to install Hadoop installation" click here for Hadoop installation).

Pig installation steps

Step 1: Login into Ubuntu

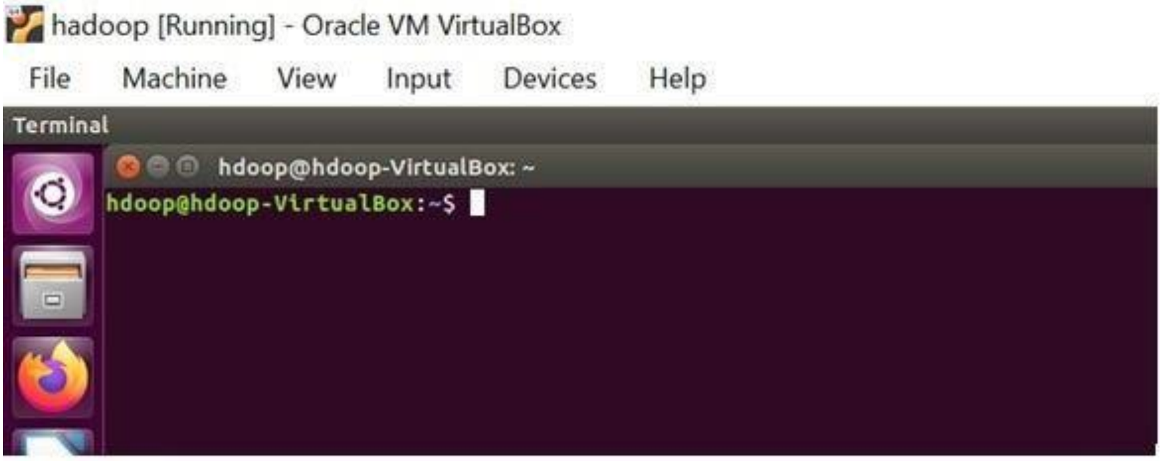

hadoop [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Terminal
hdoop@hdoop-VirtualBox: ~

```
hdoop@hdoop-VirtualBox:~$ $ wget https://dlcdn.apache.org/pig/pig-0.16.0/pig-0.1
6.0.tar.gz
$: command not found
hdoop@hdoop-VirtualBox:~$ wget https://dlcdn.apache.org/pig/pig-0.16.0/pig-0.16.
0.tar.gz
--2022-06-21 11:57:52--  https://dlcdn.apache.org/pig/pig-0.16.0/pig-0.16.0.tar.
gz
Resolving dlcdn.apache.org (dlcdn.apache.org)... 151.101.2.132, 2a04:4e42::644
Connecting to dlcdn.apache.org (dlcdn.apache.org)|151.101.2.132|:443... connecte
d.
HTTP request sent, awaiting response... 200 OK
Length: 177279333 (169M) [application/x-gzip]
Saving to: 'pig-0.16.0.tar.gz.1'

pig-0.16.0.tar.gz.1  94%[=================>  ] 158.94M  5.19MB/s    eta 2s
```

Step 2: Go to https://pig.apache.org/releases.html and copy the path of the latest version of pig that you want to install. Run the following comment to download Apache Pig in Ubuntu:

$ wget https://dlcdn.apache.org/pig/pig-0.16.0/pig-0.16.0.tar.gz


hadoop [Running] - Oracle VM VirtualBox
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hdoop@hdoop-VirtualBox: ~

```
hdoop@hdoop-VirtualBox:~$
```

Step 3: To untar pig-0.16.0.tar.gz file run the following command:

$ tar xvzf pig-0.16.0.tar.gz

Step 4: To create a pig folder and move pig-0.16.0 to the pig folder, execute the following command:

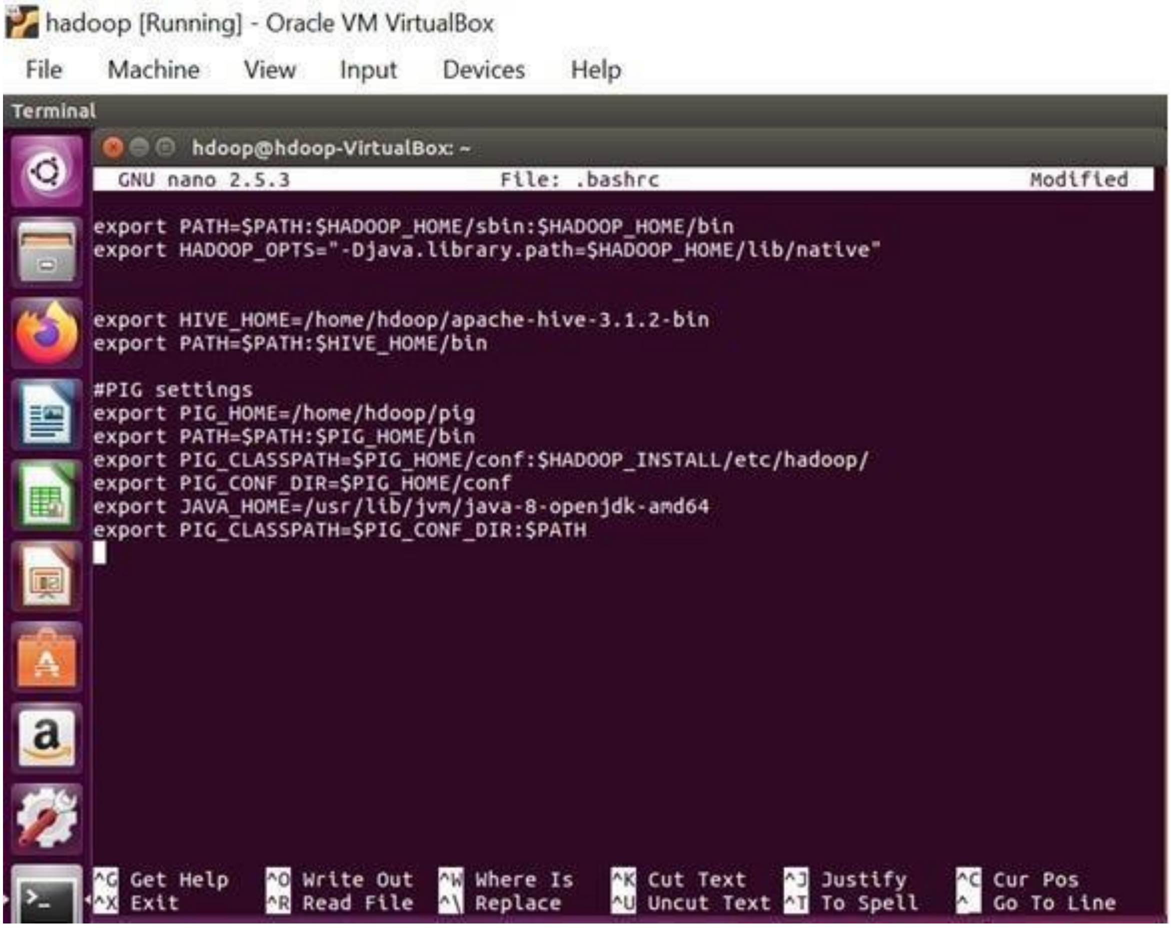
$ sudo mv /home/hdoop/pig-0.16.0 /home/hdoop/pig

Step 5: Now open the .bashrc file to edit the path and variables/settings for pig. Run the following command:

$ sudo nano .bashrc

Add the below given to .bashrc file at the end and save the file.

#PIG settingsexport PIG_HOME=/home/hdoop/pigexport PATH=$PATH:$PIG_HOME/binexport PIG_CLASSPATH=$PIG_HOME/conf:$HADOOP_INSTALL/etc/hadoop/export PIG_CONF_DIR=$PIG_HOME/confexport JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64export PIG_CLASSPATH=$PIG_CONF_DIR:$PATH#PIG setting ends


hadoop [Running] - Oracle VM VirtualBox
File
Machine
View
Input
Devices
Help
Terminal
hdoop@hdoop-VirtualBox: ~

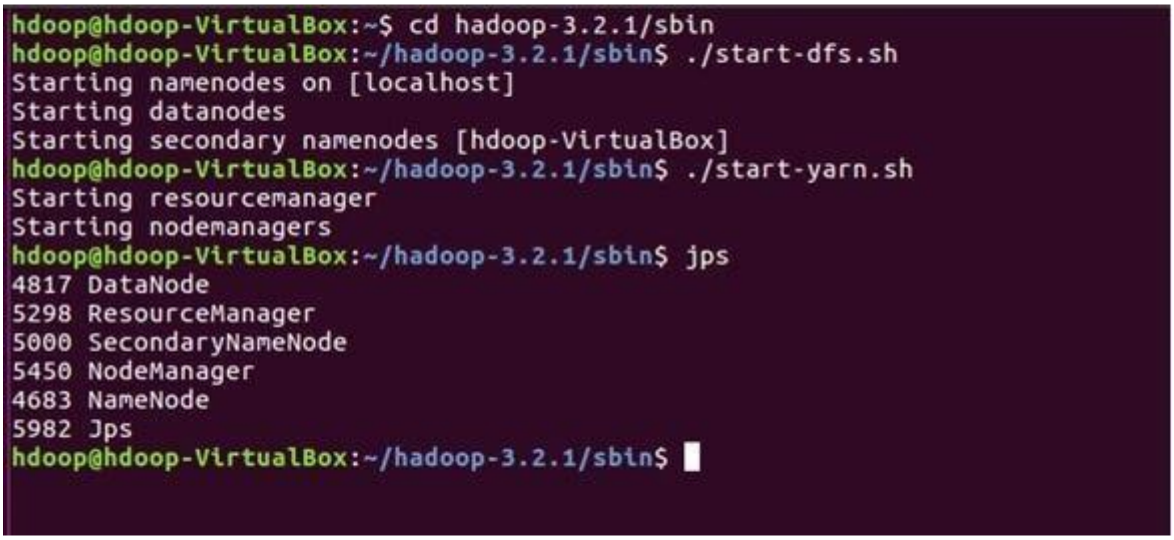
```
  GNU nano 2.5.3                 File: .bashrc                            Modified

export PATH=$PATH:$HADOOP_HOME/sbin:$HADOOP_HOME/bin
export HADOOP_OPTS="-Djava.library.path=$HADOOP_HOME/lib/native"


export HIVE_HOME=/home/hdoop/apache-hive-3.1.2-bin
export PATH=$PATH:$HIVE_HOME/bin

#PIG settings
export PIG_HOME=/home/hdoop/pig
export PATH=$PATH:$PIG_HOME/bin
export PIG_CLASSPATH=$PIG_HOME/conf:$HADOOP_INSTALL/etc/hadoop/
export PIG_CONF_DIR=$PIG_HOME/conf
export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64
export PIG_CLASSPATH=$PIG_CONF_DIR:$PATH
```

Step 6: Run the following command to make the changes effective in the .bashrc file:

$ source .bashrc

Step 7: To start all Hadoop daemons, navigate to the hadoop-3.2.1/sbin folder and run the following commands:

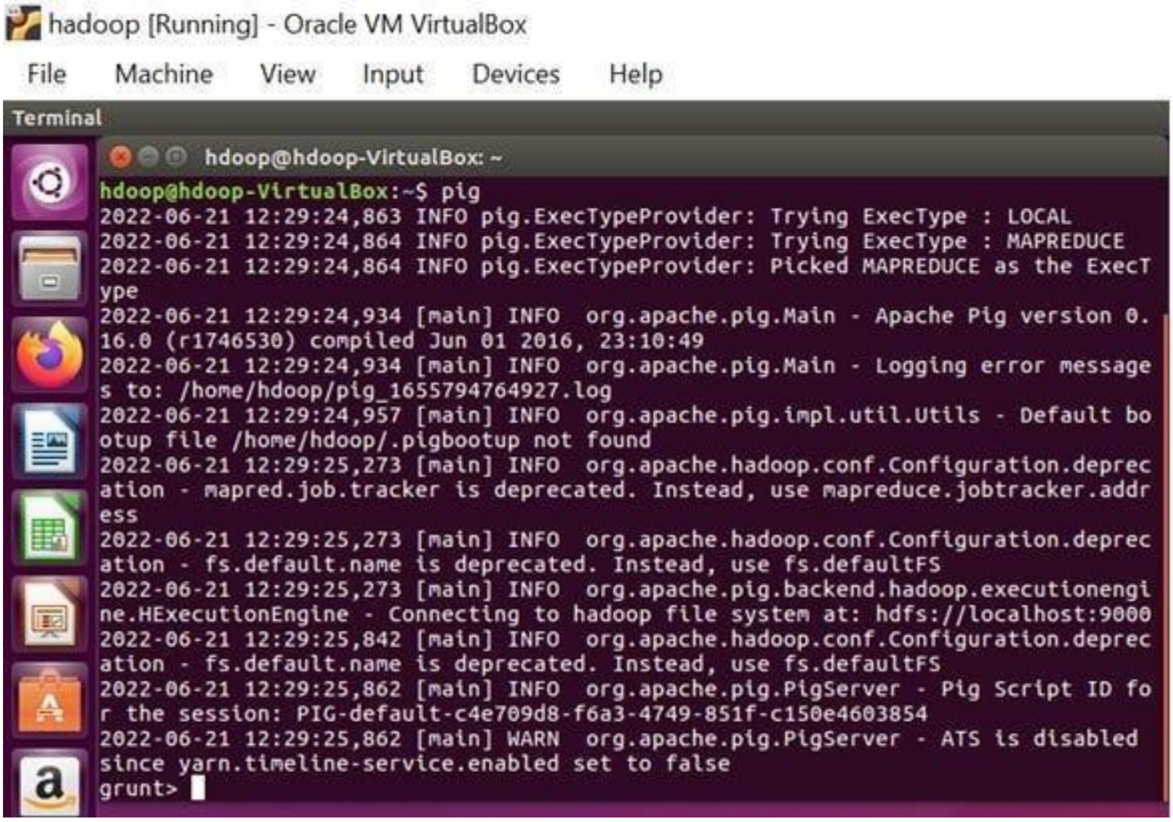
$ ./start-dfs.sh$ ./start-yarn$ jps



```
hdoop@hdoop-VirtualBox:~$ cd hadoop-3.2.1/sbin
hdoop@hdoop-VirtualBox:~/hadoop-3.2.1/sbin$ ./start-dfs.sh
Starting namenodes on [localhost]
Starting datanodes
Starting secondary namenodes [hdoop-VirtualBox]
hdoop@hdoop-VirtualBox:~/hadoop-3.2.1/sbin$ ./start-yarn.sh
Starting resourcemanager
Starting nodemanagers
hdoop@hdoop-VirtualBox:~/hadoop-3.2.1/sbin$ jps
4817 DataNode
5298 ResourceManager
5000 SecondaryNameNode
5450 NodeManager
4683 NameNode
5982 Jps
hdoop@hdoop-VirtualBox:~/hadoop-3.2.1/sbin$ 
```

Step 8: Now you can launch pig by executing the following command:

$ pig



hadoop [Running] - Oracle VM VirtualBox
File
Machine
View
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Devices
Help
Terminal
hdoop@hdoop-VirtualBox: ~

```
hdoop@hdoop-VirtualBox:~$ pig
2022-06-21 12:29:24,863 INFO pig.ExecTypeProvider: Trying ExecType : LOCAL
2022-06-21 12:29:24,864 INFO pig.ExecTypeProvider: Trying ExecType : MAPREDUCE
2022-06-21 12:29:24,864 INFO pig.ExecTypeProvider: Picked MAPREDUCE as the ExecT
ype
2022-06-21 12:29:24,934 [main] INFO  org.apache.pig.Main - Apache Pig version 0.
16.0 (r1746530) compiled Jun 01 2016, 23:10:49
2022-06-21 12:29:24,934 [main] INFO  org.apache.pig.Main - Logging error message
s to: /home/hdoop/pig_1655794764927.log
2022-06-21 12:29:24,957 [main] INFO  org.apache.pig.impl.util.Utils - Default bo
otup file /home/hdoop/.pigbootup not found
2022-06-21 12:29:25,273 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.addr
ess
2022-06-21 12:29:25,273 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-06-21 12:29:25,273 [main] INFO  org.apache.pig.backend.hadoop.executionengi
ne.HExecutionEngine - Connecting to hadoop file system at: hdfs://localhost:9000
2022-06-21 12:29:25,842 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-06-21 12:29:25,862 [main] INFO  org.apache.pig.PigServer - Pig Script ID fo
r the session: PIG-default-c4e709d8-f6a3-4749-851f-c150e4603854
2022-06-21 12:29:25,862 [main] WARN  org.apache.pig.PigServer - ATS is disabled
since yarn.timeline-service.enabled set to false
grunt> 
```

Step 9: Now you are in pig and can perform your desired tasks on pig. You can come out of the pig by the quit command:

> quit;

CREATE USER DEFINED FUNCTION(UDF)

Aim : To create User Define Function in Apache Pig and execute it on map reduce.

Procedure:

Create a sample text file

```
hadoop@Ubuntu:~/Documents$ nano sample.txt
```

Paste the below content to sample.txt

```
1,John
2,Jane
3,Joe
4,Emma
```

```
hadoop@Ubuntu:~/Documents$ hadoop fs -put sample.txt /home/hadoop/piginput/
```

Create PIG File

```
hadoop@Ubuntu:~/Documents$ nano demo_pig.pig
```

paste the below the content to demo_pig.pig

```
-- Load the data from HDFS
data = LOAD '/home/hadoop/piginput/sample.txt' USING PigStorage(',') AS (id:int>

-- Dump the data to check if it was loaded correctly
DUMP data;
```

- -

Run the above file

```
hadoop@Ubuntu:~/Documents$ pig demo_pig.pig
```

```
2024-08-07 12:13:08,791 [main] INFO
org.apache.pig.backend.hadoop.executionengine.util.MapRedUtil
```

```
- Total input paths to process : 1
(1,John)
(2,Jane)
(3,Joe)
(4,Emma)
```

- -

Create udf file an save as uppercase_udf.py

uppercase_udf.py

- -

```
def uppercase(text):
return text.upper()


if _name___== "_main_":
import sys
for line in sys.stdin:
        line = line.strip()
        result = uppercase(line)
        print(result)
```

- -

Create the udfs folder on hadoop

```
hadoop@Ubuntu:~/Documents$ hadoop fs -mkdir /home/hadoop/udfs
```

put the upppercase_udf.py in to the abv folder

```
hadoop@Ubuntu:~/Documents$ hdfs dfs -put uppercase_udf.py /home/hadoop/udfs/
```

- -

```
hadoop@Ubuntu:~/Documents$ nano udf_example.pig
```

copy and paste the below content on udf_example.pig

```
-- Register the Python UDF script
REGISTER 'hdfs:///home/hadoop/udfs/uppercase_udf.py' USING jython AS udf;
```

```
-- Load some data
data = LOAD 'hdfs:///home/hadoop/sample.txt' AS (text:chararray);

-- Use the Python UDF
uppercased_data = FOREACH data GENERATE udf.uppercase(text) AS uppercase_text;

-- Store the result
STORE uppercased_data INTO 'hdfs:///home/hadoop/pig_output_data';
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

place sample.txt file on hadoop

```
hadoop@Ubuntu:~/Documents$ hadoop fs -put sample.txt /home/hadoop/
```

To Run the pig file

```
hadoop@Ubuntu:~/Documents$ pig -f udf_example.pig
```

finally u get

Success!

Job Stats (time in seconds):

```
JobId Maps Reduces MaxMapTimeMinMapTime AvgMapTime MedianMapTime
MaxReduceTime MinReduceTime AvgReduceTime MedianReducetime
Alias Feature Outputs

job_local1786848041_0001 1 0 n/a n/a n/a n/a 00 0 0
data,uppercased_data MAP_ONLY hdfs:///home/hadoop/pig_output_data,

Input(s):
Successfully read 4 records (42778068 bytes) from: "hdfs:///home/hadoop/sample.txt"
```

```
Output(s):

Successfully stored 4 records (42777870 bytes) in: "hdfs:///home/hadoop/pig_output_data"


Counters:

Total records written : 4

Total bytes written : 42777870

Spillable Memory Manager spill count : 0

Total bags proactively spilled: 0

Total records proactively spilled: 0


Job DAG:

job_local1786848041_0001


2024-08-07 13:33:04,631 [main] WARN
org.apache.hadoop.metrics2.impl.MetricsSystemImpl -

JobTracker metrics system already initialized!

2024-08-07 13:33:04,639 [main] WARN
org.apache.hadoop.metrics2.impl.MetricsSystemImpl -

JobTracker metrics system already initialized!

2024-08-07 13:33:04,644 [main] WARN
org.apache.hadoop.metrics2.impl.MetricsSystemImpl -

JobTracker metrics system already initialized!

2024-08-07 13:33:04,667 [main] INFO

org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher -
Success!
```

Note :

If any error check jython package is installed and check the path specified on the above steps are give correctly

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To check the output file is created

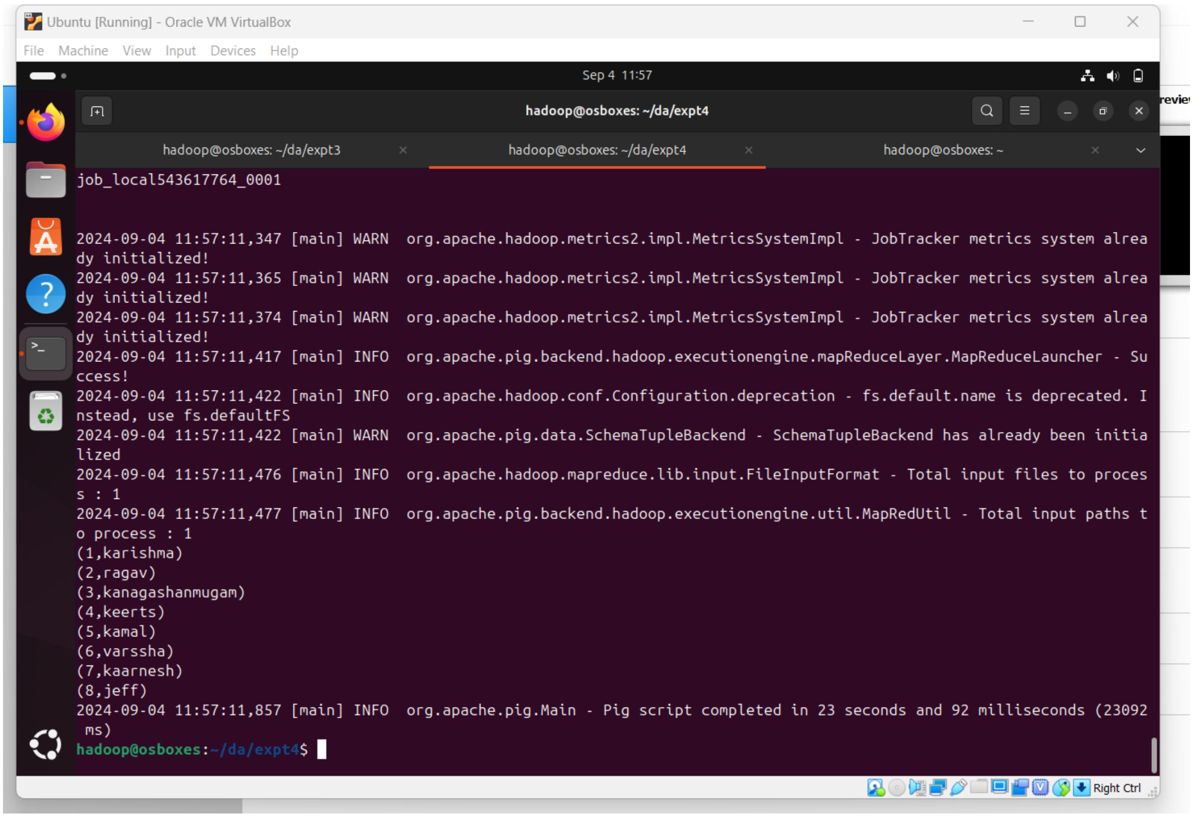
```
hadoop@Ubuntu:~/Documents$ hdfs dfs -ls /home/hadoop/pig_output_data

Found 2 items
```

If you need to examine the files in the output folder, use:

To view the output

hadoop@Ubuntu:~/Documents$ hdfs dfs -cat /home/hadoop/pig_output_data/part-m-00000



Ubuntu [Running] - Oracle VM VirtualBox
File
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View
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Help
Sep 4 11:57
hadoop@osboxes: ~/da/expt4
hadoop@osboxes: ~/da/expt3
hadoop@osboxes: ~/da/expt4
hadoop@osboxes: ~
Right Ctrl

```
job_local543617764_0001


2024-09-04 11:57:11,347 [main] WARN  org.apache.hadoop.metrics2.impl.MetricsSystemImpl - JobTracker metrics system alrea
dy initialized!
2024-09-04 11:57:11,365 [main] WARN  org.apache.hadoop.metrics2.impl.MetricsSystemImpl - JobTracker metrics system alrea
dy initialized!
2024-09-04 11:57:11,374 [main] WARN  org.apache.hadoop.metrics2.impl.MetricsSystemImpl - JobTracker metrics system alrea
dy initialized!
2024-09-04 11:57:11,417 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - Su
ccess!
2024-09-04 11:57:11,422 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. I
nstead, use fs.defaultFS
2024-09-04 11:57:11,422 [main] WARN  org.apache.pig.data.SchemaTupleBackend - SchemaTupleBackend has already been initia
lized
2024-09-04 11:57:11,476 [main] INFO  org.apache.hadoop.mapreduce.lib.input.FileInputFormat - Total input files to proces
s : 1
2024-09-04 11:57:11,477 [main] INFO  org.apache.pig.backend.hadoop.executionengine.util.MapRedUtil - Total input paths t
o process : 1
(1,karishma)
(2,ragav)
(3,kanagashanmugam)
(4,keerts)
(5,kamal)
(6,varssha)
(7,kaarnesh)
(8,jeff)
2024-09-04 11:57:11,857 [main] INFO  org.apache.pig.Main - Pig script completed in 23 seconds and 92 milliseconds (23092
 ms)
hadoop@osboxes:~/da/expt4$ 
```

Result:

Thus the program is executed successfully