Project 2:

State-Wise Development Analysis In India

In this project we are performing the data parsing and data analysis using Pig and export the results into MYSQL using Sqoop.

Step 1:

1. Place the flume config file 'filecopy.conf' at location /home/acadgild/apache-flume-1.8.0-bin/conf

filecopy.conf

```
[acadgild@localhost ~]$ cat apache-flume-1.8.0-bin/conf/filecopy.conf
agent1.sources = mysrc
agent1.sinks = hdfsdest
agent1.channels = mychannel



agent1.sources.mysrc.type = exec
agent1.sources.mysrc.command = hadoop dfs -put /home/acadgild/StatewiseDistrictwisePhysicalProgress.xml /flume_import



agent1.sinks.hdfsdest.type = hdfs
agent1.sinks.hdfsdest.hdfs.path = hdfs://localhost:9000/flume_import


agent1.channels.mychannel.type = memory



agent1.sources.mysrc.channels = mychannel
agent1.sinks.hdfsdest.channel = mychannel
[acadgild@localhost ~]$
```

Copy dataset from local file system to HDFS using flume.

Command:
flume-ng agent -n agent1 -c conf -f /home/acadgild/apache-flume-1.8.0-bin/conf/filecopy.conf

```
[acadgild@localhost ~]$ flume-ng agent -n agent1 -c conf -f /home/acadgild/apache-flume-1.8.0-bin/conf/filecopy.conf
Info: Including Hadoop libraries found via (/usr/local/hadoop-2.6.0/bin/hadoop) for HDFS access
Info: Including HBASE libraries found via (/usr/local/hbase/bin/hbase) for HBASE access
Info: Including Hive libraries found via (/usr/local/hive) for Hive access
+ exec /usr/local/java/bin/java -Xmx20m -cp 'conf:/home/acadgild/apache-flume-1.8.0-bin/lib/*:/usr/local/hadoop-2.6.0/contrib/capacity-sc
heduler/*.jar:/usr/local/hadoop-2.6.0/etc/hadoop:/usr/local/hadoop-2.6.0/share/hadoop/common/lib/*:/usr/local/hadoop-2.6.0/share/hadoop/c
ommon/*:/usr/local/hadoop-2.6.0/share/hadoop/hdfs:/usr/local/hadoop-2.6.0/share/hadoop/hdfs/lib/*:/usr/local/hadoop-2.6.0/share/hadoop/hd
fs/*:/usr/local/hadoop-2.6.0/share/hadoop/yarn/lib/*:/usr/local/hadoop-2.6.0/share/hadoop/yarn/*:/usr/local/hadoop-2.6.0/share/hadoop/map
reduce/lib/*:/usr/local/hadoop-2.6.0/share/hadoop/mapreduce/*:/usr/local/hbase/conf:/usr/local/java/lib/tools.jar:/usr/local/hbase:/usr/l
ocal/hbase/lib/activation-1.1.jar:/usr/local/hbase/lib/aopalliance-1.0.jar:/usr/local/hbase/lib/asm-3.1.jar:/usr/local/hbase/lib/avro-1.7
.4.jar:/usr/local/hbase/lib/commons-beanutils-1.7.0.jar:/usr/local/hbase/lib/commons-beanutils-core-1.8.0.jar:/usr/local/hbase/lib/common
s-cli-1.2.jar:/usr/local/hbase/lib/commons-codec-1.7.jar:/usr/local/hbase/lib/commons-collections-3.2.1.jar:/usr/local/hbase/lib/commons-
compress-1.4.1.jar:/usr/local/hbase/lib/commons-configuration-1.6.jar:/usr/local/hbase/lib/commons-daemon-1.0.13.jar:/usr/local/hbase/lib
/commons-digester-1.8.jar:/usr/local/hbase/lib/commons-el-1.0.jar:/usr/local/hbase/lib/commons-httpclient-3.1.jar:/usr/local/hbase/lib/co
mmons-io-2.4.jar:/usr/local/hbase/lib/commons-lang-2.6.jar:/usr/local/hbase/lib/commons-logging-1.1.1.jar:/usr/local/hbase/lib/commons-ma
th-2.1.jar:/usr/local/hbase/lib/commons-net-3.1.jar:/usr/local/hbase/lib/findbugs-annotations-1.3.9-1.jar:/usr/local/hbase/lib/gmbal-api-
only-3.0.0-b023.jar:/usr/local/hbase/lib/grizzly-framework-2.1.2.jar:/usr/local/hbase/lib/grizzly-http-2.1.2.jar:/usr/local/hbase/lib/gri
zzly-http-server-2.1.2.jar:/usr/local/hbase/lib/grizzly-http-servlet-2.1.2.jar:/usr/local/hbase/lib/grizzly-rcm-2.1.2.jar:/usr/local/hbas
e/lib/guava-12.0.1.jar:/usr/local/hbase/lib/guice-3.0.jar:/usr/local/hbase/lib/guice-servlet-3.0.jar:/usr/local/hbase/lib/hadoop-annotati
ons-2.2.0.jar:/usr/local/hbase/lib/hadoop-auth-2.2.0.jar:/usr/local/hbase/lib/hadoop-client-2.2.0.jar:/usr/local/hbase/lib/hadoop-common-
2.2.0.jar:/usr/local/hbase/lib/hadoop-hdfs-2.2.0.jar:/usr/local/hbase/lib/hadoop-mapreduce-client-app-2.2.0.jar:/usr/local/hbase/lib/hado
op-mapreduce-client-common-2.2.0.jar:/usr/local/hbase/lib/hadoop-mapreduce-client-core-2.2.0.jar:/usr/local/hbase/lib/hadoop-mapreduce-cl
ient-jobclient-2.2.0.jar:/usr/local/hbase/lib/hadoop-mapreduce-client-shuffle-2.2.0.jar:/usr/local/hbase/lib/hadoop-yarn-api-2.2.0.jar:/u
sr/local/hbase/lib/hadoop-yarn-client-2.2.0.jar:/usr/local/hbase/lib/hadoop-yarn-common-2.2.0.jar:/usr/local/hbase/lib/hadoop-yarn-server
-common-2.2.0.jar:/usr/local/hbase/lib/hadoop-yarn-server-nodemanager-2.2.0.jar:/usr/local/hbase/lib/hamcrest-core-1.3.jar:/usr/local/hba
se/lib/hbase-annotations-0.98.14-hadoop2.jar:/usr/local/hbase/lib/hbase-checkstyle-0.98.14-hadoop2.jar:/usr/local/hbase/lib/hbase-client-
0.98.14-hadoop2.jar:/usr/local/hbase/lib/hbase-common-0.98.14-hadoop2.jar:/usr/local/hbase/lib/hbase-common-0.98.14-hadoop2-tests.jar:/us
r/local/hbase/lib/hbase-examples-0.98.14-hadoop2.jar:/usr/local/hbase/lib/hbase-hadoop2-compat-0.98.14-hadoop2.jar:/usr/local/hbase/lib/h
base-hadoop-compat-0.98.14-hadoop2.jar:/usr/local/hbase/lib/hbase-it-0.98.14-hadoop2.jar:/usr/local/hbase/lib/hbase-it-0.98.14-hadoop2-te
sts.jar:/usr/local/hbase/lib/hbase-prefix-tree-0.98.14-hadoop2.jar:/usr/local/hbase/lib/hbase-protocol-0.98.14-hadoop2.jar:/usr/local/hba
se/lib/hbase-resource-bundle-0.98.14-hadoop2.jar:/usr/local/hbase/lib/hbase-rest-0.98.14-hadoop2.jar:/usr/local/hbase/lib/hbase-server-0.
98.14-hadoop2.jar:/usr/local/hbase/lib/hbase-server-0.98.14-hadoop2-tests.jar:/usr/local/hbase/lib/hbase-shell-0.98.14-hadoop2.jar:/usr/l
ocal/hbase/lib/hbase-testing-util-0.98.14-hadoop2.jar:/usr/local/hbase/lib/hbase-thrift-0.98.14-hadoop2.jar:/usr/local/hbase/lib/high-sca
le-lib-1.1.1.jar:/usr/local/hbase/lib/htrace-core-2.04.jar:/usr/local/hbase/lib/httpclient-4.1.3.jar:/usr/local/hbase/lib/httpcore-4.1.3.
jar:/usr/local/hbase/lib/jackson-core-asl-1.8.8.jar:/usr/local/hbase/lib/jackson-jaxrs-1.8.8.jar:/usr/local/hbase/lib/jackson-mapper-asl-
1.8.8.jar:/usr/local/hbase/lib/jackson-xc-1.8.8.jar:/usr/local/hbase/lib/jamon-runtime-2.3.1.jar:/usr/local/hbase/lib/jasper-compiler-5.5
.23.jar:/usr/local/hbase/lib/jasper-runtime-5.5.23.jar:/usr/local/hbase/lib/javax.inject-1.jar:/usr/local/hbase/lib/javax.servlet-3.1.jar
17/12/11 07:21:05 INFO node.PollingPropertiesFileConfigurationProvider: Configuration provider starting
17/12/11 07:21:05 INFO node.PollingPropertiesFileConfigurationProvider: Reloading configuration file:/home/acadgild/apache-flume-1.8.0-bi
n/conf/filecopy.conf
17/12/11 07:21:05 INFO conf.FlumeConfiguration: Processing:hdfsdest
17/12/11 07:21:05 INFO conf.FlumeConfiguration: Processing:hdfsdest
17/12/11 07:21:05 INFO conf.FlumeConfiguration: Processing:hdfsdest
17/12/11 07:21:05 INFO conf.FlumeConfiguration: Added sinks: hdfsdest Agent: agent1
17/12/11 07:21:05 INFO conf.FlumeConfiguration: Post-validation flume configuration contains configuration for agents: [agent1]
17/12/11 07:21:05 INFO node.AbstractConfigurationProvider: Creating channels
17/12/11 07:21:05 INFO channel.DefaultChannelFactory: Creating instance of channel mychannel type memory
17/12/11 07:21:05 INFO node.AbstractConfigurationProvider: Created channel mychannel
17/12/11 07:21:05 INFO source.DefaultSourceFactory: Creating instance of source mysrc, type exec
17/12/11 07:21:05 INFO sink.DefaultSinkFactory: Creating instance of sink: hdfsdest, type: hdfs
17/12/11 07:21:05 INFO node.AbstractConfigurationProvider: Channel mychannel connected to [mysrc, hdfsdest]
17/12/11 07:21:05 INFO node.Application: Starting new configuration:{ sourceRunners:{mysrc=EventDrivenSourceRunner: { source:org.apache.f
lume.source.ExecSource{name:mysrc,state:IDLE} }} sinkRunners:{hdfsdest=SinkRunner: { policy:org.apache.flume.sink.DefaultSinkProcessor@d5
4b076 counterGroup:{ name:null counters:{} } }} channels:{mychannel=org.apache.flume.channel.MemoryChannel{name: mychannel}} }
17/12/11 07:21:05 INFO node.Application: Starting Channel mychannel
17/12/11 07:21:05 INFO instrumentation.MonitoredCounterGroup: Monitored counter group for type: CHANNEL, name: mychannel: Successfully re
gistered new MBean.
17/12/11 07:21:05 INFO instrumentation.MonitoredCounterGroup: Component type: CHANNEL, name: mychannel started
17/12/11 07:21:05 INFO node.Application: Starting Sink hdfsdest
17/12/11 07:21:05 INFO node.Application: Starting Source mysrc
17/12/11 07:21:05 INFO source.ExecSource: Exec source starting with command: hadoop dfs -put /home/acadgild/StatewiseDistrictwisePhysical
Progress.xml /flume_import
17/12/11 07:21:05 INFO instrumentation.MonitoredCounterGroup: Monitored counter group for type: SOURCE, name: mysrc: Successfully registe
red new MBean.
17/12/11 07:21:05 INFO instrumentation.MonitoredCounterGroup: Component type: SOURCE, name: mysrc started
17/12/11 07:21:05 INFO instrumentation.MonitoredCounterGroup: Monitored counter group for type: SINK, name: hdfsdest: Successfully regist
ered new MBean.
17/12/11 07:21:05 INFO instrumentation.MonitoredCounterGroup: Component type: SINK, name: hdfsdest started
17/12/11 07:21:10 INFO source.ExecSource: Command [hadoop dfs -put /home/acadgild/StatewiseDistrictwisePhysicalProgress.xml /flume_import
] exited with 0
```

2. Verify that file is copied using the HDFS commands below
   The command below confirms the directory is created
   hadoop fs –ls /flume_import

```
[acadgild@localhost ~]$ hadoop fs -ls /flume_import
17/12/11 07:25:37 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where
applicable
-rw-r--r--   1 acadgild supergroup     717414 2017-12-11 07:21 /flume_import
```

3. Create folders in HDFS to store query outputs
   hadoop fs -mkdir districts_having_100percent_objectives
   hadoop fs -mkdir districts_having_80percent_objectives

```
[acadgild@localhost ~]$ hadoop fs -mkdir districts_having_100percent_objectives
17/12/11 07:40:14 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where
applicable
[acadgild@localhost ~]$ hadoop fs -mkdir districts_having_80percent_objectives
17/12/11 07:40:23 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where
applicable
[acadgild@localhost ~]$ hadoop fs -ls
17/12/11 07:40:28 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where
applicable
Found 9 items
drwxr-xr-x   - acadgild supergroup          0 2015-11-20 11:46 Pictures
drwxr-xr-x   - acadgild supergroup          0 2017-11-14 22:54 _sqoop
drwxr-xr-x   - acadgild supergroup          0 2017-11-18 20:26 company
drwxr-xr-x   - acadgild supergroup          0 2017-12-11 07:40 districts_having_100percent_objectives
drwxr-xr-x   - acadgild supergroup          0 2017-12-11 07:40 districts_having_80percent_objectives
drwxr-xr-x   - acadgild supergroup          0 2017-12-11 07:37 folders
drwxr-xr-x   - acadgild supergroup          0 2017-10-08 20:54 hadoop
drwxr-xr-x   - acadgild supergroup          0 2015-11-17 02:03 oozie-acad
drwxr-xr-x   - acadgild supergroup          0 2015-11-17 02:00 share
[acadgild@localhost ~]$
```

4. Create mysql table to store the results of query
   Start mysql using command
   sudo service mysqld start

   Login to mysql using
   mysql –u root

   Create Database bpl_results
   create database bpl_results;
   use bpl_results;
   Create tables districts_having_100percent_objectives and
   districts_having_80percent_objectives as below:

```
create table districts_having_100percent_objectives
(
   name varchar(40)
);
create table districts_having_80percent_objectives
(
   name varchar(40)
);
```

```
mysql> create database bpl_results;
Query OK, 1 row affected (0.00 sec)

mysql> use bpl_results;
Database changed
mysql> create table districts_having_100percent_objectives
    -> (
    ->     name varchar(40)
    -> );
Query OK, 0 rows affected (0.00 sec)

mysql> create table districts_having_80percent_objectives
    -> (
    ->     name varchar(40)
    -> );
Query OK, 0 rows affected (0.00 sec)

mysql> show tables;
+----------------------------------------+
| Tables_in_bpl_results                  |
+----------------------------------------+
| districts_having_100percent_objectives |
| districts_having_80percent_objectives  |
+----------------------------------------+
2 rows in set (0.00 sec)

mysql>
```

5. PIG query to process XML and store into PIG table
   Load data from HDFS to PIG alias row_physical_progress using below query:
   DEFINE XPath org.apache.pig.piggybank.evaluation.xml.XPath;
   row_physical_progress = LOAD 'hdfs://localhost:9000/flume_import' USING org.apache.pig.piggybank.storage.XMLLoader('row') as (row:chararray);

```
grunt> DEFINE XPath org.apache.pig.piggybank.evaluation.xml.XPath;
grunt> row_physical_progress = LOAD 'hdfs://localhost:9000/flume_import' USING org.apache.pig.piggybank.storage.XMLLoader('row') as (row:
chararray);
2017-12-11 08:14:06,102 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.job.tracker.persist.jobstatus.hours is dep
recated. Instead, use mapreduce.jobtracker.persist.jobstatus.hours
2017-12-11 08:14:06,102 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.heartbeats.in.second is deprecated. Instea
d, use mapreduce.jobtracker.heartbeats.in.second
2017-12-11 08:14:06,102 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - jobclient.completion.poll.interval is deprecated.
 Instead, use mapreduce.client.completion.pollinterval
2017-12-11 08:14:06,102 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.tasktracker.tasks.sleeptime-before-sigkill
 is deprecated. Instead, use mapreduce.tasktracker.tasks.sleeptimebeforesigkill
2017-12-11 08:14:06,102 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.job.tracker.http.address is deprecated. In
stead, use mapreduce.jobtracker.http.address
```

   Next, iterate over each row and load into alias physical_progress which has schema fields same as XML schema hyphen(-) are replaced with underscore (_)
   physical_progress = FOREACH row_physical_progress GENERATE XPath(row, 'row/State_Name') AS State_Name,
   XPath(row, 'row/District_Name') AS District_Name,
   XPath(row, 'row/Project_Objectives_IHHL_BPL') AS Project_Objectives_IHHL_BPL,
   XPath(row, 'row/Project_Objectives_IHHL_APL') AS Project_Objectives_IHHL_APL,
   XPath(row, 'row/Project_Objectives_IHHL_TOTAL') AS Project_Objectives_IHHL_TOTAL,
   XPath(row, 'row/Project_Objectives_SCW') AS Project_Objectives_SCW,

   XPath(row, 'row/Project_Objectives_Anganwadi_Toilets') AS Project_Objectives_Anganwadi_Toilets,

XPath(row, 'row/Project_Objectives_RSM') AS Project_Objectives_RSM,
XPath(row, 'row/Project_Objectives_PC') AS Project_Objectives_PC,
XPath(row, 'row/Project_Performance-IHHL_BPL') AS Project_Performance_IHHL_BPL,
XPath(row, 'row/Project_Performance-IHHL_APL') AS Project_Performance_IHHL_APL,
XPath(row, 'row/Project_Performance-IHHL_TOTAL') AS Project_Performance_IHHL_TOTAL,
XPath(row, 'row/Project_Performance-SCW') AS Project_Performance_SCW,
XPath(row, 'row/Project_Performance-School_Toilets') AS Project_Performance_School_Toilets,
XPath(row, 'row/Project_Performance-Anganwadi_Toilets') AS Project_Performance_Anganwadi_Toilets,
XPath(row, 'row/Project_Performance-RSM') AS Project_Performance_RSM,
XPath(row, 'row/Project_Performance-PC') AS Project_Performance_PC;

```
grunt> physical_progress = FOREACH row_physical_progress GENERATE XPath(row, 'row/State_Name') AS State_Name,
>>                       XPath(row, 'row/District_Name') AS District_Name,
>>                       XPath(row, 'row/Project_Objectives_IHHL_BPL') AS Project_Objectives_IHHL_BPL,
>>                       XPath(row, 'row/Project_Objectives_IHHL_APL') AS Project_Objectives_IHHL_APL,
>>                       XPath(row, 'row/Project_Objectives_IHHL_TOTAL') AS Project_Objectives_IHHL_TOTAL,
>>                       XPath(row, 'row/Project_Objectives_SCW') AS Project_Objectives_SCW,
>>
>>                       XPath(row, 'row/Project_Objectives_Anganwadi_Toilets') AS Project_Objectives_Anganwadi_Toilets,
>>                       XPath(row, 'row/Project_Objectives_RSM') AS Project_Objectives_RSM,
>>                       XPath(row, 'row/Project_Objectives_PC') AS Project_Objectives_PC,
>>                       XPath(row, 'row/Project_Performance-IHHL_BPL') AS Project_Performance_IHHL_BPL,
>>                       XPath(row, 'row/Project_Performance-IHHL_APL') AS Project_Performance_IHHL_APL,
>>                       XPath(row, 'row/Project_Performance-IHHL_TOTAL') AS Project_Performance_IHHL_TOTAL,
>>                       XPath(row, 'row/Project_Performance-SCW') AS Project_Performance_SCW,
>>                       XPath(row, 'row/Project_Performance-School_Toilets') AS Project_Performance_School_Toilets,
>>                       XPath(row, 'row/Project_Performance-Anganwadi_Toilets') AS Project_Performance_Anganwadi_Toilets,
>>                       XPath(row, 'row/Project_Performance-RSM') AS Project_Performance_RSM,
>>                       XPath(row, 'row/Project_Performance-PC') AS Project_Performance_PC;
grunt>
```

6. PIG Query to find out the districts who achieved 100 percent objective in BPL cards

   Here first filter the records where Project_Objectives_IHHL_BPL is equal to Project_Performance_IHHL_BPL

   physical_progress_100_percent_bpl = FILTER physical_progress BY Project_Objectives_IHHL_BPL == Project_Performance_IHHL_BPL;

   Next, Select only District_Name field using command below:

   district_100_percent_bpl = FOREACH physical_progress_100_percent_bpl GENERATE District_Name;

   Next, Store into HDFS directory districts_having_100percent_objectives using command below:

   STORE district_100_percent_bpl INTO 'hdfs://localhost:9000/districts_having_100percent_objectives'

```
grunt> physical_progress_100_percent_bpl = FILTER physical_progress BY Project_Objectives_IHHL_BPL == Project_Performance_IHHL_BPL;
grunt> district_100_percent_bpl = FOREACH physical_progress_100_percent_bpl GENERATE District_Name;
grunt> STORE district_100_percent_bpl INTO 'hdfs://localhost:9000/districts_having_100percent_objectives'
>> ;
2017-12-11 08:21:01,669 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapreduce.job.counters.limit is deprecated. Inste
ad, use mapreduce.job.counters.max
2017-12-11 08:21:01,670 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - io.bytes.per.checksum is deprecated. Instead, use
 dfs.bytes-per-checksum
2017-12-11 08:21:01,670 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.de
faultFS
2017-12-11 08:21:01,752 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.textoutputformat.separator is deprecated.
Instead, use mapreduce.output.textoutputformat.separator
2017-12-11 08:21:01,822 [main] INFO  org.apache.pig.tools.pigstats.ScriptState - Pig features used in the script: FILTER
2017-12-11 08:21:01,933 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - io.bytes.per.checksum is deprecated. Instead, use
 dfs.bytes-per-checksum
2017-12-11 08:21:01,937 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.de
faultFS
```

< ---------- Intermediate Logs ---------->

```
HadoopVersion   PigVersion      UserId  StartedAt       FinishedAt      Features
2.2.0   0.14.0  acadgild        2017-12-11 08:21:02     2017-12-11 08:21:43     FILTER

Success!

Job Stats (time in seconds):
JobId   Maps    Reduces MaxMapTime      MinMapTime      AvgMapTime      MedianMapTime   MaxReduceTime   MinReduceTime   AvgReduceTime   M
edianReducetime Alias   Feature Outputs
job_local1176682894_0001        1       0       n/a     n/a     n/a     n/a     0       0       0       0       district_100_percent_bpl,
physical_progress,physical_progress_100_percent_bpl,row_physical_progress       MAP_ONLY        hdfs://localhost:9000/districts_having_10
0percent_objectives,

Input(s):
Successfully read 607 records (729702 bytes) from: "hdfs://localhost:9000/flume_import"

Output(s):
Successfully stored 70 records (686 bytes) in: "hdfs://localhost:9000/districts_having_100percent_objectives"

Counters:
Total records written : 70
Total bytes written : 686
Spillable Memory Manager spill count : 0
Total bags proactively spilled: 0
Total records proactively spilled: 0

Job DAG:
job_local1176682894_0001


2017-12-11 08:21:43,547 [main] INFO  org.apache.hadoop.metrics.jvm.JvmMetrics - Cannot initialize JVM Metrics with processName=JobTracker
, sessionId= - already initialized
2017-12-11 08:21:43,554 [main] INFO  org.apache.hadoop.metrics.jvm.JvmMetrics - Cannot initialize JVM Metrics with processName=JobTracker
, sessionId= - already initialized
2017-12-11 08:21:43,554 [main] INFO  org.apache.hadoop.metrics.jvm.JvmMetrics - Cannot initialize JVM Metrics with processName=JobTracker
, sessionId= - already initialized
2017-12-11 08:21:43,584 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - Success!
grunt>
```

7. Verify that results are stored in HDFS
   The following command shows that folders are created under districts_having_100percent_objectives
   hadoop fs -ls /districts_having_100percent_objectives

   Next, use the following HDFS command to show the results
   hadoop fs -ls /districts_having_100percent_objectives/part-m-00000

```
[acadgild@localhost ~]$ hadoop fs -ls /districts_having_100percent_objectives
17/12/11 08:29:01 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where
applicable
Found 2 items
-rw-r--r--   3 acadgild supergroup          0 2017-12-11 08:21 /districts_having_100percent_objectives/_SUCCESS
-rw-r--r--   3 acadgild supergroup        686 2017-12-11 08:21 /districts_having_100percent_objectives/part-m-00000
```

```
[acadgild@localhost ~]$ hadoop fs -cat /districts_having_100percent_objectives/part-m-00000
17/12/11 08:32:05 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform.
applicable
NIZAMABAD
TIRAP
HAILAKANDI
MADHUBANI
NORTH GOA
AHMEDABAD
DANGS
NAVSARI
PORBANDAR
SURAT
FARIDABAD
HISAR
JHAJJAR
MAHENDRAGARH
PANCHKULA
PANIPAT
ROHTAK
SIRSA
HAMIRPUR
KINNAUR
KULLU
LAHAUL & SPITI
SHIMLA
SOLAN
UNA
DEOGHAR
LOHARDAGA
HASSAN
MANGALORE(DAKSHINA KANNADA)
UDUPI
ALAPPUZHA
KOLLAM
KOTTAYAM
KOZHIKODE
PALAKKAD
PATHANAMTHITTA
WAYANAD
GADCHIROLI
SINDHUDURG
WEST GARO HILLS
CHAMPHAI
LAWNGTLAI
HANUMANGARH
ERODE
KARUR
NAMAKKAL
TIRUCHIRAPPALLI
TIRUVANNAMALAI
DHALAI
SOUTH TRIPURA
WEST TRIPURA
AMBEDKAR NAGAR
BALRAMPUR
BAREILLY
BIJNOR
BUDAUN
ETAWAH
FARRUKHABAD
FIROZABAD
GHAZIABAD
HARDOI
JYOTIBA PHULE NAGAR
LUCKNOW
MAHARAJGANJ
MAHOBA
MORADABAD
MUZAFFARNAGAR
PILIBHIT
SONBHADRA
SULTANPUR
[acadgild@localhost ~]$
```

8. Use sqoop command to export data from HDFS into mysql table districts_having_100percent_objectives in database bpl_results

The following sqoop command is used to export data from HDFS folder districts_having_100percent_objectives into already created mysql table 'districts_having_100percent_objectives

```
[acadgild@localhost ~]$ sqoop export --connect jdbc:mysql://localhost/bpl_results --username 'root' --table 'districts_having_100percent_
objectives' --export-dir '/districts_having_100percent_objectives' --input-fields-terminated-by ','  -m 1 --columns name;
Warning: /usr/local/sqoop/../hcatalog does not exist! HCatalog jobs will fail.
Please set $HCAT_HOME to the root of your HCatalog installation.
Warning: /usr/local/sqoop/../accumulo does not exist! Accumulo imports will fail.
Please set $ACCUMULO_HOME to the root of your Accumulo installation.
Warning: /usr/local/sqoop/../zookeeper does not exist! Accumulo imports will fail.
Please set $ZOOKEEPER_HOME to the root of your Zookeeper installation.
2017-12-11 08:37:30,222 INFO  [main] sqoop.Sqoop: Running Sqoop version: 1.4.6
2017-12-11 08:37:30,638 INFO  [main] manager.MySQLManager: Preparing to use a MySQL streaming resultset.
2017-12-11 08:37:30,638 INFO  [main] tool.CodeGenTool: Beginning code generation
2017-12-11 08:37:31,334 INFO  [main] manager.SqlManager: Executing SQL statement: SELECT t.* FROM `districts_having_100percent_objectives
` AS t LIMIT 1
2017-12-11 08:37:31,399 INFO  [main] manager.SqlManager: Executing SQL statement: SELECT t.* FROM `districts_having_100percent_objectives
` AS t LIMIT 1
2017-12-11 08:37:31,409 INFO  [main] orm.CompilationManager: HADOOP_MAPRED_HOME is /usr/local/hadoop-2.6.0
Note: /tmp/sqoop-acadgild/compile/108fa63cce4b2e2786d49ebff92261ec/districts_having_100percent_objectives.java uses or overrides a deprec
ated API.
Note: Recompile with -Xlint:deprecation for details.
2017-12-11 08:37:38,448 INFO  [main] orm.CompilationManager: Writing jar file: /tmp/sqoop-acadgild/compile/108fa63cce4b2e2786d49ebff92261
ec/districts_having_100percent_objectives.jar
2017-12-11 08:37:38,505 INFO  [main] mapreduce.ExportJobBase: Beginning export of districts_having_100percent_objectives
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/local/hbase/lib/slf4j-log4j12-1.6.4.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/local/hadoop-2.6.0/share/hadoop/common/lib/slf4j-log4j12-1.7.5.jar!/org/slf4j/impl/StaticLoggerBin
der.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
2017-12-11 08:37:39,071 WARN  [main] util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java
classes where applicable
```

<---------- Intermediate Logs ---------->

```
2017-12-11 08:37:45,312 INFO  [main] Configuration.deprecation: user.name is deprecated. Instead, use mapreduce.job.user.name
2017-12-11 08:37:45,312 INFO  [main] Configuration.deprecation: mapred.reduce.tasks is deprecated. Instead, use mapreduce.job.reduces
2017-12-11 08:37:45,312 INFO  [main] Configuration.deprecation: mapred.cache.files.filesizes is deprecated. Instead, use mapreduce.job.ca
che.files.filesizes
2017-12-11 08:37:45,555 INFO  [main] mapreduce.JobSubmitter: Submitting tokens for job: job_1512956846592_0001
2017-12-11 08:37:46,561 INFO  [main] impl.YarnClientImpl: Submitted application application_1512956846592_0001 to ResourceManager at /0.0
.0.0:8032
2017-12-11 08:37:46,623 INFO  [main] mapreduce.Job: The url to track the job: http://http://localhost:8088/proxy/application_151295684659
2_0001/
2017-12-11 08:37:46,623 INFO  [main] mapreduce.Job: Running job: job_1512956846592_0001
2017-12-11 08:38:06,043 INFO  [main] mapreduce.Job: Job job_1512956846592_0001 running in uber mode : false
2017-12-11 08:38:06,046 INFO  [main] mapreduce.Job:  map 0% reduce 0%
2017-12-11 08:38:16,007 INFO  [main] mapreduce.Job:  map 100% reduce 0%
2017-12-11 08:38:17,036 INFO  [main] mapreduce.Job: Job job_1512956846592_0001 completed successfully
```

9. Verify Result in Mysql
   Use the following command in mysql to verify results in mysql

   select * from districts_having_100percent_objectives;

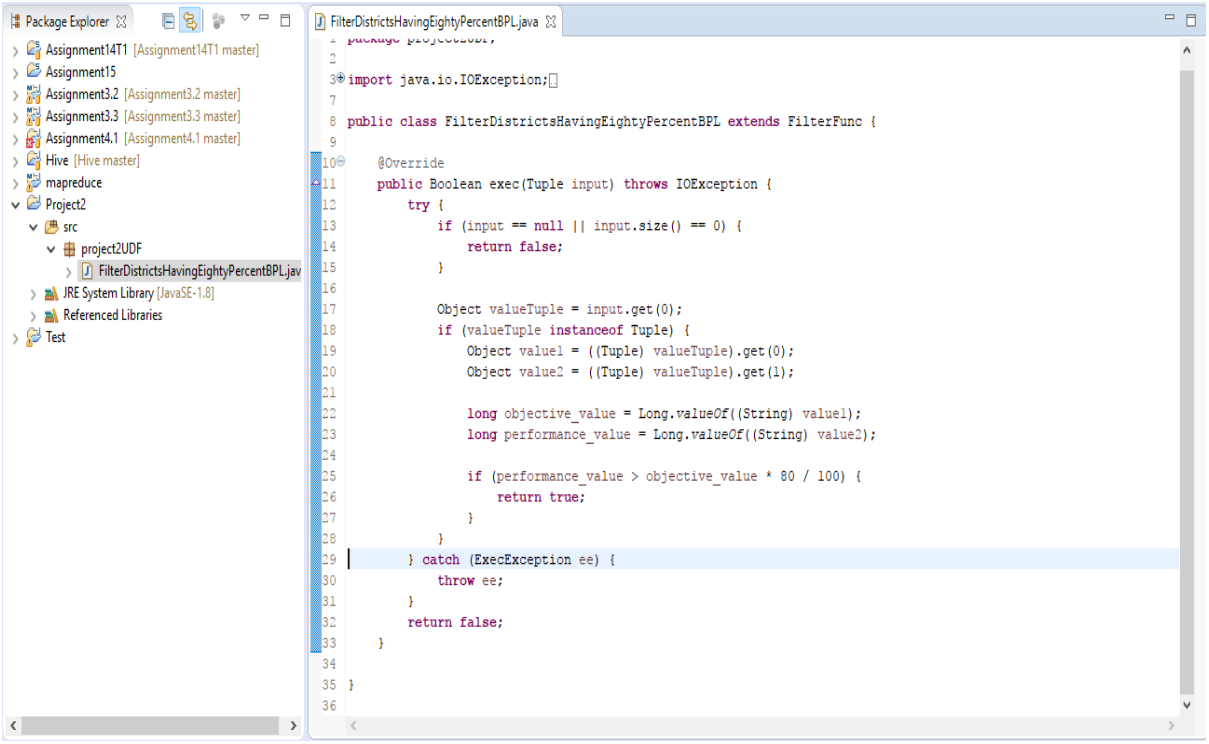
```
mysql> select * from districts_having_100percent_objectives;
+-----------------------------+
| name                        |
+-----------------------------+
| NIZAMABAD                   |
| TIRAP                       |
| HAILAKANDI                  |
| MADHUBANI                   |
| NORTH GOA                   |
| AHMEDABAD                   |
| DANGS                       |
| NAVSARI                     |
| PORBANDAR                   |
| SURAT                       |
| FARIDABAD                   |
| HISAR                       |
| JHAJJAR                     |
| MAHENDRAGARH                |
| PANCHKULA                   |
| PANIPAT                     |
| ROHTAK                      |
| SIRSA                       |
| HAMIRPUR                    |
| KINNAUR                     |
| KULLU                       |
| LAHAUL & SPITI              |
| SHIMLA                      |
| SOLAN                       |
| UNA                         |
| DEOGHAR                     |
| LOHARDAGA                   |
| HASSAN                      |
| MANGALORE(DAKSHINA KANNADA) |
| UDUPI                       |
| ALAPPUZHA                   |
| KOLLAM                      |
| KOTTAYAM                    |
| KOZHIKODE                   |
```

```
| PALAKKAD                  |
| PATHANAMTHITTA            |
| WAYANAD                   |
| GADCHIROLI                |
| SINDHUDURG                |
| WEST GARO HILLS           |
| CHAMPHAI                  |
| LAWNGTLAI                 |
| HANUMANGARH               |
| ERODE                     |
| KARUR                     |
| NAMAKKAL                  |
| TIRUCHIRAPPALLI           |
| TIRUVANNAMALAI            |
| DHALAI                    |
| SOUTH TRIPURA             |
| WEST TRIPURA              |
| AMBEDKAR NAGAR            |
| BALRAMPUR                 |
| BAREILLY                  |
| BIJNOR                    |
| BUDAUN                    |
| ETAWAH                    |
| FARRUKHABAD               |
| FIROZABAD                 |
| GHAZIABAD                 |
| HARDOI                    |
| JYOTIBA PHULE NAGAR       |
| LUCKNOW                   |
| MAHARAJGANJ               |
| MAHOBA                    |
| MORADABAD                 |
| MUZAFFARNAGAR             |
| PILIBHIT                  |
| SONBHADRA                 |
| SULTANPUR                 |
+---------------------------+
70 rows in set (0.00 sec)
```

Write a Pig UDF to filter the districts which have reached 80% of objectives of BPL cards. Export the results to MySQL using Sqoop.

1. Create a Java project Project2 and Write a Java class FilterDistrictsHavingEightyPercentBPL in eclipse which will filter those tuples for which 80 percent objective in BPL cards are achieved. The logic put in exec method is value of Project_Performance_IHHL_BPL is equal to more than 80% of Project_Objectives_IHHL_BPL.

Export the project to Project2.jar



2. Write PIG query to find out the districts who achieved 80 percent objective in BPL cards Register the Jar Project2.jar for the UDF created in step11

REGISTER /home/acadgild/pig/Project2.jar;

Next, using the UDF filter those tuple for which Project_Performance_IHHL_BPL is equal to more than 80% of Project_Objectives_IHHL_BPL

physical_progress_80_percent_bpl = FILTER physical_progress BY project2UDF.FilterDistrictsHavingEightyPercentBPL(TOTUPLE(Project_Objectives_IHHL_BPL, Project_Performance_IHHL_BPL));

Next, Select only District_Name field using command below:
district_80_percent_bpl = FOREACH physical_progress_80_percent_bpl GENERATE District_Name;

Next, Store into HDFS directory districts_having_100percent_objectives using command below:
STORE district_80_percent_bpl INTO 'hdfs://localhost:9000/districts_having_80percent_objectives';

```
grunt> REGISTER /home/acadgild/pig/Project2.jar;
2017-12-11 09:43:53,699 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - io.bytes.per.checksum is deprecated. Instead, use
 dfs.bytes-per-checksum
2017-12-11 09:43:53,699 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.de
faultFS
2017-12-11 09:43:53,699 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapreduce.job.counters.limit is deprecated. Inste
ad, use mapreduce.job.counters.max
2017-12-11 09:43:53,769 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapreduce.job.counters.limit is deprecated. Inste
ad, use mapreduce.job.counters.max
2017-12-11 09:43:53,769 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - io.bytes.per.checksum is deprecated. Instead, use
 dfs.bytes-per-checksum
2017-12-11 09:43:53,769 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.de
faultFS
grunt> physical_progress_80_percent_bpl = FILTER physical_progress BY project2UDF.FilterDistrictsHavingEightyPercentBPL(TOTUPLE(Project_O
bjectives_IHHL_BPL, Project_Performance_IHHL_BPL));
grunt> district_80_percent_bpl = FOREACH physical_progress_80_percent_bpl GENERATE District_Name;
grunt> STORE district_80_percent_bpl INTO 'hdfs://localhost:9000/districts_having_80percent_objectives';
2017-12-11 09:45:18,472 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapreduce.job.counters.limit is deprecated. Inste
ad, use mapreduce.job.counters.max
2017-12-11 09:45:18,472 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - io.bytes.per.checksum is deprecated. Instead, use
 dfs.bytes-per-checksum
2017-12-11 09:45:18,472 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.de
faultFS
2017-12-11 09:45:18,572 [main] INFO  org.apache.pig.tools.pigstats.ScriptState - Pig features used in the script: FILTER
2017-12-11 09:45:18,650 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - io.bytes.per.checksum is deprecated. Instead, use
 dfs.bytes-per-checksum
2017-12-11 09:45:18,650 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.de
faultFS
2017-12-11 09:45:18,653 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapreduce.job.counters.limit is deprecated. Inste
ad, use mapreduce.job.counters.max
```

<---------- Intermediate Logs ---------->

```
HadoopVersion   PigVersion      UserId  StartedAt       FinishedAt      Features
2.2.0   0.14.0  acadgild        2017-12-11 09:45:18     2017-12-11 09:46:02     FILTER

Success!

Job Stats (time in seconds):
JobId   Maps    Reduces MaxMapTime      MinMapTime      AvgMapTime      MedianMapTime   MaxReduceTime   MinReduceTime   AvgReduceTime   M
edianReducetime Alias   Feature Outputs
job_local427933718_0002 1       0       n/a     n/a     n/a     n/a     0       0       0       0       district_80_percent_bpl,physical_
progress,physical_progress_80_percent_bpl,row_physical_progress MAP_ONLY        hdfs://localhost:9000/districts_having_80percent_objectiv
es,

Input(s):
Successfully read 607 records (1447116 bytes) from: "hdfs://localhost:9000/flume_import"

Output(s):
Successfully stored 349 records (4038 bytes) in: "hdfs://localhost:9000/districts_having_80percent_objectives"

Counters:
Total records written : 349
Total bytes written : 4038
Spillable Memory Manager spill count : 0
Total bags proactively spilled: 0
Total records proactively spilled: 0

Job DAG:
job_local427933718_0002


2017-12-11 09:46:02,451 [main] INFO  org.apache.hadoop.metrics.jvm.JvmMetrics - Cannot initialize JVM Metrics with processName=JobTracker
, sessionId= - already initialized
2017-12-11 09:46:02,452 [main] INFO  org.apache.hadoop.metrics.jvm.JvmMetrics - Cannot initialize JVM Metrics with processName=JobTracker
, sessionId= - already initialized
2017-12-11 09:46:02,455 [main] INFO  org.apache.hadoop.metrics.jvm.JvmMetrics - Cannot initialize JVM Metrics with processName=JobTracker
, sessionId= - already initialized
2017-12-11 09:46:02,474 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - Success!
grunt>
```

3. Verify that results are stored in HDFS

The following command shows that folders are created under districts_having_100percent_objectives

hadoop fs -ls /districts_having_80percent_objectives

Next, use the following HDFS command to show the results

hadoop fs –ls /districts_having_80percent_objectives/part-m-00000

```
[acadgild@localhost ~]$ hadoop fs -ls /districts_having_80percent_objectives
17/12/11 09:53:08 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where
applicable
Found 2 items
-rw-r--r--   3 acadgild supergroup          0 2017-12-11 09:46 /districts_having_80percent_objectives/_SUCCESS
-rw-r--r--   3 acadgild supergroup       3352 2017-12-11 09:46 /districts_having_80percent_objectives/part-m-00000
[acadgild@localhost ~]$ hadoop fs -cat /districts_having_80percent_objectives/part-m-00000
17/12/11 09:53:24 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where
applicable
ANANTAPUR
CHITTOOR
CUDDAPAH
EAST GODAVARI
KARIMNAGAR
KHAMMAM
KRISHNA
KURNOOL
MEDAK
NALGONDA
NIZAMABAD
RANGAREDDI
WARANGAL
WEST GODAVARI
DIBANG VALLEY
LOHIT
TIRAP
BAGSHA
CACHAR
DIBRUGARH
GOALPARA
GOLAGHAT
HAILAKANDI
```

4. Use sqoop command to export data from HDFS into mysql table districts_having_80percent_objectives in database bpl_results

The following sqoop command is used to export data from HDFS folder districts_having_80percent_objectives into already created mysql table 'districts_having_80percent_objectives

Screenshots are as below:

sqoop export --connect jdbc:mysql://localhost/bpl_results --username 'root' --table 'districts_having_80percent_objectives' --export-dir '/districts_having_80percent_objectives' --input-fields-terminated-by ',' -m 1 --columns name

```
[acadgild@localhost ~]$ sqoop export --connect jdbc:mysql://localhost/bpl_results --username 'root' --table 'districts_having_80percent_o
bjectives' --export-dir '/districts_having_80percent_objectives' --input-fields-terminated-by ','  -m 1 --columns name
Warning: /usr/local/sqoop/../hcatalog does not exist! HCatalog jobs will fail.
Please set $HCAT_HOME to the root of your HCatalog installation.
Warning: /usr/local/sqoop/../accumulo does not exist! Accumulo imports will fail.
Please set $ACCUMULO_HOME to the root of your Accumulo installation.
Warning: /usr/local/sqoop/../zookeeper does not exist! Accumulo imports will fail.
Please set $ZOOKEEPER_HOME to the root of your Zookeeper installation.
2017-12-11 09:57:19,250 INFO  [main] sqoop.Sqoop: Running Sqoop version: 1.4.6
2017-12-11 09:57:20,156 INFO  [main] manager.MySQLManager: Preparing to use a MySQL streaming resultset.
2017-12-11 09:57:20,156 INFO  [main] tool.CodeGenTool: Beginning code generation
2017-12-11 09:57:21,045 INFO  [main] manager.SqlManager: Executing SQL statement: SELECT t.* FROM `districts_having_80percent_objectives`
 AS t LIMIT 1
2017-12-11 09:57:21,145 INFO  [main] manager.SqlManager: Executing SQL statement: SELECT t.* FROM `districts_having_80percent_objectives`
 AS t LIMIT 1
2017-12-11 09:57:21,159 INFO  [main] orm.CompilationManager: HADOOP_MAPRED_HOME is /usr/local/hadoop-2.6.0
Note: /tmp/sqoop-acadgild/compile/297be123c7d8b9a6a6fefce4bef412e3/districts_having_80percent_objectives.java uses or overrides a depreca
ted API.
Note: Recompile with -Xlint:deprecation for details.
2017-12-11 09:57:25,563 INFO  [main] orm.CompilationManager: Writing jar file: /tmp/sqoop-acadgild/compile/297be123c7d8b9a6a6fefce4bef412
e3/districts_having_80percent_objectives.jar
2017-12-11 09:57:25,608 INFO  [main] mapreduce.ExportJobBase: Beginning export of districts_having_80percent_objectives
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/local/hbase/lib/slf4j-log4j12-1.6.4.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/local/hadoop-2.6.0/share/hadoop/common/lib/slf4j-log4j12-1.7.5.jar!/org/slf4j/impl/StaticLoggerBin
der.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
2017-12-11 09:57:26,407 WARN  [main] util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java
classes where applicable
2017-12-11 09:57:26,418 INFO  [main] Configuration.deprecation: mapred.jar is deprecated. Instead, use mapreduce.job.jar
2017-12-11 09:57:28,275 INFO  [main] Configuration.deprecation: mapred.reduce.tasks.speculative.execution is deprecated. Instead, use map
reduce.reduce.speculative
2017-12-11 09:57:28,298 INFO  [main] Configuration.deprecation: mapred.map.tasks.speculative.execution is deprecated. Instead, use mapred
uce.map.speculative
2017-12-11 09:57:28,304 INFO  [main] Configuration.deprecation: mapred.map.tasks is deprecated. Instead, use mapreduce.job.maps
```

5. Verify Result in Mysql
   Use the following command in mysql to verify results in mysql

   select * from districts_having_80percent_objectives

```
mysql> select * from districts_having_80percent_objectives;
+-----------------------------------------+
| name                                    |
+-----------------------------------------+
| ANANTAPUR                               |
| CHITTOOR                                |
| CUDDAPAH                                |
| EAST GODAVARI                           |
| KARIMNAGAR                              |
| KHAMMAM                                 |
| KRISHNA                                 |
| KURNOOL                                 |
| MEDAK                                   |
| NALGONDA                                |
| NIZAMABAD                               |
| RANGAREDDI                              |
| WARANGAL                                |
| WEST GODAVARI                           |
| DIBANG VALLEY                           |
| LOHIT                                   |
| TIRAP                                   |
| BAGSHA                                  |
| CACHAR                                  |
| DIBRUGARH                               |
| GOALPARA                                |
| GOLAGHAT                                |
| HAILAKANDI                              |
| JORHAT                                  |
| KAMRUP                                  |
| KARIMGANJ                               |
| KOKRAJHAR                               |
| LAKHIMPUR                               |
| MARIGAON                                |
| NAGAON                                  |
| SIBSAGAR                                |
| SONITPUR                                |
| TINSUKIA                                |
| BEGUSARAI                               |
```

MUZAFFARPUR
SAHARSA
VAISHALI
DHAMTARI
JASHPUR
KANKER
KORBA
KORIYA
SURGUJA
NORTH GOA
AHMEDABAD
AMRELI
ANAND
BANAS KANTHA
BHARUCH
BHAVNAGAR
DAHOD
DANGS
GANDHINAGAR
JAMNAGAR
JUNAGADH
KACHCHH
KHEDA
MAHESANA
NARMADA
NAVSARI
PANCH MAHALS
PATAN
PORBANDAR
RAJKOT
SABAR KANTHA
SURAT
SURENDRANAGAR
VADODARA
VALSAD
AMBALA
BHIWANI
FARIDABAD

: :

```
| PILIBHIT                                |
| PRATAPGARH                              |
| RAE BARELI                              |
| RAMPUR                                  |
| SAHARANPUR                              |
| SANT RAVIDAS NAGAR( BHADOHI)            |
| SHAHJAHANPUR                            |
| SHRAVASTI                               |
| SIDDHARTHNAGAR                          |
| SITAPUR                                 |
| SONBHADRA                               |
| SULTANPUR                               |
| UNNAO                                   |
| VARANASI                                |
| BAGESHWAR                               |
| CHAMOLI                                 |
| DEHRADUN                                |
| HARIDWAR                                |
| NAINITAL                                |
| PITHORAGARH                             |
| RUDRAPRAYAG                             |
| TEHRI GARHWAL                           |
| UDHAM SINGH NAGAR                       |
| UTTARKASHI                              |
| BARDHAMAN                               |
| DAKSHIN DINAJPUR                        |
| HOOGHLY                                 |
| HOWRAH                                  |
| JALPAIGURI                              |
| MIDNAPUR EAST                           |
| MIDNAPUR WEST                           |
| NADIA                                   |
| NORTH 24 PARAGANAS                      |
| SOUTH 24 PARAGANAS                      |
+-----------------------------------------+
349 rows in set (0.00 sec)

mysql>
```