EX NO:3 210701167

Implement a MapReduce program to process a weather dataset

Steps:

1. Open command prompt and run as administrator

Go to hadoop sbin directory

```
C:\Windows\system32>cd C:\Hadoop\sbin

C:\Hadoop\sbin>
```

Note:

1. Check hadoop/data/datanode and hadoop/data/namenode and if both folders are empty, type “hdfs namenode -format”.
2. Check python version with “python --version”.
3. Check “C:\Python39\” is added in Environment variables > System variables > Path, if not add your python path.
4. Check Environment variables > System variables > HADOOP_HOME is set as “C:\Hadoop”.

```
C:\Hadoop\sbin>echo %HADOOP_HOME%
C:\Hadoop

C:\Hadoop\sbin>python --version
Python 3.11.4
```

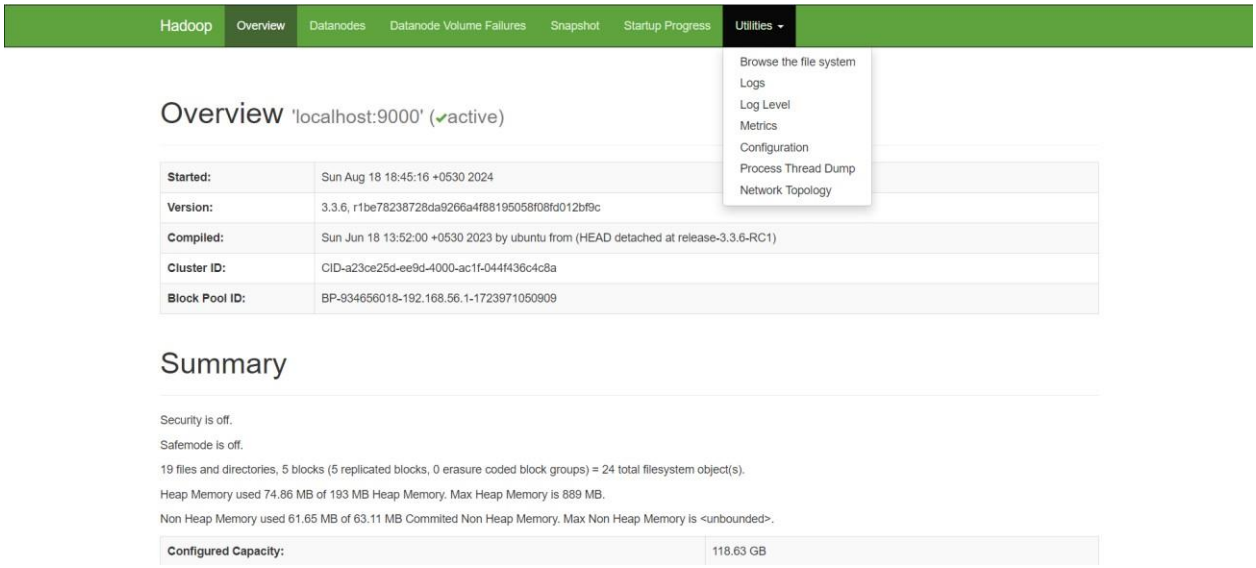
2. Start Hadoop Services start-dfs.cmd start-yarn.cmd

```
C:\Windows\System32>start-all.cmd
This script is Deprecated. Instead use start-dfs.cmd and start-yarn.cmd
starting yarn daemons

C:\Windows\System32>jps
22208 NodeManager
5808 ResourceManager
19416 DataNode
20888 Jps
2492 NameNode

C:\Windows\System32>
```

3. Open the browser and go to the URL “localhost:9870”



4. Create a Directory in HDFS

```
hadoop fs -mkdir /user/weather
```

```
C:\hadoop\sbin>hadoop fs -mkdir /user/weather
mkdir: `/user/weather': File exists

C:\hadoop\sbin>
```

5. Copy the Input File to HDFS

```
hdfs dfs -put C:\Users\monid\OneDrive\Documents\DataAnalytics\sample_weather.txt /user/weather
```

```
C:\hadoop\sbin>hdfs dfs -put C:\Users\monid\OneDrive\Documents\DataAnalytics\sample_weather.txt /user/weather
put: `/user/weather/sample_weather.txt': File exists

C:\hadoop\sbin>
```

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Note: mapper.py:

```
#! /usr/bin/env python import
sys


def map1():
    for line in sys.stdin:
        tokens = line.strip().split()
if len(tokens) < 13:
            continue


        station = tokens[0]
if "STN" in station:
            continue


        date_hour = tokens[2]
temp = tokens[3]         dew
= tokens[4]         wind =
tokens[12]


        if temp == "9999.9" or dew == "9999.9" or wind == "999.9":
            continue
        hour = int(date_hour.split("_")[-1])
date = date_hour[:date_hour.rfind("_")-2]
if 4 < hour <= 10:              section = "section1"
```

```
elif 10 < hour <= 16:            section =
"section2"        elif 16 < hour <= 22:
section = "section3"
      else:
         section = "section4"

      key_out = f"{station}_{date}_{section}"
value_out   =   f"{temp}   {dew}   {wind}"
print(f"{key_out}\t{value_out}")

if __name__ == "__main__":
   map1()
```

reducer.py:

```
#!
/usr/bin/env     python
import sys

def  reduce1():          current_key  =  None
sum_temp, sum_dew, sum_wind = 0, 0, 0
   count = 0

   for line in sys.stdin:
      key, value = line.strip().split("\t")
temp, dew, wind = map(float, value.split())
```

```
        if current_key is None:
current_key = key


        if key == current_key:
sum_temp       +=       temp
sum_dew        +=        dew
sum_wind += wind
            count += 1
        else:
            avg_temp = sum_temp / count              avg_dew = sum_dew /
count             avg_wind = sum_wind / count
print(f"{current_key}\t{avg_temp}  {avg_dew}  {avg_wind}")
            current_key = key
            sum_temp, sum_dew, sum_wind = temp, dew, wind
            count = 1


    if current_key is not None:         avg_temp = sum_temp / count
avg_dew = sum_dew / count         avg_wind = sum_wind / count
print(f"{current_key}\t{avg_temp}  {avg_dew}  {avg_wind}") if
__name__ == "__main__":

    reduce1()
```

6. Run the Hadoop Streaming Job

```
    hadoop jar C:\hadoop\share\hadoop\tools\lib\hadoop-streaming-3.3.1.jar ^     -files
    "/Users/monid/OneDrive/Documents/DataAnalytics/mapper2.py,/Users/monid/One
```

```
Drive/Documents/DataAnalytics/reducer2.py" ^    -input
/user/weather/sample_weather.txt ^    -output /user/output1 ^    -mapper "python
C:/Users/monid/OneDrive/Documents/DataAnalytics/mapper2.py" ^    -reducer
"python C:/Users/monid/OneDrive/Documents/DataAnalytics/reducer2.py "
```

```
C:\hadoop\sbin>hadoop jar C:\hadoop\share\hadoop\tools\lib\hadoop-streaming-3.3.1.jar ^    -files "/Users/monid/OneDrive
/Documents/DataAnalytics/mapper2.py,/Users/monid/OneDrive/Documents/DataAnalytics/reducer2.py" ^    -input /user/weather
/sample_weather.txt ^    -output /user/output1 ^    -mapper "python C:/Users/monid/OneDrive/Documents/DataAnalytics/mapp
er2.py" ^    -reducer "python C:/Users/monid/OneDrive/Documents/DataAnalytics/reducer2.py "
packageJobJar: [/C:/Users/monid/AppData/Local/Temp/hadoop-unjar5991909413546494244/] [] C:\Users\monid\AppData\Local\Tem
p\streamjob2531261441153576294.jar tmpDir=null
2024-09-14 08:23:08,511 INFO client.DefaultNoHARMFailoverProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032
2024-09-14 08:23:08,736 INFO client.DefaultNoHARMFailoverProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032
2024-09-14 08:23:08,915 ERROR streaming.StreamJob: Error Launching job : Output directory hdfs://localhost:9000/user/out
put1 already exists
Streaming Command Failed!
```

7. View the Output

```
hdfs dfs -cat /user/output1/part-00000
```

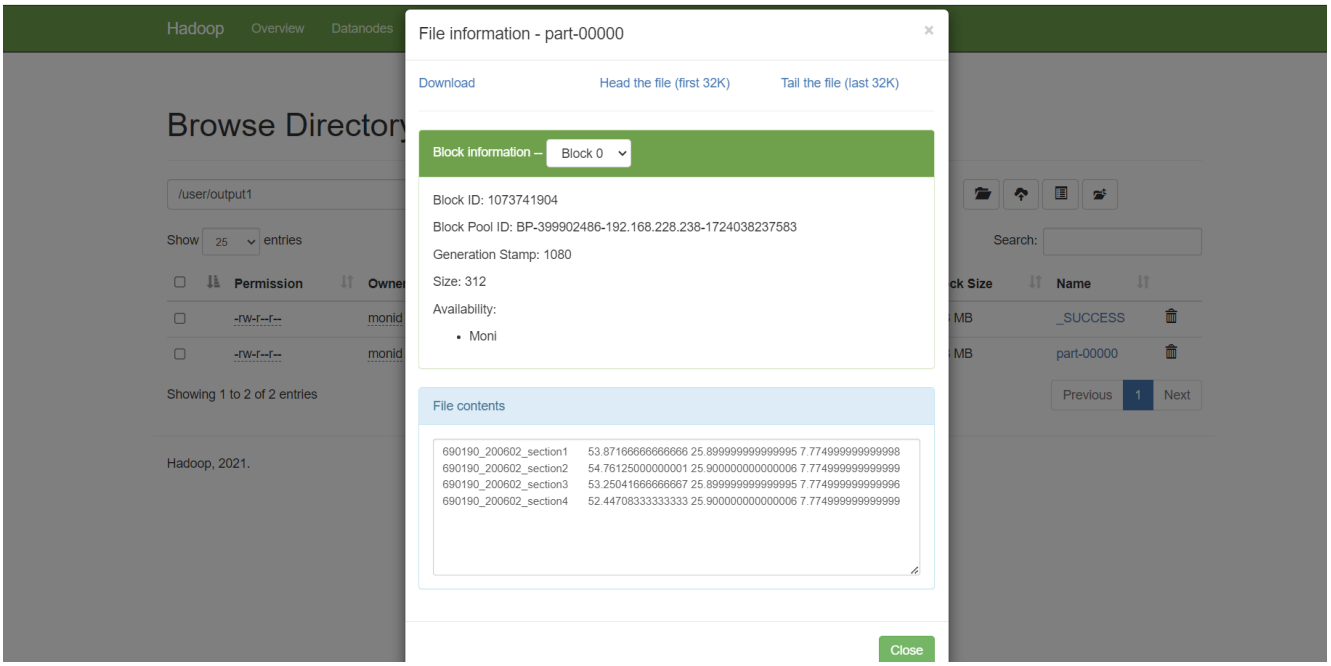
```
C:\hadoop\sbin>hdfs dfs -cat /weather/output/part-00000
cat: `/weather/output/part-00000': No such file or directory

C:\hadoop\sbin>hdfs dfs -cat /user/output1/part-00000
690190_200602_section1  53.87166666666666 25.899999999999995 7.774999999999998
690190_200602_section2  54.76125000000001 25.900000000000006 7.774999999999999
690190_200602_section3  53.25041666666667 25.899999999999995 7.774999999999996
690190_200602_section4  52.44708333333333 25.900000000000006 7.774999999999999

C:\hadoop\sbin>
```

8. Once the map reduce operations are performed successfully, the output will be present in the specified directory.

“/user/output1/part-00000”



9. Stop Hadoop Services stop-dfs.cmd

stop-yarn.cmd

```
C:\Hadoop\sbin>stop-dfs.cmd
SUCCESS: Sent termination signal to the process with PID 7964.
SUCCESS: Sent termination signal to the process with PID 13580.

C:\Hadoop\sbin>stop-yarn.cmd
stopping yarn daemons
SUCCESS: Sent termination signal to the process with PID 14412.
SUCCESS: Sent termination signal to the process with PID 7092.

INFO: No tasks running with the specified criteria.

C:\Hadoop\sbin>
```

RESULT:

Thus the implementation of the MapReduce python program a weather dataset in Hadoop is executed successfully.