Exp no:3 210701181

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
```

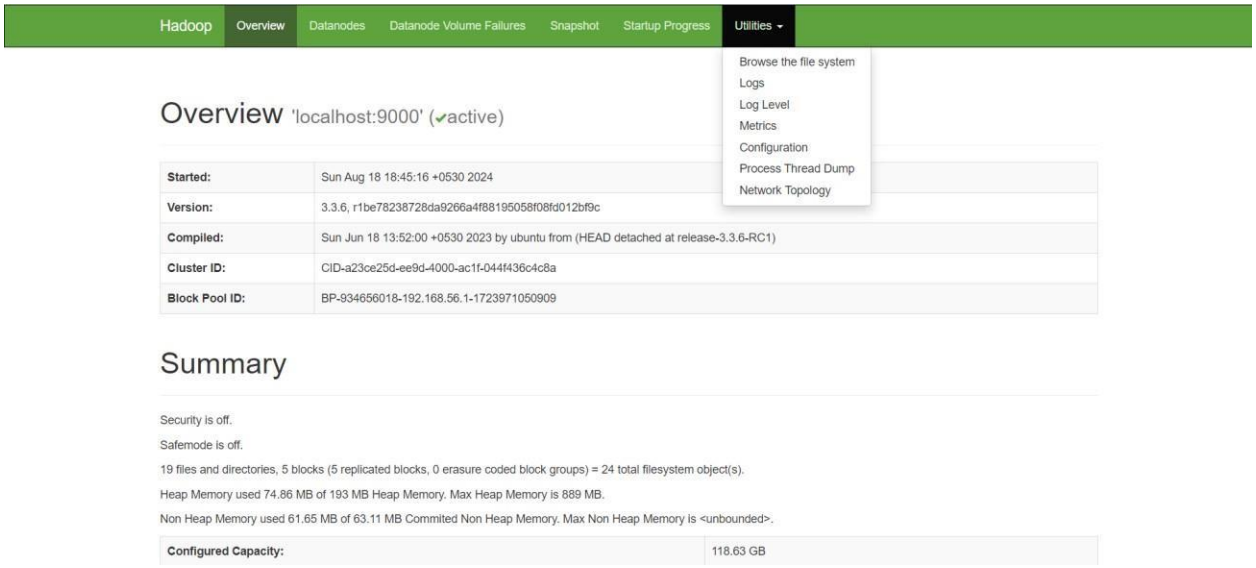
2. Start Hadoop Services start-dfs.cmd start-yarn.cmd

```
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>
```

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-3.3.6.jar \
  -input /user/hadoop/weather/input.txt \
  -output /user/output \
 -mapper "python C:\Users\nithu\OneDrive\Documents\weather\mapper1.py" \
 -reducer "python C:\Users\nithu\OneDrive\Documents\weather\reducer1.py"
```

```
C:\hadoop\sbin>hadoop jar C:\hadoop\share\hadoop\tools\lib\hadoop-streaming-3.3.6.jar ^
More? -input /user/weather/sample_weather.txt ^
More? -output /user/output2 ^
More? -mapper "python C:\Users\nithu\OneDrive\Documents\weather\mapper2.py" ^
More? -reducer "python C:\Users\nithu\OneDrive\Documents\weather\reducer2.py"
packageJobJar: [/C:/Users/nithu/AppData/Local/Temp/hadoop-unjar1757415584665957758/] [] C:\Users\nithu\AppData\Local\Te
p\streamjob1192560402267800646.jar tmpDir=null
2024-09-15 21:01:26,316 INFO client.DefaultNoHARMFailoverProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032
2024-09-15 21:01:26,454 INFO client.DefaultNoHARMFailoverProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032
2024-09-15 21:01:31,862 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging
nithu/.staging/job_1726412749780_0002
2024-09-15 21:01:32,088 INFO mapred.FileInputFormat: Total input files to process : 1
2024-09-15 21:01:32,139 INFO mapreduce.JobSubmitter: number of splits:2
2024-09-15 21:01:32,236 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1726412749780_0002
2024-09-15 21:01:32,236 INFO mapreduce.JobSubmitter: Executing with tokens: []
2024-09-15 21:01:32,357 INFO conf.Configuration: resource-types.xml not found
2024-09-15 21:01:32,358 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.
2024-09-15 21:01:32,408 INFO impl.YarnClientImpl: Submitted application application_1726412749780_0002
```

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”

File information - part-00000

Download Head the file (first 32K) Tail the file (last 32K)

Block information -- Block 0

Block ID: 1073741852

Block Pool ID: BP-1208355880-192.168.56.1-1726291919200

Generation Stamp: 1028

Size: 312

Availability:

- Nithisha

File contents

```
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
```

9. Stop Hadoop

Services

```
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>
```

Stop-dfs.cmd
Stop-yarn.cmd

RESULT:

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