

**HADOOP DEMONSTRATE THE MAP REDUCE PROGRAMMING MODEL BY  
COUNTING THE NUMBER OF WORDS IN A FILE**

**AIM:**

To demonstrate the MAP REDUCE programming model for counting the number of words in a file.

**PROCEDURE**

Step 1 - Open Terminal

```
$ su hduser
```

Password:

Step 2 - Start dfs and mapreduce services

```
$ cd /usr/local/hadoop/hadoop-2.7.2/sbin
```

```
$ start-dfs.sh
```

```
$ start-yarn.sh
```

```
$ jps
```

Step 3 - Check Hadoop through web UI

```
// Go to browser type http://localhost:8088 – All Applications Hadoop Cluster
```

```
// Go to browser type http://localhost:50070 – Hadoop Namenode
```

Step 4 – Open New Terminal

```
$ cd Desktop/
```

```
$ mkdir inputdata
```

```
$ cd inputdata/
```

```
$ echo "Hai, Hello, How are you? How is your health?" >> hello.txt
```

```
$ cat>> hello.txt
```

Step 5 – Go back to old Terminal

```
$ hadoop fs -copyFromLocal /home/hduser/Desktop/inputdata/hello.txt
```

/folder/hduser // Check in hello.txt in Namenode using Web UI

Step 6 – Download and open eclipse by creating workspace

Create a new java project.

Step 7 – Add jar to the project

You need to remove dependencies by adding jar files in the hadoop source folder. Now Click on Project tab and go to Properties. Under Libraries tab, click Add External JARs and select all the jars in the folder (click on 1st jar, and Press Shift and Click on last jar to select all jars in between and click ok)

/usr/local/hadoop/hadoop-2.7.2/share/hadoop/commonand

/usr/local/hadoop/hadoop-2.7.2/share/hadoop/mapreduce folders.

Step -8 – WordCount Program

Create 3 java files named

- WordCount.java
- WordCountMapper.java
- WordCountReducer.java

#### **WordCount.java**

```
import org.apache.hadoop.conf.Configured;  
  
import org.apache.hadoop.fs.Path;  
  
import org.apache.hadoop.io.IntWritable;  
  
import org.apache.hadoop.mapred.FileInputFormat;  
import org.apache.hadoop.mapred.FileOutputFormat;  
import org.apache.hadoop.mapred.JobClient; import  
org.apache.hadoop.mapred.JobConf;
```

```
import org.apache.hadoop.util.Tool;

import org.apache.hadoop.util.ToolRunner;

import org.apache.hadoop.io.Text;

public class WordCount extends Configured implements Tool {

    @Override

    public int run(String[] args) throws Exception {

        // TODO Auto-generated method

        stub if(args.length<2)

        {

            System.out.println("check the command line arguments");

        }

        JobConf conf=new JobConf(WordCount.class);

        FileInputFormat.setInputPaths(conf, new Path(args[0]));

        FileOutputFormat.setOutputPath(conf, new

        Path(args[1])); conf.setMapperClass(WordMapper.class);

        conf.setReducerClass(WordReducer.class);

        conf.setOutputKeyClass(Text.class);

        conf.setOutputValueClass(IntWritable.class);

        conf.setOutputKeyClass(Text.class);

        conf.setOutputValueClass(IntWritable.class);

        JobClient.runJob(conf);

        return 0;

    }

    public static void main(String args[]) throws Exception

    {
```

```
int exitcode=ToolRunner.run(new WordCount(),
args); System.exit(exitcode);
}
```

```
}
```

WordCountMapper.java

```
import java.io.IOException;

import org.apache.hadoop.io.IntWritable;

import org.apache.hadoop.io.LongWritable;

import org.apache.hadoop.mapred.MapReduceBase;

import org.apache.hadoop.mapred.OutputCollector;

import org.apache.hadoop.mapred.Reporter;

import org.apache.hadoop.io.Text;

import org.apache.hadoop.mapred.Mapper;

public class WordCountMapper extends MapReduceBase implements
Mapper<LongWritable,Text,Text,IntWritable>
{
    @Override

    public void map(LongWritable arg0, Text arg1, OutputCollector<Text,
IntWritable> arg2, Reporter arg3)
        throws IOException {

        // TODO Auto-generated method stub

        String s=arg1.toString();

        for(String word:s.split(" "))

        {

            arg2.collect(new Text(word),new IntWritable(1));
```

```
}
```

```
}
```

```
}
```

```
WordCountReducer.java
```

```
import java.io.IOException;
```

```
import java.util.Iterator;
```

```
import org.apache.hadoop.io.IntWritable;
```

```
import org.apache.hadoop.mapred.JobConf;
```

```
import org.apache.hadoop.mapred.OutputCollector;
```

```
import org.apache.hadoop.mapred.Reducer;
```

```
import org.apache.hadoop.mapred.Reporter;
```

```
import org.apache.hadoop.io.Text;
```

```
public class WordCountReducer implements
```

```
Reducer<Text,IntWritable,Text,IntWritable> { @Override
```

```
public void configure(JobConf arg0) {
```

```
// TODO Auto-generated method stub
```

```
}
```

```
@Override
```

```
public void close() throws IOException {
```

```
// TODO Auto-generated method stub
```

```
}
```

```
@Override
```

```
public void reduce(Text arg0, Iterator<IntWritable> arg1,
```

```
OutputCollector<Text, IntWritable> arg2, Reporter arg3)
```

```
throws IOException {
```

```
// TODO Auto-generated method
stub int count=0;
while(arg1.hasNext())
{
    IntWritable i=arg1.next();
    count+=i.get();
}
arg2.collect(arg0,new IntWritable(count));
}
}
```

#### Step 9 - Create JAR file

Now Click on the Run tab and click Run-Configurations. Click on New Configuration button on the left top side and Apply after filling the following properties.

#### Step 10 - Export JAR file

Now click on File tab and select Export. under Java, select Runnable Jar.

In Launch Config – select the config file you created in Step 9 (WordCountConfig).

➤ Select an export destination (let's say desktop.)

➤ Under Library handling, select Extract Required Libraries into generated JAR and click

Finish. ➤ Right-Click the jar file, go to Properties and under Permissions tab, Check

Allow executing file

as a program. and give Read and Write access to all the users

#### Step 11 – Go back to old Terminal for Execution of WordCount Program \$hadoop jar

wordcount.jar/usr/local/hadoop/input/usr/local/hadoop/output

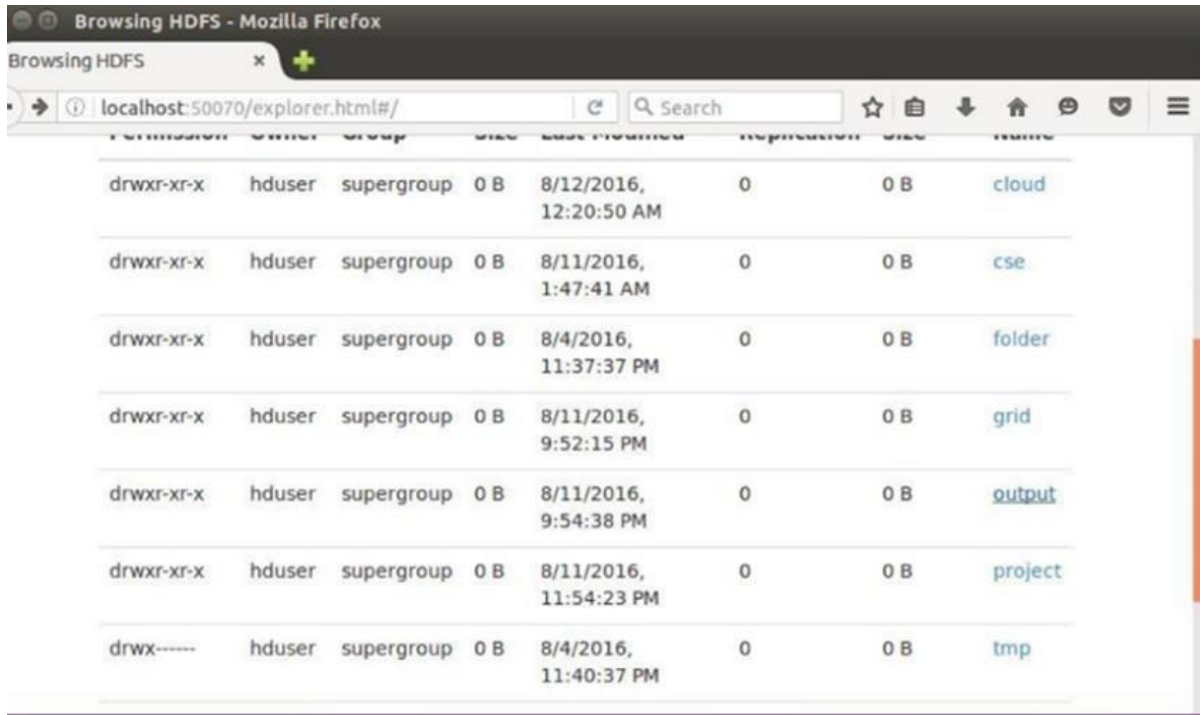
#### Step 12 – To view results in old Terminal

\$hdfs dfs -cat /usr/local/hadoop/output/part-r-00000

Step 13 - To Remove folders created using hdfs

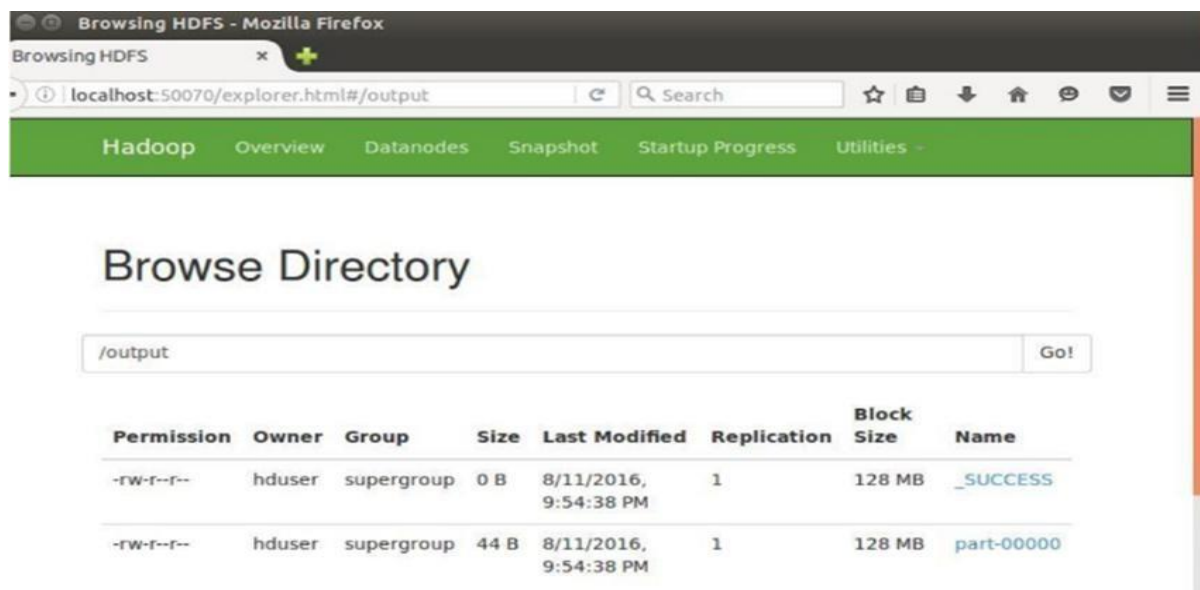
```
$ hdfs dfs -rm -R /usr/local/hadoop/output
```

## OUTPUT



The screenshot shows the 'Browsing HDFS - Mozilla Firefox' window. The address bar displays 'localhost:50070/explorer.html#/'. Below the browser window, a table lists the contents of the HDFS root directory. The table has columns for Permission, Owner, Group, Size, Last Modified, Replication, and Name. The listed items are 'cloud', 'cse', 'folder', 'grid', 'output', 'project', and 'tmp', all owned by 'hduser' and 'supergroup' with a size of '0 B'.

| Permission | Owner  | Group      | Size | Last Modified          | Replication | Name    |
|------------|--------|------------|------|------------------------|-------------|---------|
| drwxr-xr-x | hduser | supergroup | 0 B  | 8/12/2016, 12:20:50 AM | 0           | cloud   |
| drwxr-xr-x | hduser | supergroup | 0 B  | 8/11/2016, 1:47:41 AM  | 0           | cse     |
| drwxr-xr-x | hduser | supergroup | 0 B  | 8/4/2016, 11:37:37 PM  | 0           | folder  |
| drwxr-xr-x | hduser | supergroup | 0 B  | 8/11/2016, 9:52:15 PM  | 0           | grid    |
| drwxr-xr-x | hduser | supergroup | 0 B  | 8/11/2016, 9:54:38 PM  | 0           | output  |
| drwxr-xr-x | hduser | supergroup | 0 B  | 8/11/2016, 11:54:23 PM | 0           | project |
| drwx-----  | hduser | supergroup | 0 B  | 8/4/2016, 11:40:37 PM  | 0           | tmp     |



The screenshot shows the 'Browsing HDFS - Mozilla Firefox' window with the address bar set to 'localhost:50070/explorer.html#/output'. A green navigation bar at the top contains links for 'Hadoop', 'Overview', 'Datanodes', 'Snapshot', 'Startup Progress', and 'Utilities'. Below this, the 'Browse Directory' section shows a search bar with '/output' and a 'Go!' button. A table displays the contents of the '/output' directory, showing two files: '\_SUCCESS' and 'part-00000', both owned by 'hduser' and 'supergroup' with a size of '128 MB' and a replication factor of '1'.

| Permission | Owner  | Group      | Size | Last Modified         | Replication | Block Size | Name       |
|------------|--------|------------|------|-----------------------|-------------|------------|------------|
| -rw-r--r-- | hduser | supergroup | 0 B  | 8/11/2016, 9:54:38 PM | 1           | 128 MB     | _SUCCESS   |
| -rw-r--r-- | hduser | supergroup | 44 B | 8/11/2016, 9:54:38 PM | 1           | 128 MB     | part-00000 |

**RESULT:**

Thus the map reduce programming model for counting the number of words in a file has been executed successfully.