

# Vidyavardhini's College of Engineering & Technology Department of Computer Engineering

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Experiment on Hadoop Map-Reduce

Date of Performance:07/09/23

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AIM: -To write a program to implement a word count program using MapReduce.

#### THEORY:

WordCount is a simple program which counts the number of occurrences of each word in a given text input data set. WordCount fits very well with the MapReduce programming model making it a great example to understand the Hadoop Map/Reduce programming style. The implementation consists of three main parts:

- 1. Mapper
- 2. Reducer
- 3. Driver

#### Step-1. Write a Mapper

A Mapper overrides the —mapl function from the Class "org.apache.hadoop.mapreduce.Mapper" which provides <key, value> pairs as the input. A Mapper implementation may output <key, value> pairs using the provided Context.

Input value of the WordCount Map task will be a line of text from the input data file and the key would be the line number line\_number, line\_of\_text>. Map task outputs <word, one> for each word in the line of text.

```
Pseudo-code
void Map (key, value){
for each word x in value:
  output.collect(x,1);
}
```

Step-2. Write a Reducer

A Reducer collects the intermediate <key,value> output from multiple map tasks and assemble a single result. Here, the WordCount program will sum up the occurrence of each word to pairs as <word, occurrence>.

Pseudo-code

void Reduce (keyword, <list of value>){ for
each x in <list of value>:
sum+=x;

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```
final output.collect(keyword, sum);
}
Code:
import java.io.IOException;
import java.util.StringTokenizer;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.LongWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Mapper;
import org.apache.hadoop.mapreduce.Reducer;
import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.mapreduce.Job;
import org.apache.hadoop.mapreduce.lib.input.TextInputFormat;
import org.apache.hadoop.mapreduce.lib.output.TextOutputFormat;
import org.apache.hadoop.mapreduce.lib.input.FileInputFormat;
import org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;
import org.apache.hadoop.fs.Path;
public class WordCount
public static class Map extends Mapper<LongWritable, Text, Text, IntWritable> {
public void map(LongWritable key, Text value,Context context) throws
IOException, Interrupted Exception {
String line = value.toString();
StringTokenizer tokenizer = new StringTokenizer(line);
while (tokenizer.hasMoreTokens()) {
value.set(tokenizer.nextToken());
context.write(value, new IntWritable(1));
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```



```
}
}
public static class Reduce extends Reducer<Text,IntWritable,Text,IntWritable> {
public void reduce(Text key, Iterable<IntWritable> values,Context context)
throws IOException, Interrupted Exception {
int sum=0;
for(IntWritable x: values)
{
sum+=x.get();
}
context.write(key, new IntWritable(sum));
}
public static void main(String[] args) throws Exception {
Configuration conf= new Configuration();
Job job = new Job(conf,"My Word Count Program");
job.setJarByClass(WordCount.class);
job.setMapperClass(Map.class);
job.setReducerClass(Reduce.class);
job.setOutputKeyClass(Text.class);
job.setOutputValueClass(IntWritable.class);
job.setInputFormatClass(TextInputFormat.class);
job.setOutputFormatClass(TextOutputFormat.class);
Path outputPath = new Path(args[1]);
//Configuring the input/output path from the filesystem into the job
FileInputFormat.addInputPath(job, new Path(args[0]));
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```



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```
FileOutputFormat.setOutputPath(job, new Path(args[1]));

//deleting the output path automatically from hdfs so that we don't have to delete it explicitly

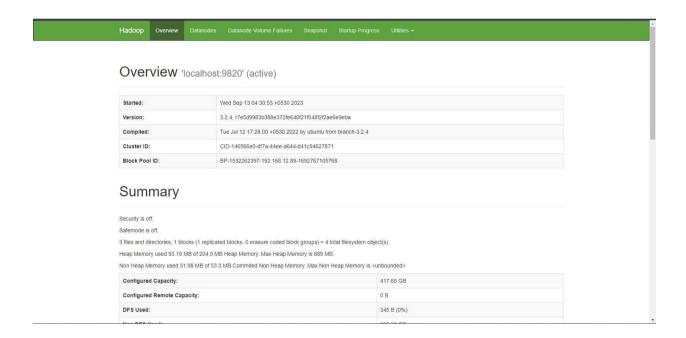
outputPath.getFileSystem(conf).delete(outputPath);

//exiting the job only if the flag value becomes false

System.exit(job.waitForCompletion(true) ?0:1);

}
```

#### **OUTPUT:**





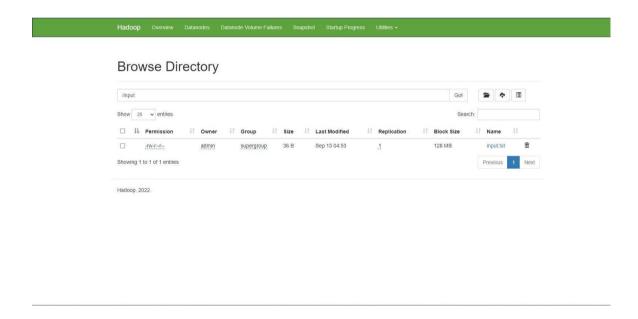
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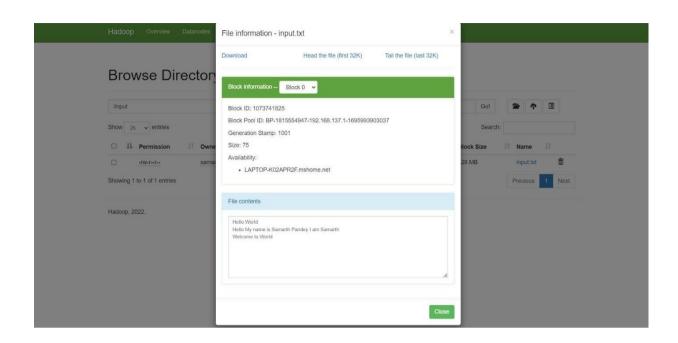
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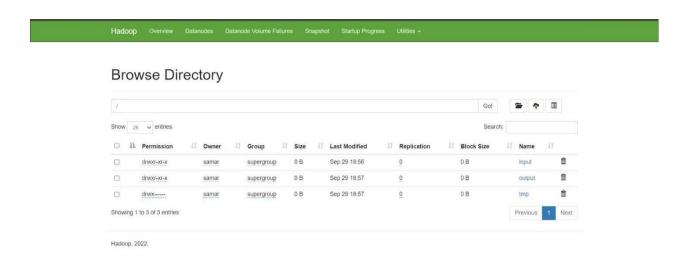


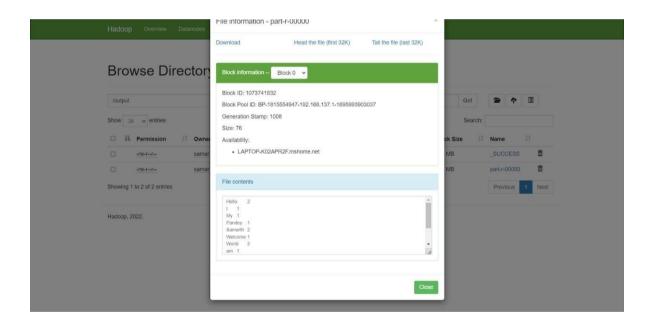






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## **CONCLUSION**:

Implementing a word count program using Map-Reduce involves breaking down the task into two primary functions: the Map function, which tokenizes and emits key-value pairs, and the Reduce function, which aggregates and counts the words. Hadoop's Map-Reduce framework efficiently processes large datasets in a distributed manner.

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