



Experiment No.4
Experiment on Hadoop Map-Reduce
Date of Performance:
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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 `map()` 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 assembles 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;
```



```
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,InterruptedException{

            String line = value.toString();

            StringTokenizer tokenizer = new

            StringTokenizer(line); while

            (tokenizer.hasMoreTokens()) {

                value.set(tokenizer.nextToken());

                context.write(value, new IntWritable(1));
```



```
}  
}  
}  
  
public static class Reduce extends Reducer<Text,IntWritable,Text,IntWritable> {  
    public void reduce(Text key, Iterable<IntWritable> values,Context context)  
        throws IOException,InterruptedException {  
        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]));
```



```
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);  
}  
}
```

CONCLUSION:

We successfully wrote a word count program using mapreduce .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.