CS4830 - BIG DATA LABORATORY
LAB 3 - ASSIGNMENT 1
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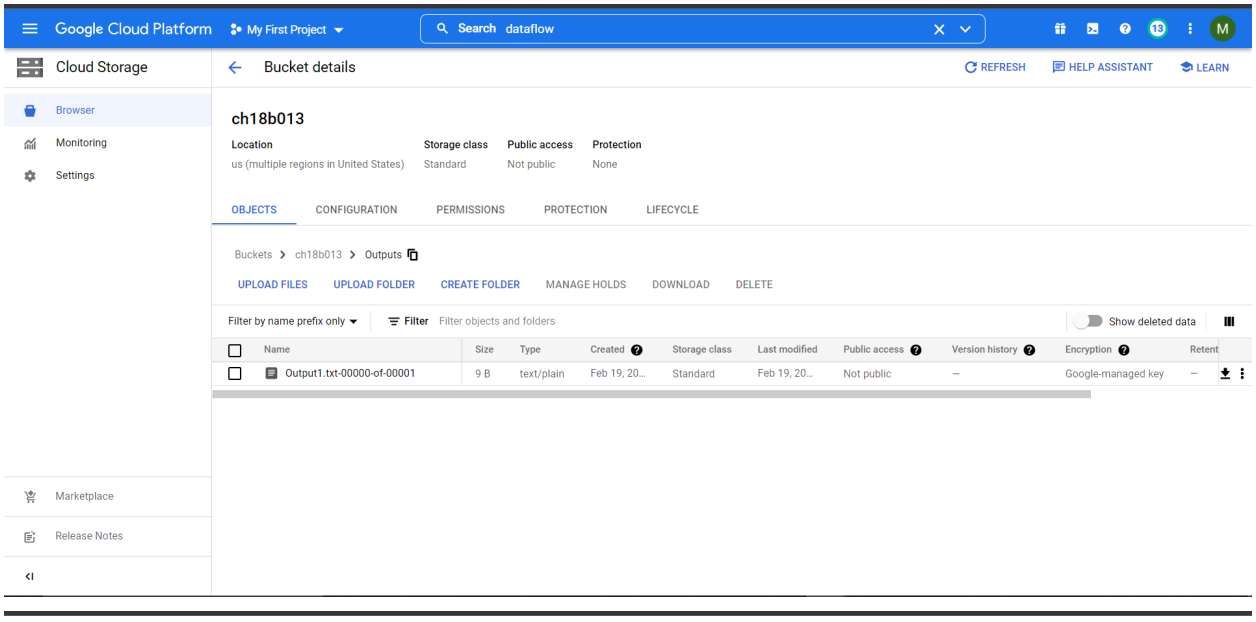
1. Dataflow job to count the number of lines in a file:

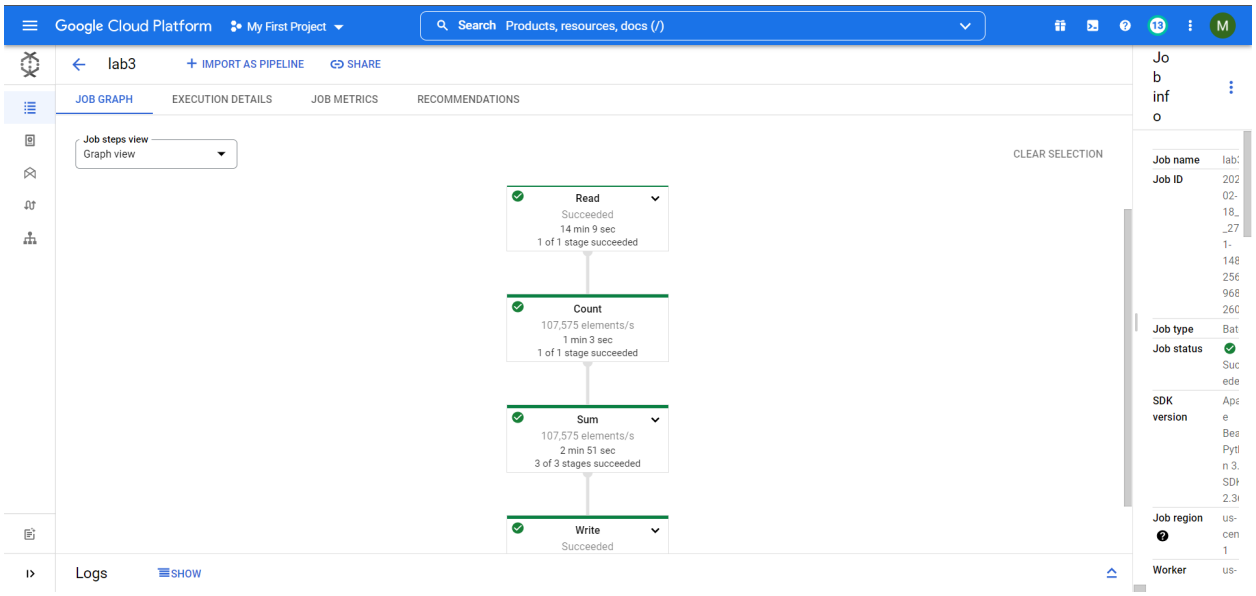
The code is given in the *dataflow_2.py* file. The screenshot of the output file is shown below.




```
51791868
```

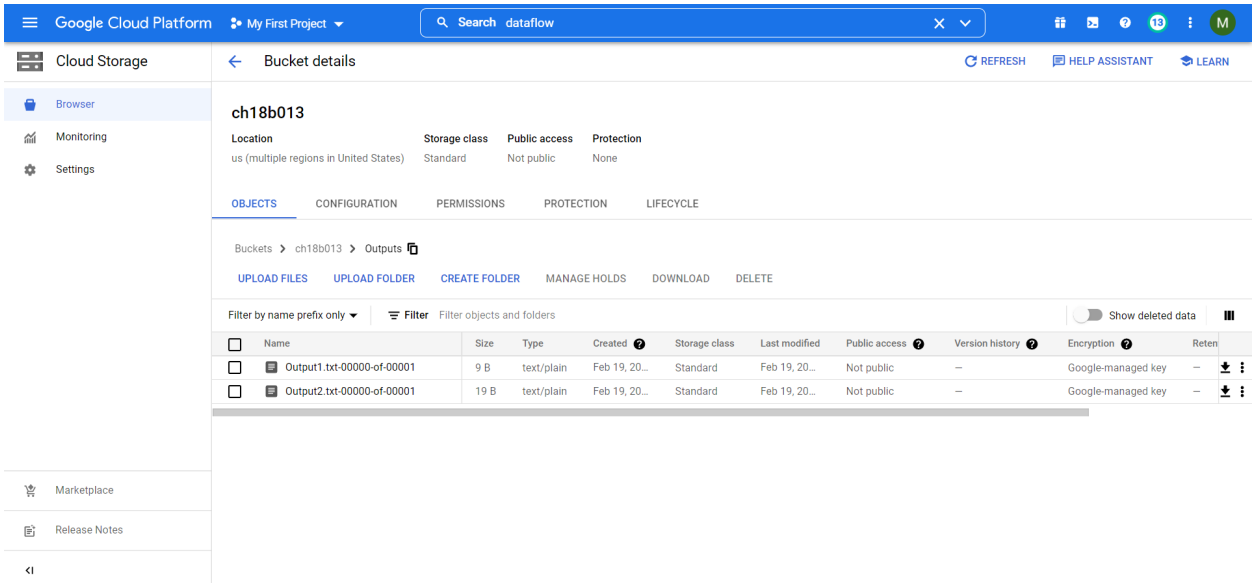
The number of lines in the file turns out to be 51791868.

The execution graph for the job is shown below:



2. Dataflow job to compute the average number of words in a line of a file:

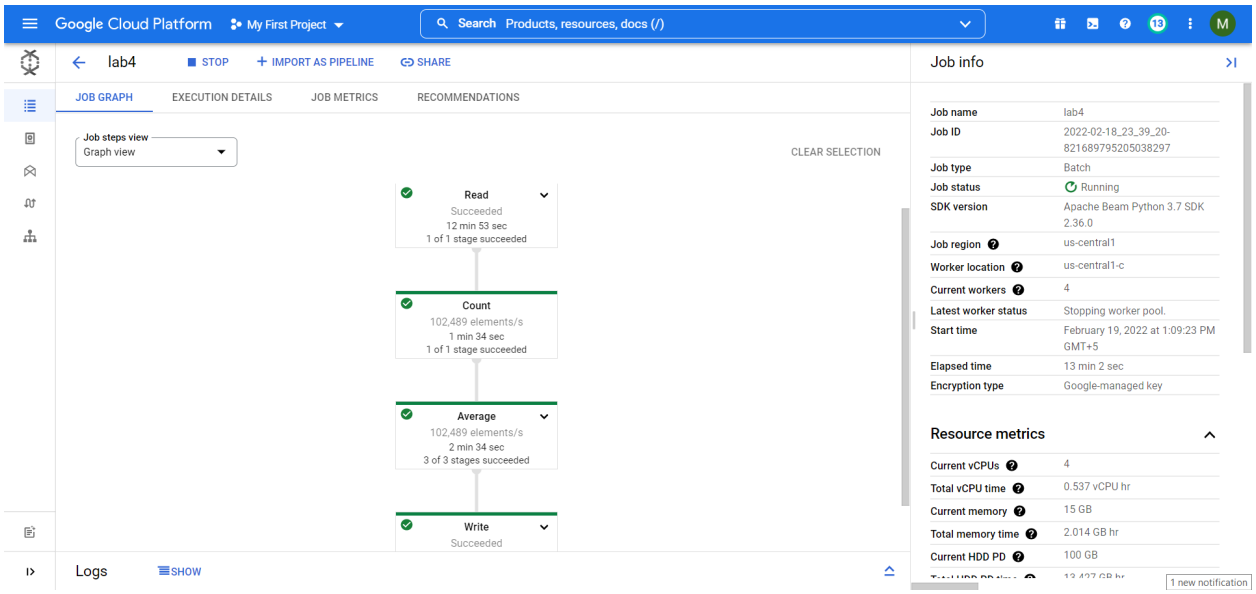
The code is given in the *dataflow_3.py* file. The screenshot of the output file is shown below.



```
1.9996232613197114
```

The average number of words in a line turns out to be 1.996232613197114.

The execution graph for the job is shown below:



3. The execution graphs for both the dataflow jobs created in the background are already presented.

4.

Pipeline for counting the number of lines:

- From the text file, we read the contents and store it in a Pcollection. Each line of the text file is stored as a string in the Pcollection.
- The Pcollection undergoes a ParDo transformation in which each element (string) of the Pcollection is transformed into count 1. The resulting Pcollection is stored in another variable.
- The new Pcollection undergoes a Combine transformation where we sum all the elements (count 1) and store the sum in a new Pcollection.
- The final Pcollection is written in an output file.

Pipeline for computing the average words in a line:

- From the text file, we read the contents and store it in a Pcollection. Each line of the text file is stored as a string in the Pcollection.
- The Pcollection undergoes a ParDo transformation in which each element (string) of the Pcollection is transformed into a count stating the number of words in the line. The resulting Pcollection is stored in another variable.
- The new Pcollection undergoes a Combine transformation where we compute the mean of all the elements (count) and store the mean in a new Pcollection.
- The final Pcollection is written in an output file.

Issues faced while designing the pipelines:

- While creating the Combine transformation for computing the mean, passing a simple function (like mean()) did not work. Since mean computation is a much more complex transformation than computing the sum, the issue was resolved by using an in-built combiner for calculating the mean **(MeanCombineFn)**.
- Apart from the above issue, things were clear after going through the Apache Beam documentation. Particularly, I got to know about the various transformations and the programming model in detail.