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A File Sharing System with Performance Progression Techniques using Hadoop

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***Abstract*— The usage of Hadoop has been increasing greatly in recent years. Hadoop adoption is widespread. Hadoop is mainly used by some big users such as Yahoo, Facebook, Netfix and Amazon for data analysis of unstructured data. As Hadoop can deal with both structured and unstructured data. Hadoop distributed file system (HDFS) is meant for storing large files but when large number of small files need to be stored, HDFS has to face few problems as all the files in HDFS are managed by a server. Hadoop, an open source java framework deals with big data. It has mainly two core components: HDFS (Hadoop distributed file system) which stores large amount of data in a reliable manner and another is MapReduce which is a programming model which processes the data in parallel and distributed manner. As large number of small files puts heavy load on NameNode of HDFS Hadoop does not perform well for those small files and MapReduce is encountered for increase in execution time. Hadoop is designed to handle huge size files and hence suffers a performance penalty while dealing with large number of small files. This research work gives an introduction about HDFS, small file problem and existing ways to deal with it these problems along with proposed approach to handle small files. In proposed approach, merging of small file is done using MapReduce programming model on Hadoop. This approach improves the performance of Hadoop in handling of small files by ignoring the files whose size is larger than the block size of Hadoop and also reduces the memory required by NameNode to store them.**

Keywords— HDFS, Hadoop, Map-Reduce, Small Files, Encryption

I. INTRODUCTION

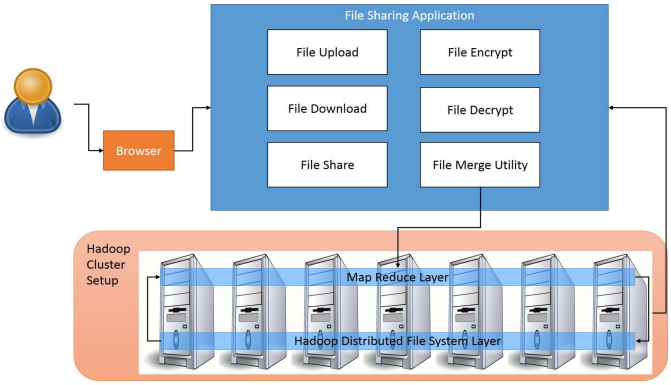
As huge amount of data is generated daily it is very difficult to deal with such huge data. So to handle this huge amount of data Hadoop is being used. Hadoop being an open source and java programming framework it supports storage and processing of extremely large data sets. It is possible to execute applications on system with Hadoop using thousands of commodity hardware nodes and it also handles thousands of terabytes of data. Hadoop being distributed file system it facilitates rapid data transfer rates within nodes and continue to operate system even in case of failure of node. With this approach the catastrophic system failure and unwanted data loss is preserve in case of number of nodes become inoperative. Hadoop is constructed using numerous functional modules as it is a software framework. Hadoop uses kernel to provide libraries for framework essentials, and other modules used in Hadoop are Hadoop distributed file system (HDFS) which can store data across number of servers to obtain high bandwidth within the nodes. Hadoop MapReduce is used to provide the programming model which can tackle large data sets and mapping of that data and reducing to obtain the desired result. [1]

II. LITERATURE SURVEY

HDFS have drawback with handling small files. It causes high consumption of NameNode and low efficiency of file reading. In this paper, SFS is used and also include merging approach. Here it cannot use the mapreduce features. Now we are increase performance of mapreduce for handling small files[3]. HDFS cannot work proper with storing and merging small files for this problem Hbase and Avro is used also it can store middle small files of different size. In future faster merging technique will be generated [4]. NameNode have its own RAM and it store metadata in it to get max Efficiency. HAR require for automatic scaling data. The following technique is used Hadoop Archive Plus (HAR+) using sha256 as the key, which is addition to HAR. Hadoop Archive plus have drawback of Overhead and it is time consuming [5]. To Avoid higher memory usage, flooding network, requests overhead and centralized point of failure (single point of failure "SPOF") of the single Namenode, HDFSX is introduce by AmrM Sauber. In future, this technique implement in real environment [6]. User access task is defined for improve and even solve the small file problem.it use PLSA technique which shows the correlations among the access tasks, applications and access files. It work from file-level to task-level. The proposed strategy effectively reduce the MDS workload and the request response delay [7]. In This avoid the weakness of hFS with help of new techniques like Fast File System and Log Structure File system with new update strategies (strategies—update-in-place and update-out-of-place).It is better technique to solve problem of handling small files in HDFS[8].

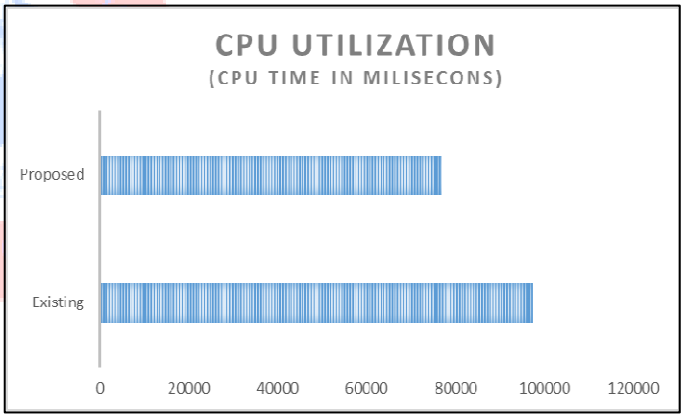
III. SYSTEM ARCHITECTURE

In this system, we have implemented File Sharing Application. This application is responsible for handle all the task. File Sharing Application consist of 6 individual blocks which are responsible for handling various types of individual tasks. These blocks are i). File Upload, ii). File Download, iii). File Sharing iv). File Encryption, v). File Decryption, vi). File Merge utility. File uploading and downloading in HDFS is handle by File Upload and File Download modules respectively. File Merging utility is main utility which optimized the storage scheme of HDFS. As per proposed system [1], this utility merge the same extension files in large one merged file. This approach will reduce the burden on NameNode. Which ultimately improves the Hadoop performance.



User use the browser to upload and download the files.Browser is connected to hadoop cluster setup via file sharing application.File sharing application can use six main method for store and merge the various types of small files.

Fig. System Architecture



IV. RESULTS AND OBSERVATION

The following graphs shows the improvement done in system. The following graph shows that CPU Utilization is reduced by 79% using Proposed System.

Fig. CPU Utilization of System

The following graph shows the comparisons between the Execution Time of Proposed System and Existing system throughout various stages of execution.

Graph state that performance is increased by (reduced
Fig. CPU Execution time

execution time) 25%,53% during Map, Reduce phase respectively. Which will cause total 44% improvement in execution time i.e. Execution time is reduced by 44%.
Overall throughput of system is also increased in proposed approach than the existing system.

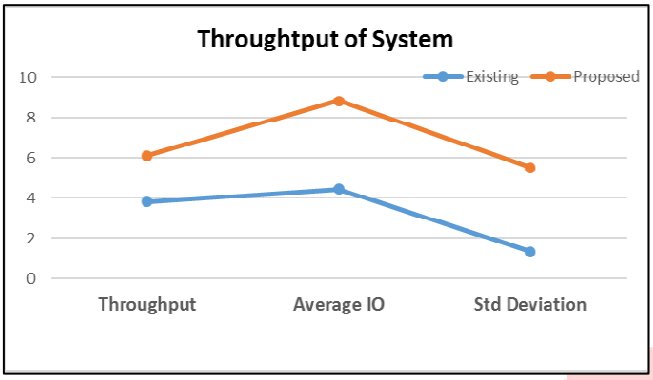


Fig. Throughput of System

V. Conclusion & Future Scope

Currently Hadoop Distributed File System (HDFS) facing problem with small files. Various methods have been proposed to deal with this problem. In terms of overhead as it involves slight overhead by combining multiple files into single split compare to other methods where sending each file to a map-reduce task will cause too much overhead. It also increases reading efficiency of small files to a great extent. HAR (Hadoop Archive) Files – HAR has been introduce to deal with small file issue. HAR is basically dependent on hadoop archive command. HAR has introduced a layer on top of HDFS, which provided interface for file accessing. A HAR file is designed by hadoop archive command runs a MapReduce job to pack the files being archived into a small number of HDFS files. Though it slow down the performance as compare to directly accessing file from HDFS. Each and every block has an index value therefore HAR create one more master index layer for lot of small file index values. So Namenode will hold master index value and in turn solves small file problem. In Future, as we did our background research into solutions to the small files problem, these following can be done to avoid produce small files (or perhaps files at all). In other words, if small files are create problem small files problem in Hadoop: 1.Change your "feeder" software so it doesn't, change your upstream code to stop generating them2.Run an offline aggregation process which aggregates your small files and re-uploads the aggregated files ready for processing3.Add an additional Hadoop step to the start of your job flow which aggregates the small files

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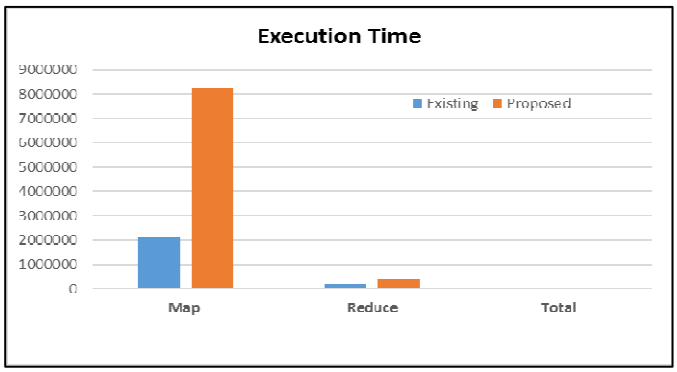

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