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# Survey of Task Scheduling Method for Mapreduce Framework in Hadoop

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## ABSTRACT

Nowadays cloud computing widely used for parallel and distributed data processing. Such as hadoop is recently mostly used for parallel and large data processing. In hadoop, mapreduce framework is programming model is allowed to process terabytes of data in very less time. Mapreduce framework uses a task scheduling method to schedule task. There are various method available for scheduling task in mapreduce framework. Survey of various task scheduling method of mapreduce framework is discussed in following sections.

## General Terms

Cloud Computing, Mapreduce, Hadoop, Scheduling algorithm.

## Keywords

Scheduler, task scheduling, mapreduce performance.

## 1. INTRODUCTION

Cloud Computing is computational paradigm for distributed processing, Now days Hadoop-MapReduce has become a emerging efficient computation model for processing large data such as Clouds. MapReduce has emerged as an important programming model. Today's data centers run many MapReduce task in parallel, so it is must to find a effective scheduling algorithm because of which completion time can optimize of these jobs. While recently scheduler focused on more optimized, there exists very little theoretical understanding of the scheduling problem in the context of MapReduce. In this paper, we have surveyed the scheduling algorithm for mapreduce framework of hadoop and compare the various scheduling algorithm for mapreduce framework of hadoop

## 2. SCHEDULING METHODS

### 2.1 Fifo, Fair and Capacity Scheduling methods

Fifo is the default scheduler which is used in default with Hadoop without any extra configuration. Fair scheduler is designed by Facebook. Fair scheduling method assigns resources to jobs such that all jobs get, on average, an equal share of resources over time. Capacity scheduler is designed by Yahoo[10]. Capacity Scheduler is a pluggable scheduler for Hadoop which provides a way to share large clusters. It is based on capacity of the resources.

### 2.2 Late (Longest Approximate Time to End) Scheduling Method

LATE scheduler always speculatively executes the task. If any task works slowly so it is very uncommon to continue with the task processing. Task is progress is very slow due to some reasons like high CPU load on the node, slow background processes etc. All tasks should be finished for completion of the entire job. The scheduler detects a slow running task to launch another equivalent task as a backup which is termed as execution relies implicitly on certain assumptions: a) Uniform Task progress on nodes b) Uniform computation at all nodes.

### 2.3 Delay Scheduling Method

Delay scheduling method is a technique for achieving locality and fairness in Scheduling. Fair scheduler is designed to allocate fair share of capacity to all the users. Two locality problems identified when fair sharing is followed are – head-of-line scheduling and sticky slots. Delay scheduling method overcomes these problems[5]. This scheduling method improves more data locality than fair scheduling.

### 2.4 Dynamic Priority Scheduling Method

Dynamic Priority Scheduling method supports capacity distribution dynamically. Based on the priorities of the user concurrently capacity is distributer among users. Automated capacity allocation and redistribution is supported in a regulated task slot resource market. This method provides users to get Map or Reduce slot on a proportional share basis per time unit. These time slots can be configured and called as allocation interval [1].

### 2.5 Deadline Constraint Scheduling Method

Deadline Constraint Scheduler focuses on the issue of deadlines but focuses more on increasing system utilization. Coordinating with deadline requirements in Hadoop based data processing is done by a job execution cost model that considers various parameters like map and reduce runtimes, input data sizes, data distribution, etc., This Scheduling method shows that when a deadline for job is different, then the scheduler assigns different number of tasks to TaskTracker and makes sure that the system specified deadline will gets fulfilled [2].

### 2.6 Data Locality aware task Scheduling Method

Data locality aware scheduling methods working start with when it receives a request from a requesting node, after receiving request this method schedules the task to the node whose input data is already present on the requesting node. If tasks were not found then it will select the task which has input data nearest to the node which have send the request, and then take the decision on whether to reserve the task on the node which stores the input data or schedule the task to the node from which request is received. By utilizing this option it can improve the data locality and also it involves the runtime overhead. That means the waiting time to schedule the task to the node which has the input data. This waiting time can be longer than the latter options runtime overhead, hence the transmission time to copy the input data to the node from which request is received. Jobtracker receives tasks from jobqueue and then it divide a job to multiple tasks and then assigns task to the tasktracker using scheduler. Data locality scheduling method is used for scheduling task to tasktracker node. The Method would perform the following functionalities: Accepts request from a requesting node. Schedules task. To reserve the task for the node storing input data. Schedule the task to the requesting node by transferring the input data to the requesting node.

## 3. ARCHITECTURE OF DATA LOCALITY AWARE SCHEDULING METHOD

Architecture of data locality aware scheduling shows in Figure 1.In this architecture it has two main modules time estimation and task scheduling module.

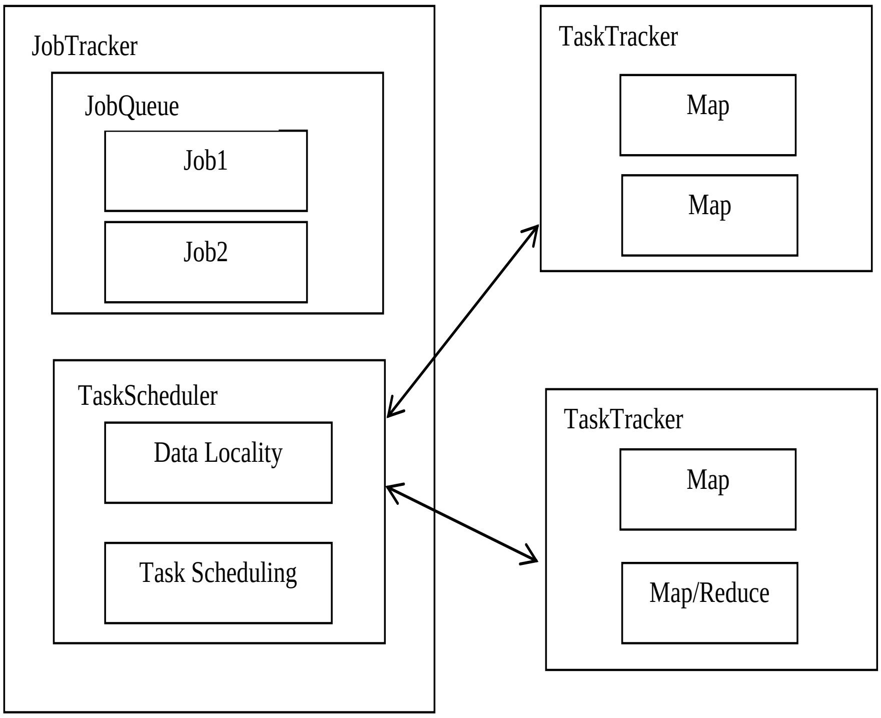

**Fig 1: Architecture of data Locality aware task scheduling method**

## 4. COMPARISON

Fifo: Drawback here is starvation of small jobs in the event of resources being utilized by large jobs.

Fair: Unlike the default Hadoop scheduler, which forms a queue of jobs, this lets short jobs finish in reasonable time while not starving long jobs. There are limits to the number of the concurrently running jobs in each job pool. If there are too many jobs submitted, the follow-up jobs will wait in the scheduling queue until previous jobs complete and release task slots [6].

LATE: If bugs cause a task to hang or slow down then speculative execution is not a solution, since the same bugs are likely to affect the speculative task also. Bugs should be fixed so that the task doesn’t hang or slow down [2].

## 4.1 Conclusion

By achieving data locality the mapreduce framework performance is improved. Using data locality aware task scheduling method data locality can be achieved and as future work we can consider this scheduling method in Hadoop in heterogeneous clusters.

## 5. ACKNOWLEDGMENTS

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## 6. REFERENCES

[1] Dynamic Priority Scheduler for Hadoop. http://issues.apache.org/jira/browse/HADOOP-476

[2] J. Dean and S. Ghemawat. Mapreduce: simplified data processing on large clusters. In Proceedings of the 6th

conference on Symposium on Opearting Systems Design & Implementation - Volume 6, pages 10–10,Berkeley, CA, USA, 2004. USENIX Association.

[3] M. Zaharia, A. Konwinski, A. D. Joseph, R. H. Katz,and I. Stoica. Improving mapreduce performance in heterogeneous environments. Technical Report UCB/EECS-2008-99, EECS Department, Universityof California, Berkeley, Aug 2008.

[4] M. Zaharia, A. Konwinski, A. D. Joseph, R. Katz, and I. Stoica, "Improving MapReduce performance in heterogeneous environments," in Proc. of OSDI'08. Berkeley, CA, USA:pp. 29-42,2012.

[5] M. Zaharia, D. Borthakur, J. S. Sen, K. Elmeleegy, S. Shenker, and I. Stoica. Delay scheduling: a simple technique for achieving locality and fairness in cluster scheduling. In Proceedings of the 5th European conference on Computer systems, EuroSys ’10, pages 265–278, New York, NY, USA, 2010. ACM.

[6] M. Zaharia, D. Borthakur, J. S. Sen, K. Elmeleegy, S. Shenker, and I. Stoica. Delay scheduling: a simple technique for achieving locality and fairness in cluster scheduling. In Proceedings of the 5th European conference on Computer systems, EuroSys '10, pages 265{278, New York, NY, USA, 2010. ACM.

[7] Thomas Sandholm and Kevin Lai. Dynamic proportional share scheduling in hadoop. In JSSPP ’10: 15th Workshop on Job Scheduling Strategies for Parallel Processing, April,2010.

[8] X. Zhang, Y. Feng, S. Feng, J. Fan and M. Zhong. An Effective Data Locality Aware Task Scheduling Method for MapReduce Framework in Heterogeneous Environments. In Proceedings of the International Conference on Cloud and Service Computing, pp. 206-2055, 2011.

[9] X. Zhang, Z. Zhong, B. Tu, S. Feng, and J. Fan.Improving data locality of mapreduce by scheduling in homogeneous computing environments. In Proceedings of IEEE 9th International Symposium on Parallel and Distributed Processing with Applications, pages 120–126, Busan, Korea, 2011. IEEE.

[10] X. Zhang, G.Wang, Z.Yang,Y.Ding “A Two-phase Execution Engine of Reduce Tasks In Hadoop MapReduce”2012.

[11] Yahoo. Hadoop at yahoo, 2010.

[12] Zhenhua Guo, Geoffrey Fox, Mo Zhou “Investigation of Data Locality in MapReduce” 2012.