Abstract

In recent years, Map Reduce has become a popular model with regard to data-intensive computation. Map Reduce can significantly reduce the execution time of data-intensive jobs. In order to achieve this objective, Map Reduce breaks down each job into small map and reduce tasks and executes them in parallel across a large number of machines. However, existing solutions mainly focus on scheduling at the task-level, which offer sub-optimal job performance, because tasks may have resource requirements which may vary during their lifetime. This makes it difficult for existing system’s task-level schedulers to effectively utilize available resources in order to reduce job execution time.

To avoid this limitation, PRISM is introduced. PRISM stands for Phase and Resource Information-aware Scheduler for Map-Reduce. PRISM consists of various clusters that perform resource-aware scheduling at the level of phases. PRISM can be defined as a fine-grained resource-aware Map Reduce scheduler that divides tasks into phases. Here, each phase has a constant resource usage profile, so that not a single phase suffers from starvation. PRISM also
offers high resource utilization and provides 1:3x improvements in job running time as compared to the current Hadoop schedulers.

References

Index Terms

Computer Science  Operating Systems

Keywords

Map Reduce, scheduling, resource allocation.