Abstract

This paper tracks the development of Grid Computing since its inception in the late 1990s to its dominance in today’s world of Distributed Computing and Information Technology. It focuses on the recent developments that spurred our interest to take up this field of research with emphasis on the algorithms we are researching for job scheduling and load balancing in the Grid Environment. The entire structure of the Grid Environment is dynamic and hybrid by nature, changing with the availability and the capability of resources or hosts that perform user tasks and the Quality of Service requirements of the tasks themselves. This makes the problem of developing an optimal task-to-resource schedule that ensures proper load balancing and also produces the minimum overall makespan (time to complete scheduled tasks) an NP-Hard Problem. Our attempt in this research is not to find the optimal solution for this problem, but to analyze and test various algorithms that produce acceptable performance in the commonly occurring practical scenarios. The algorithms considered for research and analysis include the classical First Come First Served Algorithm that schedules jobs to the best possible resources on arrival basis, Adaptive Workload Balancing Algorithm that essentially considers the job pool and the resource pool at a given point of time to give the optimal load-balanced schedule, and a brief insight into Genetic Algorithms that apply heuristics to perform optimization for some job criteria. Lastly, we include two algorithms, Fastest Processor to Largest Task First and Nearest
Comparative Analysis of Scheduling Algorithms in Computational Grid Environment

Deadline First Served, which we have indigenously developed and are currently testing for performance.

References

- Sukalyan Goswami and Ajanta De Sarkar, A Comparative Study of Load Balancing Algorithms in Computational Grid Environment, Proceedings of the Fifth International Conference on Computational Intelligence, Modelling and Simulation by IEEE Computer...
Comparative Analysis of Scheduling Algorithms in Computational Grid Environment


Index Terms

Computer Science

Distributed Systems

Keywords

Clients Users Resources Resource Domains Hosts Processing Elements

Jobs Tasks

(PEs)

Workload

Makespan

FCFS

AWLB

FPLTF

NDFS

Globus Toolkit

Unicore.