

ABSTRACT

The grid computing enables wide area resource sharing and collaboration. It is a fast emerging distributed technology. Based on scheduling of computational jobs for different resources, the computational grid can be classified into two type's namely centralized grid and decentralized market-like grid. Both the types involve sharing and collaboration among different resource providers and consumers with centralized or decentralized scheduling schemes.

The key difference between the two schemes lies in scheduling decision. In the centralized grid, the grid system makes decisions as follows.

- Which job is to be executed?
- When is it to be executed?
- Which resource can be utilized?

In the decentralized market-like grid, such decisions are made by concerned resource provider/ consumer to share the data among different participants efficiently with less unit price.

This work which is based on decentralized market-like grid comprises of an association of jobs and resources, a development of Economic Demand Model with reasonable pricing scheme and an Optimistic Heuristic Model. The association of global, local jobs and resources in this

work allows the grid to communicate each other effectively by exchanging the jobs and resources.

The development of Economic Demand Model with reasonable pricing scheme in this work, offers a high successful execution rate of jobs with sizeable profit for resource providers and it is economical for consumers also.

The reasonable pricing scheme in my research work is implemented using the two models namely Demand Based Pricing Model and Best Bid Pricing Model. These models handle the process of discovery, selection, submission of jobs, enhancing system throughput and offers user satisfaction in terms of cost and time.

The Optimistic Heuristic Model which comprises of heuristic techniques namely Heuristic Local Search (HLS), Heuristic Simulated Annealing (HSA) and Heuristic Tabu Search (HTS), is implemented in my research work. This model is required for mapping of jobs to different schedulers which are irregular and time varying due to their dynamic nature.

The HLS technique comes in handy when the scheduling job is available in the local queue. The HSA technique plays its role when the unconfirmed jobs are getting increased. The HTS technique is applied when the unconfirmed jobs exceed a limit compared to the confirmed jobs. Although there are some algorithms based on predictive factor which are intended to improve the performance of the grid system, each of them serves only specific need.

Therefore, a comprehensive approach is very much necessary to enhance performance of grid system by considering different parameters such as speed, cost, time, and optimization in accepting the confirmed jobs, successful execution rate, and number of submitted jobs, incentives earned out of efficient allocation of jobs and compilation time.

This research work also focuses on optimization of choosing a suitable scheduling scheme among First Come First Served, Shortest Job First, Earliest Deadline First and First Reward. Based on the heuristics that sorts the jobs by the essential characteristics such as arrival time, length and deadline respectively. An optimized scheduling technique deployed in the decentralized scheduling scheme improves the performance of grid system considerably.

The research work has been carried out to achieve such a comprehensive model to enhance the performances of grid system namely service discovery and migration, demand driven dynamic unit pricing and to develop optimistic heuristic algorithms for selection of independent jobs and effective resource utilization. By considering the aforementioned different parameters the results of the experiments show that the proposed Integrated Job and Resource Management (IJRM) Scheduling Model significantly improves the performances of the grid system by considering various parameters by integrating allocation, scheduling and optimization algorithms.