Abstract

Some parallel applications that solve big problems in fields like weather forecasting, data analysis, energy fields, and protein folding need to create unpredicted processes at the application run time. The MPI package provides capability to not only write static parallel programs but also to create dynamic processes at run time. However, the MPI standard did not provide any way to schedule these dynamically created processes. Online scheduling can be a solution for this problem. Hence, this work introduces an online scheduling algorithm for dynamically created processes on cluster's nodes according to the machines' performance. The objective of the algorithm is to achieve dynamic load balancing along the scheduler run time over heterogeneous cluster's machines. In addition, the proposed scheduler achieves load balancing over heterogeneous hardware according to the current real-time state of the nodes even if the processors are responding to other parallel simultaneous schedulers or running other parallel or sequential programs.
A Dynamic Scheduling Algorithm for Spawn Processes in MPI-2 to Improve and Maintain Load Balancing


Index Terms

Computer Science

Applied Sciences
Keywords
Spawn processes  Dynamic scheduling  Parallel processing  MPI