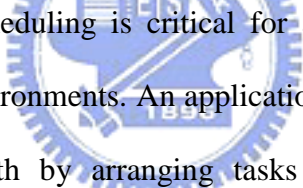


An Effective Duplication-based Task Scheduling Algorithm with Link Contention Constraints for Heterogeneous Computing System

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Abstract



Effective application scheduling is critical for achieving high performance in heterogeneous computing environments. An application scheduling problem is to find the minimum schedule length by arranging tasks of application on computing resources. This problem is a NP-complete problem. Most task scheduling algorithms assume fully connected heterogeneous processors and ignore contention on the network links. For more accurate and efficient schedules, we take the link contention constraints into our system model. We propose a *Duplication-based Earliest Finish Time* (DEFT) algorithm to solve the scheduling problem effectively. The DEFT algorithm selects the task with highest *bottom_level* value at each step and assigns the selected task to the processor, which minimizes its earliest finish time by a task duplication mechanism. The simulation studies, based on randomly generated graphs, show that our scheduling algorithm significantly surpasses other algorithms in terms of minimizing the scheduling length of applications.