

TITLE:**DYNAMIC SCHEDULER FOR HETEROGENEOUS CLUSTERS IN A MULTI-USER ENVIRONMENT****BACKGROUND:**

This proposal addresses the problem of scheduling multi-users jobs on cluster, both homogeneous and heterogeneous. The jobs (or applications) considered are composed by a set of dependent tasks and represented by Direct Acyclic Graphs (DAGs). The common scheduling approach is to consider a fixed number of processors per job, which in a multi-user environment corresponds to fix the number of processors available per user. It was shown before that each job may not require the capacity of those processors throughout the DAG execution and therefore the efficiency is lower than it could be.

The cluster schedulers usually allow that users specify the number of processors required to run their jobs, which imposes a static allocation of the cluster nodes and a non-unified cluster management based only on user requests. Users try to allocate as much capacity as possible and there is not a global management.

Another issue is that schedulers usually use the task parallel paradigm, which assigns one task to one processor, or the parallel task paradigm, which assigns one task to several processor defined by the user. The idea is to use the last paradigm but with the number of processor assigned at run time based on global cluster optimization, availability, heterogeneity and the Quality of Service (QoS). The multi-core architectures are also a characteristic to consider.

The target computer platform is a cluster, either homogeneous or heterogeneous, with a dedicated network. Such clusters can be private clusters of some organization but also they can be the nodes of a Grid infrastructure which to have a good performance requires, at least, that the end clusters have also a good performance.

OBJECTIVES:

The first aim is to develop/improve a scheduling algorithm that maximizes the resource usage by allowing a floating mapping of processors to a given job.

The second aim is to develop an algorithm to compose super-DAGs, i.e. a DAG that represents all jobs submitted to the cluster from different users, which considers user privileges in allocating processors, mean response time (QoS) and that can adapt dynamically as new jobs arrive with different priorities. The output of this algorithm will be the input of the scheduler (first aim) and together result in a dynamic scheduler for heterogeneous clusters in a multi-user environment.

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