SPAGHETtI: Scheduling/Placement Approach for task-Graphs on HETerogeneous archItecture

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Abstract

We propose a new algorithm, called SPAGHETtI, for static scheduling tasks on an unbounded heterogeneous resources where re- sources belongs to different architecture (e.g. CPU or GPU). We show that this algorithm is optimal in complexity $O(|E||A|^2 + |V||A|)$, where $|E|$ is the number of edges, $|V|$ the number of vertices of the scheduled DAG and $|A|$ the number of architectures – usually a small value – and that it is able to compute the optimal makespan. Moreover, the number of resources to be used for executing the schedule is given by a linear time algorithm. When the resources are bounded we provide a method to reduce the number of necessary resources up to the bound providing a set of compromises between the makespan and the size of the infrastructure.

Keywords: Heterogeneous resources, Optimal scheduling, bounded resources

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