Scheduling Workflows on a Cluster of Memory Managed Multicore Machines

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Abstract—Workflows are modeled with directed acyclic graphs in which vertices represent computational tasks, referred to as requests, and edges represent precedent constraints among requests. Associated with each workflow is a deadline that defines the time by which all computations of a workflow should be complete. Workflows are submitted by numerous clients to a centralized scheduler that assigns workflow requests to a cluster of memory managed multicore machines for execution. The objective of the scheduler is to minimize missed workflow deadlines. The characteristics of workflows are assumed to vary along several dimensions, including: arrival rate, periodicity, degree of parallelism, and number of requests. Five scheduling policies are evaluated; four of these policies are known from the literature and one policy is newly proposed. The advantages and disadvantages of each policy is determined through simulation studies.