

SORS: Scheduling scientific workflows for energy and performance



Speaker: Rizos Sakellariou, Manchester University, UK

Abstract: Scientific workflows are computationally demanding applications whose structure is typically represented by a Directed Acyclic Graph. The heterogeneity of such a graph and the need to meet task dependencies create a number of optimization opportunities when it comes to mapping tasks onto a set of parallel machines. The talk will explore these opportunities and will focus on algorithms to provision resources at different frequencies in order to optimize overall energy consumption without compromising performance. As cloud providers already offer virtual machines priced by CPU frequency, the problem is how to select appropriate resources to complete the execution of a workflow within a deadline still minimizing the total amount of energy consumed. Algorithms, experimental results and ongoing work will be presented.

Short Bio: School of Computer Science, University of Manchester, U.K.: Senior Lecturer in Computer Science. I have been leading a research laboratory focusing on research in High-Performance, Parallel and Distributed Software Systems.



My research focuses on the development of techniques that could be used to produce efficient software for large-scale computing systems, which make use of some form of concurrency/parallelism. The methodology employed typically involves the development of algorithms or heuristics of wide applicability for particular research problems and applications, which are demonstrated experimentally by building appropriate software systems. A recurring theme in my research is efficient resource allocation and sharing, a central issue in parallel and distributed systems. My work considers both computation and data and has made contributions to a number of topics such as: Compile-Time Analysis to Evaluate Loop Counts, Parallel Loop Partitioning and Scheduling, Parallel Performance Prediction, Distributed Query Processing, DAG Scheduling in Heterogeneous Platforms, Quality of Service for Simultaneous Multithreading, Service Level Agreement Based Job Scheduling, Autonomic Computing and Adaptive Execution, Service Allocation for Cloud Computing, Load Balancing. <http://www.cs.man.ac.uk/~rizos/>

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