

Topic 3

Scheduling and Load-Balancing

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Topic Chairs

While scheduling and load-balancing problems have been studied for several decades, the dramatic multi-scale shifts in distributed systems and their usage in the last few years have raised new and exciting challenges. These challenges span the entire spectrum from theory to practice, as demonstrated by the selection of papers in the scheduling and load-balancing topic this year at EuroPar. Out of the twenty-three submissions to the topic we accepted six papers. The topic organizers would like to thank all reviewers whose work made it possible for each paper to receive at least three reviews.

In “Cooperation in Multi-Organization Scheduling”, the authors demonstrate at a theoretical level that when multiple organizations share compute resources with selfish goals it is always preferable for these organizations to collaborate with respect to job scheduling.

The paper “A Framework for Scheduling with Online Availability” obtains new complexity results for classical scheduling problems with the assumption that availability of compute resources is stochastic throughout application execution.

In “A Parallelisable Multi-Level Banded Diffusion Scheme for Computing Balanced Partitions with Smooth Boundaries”, the author proposes a novel and practical technique for domain partitioning that yields partitions of higher quality than previously proposed approaches, and in particular that yields smooth partition boundaries.

The authors of “Toward Optimizing Latency under Throughput Constraints for Application Workflows on Clusters” proposes pipelining and task replication strategies for minimizing the latency of a scientific workflow on a homogeneous cluster, while enforcing that the workflow’s throughput be above a pre-determined threshold.

The paper “Scheduling File Transfers for Data-Intensive Jobs on Heterogeneous Clusters” presents both an algorithm based on Integer Programming and a heuristic to schedule collective file transfers between multiple storage devices distributed within a multi-cluster platform.

The author of “Load Balancing on an Interactive Multiplayer Game Server” presents an experimental study of multi-threaded multiplayer game servers, and highlights several practical solutions to improve the scalability of such servers including the use of an efficient load-balancing approach.