

Efficient Parallel SAT Solving in Grids

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Abstract. In addition to data storage and indexing systems, computational Grids are used for solving computationally demanding tasks. Because of the inherent communication delays and high failure probabilities of a loosely coupled and large computational Grid, such an environment poses a great challenge for highly data-dependent algorithms. In this work we study the problem of solving the propositional satisfiability problem (SAT) by exploiting parallel computation. We develop an implementation of a parallelization scheme called scattering for NorduGrid which is a production level Grid environment. The result is a dynamic and aggressive algorithm which takes into account the specific requirements posed by the environment. Scattering is analyzed with respect to the long communication delays and the occasional high failure rates of individual jobs. We study different approaches to coping with the communication delays and thus maximizing the effective parallelism in the Grid.