Alea - Complex Job Scheduling Simulator

Dalibor Klusáček[1], Mehmet Soysal[2], Frédéric Suter[3]
[1]CESNET a.l.e., Brno, Czech Republic
[2]Steinbuch Centre for Computing, Karlsruhe Institute of Technology, Germany
[3]IN2P3 Computing Center / CNRS, Lyon-Villeurbanne, France
klusacek@cesnet.cz, mehmet.soysal@kit.edu,
frederic.suter@cc.in2p3.fr

Using large computer systems such as HPC clusters up to their full potential can be hard. Many problems and inefficiencies relate to the interactions of user workloads and system-level policies. These policies enable various setup choices of the resource management system (RMS) as well as the applied scheduling policy. While expert's assessment and well known best practices do their job when tuning the performance, there is usually plenty of room for further improvements, e.g., by considering more efficient system setups or even radically new scheduling policies. For such potentially damaging modifications it is very suitable to use some form of a simulator first, which allows for repeated evaluations of various setups in a fully controlled manner. This paper presents the latest improvements and advanced simulation capabilities of the Alea job scheduling simulator that has been actively developed for over 10 years now. We present both recently added advanced simulation capabilities as well as a set of real-life based case studies where Alea has been used to evaluate major modifications of real HPC and HTC systems.

Keywords: simulation, scheduling, practical experience, HPC, HTC, GridSim.