
Energy-efficiency tuning of a Lattice Boltzmann simulation using MERIC

Enrico Calore¹, Alessandro Gabbana^{1,2}, Sebastiano Fabio Schifano^{1,2},
Raffaele Tripiccione^{1,2}

¹INFN Ferrara, Italy

²Università degli Studi di Ferrara, Italy

enrico.calore@fe.infn.it

Energy-efficiency is already of paramount importance for High Performance Computing (HPC) systems operation, and tools to monitor power usage and tune relevant hardware parameters are already available and in use at major supercomputing centres. On the other hand, HPC application developers and users still usually focus just on performance, even if they will probably be soon required to look also at the energy-efficiency of their jobs. Only a few software tools allow to energy-profile a generic application, and even less are able to tune energy-related hardware parameters from the application itself. In this work we use the MERIC library and the RADAR analyzer, developed within the EU READEX project, to profile and tune for efficiency the execution parameters of a real-life Lattice Boltzmann code. Profiling methodology and details are described, and results are presented and compared with the ones measured in a previous work using different methodologies and tools.

Keywords: MERIC, Optimization, Lattice Boltzmann, Energy, Efficiency.