

Preface

The field of high-performance computing is currently witnessing a significant shift of paradigm. Ever larger raw number crunching capabilities of modern processors are in principle available to computational scientists. Imperative knowledge of efficiently exploiting modern processors and performance achievements in the scientific community is growing by leaps and bounds.

On the other hand, many areas of computational science have reached a saturation in terms of problem size. Scientists often do no longer wish to solve larger problems. Instead they wish to solve smaller problems in a shorter time. The current architectures, however, are much more efficient for larger problems than they are for the more relevant smaller problems.

This series of workshops focuses on *sustained simulation performance*, i.e. high-performance computing for real application use-cases, rather than on peak performance, which is the scope of artificial problem sizes. The series was established in 2004, initially named Teraflop Workshop, and renamed to Workshop for Sustained Simulation Performance in 2012. In general terms, the scope of the workshop series has shifted from optimization for vector computers as the NEC SX-8, through efficient usage of large-scale systems, including NEC SX-9 but also cluster installations, to emphasis on future challenges, productivity and feasibility of current and future high-performance computing systems.

This book presents the combined results of the 18th and 19th installments of the series. The 18th workshop was held at the High-Performance Computing Center, Stuttgart, Germany, in October 2013. The 19th workshop was held in March 2014 at Sendai, Miyagi, Japan, and organized jointly with the University of Tohoku, Sendai, Japan.

The topics studied by the contributed papers include application driven approach towards future of HPC systems (Part I), framework analysis and scalability, exploitation of performance and productivity of the modern and existing hardware architectures (Part II), and application use-cases studies in interdisciplinary field (Part III).

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