EDITORIAL

Editorial for the special issue on new algorithms and software for E-scale high performance computing

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As a great power in supporting scientific research, engineering, and many other fields, High Performance Computing plays a more and more important role is the current world. Supercomputers are deployed in many countries around the world, and have been used in a wide range of areas. Technology of designing, building, managing, and utilizing high performance computers has been developing dramatically. With the debut of Frontier in ORNL, the world has stepped into the Exascale era. We are witnessing dramatic changes in many aspects of high performance computing, from architecture, to system software, and applications. Obviously, building Exascale supercomputers requires advanced technology, to ensure performance, power efficiency, stability, etc. On the other hand, developing software on machines at this scale is also extremely demanding, not only due to the huge processor number and the complex network, but also because of the complication in the architecture of the processors. Heterogeneity is unavoidable. It requires tremendous efforts in software development, at all levels. But it also provides opportunities. In China, we are glad to see the home-grown supercomputers evolving rapidly, providing an incubator for researchers and young students, to do research in a broad spectrum of software development at different levels. This special issue, focusing on high performance computing technology on Exascale machines, includes 7 papers in various aspects of the topic. We see efforts in building basic math library, optimizing and evaluating benchmarks, improving performance of certain types of tensor computations, and developing intelligent parallelization algorithms,

etc., on the newly built supercomputers. We would like to give our sincere gratitude to the authors for the insightful and inspiring ideas, and the wonderful work. We also want to thank the reviewers, and many other people who endeavored to the successful publication of this issue, overcoming all the difficulty. It is their hard work that made the wonderful ideas and techniques visible to our dear readers, and we are confident that more progress in this field will be incited and flourish.

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