Jülich on the way to Exascale – Applications, Tools, Systems –

Bernd Mohr

Jülich Supercomputing Centre, Jülich, Germany

Jülich Supercomputing Centre (JSC) is one of the three national supercomputing centres of Germany. For more than three decades now, it provides leadership-class high-performance computing systems to the scientific community in Germany and Europe, supports application developers to make efficient use of the systems, and develops highly-scalable tools for assessing the performance of the applications.

Applications: In the first part of this presentation, some of the knowledge gained with running and tuning highly-scalable applications, focusing on JUQUEEN, the IBM Blue Gene/Q at JSC, is reviewed. The ability to execute successfully on all 458,752 cores with up to 1.8 million processes or threads may qualify codes for the High-Q Club, effectively defining a collection of the highest scaling codes on JUQUEEN. With the shutdown of JUQUEEN in summer 2018, it is timely to compare the characteristics of the 32 High-Q Club member codes to provide guidance as to how applications may (need to) be designed in future to exploit expected exa-scale computer systems [1].

Tools: Next, the extreme scalability of the software tools Score-P and Scalasca for parallel performance measurement and analysis developed at JSC and the limitations for their use on future exascale systems is briefly examined [2].

Systems: Finally, the development of cutting-edge supercomputing technology by JSC is discussed. It is illustrated with the supercomputer evolution experienced at JSC, with three unique architecture approaches developed in the centre in slightly over a decade, namely the Dual Supercomputer approach, the Cluster-Booster concept and the Modular Supercomputer architecture. They represent an evolution in the way HPC systems are built and operated, aiming at offering real-world applications the best possible computing platform [3].

References

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