Activities

First JUQUEEN Porting and Tuning Workshop

The Jülich Supercomputing Centre (JSC) recently finished installing JUQUEEN to a final size of 28 racks of the latest Blue Gene architecture. As with any new system, new challenges arise for its users to unlock the full potential of the architecture. Designed to improve the users' expertise in using JUQUEEN, this first workshop was held from 4th to 6th of February 2013 at JSC. As a PRACE Advanced Training Centre (PATC) course it attracted 46 participants from eight European countries, all with active scientific projects on JUQUEEN. The goals of the workshop were to make the participants more familiar with the system installed at JSC and to provide tools and ideas to help with porting their codes, analysing the performance, and in improving the efficiency.

The program of the workshop included in-depth talks on very specific features of the Blue Gene/Q architecture alongside introductory talks to get the participants started. Topics covered were the Blue Gene/Q hardware, best practices for programmers, performance tools and debuggers as well as guidelines for OpenMP usage and parallel I/O. The specialists' talks explored the memory system including methods for prefetching and atomic operations for the level 2 cache. They also elaborated on transactional memory, speculative execution, intrinsics for vectorisation, and low-level networking. The main part of the workshop was then spent in hands-on sessions with the users' codes. These hands-on sessions were supervised by almost 20 members of staff from JSC's Simulation Laboratories and cross-sectional teams (Application Optimisation, Performance Analysis, Mathematical Methods and Algorithms) as well as from IBM.

Among the many promising improvements that had been identified were those of parallel I/O and a hybrid programming model. Some participants gained an immediate speed-up of several tens of percent with OpenMP adjustments or by better understanding the vendor's compilers. The workshop also helped JSC and IBM staff to appreciate the needs and requirements of users on JUQUEEN much better. At the same time, a closer collaboration between the participants and the Simulation Laboratories at JSC could be initiated.

The participants' general perception of the workshop seemed very positive and inspiring. Especially the hands-on sessions with direct support by the hard- and software experts were received well and helped solving specific problems. To quote two of the participants on what they enjoyed on the workshop: "I really liked, the hands on sessions. I would need to spend so much more time if I were to do all these things on my own - so much perhaps, that I just would not do it at all" and "The school was with very useful content and well organized from a team with excellent professional expertise". So due to the success of this workshop and expected future demand it is planned to stage similar workshops as a regular event.

The slides to the talks can be found on the web at http://www.fz-juelich.de/ias/jsc/jqws13.

Figure 1: Participants of the First JUQUEEN Porting and Tuning Workshop (Source: Forschungszentrum Jülich GmbH)

• Dirk Brömmel

Jülich Supercomputing Centre