SORS: Performance Analysis Techniques for the Exascale Co-Design Process

Speaker: Dr. Martin Schulz (Lawrence Livermore National Laboratory)

Date: The seminar will take place next Tuesday January 14. The presentation will start at 12:00.

Venue: E101 room of the C6 building.

Abstract: Reaching exascale will require substantial advances at all levels of the computational ecosystem: the hardware, the OS, the runtime system, algorithms, as well as the applications themselves. Further, we need to work on these aspects together - individual solutions limited to single layers won't provide the necessary benefits. Following this idea, a wide range of efforts focus on the idea of Co-Design for exascale, including three dedicated Exascale Co-Design centres initiated by the US Department of Energy. A central aspect in any of these Co-Design efforts are techniques to measure, track and analyse a wide range of performance metrics, incl. execution time, memory system behaviour, power consumption and the resiliency to faults.

In this talk I will highlight two approaches providing analysis frameworks for exascale efforts and their use in the Co-Design centres: PAVE, a project that investigates a new way of mapping performance data to more intuitive domains and uses advanced visualization techniques to pinpoint problems, and GREMLIN, an exascale evaluation environment capable of emulating expected properties of exascale architectures on petascale machines. Combined, these projects enable us to provide a meaningful introspection into the target applications' characteristics as well as their expected behaviour and, more importantly, likely bottlenecks on future generation machines.

Bio of the speaker: Dr. Martin Schulz is a Computer Scientist at the Center for Applied Scientific Computing (CASC) at Lawrence Livermore National Laboratory (LLNL). He earned his Doctorate in Computer Science in 2001 from the Technische Universität München (Munich, Germany) and also holds a Master of Science in Computer Science from the University of Illinois at Urbana Champaign. He has published over 160 peer-reviewed papers. He is the PI for the Office of Science X-Stack project "Performance Insights for Programmers and Exascale Runtimes" (PIPER) and for the ASC/CCE project on Open|SpeedShop. Further, he is the chair of the MPI forum, the standardization body for the Message Passing Interface, and is involved in the DOE/Office of Science Exascale Co-Design Centres CESAR and ExMatEx, as well as the Exascale OS centre ARGO.

DAC link: http://www.ac.upc.edu/ca/martin-schulzs-talk-performance-analysis-techniques-exascale-co-design-process-c6-e101-1200