Tools and Techniques for Scalable Performance Analysis and Optimization

Abstract:

The growing scale of future machines, coupled with increasing node as well as application complexity, makes optimization both more necessary and more difficult than ever before. It can no longer be a manual process; instead users require sophisticated tools to tackle the challenges and these tools must be intuitive and easy to use. These tools must present information in a concise and scalable way, and at the same time must scale to the full scale of the machine and provide a robust program development environment. Further, tools need to be less monolithic and instead be adjustable to particular applications and target scenarios, since only this will allow them to exploit application level semantics for effective data filtering and attribution.

In this talk I will present tools and techniques that address these challenges and enable users to analyze the performance of their codes on current and future machines. I will provide a brief overview of existing analysis approaches and tool solutions and will discuss two tools, the MPI profiler mpiP and the performance analysis toolkit Open|SpeedShop, in more detail. Further, I will show the limits of current tool solutions and discuss approaches that help users overcome them. In particular, I will discuss the use of modular toolkits and their ability to customize tools to application specific scenarios as well as new techniques for performance visualization that help users see code behavior and performance anomalies from a new and significantly more intuitive perspective.

Date, Time, and Location:

Tuesday, October 9, 2012
10:00 AM – 11:00 AM
NCAR Mesa Lab Main Seminar Room