

TAU and PPW: Parallel Performance Evaluation Tools for PGAS Languages

Full Day Tutorial

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Tutorial Type: Hands on

Outline:

This tutorial will focus on performance data collection, analysis, and performance optimization. It will cover performance evaluation of parallel programs written in UPC, Chapel, C, C++, and Fortran and will introduce instrumentation options for SHMEM, OpenSHMEM, and MPI libraries. The hands-on session will be conducted using an HPCLinux LiveDVD featuring the Berkeley UPC compiler, OpenShmem (if available), OpenMPI, UPC, Chapel, PPW and TAU performance evaluations tools. In this workshop, we will also introduce new instrumentation techniques to simplify the usage of performance tools. These will include compiler-based instrumentation, replacement of library calls for SHMEM instrumentation, and automatic instrumentation of source code. Performance data will include MPI, SHMEM communication matrix, I/O and memory, and hardware performance counters from PAPI. After describing and demonstrating how performance data (both profile and trace data) can be collected using automated instrumentation, the workshop will cover how to analyze the performance data collected and drill down to find performance bottlenecks and determine their causes. The workshop will include some sample codes that illustrate the different instrumentation and measurement choices available to the users.

For the hands-on session, the participants will be provided an HPCLinux LiveDVD that will allow them to boot their laptops to a Linux distribution that has the above tools installed. The participants are encouraged to bring a laptop with them. The tutorial will feature TAU (half day) and PPW (second half) lecture and hands-on sessions.