Thema: Performance Technology for Complex Parallel Systems

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Inhalt: Fundamental to the development and use of parallel systems is the ability to observe, analyze, and understand their performance. However, the growing complexity of parallel systems challenge performance technologists to produce tools and methods that are at once robust (scalable, extensible, configurable) and ubiquitous (cross-platform, cross-language). This half-day tutorial will focus on performance analysis in complex parallel systems which include multi-threading, clusters of SMPs, mixed-language programming, and hybrid parallelism. Several representative complexity scenarios will be presented to highlight two fundamental performance analysis concerns:

1) the need for tight integration of performance observation (instrumentation and measurement) technology with sophisticated programming environments and system platforms, and
2) the ability to map execution performance data to high-level programming abstractions implemented on layered, hierarchical software systems.

The tutorial will describe the TAU performance system in detail and demonstrate how it is used to successfully address the performance analysis concerns in each complexity scenario discussed. Tutorial attendees will be introduced to TAU's instrumentation, measurement, and analysis tools, and shown how to configure the TAU performance system for specific needs. A description of future enhancements of the TAU performance framework, including a demonstration of a prototype for automatic bottleneck analysis, will conclude the tutorial.

Part 1: Overview (1 hour)

- Introduction and terminology
- Complexity issues
- TAU performance system

Part 2: Complexity scenarios (1 hour)

- Using the TAU framework for performance analysis of
  - Mixed-language applications
  - Multi-threaded and asynchronous execution
  - Mixed-mode parallelism (e.g., OpenMP+MPI, Java+MPI)
  - Hyprid parallelism (e.g., Opus/HPF)

Part 3: Additional Tools and Frameworks (1 hour)

- Commercial solutions: using Vampir/Guideview
- Smart event trace analysis: using KOJAK/EXPERT
- Evolution of the TAU performance framework

Zeit: Friday/Freitag, 08.03.2002, 08:30 - 12:00 Uhr
Ort: Hörsaalzentrum, HSZ 403