Final Program

Architectures and Algorithms for Petascale Computing

Schloss Dagstuhl

February 12, 2006 – February 17, 2006

Sunday, Feb 12:

Informal Evening Get Together

Monday, Feb 13:

9:00 - 10:00:
Opening Remarks
Rüde, Ulrich (University of Erlangen-Nürnberg)
Petaflop/s, Seriously
Keyes, David (Columbia University)

10:30 - 12:15 (Chair: H. Simon):
Overcoming the Barriers to Sustained Petaflop Performance
Gropp, William D. (Argonne National Laboratory)
Towards High-Level Languages for Peta-Scale Computing
Zima, Hans (CalTech- Pasadena)
What Grid Computing May Contribute to Petacomputing
Bubak, Marian (AGH University of Science and Technology, Poland)

13:30 - 15:30 (Chair: S. Ashby):
Let us design our own Petaflops System
Simon, Horst D. (Lawrence National Lab. - Berkeley)
The Shrinking SMP Box
Bischof, Christian H. (RWTH Aachen)
Petascale Computing: Impact on Future NASA Missions
Biswas, Rupak (NASA - Moffett Field)
Beyond the Earth Simulator - an MPI developer's point of view
Träff, Jesper Larsson (NEC Europe - St. Augustin)

16:00 - 18:00 (B. Hendricksen):
Tsunami Simulations and Their Need for Computational Power
Langtangen, Hans Petter (University of Oslo)
Components for efficient FSI simulations
Bungartz, Hans-Joachim (TU München)
A Usable, Workable, Parallel Matlab
Schreiber, Rob (HP Palo Alto)
From Terascale to Petascale Simulation-Based Optimization
Ghattas, Omar (Univ. of Texas at Austin)

Tuesday, Feb 14:

8:45 - 10:15 (Chair: H.P. Langtangen):
Petascale Computing for Large Scale Graph Problems
Bader, David A. (Georgia Institute of Technology)
Applications Scalability for Possible and Impossible Problems
Berzins, Martin (University of Utah)
Flexibility and High Performance in Numerical Software
Bastian, Peter (Universität Heidelberg)

10:45 - 12:00 (Chair: H.J. Bungartz):
Experiences with Scaling Parallel Computations to a Hundred Thousand Processors
Gupta, Manish (IBM TJ Watson Research Center)
Fault Tolerance in Linear Algebra Algorithms and Software
Dongarra, Jack (University of Tennessee)

13:30 - 15:30 (Chair: P. Sloot):
Performance Evaluation of Leading Supercomputers using HPCC and IMB Benchmarks
Rabenseifner, Rolf (Universitat Stuttgart)
Message-driven Split-transaction Execution to Enable Scalable Parallel Architecture for trans-Petascale Domain Computing
Sterling, Thomas (CalTech - Pasadena)
Multi-layered Software Architectures in Petascale Computing
Überhuber, Christoph (TU Wien)
Energy-Aware Memory Optimizations for Fast Sparse Scientific Computations
Raghavan, Padma (Penn State University)

16:00 - 18:00:
Topical work groups will prepare the panel sessions

Evening, ca. 20:00: *Get together with a group of science writers*

Wednesday, Feb 15:

8:45 - 10:15 (Chair: M. Berzins):
Software Architecture for Petascale Computing: Lessons from Dataflow
Gurd, John (Manchester University)
High-Performance-Computing and FEM simulation of PDE
Turek, Stefan (Universität Dortmund)
The Demand for HPC in an Industrial Setting
Hülsemann, Frank (EDF)

10:45 - 12:00 Panel Discussion I (Biswas, Zima):
Performance Evaluation, Program Optimization, and Languages

Afternoon:
Hike or Excursion

Thursday, Feb 16:

8:45 - 10:15 (Chair: P. Raghavan):
Scalable Algorithms and Novel Paradigms for Petascale Simulation
Ashby, Steven F. (LLNL - Livermore)
Why is the Performance Productivity Poor on Modern Computer Architectures?
Treibig, Jan (Universität Erlangen-Nürnberg)
Holistic Fault Tolerance for Petascale Systems
Geist, Al (Oak Ridge National Lab.)

11:00 - 12:15:
Simulating Virtual Worlds with Supercomputers: An HPC Showcase

Visit by TV Team from "Saarländischer Rundfunk"

14:00 - 15:30 Panel Discussion II *(Gropp, Hendricksen):*
Obstacles to Achieving PetaFlops for Real Applications

16:00 - 17:30 Panel Discussion III *(Berzins, Geist):*
Why do Software Engineering Methods Fail for Large Scale HPC Applications?

20:00 – 24:00: Open Discussion

Friday, Feb 17:

9:00 - 10:00 (Chair: M. Snir):
Periscope: An automatic performance analysis tool
Gerndt, Hans Michael (TU München)
Real-Time Wave-Front Reconstruction for Adaptive Optics
Stals, Linda (Australian National University - Canberra)

10:30 - 12:00 (Chair: S. Parker):
Remarks on Cell Processors
Küster, Uwe (Uni Stuttgart)
Patterns for High Performance Computing.
Snir, Marc (Univ. of Illinois, Urbana)
PetaFlops, Performance Evaluation, and Performance Modeling
Strohmaier, Erich (Lawrence Berkeley Lab. - Berkeley)

Seminar Ends