HPC Advisory Council

Introduction
The HPC Advisory Council Update

- World-wide HPC non-profit organization (370+ members)
- Bridges the gap between HPC usage and its potential
- Provides best practices and a support/development center
- Explores future technologies and future developments
- Leading edge solutions and technology demonstrations
Centers of Excellence
Special Interest Subgroups

- **HPC|Scale Subgroup**
  - Explore usage of commodity HPC as a replacement for multi-million dollar mainframes and proprietary based supercomputers.

- **HPC|Cloud Subgroup**
  - Explore usage of HPC components as part of the creation of external/public/internal/private cloud computing environments.

- **HPC|Works Subgroup**
  - Provide best practices for building balanced and scalable HPC systems, performance tuning and application guidelines.

- **HPC|Storage Subgroup**
  - Demonstrate how to build high-performance storage solutions and their affect on application performance and productivity.

- **HPC|GPU Subgroup**
  - Explore usage models of GPU components as part of next generation compute environments and potential optimizations for GPU based computing.

- **HPC|FSI Subgroup**
  - Explore the usage of high-performance computing solutions for low latency trading, productive simulations and overall more efficient financial services.

- **HPC|Music**
  - To enable HPC in music production and to develop HPC cluster solutions that further enable the future of music production.
HPC Advisory Council HPC Center

- **Dell™ PowerEdge™ R720xd/R720** 33-node cluster
- **HP ProLiant SL230s Gen8** 4-node cluster
- **HP Cluster Platform 3000SL** 16-node cluster

- **Dell™ PowerEdge™ C6145** 6-node cluster
- **Dell™ PowerEdge™ R815** 11-node cluster
- Dell™ PowerVault MD3220 / MD3260 InfiniBand-based Lustre Storage
- **Dell™ PowerEdge™ M610** 38-node cluster

- **Dell™ PowerEdge™ C6100** 4-node cluster
130 Applications Best Practices Published

- Abaqus
- AcuSolve
- Amber
- AMG
- AMR
- ABySS
- ANSYS CFX
- ANSYS FLUENT
- ANSYS Mechanics
- BQCD
- CCSM
- CESM
- COSMO
- CP2K
- CPMD
- Dacapo
- Desmond
- DL-POLY
- Eclipse
- FLOW-3D
- GADGET-2
- GROMACS
- Himeno
- HOOMD-blue
- HYCOM
- ICON
- Lattice QCD
- LAMMPS
- LS-DYNA
- miniFE
- MILC
- MSC Nastran
- MR Bayes
- MM5
- MPQC
- NAMD
- Nekbone
- NEMO
- Nekbone
- NWChem
- Octopus
- OpenAtom
- OpenFOAM
- MILC
- OpenMX
- PARATEC
- PFA
- PFLOTRAN
- Quantum ESPRESSO
- RADIOSS
- SPECFEM3D
- WRF
HPC Training

• HPC Training Center
  – CPUs
  – GPUs
  – Interconnects
  – Clustering
  – Storage
  – Cables
  – Programming
  – Applications

• Network of Experts
  – Ask the experts
University Award Program

- **University award program**
  - Universities are encouraged to submit proposals for advanced research
  - Once / twice a year, the HPC Advisory Council will select a few proposals

- **Selected proposal will be provided with:**
  - Exclusive computation time on the HPC Advisory Council’s Compute Center
  - Invitation to present in one of the HPC Advisory Council’s worldwide workshops
  - Publication of the research results on the HPC Advisory Council website

- **2010 award winner is Dr. Xiangqian Hu, Duke University**
  - Topic: “Massively Parallel Quantum Mechanical Simulations for Liquid Water”

- **2011 award winner is Dr. Marco Aldinucci, University of Torino**

- **2012 award winner is Jacob Nelson, University of Washington**
  - “Runtime Support for Sparse Graph Applications”

- **2013 award winner is Antonis Karalis**
  - Topic: “Music Production using HPC”

- **To submit a proposal – please check the HPC Advisory Council web site**
ISC’14 – Student Cluster Competition

• University-based teams to compete and demonstrate the incredible capabilities of state-of-the-art HPC systems and applications on the ISC’14 show-floor

• The Student Cluster Challenge is designed to introduce the next generation of students to the high performance computing world and community
ISC’13 – Student Cluster Competition Teams

1. Purdue University

2. Karlsruhe Institute of Technology (KLUSTER)

3. Technical University of Chemnitz

4. University of Edinburgh

5. Tsinghua University

6. Technologico de Costa Rica

7. Asia Student Supercomputer Challenge 2013
ISC’13 Student Cluster Competition
ISC’14 – Student Cluster Competition Teams
HPCAC-ISC'14 SCC – University Teams

Technische Universität Chemnitz
CHPC
MIT
University of Colorado Boulder
Northeastern University

epcc

University of Science and Technology of China
UNIST
Tsinghua University
The University of Edinburgh
Shanghai Jiao Tong University
Bentley University
Universität Hamburg

Universidade de São Paulo
Brasil

ISC’14 Student Cluster Competition
2013 European HPC Conference (June)
2013 Spain HPC Conference (September)
2013 China HPC Conference (Oct)
2014 Stanford HPC Conference (Feb)
2014 Swiss HPC Conference (April)
HPC Advisory Council (HPCAC)
- Application best practices, case studies
- Benchmarking center with remote access for users
- World-wide workshops
- Value add for your customers to stay up to date and in tune to HPC market

2014 Workshops
- USA (Stanford University) – Feb 3, 2014
- Switzerland (CSCS) – March 31, 2014
- Brazil – May 26, 2014
- Germany (ISC’14) – June 22, 2014
- Spain – Sep 24, 2014
- China (HPC China) – Nov 2014
- South Africa – Dec 2014

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