Welcome!
Welcome!

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Day 1 Agenda

- **8:00-8:45**: Registration
- **8:45-9:00**: Opening Session (Gilad Shainer, HPCAC and Hussein Harake, CSCS)
- **9:00-9:45**: Keynote session: Large-Scale PDE-Constrained Optimization on HPC Architectures: Applications, Algorithms and Software (Olaf Schenk, The University of Lugano)
- **9:45-10:45**: Communications: MPI: Overview, Performance Optimizations and Tuning (Dhabaleswar K. Panda, Ohio State University)
- **10:45-11:00**: Coffee break and exhibition time
- **11:00-12:00**: HPC disaster recovery (Hussein Harake, CSCS)
- **12:00-12:20**: Sponsorship session: (HP)
- **12:20-13:20**: Lunch and exhibition time
- **13:20-13:40**: Sponsorship session: (AMD)
- **13:40-14:00**: Sponsorship session: (Sean Stacey, Acer)
- **14:00-14:30**: Storage: Future High Performance Parallel I/O with Lustre (Brent Gorda, Whamcloud)
- **14:30-15:00**: Storage: Increased Reliability of Large HPC Storage Deployments (Torben Kling Petersen, PhD, Xyratex)
- **15:00-15:45**: Applications: Pattern-based Parallel Edge Preserving Algorithm for Salt-and-Pepper Image Denoising (Marco Aldinucci, University of Torino; presentation related to EU Paraphrase project; Marco Aldinucci is the HPCAC University Award Winner)
- **15:45-16:00**: Coffee break and exhibition time
- **16:00-16:15**: Sponsorship session: (Xyratex)
- **16:15-16:30**: Sponsorship session: (Gnodal)
- **16:30-18:00**: Interconnect hands-on: Building you own InfiniBand FDR Cluster : Installation, optimizations, troubleshooting (Todd Wilde, Mellanox)
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>9:00-9:45</td>
<td>Keynote session: Challenges in Establishment of Open Cloud Markets (Ivona Brandic, Vienna University of Technology)</td>
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<tr>
<td>9:45-10:15</td>
<td>Storage: CSCS Relocation: Running GPFS over Longbow Infiniband Range Extension (Hussein Harake, Swiss Supercomputer Center)</td>
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<td>10:15-10:45</td>
<td>Storage: Active Cloud Engine/Active File Management using GPFS across WAN (Kalyan C Gunda, IBM)</td>
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<td>11:00-12:00</td>
<td>Communications: MPI: Advanced Topics and Future Trends (Dhabaleswar K. Panda, Ohio State University)</td>
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<td>12:00-12:20</td>
<td>Sponsorship session: HPC &amp; Cloud - How you can Exploit the Full Potential of your Cluster(s) to Solve the Challenges of Tomorrow (Terry Fischer, IBM)</td>
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<td>12:20-13:20</td>
<td>Lunch and exhibition time</td>
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<td>13:40-14:00</td>
<td>Sponsorship session: (Mellanox)</td>
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<tr>
<td>14:00-14:30</td>
<td>Interconnect: InfiniBand, 3D-Torus topologies, SHMEM/PGAS interfaces, Offloading and accelerations (Todd Wilde, Mellanox)</td>
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<td>14:30-15:00</td>
<td>European Intel Exascale labs: 4 collaborative competence centers for enabling software co-design (Marie-Christine Sawley, Intel)</td>
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<td>15:00-15:30</td>
<td>Applications: Data staging for in-situ processing and parallel IO/coupling of HPC applications (John Biddiscombe, Swiss Supercomputing Center)</td>
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<td>15:30-15:45</td>
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<tr>
<td>15:45-16:00</td>
<td>Sponsorship session: (DataDirect Networks)</td>
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<tr>
<td>16:00-16:15</td>
<td>Sponsorship session: EOFS (European Open File Systems initiative) - a European platform for worldwide HPC (Hugo R. Falter, ParTec)</td>
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<td>16:15-17:30</td>
<td>Accelerations hands-on: rCUDA, an approach to provide remote access to GPU computational power (Professor Federico Silla and Antonio J. Peña, Technical University of Valencia Spain)</td>
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<tr>
<td>17:30</td>
<td>Trip to CSCS and Dinner Event</td>
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Day 3 Agenda

9:00-9:45  Keynote session: CDAC activities on many cores and accelerators (Goldi Misra, HPC Solutions Group, C-DAC, India)

9:45-10:15  Accelerations: Many-Core Technologies: Towards general purpose, high-performance/throughput and energy-efficient IA/x86 computing (Herbert Cornelius, Intel)

10:15-10:45  Accelerations: Scalable Cluster Computing with NVIDIA GPUs (Axel Koehler, NVIDIA)

10:45-11:00  Coffee break and exhibition time

11:00-12:00  Communications: Accelerations for Big Data, Hadoop and Memcached (Dhabaleswar K. Panda, Ohio State University)

12:00-12:20  Sponsorship session: (Panasas)

12:20-13:10  Lunch and exhibition time

13:10-13:30  Building Highly Available SSD (Adam Chunn, Texas Memory Systems)

13:30-14:00  Topologies: Fat-trees and Dragonflies - A Perspective on Topologies (Sven-Arne Reinemo, Simula Laboratory, Norway)

14:00-15:00  Accelerations: The application and optimization of the GPU cluster in the field of seismic data processing (Xiangyang Zhang, China National Petroleum Corporation)

15:00-15:45  Application: Recipe for High Performance Computing Software and Application at Exascale (Ltaief Hatem, KAUST)

15:45-16:00  Coffee break and exhibition time

16:00-16:30  Next Generation Subnet Management (David Southwell, Obsidian Strategics)

16:30-17:00  High Performance Computing for Chess (Vincent Diepeveen, creator of Diep and Fide-Master)

17:00-18:00  Cluster competition with prizes

18:00  Adjourn and future plans
Administration

• **The workshop goals**
  – Education, training, solutions, futures

• **3 day workshop and a tight schedule**
  – We encourage live discussions
  – We want to have all sessions start in time
  – There are breaks for offline discussions

• **Speakers** – make sure Brian has your slides!

• **We have a conference dinner on the Wed evening and a trip to CSCS**
  – Contact Hussein for any issues / cancelation

• **Clustering hands-on competition with prizes**
  – Thu afternoon!

• **And the raffle…**
The HPC Advisory Council

- World-wide HPC non-profit organization (300+ members)
- Bridges the gap between HPC usage and its potential
- Provides best practices and a support/development center
- Explores future technologies and future developments
- Working Groups
  - HPC|Cloud, HPC|Scale, HPC|GPU, HPC|Storage, HPC|Works, HPC|FSI
- Leading edge solutions and technology demonstrations
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- HPC Advisory Council HPC|GPU Special Interest Group Chair
  Sadaf Alam – sadaf@hpcadvisorycouncil.com

- HPC Advisory Council India Outreach
  Goldi Misra – goldi@hpcadvisorycouncil.com

- Director of the HPC Advisory Council Switzerland Center of Excellence and HPC|Storage Special Interest Group Chair
  Hussein Harake – hussein@hpcadvisorycouncil.com
HPC Advisory Council HPC Center

**InfiniBand-based Storage (Lustre)**
- Two Intel Core i7 920 CPUs (2.67GHz)
- DDR3-1333MHz memory (6GB total)
- Seagate Cheetah 15K 450GB SAS Hard Disk
- OS: RHEL5.2
- Mellanox ConnectX-2 40Gb/s QDR InfiniBand adapter

**GPU Cluster**
- Dell PowerEdge™ C6100 4-node cluster
- Dell PowerEdge™ C410x PCIe Expansion Chassis
- Six-Core Intel® Xeon® processor X5670 @ 2.93 GHz
- 4 NVIDIA® Tesla C2050 (Fermi) GPU
- Mellanox ConnectX®-2 VPI 40Gb/s InfiniBand mezzanine card
- Mellanox 36-Port 40Gb/s InfiniBand switch
- Memory: 24GB memory per node

**Main**
- Intel
- Mellanox
- HP
- Dell
- Intel
- Mellanox

**Lustre**
- 192 cores

**GPU Cluster**
- 384 cores

**Main**
- 704 cores

**Janus**
- Dell PowerEdge™ M610 38-node cluster
- Intel Cluster Ready certified cluster
- Mellanox ConnectX®-2 40Gb/s InfiniBand mezzanine card
- Mellanox M3610Q 36-Port 40Gb/s InfiniBand Switch
- Memory: 24GB memory per node

**Mercury**
- Dell PowerEdge™ C5143 6-node cluster
- Quad-socket AMD Opteron 6276 (Interlagos), 64 Cores per node
- Mellanox ConnectX®-3 40Gb/s InfiniBand adapters per node
- Mellanox 39-Port 40Gb/s InfiniBand Switch
- Memory 128 GB, 1066 MHz DDR3 memory per node

**Vesta**
- Dell PowerEdge™ R815 11-node cluster
- Quad-socket AMD Opteron 6276 (Interlagos), 64 Cores per node
- Dual Mellanox ConnectX®-2 40Gb/s InfiniBand adapters per node
- Mellanox 36-Port 40Gb/s InfiniBand Switch
- Memory 120 GB, 1229 MHz memory per node

**Janus**
- 456 cores
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 around high-performance computing
  - 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 the research results in one of the HPC Advisory Council’s worldwide workshops, including sponsorship of travel expenses (according to the Council Award Program rules)
  - Publication of the research results on the HPC Advisory Council website and related publications
  - Publication of the research results and a demonstration if applicable within HPC Advisory Council world-wide technology demonstration activities

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

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

- **Fall 2011 award winner is Jacob Nelson, University of Washington**
  - “Runtime Support for Sparse Graph Applications”

- To submit a proposal – please check the HPC Advisory Council web site
ISC’12 – Student Cluster Competition

- ISC’12 will feature a new activity - HPCAC-ISC 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’12 show-floor

- The Student Cluster Competition is designed to introduce the next generation of students to the high performance computing world and community

- Details: scc@isc-events.com, info@hpcadvisorycouncil.com
2012 HPC Advisory Council Workshops

- Israel (Tel Aviv University), 1 day – February 7th, 2011
- Switzerland (with Swiss Supercomputer Center), 3 days – March 13th-15th
- Germany (ISC’12), 1 day – June 17th
- Spain (with Barcelona Supercomputer Center), 1 day – September
- China (HPC China), 1 day – October
- USA (Stanford, California), 2 days – December

- For more information
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Welcome!

HPC Advisory Council