21st International ACM Symposium on High-Performance Parallel and Distributed Computing

HPDC 2012

Delft, the Netherlands

18-22 June 2012

Program

Version May 29, 2012

General chair:
Dick Epema, Delft University of Technology, Delft, the Netherlands

Program co-chairs:
Thilo Kielmann, Vrije Universiteit, Amsterdam, the Netherlands
Matei Ripeanu, The University of British Columbia, Vancouver, Canada

Posters chair:
Ana Varbanescu, Delft University of Technology, Delft, the Netherlands

Workshops chair:
Alexandru Iosup, Delft University of Technology, Delft, the Netherlands
# HPDC 2012 Workshop Overview

## Monday June 18

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full day</td>
<td>ECMLS2012: 3\textsuperscript{rd} International Emerging Computational</td>
</tr>
<tr>
<td>Room 1.1x0</td>
<td>Methods for the Life Sciences Workshop</td>
</tr>
<tr>
<td>Full day</td>
<td>ScienceCloud: 3\textsuperscript{rd} Workshop on Scientific Cloud</td>
</tr>
<tr>
<td>Room 1.1x0</td>
<td>Computing</td>
</tr>
<tr>
<td>Full day</td>
<td>MapReduce’12: The Third International Workshop on MapReduce and its</td>
</tr>
<tr>
<td>Room 01.1x0</td>
<td>Applications</td>
</tr>
</tbody>
</table>

## Tuesday June 19

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full day</td>
<td>Astro-HPC: Workshop on High-Performance Computing for Astronomy</td>
</tr>
<tr>
<td>Room 1.1x0</td>
<td></td>
</tr>
<tr>
<td>Full day</td>
<td>DICD: Fifth International Workshop on Data-Intensive Distributed</td>
</tr>
<tr>
<td>Room 1.1x0</td>
<td>Computing</td>
</tr>
<tr>
<td>Full day</td>
<td>VTDC-2012: 6\textsuperscript{th} International Workshop on Virtualization</td>
</tr>
<tr>
<td>Room 01.1x0</td>
<td>Technologies in Distributed Computing</td>
</tr>
</tbody>
</table>

Schedule of breaks on Monday and Tuesday: TBA
# HPDC 2012 Conference Program Overview

<table>
<thead>
<tr>
<th>Wednesday June 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:45 – 09:00</td>
</tr>
<tr>
<td>09:00 – 10:00</td>
</tr>
<tr>
<td>10:00 – 10:20</td>
</tr>
<tr>
<td>10:20 – 12:00</td>
</tr>
<tr>
<td>12:00 – 13:15</td>
</tr>
<tr>
<td>13:15 – 14:55</td>
</tr>
<tr>
<td>14:55 – 15:15</td>
</tr>
<tr>
<td>15:15 – 16:05</td>
</tr>
<tr>
<td>16:05 – 16:15</td>
</tr>
<tr>
<td>16:15 – 17:05</td>
</tr>
<tr>
<td>17:05 – 17:55</td>
</tr>
<tr>
<td>18:00 – 19:00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thursday June 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00 – 10:00</td>
</tr>
<tr>
<td>10:00 – 10:20</td>
</tr>
<tr>
<td>10:20 – 12:00</td>
</tr>
<tr>
<td>12:00 – 13:15</td>
</tr>
<tr>
<td>13:15 – 14:55</td>
</tr>
<tr>
<td>14:55 – 15:15</td>
</tr>
<tr>
<td>15:15 – 16:05</td>
</tr>
<tr>
<td>16:05 – 16:15</td>
</tr>
<tr>
<td>16:15 – 17:15</td>
</tr>
<tr>
<td>18:00 – 19:00</td>
</tr>
<tr>
<td>19:00 – 22:00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Friday June 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00 – 10:00</td>
</tr>
<tr>
<td>10:00 – 10:20</td>
</tr>
<tr>
<td>10:20 – 11:35</td>
</tr>
<tr>
<td>11:35 – 11:45</td>
</tr>
<tr>
<td>11:45 – 12:45</td>
</tr>
<tr>
<td>12:45</td>
</tr>
</tbody>
</table>
Wednesday, June 20

08:45-09:00  Conference Opening

09:00-10:00  Session 1: Keynote 1
Chair: Matei Ripeanu

Putting “Big-data” to Good Use: Building Kinect
Mihai Budiu, Microsoft Research, Mountain View, USA

10:00-10:20  Break

10:20-12:00  Session 2: Virtualization
Chair: TBA

vSlicer: Latency-aware Virtual Machine Scheduling via Differentiated-frequency CPU Slicing
Cong Xu (Purdue University), Sahan Gamage (Purdue University), Pawan N. Rao (Purdue University), Ardalan Kangarlou (NetApp), Ramana Kompella (Purdue University), Dongyan Xu (Purdue University)

Singleton: System-wide Page Deduplication in Virtual Environments
Prateek Sharma, Purushottam Kulkarni (IIT Bombay)

Locality-aware Dynamic VM Reconfiguration on MapReduce Clouds
Jongse Park, Daewoo Lee, Bokyeong Kim, Jaehyuk Huh, Seungryoul Maeng (KAIST)

Achieving Application-Centric Performance Targets via Consolidation on Multi-cores: Myth or Reality?
Lydia Y. Chen Chen (IBM Research Zurich Lab), Danilo Ansaloni (University of Lugano), Evgenia Smirni (College of William and Mary), Akira Yokokawa (University of Lugano), Walter Binder (University of Lugano)

12:00-13:15  Lunch

13:15-14:55  Session 3: I/O
Chair: TBA

Enabling Event Tracing at Leadership-Class Scale through I/O Forwarding Middleware
Thomas Ilsche (Technische Universität Dresden), Joseph Schuchart (Technische Universität Dresden), Jason Cope (Argonne National Laboratory), Dries Kimpe (Argonne National Laboratory), Terry Jones (Oak Ridge National Laboratory), Andreas Knöpfer (Technische Universität Dresden), Kamil Iskra (Argonne National Laboratory), Robert Ross (Argonne National Laboratory), Wolfgang E. Nagel (Technische Universität Dresden), Stephen Poole (Oak Ridge National Laboratory)

ISOBAR Hybrid Compression-I/O Interleaving for Large-scale Parallel I/O Optimization
Eric R. Schendel (North Carolina State University), Saurabh V. Pendse (North Carolina State University), John Jenkins (North Carolina State University), David A. Boyuka (North Carolina State University), Zhenhuan Gong (North Carolina State University), Sriram Lakshminarasimhan (North Carolina State University), Qing Liu (Oak Ridge National Laboratory), Scott Klasky (Oak Ridge National Laboratory), Robert Ross (Argonne National Laboratory), Nagiza F. Samatova (North Carolina State University)
QBox: Guaranteeing I/O Performance on Black Box Storage Systems
Dimitris Skourtis, Shinpei Kato, Scott Brandt (University of California, Santa Cruz)

Towards Efficient Live Migration of I/O Intensive Workloads: A Transparent Storage Transfer Proposal
Bogdan Nicolae (INRIA), Franck Cappello (INRIA/UIUC)

14:55-15:15 Break

15:15-16:30 Session 4: Industry Session (planned)
Chair: Alexandru Iosup

16:30-16:40 Short break

16:40-17:30 Session 5: GPUs
Chair: TBA
A Virtual Memory Based Runtime to Support Multi-tenancy in Clusters with GPUs
Michela Becchi (University of Missouri), Kittisak Sajjapongse (University of Missouri), Ian Graves (University of Missouri), Adam Procter (University of Missouri), Vignesh Ravi (Ohio State University), Srimat Chakradhar (NEC Laboratories America)

Interference-driven Scheduling and Resource Management for GPU-based Heterogeneous Clusters
Rajat Phull, Cheng-Hong Li, Kunal Rao, Hari Cadambi, Srimat Chakradhar (NEC Laboratories America)

17:30-18:00 Session 6: Poster Presentations
Chair: Ana Varbanescu

18:00-19:00 Session 7: Posters + Conference Reception
Thursday, June 21

09:00-10:00  Session 8: Keynote 2
Chair: Thilo Kielmann

**Leveraging Renewable Energy in Data Centers: Present and Future**
*Ricardo Bianchini, Rutgers University, USA*

10:00-10:20  Break

10:20-12:00  Session 9: Applications and Resources
Chair: TBA

**Work Stealing and Persistence-based Load Balancers for Iterative Overdecomposed Applications**
Jonathan Lifflander (UIUC), Sriram Krishnamoorthy (PNNL), Laxmikant V. Kale (UIUC)

**Highly Scalable Graph Search for the Graph500 Benchmark**
Koji Ueno (Tokyo Institute of Technology/JST CREST), Toyotaro Suzumura (Tokyo Institute of Technology/IBM Research Tokyo/JST CREST)

**PonD: Dynamic Creation of HTC Pool on Demand Using a Decentralized Resource Discovery System**
Kyungyong Lee (University of Florida), David Wolinsky (Yale University), Renato Figueiredo (University of Florida)

**SpeQuloS: A QoS Service for BoT Applications Using Best Effort Distributed Computing Infrastructures**
Simon Delamare (INRIA), Gilles Fedak (INRIA), Derrick Kondo (INRIA), Oleg Lodygensky (IN2P3)

12:00-13:15  Lunch

13:15-14:55  Session 10: MapReduce
Chair: TBA

**Understanding the Effects and Implications of Compute Node Related Failures in Hadoop**
Florin Dinu, T. S. Eugene Ng (Rice University)

**Optimizing MapReduce for GPUs with Effective Shared Memory Usage**
Linchuan Chen, Gagan Agrawal (The Ohio State University)

**CAM: A Topology Aware Minimum Cost Flow Based Resource Manager for MapReduce Applications in the Cloud**
Min Li (Virginia Tech), Dinesh Subhraveti (IBM Almaden Research Center), Ali Butt (Virginia Tech), Aleksandr Khasymski (Virginia Tech), Prasenjit Sarkar (IBM Almaden Research Center)

**Distributed Approximate Spectral Clustering for Large-Scale Datasets**
Fei Gao (Simon Fraser University), Wael Abd-Almageed (University of Maryland), Mohamed Hefeeda (Qatar Computing Research Center)

14:55-15:15  Break
15:15-16:05  **Session 11: Energy**  
Chair: TBA  

**Exploring Cross-layer Power Management for PGAS Applications on the SCC Platform**  
Marc Gamell (Rutgers University), Ivan Rodero (Rutgers University), Manish Parashar (Rutgers University), Rajeev Muralidhar (Intel India)  

**Dynamic Adaptive Virtual Core Mapping to Improve Power, Energy, and Performance in Multi-socket Multicores**  
Chang Bae (Northwestern University), Lei Xia (Northwestern University), Peter Dinda (Northwestern University), John Lange (University of Pittsburgh)  

16:05-16:15  **Short break**  

16:15-17:15  **Session 12: Panel on Energy Efficiency**  
Moderator: TBA  
Members: TBA  

18:00-19:00  **Social Event (1): Visit to Museum De Prinsenhof**  

19:00-22:00  **Social Event (2): Conference Dinner in Restaurant De Prinsenkelder**
Friday, June 22

09:00-10:00  Session 13: Achievement Award Talk  
Chair: Dick Epema  

Reflections on 20 Years of Grid Computing  
Ian Foster, University of Chicago and Argonne National Laboratory, USA

10:00-10:20  Break

10:20-11:35  Session 14: Networked Systems  
Chair: TBA

VNET/P: Bridging the Cloud and High Performance Computing Through Fast Overlay Networking  
Lei Xia (Northwestern University), Zheng Cui (University of New Mexico), John Lange (University of Pittsburgh), Yuan Tang (UESTC, China), Peter Dinda (Northwestern University), Patrick Bridges (University of New Mexico)

Massively-Parallel Stream Processing under QoS Constraints with Nephele  
Björn Lohrmann, Daniel Warneke, Odej Kao (Technische Universität Berlin)

A Resiliency Model for High Performance Infrastructure Based on Logical Encapsulation  
James Moore (The University of Southern California/EMC Corporation), Carl Kesselman (The University of Southern California)

11:35-11:45  Short break

11:45-12:45  Session 15: Panel on the Value of HPDC  
Moderator: Henri Bal, Vrije Universiteit, The Netherlands  
Members: TBA

12:45-13:00  Conference Closing (with Best Paper Award)
Accepted Posters (based on full submitted papers)

**Dynamic Binary Rewriting and Migration for Shared-ISA Asymmetric, Multicore Processors**
Giorgis Georgakoudis (University of Thessaly), Dimitrios S. Nikolopoulos (Queen’s University of Belfast)

**Exploring the Performance and Mapping of HPC Applications to Platforms in the Cloud**
Abhishek Gupta (UIUC), Laxmikant V. Kale (UIUC), Dejan S. Milojicic (HP labs, Palo Alto), Paolo Faraboschi (HP labs, Palo Alto), Richard Kaufmann (HP labs, Palo Alto), Verdi March (HP labs, Singapore), Filippo Gioachin (HP labs, Singapore), Chun Hui Suen (HP labs, Singapore), Bu-Sung Lee (HP labs, Singapore)

**Fault Tolerant Data Intensive Algorithms**
Mucahid Kutlu, Gagan Agrawal, Oguz Kurt (The Ohio State University)

**P*: A Model of Pilot-Abstractions**
Andre Luckow (CCT/LSU), Mark Santcroos (AMC/University of Amsterdam), Ole Weidner (CCT/LSU), Andre Merzky (CCT/LSU), Sharath Maddineni (CCT/LSU), Shantenu Jha (Rutgers University)

**Performance Evaluation of Inter-thread Communication Mechanisms on Multicore/multithreaded Architectures**
Davide Pasetto, Massimiliano Meneghin, Hubertus Franke, Fabrizio Petrini, Jimi Xenidis (IBM Research)

**SMART-IO: SysteM-AwaRe Two-Level Data Organization for Efficient Scientific Analytics**
Yuan Tian (Auburn University), Scott Klasky (Oak Ridge National Laboratories), Weikuan Yu (Auburn University), Hasan Abbasi (Oak Ridge National Laboratories), Bin Wang (Auburn University), Norbert Podhorszki (Oak Ridge National Laboratories), Ray Grout (National Renewable Energy Laboratory), Matt Wolf (Georgia Institute of Technology)

**Coupling Task Progress for MapReduce Resource-Aware Scheduling**
Jian Tan, Xiaoqiao Meng, Li Zhang (IBM T.J. Watson)