Contents

Invited Papers

Concurrent Systems: Hybrid Object Implementations and Abortable Objects ..................................................... 3
  Michel Raynal

Runtime-Aware Architectures ................................................. 16
  Marc Casas, Miquel Moreto, Lluc Alvarez, Emilio Castillo,
  Dimitrios Chasapis, Timothy Hayes, Luc Jaulmes, Oscar Palomar,
  Osman Unsal, Adrian Cristal, Eduard Ayguade, Jesus Labarta,
  and Mateo Valero

Support Tools and Environments

MPI Thread-Level Checking for MPI+OpenMP Applications ................. 31
  Emmanuelle Saillard, Patrick Carribault, and Denis Barthou

Event-Action Mappings for Parallel Tools Infrastructures ................. 43
  Tobias Hilbrich, Martin Schulz, Holger Brunst, Joachim Protze,
  Bronis R. de Supinski, and Matthias S. Müller

Performance Modeling, Prediction and Evaluation

Low-Overhead Detection of Memory Access Patterns and Their
  Time Evolution ................................................................. 57
  Harald Servat, Germán Llort, Juan González, Judit Giménez,
  and Jesús Labarta

Automatic On-Line Detection of MPI Application Structure with Event
  Flow Graphs ................................................................. 70
  Xavier Aguilar, Karl Fürlinger, and Erwin Laure

Online Automated Reliability Classification of Queueing Models
  for Streaming Processing Using Support Vector Machines ............... 82
  Jonathan C. Beard, Cooper Epstein, and Roger D. Chamberlain

Scheduling and Load Balancing

A Duplicate-Free State-Space Model for Optimal Task Scheduling ......... 97
  Michael Orr and Oliver Sinnen
On the Heterogeneity Bias of Cost Matrices When Assessing Scheduling Algorithms. ................................................. 109
Louis-Claude Canon and Laurent Philippe

Hardware Round-Robin Scheduler for Single-ISA Asymmetric Multi-core ... 122
Nikola Markovic, Daniel Nemirovsky, Veljko Milutinovic, Osman Unsal, Mateo Valero, and Adrian Cristal

Moody Scheduling for Speculative Parallelization ......................... 135
Alvaro Estebanez, Diego R. Llanos, David Orden, and Belen Palop

Allocating Jobs with Periodic Demand Variations ......................... 147
Olivier Beaumont, Ikbel Belaid, Lionel Eyraud-Dubois, and Juan-Angel Lorenzo-del-Castillo

A Multi–level Hypergraph Partitioning Algorithm Using Rough Set Clustering ............................................................... 159
Foad Lotfifar and Matthew Johnson

Non-preemptive Throughput Maximization for Speed-Scaling with Power-Down ......................................................... 171
Eric Angel, Evripidis Bampis, Vincent Chau, and Nguyen Kim Thang

Scheduling Tasks from Selfish Multi-tasks Agents ......................... 183
Johanne Cohen and Fanny Pascual

Locality and Balance for Communication-Aware Thread Mapping in Multicore Systems .................................................. 196
Matthias Diener, Eduardo H.M. Cruz, Marco A.Z. Alves, Mohammad S. Alhakeem, Philippe O.A. Navaux, and Hans-Ulrich Heiß

Priority Queues Are Not Good Concurrent Priority Schedulers ............. 209
Andrew Lenharth, Donald Nguyen, and Keshav Pingali

Load Balancing Prioritized Tasks via Work-Stealing .......................... 222
Shams Imam and Vivek Sarkar

Architecture and Compilers

Optimizing Task Parallelism with Library-Semantics-Aware Compilation ... 237
Peter Thoman, Stefan Moosbrugger, and Thomas Fahringer

Data Layout Optimization for Portable Performance ........................ 250
Kamal Sharma, Ian Karlin, Jeff Keasler, James R. McGraw, and Vivek Sarkar

Automatic Data Layout Optimizations for GPUs ............................ 263
Klaus Kofler, Biagio Cosenza, and Thomas Fahringer
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parallel and Distributed Data Management</strong></td>
<td>Performance Impacts with Reliable Parallel File Systems at Exascale Level</td>
<td>277</td>
</tr>
<tr>
<td></td>
<td><em>Ramon Nou, Alberto Miranda, and Toni Cortes</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rapid Tomographic Image Reconstruction via Large-Scale Parallelization</td>
<td>289</td>
</tr>
<tr>
<td></td>
<td><em>Tekin Bicer, Doga Gursoy, Rajkumar Kettimuthu, Francesco De Carlo, Gagan Agrawal, and Ian T. Foster</em></td>
<td></td>
</tr>
<tr>
<td><strong>Grid, Cluster and Cloud Computing</strong></td>
<td>Software Consolidation as an Efficient Energy and Cost Saving Solution for a SaaS/PaaS Cloud Model</td>
<td>305</td>
</tr>
<tr>
<td></td>
<td><em>Alain Tchana, Noel De Palma, Ibrahim Safieddine, Daniel Hagimont, Bruno Diot, and Nicolas Vuillerme</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>VMPlaceS: A Generic Tool to Investigate and Compare VM Placement Algorithms</td>
<td>317</td>
</tr>
<tr>
<td></td>
<td><em>Adrien Lebre, Jonathan Pastor, and Mario Südholt</em></td>
<td></td>
</tr>
<tr>
<td><strong>Distributed Systems and Algorithms</strong></td>
<td>A Connectivity Model for Agreement in Dynamic Systems</td>
<td>333</td>
</tr>
<tr>
<td></td>
<td><em>Carlos Gómez-Calzado, Arnaud Casteigts, Alberto Lafuente, and Mikel Larrea</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DFEP: Distributed Funding-Based Edge Partitioning</td>
<td>346</td>
</tr>
<tr>
<td></td>
<td><em>Alessio Guerrieri and Alberto Montresor</em></td>
<td></td>
</tr>
<tr>
<td><strong>Parallel and Distributed Programming, Interfaces and Languages</strong></td>
<td>PR-STM: Priority Rule Based Software Transactions for the GPU</td>
<td>361</td>
</tr>
<tr>
<td></td>
<td><em>Qi Shen, Craig Sharp, William Blewitt, Gary Ushaw, and Graham Morgan</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Leveraging MPI-3 Shared-Memory Extensions for Efficient PGAS Runtime Systems</td>
<td>373</td>
</tr>
<tr>
<td></td>
<td><em>Huan Zhou, Kamran Idrees, and José Gracia</em></td>
<td></td>
</tr>
<tr>
<td><strong>Multi- and Many-core Programming</strong></td>
<td>A Practical Transactional Memory Interface</td>
<td>387</td>
</tr>
<tr>
<td></td>
<td><em>Shahar Timnat, Maurice Herlihy, and Erez Petrank</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A Multicore Parallelization of Continuous Skyline Queries on Data Streams</td>
<td>402</td>
</tr>
<tr>
<td></td>
<td><em>Tiziano De Mattes, Salvatore Di Girolamo, and Gabriele Mencagli</em></td>
<td></td>
</tr>
</tbody>
</table>
XXXIV Contents

A Fast and Scalable Graph Coloring Algorithm for Multi-core and Many-core Architectures ........................................ 414

Georgios Rokos, Gerard Gorman, and Paul H.J. Kelly

A Composable Deadlock-Free Approach to Object-Based Isolation ........ 426

Shams Imam, Jisheng Zhao, and Vivek Sarkar

Scalable Data-Driven PageRank: Algorithms, System Issues, and Lessons Learned .................................................. 438

Joyce Jiyoung Whang, Andrew Lenharth, Inderjit S. Dhillon, and Keshav Pingali

How Many Threads will be too Many? On the Scalability of OpenMP Implementations ........................................... 451

Christian Iwainsky, Sergei Shudler, Alexandru Calotoiu, Alexandre Strube, Michael Knobloch, Christian Bischof, and Felix Wolf

Theory and Algorithms for Parallel Computation

Efficient Nested Dissection for Multicore Architectures ...................... 467

Dominique LaSalle and George Karypis

Scheduling Trees of Malleable Tasks for Sparse Linear Algebra ............ 479

Abdou Guermouche, Loris Marchal, Bertrand Simon, and Frédéric Vivien

Elastic Tasks: Unifying Task Parallelism and SPMD Parallelism with an Adaptive Runtime ........................................... 491

Alina Sbîrlea, Kunal Agrawal, and Vivek Sarkar

Numerical Methods and Applications

Semi-discrete Matrix-Free Formulation of 3D Elastic Full Waveform Inversion Modeling ......................................................... 507

Stephen Moore, Devi Sudheer Chunduri, Sergiy Zhuk, Tigran Tchrakian, Ewout van den Berg, Albert Akhriev, Alberto Costa Nogueira Jr., Andrew Rawlinson, and Lior Horesh

10,000 Performance Models per Minute – Scalability of the UG4 Simulation Framework .................................................... 519

Andreas Vogel, Alexandru Calotoiu, Alexandre Strube, Sebastian Reiter, Arne Nägel, Felix Wolf, and Gabriel Wittum

Exploiting Task-Based Parallelism in Bayesian Uncertainty Quantification ... 532

Panagiotis E. Hadjidoukas, Panagiotis Angelikopoulos, Lina Kulakova, Costas Papadimitriou, and Petros Koumoutsakos
Parallelization of an Advection-Diffusion Problem Arising in Edge Plasma Physics Using Hybrid MPI/OpenMP Programming ........................................ 545
  Matthieu Kuhn, Guillaume Latu, Nicolas Crouzeilles, and Stéphane Genaud

Behavioral Non-portability in Scientific Numeric Computing .................. 558
  Yijia Gu, Thomas Wahl, Mahsa Bayati, and Miriam Leeser

Accelerator Computing

Fast Parallel Suffix Array on the GPU ........................................... 573
  Leyuan Wang, Sean Baxter, and John D. Owens

Effective Barrier Synchronization on Intel Xeon Phi Coprocessor .............. 588
  Andrey Rodchenko, Andy Nisbet, Antoniu Pop, and Mikel Luján

High Performance Multi-GPU SpMV for Multi-component PDE-Based Applications ................................................................. 601
  Ahmad Abdelfattah, Hatem Ltaief, and David Keyes

Accelerating Lattice Boltzmann Applications with OpenACC ................... 613
  Enrico Calore, Jiri Kraus, Sebastiano Fabio Schifano, and Raffaele Tripiccione

High-Performance and Scalable Design of MPI-3 RMA on Xeon Phi Clusters ................................................................. 625
  Mingzhe Li, Khaled Hamidouche, Xiaoyi Lu, Jian Lin, and Dhabaleswar K. (DK) Panda

Improving Performance of Convolutional Neural Networks by Separable Filters on GPU .................................................. 638
  Hao-Ping Kang and Che-Rung Lee

Iterative Sparse Triangular Solves for Preconditioning .......................... 650
  Hartwig Anzt, Edmond Chow, and Jack Dongarra

Targeting the Parallella ..................................................................... 662
  Spiros N. Agathos, Alexandros Papadogiannakis, and Vassilios V. Dimakopoulos

Systematic Fusion of CUDA Kernels for Iterative Sparse Linear System Solvers ................................................................. 675
  José I. Aliaga, Joaquín Pérez, and Enrique S. Quintana-Ortí

Efficient Execution of Multiple CUDA Applications Using Transparent Suspend, Resume and Migration .................................. 687
  Taichiro Suzuki, Akira Nukada, and Satoshi Matsuoka

Author Index .................................................................................. 701
Euro-Par 2015: Parallel Processing
21st International Conference on Parallel and Distributed Computing, Vienna, Austria, August 24–28, 2015,
Proceedings
Träff, J.L.; Hunold, S.; Versaci, F. (Eds.)
2015, XXXV, 703 p. 232 illus., Softcover
ISBN: 978-3-662-48095-3