Contents

E-MuCoCoS

2016 Workshop on Exascale Multi/Many Core Computing Systems
(E-MuCoCoS) ......................................................... 2

Sabri Pllana and Achim Streit

Behavioral Emulation for Scalable Design-Space Exploration of Algorithms
and Architectures .................................................. 5

Nalini Kumar, Carlo Pascoe, Christopher Hajas, Herman Lam,
Greg Stitt, and Alan George

Closing the Performance Gap with Modern C++ ....................... 18

Thomas Heller, Hartmut Kaiser, Patrick Diehl, Dietmar Fey,
and Marc Alexander Schweitzer

Energy Efficient Runtime Framework for Exascale Systems ............ 32

Yousri Mhedheb and Achim Streit

Extreme-Scale In Situ Visualization of Turbulent Flows on IBM Blue
Gene/Q JUQUEEN ..................................................... 45

Jens Henrik Göbbert, Mathis Bode, and Brian J.N. Wylie

The EPIGRAM Project: Preparing Parallel Programming Models
for Exascale .......................................................... 56

Stefano Markidis, Ivy Bo Peng, Jesper Larsson Träff, Antoine Rougier,
Valeria Bartsch, Rui Machado, Mirko Rahn, Alistair Hart,
Daniel Holmes, Mark Bull, and Erwin Laure

Work Distribution of Data-Parallel Applications on Heterogeneous Systems . . 69

Suejb Memeti and Sabri Pllana

ExaComm

Reducing Manipulation Overhead of Remote Data-Structure by Controlling
Remote Memory Access Order ..................................... 85

Yuichiro Ajima, Takaumi Nose, Kazushige Saga, Naoyuki Shida,
and Shinji Sumimoto

SONAR: Automated Communication Characterization
for HPC Applications ............................................. 98

Steffen Lammel, Felix Zahn, and Holger Fröning
HPC-IODC

HPC I/O in the Data Center Workshop (HPC-IODC) 116
Julian M. Kunkel, Jay Lofstead, and Colin McMurtrie

An Overview of the Sirocco Parallel Storage System 121
Matthew L. Curry, H. Lee Ward, Geoff Danielson, and Jay Lofstead

Analyzing Data Properties Using Statistical Sampling Techniques –
Illustrated on Scientific File Formats and Compression Features 130
Julian M. Kunkel

Delta: Data Reduction for Integrated Application Workflows
and Data Storage 142
Jay Lofstead, Gregory Jean-Baptiste, and Ron Oldfield

Investigating Read Performance of Python and NetCDF When
Using HPC Parallel Filesystems 153
Matthew Jones, Jon Blower, Bryan Lawrence, and Annette Osprey

IWOPH

International Workshop on OpenPOWER for HPC (IWOPH) 170
Oscar R. Hernandez, M. Graham Lopez, Dirk Pleiter, and Jack Wells

Early Application Performance at the Hartree Centre
with the OpenPOWER Architecture 173
Mike Ashworth, Jianping Meng, Vedran Novakovic, and Sersi Siso

Early Experiences Porting the NAMD and VMD Molecular Simulation
and Analysis Software to GPU-Accelerated OpenPOWER Platforms 188
John E. Stone, Antti-Pekka Hynninen, James C. Phillips,
and Klaus Schulten

Exploring Energy Efficiency for GPU-Accelerated POWER Servers 207
Thorsten Hater, Benedikt Anlauf, Paul Baumeister, Markus Bühler,
Jiri Kraus, and Dirk Pleiter

First Experiences with ab initio Molecular Dynamics on OpenPOWER:
The Case of CPMD 228
Valéry Weber, A. Cristiano I. Malossi, Ivano Tavernelli, Teodoro Laino,
Costas Bekas, Manish Modani, Nina Wilner, Tom Heller,
and Alessandro Curioni

High Performance Computing on the IBM Power8 Platform 235
István Z. Reguly, Abdoul-Kader Keita, Rafik Zurob,
and Michael B. Giles
Measuring and Managing Energy in OpenPOWER ....................... 255
  Todd Rosedah, Charles Lefurgy, and Martha Broyles

Performance Analysis of Spark/GraphX on POWER8 Cluster .......... 268
  Xinyu Que, Lars Schneidenbach, Fabio Checconi, Carlos H. A. Costa, and Daniele Buono

Performance of the 3D Combustion Simulation Code RECOM®-AIOLOS on IBM® POWER8® Architecture .......................... 286
  Alexander Berreth, Benedetto Risio, Markus Bühler, Benedikt Anlauf, and Pascal Vezolle

Performance-Portable Many-Core Plasma Simulations: Porting PIConGPU to OpenPower and Beyond .................. 293
  Erik Zenker, René Widera, Axel Huebl, Guido Juckeland, Andreas Knüpfel, Wolfgang E. Nagel, and Michael Bussmann

IXPUG

Application Performance on Intel Xeon Phi – Being Prepared for KNL and Beyond .......................................................... 304
  Richard A. Gerber, Kent Milfeld, Chris J. Newburn, and Thomas Steinke

A Comparative Study of Application Performance and Scalability on the Intel Knights Landing Processor .......................... 307
  Carlos Rosales, John Cazes, Kent Milfeld, Antonio Gómez-Iglesias, Lars Koesterke, Lei Huang, and Jerome Vienne

Application Suitability Assessment for Many-Core Targets ............. 319
  Chris J. Newburn, Jim Sukha, Ilya Sharapov, Anthony D. Nguyen, and Chyi-Chang Miao

Applying the Roofline Performance Model to the Intel Xeon Phi Knights Landing Processor ............................................. 339
  Douglas Doerfler, Jack Deslippe, Samuel Williams, Leonid Oliker, Brandon Cook, Thorsten Kurth, Mathieu Lobet, Tareq Malas, Jean-Luc Vay, and Henri Vincenti

Dynamic SIMD Vector Lane Scheduling .................................. 354
  Olaf Krzikalla, Florian Wende, and Markus Höhnerbach

High Performance Optimizations for Nuclear Physics Code MFDn on KNL ......................................................... 366
  Brandon Cook, Pieter Maris, Meiyou Shao, Nathan Wichmann, Marcus Wagner, John O’Neill, Thanh Phung, and Gaurav Bansal

Optimization of the Sparse Matrix-Vector Products of an IDR Krylov Iterative Solver in EMGeo for the Intel KNL Manycore Processor ................ 378
  Tareq Malas, Thorsten Kurth, and Jack Deslippe
Software Cost Analysis of GPU-Accelerated Aeroacoustics Simulations in C++ with OpenACC .......................................................... 524
Marco Nicolini, Julian Miller, Sandra Wienke, 
Michael Schlottke-Lakemper, Matthias Meinke, and Matthias S. Müller

Task-Based Cholesky Decomposition on Knights Corner Using OpenMP . . . 544
Joseph Dorris, Jakub Kurzak, Piotr Luszczek, Asim Yarkhan, 
and Jack Dongarra

Using C++ AMP to Accelerate HPC Applications on Multiple Platforms . . . 563
M. Graham Lopez, Christopher Bergstrom, Ying Wai Li, Wael Elwasif, 
and Oscar Hernandez

WOPSSS

Analysis of Memory Performance: Mixed Rank Performance Across Microarchitectures ................................................................. 579
Mourad Bouache, John L. Glover III, and Jalil Boukhobza

Considering I/O Processing in CloudSim for Performance and Energy Evaluation ................................................................. 591
Hamza Ouarnoughi, Jalil Boukhobza, Frank Singhoff, Stéphane Rubini, 
and Erwann Kassis

Early Evaluation of the “Infinite Memory Engine” Burst Buffer Solution . . . 604
Wolfram Schenck, Salem El Sayed, Maciej Foszczynski, 
Wilhelm Homberg, and Dirk Pleiter

Motivation and Implementation of a Dynamic Remote Storage System for I/O Demanding HPC Applications ........................................... 616
Matthias Neuer, Jürgen Salk, Holger Berger, Erich Focht, 
Christian Mosch, Karsten Siegmund, Volodymyr Kushnarenko, 
Stefan Kombrink, and Stefan Wesner

Parallel I/O Architecture Modelling Based on File System Counters ........ 627
Salem El Sayed, Matthias Bolten, and Dirk Pleiter

User-Space I/O for μs-level Storage Devices ........................................ 638
Anastasios Papagiannis, Giorgos Saloustros, Manolis Marazakis, 
and Angelos Bilas

Scaling Spark on Lustre ................................................................. 649
Nicholas Chaimov, Allen Malony, Costin Iancu, and Khaled Ibrahim
VHPC

Accelerating Application Migration in HPC .................................................. 663
  Ramy Gad, Simon Pickartz, Tim Süß, Lars Nagel, Stefan Lankes,
  and André Brinkmann

Migrating Linux Containers Using CRIU ....................................................... 674
  Simon Pickartz, Niklas Eiling, Stefan Lankes, Lukas Razik,
  and Antonello Monti

Providing Security in Container-Based HPC Runtime Environments ............... 685
  Holger Gantikow, Christoph Reich, Martin Knahl, and Nathan Clarke

Author Index .................................................................................................. 697
High Performance Computing
ISC High Performance 2016 International Workshops, ExaComm, E-MuCoCoS, HPC-IODC, IXPUG, IWOPH, P^3MA, VHPV, WOPSSS, Frankfurt, Germany, June 19-23, 2016, Revised Selected Papers
Tauer, M.; Mohr, B.; Kunkel, J.M. (Eds.)
2016, XX, 699 p. 296 illus., Softcover
ISBN: 978-3-319-46078-9