

Contents

E-MuCoCoS

2016 Workshop on Exascale Multi/Many Core Computing Systems (E-MuCoCoS)	2
<i>Sabri Pllana and Achim Streit</i>	
Behavioral Emulation for Scalable Design-Space Exploration of Algorithms and Architectures	5
<i>Nalini Kumar, Carlo Pascoe, Christopher Hajas, Herman Lam, Greg Stitt, and Alan George</i>	
Closing the Performance Gap with Modern C++.	18
<i>Thomas Heller, Hartmut Kaiser, Patrick Diehl, Dietmar Fey, and Marc Alexander Schweitzer</i>	
Energy Efficient Runtime Framework for Exascale Systems	32
<i>Yousri Mhedheb and Achim Streit</i>	
Extreme-Scale In Situ Visualization of Turbulent Flows on IBM Blue Gene/Q JUQUEEN	45
<i>Jens Henrik Göbber, Mathis Bode, and Brian J.N. Wylie</i>	
The EPiGRAM Project: Preparing Parallel Programming Models for Exascale	56
<i>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</i>	
Work Distribution of Data-Parallel Applications on Heterogeneous Systems . . .	69
<i>Suejb Memeti and Sabri Pllana</i>	

ExaComm

Reducing Manipulation Overhead of Remote Data-Structure by Controlling Remote Memory Access Order	85
<i>Yuichiro Ajima, Takafumi Nose, Kazushige Saga, Naoyuki Shida, and Shinji Sumimoto</i>	
SONAR: Automated Communication Characterization for HPC Applications	98
<i>Steffen Lammel, Felix Zahn, and Holger Fröning</i>	

HPC-IODC

HPC I/O in the Data Center Workshop (HPC-IODC).	116
<i>Julian M. Kunkel, Jay Lofstead, and Colin McMurtrie</i>	
An Overview of the Sirocco Parallel Storage System.	121
<i>Matthew L. Curry, H. Lee Ward, Geoff Danielson, and Jay Lofstead</i>	
Analyzing Data Properties Using Statistical Sampling Techniques – Illustrated on Scientific File Formats and Compression Features	130
<i>Julian M. Kunkel</i>	
Delta: Data Reduction for Integrated Application Workflows and Data Storage.	142
<i>Jay Lofstead, Gregory Jean-Baptiste, and Ron Oldfield</i>	
Investigating Read Performance of Python and NetCDF When Using HPC Parallel Filesystems	153
<i>Matthew Jones, Jon Blower, Bryan Lawrence, and Annette Osprey</i>	

IWOPH

International Workshop on OpenPOWER for HPC (IWOPH)	170
<i>Oscar R. Hernandez, M. Graham Lopez, Dirk Pleiter, and Jack Wells</i>	
Early Application Performance at the Hartree Centre with the OpenPOWER Architecture.	173
<i>Mike Ashworth, Jianping Meng, Vedran Novakovic, and Sersi Siso</i>	
Early Experiences Porting the NAMD and VMD Molecular Simulation and Analysis Software to GPU-Accelerated OpenPOWER Platforms	188
<i>John E. Stone, Antti-Pekka Hynninen, James C. Phillips, and Klaus Schulten</i>	
Exploring Energy Efficiency for GPU-Accelerated POWER Servers	207
<i>Thorsten Hater, Benedikt Anlauf, Paul Baumeister, Markus Bühler, Jiri Kraus, and Dirk Pleiter</i>	
First Experiences with <i>ab initio</i> Molecular Dynamics on OpenPOWER: The Case of CPMD.	228
<i>Valéry Weber, A. Cristiano I. Malossi, Ivano Tavernelli, Teodoro Laino, Costas Bekas, Manish Modani, Nina Wilner, Tom Heller, and Alessandro Curioni</i>	
High Performance Computing on the IBM Power8 Platform.	235
<i>István Z. Reguly, Abdoul-Kader Keita, Rafik Zurob, and Michael B. Giles</i>	

Measuring and Managing Energy in OpenPOWER	255
<i>Todd Rosedah, Charles Lefurgy, and Martha Broyles</i>	
Performance Analysis of Spark/GraphX on POWER8 Cluster.	268
<i>Xinyu Que, Lars Schneidenbach, Fabio Checconi, Carlos H.Á. Costa, and Daniele Buono</i>	
Performance of the 3D Combustion Simulation Code RECOM®-AIOLOS on IBM® POWER8® Architecture	286
<i>Alexander Berreth, Benedetto Risio, Markus Bühler, Benedikt Anlauf, and Pascal Vezolle</i>	
Performance-Portable Many-Core Plasma Simulations: Porting PIconGPU to OpenPower and Beyond.	293
<i>Erik Zenker, René Widera, Axel Huebl, Guido Juckeland, Andreas Knüpfer, Wolfgang E. Nagel, and Michael Bussmann</i>	
IXPUG	
Application Performance on Intel Xeon Phi – Being Prepared for KNL and Beyond	304
<i>Richard A. Gerber, Kent Milfeld, Chris J. Newburn, and Thomas Steinke</i>	
A Comparative Study of Application Performance and Scalability on the Intel Knights Landing Processor	307
<i>Carlos Rosales, John Cazes, Kent Milfeld, Antonio Gómez-Iglesias, Lars Koesterke, Lei Huang, and Jerome Vienne</i>	
Application Suitability Assessment for Many-Core Targets.	319
<i>Chris J. Newburn, Jim Sukha, Ilya Sharapov, Anthony D. Nguyen, and Chyi-Chang Miao</i>	
Applying the Roofline Performance Model to the Intel Xeon Phi Knights Landing Processor.	339
<i>Douglas Doerfler, Jack Deslippe, Samuel Williams, Leonid Oliker, Brandon Cook, Thorsten Kurth, Mathieu Lobet, Tareq Malas, Jean-Luc Vay, and Henri Vincenti</i>	
Dynamic SIMD Vector Lane Scheduling	354
<i>Olaf Krzikalla, Florian Wende, and Markus Höhnerbach</i>	
High Performance Optimizations for Nuclear Physics Code MFDn on KNL . . .	366
<i>Brandon Cook, Pieter Maris, Meiyue Shao, Nathan Wichmann, Marcus Wagner, John O’Neill, Thanh Phung, and Gaurav Bansal</i>	
Optimization of the Sparse Matrix-Vector Products of an IDR Krylov Iterative Solver in EMGeo for the Intel KNL Manycore Processor	378
<i>Tareq Malas, Thorsten Kurth, and Jack Deslippe</i>	

Optimizing a Multiple Right-Hand Side Dslash Kernel for Intel Knights Corner	390
<i>Aaron Walden, Sabbir Khan, Bálint Joó, Desh Ranjan, and Mohammad Zubair</i>	
Optimizing Excited-State Electronic-Structure Codes for Intel Knights Landing: A Case Study on the BerkeleyGW Software	402
<i>Jack Deslippe, Felipe H. da Jornada, Derek Vigil-Fowler, Taylor Barnes, Nathan Wichmann, Karthik Raman, Ruchira Sasanka, and Steven G. Louie</i>	
Optimizing Wilson-Dirac Operator and Linear Solvers for Intel [®] KNL	415
<i>Bálint Joó, Dhiraj D. Kalamkar, Thorsten Kurth, Karthikeyan Vaidyanathan, and Aaron Walden</i>	
P³MA	
First International Workshop on Performance Portable Programming Models for Accelerators (P ³ MA).	430
A C++ Programming Model for Heterogeneous System Architecture	433
<i>Ralph Potter, Russell Bradford, Alastair Murray, and Uwe Dolinsky</i>	
Battling Memory Requirements of Array Programming Through Streaming . . .	451
<i>Mads R.B. Kristensen, James Avery, Troels Blum, Simon Andreas Frimann Lund, and Brian Vinter</i>	
From Describing to Prescribing Parallelism: Translating the SPEC ACCEL OpenACC Suite to OpenMP Target Directives	470
<i>Guido Juckeland, Oscar Hernandez, Arpith C. Jacob, Daniel Neilson, Verónica G. Vergara Larrea, Sandra Wienke, Alexander Bobyr, William C. Brantley, Sunita Chandrasekaran, Mathew Colgrove, Alexander Grund, Robert Henschel, Wayne Joubert, Matthias S. Müller, Dave Raddatz, Pavel Shelepugin, Brian Whitney, Bo Wang, and Kalyan Kumaran</i>	
GPU-STREAM v2.0: Benchmarking the Achievable Memory Bandwidth of Many-Core Processors Across Diverse Parallel Programming Models	489
<i>Tom Deakin, James Price, Matt Martineau, and Simon McIntosh-Smith</i>	
Porting the MPI Parallelized LES Model PALM to Multi-GPU Systems – An Experience Report	508
<i>Helge Knoop, Tobias Gronemeier, Christoph Knigge, and Peter Steinbach</i>	

Software Cost Analysis of GPU-Accelerated Aeroacoustics Simulations in C++ with OpenACC	524
<i>Marco Nicolini, Julian Miller, Sandra Wienke, Michael Schlottko-Lakemper, Matthias Meinke, and Matthias S. Müller</i>	
Task-Based Cholesky Decomposition on Knights Corner Using OpenMP. . . .	544
<i>Joseph Dorris, Jakub Kurzak, Piotr Luszczek, Asim YarKhan, and Jack Dongarra</i>	
Using C++ AMP to Accelerate HPC Applications on Multiple Platforms	563
<i>M. Graham Lopez, Christopher Bergstrom, Ying Wai Li, Wael Elwasif, and Oscar Hernandez</i>	

WOPSSS

Analysis of Memory Performance: Mixed Rank Performance Across Microarchitectures	579
<i>Mourad Bouache, John L. Glover III, and Jalil Boukhobza</i>	
Considering I/O Processing in CloudSim for Performance and Energy Evaluation	591
<i>Hamza Ouarnoughi, Jalil Boukhobza, Frank Singhoff, Stéphane Rubini, and Erwann Kassis</i>	
Early Evaluation of the “Infinite Memory Engine” Burst Buffer Solution	604
<i>Wolfram Schenck, Salem El Sayed, Maciej Foszczynski, Wilhelm Homberg, and Dirk Pleiter</i>	
Motivation and Implementation of a Dynamic Remote Storage System for I/O Demanding HPC Applications	616
<i>Matthias Neuer, Jürgen Salk, Holger Berger, Erich Focht, Christian Mosch, Karsten Siegmund, Volodymyr Kushnarenko, Stefan Kombrink, and Stefan Wesner</i>	
Parallel I/O Architecture Modelling Based on File System Counters	627
<i>Salem El Sayed, Matthias Bolten, and Dirk Pleiter</i>	
User-Space I/O for μ s-level Storage Devices.	638
<i>Anastasios Papagiannis, Giorgos Saloustros, Manolis Marazakis, and Angelos Bilas</i>	
Scaling Spark on Lustre	649
<i>Nicholas Chaimov, Allen Malony, Costin Iancu, and Khaled Ibrahim</i>	

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



<http://www.springer.com/978-3-319-46078-9>

High Performance Computing

ISC High Performance 2016 International Workshops,

ExaComm, E-MuCoCoS, HPC-IODC, IXPUG, IWOPH,

P³MA, VHPC, WOPSSS, Frankfurt, Germany, June

19-23, 2016, Revised Selected Papers

Taufer, M.; Mohr, B.; Kunkel, J.M. (Eds.)

2016, XX, 699 p. 296 illus., Softcover

ISBN: 978-3-319-46078-9