## Contents

### Parallel and Distributed Architectures

Intelligent SPARQL Endpoints: Optimizing Execution Performance by Automatic Query Relaxation and Queue Scheduling .................................................. 3  
*Ana I. Torre-Bastida, Esther Villar-Rodriguez, Miren Nekane Bilbao, and Javier Del Ser*

Hardware-Based Sequential Consistency Violation Detection Made Simpler .......................... 18  
*Mohammad Majharul Islam, Riad Akram, and Abdullah Muzahid*

Optimized Mapping Spiking Neural Networks onto Network-on-Chip .............................. 38  
*Yu Ji, Youhui Zhang, He Liu, and Weimin Zheng*

### Software Systems and Programming

A Portable Lock-Free Bounded Queue ......................................................... 55  
*Peter Pirkelbauer, Reed Milewicz, and Juan Felipe Gonzalez*

A C++ Generic Parallel Pattern Interface for Stream Processing ............................. 74  
*David del Rio Astorga, Manuel F. Dolz, Luis Miguel Sanchez, Javier García Blas, and J. Daniel García*

Creating Distributed Execution Plans with BobolangNG .................................. 88  
*David Bednárek, Martin Kruliš, Jakub Yaghob, and Filip Zavoral*

Deciding the Deadlock and Livelock in a Petri Net with a Target Marking Based on Its Basic Unfolding .............................................................. 98  
*Guanjun Liu, Kun Zhang, and Changjun Jiang*

A New Scalable Approach for Distributed Metadata in HPC ................................ 106  
*Cristina Rodríguez-Quintana, Antonio F. Díaz, Julio Ortega, Raúl H. Palacios, and Andrés Ortiz*

Enabling Android-Based Devices to High-End GPGPUs ...................................... 118  
*Raffaele Montella, Carmine Ferraro, Sokol Kosta, Valentina Pelliccia, and Giulio Giunta*

### Distributed and Network-Based Computing

3-Additive Approximation Algorithm for Multicast Time in 2D Torus Networks .................. 129  
*Hovhaness A. Harutyunyan and Meghrig Terzian*
Online Resource Coalition Reorganization for Efficient Scheduling on the Intercloud .......................................................... 143
   Adrian Spataru, Teodora Selea, and Marc Frincu

Graphein: A Novel Optical High-Radix Switch Architecture for 3D Integration ................................................................. 162
   Jie Jian, Mingche Lai, Liquan Xiao, and Weixia Xu

Improving the Performance of Volunteer Computing with Data Volunteers: A Case Study with the ATLAS@home Project .................. 178
   Saúl Alonso-Monsalve, Félix García-Carballeira, and Alejandro Calderón

Microcities: A Platform Based on Microclouds for Neighborhood Services . . 192
   Ismael Cuadrado-Cordero, Felix Cuadrado, Chris Phillips, Anne-Cécile Orgerie, and Christine Morin

Impact of Shutdown Techniques for Energy-Efficient Cloud Data Centers . . 203
   Issam Raïs, Anne-Cécile Orgerie, and Martin Quinson

Processing Partially Ordered Requests in Distributed Stream Processing Systems .................................................................. 211
   Rijun Cai, Weigang Wu, Ning Huang, and Lihui Wu

Implement and Optimization of Indoor Positioning System Based on Wi-Fi Signal .............................................................. 220
   Chongsheng Yu, Xin Li, Lei Dou, Jianwei Li, Yu Zhang, Jian Qin, Yuqing Sun, and Zhiyue Cao

Big Data and Its Applications

Optimizing Inter-server Communications by Exploiting Overlapping Communities in Online Social Networks ....................... 231
   Jingya Zhou, Jianxi Fan, Baolei Cheng, and Juncheng Jia

Road Segment Information Based Named Data Networking for Vehicular Environments ..................................................... 245
   Junlan Xiao, Jian Deng, Hui Cao, and Weigang Wu

Energy-Aware Query Processing on a Parallel Database Cluster Node ...... 260
   Amine Roukh, Ladjel Bellatreche, Nikos Tziritas, and Carlos Ordonez

Current Flow Betweenness Centrality with Apache Spark .................. 270
   Massimiliano Bertolucci, Alessandro Lulli, and Laura Ricci
Parallel and Distributed Algorithms

Light Loss-Less Data Compression, with GPU Implementation

Shunji Funasaka, Koji Nakano, and Yasuaki Ito

Deterministic Construction of Regular Geometric Graphs with Short
Average Distance and Limited Edge Length

Satoshi Fujita, Koji Nakano, Michihiro Koibuchi, and Ikki Fujiwara

A GPU-Based Backtracking Algorithm for Permutation Combinatorial
Problems

Tiago Carneiro Pessoa, Jan Gmys, Nouredine Melab,
Francisco Heron de Carvalho Junior, and Daniel Tuyttens

Buffer Minimization for Rate-Optimal Scheduling of Synchronous
Dataflow Graphs on Multicore Systems

Mingze Ma and Rizos Sakellariou

Implementing Snapshot Objects on Top of Crash-Prone Asynchronous
Message-Passing Systems

Carole Delporte-Gallet, Hugues Fauconnier, Sergio Rajsbaum,
and Michel Raynal

Scaling DBSCAN-like Algorithms for Event Detection Systems in Twitter

Joan Capdevila, Gonzalo Pericacho, Jordi Torres, and Jesús Cerquides

Towards Parallel CFD Computation for the ADAPT Framework

Imad Kissami, Christophe Cérin, Fayssal Benkhaldoun,
and Gilles Scarella

Feedback Control Optimization for Performance and Energy Efficiency
on CPU-GPU Heterogeneous Systems

Feng-Sheng Lin, Po-Ting Liu, Ming-Hua Li, and Pao-Ann Hsiung

The Impact of Panel Factorization on the Gauss-Huard Algorithm
for the Solution of Linear Systems on Modern Architectures

Sandra Catalán, Pablo Ezzatti, Enrique S. Quintana-Ortí,
and Alfredo Remón

Leveraging the Performance of LBM-HPC for Large Sizes on GPUs
Using Ghost Cells

Pedro Valero-Lara

Improving Hash Distributed A* for Shared Memory Architectures
Using Abstraction

Victoria Sanz, Armando De Giusti, and Marcelo Naiouf
On a Parallel Algorithm for the Determination of Multiple Optimal Solutions for the LCSS Problem ................................. 440
   Bchira Ben Mabrouk, Hamadi Hasni, and Zaher Mahjoub

Locality of Computation for Stencil Optimization ............................. 449
   Lufeng Yuan, Jinhong Liu, Yulong Luo, and Guangming Tan

GPU Computing to Speed-Up the Resolution of Microrheology Models. . . 457
   Gloria Ortega, Antonio Puertas, Fco Javier de Las Nieves,
   and Ester Martin-Garzón

Applications of Parallel and Distributed Computing

Methodological Approach to Data-Centric Cloudification of Scientific Iterative Workflows .................................................. 469
   Silvina Caín-Lores, Andrei Lapin, Peter Kropf, and Jesús Carretero

Efficient Parallel Algorithm for Optimal DAG Structure Search on Parallel Computer with Torus Network ............................. 483
   Hirokazu Honda, Yoshinori Tamada, and Reiji Suda

Bin Recycling Strategy for an Accuracy-Aware Implementation of Two-Point Angular Correlation Function on GPU .................. 503
   Miguel Cárdenas-Montes, Juan José Rodríguez-Vázquez,
   Miguel A. Vega-Rodríguez, Ignacio Sevilla Noarbe,
   and Antonio Gómez-Iglesias

An Efficient Implementation of LZW Compression in the FPGA .......... 512
   Xin Zhou, Yasuaki Ito, and Koji Nakano

Shared Memory Tile-Based vs Hybrid Memory GOP-Based Parallel Algorithms for HEVC Encoder ................................. 521
   Héctor Migallón, Otoniel López-Granado, Vicente Galiano,
   Pablo Piñol, and Manuel P. Malumbres

GPU-Based Heterogeneous Coding Architecture for HEVC ............... 529
   Gabriel Cebrián-Márquez, Héctor Migallón, José Luis Martínez,
   Otoniel López-Granado, Pablo Piñol, and Pedro Cuenca

Optimizing GPU Code for CPU Execution Using OpenCL and Vectorization: A Case Study on Image Coding .................. 537
   Pedro M.M. Pereira, Patricio Domingues, Nuno M.M. Rodrigues,
   Gabriel Falcao, and Sergio M.M. de Faria

Improving the Performance of Cardiac Simulations in a Multi-GPU Architecture Using a Coalesced Data and Kernel Scheme ........ 546
   Raphael Pereira Cordeiro, Rafael Sachetto Oliveira,
   Rodrigo Weber dos Santos, and Marcelo Lobosco
Service Dependability and Security in Distributed and Parallel Systems
Dynamic Verifiable Search Over Encrypted Data in Untrusted Clouds . . . . . . . . . 557
   Xiaohong Nie, Qin Liu, Xuhui Liu, Tao Peng, and Yapin Lin
Reducing TCB of Linux Kernel Using User-Space Device Driver . . . . . . . . . 572
   Weizhong Qiang, Kang Zhang, and Hai Jin
OBC Based Optimization of Re-encryption for Cryptographic
Cloud Storage. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 586
   Huidong Qiao, Jiangchun Ren, Zhiying Wang, Haihe Ba, Huaihe Zhou, and Tie Hong

Performance Modeling and Evaluation
Modeling Performance of Hadoop Applications: A Journey from Queueing
Networks to Stochastic Well Formed Nets . . . . . . . . . . . . . . . . . . . . . . . . . . . 599
   Danilo Ardagna, Simona Bernardi, Eugenio Gianniti, Soroush Karimian Aliabadi, Diego Perez-Palacin, and José Ignacio Requeno
D-SPACE4Cloud: A Design Tool for Big Data Applications . . . . . . . . . . . . . . 614
   Michele Ciavotta, Eugenio Gianniti, and Danilo Ardagna
Porting MATLAB Applications to High-Performance C++ Codes:
CPU/GPU-Accelerated Spherical Deconvolution of Diffusion MRI Data . . . . . . . . 630
   Javier Garcia Blas, Manuel F. Dolz, J. Daniel Garcia, Jesus Carretero, Alessandro Daducci, Yasser Aleman, and Erick Jorge Canales-Rodriguez
On Stochastic Performance and Cost-Aware Optimal Capacity Planning
of Unreliable Infrastructure-as-a-Service Cloud . . . . . . . . . . . . . . . . . . . . . . . . . 644
   Weiling Li, Lei Wu, Yunni Xia, Yuandou Wang, Kunyin Guo, Xin Luo, Mingwei Lin, and Wanbo Zheng
A Distributed Formal Model for the Analysis and Verification
of Arbitration Protocols on MPSoCs Architecture . . . . . . . . . . . . . . . . . . . . . . 658
   Imen Ben Hafaiedh, Maroua Ben Slimane, and Riadh Robbana
Synthetic Traffic Model of the Graph500 Communications . . . . . . . . . . . . . . 675
   Pablo Fuentes, Enrique Vallejo, José Luis Bosque, Ramón Beivide, Andreea Anghel, Germán Rodriguez, Mitch Gusat, and Cyriel Minkenberg

Author Index . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 685
Algorithms and Architectures for Parallel Processing
16th International Conference, ICA3PP 2016, Granada, Spain, December 14-16, 2016, Proceedings
2016, XXI, 687 p. 239 illus., Softcover
ISBN: 978-3-319-49582-8