

Jesus Carretero · Javier Garcia-Blas
Ryan K.L. Ko · Peter Mueller
Koji Nakano (Eds.)

Algorithms and Architectures for Parallel Processing

16th International Conference, ICA3PP 2016
Granada, Spain, December 14–16, 2016
Proceedings

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
Hovhanness A. Harutyunyan and Meghrig Terzian

Online Resource Coalition Reorganization for Efficient Scheduling on the Intercloud.	143
<i>Adrian Spataru, Teodora Selea, and Marc Frincu</i>	
Graphein: A Novel Optical High-Radix Switch Architecture for 3D Integration	162
<i>Jie Jian, Mingche Lai, Liquan Xiao, and Weixia Xu</i>	
Improving the Performance of Volunteer Computing with Data Volunteers: A Case Study with the ATLAS@home Project.	178
<i>Saúl Alonso-Monsalve, Félix García-Carballeira, and Alejandro Calderón</i>	
Microcities: A Platform Based on Microclouds for Neighborhood Services. . .	192
<i>Ismael Cuadrado-Cordero, Felix Cuadrado, Chris Phillips, Anne-Cécile Orgerie, and Christine Morin</i>	
Impact of Shutdown Techniques for Energy-Efficient Cloud Data Centers . . .	203
<i>Issam Raïs, Anne-Cécile Orgerie, and Martin Quinson</i>	
Processing Partially Ordered Requests in Distributed Stream Processing Systems	211
<i>Rijun Cai, Weigang Wu, Ning Huang, and Lihui Wu</i>	
Implement and Optimization of Indoor Positioning System Based on Wi-Fi Signal	220
<i>Chongsheng Yu, Xin Li, Lei Dou, Jianwei Li, Yu Zhang, Jian Qin, Yuqing Sun, and Zhiyue Cao</i>	
Big Data and Its Applications	
Optimizing Inter-server Communications by Exploiting Overlapping Communities in Online Social Networks	231
<i>Jingya Zhou, Jianxi Fan, Baolei Cheng, and Juncheng Jia</i>	
Road Segment Information Based Named Data Networking for Vehicular Environments	245
<i>Junlan Xiao, Jian Deng, Hui Cao, and Weigang Wu</i>	
Energy-Aware Query Processing on a Parallel Database Cluster Node	260
<i>Amine Roukh, Ladjel Bellatreche, Nikos Tziritas, and Carlos Ordonez</i>	
Current Flow Betweenness Centrality with Apache Spark.	270
<i>Massimiliano Bertolucci, Alessandro Lulli, and Laura Ricci</i>	

Parallel and Distributed Algorithms

Light Loss-Less Data Compression, with GPU Implementation	281
<i>Shunji Funasaka, Koji Nakano, and Yasuaki Ito</i>	
Deterministic Construction of Regular Geometric Graphs with Short Average Distance and Limited Edge Length	295
<i>Satoshi Fujita, Koji Nakano, Michihiro Koibuchi, and Ikki Fujiwara</i>	
A GPU-Based Backtracking Algorithm for Permutation Combinatorial Problems	310
<i>Tiago Carneiro Pessoa, Jan Gmys, Nouredine Melab, Francisco Heron de Carvalho Junior, and Daniel Tuytens</i>	
Buffer Minimization for Rate-Optimal Scheduling of Synchronous Dataflow Graphs on Multicore Systems	325
<i>Mingze Ma and Rizos Sakellariou</i>	
Implementing Snapshot Objects on Top of Crash-Prone Asynchronous Message-Passing Systems	341
<i>Carole Delporte-Gallet, Hugues Fauconnier, Sergio Rajsbaum, and Michel Raynal</i>	
Scaling DBSCAN-like Algorithms for Event Detection Systems in Twitter. . .	356
<i>Joan Capdevila, Gonzalo Pericacho, Jordi Torres, and Jesús Cerquides</i>	
Towards Parallel CFD Computation for the ADAPT Framework.	374
<i>Imad Kissami, Christophe Cérin, Fayssal Benkhaldoun, and Gilles Scarella</i>	
Feedback Control Optimization for Performance and Energy Efficiency on CPU-GPU Heterogeneous Systems	388
<i>Feng-Sheng Lin, Po-Ting Liu, Ming-Hua Li, and Pao-Ann Hsiung</i>	
The Impact of Panel Factorization on the Gauss-Huard Algorithm for the Solution of Linear Systems on Modern Architectures	405
<i>Sandra Catalán, Pablo Ezzatti, Enrique S. Quintana-Ortí, and Alfredo Remón</i>	
Leveraging the Performance of LBM-HPC for Large Sizes on GPUs Using Ghost Cells	417
<i>Pedro Valero-Lara</i>	
Improving Hash Distributed A* for Shared Memory Architectures Using Abstraction	431
<i>Victoria Sanz, Armando De Giusti, and Marcelo Naiouf</i>	

On a Parallel Algorithm for the Determination of Multiple Optimal Solutions for the LCSS Problem	440
<i>Bchira Ben Mabrouk, Hamadi Hasni, and Zaher Mahjoub</i>	
Locality of Computation for Stencil Optimization	449
<i>Lufeng Yuan, Junhong Liu, Yulong Luo, and Guangming Tan</i>	
GPU Computing to Speed-Up the Resolution of Microrheology Models.	457
<i>Gloria Ortega, Antonio Puertas, Fco Javier de Las Nieves, and Ester Martín-Garzón</i>	
Applications of Parallel and Distributed Computing	
Methodological Approach to Data-Centric Cloudification of Scientific Iterative Workflows.	469
<i>Silvina Caño-Lores, Andrei Lapin, Peter Kropf, and Jesús Carretero</i>	
Efficient Parallel Algorithm for Optimal DAG Structure Search on Parallel Computer with Torus Network	483
<i>Hirokazu Honda, Yoshinori Tamada, and Reiji Suda</i>	
Bin Recycling Strategy for an Accuracy-Aware Implementation of Two-Point Angular Correlation Function on GPU	503
<i>Miguel Cárdenas-Montes, Juan José Rodríguez-Vázquez, Miguel A. Vega-Rodríguez, Ignacio Sevilla Noarbe, and Antonio Gómez-Iglesias</i>	
An Efficient Implementation of LZW Compression in the FPGA	512
<i>Xin Zhou, Yasuaki Ito, and Koji Nakano</i>	
Shared Memory Tile-Based vs Hybrid Memory GOP-Based Parallel Algorithms for HEVC Encoder.	521
<i>Héctor Migallón, Otoniel López-Granado, Vicente Galiano, Pablo Piñol, and Manuel P. Malumbres</i>	
GPU-Based Heterogeneous Coding Architecture for HEVC	529
<i>Gabriel Cebrián-Márquez, Héctor Migallón, José Luis Martínez, Otoniel López-Granado, Pablo Piñol, and Pedro Cuenca</i>	
Optimizing GPU Code for CPU Execution Using OpenCL and Vectorization: A Case Study on Image Coding	537
<i>Pedro M.M. Pereira, Patricio Domingues, Nuno M.M. Rodrigues, Gabriel Falcao, and Sergio M.M. de Faria</i>	
Improving the Performance of Cardiac Simulations in a Multi-GPU Architecture Using a Coalesced Data and Kernel Scheme.	546
<i>Raphael Pereira Cordeiro, Rafael Sachetto Oliveira, Rodrigo Weber dos Santos, and Marcelo Lobosco</i>	

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, Huaizhe 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 Gianni,
 Soroush Karimian Aliabadi, Diego Perez-Palacin,
 and José Ignacio Requeno*

D-SPACE4Cloud: A Design Tool for Big Data Applications 614
Michele Ciavotta, Eugenio Gianni, 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 Hafaiadh, Maroua Ben Slimane, and Riadh Robbana

Synthetic Traffic Model of the Graph500 Communications. 675
*Pablo Fuentes, Enrique Vallejo, José Luis Bosque,
 Ramón Bevide, Andreea Anghel, Germán Rodríguez,
 Mitch Gusat, and Cyriel Minkenberg*

Author Index 685