

**2012 20th Euromicro
International Conference on
Parallel, Distributed and
Network-based Processing**

(PDP 2012)

**Munich, Germany
15-17 February 2012**



IEEE Catalog Number: CFP12169-PRT
ISBN: 978-1-4673-0226-5

2012 20th Euromicro International Conference on Parallel, Distributed and Network-based Processing

PDP 2012

Table of Contents

Preface from the Program Chairs	xiii
Preface from the Organizing Chair	xiv
Organization	xv
Program Committee	xvi
Additional Reviewers	xviii

Main Track Sessions

Models and Tools

A Lightweight C++ Interface to MPI	3
<i>Simone Pellegrini, Radu Prodan, and Thomas Fahringer</i>	
RobustTrav: NAT Optimisation for the RobustCooperation Suite	11
<i>Christoph Beckmann, Tom Gross, and Ferdinand Kastl</i>	
TCP: Thread Contention Predictor for Parallel Programs	19
<i>Aparna Mandke Dani, Bharadwaj Amrutur, Y.N. Srikant, and Chiranjib Bhattacharyya</i>	
Parallel Patterns + Macro Data Flow for Multi-core Programming	27
<i>M. Aldinucci, L. Anardu, M. Danelutto, M. Torquati, and P. Kilpatrick</i>	
DIMVHCM: An On-line Distributed Monitoring Data Collection Model	37
<i>Rafael Keller Tesser and Philippe Olivier Alexandre Navaux</i>	
Tackling Algorithmic Skeleton's Inversion of Control	42
<i>Gustavo Pabón and Mario Leyton</i>	
An Effective Approach for Home Services Management	47
<i>P. Moreaux, F. Sartor, and F. Vernier</i>	

SCTA Tracer: A Distributed Environment for Standardized Awareness Support Assessments	52
<i>Christoph Oemig and Tom Gross</i>	
Parallel Computing	
LDPC Decoding on the Intel SCC	57
<i>Andreas Diavastos, Panayiotis Petrides, Gabriel Falcão, and Pedro Trancoso</i>	
Improving Linear Algebra Computation on NUMA Platforms through Auto-tuned Nested Parallelism	66
<i>Javier Cuenca, Luis P. García, and Domingo Giménez</i>	
ArTA: Adaptive Granularity in Transactional Applications	74
<i>Ehsan Atoofian</i>	
Assessing HPC Failure Detectors for MPI Jobs	81
<i>Kishor Kharbas, Donghoon Kim, Torsten Hoefler, and Frank Mueller</i>	
A Performance Study of Virtual Machines on Multicore Architectures	89
<i>Jie Tao, Karl Furlinger, Lizhe Wang, and Holger Marten</i>	
Reduced Data Communication for Parallel CMA-ES for REACTS	97
<i>Doug Hakkarinen, Tracy Camp, Zizhong Chen, and Allan Haas</i>	
Distributed and Network-Based Computing	
Optimal Configuration of High-Radix Combined Switches	102
<i>Juan A. Villar, Francisco J. Andújar, José L. Sánchez, Francisco J. Alfaro, and José Duato</i>	
File I/O for MPI Applications in Redundant Execution Scenarios	112
<i>Swen Böhm and Christian Engelmann</i>	
QoS Monitoring and Analysis Approach for Publish/Subscribe Systems Deployed on MANET	120
<i>Imene Lahyani, Nesrine Khabou, and Mohamed Jmaiel</i>	
A Performance Prediction Approach for MPI Routines on Multi-clusters	125
<i>Sami Achour and Wahid Nasri</i>	
Advanced Algorithms and Applications	
An Optimized Degree Strategy for Persistent Sensor Network Data Distribution	130
<i>Wei Zhang, Qinchao Zhang, Xianghua Xu, and Jian Wan</i>	
Analysing the Adaptation Level of Parallel Hyperheuristics Applied to Multiobjectivised Benchmark Problems	138
<i>Carlos Segura, Eduardo Segredo, and Coromoto León</i>	

Context Map for Navigating the Physical World	146
<i>Vaskar Raychoudhury, Jiannong Cao, Weiping Zhu, and Ajay D. Kshemkalyani</i>	
Robust and Tuneable Family of Gossiping Algorithms	154
<i>Vincenzo De Florio and Chris Blondia</i>	
Efficiency-Aware Jobs Allocation for e-Science Environments	162
<i>Andrea Clematis, Daniele D’Agostino, Antonella Galizia, and Alfonso Quarati</i>	
Performance Evaluations of a BSP Algorithm for State Space Construction of Security Protocols	170
<i>Frédéric Gava, Michael Guedj, and Franck Pommereau</i>	
A Dynamic Deadlock Detection/Resolution Algorithm with Linear Message Complexity	175
<i>María Castillo, Federico Fariña, and Alberto Córdoba</i>	
A Dynamic Distributed Algorithm for Read Write Locks	180
<i>Soumeya Leila Hernane, Jens Gustedt, and Mohamed Benyettou</i>	
Locality-Aware Dynamic Mapping for Multithreaded Applications	185
<i>Betul Demiroz, Haluk Rahmi Topcuoglu, Mahmut Kandemir, and Oguz Tosun</i>	
Data Intensive Computing	
Interaction List Compression in Large Parallel Particle Simulations on Multicore Systems	190
<i>Gudula Rünger and Michael Schwind</i>	
A Federated Data Zone for the Arts and Humanities	198
<i>Danah Tonne, Rainer Stotzka, Thomas Jejkal, Volker Hartmann, Halil Pasic, Andrea Rapp, Philipp Vanscheidt, Bernhard Neumair, Achim Streit, Ariel García, Daniel Kurzawe, Tibor Kálmán, Jędrzej Rybicki, and Beatriz Sanchez Bribian</i>	
Bit Rate Reduction Video Transcoding with Distributed Computing	206
<i>Fareed Jokhio, Tewodros Deneke, Sébastien Lafond, and Johan Lilius</i>	
LAMBDA—The LSDF Execution Framework for Data Intensive Applications	213
<i>Thomas Jejkal, Volker Hartmann, Rainer Stotzka, Jens Otte, Ariel García, Jos van Wezel, and Achim Streit</i>	
Systems and Architectures	
Dynamic Serialization: Improving Energy Consumption in Eager-Eager Hardware Transactional Memory Systems	221
<i>Epifanio Gaona, Rubén Titos-Gil, Manuel E. Acacio, and Juan Fernández</i>	
A Runtime Library for Platform-Independent Task Parallelism	229
<i>Panagiotis E. Hadjidoukas, Evaggelos Lappas, and Vassilios V. Dimakopoulos</i>	

FT-GReLoSSS: A Skeletal-Based Approach towards Application Parallelization and Low-Overhead Fault Tolerance	237
<i>Constantinos Makassikis, Stéphane Vialle, and Xavier Warin</i>	
A Distributed E2E Recovery Mechanism for MPLS Networks	245
<i>Ali El Kamel and Habib Youssef</i>	

Special Sessions

Security in Networked and Distributed Systems (Security)

A Novel Approach for Single-Packet IP Traceback Based on Routing Path	253
<i>Ning Lu, Yulong Wang, Fangchun Yang, and Maotong Xu</i>	
A Methodology for the Analysis and Modeling of Security Threats and Attacks for Systems of Embedded Components	261
<i>Jose Fran Ruiz, Rajesh Harjani, Antonio Maña, Vasily Desnitsky, Igor Kotenko, and Andrey Chechulin</i>	
Design and Performance Evaluation of Improved Genetic Algorithm for Role Mining Problem	269
<i>Igor Saenko and Igor Kotenko</i>	
A More Efficient Hybrid Approach for Single-Packet IP Traceback	275
<i>Yulong Wang, Sen Su, Yi Yang, and Ji Ren</i>	
Continuous Authorizations in SIP with Usage Control	283
<i>Georgios Karopoulos, Paolo Mori, and Fabio Martinelli</i>	
Security Requirements for Uniformly Parameterised Cooperations	288
<i>Peter Ochsenschläger and Roland Rieke</i>	
Prototyping a 100G Monitoring System	293
<i>Scott Campbell and Jason Lee</i>	
Markovian Modeling and Security Measure Analysis for Networks under Flooding DoS Attacks	298
<i>Hendrik Baumann and Werner Sandmann</i>	

Modeling, Simulation, and Optimization of Peer-to-Peer Environments (Peer-to-Peer)

A Framework for a Comprehensive Evaluation of Ant-Inspired Peer-to-Peer Protocols	303
<i>Amos Brocco and Ingmar Baumgart</i>	
Clustering Superpeers in P2P Networks by Growing Neural Gas	311
<i>Mihai Dumitrescu and Razvan Andonie</i>	
Characterizing Dynamic Properties of the SopCast Overlay Network	319
<i>Kênia Carolina Gonçalves, Alex Borges Vieira, Jussara M. Almeida, Ana Paula C. da Silva, Humberto Marques-Neto, and Sérgio V.A. Campos</i>	

Raptor Codes for P2P Streaming	327
<i>Philipp M. Eitzenberger, Todor Mladenov, and Udo R. Krieger</i>	
Integrating Virtual Execution Environments into Peer-to-Peer Desktop Grids	333
<i>Kay Dörnemann, Uwe Boschanski, Alexander Zeiss, and Bernd Freisleben</i>	
Minimizing Wait Latency in Periodic P2P Hypercube Gossiping	341
<i>Philipp Berndt</i>	

Energy-Aware Systems (Energy-Aware Systems)

Analysis of Strategies to Save Energy for Message-Passing Dense Linear Algebra Kernels	346
<i>Maribel Castillo, Juan Carlos Fernández, Rafael Mayo, Enrique S. Quintana-Ortí, and Vicente Roca</i>	
Saving Energy in the LU Factorization with Partial Pivoting on Multi-core Processors	353
<i>Pedro Alonso, Manuel F. Dolz, Francisco D. Igual, Rafael Mayo, and Enrique S. Quintana-Ortí</i>	
Energy-Aware Load Direction for Servers: A Feasibility Study	359
<i>Shane Case, Furat Afram, Erdem Aktas, and Kanad Ghose</i>	

GPU Computing and Hybrid Computing (GPU)

phiGEMM: A CPU-GPU Library for Porting Quantum ESPRESSO on Hybrid Systems	368
<i>Filippo Spiga and Ivan Girotto</i>	
Optimization Techniques and Performance Analyses of Two Life Science Algorithms for Novel GPU Architectures	376
<i>David Dilch and Eduard Mehofer</i>	
Smoothed Particle Hydrodynamics Simulations on Multi-GPU Systems	384
<i>E. Rustico, G. Bilotta, G. Gallo, A. Hérault, and C. Del Negro</i>	
Parallel Branch and Bound on a CPU-GPU System	392
<i>Abdelamine Boukedjar, Mohamed Esseghir Lalami, and Didier El-Baz</i>	
SIMT Microscheduling: Reducing Thread Stalling in Divergent Iterative Algorithms	399
<i>Steffen Frey, Guido Reina, and Thomas Ertl</i>	
Towards Solving the Table Maker's Dilemma on GPU	407
<i>Pierre Fortin, Mourad Gouicem, and Stef Graillat</i>	
gpuDCI: Exploiting GPUs in Frequent Itemset Mining	416
<i>Claudio Silvestri and Salvatore Orlando</i>	

On Realistic Divisible Load Scheduling in Highly Heterogeneous Distributed Systems	426
<i>Aleksandar Ilic and Leonel Sousa</i>	
Accelerating the Production of Synthetic Seismograms by a Multicore Processor Cluster with Multiple GPUs	434
<i>Ferdinando Alessi, Annalisa Massini, and Roberto Basili</i>	
Applying OOC Techniques in the Reduction to Condensed Form for Very Large Symmetric Eigenproblems on GPUs	442
<i>Davor Davidovic and Enrique S. Quintana-Ortí</i>	
Fast PageRank Computation on a GPU Cluster	450
<i>Arnon Rungasawang and Bundit Manaskasemsak</i>	
 On-chip Parallel and Network-Based Systems (On-chip)	
Design and Evaluation of a High Throughput QoS-Aware and Congestion-Aware Router Architecture for Network-on-Chip	457
<i>Chifeng Wang and Nader Bagherzadeh</i>	
Effect of Application Mapping on Network-on-Chip Performance	465
<i>Coskun Çelik and Cüneyt F. Bazlamaçcı</i>	
Exploring NoC Virtualization Alternatives in CMPs	473
<i>F. Triviño, J.L. Sánchez, F.J. Alfaro, and J. Flich</i>	
Design and Analysis of a Mesh-based Wireless Network-on-Chip	483
<i>Wen-Hsiang Hu, Chifeng Wang, and Nader Bagherzadeh</i>	
Packet Triggered Prediction Based Task Migration for Network-on-Chip	491
<i>Chao Wang, Licheng Yu, Li Liu, and Tianzhou Chen</i>	
Exploration of Temperature Constraints for Thermal Aware Mapping of 3D Networks on Chip	499
<i>Parisa Khadem Hamedani, Shaahin Hessabi, Hamid Sarbazi-Azad, and Natalie Enright Jerger</i>	
An Efficient Hybridization Scheme for Stacked Mesh 3D NoC Architecture	507
<i>Amir-Mohammad Rahmani, Pasi Liljeberg, Juha Plosila, and Hannu Tenhunen</i>	
LATEX: New Selection Policy for Adaptive Routing in Application-Specific NoC	515
<i>Sanaz Azampanah, Ahmad Khademzadeh, Nader Bagherzadeh, Majid Janidarmian, and Reza Shojaee</i>	
LEAR—A Low-Weight and Highly Adaptive Routing Method for Distributing Congestions in On-chip Networks	520
<i>Masoumeh Ebrahimi, Masoud Daneshtalab, Pasi Liljeberg, Juha Plosila, and Hannu Tenhunen</i>	

Global Control in Distributed Programs with Dynamic Process Membership525
J. Borkowski and M. Tudruj

A New Fault Injection Approach for Testing Network-on-Chips530
Luca Sterpone, Davide Sabena, and Matteo Sonza Reorda

Parallel and Distributed Storage Systems (Storage Systems)

On the Influence of PRNGs on Data Distribution536
Ivan Popov, André Brinkmann, and Tom Friedetzky

Analyzing Long-Term Access Locality to Find Ways to Improve Distributed
Storage Systems544
Alberto Miranda and Toni Cortes

IOPm—Modeling the I/O Path with a Functional Representation of Parallel
File System and Hardware Architecture554
Julian M. Kunkel and Thomas Ludwig

Simulation-Aided Performance Evaluation of Server-Side Input/Output
Optimizations562
Michael Kuhn, Julian M. Kunkel, and Thomas Ludwig

Cloud Computing for Computer and Data Intensive Applications (Cloud Computing)

Integrated Monitoring Approach for Seamless Service Provisioning
in Federated Clouds567
A. Kertesz, G. Kecskemeti, A. Marosi, M. Oriol, X. Franch, and J. Marco

Facilitating Self-Adaptable Inter-cloud Management575
G. Kecskemeti, M. Maurer, I. Brandic, A. Kertesz, Zs. Nemeth, and S. Dustdar

Running User-Provided Virtual Machines in Batch-Oriented Computing
Clusters583
Vitor Oliveira, António Manuel Pina, and André Rocha

Grid, Parallel, and Distributed Bioinformatics Applications (Bioinformatics Applications)

Parallelization of Virtual Screening in Drug Discovery on Massively Parallel
Architectures588
Ginés D. Guerrero, Horacio E. Pérez-Sánchez, José M. Cecilia, and José M. García

Enabling Parallel Computing of a Brain Connectivity Map Using
the MediGRID-Infrastructure and FSL596
*Romanus Gruetz, Benjamin Loehnhardt, Niels K. Focke, Fred Viezens,
Andreas Hoheisel, Frank Dickmann, and Dagmar Krefting*

On Optimizing the Longest Common Subsequence Problem by Loop Unrolling Along Wavefronts	603
<i>Johann Steinbrecher and Weijia Shang</i>	
A CUDA-based Implementation of the SSAKE Genomics Application	612
<i>Daniele D'Agostino, Andrea Clematis, Alessandro Guffanti, Luciano Milanesi, and Ivan Merelli</i>	
High-throughput Molecular Docking Now in Reach for a Wider Biochemical Community	617
<i>Dhananjay M. Balan, Tomas Malinauskas, Pjotr Prins, and Steffen Möller</i>	
Accelerating Fibre Orientation Estimation from Diffusion Weighted Magnetic Resonance Imaging Using GPUs	622
<i>Moisés Hernández, Ginés D. Guerrero, José M. Cecilia, José M. García, Alberto Inuggi, and Stamatios N. Sotiropoulos</i>	
Author Index	627