

2016 Fourth International Symposium on Computing and Networking

CANDAR 2016

Table of Contents

Message from Organizers	xvi
Conference Organization.....	xvii
Program Committee.....	xix
Reviewers.....	xxii
AFCA 2016 Workshop Organization.....	xxviii
ASON 2016 Workshop Organization.....	xxix
CSA 2016 Workshop Organization.....	xxx
GCA 2016 Workshop Organization.....	xxxix
LHAM 2016 Workshop Organization.....	xxxii
PDAA 2016 Workshop Organization.....	xxxiii
WANC 2016 Workshop Organization.....	xxxiv
WICS 2016 Workshop Organization.....	xxxv

Fourth International Symposium on Computing and Networking

Long Papers

Tight Bounds for Two-Hop Delivery in Homogeneous P2P Video Streaming Systems.....	1
<i>Hironori Ando and Satoshi Fujita</i>	
LOREN: A Scalable Routing Method for Layout-Conscious Random Topologies	9
<i>Ryuta Kawano, Hiroshi Nakahara, Ikki Fujiwara, Hiroki Matsutani, Michihiro Koibuchi, and Hideharu Amano</i>	
A Self-Optimizing Routing Algorithm in a 3-Dimensional Virtual Grid Network.....	19
<i>Yonghwan Kim and Yoshiaki Katayama</i>	

An Estimate of the Complexity of the Section Finding Problem on Algebraic Surfaces.....	28
<i>Shinya Okumura, Koichiro Akiyama, and Tsuyoshi Takagi</i>	
Topology-Aware Data Aggregation for High Performance Collective MPI-IO on a Multi-core Cluster System.....	37
<i>Yuichi Tsujita, Atsushi Hori, Toyohisa Kameyama, and Yutaka Ishikawa</i>	
A Cost-Effective and Scalable Merge Sorter Tree on FPGAs.....	47
<i>Takuma Usui, Thiem Van Chu, and Kenji Kise</i>	
CPRtree: A Tree-Based Checkpointing Architecture for Heterogeneous FPGA Computing.....	57
<i>Hoang Gia Vu, Supasit Kajkamhaeng, Shinya Takamaeda-Yamazaki, and Yasuhiko Nakashima</i>	
Accelerating BLAST Computation on an FPGA-enhanced PC Cluster	67
<i>Masato Yoshimi, Celimuge Wu, and Tsutomu Yoshinaga</i>	

Regular Papers

A Concurrency Control in Hardware Transactional Memory Considering Execution Path Variation.....	77
<i>Anju Hirota, Keisuke Mashita, and Tomoaki Tsumura</i>	
A Semantic Dataflow Logger Connecting Java Objects and Database Rows and Columns.....	84
<i>Toshio Ito and Yu Kaneko</i>	
Set-to-Set Disjoint Paths in Tori.....	91
<i>Keiichi Kaneko and Antoine Bossard</i>	
Automated Dataset Construction from Web Resources with Tool Kayur	98
<i>Alexander Kohan, Mitsuharu Yamamoto, and Cyrille Artho</i>	
Energy Efficient Processing of Fine-Grained Loads in Heterogeneous Server Farms.....	105
<i>Jörg Lenhardt and Wolfram Schiffmann</i>	
On-the-Fly Data Compression/Decompression Mechanism with ExpEther.....	112
<i>Hideki Shimura, Takuji Mitsuishi, Masaki Kan, Takashi Yoshikawa, and Hideharu Amano</i>	
Finite Computational Structures and Implementations	119
<i>Attila Egri-Nagy</i>	
A Light-Weight Content Distribution Scheme for Cooperative Caching in Telco-CDNs	126
<i>Takuma Nakajima, Masato Yoshimi, Celimuge Wu, and Tsutomu Yoshinaga</i>	

An Effective Page Padding Method for RAM Buffer Algorithms to Enhance the SSD Endurance	133
<i>Eri Ogawa and Kenji Kise</i>	
Parallelized Side-Channel Attack Resisted Scalar Multiplication Using q-Based Addition-Subtraction k-Chains	140
<i>Kittiphop Phalakarn, Kittiphon Phalakarn, and Vorapong Suppakitpaisarn</i>	
Performance Evaluation of Multiuser Digital Color Shift Keying Using Pseudo-Noise Code with On-Off Signaling.....	147
<i>Fuminori Sato, Yusuke Kozawa, and Yohtaro Umeda</i>	
Cold Boot Attack Methods for the Discrete Logarithm Problem	154
<i>Hwei-Ming Ying and Noboru Kunihiro</i>	
Formulation of Energy Consumption in WSNs with Progress-Based Nearest Forwarding Policy.....	161
<i>Sho Sasaki, Yuichi Miyaji, and Hideyuki Uehara</i>	
On the Tightness of Deterministic Identity-Based Signatures	168
<i>Naoto Yanai</i>	
Performance Comparison of CGRA and Mobile GPU for Light-Field Image Processing.....	174
<i>Yuttakon Yuttakonkit and Yasuhiko Nakashima</i>	
Performance Evaluation of VM-based Intrusion Tolerant Systems with Poisson Arrivals	181
<i>Junjun Zheng, Hiroyuki Okamura, and Tadashi Dohi</i>	
Towards Ideal Hop Counts in Interconnection Networks with Arbitrary Size	188
<i>Michihiro Koibuchi, Ikki Fujiwara, Fabien Chaix, and Henri Casanova</i>	
Vertical Packet Switching Elevator Network Using Inductive Coupling ThruChip Interface	195
<i>Akio Nomura, Hiroki Matsutani, Tadahiro Kuroda, Junichiro Kadomoto, Yusuke Matsushita, and Hideharu Amano</i>	

Fourth International Workshop on Applications and Fundamentals of Cellular Automata (AFCA)

Regular Papers

Universal 2-State 24-Neighborhood Asynchronous Cellular Automaton with Inner-Independent Open Rule	202
<i>Susumu Adachi, Jia Lee, Ferdinand Peper, and Hiroshi Umeo</i>	
Particle Complexity of Universal Finite Number-Conserving Cellular Automata	209
<i>Artiom Alhazov and Katsunobu Imai</i>	

Pattern Formation and Computation by Autonomous Chemical Reaction Diffusion Model Inspired by Cellular Automata	215
<i>Ibuki Kawamata, Takuto Hosoya, Fumi Takabatake, Ken Sugawara, Shin-Ichiro Nomura, Teijiro Isokawa, Ferdinand Peper, Masami Hagiya, and Satoshi Murata</i>	
On the Ergodicity of One-Dimensional Linear Cellular Automata with Additive Error	222
<i>Ryouta Kouduma and Masato Takei</i>	
Synchronizing the Squad with (Almost) Arbitrary Cut Ratio.....	229
<i>Luidnel Maignan and Jean-Baptiste Yunès</i>	
On Limiting Measures for a Class of One-Dimensional Linear Cellular Automata	236
<i>Masato Takei</i>	
Cellular Automaton Modeling of SDP System and its Applications in 1D Traffic Flow.....	243
<i>Akiyasu Tomoeda</i>	
Computation Based on Signal Random Fluctuation in Asynchronous Cellular Automata	249
<i>Wen-Li Xu and Jia Lee</i>	

Poster Papers

An Asynchronous Updating Scheme for a Cellular Logic Memory Array	254
<i>Teijiro Isokawa, Ferdinand Peper, Shoji Ishibashi, Toshifumi Minemoto, and Nobuyuki Matsui</i>	
The Firing Squad Synchronization Problem on Higher-Dimensional CA with Multiple Updating Cycles	258
<i>Luca Manzoni, Antonio E. Porreca, and Hiroshi Umeo</i>	
Zeta Function of a Class of Subshifts of Dyck Shift	262
<i>Takao Namiki and Ken Saito</i>	

Ninth International Workshop on Autonomous Self-Organizing Networks (ASON)

Regular Papers

On Sensor Fusion for Location-Based Recommender Systems.....	266
<i>Jürgen Dunkel</i>	
A Minimum Contention Window Control Method for Lowest Priority Based on Collision History of Wireless LAN	272
<i>Tomoki Hanzawa and Shigetomo Kimura</i>	

Information Dissemination Scheme Using Mobile Agents in Autonomous Clustering-Based Heterogeneous Wireless Networks.....	279
<i>Takeshi Hashimoto, Ryota Ito, Tomoyuki Ohta, and Yoshiaki Kakuda</i>	
On Availability and Energy Consumption of the Fast Connection Establishment Method by Using Bluetooth Classic and Bluetooth Low Energy	286
<i>Nobuhiro Kajikawa, Yuya Minami, Eitaro Kohno, and Yoshiaki Kakuda</i>	
Performance Evaluation of Participatory Sensing Scheme Using Delay Tolerant Networking.....	291
<i>Hiro Onishi and Takuya Asaka</i>	
Polling-Based P2P File Sharing with High Success Rate and Low Communication Cost	297
<i>Kouhei Ootani and Satoshi Fujita</i>	
Impact of Fluctuating Goals on Adaptability of Evolvable VNF Placement Method.....	304
<i>Mari Otokura, Kenji Leibnitz, Yuki Koizumi, Daichi Kominami, Tetsuya Shimokawa, and Masayuki Murata</i>	
A Minimax Approach for Access-Point Setup Optimization Using Throughput Measurements in IEEE802.11n Wireless Networks.....	311
<i>Kyaw Soe Lwin, Nobuo Funabiki, Khin Khin Zaw, Md. Selim Al Mamun, and Minoru Kuribayashi</i>	
A Channel Assignment Extension of Active Access-Point Configuration Algorithm for Elastic WLAN System under Limited Channels	318
<i>Md. Selim Al Mamun, Sumon Kumar Debnath, Kyaw Soe Lwin, and Nobuo Funabiki</i>	
Deterministic Construction of Artificial Scale-Free Networks with Designated Maximum Degree.....	325
<i>Naoki Takeuchi and Satoshi Fujita</i>	
Workflow Support Based on Mobile Data Stream Management System.....	332
<i>Jiwang Xu, Yukikazu Nakamoto, and Shingo Akiyama</i>	
Improving Consistency of Parallel Emulation for Multi-hop Wireless Ad-Hoc Network.....	338
<i>Yusuke Yamazaki, Timothy Girry Kale, Satoshi Ohzahata, and Toshihiko Kato</i>	
 Poster Paper	
Communication Link Switching Method Based on Destination IP Address for Power Savings.....	343
<i>Masato Nishiguchi and Shigetomo Kimura</i>	

Fourth International Workshop on Computer Systems and Architectures (CSA)

Regular Papers

Last Path Caching: A Simple Way to Remove Redundant Memory Accesses of Path ORAM.....	347
<i>Naoki Fujieda, Ryo Yamauchi, and Shuichi Ichikawa</i>	
Exploiting Bloom Filters for Saving Power Consumption of Auto-Memoization Processor	354
<i>Masayoshi Fujii, Yuuki Sato, Tomoaki Tsumura, and Yasuhiko Nakashima</i>	
Stop the World: A Lightweight Runtime Power-Capping Mechanism for FPGAs	361
<i>Keisuke Fujimoto, Shinya Takamaeda-Yamazaki, and Yasuhiko Nakashima</i>	
PGASUS: A Framework for C++ Application Development on NUMA Architectures	368
<i>Wieland Hagen, Max Plauth, Felix Eberhardt, Frank Feinbube, and Andreas Polze</i>	
CPU Meets VR: A Scalable 3D Representation of Manycores for Behavior Analysis	375
<i>Hirosama Kato, Satoshi Shimaya, Keisuke Fujimoto, Tomoya Kameda, Tran Thi Hong, Shinya Takamaeda-Yamazaki, and Yasuhiko Nakashima</i>	
Hardware Supported Marking for Common Garbage Collections.....	381
<i>Shinji Kawamura and Tomoaki Tsumura</i>	
A Rapid Verification Framework for Developing Multi-core Processor	388
<i>Kouki Kayamuro, Takahiro Sasaki, Yuki Fukazawa, and Toshio Kondo</i>	
Implementing Breadth-First Search on a Compact Supercomputer Suiren	395
<i>Takuji Mitsuishi, Takahiro Kaneda, Sunao Torii, and Hideharu Amano</i>	
File Placing Control for Improving the I/O Performance of Hadoop in Virtualized Environment.....	402
<i>Kenji Nakashima, Eita Fujishima, and Saneyasu Yamaguchi</i>	
Towards Automating Multi-dimensional Data Decomposition for Executing a Single-GPU Code on a Multi-GPU System	408
<i>Ryotaro Sakai, Fumihiko Ino, and Kenichi Hagihara</i>	
Evaluation of Task Mapping on Multicore Neural Network Accelerators	415
<i>Satoshi Shindo, Momoka Ohba, Tomoaki Tsumura, and Shinobu Miwa</i>	
FPGA-based Real-Time Object Tracking Using a Particle Filter with Stream Architecture	422
<i>Akane Tahara, Yoshiki Hayashida, Theint Theint Thu, Yuichiro Shibata, and Kiyoshi Oguri</i>	

Introducing PSO for Optimal Packet Scheduling of Collective Communication	429
<i>Takashi Yokota, Kanemitsu Ootsu, and Takeshi Ohkawa</i>	
FPGA-based Annealing Processor for Ising Model.....	436
<i>Chihiro Yoshimura, Masato Hayashi, Takuya Okuyama, and Masanao Yamaoka</i>	

Poster Papers

Toward a Database Refactoring Support Tool.....	443
<i>Kohei Hamaji and Yukikazu Nakamoto</i>	
A Cost and Performance Analytical Model for Large-Scale On-Chip Interconnection Networks	447
<i>Takanori Kurihara and Yamin Li</i>	
A Power Estimation Method for Mesh-Based Photonic NoC Routing Algorithms	451
<i>Michael Meyer, Yuichi Okuyama, and Abderazek Ben Abdallah</i>	
Feasibility Study for Building Hybrid Storage System Consisting of Non-volatile DIMM and SSD.....	454
<i>Kazuichi Oe, Takeshi Nanri, and Koji Okamura</i>	
A Serial Booth Multiplier Using Ring Oscillator	458
<i>Daichi Okamoto, Masafumi Kondo, Tomoyuki Yokogawa, Yoshihiro Sejima, Kazutami Arimoto, and Yoichiro Sato</i>	

First International Workshop on GPU Computing and Applications (GCA)

Regular Papers

How to Speed Up CUDA-WSat-PcL by 5x.....	462
<i>Heng Liu, Arrvinth Shriraman, and Evgenia Ternovska</i>	
Accelerating Ant Colony Optimization for the Vertex Coloring Problem on the GPU	469
<i>Ryouhei Murooka, Yasuaki Ito, and Koji Nakano</i>	
A Fast Hybrid Approach for Stream Compaction on GPUs.....	476
<i>Vernon Rego, Janche Sang, and Chansu Yu</i>	
A Memory-Access-Efficient Implementation of the Approximate String Matching Algorithm on GPU.....	483
<i>Lucas S. N. Nunes, J. L. Bordim, Koji Nakano, and Yasuaki Ito</i>	
GPU-Accelerated Bulk Computation of the Eigenvalue Problem for Many Small Real Non-symmetric Matrices	490
<i>Hiroki Tokura, Takumi Honda, Yasuaki Ito, Koji Nakano, Mitsuya Nishino, Yushiro Hirota, and Masami Saeki</i>	

Performance Evaluation of Parallelizing Algorithm Using Spanning Tree for Stream-Based Computing.....	497
<i>Guyue Wang, Koichi Wada, and Shinichi Yamagiwa</i>	

Poster Paper

Experimental Evaluation of a GPU-based Frequent Subgraph Miner Using Synthetic Databases.....	504
<i>Tatsuya Toki and Tomonobu Ozaki</i>	

Fourth International Workshop on Legacy HPC Application Migration (LHAM)

Regular Papers

A User-Defined Code Transformation Approach to Overlapping MPI Communication with Computation.....	508
<i>Yasuharu Hayashi, Hiroyuki Takizawa, and Hiroaki Kobayashi</i>	
A Directive Generation Approach Using User-Defined Rules.....	515
<i>Kazuhiko Komatsu, Ryusuke Egawa, Hiroyuki Takizawa, and Hiroaki Kobayashi</i>	
Xevedriver: A Software System Supporting XML-based Source-to-Source Code Transformations on Fortran Programs.....	522
<i>Reiji Suda and Hiroyuki Takizawa</i>	
The Importance of Dynamic Load Balancing among OpenMP Thread Teams for Irregular Workloads.....	529
<i>Xiong Xiao, Shoichi Hirasawa, Hiroyuki Takizawa, and Hiroaki Kobayashi</i>	
Towards Performance Portability through Locality-Awareness for Applications Using One-Sided Communication Primitives.....	536
<i>Huan Zhou and José Gracia</i>	

Poster Paper

A Case Study of the Running Time Fluctuation of Application	543
<i>Kiyoshi Kumahata and Kazuo Minami</i>	

Eighth International Workshop on Parallel and Distributed Algorithms and Applications (PDAA)

Regular Papers

A Mapping Heuristic for Minimizing Message Latency in Massively Distributed MCTS	547
<i>Alonso Gragera and Vorapong Suppakitpaisarn</i>	
An MPI-based Framework for Processing Spatial Vector Data on Heterogeneous Distributed Systems.....	554
<i>Kouichi Araki and Taiki Shimbo</i>	
On the Complexity of Distributed Wake-Up	559
<i>Stefan Dobrev, Rastislav Královič, and Nicola Santoro</i>	
A Hardware Sorter for Almost Sorted Sequences, with FPGA Implementations	565
<i>Naoaki Harada, Naoyuki Matsumoto, Koji Nakano, and Yasuaki Ito</i>	
An Asynchronous P System for MAX-SAT	572
<i>Junichiro Imatomi and Akihiro Fujiwara</i>	
Prediction of Future Loads Using Neural Networks for Energy-Efficient Computing	579
<i>Jörg Lenhardt, Wolfram Schiffmann, and Stefan Jannevers</i>	

Poster Paper

Collaborative Development Environment in Peer-to-Peer Networks.....	586
<i>Martin Thodi and Satoshi Fujita</i>	

Third International Workshop on Information and Communication Security (WICS)

Regular Papers

Lightweight Hashing Using Lesamnta-LW Compression Function Mode and MDP Domain Extension	590
<i>Asraf Akhimullah and Shoichi Hirose</i>	
A Password-Protected Secret Sharing Based on Kurosawa-Desmedt Hybrid Encryption.....	597
<i>Takahiro Arai and Satoshi Obana</i>	
Auto and Cross Correlation of Well Balanced Sequence over Odd Characteristic Field	604
<i>Ali Md. Arshad, Yasuyuki Nogami, Hiroto Ino, and Satoshi Uehara</i>	
Implementation of a Revocable Group Signature Scheme with Compact Revocation List Using Accumulator	610
<i>Nasima Begum, Toru Nakanishi, Shahidatul Sadiyah, and Md. Ezharul Islam</i>	

Process Mining Meets Malware Evolution: A Study of the Behavior of Malicious Code	616
<i>Mario Luca Bernardi, Marta Cimitile, and Francesco Mercaldo</i>	
Cheating Detectable Secret Sharing Scheme Suitable for Implementation	623
<i>Hidetaka Hoshino and Satoshi Obana</i>	
Isomorphic Mapping for Ate-Based Pairing over KSS Curve of Embedding Degree 18.....	629
<i>Md. Al-Amin Khandaker and Yasuyuki Nogami</i>	
Memory Access Monitoring and Disguising of Process Information to Avoid Attacks to Essential Services	635
<i>Masaya Sato, Toshihiro Yamauchi, and Hideo Taniguchi</i>	
Evaluation of Latch-Based PUFs Implemented on 40 nm ASICs	642
<i>Naoya Torii, Dai Yamamoto, and Tsutomu Matsumoto</i>	
SQL Injection Attack Detection Method Using Expectation Criterion	649
<i>Linghuan Xiao, Shinichi Matsumoto, Tomohisa Ishikawa, and Kouichi Sakurai</i>	
Decryption of Frequent Password Hashes in Rainbow Tables	655
<i>Hwei-Ming Ying and Noboru Kunihiro</i>	

Poster Paper

Biometric Bit String Generation from Handwritten Signatures on Smart Device	662
<i>Taiki Sowa, Suguru Sunada, Yasushi Yamazaki, and Takeru Miyazaki</i>	

Seventh International Workshop on Advances in Networking and Computing (WANC)

Short Papers

An Interconnection Network Exploiting Trade-Off between Routing Table Size and Path Length	666
<i>Thanh-Chung Kieu, Khanh-Van Nguyen, Nguyen T. Truong, Ikki Fujiwara, and Michihiro Koibuchi</i>	
On the Performance Evaluation of Multi-channel MAC Protocols.....	671
<i>Marcos Fagundes Caetano and Jacir Luiz Bordim</i>	
Automatic Generation of Temporal Feature Vectors with Application to Tourism Recommender Systems.....	676
<i>Guan-Shen Fang, Sayaka Kamei, and Satoshi Fujita</i>	
Data Protection for Cross-Border Live Migration in Multi-cloud Environment	681
<i>Yuichi Hashi, Toshihiro Uchibayashi, Seira Hidano, Shinsaku Kiyomoto, Abdur Rahim, Takuo Suganuma, and Masahiro Hiji</i>	

Service Identification by Packet Inspection Based on N-grams in Multiple Connections	686
<i>Masaki Hara, Shinnosuke Nirasawa, Aki Nakao, Masato Oguchi, Shu Yamamoto, and Saneyasu Yamaguchi</i>	
Fork Bomb Attack Mitigation by Process Resource Quarantine	691
<i>Gaku Nakagawa and Shuichi Oikawa</i>	
Design and Implementation of an Application State Migration Mechanism between Android Devices	696
<i>Kohei Sato, Koichi Mouri, and Shoichi Saito</i>	
Poster Papers	
A Study on Object Lifetime in GC of Android Applications.....	701
<i>Shintaro Hamanaka, Shun Kurihara, Shoki Fukuda, Masato Oguchi, and Saneyasu Yamaguchi</i>	
An Evaluation of the Parallella Architecture for the Convex Hull Computation.....	704
<i>Keisuke Nakata and Yasuaki Ito</i>	
Initial Study of Reconfigurable Neural Network Accelerators	707
<i>Momoka Ohba, Satoshi Shindo, Shinobu Miwa, Tomoaki Tsumura, Hayato Yamaki, and Hiroki Honda</i>	
A Hotel Recommendation System Based on Reviews: What Do You Attach Importance To?	710
<i>Koji Takuma, Junya Yamamoto, Sayaka Kamei, and Satoshi Fujita</i>	
Proposal of Lambda Architecture Adoption for Real Time Predictive Maintenance	713
<i>Yoji Yamato, Hiroki Kumazaki, and Yoshifumi Fukumoto</i>	
Author Index	716