2007 International Conference on Parallel Processing Workshops

(ICPP)

Xian, China
10 – 14 September 2007
TABLE OF CONTENTS

SESSION 1A: MULTI-CORE SYSTEMS

Parallelization and Performance Analysis of Video Feature Extractions on Multi-core Based Systems ................................................................. 1
Qi Zhang, Yurong Chen, Jianguo Li, Yimin Zhang, Yinlong Xu

Towards Optimized Packet Classification Algorithms for Multi-core Network Processors ..................................................... 9
Yaxuan Qi, Bo Xu, Fei He, Xin Zhou, Jianming Yu, Jun Li

Loop-Level Speculative Parallelism in Embedded Applications ................................................................. 17
Mafijul M. Islam, Alexander Busck, Mikael Engbom, Simji Lee, Michel Dubois, Per Stenström

Integrating Memory Compression and Decompression with Coherence Protocols in Distributed Shared Memory Multiprocessors ................................ 27
Lakshmana Rao Vittanala, Mainak Chaudhuri

SESSION 1B: SEARCHING IN P2P SYSTEMS

Improving Search Using a Fault-Tolerant Overlay in Unstructured P2P Systems ................................................................. 37
William Acosta, Surendar Chandra

Difficulty-Aware Hybrid Search in Peer-to-Peer Networks .................................................................................... 47
Hanhua Chen, Hai Jin, Yunhao Liu, Lionel M. Ni

Collaborative Search in Large-Scale Unstructured Peer-to-Peer Networks .................................................................................... 55
Yiming Zhang, Dongsheng Li, Lei Chen, Xicheng Lu

ASAP: An Advertisement-Based Search Algorithm for Unstructured Peer-to-Peer Systems ................................................................. 63
Peng Gu, Jun Wang, Hailong Cai

SESSION 1C: OS AND RESOURCE MANAGEMENT

Mercury: Combining Performance with Dependability Using Self-Virtualization ................................................................. 71
Haibo Chen, Rong Chen, Fengzhe Zhang, Binyu Zang, Pen-Chung Yew

FlexFetch: A History-Aware Scheme for I/O Energy Saving in Mobile Computing ................................................................. 79
Feng Chen, Song Jiang, Weisong Shi, Weikuan Yu

Methods of Memory Optimizations in Streaming Applications .................................................................................... 88
Nissim Harel, Hasnain A. Mandviwala, Kath Knobe, Umakishore Ramachandran

Multi-layer Event Trace Analysis for Parallel I/O Performance Tuning .................................................................................... 96
Pin Lu, Kai Shen

SESSION 2A: ALGORITHMS AND APPLICATIONS

Column-Based Partitioning for Data in High Dimensional Space .................................................................................... 106
Ekasit Kijsipongse, Sudsanguan Ngamsuriyaroj

 Efficient Parallel Algorithm for Optimal Three-Sequences Alignment .................................................................................... 113
Chun Yuan Lin, Chen Tai Huang, Yeh-Ching Chung, Chuan Yi Tang
Parallel Algorithms for Bayesian Indoor Positioning Systems .......................................................... 121
Konstantinos Kleisouris, Richard P. Martin

A Fast Multi-pattern Matching Algorithm for Deep Packet Inspection on a Network Processor .......................................................... 131
Jia Ni, Chuang Lin, Zhen Chen, Peter Ungsunan

SESSION 2B: CLUSTER COMPUTING

Collaborative Memory Pool in Cluster System ........................................................................ 139
Nan Wang, Xuhai Liu, Jin He, Jizhong Han, Lisheng Zhang, Zhiyong Xu

CPU MISER: A Performance-Directed, Run-Time System for Power-Aware Clusters .................. 147
Rong Ge, Xizhou Feng, Wu-chun Feng, Kirk W. Cameron

Energy-Efficient Scheduling for Parallel Applications Running on Heterogeneous Clusters 155
Ziliang Zong, Xiao Qin, Xiaojun Ruan, Kiranmai Bellam, Mais Nijim, Mohamed Alghamdi

Real-Time Divisible Load Scheduling with Different Processor Available Times .......................... 163
Xuan Lin, Ying Lu, Jitender Deogun, Steve Goddard

SESSION 2C: LOAD BALANCE

Hardware-Based Multicast with Global Load Balance on k-ary n-Trees ........................................ 173
Quanbao Sun, Minxuan Zhang, Liquan Xiao

Fair Load-Balancing on Parallel Systems for QoS ............................................................................ 180
L. F. Orleans, P. N. Furtado

Scheduling Divisible Loads on Bus Networks with Start-Up Costs by Utilizing Multiple Data Transfer Streams: PORI .......................................................... 188
Jie Hu, Raymond Klefstad

Adaptive Load-Balancing for Force-Decomposition Based 3-Body Molecular Dynamics Simulations in a Heterogeneous Distributed Environment with Variable Number of Processors .......................................................... 196
J. V. Sumanth, David R. Swanson, Hong Jiang

SESSION 3A: OPTIMIZATION FOR PARALLELISM

COBRA: An Adaptive Runtime Binary Optimization Framework for Multithreaded Applications ........................................................................ 206
Jinpyo Kim, Wei-Chung Hsu, Pen-Chung Yew

Automatic Trace-Based Parallelization of Java Programs .............................................................. 215
Borys J. Bradel, Tarek S. Abdelrahman

Toward Automatic Data Distribution for Migrating Computations ........................................ 225
Lei Pan, Jingling Xue, Ming Kin Lai, Michael B. Dillencourt, Lubomir F. Bic

SESSION 3B: RELIABLE P2P SYSTEMS

Defending P2Ps from Overlay Flooding-Based DDoS ................................................................ 233
Yunhao Liu, Xiaomei Liu, Chen Wang, Li Xiao
Achieving Reliability through Replication in a Wide-Area Network DHT Storage System .................................................. 241
  Jing Zhao, Hongliang Yu, Kun Zhang, Weimin Zheng, Jie Wu, Jinfeng Hu

Towards Location-Aware Topology in both Unstructured and Structured P2P Systems ................................................. 249
  Tongqing Qiu, Guihai Chen, Mao Ye, Edward Chan, Ben Y. Zhao

SESSION 3C: PARALLEL DATA ACCESS

Design, Implementation, and Evaluation of Trellis-SDP for File-Level Data Parallelism ........................................... 257
  Meng Ding, Paul Lu, Juefu Wang, Mauricio D. Sacchi

SOR: A Static File Assignment Strategy Immune to Workload Characteristic Assumptions in Parallel I/O Systems ........ 267
  Tao Xie

Scaling Up Genome Similarity Search Services through Content Distribution .......................................................... 275
  Chen Wang, Bing Bing Zhou, Albert Y. Zomaya

SESSION 4A: APPLICATION SYSTEMS AND TOOLS

ANTS: Efficient Vehicle Locating Based on Ant Search in ShanghaiGrid ................................................................. 283
  Hongzi Zhu, Yanmin Zhu, Minglu Li, Lionel M. Ni

Architectural Challenges in Memory-Intensive, Real-Time Image Forming ................................................................. 291
  A. Åhlander, H. Hellsten, K. Lind, J. Lindgren, B. Svensson

Image Reconstruction Using Microwave Tomography for Breast Cancer Detection on Distributed Memory Machine .................................................. 301
  Meilian Xu, Abas Sabouni, Parimala Thulasiraman, Sima Noghanian, Stephen Pistorius

Tempest: A Portable Tool to Identify Hot Spots in Parallel Code ................................................................. 309
  Kirk W. Cameron, Hari K. Pyla, Srinidhi Varadarajan

SESSION 4B: RELIABILITY AND FAULT TOLERANCE

Reliability and Scheduling on Systems Subject to Failures .................................................................................. 317
  Mourad Hakem, Franck Butelle

Fault-Driven Re-scheduling for Improving System-Level Fault Resilience .................................................. 326
  Yawei Li, Prashasta Gujrati, Zhiling Lan, Xian-he Sun

A Meta-learning Failure Predictor for Blue Gene/L Systems .................................................................. 334
  Prashasta Gujrati, Yawei Li, Zhiling Lan, Rajeev Thakur, John White

Deadlock-Free Adaptive Routing in Meshes Based on Cost-Effective Deadlock Avoidance Schemes ............ 342
  Dong Xiang, Yueli Zhang, Yi Pan, Jie Wu

SESSION 4C: JOB SCHEDULING

Analyzing and Minimizing the Impact of Opportunity Cost in QoS-Aware Job Scheduling .............................. 350
  M. Islam, P. Balaji, G. Sabin, P. Sadasayappan

Adaptive Scheduling of Parallel Jobs on Functionally Heterogeneous Resources .............................................. 358
  Yuxiong He, Hongyang Sun, Wen-Jing Hsu
ReSHAPE: A Framework for Dynamic Resizing and Scheduling of Homogeneous Applications in a Parallel Environment
Rajesh Sudarsan, Calvin J. Ribbens

Improving Static Task Scheduling in Heterogeneous and Homogeneous Computing Systems
Chih-Hsueh Yang, PeiZong Lee, Yeh-Ching Chung

SESSION 5A: DISTRIBUTED I/O

High Performance MPI over iWARP: Early Experiences
S. Narravula, A. Mamidala, A. Vishnu, G. Santhanaraman, D. K. Panda

Group-Based Coordinated Checkpointing for MPI: A Case Study on InfiniBand
Qi Gao, Wei Huang, Matthew J. Koop, Dhabaleswar K. Panda

RDMA-Based and SMP-Aware Multi-port All-Gather on Multi-rail QsNetII SMP Clusters
Ying Qian, Ahmad Afsahi

Designing NFS with RDMA for Security, Performance and Scalability
Ranjit Noronha, Lei Chai, Thomas Talpey, Dhabaleswar K. Panda

SESSION 5B: MEASUREMENT AND MODELLING

Performance Predictions for General-Purpose Computation on GPUs
Weiguo Liu, Wolfgang Müller-Wittig, Bertil Schmidt

L2 Cache Modeling for Scientific Applications on Chip Multi-processors
Fengguang Song, Shirley Moore, Jack Dongarra

Dual Processor Performance Characterization for XML Application-Oriented Networking
Jianxun Jason Ding, Abdul Waheed

Evaluation of Transcendental Functions on Imagine Architecture
Xiaobo Yan, Tao Tang, Yu Deng, Jing Du, Xuejun Yang

SESSION 5C: WIRELESS AND SENSOR NETWORKS

MHH: A Novel Protocol for Mobility Management in Publish/Subscribe Systems
Jinling Wang, Jiannong Cao, Jing Li, Jie Wu

On Broadcasting in Wireless Sensor Networks with Irregular and Dynamic Radio Coverage
Li-Chun Hsu, Chung-Ta King, Amit Banerjee

VIRE: Active RFID-Based Localization Using Virtual Reference Elimination
Yiyang Zhao, Yunhao Liu, Lionel M. Ni

Cache Invalidation Strategies for Mobile Ad Hoc Networks
Wenzhong Li, Edward Chan, Yilin Wang, Daoxu Chen

SESSION 6A: COMPILER AND LANGUAGES

Code Compilation for an Explicitly Parallel Register-Sharing Architecture
Alex Gontmakher, Avi Mendelson, Assaf Schuster, Gregory Shklover
An Effective Strategy for Porting C++ Applications on Cell
Ana Lucia Varbanescu, Henk Sips, Kenneth A. Ross, Qiang Liu, Lurung-Kuo Liu, Apostol Natsev, John R. Smith

A Component-Based Coordination Language for Efficient Reconfigurable Streaming Applications
Maik Nijhuis, Herbert Bos, Henri E. Bal

SESSION 6B: PEER-TO-PEER SYSTEMS

A Large-Scale and Decentralized Infrastructure for Content-Based Publish/Subscribe Services
Xiaoyu Yang, Yingwu Zhu, Yiming Hu

Attribute-Based Overlay Network for Non-DHT Structured Peer-to-Peer Lookup
Ming-Tsung Sun, Chung-Ta King, Wen-Hung Sun, Chieh-Ping Chang

Incentive-Driven P2P Anonymity System: A Game-Theoretic Approach
Souvik Ray, Giora Slutzki, Zhao Zhang

SESSION 6C: GRID COMPUTING

Dependency-Aware Maintenance for Dynamic Grid Services
Hai Jin, Li Qi, Song Wu, Yaqin Luo, Jie Dai

A Composition Approach to Mutual Exclusion Algorithms for Grid Applications
Julien Sopena, Fabrice Legond-Aubry, Luciana Arantes, Pierre Sens

Two-Phase Computation and Data Scheduling Algorithms for Workflows in the Grid
Fangpeng Dong, Selim G. Akl

SESSION 7A: WIRELESS NETWORKS

EEGR: Energy-Efficient Geographic Routing in Wireless Sensor Networks
Haibo Zhang, Hong Shen

Three Dimensional Broadcast Protocol for Wireless Networks
Vamsi Paruchuri, Arjan Durresi, Leonard Barolli, Makoto Takizawa

Processing the v-KNN Queries in Wireless Sensor Networks
Yongxuan Lai, Hong Chen, Cuiping Li

On Providing Guaranteed Detectability for Surveillance Applications
Yanmin Zhu, Quanbin Chen, Lionel M. Ni

SESSION 7B: RESOURCE ALLOCATION AND MANAGEMENT

Wavelength Assignment for Directional Hypercube Communications on a Class of WDM Optical Networks
Yawen Chen, Hong Shen

Multiuser Power and Channel Allocation Algorithm in Cognitive Radio
Jiandong Li, Dong Chen, Weiyong Li, Jing Ma
Advanced Flow-Control Mechanisms for the Sockets Direct Protocol over InfiniBand ........................................602
   P. Balaji, S. Bhagvat, D. K. Panda, R. Thakur, W. Gropp

RECN-IQ: A Cost-Effective Input-Queued Switch Architecture with Congestion Management ............................................................................................................................... 610
   Gaspar Mora, Pedro J. Garcia, José Flich, José Duato

SESSION 7C: NETWORK ON CHIPS

Tightly-Coupled Multi-layer Topologies for 3-D NoCs .................................................................620
   Hiroki Matsutani, Michihiro Koibuchi, Hideharu Amano

Communication Modelling of the Spidergon NoC with Virtual Channels .................................................630
   M. Moadeli, A. Shahrabi, W. Vanderbauwhede, M. Ould-Khaoua

Performance Improvement Methodology for ClearSpeed’s CSX600 .................................................638
   Yuri Nishikawa, Michihiro Koibuchi, Masato Yoshimi, Kenichi Miura, Hideharu Amano

Author Index