

Table of Contents

I. Invited Papers

Instruction Level Distributed Processing: Adapting to Future Technology	1
<i>J. E. Smith</i>	
Macroservers: An Object-Based Programming and Execution Model for Processor-in-Memory Arrays	7
<i>Hans P. Zima and Thomas L. Sterling</i>	
The New DRAM Interfaces: SDRAM, RDRAM and Variants	26
<i>Brian Davis, Bruce Jacob and Trevor Mudge</i>	
Blue Gene	32
<i>Henry S. Warren, Jr.</i>	
Earth Simulator Project in Japan — Seeking a Guide Line for the Symbiosis between the Earth and Human Beings – Visualizing an Aspect of the Future of the Earth by a Supercomputer –	33
<i>Keiji Tani</i>	

II. Compilers, Architectures and Evaluation

Limits of Task-Based Parallelism in Irregular Applications	43
<i>Barbara Kreaseck, Dean Tullsen and Brad Calder</i>	
The Case for Speculative Multithreading on SMT Processors	59
<i>Haitham Akkary and Sébastien Hily</i>	
Loop Termination Prediction	73
<i>Timothy Sherwood and Brad Calder</i>	
Compiler-Directed Cache Assist Adaptivity	88
<i>Xiaomei Ji, Dan Nicolaescu, Alexander Veidenbaum, Alexandru Nicolau and Rajesh Gupta</i>	
Skewed Data Partition and Alignment Techniques for Compiling Programs on Distributed Memory Multicomputers	105
<i>Tzung-Shi Chen and Chih-Yung Chang</i>	
Processor Mechanisms for Software Shared Memory	120
<i>Nicholas P. Carter, William J. Dally, Whay S. Lee, Stephen W. Keckler and Andrew Chang</i>	
An Evaluation of Page Aggregation Technique on Different DSM Systems	134
<i>Mario Donato Marino and Geraldo Lino de Campos</i>	

Nanothreads vs. Fibers for the Support
of Fine Grain Parallelism on Windows NT/2000 Platforms146
*Vasileios K. Barekas, Panagiotis E. Hadjidoukas,
Eleftherios D. Polychronopoulos and Theodore S. Papatheodorou*

III. Algorithms, Models and Applications

Partitioned Parallel Radix Sort160
Shin-Jae Lee, Minsoo Jeon, Andrew Sohn and Dongseung Kim

Transonic Wing Shape Optimization Based on Evolutionary Algorithms ...172
Shigeru Obayashi, Akira Oyama and Takashi Nakamura

A Common CFD Platform UPACS182
Hiroyuki Yamazaki, Shunji Enomoto and Kazuomi Yamamoto

On Performance Modeling for HPF Applications with ASL191
*Thomas Fahringer, Michael Gerndt, Graham Riley and
Jesper Larsson Träff*

A “Generalized k-Tree-Based Model to Sub-system Allocation”
for Partitionable Multi-dimensional Mesh-Connected Architectures205
Jeeraporn Srisawat and Nikitas A. Alexandridis

An Analytic Model for Communication Latency in Wormhole-Switched
k-Ary n-Cube Interconnection Networks with Digit-Reversal Traffic218
H. Sarbazi-Azad, L. M. Mackenzie and M. Ould-Khaoua

Performance Sensitivity of Routing Algorithms to Failures
in Networks of Workstations230
Xavier Molero, Federico Silla, Vicente Santonja and José Duato

IV. Short Papers

Decentralized Load Balancing in Multi-node Broadcast Schemes
for Hypercubes243
Satoshi Fujita and Yuji Kashima

Design and Implementation of an Efficient Thread Partitioning
Algorithm252
*José Nelson Amaral, Guang Gao, Erturk Dogan Kocalar,
Patrick O'Neill and Xinan Tang*

A Flexible Routing Scheme for Networks of Workstations260
José Carlos Sancho, Antonio Robles and José Duato

Java Bytecode Optimization with Advanced Instruction
Folding Mechanism268
Austin Kim and Morris Chang

Performance Evaluation of a Java Based Chat System	276
<i>Fabian Breg, Mike Lew and Harry A. G. Wijshoff</i>	
Multi-node Broadcasting in All-Ported 3-D Wormhole-Routed Torus Using Aggregation-then-Distribution Strategy	284
<i>Yuh-Shyan Chen, Che-Yi Chen and Yu-Chee Tseng</i>	
On the Influence of the Selection Function on the Performance of Networks of Workstations	292
<i>J. C. Martínez, F. Silla, P. López and J. Duato</i>	
Combining In-Transit Buffers with Optimized Routing Schemes to Boost the Performance of Networks with Source Routing	300
<i>Jose Flich, Pedro López, Manuel. P. Malumbres, José Duato and Tom Rokicki</i>	
A Comparison of Locality-Based and Recency-Based Replacement Policies	310
<i>Hans Vandierendonck and Koen De Bosschere</i>	
The Filter Data Cache: A Tour Management Comparison with Related Split Data Cache Schemes Sensitive to Data Localities	319
<i>Julio Sahuquillo, Ana Pont and Veljko Milutinovic</i>	
Global Magneto-Hydrodynamic Simulations of Differentially Rotating Accretion Disk by Astrophysical Rotational Plasma Simulator ...	328
<i>Mami Machida, Ryoji Matsumoto, Shigeki Miyaji, Kenji E. Nakamura and Hideaki Tonoooka</i>	
Exploring Multi-level Parallelism in Cellular Automata Networks	336
<i>Claudia Roberta Calidonna, Claudia Di Napoli, Maurizio Giordano and Mario Mango Furnari</i>	
Orgel: An Parallel Programming Language with Declarative Communication Streams	344
<i>Kazuhiko Ohno, Shigehiro Yamamoto, Takanori Okano and Hiroshi Nakashima</i>	
BS λ_p : Functional BSP Programs on Enumerated Vectors	355
<i>Frédéric Loulergue</i>	
Ability of Classes of Dataflow Schemata with Timing Dependency	364
<i>Yasuo Matsubara and Hiroyuki Miyagawa</i>	
A New Model of Parallel Distributed Genetic Algorithms for Cluster Systems: Dual Individual DGAs	374
<i>Tomoyuki Hiroyasu, Mitsunori Miki, Masahiro Hamasaki and Yusuke Tanimura</i>	

V. International Workshop on OpenMP: Experiences and Implementations (WOMPEI)

An Introduction to OpenMP 2.0384
Timothy G. Mattson

Implementation and Evaluation of OpenMP for Hitachi SR8000391
Yasunori Nishitani, Kiyoshi Negishi, Hiroshi Ohta and Eiji Nunohiro

Performance Evaluation of the Omni OpenMP Compiler403
Kazuhiro Kusano, Shigehisa Satoh and Mitsuhsa Sato

Leveraging Transparent Data Distribution in OpenMP
via User-Level Dynamic Page Migration415
*Dimitrios S. Nikolopoulos, Theodore S. Papatheodorou,
Constantine D. Polychronopoulos, Jesús Labarta and Eduard Ayguadé*

Formalizing OpenMP Performance Properties with ASL428
*Thomas Fahringer, Michael Gerndt, Graham Riley and
Jesper Larsson Träff*

Automatic Generation of OpenMP Directives and Its Application
to Computational Fluid Dynamics Codes440
Haoqiang Jin, Michael Frumkin and Jerry Yan

Coarse-Grain Task Parallel Processing Using the OpenMP Backend
of the OSCAR Multigrain Parallelizing Compiler457
Kazuhsa Ishizaka, Motoki Obata and Hironori Kasahara

Impact of OpenMP Optimizations for the MGCG Method471
Osamu Tatebe, Mitsuhsa Sato and Satoshi Sekiguchi

Quantifying Differences between OpenMP and MPI Using
a Large-Scale Application Suite482
Brian Armstrong, Seon Wook Kim and Rudolf Eigenmann

VI. International Workshop on Simulation and Visualization (IWSV)

Large Scale Parallel Direct Numerical Simulation of
a Separating Turbulent Boundary Layer Flow over a Flat Plate
Using NAL Numerical Wind Tunnel494
*Naoki Hirose, Yuichi Matsuo, Takashi Nakamura, Martin Skote and
Dan Henningson*

Characterization of Disorderd Networks in Vitreous SiO₂ and
Its Rigidity by Molecular-Dynamics Simulations on Parallel Computers ...501
Hajime Kimizuka, Hideo Kaburaki, Futoshi Shimizu and Yoshiaki Kogure

Direct Numerical Simulation of Coherent Structure in Turbulent
Open-Channel Flows with Heat Transfer502
Yoshinobu Yamamoto, Tomoaki Kunugi and Akimi Serizawa

High Reynolds Number Computation for Turbulent Heat Transfer in a Pipe Flow	514
<i>Shin-ichi Satake, Tomoaki Kunugi and Ryutaro Himeno</i>	
Large-Scale Simulation System and Advanced Photon Research	524
<i>Yutaka Ueshima and Yasuaki Kishimoto</i>	
Parallelization, Vectorization and Visualization of Large Scale Plasma Particle Simulations and Its Application to Studies of Intense Laser Interactions	535
<i>Katsunobu Nishihara, Hirokazu Amitani, Yuko Fukuda, Tetsuya Honda, Y. Kawata, Yuko Ohashi, Hitoshi Sakagami and Yoshitaka Suzuki</i>	
Fast LIC Image Generation Based on Significance Map	537
<i>Li Chen, Issei Fujishiro and Qunsheng Peng</i>	
Fast Isosurface Generation Using the Cell-Edge Centered Propagation Algorithm	547
<i>Takayuki Itoh, Yasushi Yamaguchi and Koji Koyamada</i>	
Fast Ray-Casting for Irregular Volumes	557
<i>Koji Koyamada</i>	
A Study on the Effect of Air on the Dynamic Motion of a MEMS Device and Its Shape Optimization	573
<i>Hidetoshi Kotera, Taku Hirasawa, Sasatoshi Senga and Susumu Shima</i>	
A Distributed Rendering System “On Demand Rendering System”	585
<i>Hideo Miyachi, Toshihiko Kobayashi, Yasuhiro Takeda, Hiroshi Hoshino and Xiuyi Jin</i>	
Author Index	593

High Performance Computing

Third International Symposium, ISHPC 2000 Tokyo,

Japan, October 16-18, 2000 Proceedings

Valero, M.; Joe, K.; Kitsuregawa, M.; Tanaka, H. (Eds.)

2000, XV, 598 p., Softcover

ISBN: 978-3-540-41128-4