9th Heterogeneous Computing Workshop (HCW 2000)

The 9th Heterogeneous Computing Workshop (HCW 2000) is a forum to discuss latest findings in heterogeneous computing and promising work in progress. Heterogeneous computing systems range from diverse elements within a single computer to coordinated, geographically distributed machines with different architectures. A heterogeneous computing system provides a variety of capabilities that can be orchestrated to execute multiple tasks with varied computational requirements. Applications in these environments achieve performance by exploiting the affinity of different tasks to different computational platforms or paradigms, while considering the overhead of inter-task communication and the coordination of distinct data sources and administrative domains. Such computing systems support information infrastructure and other terms including Cluster Computing and Grid Computing are also used to describe heterogeneous computing. HCW 2000 is co-sponsored by the IEEE Computer Society, through the technical committee of Parallel Processing, and the U. S. Office of Naval Research.

42 submissions were received of which 32 papers were selected for presentation. The papers are grouped into 10 sessions along two parallel tracks. The following is the technical program.

Session 1-A
Grid Environment

Master/Slave Computing on the Grid
Gary Shao and Fran Berman, University of California San Diego, Rich Wolski, University of Tennessee, USA

Heterogeneity as Key Feature of High Performance Computing: the PQE1 Prototype
P.Palazzari, L. Arcipiani, M.Celino, A. Mathis, P. Novelli, and V. Rosato, ENEA - HPCN project, R. Guadagni, ENEA-Funzione Centrale Informatica, Italy

The NRW-Metacomputer - Building Blocks for A Worldwide Computational Grid
Claus Bitten, University of Cologne, Joern Gehring, Paderborn Center for Parallel Computing, U. Schwiegelshohn and R. Yahyapour, University Dortmund, Germany

Session 1-B
Resource Discovery and Management

Agent-Based Resource Discovery
K. Jun, L. Boloni, K. Palacz, and Dan Marinescu, Purdue University, USA

Evaluation of PAM's Adaptive Management Services
Yoonhee Kim, Syracuse University, Salim Hariri, and Muhamad Djunaedi, University of Arizona, USA

Load Balancing Across Near-Homogeneous Multi-Resource Servers
William Leinberger, George Karypis, and Vipin Kumar, University of Minnesota, USA

Session 2-A
Communication and Data Management

Evaluation of Expanded Heuristics in a Heterogeneous Distributed Data Staging Network
Noah B. Beck, H.J. Siegel, Purdue University, Mitchell D. Theys, University of Illinois at Chicago, and Michael Jurczyk, University of Missouri - Columbia, USA

Fast Heterogeneous Binary Data Interchange
Greg Eisenhauer and Lynn K. Daley, Georgia Institute of Technology, USA

A Heuristic Algorithm for Mapping Communicating Tasks on Heterogeneous Resources
Kenjiro Taura and Andrew Chien, University of California San Diego, USA

Design of an Infrastructure for Data-Intensive Wide-Area Applications
Michael D. Beynon, T. Kurc, M. Uysal, A. Sussman, and J. Saltz, University of Maryland, USA

Session 2-B
Modeling and Metrics

Quality of Security Service in a Resource Management System Benefit Function
Tim Levin, Anteon Corporation, Cynthia Irvine, Naval Postgraduate School, USA

Optimizing Heterogeneous Task Migration in the Gardens Virtual Cluster Computer
Ashley Beitz, S. Kent, and Paul Roe, Queensland University of Technology, Australia

Linear Algebra Algorithms in Heterogeneous Cluster of Personal Computers
Jorge Barbosa, J. Tavares, and A. Padilha, FEUP-INEB, Portugal

New Cost Metrics for Iterative Task Assignment Algorithms in Heterogeneous Computing Systems
Raju Venkataramana and N. Ranganathan, University of South Florida, USA

Session 3-A
Theory and Modeling

Task Execution Time Modeling for Heterogeneous Computing Systems
Shoukat Ali, H.J. Siegel, Purdue University, USA, Muthucumaru Maheswaran, University of Manitoba, Canada, and Debra Hengsen, Naval Postgraduate School, USA

Distributed Quasi Monte-Carlo Methods in a Heterogeneous Environment
E. deDoncker, R. Zanny, M. Ciobanu, and Y. Guan, Western Michigan University, USA

Session 3-B
Scheduling I

Scheduling Multi-Component Applications in Heterogeneous Wide-area Networks
Jon B. Weissman, University of Minnesota, USA

Application-Aware Scheduling of a Magnetohydrodynamics Application in the Legion Metasystem
Holly Dail, G. Obertelli, Francine Berman, University of California San Diego, R. Wolski, University of Tennessee, and A. Grimshaw, University of Virginia, USA

Fast and Effective Task Scheduling in Heterogeneous Systems
Andrei Radulescu and A. Gemund, Delft University of Technology, Netherlands

Session 4-A
Grid Applications

Combining Workstations and Supercomputers to Support Grid Applications: The Parallel Tomography Experience
Shava Smallen, W. Cirne, and F. Berman, University of California San Diego, J. Frey, S. Young, and M. Ellisman, National Center for Microscopy and Imaging Research, R. Wolski, University of Tennessee, M. Su and C. Kesselman, Information Science Institute/University of Southern California, USA

Cluster Performance and the Implications for Distributed, Heterogeneous Grid Performance
Craig A. Lee, C. Dematteis, J. Stepanek, and J. Wang, The Aerospace Corporation, USA

A Debugger for Computational Grid Applications
Robert Hood and G. Jost, NASA Ames Research Center, USA

Session 4-B
Resource Management

A Framework for Resource Co-Allocation in Heterogeneous Computing Systems
Ammar Alhusaini, Viktor K. Prasanna, and C.S. Raghavendra, University of Southern California, USA

Heterogeneous Resource Management for Dynamic Real-Time Systems
Eui-Nam Huh and L. Welch, Ohio University, Behrooz Shirazi, C. Cavanaugh, and S. Anwar, University of Texas at Arlington, USA

Dynamic Resource Sharing Mechanisms for High-performance Heterogeneous Clusters
Dimitrios Katramatos, Deepak Saxena, Nehal Mehta, and Steve Chapin, Syracuse University, USA

Session 5-A
Design tools

The Harness PVM-Proxy: Gluing PVM Applications to Distributed Objects Environments and Applications
Mauro Migliardi and Vaidy Sunderam, Emory University, USA

MoBiDiCK: A Tool for Distributed Computing on the Internet
Moez A. Dharsee and Christopher W.V. Hogue, Samuel Lunenfeld Research Institute, Canada

RsdEditor: A Graphical User Interface for Specifying Metacomputer Components
R. Baraglia and D. Laforenza, Instituto del Consiglio Nazionale delle Ricerche, Italy, A. Keller, Paderborn Center for Parallel Computing, Germany, A. Reinefeld, Konrad-Zuse-Zentrum Berlin, Germany

Session 5-B
Scheduling II

Heuristics for Scheduling Parameter Sweep Applications in Grid Environments
Henri Casanova, D. Zagorodnov, and F. Berman, University of California San Diego, A. Legrand, Ecole Normale Superieure de Lyon, France

Parallel Program Execution on a Heterogeneous PC Cluster Using Task Duplication
Yu-Kwong Kwok, University of Hong Kong

Segmented Min-Min: A Static Mapping Algorithm for Meta-tasks on Heterogeneous Computing Systems
Min-You Wu, Wei Shu, and Hong Zhang, University of Central Florida, USA

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