2007 Seventh IEEE International Symposium on Cluster Computing and the Grid

(CCGrid 2007)

Rio de Janeiro, Brazil
14-17 May 2007
# Table of Contents

- **Message from the General Chairs**.............................................xiv
- **Message from the Program Chairs**..........................................xvii
- **Message from the Workshops Chairs**.......................................xix
- **Organizers**................................................................................xxi
- **Program Committee**...................................................................xxii
- **Reviewers**..................................................................................xxiv

## Invited papers

- Toward an International Computer Science Grid..........................3
  Franck Cappello and Henri Bal

## Distributed Storage I

- Redundancy Management for P2P Storage.................................15
  Chris Williams, Philippe Huibonhoa, JoAnne Holliday, Andy Hospodor,
  and Thomas Schwarz

- Design and Implementation of a Middleware for Data Storage
  in Opportunistic Grids...............................................................23
  Raphael Y. de Camargo and Fabio Kon

- Cooperative Caching for Grid Based Data Warehouses.............31
  Frank Dehne, Michael Lawrence, and Andrew Rau-Chaplin

- Active Data: Supporting the Grid Data Life Cycle....................39
  Tim Ho and David Abramson

## Collaboration

- Dynamic Condor-Based Services for Distributed Image Analysis.....49
  Simon Caton, Omer Rana, and Bruce Batchelor

- BBCLB: A Bulletin-Board Based Cooperative Load Balance Strategy
  for Service Grid........................................................................57
  Tianyu Wo, Liang Zhong, Chunming Hu, Jinpeng Huai

- CyberBridges; A Model Collaboration Infrastructure for e-Science.....65
  Heidi L. Alvarez, David Chatfield, Donald A. Cox, Eric Crumpler,
  Cassian D’Cunha, Ronald Gutierrez, Julio Ibarra, Eric Johnson,
  Kuldeep Kumar, Tom Milledge, Giri Narasimhan, S. Masoud Sadjadi,
  and Chi Zhang

- Executing Large Parameter Sweep Applications on a Multi-VO Testbed...73
  Shahaan Ayyub, David Abramson, Colin Enticott, Slavisa Garic,
  and Jefferson Tan
Scheduling I
An On-line Algorithm for Fair-Share Node Allocations
in a Cluster .................................................................83
Lior Amar, Amnon Barak, Ely Levy, and Michael Okun

Dynamic Scheduling with Process Migration .........................92
Cong Du, Xian-He Sun, and Ming Wu

Optimizing Jobs Timeouts on Clusters and Production Grids ..........100
Tristan Glatard, Johan Montagnat, and Xavier Pennec

A Hybrid Linear Programming and Evolutionary Algorithm Based
Approach for On-Line Resource Matching in Grid Environments ....108
Paweł Garbacki and Vijay K. Naik

Semantics, Trust & Incentives
A Semantic Framework for Integrated Asset Management
in Smart Oilfields ..........................................................119
Ramakrishna Soma, Amol Bakshi, and Viktor K. Prasanna

Ontology-Based Semantic Integration Scheme for Medical
Image Grid .................................................................127
Hai Jin, Aobing Sun, Ran Zheng, Ruhao He, and Qin Zhang

Incremental Trust in Grid Computing ................................135
Michael Brinkløv and Robin Sharp

Sustaining Incentive in Grid Resource Allocation: A Reinforcement
Learning Approach ......................................................145
Li Lin, Yu Zhang, and Jinpeng Huai

Replica Management
Hierarchical Replication Control in a Global File System ..........155
Jiaying Zhang and Peter Honeyman

A Predictive Technique for Replica Selection in Grid
Environment ......................................................................163
Rashedur M. Rahman, Ken Barker, and Reda Alhajj

Study of Different Replica Placement and Maintenance Strategies
in Data Grid ......................................................................171
Rashedur M. Rahman, Ken Barker, and Reda Alhajj

Intelligent Scheduling and Replication in Datagrids: a Synergistic
Approach ........................................................................179
Ali Elghirani, Riky Subrata, and Albert Y. Zomaya

Workload and Performance Modeling
Analysis and Synthesis of Pseudo-Periodic Job Arrivals
in Grids: A Matching Pursuit Approach ................................187
Hui Li, Richard Heusdens, Michael Muskulus, and Lex Wolters

Profiling Computation Jobs in Grid Systems ..........................197
Michael Oikonomakos, Kostas Christodouloupolos, and Emmanouel Varvarigos

Build-and-Test Workloads for Grid Middleware: Problem,
Analysis, and Applications ..............................................205
Alexandru Iosup, Dick Epema, Peter Couvares, Anatoly Karp, and Miron Livny
Krzysztof Rzadca, Denis Trystram, and Adam Wierzbicki
A Static Load-Balancing Scheme for Parallel XML Parsing
on Multicore CPUs.......................................................... 351
Yinfei Pan, Wei Lu, Ying Zhang, and Kenneth Chiu

Applications II
Processing Mesoscale Climatology in a Grid Environment.............. 363
R. P. Souto, R. B. Ávila, P. O. A Navaux, M. X. Py, N. Maillard, T. A. Diverio,
H. F. Campos Velho, S. Stephany, A. J. Preto, J. Panetta, E. R. Rodrigues,
E. S. Almeida, P. L. Silva Dias, and A. W. Gandú

Specification-Correct and Scalable Coordination of Scientific
Applications in Grid Environments............................................ 371
Radu Prodan

Distributed Visualization Using VTK in Grid Environments.............. 381
Marcio Dutra, Paulo S. S. Rodrigues, Gilson A. Giraldi, and Bruno Schulze

Online Analysis and Runtime Steering of Dynamic Workflows
in the ASKALON Grid Environment............................................. 389
Radu Prodan

Scheduling III
Scheduling Data-Intensive Workflows onto Storage-Constrained
Distributed Resources...................................................... 401
Arun Ramakrishnan, Gurmeet Singh, Henan Zhao, Ewa Deelman,
Rizos Sakellariou, Karan Vahi, Kent Blackburn, David Meyers,
and Michael Samidi

Scheduling Deadline-Constrained Bulk Data Transfers to Minimize
Network Congestion......................................................... 410
Bin Bin Chen and Pascale Vicat-Blanc Primet

A Distributed Query Execution Engine in a Grid Environment........ 418
Gustavo G. Trevisol, Cristiano Biancardi, Alvaro C. P. Barbosa,
José G. Pereira Filho, Ramon G. Costa, and Evellin S. Cardoso

Scheduling Remote Access to Scientific Instruments
in Cyberinfrastructure for Education and Research.......................... 426
Jie Yin, Junwei Cao, Yuexuan Wang, Lianchen Liu, and Cheng Wu

Reliability & Redundancy
Reliability Analysis of Self-Healing Network Using
Discrete-Event Simulation.................................................... 437
Thara Angskun, George Bosilca, Graham Fagg, Jelena Pješivac-Grbović,
and Jack J. Dongarra

An Efficient and Reliable Scientific Workflow System...................... 445
Tulio Tavares, George Teodoro, Tahsin Kurc, Renato Ferreira, Dorgival
Guedes, Wagner Meira Jr., Umit Catalyurek, Shannon Hastings, Scott Oster,
Steve Langella, and Joel Saltz

Query-Load Balancing in Structured Overlays................................ 453
Anwitaman Datta, Roman Schmidt, and Karl Aberer

A Robust Decentralized Job Scheduling Approach for Mobile
Peers in Ad-hoc Grids...................................................... 461
Karin Anna Hummel and Gerda Jelleschitz
Cluster Technologies I
Understanding the Impact of Multi-core Architecture in Cluster Computing: A Case Study with Intel Dual-Core System.........................471
   Lei Chai, Qi Gao, and Dhabaleswar K. Panda

Hot-Spot Avoidance with Multi-pathing over InfiniBand: An MPI Perspective.................................................................479
   A. Vishnu, M. Koop, A. Moody, A. R. Mamidala, S. Narravula, and D. K. Panda

High-Performance MPI Broadcast Algorithm for Grid Environments Utilizing Multi-lane NICs..................................................487
   Tatsuhiro Chiba, Toshio Endo, and Satoshi Matsuoka

Reducing Connection Memory Requirements of MPI for InfiniBand Clusters: A Message Coalescing Approach.................................495
   Mathew J. Koop, Terry Jones, and Dhabaleswar K. Panda

Performance Modeling and Analysis
Adaptive Performance Modeling on Hierarchical Grid Computing Environments.................................................................505
   Wahid Nasri, Luis Angelo Steffenel, and Denis Trystram

Performance Analysis of Updating Mechanisms for Dynamic Content in Peer-to-Peer Networks..................................................513
   Daniel Villela

Relative Performance of Scheduling Algorithms in Grid Environments........521
   Yang Zhang, Charles Koelbel, and Ken Kennedy

Reparallelization and Migration of OpenMP Programs........................529
   Michael Klemm, Matthias Bezold, Stefan Gabriel, Ronald Veldema, and Michael Phillippsen

Cluster Technologies II
Power Aware Scheduling of Bag-of-Tasks Applications with Deadline Constraints on DVS-enabled Clusters..........................541
   Kyong Hoon Kim, Rajkumar Buyya, and Jong Kim

Virtual Clusters on the Fly---Fast, Scalable, and Flexible Installation.................................................................549
   Hideo Nishimura, Naoya Maruyama, and Satoshi Matsuoka

Integrated Data Reorganization and Disk Mapping for Reducing Disk Energy Consumption..................................................557
   Seung Woo Son and Mahmut Kandemir

STORM: An Approach to Database Storage Management in Clustered Storage Environments..................................................565
   Kaushik Dutta and Raju Rangaswami

Communication Infrastructure & Programming Models
On the Advantages of an Alternative MPI Execution Model for Grids.................................................................575
   A.C. Sena, A.P. Nascimento, J. A. da Silva, D.Q.C. Vianna, C. Boeres, and V.E.F. Rebello

High Performance Distributed Lock Management Services Using
Network-Based Remote Atomic Operations..........................583
S. Narravula, A. Mamidala, A. Vishnu, K. Vaidyanathan, and D. K. Panda
Dynamic Malleability in Iterative MPI Applications...............591
Kaoutar El Maghraoui, Travis J. Desell, Boleslaw K. Szymanski,
and Carlos A. Varela
Collective Interfaces for Distributed Components..................599
Françoise Baude, Denis Caromel, Ludovic Henrio, and Matthieu Morel

Standardization & Services
Genesis II - Standards Based Grid Computing.......................611
Mark M. Morgan and Andrew S. Grimshaw
Standardization of an API for Distributed Resource
Management Systems....................................................619
Peter Tröger, Hrabri Rajic, Andreas Haas, and Piotr Domagalski
A Service-Oriented System to Support Data Integration
on Data Grids..........................................................627
Anastasios Gounaris, Carmela Comito, Rizos Sakellariou, and Domenico Talia
Design of a Scalable Peer-to-Peer Information System Using
the GT4 Index Service..................................................636
Shishir Bharathi and Ann Chervenak

The 6th International Workshop on Agent-Based Grid Computing
Token Exchange System as Incentive Mechanism for the e-Science Grid........649
Arun Anandasivam and Dirk Neumann
Using Jade Agent Framework to Prototype an e-Science Workflow Bus........655
Zhiming Zhao, Adam Belloum, Cees de Laat, Pieter Adriaans,
and Bob Hertzberger
RABC: A Conceptual Design of Pervasive Infrastructure
for Browser Computing based on Ajax technologies..................661
Fumikazu Konishi, Manabu Ishii, Shingo Ohki, Ryo Umemaru,
and Akihiko Konagaya

The 5th International Workshop on Biomedical Computations on the
Grid (BioGrid'07)
Deploying PHYLIP Phylogenetic Package on a Large Scale
Distributed System......................................................673
Nabil Abdennadher and Regis Boesch
Workflow Management in a Protein Clustering Application.................679
J. L. Vázquez-Poletti, E. Huedo, R. S. Montero, and I. M. Llorente
Parameter Sweeps for Functional MRI Research in the "Virtual
Laboratory for e-Science" Project......................................685
Silvia D. Olabarriaga, Aart J. Nederveen, and Breannndán Ó Nualláin
Large Scale Deployment of Molecular Docking Application
on Computational Grid Infrastructures for Combating Malaria..............691
Vinod Kasam, Jean Salzemann, Nicolas Jacq, Astrid Mass, and Vincent Breton
The First International Workshop on Context-Awareness and Mobility in Grid Computing
Mobility-Aware Efficient Job Scheduling in Mobile Grids....................701
  Preetam Ghosh, Nirmalya Roy, and Sajal K Das

A Hierarchical Two-Tier Information Management Architecture for Mobile Ad-Hoc Grid Environments........................................707
  Joachim Zottl, Wilfried N. Gansterer, and Helmut Hlavacs

Impact of the Execution Context on Grid Job Performances...............713
  Tristan Glatard, Diane Lingrand, Johan Montagnat, and Michel Riveill

DICHOTOMY: A Resource Discovery and Scheduling Protocol for Multihop Ad hoc Mobile Grids...........................................719
  Antônio Tadeu A. Gomes, Artur Ziviani, Luciana S. Lima, and Markus Endler

MAPGrid: A New Architecture for Empowering Mobile Data Placement in Grid Environments.............................................725
  Yun Huang, Nalini Venkatasubramanian, and Yang Wang

A Semantic Approach to Enhance Service Composition in Workflows That Use Mobile Services...............................................731
  Robert B. Piotter, T. Kirkham, J. Gallop, I. Johnson, D. Mac Randal, and B Ritchie

The 7th International Workshop on Global and Peer-to-Peer Computing
Characterizing and Classifying Desktop Grid..................................743
  SungJin Choi, HongSoo Kim, EunJoung Byun, MaengSoon Baik,
  SungSuk Kim, ChanYeol Park, and ChongSun Hwang

A Parallel P2P Branch-and-Bound Algorithm for Computational Grids........749
  Ahcène Bendjoudi, Nouredine Melab, and El-Ghazali Talbi

Transparent Symmetric Active/Active Replication for Service-Level High Availability....................................................755
  C. Engelmann, S. L. Scott, C. Leangsuksun, and X. He

Comparison of JXTA and WSRF..................................................761
  Asif Akram and Rob Allan

On the Efficiency and Cost of Introducing QoS in BitTorrent..............767
  Nazareno Andrade, Jaidson Santana, Francisco Brasileiro, and Walfredo Cirne

Requirements of Peer-to-Peer-Based Massively Multiplayer Online Gaming.................................................................773
  Gregor Schiele, Richard Süselbeck, Arno Wacker, Jörg Hähnner,
  Christian Becker, and Torben Weis

The First International Workshop on Programming Models for Grid Computing
GiGi: An Ocean of Gridlets on a "Grid-for-the-Masses"........................783
  Luís Veiga, Rodrigo Rodrigues, and Paulo Ferreira

An Aspect-Oriented Programming Model for Bag-of-Tasks Grid Applications.................................................................789
  Marcio E. F. Maia, Paulo H. M. Maia, Nabor C. Mendonça,
and Rossana M. C. Andrade
Assessing the Quality of Automatically Built Network Representations............................................................795
Lionel Eyraud-Dubois and Martin Quinson

Revisit of View-Oriented Parallel Programming.........................801
Z. Huang and W. Chen

The First Latin American Grid Workshop
Development of a Robust and Flexible WebLab Framework Based on AJAX and Design Patterns........................................811
Ariadne A. Cruz, Fábio A. L. Gomes, Fabryccio A.C.M. Cardoso, Ernesto B. Martin, and Dalton S. Arantes

Bridging the High Performance Computing Gap: the OurGrid Experience......817
Francisco Brasileiro, Eliane Aradjo, William Voorsluys, Milena Oliveira, and Flavio Figueiredo

TVGrid: A Grid Architecture to Use the Idle Resources
on a Digital TV Network....................................................823
Carlos Eduardo Coelho Batista, Tiago Maritan Ugulino de Araújo, Derzu Omaia, Thiago Curvelo dos Anjos, Giuliano Maia Lins de Castro, Francisco Vilar Brasileiro, and Guido Lemos de Souza Filho

Latin American Perspectives on Grid Computing from Bahía Blanca, Argentina..........................................................829
Javier Echaiz and Jorge Ardenghi

Building a Grid in Latin America: The EELA Project e-Infrastructure......835
B. Marechal, P.H. Rausch Bello, and D. Carvalho

A Computer-Aided Diagnostic System Using a Global Data
Grid Repository for the Evaluation of Ultrasound Carotid Images.........840
Marco Antonio Gutierrez, Silvia Helena Gelas Lage, Jasper Lee, and Zheng Zhou

QEF - Supporting Complex Query Applications................................846
Fabio Porto, Vinicius F. V. da Silva, Bruno Schulze, and Fausto V. M. Ayres

Applications Ported to the EELA e-Infrastructure..........................852
B. Marechal, P.H. Rausch Bello, Diego Carvalho, and Rafael Mayo

A Classification for the Implementations of Heterogeneous
Strong Migration of Computations...........................................858
Anolan Milanés, Noemi Rodriguez, and Bruno Schulze

The First IEEE TCSC Doctoral Symposium
Hui Li

PACE: Augmenting Personal Mobile Devices with Scalable Computing........875
Xun Luo

Detecting, Managing and Querying Replicas and Versions
in a Peer-to-Peer Environment..................................................881
Deise de Brum Saccol, Nina Edelweiss, and Renata de Matos Galante

Economy-Based Content Replication for Peering Content Delivery Networks.........................................................887