



Dominik Ślęzak Tai-hoon Kim  
Stephen S. Yau Osvaldo Gervasi  
Byeong-Ho Kang (Eds.)

# Grid and Distributed Computing

International Conference, GDC 2009  
Held as Part of the Future Generation  
Information Technology Conference, FGIT 2009  
Jeju Island, Korea, December 10-12, 2009  
Proceedings

Volume Editors

Dominik Ślęzak  
University of Warsaw and Infobright Inc.  
E-mail: slezak@infobright.com

Tai-hoon Kim  
Hannam University, South Korea  
E-mail: taihoonn@hnu.kr

Stephen S. Yau  
Arizona State University, USA  
E-mail: yau@asu.edu

Oswaldo Gervasi  
University of Perugia, Italy  
E-mail: osvaldo@unipg.it

Byeong-Ho Kang  
University of Tasmania, Australia  
E-mail: bhkang@utas.edu.au

Library of Congress Control Number: 2009939711

CR Subject Classification (1998): C.1.4, C.2.4, C.2.1, D.1.3, D.4.2, D.4.3, E.1, H.2.4, H.3.4

ISSN 1865-0929  
ISBN-10 3-642-10548-3 Springer Berlin Heidelberg New York  
ISBN-13 978-3-642-10548-7 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

springer.com

© Springer-Verlag Berlin Heidelberg 2009  
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India  
Printed on acid-free paper SPIN: 12805679 06/3180 5 4 3 2 1 0

# Foreword

As future generation information technology (FGIT) becomes specialized and fragmented, it is easy to lose sight that many topics in FGIT have common threads and, because of this, advances in one discipline may be transmitted to others. Presentation of recent results obtained in different disciplines encourages this interchange for the advancement of FGIT as a whole. Of particular interest are hybrid solutions that combine ideas taken from multiple disciplines in order to achieve something more significant than the sum of the individual parts. Through such hybrid philosophy, a new principle can be discovered, which has the propensity to propagate throughout multifaceted disciplines.

FGIT 2009 was the first mega-conference that attempted to follow the above idea of hybridization in FGIT in a form of multiple events related to particular disciplines of IT, conducted by separate scientific committees, but coordinated in order to expose the most important contributions. It included the following international conferences: Advanced Software Engineering and Its Applications (ASEA), Bio-Science and Bio-Technology (BSBT), Control and Automation (CA), Database Theory and Application (DTA), Disaster Recovery and Business Continuity (DRBC; published independently), Future Generation Communication and Networking (FGCN) that was combined with Advanced Communication and Networking (ACN), Grid and Distributed Computing (GDC), Multimedia, Computer Graphics and Broadcasting (MulGraB), Security Technology (SecTech), Signal Processing, Image Processing and Pattern Recognition (SIP), and u- and e-Service, Science and Technology (UNESST).

We acknowledge the great effort of all the Chairs and the members of advisory boards and Program Committees of the above-listed events, who selected 28% of over 1,050 submissions, following a rigorous peer-review process. Special thanks go to the following organizations supporting FGIT 2009: ECSIS, Korean Institute of Information Technology, Australian Computer Society, SERSC, Springer LNCS/CCIS, COEIA, ICC Jeju, ISEP/IPP, GECAD, PoDIT, Business Community Partnership, Brno University of Technology, KISA, K-NBTC and National Taipei University of Education.

We are very grateful to the following speakers who accepted our invitation and helped to meet the objectives of FGIT 2009: Ruay-Shiung Chang (National Dong Hwa University, Taiwan), Jack Dongarra (University of Tennessee, USA), Xiaohua (Tony) Hu (Drexel University, USA), Irwin King (Chinese University of Hong Kong, Hong Kong), Carlos Ramos (Polytechnic of Porto, Portugal), Timothy K. Shih (Asia University, Taiwan), Peter M.A. Sloot (University of Amsterdam, The Netherlands), Kyu-Young Whang (KAIST, South Korea), and Stephen S. Yau (Arizona State University, USA).

We would also like to thank Rosslin John Robles, Maricel O. Balitanas, Farkhod Alisherov Alisherovich, and Feruza Sattarova Yusfovna – graduate students of Han-nam University who helped in editing the FGIT 2009 material with a great passion.

October 2009

Young-hoon Lee  
Tai-hoon Kim  
Wai-chi Fang  
Dominik Ślęzak

## Preface

We would like to welcome you to the proceedings of the 2009 International Conference on Grid Distributed Computing (GDC 2009), which was organized as part of the 2009 International Mega-Conference on Future Generation Information Technology (FGIT 2009), held during December 10–12, 2009, at the International Convention Center Jeju, Jeju Island, South Korea.

GDC 2009 focused on various aspects of advances in grid and distributed computing with computational sciences, mathematics and information technology. It provided a chance for academic and industry professionals to discuss recent progress in the related areas. We expect that the conference and its publications will be a trigger for further related research and technology improvements in this important subject.

We would like to acknowledge the great effort of all the Chairs and members of the Program Committee. Out of 100 submissions to GDC 2009, we accepted 29 papers to be included in the proceedings and presented during the conference. This gives roughly a 30% acceptance ratio. Three of the papers accepted for GDC 2009 were published in the special FGIT 2009 volume, LNCS 5899, by Springer. The remaining 26 accepted papers can be found in this CCIS volume.

We would like to express our gratitude to all of the authors of submitted papers and to all of the attendees, for their contributions and participation. We believe in the need for continuing this undertaking in the future.

Once more, we would like to thank all the organizations and individuals who supported FGIT 2009 as a whole and, in particular, helped in the success of GDC 2009.

October 2009

Dominik Ślęzak  
Tai-hoon Kim  
Stephen S. Yau  
Osvaldo Gervasi  
Byeong-Ho Kang

# Organization

## Organizing Committee

General Chairs	Stephen S. Yau (Arizona State University, USA) Osvaldo Gervasi (University of Perugia, Italy)
Program Chairs	Byeong-Ho Kang (University of Tasmania, Australia) Tai-hoon Kim (Hannam University, Korea)

## Program Committee

Albert Zomaya	Gail-Joon Ahn	Minglu Li
Alex Sim	Geoffrey Fox	Mohamed Jemni
Bilha Mendelson	George Bosilca	Mohand-Said Hacid
BongHee Hong	Hai Jin	Nabil Abdennadher
Chao-Tung Yang	Hung-Chang Hsiao	Omer F. Rana
Cho-Li Wang	Hyeong-Ok Lee	Ramin Yahyapour
Chun-His	Jan-Jan Wu	Ronald Perrott
Damon Shing-Min Liu	Jean-Louis Pazat	Ruay-Shiung Chang
Dan Grigoras	Jiannong Cao	Stephane Genaud
Dan Meng	John Cavazos	Susumu Date
Daniel S. Katz	Keecheon Kim	Tomàs Margalef
Danilo Gonzalez	Kenichi Takahashi	Yangwoo Kim
Deok-Gyu Lee	Liria Matsumoto Sato	Yeh-Ching Chung
Dimitrios Serpanos	Marcin Paprzycki	Yong Man Ro
Domenico Laforenza	Marian Bubak	Yongik Yoon
Domenico Talia	Mark Baker	Yong-Kee Jun
Eung Nam Ko	Matt Mutka	

# Table of Contents

Autonomic Management of Object Replication for FT-CORBA Based Intelligent Transportation Systems .....	1
<i>Woonsuk Suh and Eunseok Lee</i>	
Meshlization of Irregular Grid Resource Topologies by Heuristic Square-Packing Methods .....	9
<i>Uei-Ren Chen, Chin-Chi Wu, Sheng-Wun Li, and Woei Lin</i>	
An Architecture and Supporting Environment of Service-Oriented Computing Based-On Context Awareness .....	17
<i>Tianxiao Ma, Gang Wu, and Jun Huang</i>	
Relaxed Time Slot Negotiation for Grid Resource Allocation .....	25
<i>Seokho Son and Kwang Mong Sim</i>	
A Brokering Protocol for Agent-Based Grid Resource Discovery .....	33
<i>Jaeyong Kang and Kwang Mong Sim</i>	
Towards a Better Understanding of Locality-Awareness in Peer-to-Peer Systems .....	41
<i>Hongliang Yu, Guangyu Shi, Jian Chen, Xiongfei Weng, and Weimin Zheng</i>	
Default $\alpha$ -Logic for Modeling Customizable Failure Semantics in Workflow Systems Using Dynamic Reconfiguration Constraints .....	49
<i>Hasan Davulcu, Supratik Mukhopadhyay, Prabhdeep Singh, and Stephen S. Yau</i>	
A Back Propagation Neural Network for Evaluating Collaborative Performance in Cloud Computing .....	57
<i>Biao Song, Mohammad Mehedi Hassan, Yuan Tian, and Eui-Nam Huh</i>	
SCAIMO – A Case for Enabling Security in Semantic Web Service Composition .....	65
<i>Amir Vahid Dastjerdi, Sayed Gholam Hassan Tabatabaei, Wan M.N. Wan Kadir, Suhaimi Ibrahim, and Elahe Sarafian</i>	
Automatic Synthesis and Deployment of Intensional Kahn Process Networks .....	73
<i>Manuel Peralta, Supratik Mukhopadhyay, and Ramesh Bharadwaj</i>	
Extended Heartbeat Mechanism for Fault Detection Service Methodology .....	88
<i>Ahmad Shukri Mohd. Noor and Mustafa Mat Deris</i>	



Trust-Oriented Multi-objective Workflow Scheduling in Grids . . . . .	96
<i>Amit Agarwal and Padam Kumar</i>	
Empirical Comparison of Race Detection Tools for OpenMP Programs . . . . .	108
<i>Ok-Kyoon Ha, Young-Joo Kim, Mun-Hye Kang, and Yong-Kee Jun</i>	
Efficient Service Recommendation System for Cloud Computing Market . . . . .	117
<i>Seung-Min Han, Mohammad Mehedi Hassan, Chang-Woo Yoon, Hyun-Woo Lee, and Eui-Nam Huh</i>	
Scalable Cooperative Positioning System in Wireless Sensor Networks . . . . .	125
<i>Cheolsu Son, Wonjung Kim, Hyun Sim, and Hyeong-Ok Lee</i>	
One-to-One Embedding between Hyper Petersen and Petersen-Torus Networks . . . . .	133
<i>Jung-Hyun Seo, Moon-Suk Jang, EungKon Kim, Kyeong-Jin Ban, NamHoon Ryu, and HyeongOk Lee</i>	
A Dynamic Mobile Grid System for 4G Networks . . . . .	140
<i>Manel Abdelkader and Mohamed Hamdi Noureddine Boudriga</i>	
Authorization Framework for Resource Sharing in Grid Environments . . . . .	148
<i>Jing Jin and Gail-Joon Ahn</i>	
Design and Implementation of a SOA-Based Medical Grid Platform . . . .	156
<i>Chao-Tung Yang, Shih-Chi Yu, and Ting-Chih Hsiao</i>	
RFID-Based Onion Skin Location Estimation Technique in Indoor Environment . . . . .	164
<i>Gihong Kim and BongHee Hong</i>	
Harmonized Media Service Middleware Using to Emotional Knowledge . . . . .	176
<i>Jihye Lee and Yong-Ik Yoon</i>	
A Trust Evaluation Model for Cloud Computing . . . . .	184
<i>Hyukho Kim, Hana Lee, Woongsup Kim, and Yangwoo Kim</i>	
Multiple Reduced Hypercube $MRH(n)$ : A New Interconnection Network Reducing Both Diameter and Edge of Hypercube . . . . .	193
<i>Hyun Sim, Jae-Chul Oh, and Hyeong-Ok Lee</i>	
Embedding Algorithm between $MRH(n)$ and Hypercube . . . . .	206
<i>Hyun Sim, Jae-Chul Oh, and Hyeong-Ok Lee</i>	

Fuzzy Based Approach for Load Balanced Distributing Database on Sensor Network . . . . .	215
<i>Mohammad Zeynali and Mohammad Ali Jamali</i>	
An Ontology-Based Resource Selection Service on Science Cloud . . . . .	221
<i>Hyunjeong Yoo, Cinyoung Hur, Seoyoung Kim, and Yoonhee Kim</i>	
<b>Author Index</b> . . . . .	229