Communications
in Computer and Information Science 169

Archana Mantri Suman Nandi
Gaurav Kumar Sandeep Kumar (Eds.)

High Performance Architecture and Grid Computing

International Conference, HPAGC 2011
Chandigarh, India, July 19-20, 2011
Proceedings

Springer

Volume Editors

Archana Mantri
Suman Nandi
Gaurav Kumar
Sandeep Kumar

Chitkara University
Chandigarh 160 009, India

E-mail:
archana.mantri@chitkara.edu.in
suman.nandi@chitkara.edu.in
gaurav.kumar@chitkara.edu.in
sandeep.mca@chitkara.edu.in

ISSN 1865-0929 e-ISSN 1865-0937
ISBN 978-3-642-22576-5 e-ISBN 978-3-642-22577-2
DOI 10.1007/978-3-642-22577-2
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2011931730

CR Subject Classification (1998): C.2, H.4, I.2, H.3, D.2, J.1, H.5

© Springer-Verlag Berlin Heidelberg 2011
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.
The use of general descriptive names, registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Message from the General Chair

It is indeed a matter of pride that the Department of Computer Applications, Chitkara University, Punjab, in association with the University of Applied Sciences Osnabrück, Germany, has taken a pioneering initiative in organizing and international conference on the highly significant topic of High-Performance Architecture and Grid Computing, HPAGC-2011, along with a one-day workshop on the latest topics in data mining and cloud computing. In the quest for knowledge, we take immense pride in providing a platform for presenting and exchanging current research themes and experiences and fostering a relationship among universities, research institutes, industry and policy makers to take stock of the current developments and have a look into the future trends in this area.

HPAGC 2011 brought together academic scientists, leading engineers, industry researchers and students to exchange and share their experiences and research results in all aspects of high-performance computing, and to discuss the practical challenges encountered and the solutions adopted.

I want to express my sincere gratitude to Springer, for publishing the proceedings of the conference.

It was a privilege to welcome delegates from India and abroad and I would like to thank the organizers for planning this conference in a highly professional manner.

Madhu Chitkara

Message from the Volume Editors

It gives us immense pleasure to present the proceedings of the International Conference on High-Performance Architecture and Grid Computing (HPAGC 2011). Chitkara University is indebted to the University of Applied Sciences Osnabrück, Germany, and Springer for their involvement.

The International Conference on High-Performance Architecture and Grid Computing is structured with the aim of presenting and exchanging current research themes and experiences, and it fosters a relationship among universities, research institutes and industry and policy makers to take stock of the current developments and have a look into the future trends in this area. We received 240 papers from researchers from around the world, and 87 manuscripts were selected after a rigorous review process for publication in the conference proceedings.

We express our appreciation and thanks to the Organizing Committee for making HPAGC 2011 a big success and an achievement for Chitkara University.

Archana Mantri
Suman Nandi
Gaurav Kumar
Sandeep Kumar

Organization

General Chairs

Ashok Chitkara	Chitkara University, India
Madhu Chitkara	Chitkara University, India

Chief Guest

Jaya Panwalkar	Director, nVIDIA, India

Conference Chair

Archana Mantri	Chitkara University, India

Program Chairs

Bhanu Kapoor	President, Mimasic, USA and Chitkara University, India
Suman Kumar Nandi	Chitkara University, India

Technical Chair

Gaurav Kumar	Chitkara University, India

Publicity Chair

Vandana Bajaj	Chitkara University, India

Workshop Chair

Rajni Duggal	Chitkara University, India

Finance Chair

Rashmi Aggarwal	Chitkara University, India

Advisory and Technical Review Committee

Manuel Frutos-Perez	University of the West of England, UK
Sigurd Meldal	San Jose State University, USA
Thierry PRIOL	EIT ICT Labs, France
Michael Uelschen	University of Applied Sciences Osnabrück, Germany
Heinz-Josef Eikerling	University of Applied Sciences Osnabrück, Germany
A.K. Saxena	I.I.T. Roorkee, India
Srikanta Tirthapura	Iowa State University, USA
Sumeet Dua	Louisiana State University Health Sciences Center, New Orleans, USA
T. Meyyappan	Alagappa University, India
C. Lakshmi	SRM University, India
Kumar Padmanabh	Infosys Technologies Ltd., India
Rohit Gupta	Infosys Technologies Ltd., India
K.V. Arya	ABV-IITM, India
Leszek T. Lilien	Western Michigan University, USA
Veena Goswami	KIIT University, India
Dana Petcu	West University of Timisoara, Romania
Louise Perkins	Universiti Sains Malaysia, Malaysia
Sriram Chellappan	Missouri University, USA
Sanjay Madria	Missouri University, USA
Seema Bawa	Thapar University, India
R.K. Bawa	Punjabi University, India
Ashwani Kush	Kurukshetra University, India
Bharat Bhargava	Purdue University, USA
N. Jaisankar	VIT University, India
Amlan Chakrabarti	University of Calcutta, India
Natarajan Meghanathan	Jackson State University, USA
Krishna Kant	George Mason University, USA
Jiannong Cao	Hong Kong Polytechnic University, China
David Peleg	Weizmann Institute of Science, Israel
Maurice Herlihy	Brown University, USA
Elizabeth Buchanan	University of Wisconsin-Stout, USA
Maninder Singh	Thapar University, India
Kawaljeet Singh Chowdhary	Punjabi University, India
Vishal Goyal	Punjabi University, India
Himanshu Aggarwal	Punjabi University, India

Organizing Committee (Chitkara University, Punjab)

Vikram Mangla
Deepika Chaudhary
Nishu Bali
Preetinder Brar
Jaiteg Singh
Vikas Rattan
Vinay Kukreja
Maninderjit Singh Khanna
Nidhi Arora
Sheilini Jindal
Ravita Chahar

Table of Contents

Theme - 1: Grid and Cloud Computing

Era of Cloud Computing 1
Pramod Kumar Joshi and Sadhana Rana

An Overview on Soft Computing Techniques 9
K. Koteswara Rao and G. SVP Raju

A Novel Approach for Task Processing through NEST Network in a Grid 24
Tarun Gupta and Vipin Tyagi

TCP/IP Security Protocol Suite for Grid Computing Architecture 30
Vikas Kamra and Amit Chugh

Security Issues in Cloud Computing 36
Pardeep Sharma, Sandeep K. Sood, and Sumeet Kaur

Classification of Software Quality Attributes for Service Oriented Architecture 46
Satish Kumar, Neeta Singh, and Anuj Kumar

Energy Efficiency for Software and Services on the Cloud 52
Priyanka Bhati, Prerna Sharma, Avinash Sharma, Jatin Sutaria, and M. Hanumanthapa

Evaluation of Grid Middleware Frameworks for Execution of MPI Applications 56
Abhishek Jain and Sathish S. Vadhiyar

Virtualization as an Engine to Drive Cloud Computing Security 62
Jyoti Snehi, Manish Snehi, and Rupali Gill

Multi-dimensional Grid Quorum Consensus for High Capacity and Availability in a Replica Control Protocol 67
Vinit Kumar and Ajay Agarwal

Efficient Task Scheduling Algorithms for Cloud Computing Environment 79
S. Sindhu and Saswati Mukherjee

"Cloud Computing: Towards Risk Assessment" 84
Bharat Chhabra and Bhawna Taneja

Efficient Grid Scheduling with Clouds 92
L. Yamini, G. LathaSelvi, and Saswati Mukherjee

Security Concerns in Cloud Computing 103
Puneet Jai Kaur and Sakshi Kaushal

Cloud Computing – The Future 113
Vinay Chawla and Prenul Sogani

Cloud Computing: A Need for a Regulatory Body 119
Bikramjit Singh, Rizul Khanna, and Dheeraj Gujral

Clustering Dynamic Class Coupling Data to Measure Class Reusability Pattern 126
Anshu Parashar and Jitender Kumar Chhabra

Cloud Computing in Education: Make India Better with the Emerging Trends 131
Sunita Manro, Jagmohan Singh, and Rajan Manro

Enhancing Grid Resource Scheduling Algorithms for Cloud Environments 140
Pankaj Deep Kaur and Inderveer Chana

Development of Efficient Artificial Neural Network and Statistical Models for Forecasting Shelf Life of Cow Milk Khoa – A Comparative Study 145
Sumit Goyal, A.K. Sharma, and R.K. Sharma

QoS for Grid Systems 150
Vandana and Tamanna Sehgal

Creating Information Advantage in Cloudy World 154
Ravita Chahar and Vikram Mangla

Theme - 2: High Performance Architecture

Design of CMOS Energy Efficient Single Bit Full Adders 159
Manoj Kumar, Sujata Pandey, and Sandeep K. Arya

Exploring Associative Classification Technique Using Weighted Utility Association Rules for Predictive Analytics 169
Mamta Punjabi, Vineet Kushwaha, and Rashmi Ranjan

Bio-enable Security for Operating System by Customizing Gina 179
Swapnaja A. Ubale and S.S. Apte

A Destination Capability Aware Dynamic Load Balancing Algorithm for Heterogeneous Environment 186
Sharma Rajkumar, Kanungo Priyesh, and Chandwani Manohar

Reliable Mobile Agent in Multi – Region Environment with Fault Tolerance for E-Service Applications 192
M. Vigilson Prem and S. Swamynathan

Composition of Composite Semantic Web Services Using Abductive Event Calculus 201
D. Paulraj and S. Swamynathan

Ant Colony Optimization Based Congestion Control Algorithm for MPLS Network 214
S. Rajagopalan, E.R. Naganathan, and P. Herbert Raj

Low Power Optimized Array Multiplier with Reduced Area 224
Padma Devi, Gurinder Pal Singh, and Balwinder Singh

Simulink Library Development and Implementation for VLSI Testing in Matlab 233
Gurinder Pal Singh and Balwinder Singh

Processing of Image Data Using FPGA-Based MicroBlaze Core 241
Swagata Samanta, Soumi Paik, Shreedeep Gangopadhyay, and Amlan Chakrabarti

Parametric Analysis of Zone Routing Protocol 247
Rani Astya, Parma Nand, and S.C. Sharma

Vision of 5G Communication 252
Mohd. Maroof Siddiqui

Secure Satellite Images Transmission Scheme Based on Chaos and Discrete Wavelet Transform 257
Musheer Ahmad and Omar Farooq

Computational Analysis of Availability of Process Industry for High Performance 265
Shakuntla, A.K. Lal, and S.S. Bhatia

A Preprocessing Technique for Recognition of Online Handwritten Gurmukhi Numerals 275
Rajesh Kumar Bawa and Rekha Rani

A Framework for Vulnerability Analysis during Software Maintenance 282
Jitender Kumar Chhabra and Amarjeet Prajapati

Performance Optimization for Logs of Servers 288
M. Vedaprakash, Ramakrishna Alavala, and Veena R. Desai

Ontology Based Information retrieval for Learning Styles of Autistic People 293
Sanchika Gupta and Deepak Garg

Analyze the Performance of New Edge Web Application's over N-Tiers Layer Architecture 299
Pushpendra Kumar Singh, Prabhakar Gupta, S.S. Bedi, and Krishna Singh

Self-Configurable Scheduling Algorithm for Heterogeneous Computing Systems 306
A. PrashanthRao and A. Govardhan

Performance Analysis of Proposed Maes Cryptographic Techniques 316
Richa Kalra, Ankur Singhal, Rajneesh Kaler, and Promila Singhal

Analysis of Core-Level Scale-Out Efficiency for OpenMP Programs on Multi-core Processors 322
Sareh Doroodian, Nima Ghaemian, and Mohsen Sharifi

SQLIVD - AOP: Preventing SQL Injection Vulnerabilities Using Aspect Oriented Programming through Web Services 327
V. Shanmughaneethi, Ra. Yagna Pravin, C. Emilin Shyni, and S. Swamynathan

Analysis and Study of Incremental K-Means Clustering Algorithm 338
Sanjay Chakraborty and N.K. Nagwani

Computational Model for Prokaryotic and Eukaryotic Gene Prediction 342
Sandeep Kaur, Anu Sheetal, and Preetkanwal Singh

Detection of Malicious Node in Ad Hoc Networks Using Statistical Technique Based on CPU Utilization 349
Deepak Sharma, Deepak Prashar, Dalwinder Singh Salaria, and G. Geetha

Optimum Controller for Automatic Generation Control 357
Rahul Agnihotri, Gursewak Singh Brar, and Raju Sharma

Abstraction of Design Information From Procedural Program 364
R.N. Kulkarni, T. Aruna, and N. Amrutha

Design of an Intelligent and Adaptive Mapping Mechanism for Multiagent Interface 373
Aarti Singh, Dimple Juneja, and A.K. Sharma

Autonomous Robot Motion Control Using Fuzzy PID Controller 385
Vaishali Sood

A Multiresolution Technique to Despeckle Ultrasound Images 391
Parvinder Kaur and Baljit Singh

Theme - 3: Information Management and Network Security

Design and Analysis of the Gateway Discovery Approaches in MANET 397
Koushik Majumder, Sudhabindu Ray, and Subir Kumar Sarkar

Wireless Sensor Network Security Research and Challenges: A Backdrop 406
Dimple Juneja, Atul Sharma, and A.K. Sharma

Automated Test Case Generation for Object Oriented Systems Using UML Object Diagrams 417
M. Prasanna and K.R. Chandran

Dead State Recovery Based Power Optimization Routing Protocol for MANETs (DSPO) 424
Tanu Preet Singh, Manmeet Kaur, and Vishal Sharma

On the Potential of Ricart-Agrawala Algorithm in Mobile Computing Environments 430
Bharti Sharma, Rabinder Singh Bhatia, and Awadhesh Kumar Singh

Analysis of Digital Forensic Tools and Investigation Process 435
Seema Yadav, Khaleel Ahmad, and Jayant Shekhar

Evaluation of Normalized Routing Load for MANET 442
Sunil Taneja and Ashwani Kush

Reliabilty and Performance Based Resource Selection in Grid Environment 449
Rajesh Kumar Bawa and Gaurav Sharma

Elliptic Curve Cryptography: Current Status and Research Challenges 455
Sheetal Kalra and Sandeep K. Sood

SBFDR: Sector Based Fault Detection and Recovery in Wireless Sensor Networks 461
Indrajit Banerjee, Prasenjit Chanak, and Hafizur Rahaman

Study and Analysis of Incremental Apriori Algorithm 470
Neeraj Kumar Sharma and N.K. Nagwani

Energy Aware and Energy Efficient Routing Protocol for Adhoc Network Using Restructured Artificial Bee Colony System 473
B. Chandra Mohan and R. Baskaran

Implementing Key Management for Security in Ad Hoc Network 485
Avinash Sharma, Narendra Agarwal, Satyabrata Roy, Ajay Sharma, and Pankaj Sharma

Performance Evaluation of MAC- and PHY-Protocols in IEEE 802.11 WLAN 490
Vishal Sharma, Jagjit Malhotra, and Harsukhpreet Singh

Key Authentication for MANET Security 497
Vijay Kumar, Rakesh Sharma, and Ashwani Kush

Biometric Encryption: Combining Fingerprints and Cryptography 505
Mini Singh Ahuja and Sumit Chabbra

Node Architectures and Its Deployment in Wireless Sensor Networks: A Survey 515
Sumit Kushwaha, Vinay Kumar, and Sanjeev Jain

New Innovations in Cryptography and Its Applications 527
Saurabh Sharma and Neeraj Kumar Mishra

Competitive Equilibrium Theory and Its Applications in Computer Science 539
J. Ujwala Rekha, K. Shahu Chatrapati, and A. Vinaya Babu

A Novel Approach for Information Dissemination in Vehicular Networks 548
Rakesh Kumar and Mayank Dave

Understanding the Generation of Cellular Technologies 557
Manjit Sandhu, Tajinder Kaur, Mahesh Chander, and Anju Bala

Evaluation of Routing Schemes for MANET 568
Sima Singh and Ashwani Kush

Fuzzy Logic Based Routing Algorithm for Mobile Ad Hoc Networks 574
Sonia Gupta, P.K. Bharti, and Vishal Choudhary

Analysis of Security and Key Management Schemes for Authenticated Broadcast in Heterogeneous Wireless Sensor Networks 580
P. Kalyani and C. Chellappan

Simulative Analysis of Bidirectional WDM/TDM-PON Using NRZ and RZ Downstream Signals and Narrowband AWG 588
Rajniti, Anita Suman, Anu Sheetal, and Parveen Kumar

Data Mining Techniques for Prefetching in Mobile Ad Hoc Networks ... 594
Naveen Chauhan, L.K. Awasthi, and Narottam Chand

An Image Steganography Approach Based upon Matching 603
Sukhpreet Kaur and Sumeet Kaur

From Calculus to Number Theory Paves Way to Break OSS Scheme 609
G. Geetha and Saruchi

Digital Image Watermarking Technique Based on Dense Descriptor 612
Ekta Walia and Anu Suneja

Novel Face Detection Using Gabor Filter Bank with Variable Threshold 617
P.K. Suri, Ekta Walia, and Amit Verma

When to Stop Testing 626
Ajay Jangra, Gurbaj Singh, Chander Kant, and Priyanka

An Efficient Power Saving Adaptive Routing (EPSAR) Protocol for Mobile Ad Hoc Networks (MANETs) 631
Ajay Jangra, Nitin Goel, Chander Kant, and Priyanka

Agile Software: Ensuring Quality Assurance and Processes 640
Narinder Pal Singh and Rachna Soni

Measure Complexity in Heterogeneous System 649
Kuldeep Sharma

Author Index 657