# Preface

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**Biographical notes:** Leonard Barolli received his BE and PhD from Tirana University and Yamagata University in 1989 and 1997, respectively. Presently he is a Full Professor at Fukuoka Institute of Technology. He has published more than 250 papers in refereed journals, books and international conference proceedings. He has served as a Guest Editor for many international journals. He has chaired several international conferences and workshops. He is the Steering Committee Chair of CISIS International Conference. His research interests include network traffic control, ad-hoc networks, sensor networks, web-based applications and P2P systems. He is a member of SOFT, IPSJ and IEEE.

Fatos Xhafa received his PhD in Computer Science from the Technical University of Catalonia (UPC), Spain, in 1998. He is currently Associate Professor and member of the ALBCOM Research Group of the Department of Languages and Informatic Systems (UPC). His current research interests include parallel algorithms, combinatorial optimisation, meta-heuristics, distributed programming, Grid and P2P computing. He has served as Organising Chair of ARES-2008, PC Chair of CISIS-2008 and General Co-Chair of HIS-2008 conferences held in Barcelona. Presently, he is PC Co-Chair of AINA-2010 and General Co-Chair of CISIS-2010. He is also member of the editorial boards of several international journals.

Grid and P2P computing technologies have emerged as new paradigms for solving complex problems by enabling large-scale aggregation and sharing of computational, data and other geographically distributed resources. The research topics related to the Grid and P2P computing are recent and require the investigation of many issues. Among the most important issues are:

- The effective harnessing of internet connected resources. Grid and P2P systems are large-scale systems. Benefiting from the large amount of resources is not straightforward and requires the development of new methods and techniques, for the efficient discovery and allocation of resources.
- Service discovery and deployment: many Grid and P2P-based applications are offered through services, following the web services pattern. Again, the efficient discovery and deployment of application and services is an issue in Grid and P2P systems.

These issues are nowadays real challenges to the development of Grid and P2P-based large distributed systems and applications.

This special issue follows the Second Workshop on P2P, Parallel, Grid and Internet Computing (3PGIC-2008) held at the Technical University of Catalonia in Barcelona, Spain, on 4–7 March, 2008. It comprises eight papers carefully selected based on their originality, significance, technical soundness and clarity of exposition. The papers describe advances – from theory and practice – in efficient resource and service management for Grid and P2P systems.

In the first paper, Pop and Cristea present a communication model for decentralised meta-scheduler in Grid environments in order to achieve fault-tolerant, adaptive and efficient schedulers. Their model is based on agents, and therefore the communication protocol between agents and the proposed structure for agents are described. The approach is validated in practice through experimental study using cluster Grids.

Vilajosana et al. in the second paper consider the efficiency of the resource allocation problem, in which computational efficiency is viewed as economical efficiency by creating incentives to resource providers aiming to develop nearly optimal resource allocation frameworks. The authors have tried to homogenise scenarios with multiple market mechanisms, by providing a bidding specification language.

In the third paper, Abdelkader and Broeckhove investigate the pricing of resources in dynamic grids based on a computational commodity market of CPU resources. Prices of resources are determined based on achieving supply-and-demand equilibrium. The approach has been validated in practice through simulations.

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The fourth paper, by Gianuzzi et al. addresses the need to efficiently manage a large number of distributed and mobile entities, when considering problems such as resource discovery or the realisation of networked virtual environments. A scalable partitioning technique of the entity space, based on Voronoi diagrams, is showed to be appropriate for a variety of distributed applications that exhibit a dynamically changing topology.

Lázaro et al. in the fifth paper propose an architecture and mechanisms for deploying services in a decentralised contributory system. The resources contributed by the members of the community are used to host the services deployed in it, while achieving scalability, decentralisation, fault tolerance, load-balancing and self-properties.

In the sixth paper, Pujol et al. introduce a content-based pub/sub system for P2P systems that avoids building a specific overlay for the pub/sub system by using the rendezvous model to meet both events and subscribers. The work evidences that this model is suitable for high-dimensional pub/sub domains, requiring very low memory capacity to run subscription and event notification processes.

The seventh paper, by Mehdi et al. builds on a previous parallel B&B algorithm for distributed systems using the farmer-worker paradigm. The authors propose a new P2P approach inspired from the strategies of existing P2P systems with the objective to enhance the efficiency of the P2P implementation by avoiding redundant exploration of nodes in the B&B tree. The authors have validated the efficiency of their approach by solving the single-objective flow-shop problem benchmarks using 500 processors belonging to the French national grid, Grid'5000.

Galizia et al. in the last paper, address the issue of how to make Grid systems useful in practice for many users for solving their complex problems. The authors have shown how a Grid approach could be useful for solving real problems from bioinformatics community, more precisely, the problem of the efficient processing of images obtained through the Tissue MicroArray (TMA) technique. A grid framework is developed for TMA analysis that allows the selection of the TMA images and their efficient and concurrent analysis on the Grid.

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