Editorial

Santi Caballé

Department of Computer Science, Multimedia and Telecommunication,
Open University of Catalonia,
Rambla Poblenou, 156, 08018 Barcelona, Spain
E-mail: scaballe@uoc.edu

Biographical notes: Santi Caballé received his PhD, Masters and Bachelors in Computer Science from the Open University of Catalonia (Barcelona, Spain). Since 2003 he has been an Assistant Professor and in 2006 he became an Associate Professor at the Open University of Catalonia teaching a variety of online courses in Computer Science in the area of software engineering. He has been involved in the organisation of several international conferences, conference tracks and workshops, and has published over 50 research contributions as books, book chapters, and international journal and conference papers. He has also acted as an editor for books and special issues of international journals. His research focuses on distributed and grid and peer-to-peer technologies, e-learning and collaborative and mobile learning, and software engineering.

Autonomic computing is becoming a key research field in large-scale distributed systems. Indeed, the increasing complexity of grid and P2P systems yield many issues and challenges as for the effective, efficient and secure management, scheduling and utilisation of the huge amount of computing resources available in these systems.

The goal of this special issue is to present innovative research from academics, professionals and practitioners about problems and solutions related to efficient techniques for autonomic computing in grid and P2P systems from the resources scheduling, and management perspective.

This special issue follows the 3rd 3PGIC-2009 (Third International Workshop on P2P, Parallel, Grid and Internet Computing), held 16–19 March 2009, Fukuoka Institute of Technology, Japan, in conjunction with: International Conference on Complex, Intelligent and Software Intensive Systems (CICIS-2009) (available at http://www.cisis-conference.eu/cisis2009).

The special issue comprises seven papers carefully selected based on their originality, significance, technical soundness, and clarity of exposition. A rigorous research methodology has been required, as well as a review of existing literature and adequate reference to bibliographical sources. All papers were selected with the aim to make both empirical and theoretical contributions based on models, designs, and experiences on the scope of this special issue.

The papers in this special issue are organised as follows:

From the autonomic resource scheduling perspective, the first paper of this special issue presents a dynamic resource scheduling in large scale distributed systems based on real-time monitoring of the nodes of the network.

From the autonomic resource management perspective, the three next papers present the benefits of resource management for several purposes in large-scale distributed

environments. From this view, the second paper of this special issue proposes an agent-based resource self-stabilisation system for distributed management of large-scale virtual organisations while the third paper provides a self-controlled-based framework that supports auction mechanisms for trading grid resources in distributed marketplaces. The fourth contribution incorporates dynamic autonomic computing for providing self-controlled pervasive services in wireless mobile environments.

From the autonomic resource utilisation perspective, the three last papers present initiatives to improve the resource utilisation in distributed networks. The fifth paper in this special issue proposes an effective back-up system for network file systems that mirrors data in real time while the sixth paper provides a failure-aware and error detection data transfer scheduling framework for the improvement of file data transfer. Finally, the last paper presents an approach for improving security in pure peer-to-peer networks.

In particular, the seven papers face the following issues and challenges:

In the first paper, Pop et al. (2010) describe an architecture for dynamic scheduling in large scale distributed systems, and in particular grid systems, in order to perform task allocation on the fly as the application executes. The architecture is based on monitoring of the nodes of the distributed infrastructure and focuses on performance as an essential issue to enable real-time dynamic scheduling.

Pournaras et al. (2010), in the second paper, propose an agent-based self-stabilisation system for global resource utilisation in large-scale virtual organisations. The approach considers individual local knowledge and coordination, and uses adaptations to stabilise the ever dynamic behaviour of the resource management systems.

In the third paper, Vilajosana et al. (2010) present an autonomic-oriented auction framework for the self-deployment, configuration and execution of different auction mechanisms so as to enable the trading of grid resources in heterogeneous and dynamic distributed marketplaces. Their approach is described from the design principles to the architecture and implementation issues.

In the fourth paper, Ou et al. (2010) address the issues involved in dynamic autonomic computing in mobile wireless contexts. To this end, their approach proposes an autonomic computing environment that provides deployment, configuration and healing mechanisms for self-controlled pervasive services.

Nishimura et al. (2010) propose, in the fifth paper, an effective back-up system for network file systems that mirrors data in real time onto more than one server and avoid the risk of data corruption. Their approach also offers flexible and fast back-up by offering dynamic allocation of the mirroring functionalities and providing faster throughput than conventional mirroring.

In the sixth paper, Balman and Kosar (2010) investigate the applicability of early error detection and error classification of data transfer in distributed environments. As a result, they present a framework for failure-aware data transfer scheduling to improve and enhance data transfer operations and decision making of data transfer schedulers.

In the last paper, Arnedo and Herrera (2010) present an approach to protect the core of the JXTA's protocols. The aim is to offer secure peer-to-peer computing while keeping a pure peer-to-peer model by increasing the security of JXTA-based networks and avoiding the current centralisation of a trusted external party or established trust relationship between peers.

Acknowledgements

The editor of this special issue wish to thanks the referees who have carefully reviewed the papers and gave useful suggestions and feedback to the authors. I hope that the readers will find this special issue useful in their research. Finally, I would like to thank Prof. Fatos Xhafa (Technical University of Catalonia) and Michal Kratky for the opportunity to edit this special issue. The editor acknowledges the support of the Spanish MCyT TIN2008-01288/TSI.

References

Pop, F., Dobre, C., Stratan, C., Costan, A. and Cristea, V. (2010) 'Dynamic meta-scheduling architecture based on monitoring in distributed systems'.

Pournaras, E., Warnier, M. and Brazier, F.M.T. (2010) 'Local agent-based self-stabilisation in global resource utilisation'.

Vilajosana, X., Krishnaswamy, R., Marquès, J.M., Juan, A., Navarro, L. and Lázaro, D. (2010) 'A self-* auction server: design principles, architecture and implementation'.

Ou, S., Yang, K. and Zhu, H. (2010) 'Dynamic algorithms for autonomic pervasive services in mobile wireless environments'.

Nishimura, S., Sano, M. and Ikeda, K. (2010) 'Implementation of a stackable file system for real-time network backup'.

Balman, M. and Kosar, T. (2010) 'Error detection and error classification: failure awareness in data transfer scheduling'.

Arnedo, J. and Herrera, J. (2010) 'XML-based security for JXTA core protocols'.