Editorial

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Biographical notes: Ching-Hsien (Robert) Hsu is currently a Professor of the Department of Computer Science and Information Engineering at Chung Hua University, Taiwan. His research interest is primarily in parallel and distributed computing, cloud and grid computing. He has published more than 150 academic papers in journals, books and conference proceedings. He was awarded four times as annual outstanding researcher and distinguished award in 2008 for excellence in research from Chung Hua University. He is serving in a number of journal editorial boards, edited more than 20 international journal special issues and served many international conferences as various chairs and committee members. He is a Member of Phi Tau Phi Scholastic honour society; IEEE Senior Member, executive committee of IEEE TCSC, the executive committee of Taiwan Association of Cloud Computing.

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Jiannong Cao is currently a Professor and Acting Head in the Department of Computing at Hong Kong Polytechnic University. His research interests include mobile and pervasive computing, computer networking, and parallel and distributed computing. He has published over 300 papers in the related areas. He is a Senior Member of China Computer Federation, a Senior Member of the IEEE, and a Member of ACM. He is the Coordinator in Asia of the Technical Committee on Distributed Computing (TPDC) of IEEE Computer Society. He has served editorial boards of several international journals, including *IEEE Transactions on Parallel and Distributed Systems*, *Pervasive and Mobile Computing Journal*, *Peer-to-Peer Networking and Applications and JCST*. He has also served committees for many conferences, including INFOCOM, PERCOM, ICDCS, RTSS, SRDS, ICC, GLOBECOM, and WCNC.

Cloud and Pervasive Computing (CPC) has emerged rapidly as an exciting new paradigm that offers a challenging model of cyber-physical systems and poses fascinating problems regarding distributed resource management, ranging from resource virtualisation, information sharing to cooperative computing. This special issue is intended to foster state-of-the-art research in the area of CPC including the topics of algorithm development, implementation and execution on real-world cloud architecture and novel applications associated with this new paradigm.

This special issue includes one extended version of the best paper originally presented at the 10th International Symposium on Pervasive Systems, Algorithms and Networks, held at Kaohsiung, Taiwan, and four regular papers selected from 25 submissions, comprising a 16% acceptance rate. The five papers included in this special

issue demonstrate the effectiveness and efficiency of a variety of technologies and applications in different areas of CPC. All of them not only contribute valuable insights and results but also have particular relevance to the cloud and services computing community. They also present high-quality results for tackling problems arising from the ever-growing cloud and pervasive technologies.

The first paper by Hyeong S. Kim, Dong In Shin, Young Jin Yu, Hyeonsang Eom and Heon Y. Yeom in their paper entitled 'Systematic approach of using Power Save Mode for cloud data processing services' introduces software techniques for service-level power saving. The main idea is that each of the services provided by servers, such as web servers and application servers, has its own PSM. They also studied the performance of the MapReduce jobs with low-power machines and proposed a practical system design of the power save mode for data-processing services. Experimental results show that the proposed system significantly reduces the network usage and the elapsed time for the power save mode.

The second paper by Wu-Chun Chung, Yi-Hsiang Lin, Kuan-Chou Lai, Kuan-Ching Li and Yeh-Ching Chung entitled 'A self-adaptive resource index and discovery system in distributed computing environments' proposes a self-adaptive resource index and discovery system, named SARIDS for large-scale distributed resource sharing systems with heterogeneous resources and with different sharing policies, to achieve load balancing by adopting a two-tier architecture based on structured P2P overlay. The sampling-based mechanism is proposed to balance the load in the inter-overlay, and a leave-rejoin-style protocol based on a random-walk approach is presented for the intra-overlay load balancing. The experimental results show that SARIDS supports multi-attribute range queries with well scalability and good load balance, and works well even in a non-uniform distribution of peer ranges.

The third paper by Wesley Emeneker and Amy Apon entitled 'Characterising the performance of cache-aware placement of virtual machines on a multi-core architecture' presents an investigation of performance-impacting machine-level events, comparing the Xen virtual machine with native Linux, and using knowledge of the underlying CPU cache architecture to improve relevant cache behaviour. Several machine-level events are gathered, including translation lookaside buffer misses and cache misses. Results from the experiments show that cache-aware virtual machine placement has a significant impact on scientific applications.

The fourth paper by Lizhe Wang, Gregor von Laszewski, Jiaqi Zhao and Jie Tao, entitled 'Resource management of distributed virtual machines', addresses the problem of scheduling distributed virtual machines in SOA environment. The authors developed a Multi-Dimensional Scheduling Algorithm (M-DSA) for task scheduling on virtual machines in which the parallel task model is studied. Compared with resource allocation in the traditional parallel and distributed system, virtual machines contain more properties for scheduling, for example, CPU, memory, storage and software licenses must also be considered within the scheduling algorithm. Simulation results show that the proposed technique has good improvement compared with the Random Resource Allocation Algorithm (RRAA). A test case, bio-sequence alignment application, running on a real SOA environment scheduled with M-DSA is also presented.

The last paper by Jan-Jan Wu, Hung-Jui Chang, Yu-Fan Ho and Pangfeng Liu entitled 'Scheduling of variable-time jobs for distributed systems with heterogeneous processor cardinality' addresses the problem of scheduling jobs with different release time and execution time, to machines with heterogeneous processor cardinality. A dynamic programming method and heuristic algorithms to find the optimal schedules is presented in this study. Experimental results suggest that some of the heuristics not only compute the answer efficiently but also provide good solution.

All of the above-mentioned papers address either technologies issues in CPC systems or propose novel application models in the various CPC fields. They also trigger further related research and technology improvements in application and services of CPC. Honourably, this special issue serves as a landmark source for education, information and reference to professors, researchers and graduate students interested in updating their knowledge about or active in application models for CPC systems.

Finally, we hope you will enjoy reading these selected papers as we did and you will find this issue informative and helpful in keeping yourselves up-to-date in the fast changing field of the "Cloud Computing era".