J Supercomput (2006) 36: 199–200
DOI 10.1007/s11227-006-8292-3

GUEST EDITORIAL

Foreword

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Welcome to the special issue on New Trends in Parallel and Distributed Computing and Networking, The Journal of Supercomputing. In recent years, parallel/distributed processing and networking have become a key technology which will play an important part in determining and shaping future research and development activities in many academic and industrial branches.

The stated goal of this special issue is to provide a forum for computer scientists and engineers, applied mathematicians and researchers to present and exchange ideas, results, work in progress and experience of research in the area of parallel and distributed computing and networking.

The special issue is in conjunction with the 2004 International Symposium on Parallel and Distributed Processing and Applications (ISPA-04) held in Hong Kong on December 13–15, 2004. There were more than 380 paper submissions from 19 countries and regions. All submissions were reviewed by at least three referees. It is extremely difficult to select the papers for the special issue because there were so many excellent and interesting submissions. Based on the referee reports, a total of eight revised papers from the proceedings of ISPA-04 were selected for inclusion in the special issue. All of them were the best paper candidates. We believe all of these papers and topics will not only provide novel ideas, and state-of-the-art techniques in this field, but also stimulate the future research activities in the area of parallel and distributed processing with applications.

The special issue is mostly contributed from the researchers in Eastern Asia: four papers are from Hong Kong, 2 papers from Japan, one from Taiwan and finally, one from Singapore.

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In the first paper, Dr. Lin et al. studied I/O sever placement for optimizing parallel I/O performance on switch-based clusters, which typically adopt irregular network topologies to allow construction of scalable systems with incremental expansion capability. The second paper presented an effective scheme for clustering a huge data set using a PC cluster system, in which each PC is equipped with a commodity programmable graphics processing unit (GPU). In the third paper, Dr. Xiao et al. proposed a novel cooperative system for producing warning of Distributed Denial-of-Service (DDoS) attacks. The system consists of a client detector and a server detector. The authors also showed the false alarm probability of the detection scheme, which is insensitive to false alarms when using specially designed evaluation functions. In the fourth paper, the authors presented the design of a grid-enabled service oriented framework for facilitating the construction of scalable Distributed Virtual Environment (DVE) systems on computing grids. They also proposed a service component called "gamelet", whose distinctive mark is its high mobility for supporting dynamic load sharing. Dr. Kwong and Dr. Tsang proposed a congestion-aware search protocol for unstructured P2P networks in the fifth paper. Their proposed protocol consists of three parts: Congestion-Aware Forwarding, Random Early Stop and Emergency Signaling. The sixth paper proposed a novel dynamic cache size tuning model called CACHE_{RP}, which leverages the relative object popularity as the sole parameter for dynamic cache size tuning. By adaptively maintaining the given hit ratio, it effectively reduces the end-to-end information retrieval roundtrip time (RTT) and frees more bandwidth for sharing. In the seventh paper, the authors considered the problem of survivable routing in dynamic WDM networks with single link failure model. Their main contribution is to dynamically determine a protection cycle to establish a dependable lightpath with backup paths sharing. Finally, in the eighth paper, Dr. Xavier et al. presented a theoretical analysis of the problem of job traffic burstiness on resource allocation performance in order to elicit the general job management strategies to be employed.

We would like to express our sincere appreciation to all authors for their valuable contributions and to all referees for their cooperation in completing the hard work and putting in the long hours to review each paper in a timely and professional way. We would like to thank Professor Hamid Arabnia for his encouragement and patience in assisting us for this special issue.