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## Preface

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**Biographical notes:** Makoto Takizawa is a Professor in the Department of Computer and Information Science, Seikei University. He was a Professor and the Dean of the Graduate School of Science and Engineering, Tokyo Denki University. He was a Visiting Professor at GMD-IPSI, Keele University, and Xidian University. He was on the Board of Governors and a Golden Core member of IEEE CS and is a fellow of IPSJ. He received his DE in Computer Science from Tohoku University. He chaired many international conferences like IEEE ICDCS, ICPADS, and DEXA. He founded IEEE AINA. His research interests include distributed systems and computer networks.

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Various types of computers from personal computers to supercomputers are interconnected in communication networks and can provide a high-performance communication. In addition, the network speed is increasing very fast and by using optical networks a transmission speed in range of Terabit per second (Tb/s) for wired networks and 100 Megabit per second (Mb/s) for wireless networks can be achieved. Computing models are also changing to new

architecture like Grid computing systems and Peer-to-Peer (P2P) computing models. For this reason, it is significant to discuss how to design and realise high-performance computation models and applications for parallel and distributed systems.

This special issue on high performance computing in parallel and distributed systems is organised from the high-quality papers presented at the 11th IEEE International

Conference on Parallel and Distributed Systems (ICPADS-2005) and ten workshops in conjunction with ICPADS-2005, which were successfully held at Fukuoka Institute of Technology (FIT), Fukuoka, Japan, 20–22 July, 2005 and covered the various aspects of architectures, algorithms, communication protocols, and applications of parallel and distributed systems. The ICPADS-2005 International Conference received 331 paper submissions and every paper was reviewed carefully by at least three reviewers based on their quality, originality, and significance. Based on the review results, 118 papers were accepted for presentation. During ICPADS-2005 ten workshops were held and a total of 140 papers were accepted. All the authors of ICPADS-2005 conference and workshops were encouraged to submit their revised manuscripts to this special issue and 20 submissions were received. The papers were reviewed carefully by at least two reviewers based on technical quality and suitability to the special issue as well as the journal. Finally, ten high-quality papers were selected and revised based on reviewers comments.

In the first paper, Haovi Wan et al. proposed a network topology optimisation mechanism for unstructured P2P overlay networks. The proposed mechanism uses the local topology information considering the characteristics of underlying physical links. Through simulations, the authors showed that the proposed mechanism is effective to decrease the average hop counts between any pair of peer nodes for various scale P2P overly networks.

The second paper written by Andrzej M. Goscinski and Adam K.L. Wong showed that concurrent execution of parallel and sequential applications on a non-dedicated cluster improves the execution performance of parallel applications. Through the experiments, the authors showed the load balancing exploiting load information and process migration is an effective scheduling scheme to make concurrent execution of parallel applications with sequential application feasible.

In distributed collaborative editing systems with replicated architecture, reconciliation of editing actions generated from the user interfaces of different editors for the consistency maintenance is a critical issue. The third paper written by Haifeng Shen and Suiping Zhou proposed a three-layer architecture to bridge the semantic gap between editing actions generated from the editor user interface and editing operations that are used to represent these actions.

In the fourth paper, David Carrera et al. introduced a novel web server architecture that combines the best aspects of both the multithreaded and the event-driven architectures to create a server model that offers an improved performance in terms of user session completions without losing the natural ease of programming characteristic of the multithreading paradigm. Then, the

authors showed the implementation and evaluation of the proposed scheme.

The fifth paper written by B.H. Yu and P. Werstein proposed the design and implementation of a novel home-based software Distributed Shared Memory (DSM) system named Lazy Home-based Scope Consistency (LHScC). Through some performance evaluations, authors showed the LHScC is more scalable than other DSM systems such as TreadMarks and removes the home assignment problem in the conventional home-based protocol.

In the sixth paper written by Valbona Barolli et al. is proposed an evaluation model for marketable quality and profitability of corporations. The authors applied the real values of some leading manufacturing corporations in Japan to the proposed model to analyse its accuracy. From the analysis, the authors concluded that the theoretical and real standard values of the marketable quality indicator were both 0.6. In addition, authors showed that the proposed model gives a good approximation of economic trends of Japanese corporations.

The seventh paper written by Shyh-Chang Liu et al. described the problem of designing a scalable query process for Multimedia on Demand (MoD) system. Then, the authors proposed a business model that shares contents by integrating P2P technique and Sharable Content Object Reference Model (SCORM) concepts. The authors showed the proposed algorithm yields high search effectiveness in P2P environments through some experimental results.

In the eighth paper, Takuya Tojo and Makoto Takizawa proposed the novel Two-Phase Slow Start (TPSS) data transmission procedure where the transmission rate is increased by transmitting more redundant packets without increasing application data. In addition, authors newly proposed the Synchronous Transmission Procedure (STP) to high-speed multimedia group communications where a process receives packets from multiple processes. The authors evaluated the STP and TPSS protocols by comparing with the traditional approaches.

Admission and congestion control mechanisms are integral parts of the design and provision of Quality of Service (QoS) in interconnection networks. The ninth paper written by Shihang Yan et al. investigated the admission and congestion control mechanisms for InfiniBand networks in cluster-based computing systems. Then, the authors showed an improved Link-by-Link (LL) admission control algorithm and proposed an effective source response function called Power Increase and Power Decrease (PIPD), which adopts the rate control to reduce congestion of multiple-class traffic in InfiniBand networks.

In the last paper written by Akio Koyama et al. is proposed and evaluated a QoS multicast routing algorithm based on Genetic Algorithm (GA). Then, authors evaluated

the performance of the proposed routing protocol via computer simulations. From the simulation results, authors concluded that the proposed algorithm has better search success ratio and computation time for both cases compared with the conventional algorithm.

We hope that this special issue will lead to a better understanding on parallel and distributed systems. As we conclude this overview, we would like to thank all the

authors for submitting their papers, and express our great thank to all the reviewers for their good work to make it possible to publish this special issue.

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