

Editor's Introduction: Parallel and Distributed Operating Systems

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This special section of the *Journal of Information Processing* hosts a collection of papers on the subject of Parallel and Distributed Operating Systems. The papers in this special section are selected from those presented at the third Computer System Symposium held at the University of Tokyo in March 26-27, 1991 by the Special Interest Group on Operating Systems (SIGOS), Information Processing Society of Japan. The Computer System Symposia are forums for reporting results of a wide range of operating systems research. The scope of the third Symposium was limited to topics relating to parallel and distributed operating systems in which there has been growing interest in recent years. Many active practitioners of operating systems contributed submissions to the Symposium. The goal of this special section is to encourage publication of their recent works and to present readers of the *Journal of Information Processing* with a comprehensive view of the status of their investigations.

There were fourteen papers submitted to the Symposium; two of them are invited papers from AT & T Unix International and the Open Software Foundation. Each of the Symposium papers (in Japanese or English) was reviewed by two members of the program committee for the Symposium, and its improved version (in English) was again reviewed by at least two referees for this special section through the regular review process of the *Journal of Information Processing*. A total of seven papers have been selected for this special section: There are six regular (contributed research) papers and one invited paper.

The first three papers address the design of operating systems for distributed systems. The first paper, "Design of the XERO Open Distributed Operating System," by Kato, Inohara, Narita, Chiba and Masuda, describes the design of a flexible programming model and operating system mechanisms for thread and storage management for heterogeneous distributed systems. The second paper, "A Proposal for an Operating System Designed for Cluster Servers," by Tago, Negishi and Hoshiba, presents the design of cluster servers. It describes the design of hardware and communication protocol for high-speed data transfer and the design of a distributed file system implemented by using these mechanisms. The third paper, "An Operating System for the Intellectual Distributed Processing System—An Object Oriented Approach Based on Broadcast Communication," by Seki, Hasegawa, Okataku and Tamura, describes the object-oriented design of a transparent distributed operating system based on reliable broadcast communication.

The next two papers deal with the design of multiprocessor operating systems. In "A Local Operating System for the A-NET Parallel Object-Oriented Computer," Yoshinaga and Baba describe the design of a parallel computer and its operating system which support concurrent object-oriented computation. In "A Message-Pool-Based Parallel Operating System for the Kyushu University Reconfigurable Parallel Processor—Parallel Creation of Multiple Threads," Tsunedomi, Hukuda, Murakami and Tomita propose the mechanism for extracting parallelism of the operating system kernel for shared memory multiprocessor systems and measure the performance of various thread creation schemes by using a simulation technique.

The sixth paper, "Parametric Analysis of Optimal Static Load Balancing in Distributed Computer Systems," by Zhang, Kameda and Shimizu, is concerned with the performance analysis of static load balancing. It discusses the solutions of overall and individually optimal policies and shows that there exists a striking parallelism between the solutions of two policies.

The final paper, "Microkernel Operating System Architecture and Mach," by Black, Golub, Julin, Rashid, Draves, Dean, Forin, Barrera, Tokuda, Malan and Bohman, is an invited paper. It describes the design features of the Mach microkernel, its use to emulate other operating systems (e.g. Unix, MS-DOS) and the current status of the system development at the Carnegie Mellon University and the Open Software Foundation.

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