Cluster Computing using High-Speed Networks Special Issue Guest Editorial

August 24, 2000

Cluster-based computing has become an area of serious interest due to the availability of high-end workstation class processors and high-speed networks as commodity components. High performance computing over networked computers is increasingly gaining popularity leading to commodity supercomputing. Computer applications are increasingly making use of multimedia contents rich with data, voice and video. To support cluster computing with multimedia traffic, the networking architecture, which is at the backbone of cluster computing paradigm, needs to support efficient transportation of voice and video in addition to traditional data types at very high speed. Several high speed networking technologies that are capable of handling such requirements, e.g., Myrinet, Gigabit Ethernet and ATM networks, have emerged in the recent years. The aim of this special issue is to bring together original work from both academia and industry on issues related to cluster computing with high speed networks.

Out of all the submissions we received for this special issue, we have selected five papers that we thought will be of relevance to the researchers working in this area. The first paper entitled "Information Retrieval on an SCI-Based PC Cluster" discusses an information retrieval system implemented on a PC cluster with internet usage in mind. The authors observed a speed up of 500when the performance of this efficient parallel processing model is compared to a traditional MPI-based information retrieval system.

"Object Clustering for High Performance Parallel Computing" elaborates on a new parallel programming environment called DOVE aimed at cluster computing environments. The implementation provides an easy to use interface for the end users while exploiting the parallel working environment to the maximum.

"Asynchronous Transfer Mode and other Network Technologies for Wide Area and High Performance Cluster Computing" shares the authors experiences in constructing local and wide area clusters based on ATM networking. They discuss the DISCWorld problem solving environment created to handles large latencies encountered while workstations in a cluster are connected by WANs.

"Fault Tolerant Parallel Scheduling of Tasks on a Heterogeneous High Performance Workstation Cluster" addresses the issue of task scheduling. Authors propose a new approach called Cluster Based Search that promises to exploit the synergy obtained in the clustered environment while attempting to solve the problem on hand.

Most of the cluster computing structures developed these days use Windows NT environment on Intel or Alpha processors, "An Assessment of MPI Environment for Windows NT" evaluates the characteristics of these two processor environments for MPI architecture. Paper presents several benchmark results.

Thus, in our opinion, the selected papers cover as broad a range of topics as possible within the area of cluster computing using high speed networks. We hope that the research community finds this special issue of use and interest. We would like to thank the editor of the Journal of Supercomputing, Dr. Hamid Arabnia for giving us an opportunity to edit this issue. We would also like to thank the referees listed at the end for their time and energy during the evaluation process.

On related front we are pleased to mention the formation of a IEEE Task Force on Cluster Computing (TFCC) due to growing interest in cluster computing. TFCC is acting as a focal point and guide to the current cluster computing community and has been actively promoting the field of cluster computing with the aid of a number of novel projects. For example TFCC has an educational activity that has a book donation programme, holds forums for informal discussion, helps guide R&D work both in academic and industrial settings through workshops, symposiums and conferences. Further information on TFCC can be accessed from the Task Force web site: http://www.ieeetfcc.org We hope you will find this special issue interesting. Happy reading!

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