Cluster Computing using High-Speed Networks
Special Issue Guest Editorial

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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 500 when 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 environ-
ment 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 Assess-
ment of MPI Environment for Windows NT” evaluates the characteris-
tics 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 don-
ation programme, holds forums for informal discussion, helps guide
R&D work both in academic and industrial settings through work-
shops, symposiums and conferences. Further information on TFCC can
be accessed from the Task Force web site: http://www.ieetfcc.org We
hope you will find this special issue interesting. Happy reading!

**Guest Editors**

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