

Using Communication Reduction Techniques to Improve Throughput in High-Performance Networks

Dr. David Surma

Department of Computer and Information Sciences

Indiana University South Bend

www.cs.iusb.edu

ABSTRACT

This proposal seeks support for the study and development of new techniques to improve throughput in High-Performance Networks by reducing the inherent communication overhead. To meet today's computing needs high performance computing solutions are increasingly being used. While using multiple processing elements has been successful in reducing the computation time, the overall processing time has not been reduced proportionally. This is due to the overhead incurred by allocating portions of the processing (control and data) to multiple processing elements. This movement of information is typically accomplished by passing messages and constitutes the communication overhead. While much research has centered on the allocation of tasks to the processing elements, substantially less work has focused on the effects of the underlying message passing. Therefore, this research presents techniques to reduce the communication overhead (thereby improving the throughput) by scheduling these message transmissions. The expected results include a new scheduling framework that is adaptable to interconnection networks, networks of workstations, mobile networks, the Internet and other architectures.