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Demonstration of Parallel Processing Computing: A Scalable Linux Personal Computer Cluster Approach

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ABSTRACT

In this paper, we describe an innovative approach to teaching parallel computing concepts in a lab setting using a master and slave cluster of Pentium PCs strapped together using Scyld Corporation's Beowulf software, applying a straightforward, custom written prime number test analytical program. This classroom based parallel processing application serves to illustrate three useful topics for the advanced decision sciences student: 1) the Linux operating system and programming concepts, 2) Beowulf cluster computing, and 3) the importance of Linux based parallel processing using low level PCs to solve complex computing applications. It is likely that the results described here can be replicated at low cost in most academic computing environments, yielding enhanced student understanding and ownership of previously less accessible information systems programming concepts. Further, learning the described cluster computing technology tool may build improved problem solving skills for students faced with large, non-trivial computational requirements. Finally, we believe that the demonstrated approach is inherently scalable, thus, deploying this method in larger and larger clusters would be additionally instructive.

Keywords: Parallel Processing Computing, Linux Platform, Scalable Personal Computer Cluster