

# Scalable Cluster Computing-- opportunities and challenges

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## Abstract

*Cluster computing would appear to offer a viable alternative to current supercomputing offerings from vendors. In fact, several major institutions have adopted scalable clusters either as mainline computing platforms, as capacity engines, or as risk-reducing alternatives to vendor-supplied solutions. I will discuss the successes and shortcomings of cluster efforts to date in the field of High Performance Supercomputing. In particular I will review one major effort built initially on Compaq Alpha processors, Myrinet interconnect hardware, Linux and custom communications, libraries and system integration and management software. This project, Cplant, at Sandia National Laboratories has created a virtual supercomputing environment that nearly duplicates the look, feel and stability of a massively parallel supercomputer such as Intel's ASCI TFlops and Cray's T3E machines. Cplant has been released under GNU public license and has been downloaded by nearly 1000 users as of 8/1/01.*

*In this talk I will concentrate on what makes a "good" supercomputer for engineering and scientific applications and evaluate the current state and outlook for scalable clusters as a competitive approach for scalable supercomputing. This will be done largely in the context of the Cplant initiative. Finally I will mention some successes with scalable clustering in other areas such as bio-informatics and visualization of terascale and petascale datasets.*