A Xen-based Paravirtualization System toward Efficient High Performance Computing Environments

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Abstract

A virtual machine provides platforms to install an OS within another OS which provides resources. It can be accomplished to construct a computational cluster system on a single machine. The real cluster with machines provides full utilization of its resource for users while a virtual machine assigns the resources of the host to residing OSs. Xen is such kind of virtual machine to construct the virtualization system. It is chosen to be our system's virtual machine monitor because it provides better efficiency, supports different operating system work simultaneously, and gives each operating system an independent system environment. The performance of the virtualization system is examined by comparing with a non-virtualization system which is a real cluster system. The experiments show less power consumption and better computing efficiency by executing programs such as matrix multiplication, LINPACK, lower-upper triangular and Primes test sets. The results show better choices of constructing a large-scaled computing system using a virtual machine.

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