Commodity Cluster Using Single System Image Based on Linux/Kerrighed for High-Performance Computing

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Abstract	Commodity Information Technology (IT) infrastructure, including hardware, software, and networking, is commonly used in computing facilities, such as computer laboratory. Unfortunately, the infrastructure in that particular place need to be updated and upgraded regularly to cater to the demands of users and applications for more and more computing resources, especially in scientific computation. The existing infrastructure can be utilized to tackle the issue by forming it into cluster computing. We report our exploration results in constructing Vincster, a low-cost and scalable commodity cluster for high-performance computing (HPC) to utilize the existing IT infrastructure in a computer laboratory. The cluster uses one additional computer to serve as a head node containing a Single System Image (SSI) Operating System (OS) based on Linux with Kerrighed as the kernel-level SSI support, along with middleware and application softwares that build up the SSI approach. Vincster has been constructed and implemented with 7 SSI key services/features utilizing 17 compute nodes from 20 available computers. We evaluated computational performance of the cluster by running parallel matrix multiplication program.
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