



Scalable Computing Software Laboratory

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Model and Incarnate Virtual Environments

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Abstract

Newly developed distributed environments, such as Grid, enable the sharing of network resources among widely distributed users and institutions. They have shown an unprecedented potential but have not been a popular choice in most commercial applications. In an actual commercial environment, customers often require a more secure, stable, and specialized computing environment than current Grid environments can provide. Virtual Machine (VM) technology has been identified as the technology to provide customers personalized virtual environments in a shared cyberspace. However, VM was first developed in 1970s. It provides virtualization but does not well adapt to the dynamics of cyberspace, where computing resources are heterogeneous and their availability varies with time. VM needs to be instantiated dynamically in a general distributed environment. In this study we address two of the most fundamental issues to generate a VM dynamically: VM modeling and incarnation. We first introduce a VM Description (VMD) script to define the hardware and software configuration of the VM. Then, a parser is implemented to parse the VMD script. Finally, a VM Instantiation service is designed to instantiate the VM dynamically according to the VMD script. We implemented and tested our designs with CPU2000 benchmark package. Experimental results show that our approach is feasible and works well.

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