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Dynamic Management of Virtual Appliances with the OpenNebula Engine

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Grid users often require specific versions of different software components (e.g. operating system, libraries or post-processing utilities). The cost of the installation, configuration and maintenance of user-specific or VO-specific worker nodes limits the flexibility of the infrastructure, and so the adoption of Grid computing. OpenNebula is the name of a new open-source technology that transforms a physical infrastructure into a virtual infrastructure by dynamically overlaying VMs over physical resources. So computing services, such as working nodes managed by existing LRMs (Local Resource Managers) like SGE, Condor, OpenPBS..., could be executed on top of the virtual infrastructure; so allowing a physical cluster to dynamically execute multiple virtual clusters. The separation of resource provisioning, managed by OpenNebula, from job execution management, managed by existing LRMs, provides important benefits, such as cluster consolidation, high availability, support for planned maintenance and changing capacity availability, performance partitioning, protection against malicious use of resources... Regarding user interaction, its main benefit is the support for heterogeneous workloads with multiple (even conflicting) software requirements, allowing the execution of software with strict requirements as jobs that will only run with a specific version of a library or legacy application execution. Consequently, this approach provides the flexibility required to allow Grid sites to execute on-demand VO-specific working nodes and to isolate and partition the physical resources.

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