The WNoDeS Cache Manager, an efficient method to self-allocate virtual resources

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**WNoDeS as IaaS**

WNoDeS relies on batch systems for VM provisioning.

The broker actor is the same batch system in charge for the policies. Virtual Machine pre-allocation optimize provisioning the VM.

As a result of cache hit the wait for the batch system is cleared and is only required a brief configuration process to provide a VM.

Despite of the fact WNoDeS currently provides facilities as a cloud IaaS solution, it can be easily extended toward a Paas model.

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**Introduction**

The WNoDeS software framework uses virtualization technologies to provide access to a common pool of dynamically allocated computing resources. WNoDeS can process batch and interactive requests, in local, Grid and Cloud environments.

A problem of resource allocation in cloud environments is the time it takes to actually allocate the resource and make it available to customers. WNoDeS, for its resource scheduling and allocation tasks, uses an underlying batch system. The time to allocate resources is therefore dictated by this batch system, by its configuration, and by site-specific peculiarities.

Depending on site policies and configurations, the allocation time could therefore be in the order of several minutes; while this is perhaps acceptable for traditional Cloud instantiations via a Web interface, it is normally not for interactive allocation of virtual resources.

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**Cache strategy**

The CM has been designed to speed up the allocation of virtual machines.

The CM keeps a cache of ready-to-use virtual machines, matches them to user requirements, verifying if the request is compatible with a VM in the cache having same O.S., architecture and resources (disk space, cpu core and ram) making them readily available for consumption.

The VM in the cache had been previously allocated by wnodes CM over the batch system. When the request resource is not available (cache miss) it is directly scheduled to the batch system.

A number of resource allocation strategies can be chosen and the dimension of the cache is configurable to balance resource consumption and availability.

A static configuration of VM defined by the admin and a LRU strategy (last recently used) are already implemented, but different techniques can simply be added.

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**Conclusions**

The adoption of the WNoDeS CM speeds up considerably resource allocation, thereby significantly improving user experience in the self-allocation of virtual nodes used for Cloud computing, or for the self-instantiation of machine pools used, for example, for physics analysis.

The wait necessary to obtain a virtual resource passing through the queue of the batch system is not easily predictable and his highly dependent by the load of the the farm. However, even in best condition the speedup provided by the CM changes the order of magnitude from minutes to seconds. This delay is intrinsically due to batch system notification.

Recently WNoDeS has been included into the EMI stack (http://www.eu-emi.eu/) and the Cache Manager component will be released as a future upgrade.

For further details please visit http://web.infn.it/wnodes