

WNoDeS: how virtualization can get both users and resource center administrators satisfied

Description of the work

WNoDeS integrates Grid and Cloud provisioning through virtualization. Resource brokering is done through a tight integration with an LRMS, allowing flexible policies to access resources; since these are allocated through an LRMS regardless of the requested interface, sites can enrich their offerings with IaaS provisioning exploiting current assets, know-how and tools. Also, static partitioning can be avoided, allowing optimization of resource utilization.

Grid jobs can be run on VMs using a GLUE Schema attribute to specify virtual image name and characteristics such as RAM or cores. For VM instantiation an API (being made compliant to the OCCI 1.1 specification) and a CLI are provided.

A WNoDeS feature called mixed mode allows using physical resources as both traditional batch nodes and, at the same time, as HVs for VM instantiation. This lets sites to introduce features such as VM and cloud computing support on traditional resources without disrupting existing services and allows to efficiently decide which workloads are to be virtualized and which should be run instead on non-virtual hardware.

The demo will show how WNoDeS was used to support some real use cases:

- how a virtual image is managed, how a user can ask that jobs be executed on a VM running a given image and how mixed mode supports on the same box jobs requiring a virtual environment and jobs that don't. This will be applied to a case describing the work to support the Auger experiment through an adaptation of their exp. framework involving DBs accessed from and encapsulated in VMs.

- how WNoDeS can run Grid jobs on custom VMs for the WeNMR project. Their CING (Common Interface for NMR structure Generation) sw has many external dependencies making it suitable for a virtual set up. The demo will show how the VCING machine is instantiated and how a selection mechanism allows WeNMR users to run jobs on the VM.
- how it is possible to directly instantiate VMs using the OCCI API and the WNoDeS CLI.

Link for further information

<http://web.infn.it/wnodes>

<http://wiki.italiangrid.it/twiki/bin/view/Cloud/WebHome>

Wider impact of this work

WNoDeS has been in production use at INFN Tier-1 site, at CNAF, Bologna, for over three years and has been installed at several Italian centers. Scalability of the WNoDeS LRMS-based brokering system has been demonstrated for several thousands of concurrent virtual machines running millions of production jobs. WNoDeS 2, the latest version, has been released as part of the EMI-2 distribution and further developments are already planned to improve the product. In particular, we expect important new features related to flexible support of dynamic virtual networks and to the integration of third party solutions to implement intercloud operations to be introduced. WNoDeS characteristics like OCCI support, mixed mode and integration with local and Grid computing, demonstrated through real use cases in this session, will allow a seamless introduction of virtual and Cloud computing services into existing centers, extending the customer base and optimizing resource exploitation.

Printable Summary

The demo will show how the WNoDeS virtualization framework was applied to real use cases. In particular, how WNoDeS can be used to introduce Cloud-based services and to support custom VMs for local and Grid

users alike. The demo is based on actual production usage at the INFN Tier-1 CC at CNAF, Bologna and describes how WNoDeS has fulfilled the needs of 2 important user communities:

- the Auger astro-particle physics experiment;
- a use case part of the WeNMR e-infrastructure.

It will also show how direct instantiation of VMs can be accomplished through an OCCI-compliant CLI.

Finally, it will show how the WNoDeS mixed mode feature can be used to efficiently decide which workloads are to be virtualized and which instead should be run on non-virtual hardware. This lets the centers to progressively introduce virtualization technologies and related services without disrupting existing customers and, at the same time, achieving maximum exploitation of the available computing resources.

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Track Classification: Virtualised Resources: challenges and opportunities (Michel Drescher: track leader)