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## AppPot: bridging the Grid and Cloud worlds

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### Conclusions

AppPot has already seen quite some user interest, and the first usage experiences in SMSCG have gotten positive feedback and show that this interest is growing.

We expect much more widespread adoption, now that AppPot supports all the most popular virtualization techniques, and runs indifferently in Grid- and Cloud-based infrastructures.

We believe that AppPot can be an effective construction ingredient infuture mixed Grid/Cloud infrastructures.

### Impact

AppPot is already used in production within the Swiss National Grid Infrastructure (SMSCG, part of NGL\_CH) to support applications from several scientific domains like meteorology, economics, and computational chemistry, and in general to ease Grid deployment and support of user-developed code.

In a similar vein, it has also been successfully used by the COMPCHEM VO on NGL\_IT resources for running computational chemistry workflows comprising software developed in-house at the University of Perugia.

An AppPot-based compute node VM has been used in the Swiss project VM-MAD to provide elastic expansion of a local clusters using virtualised computing hardware drawn from the EC2 infrastructure.

### URL

<http://apppot.googlecode.com/>

### Description of the Work

AppPot's current incarnation is a Debian-based VM, that has been optimized for optimal startup time (9s from VM launch to payload start). The VM supports either console-mode interactive usage, or batch-mode non-interactive job execution.

Indeed, the AppPot VM is complemented by a set of scripts that provide a way to start an AppPot VM and run a specified command into it, all from the command-line. This makes it possible to use AppPot VMs as regular non-interactive batch-mode jobs.

AppPot also features a snapshot-based mechanism that is used to reduce bandwidth usage in Grid job submission: a "base" image can be deployed to execution sites by the software administrator, and then users can send the "differences" with their own development version. The AppPot runtime automatically merges in the changes upon startup, so that users' jobs are executed in an environment equivalent to the one used by the users.

## Overview (For the conference guide)

AppPot is a system for creating Linux virtual machines that can run with most virtualization software (KVM, Xen, VirtualBox and UML are supported) plus a set of scripts for controlling the execution of noninteractive computational programs in the VM.

Indeed, thanks to the use of “User-Mode Linux” virtualization, AppPot VMs can run on Grid clusters as regular Grid jobs, without the need for sysadmin support or root access.

In particular, AppPot is a way to implement generic application deployment on a computational Grid, and especially to enable users to provide their own software to the computing cluster: users can use an AppPot VM on their computer for coding, and then run the same VM as a Grid job or in a Cloud IaaS infrastructure for production runs.

In this talk we give an overview on AppPot and its features, the technology that makes it possible, and report on experiences running it in production use within the NGI\_CH SMSCG infrastructure.

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