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The Integration of CloudStack and OpenNebula with DIRAC

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The increasing availability of cloud resources is making the scientific community to consider a choice between Grid and Cloud. The DIRAC framework for distributed computing is an easy way to obtain resources from both systems.

In this paper we explain the integration of DIRAC with a two Open-source Cloud Managers, OpenNebula and CloudStack. They are computing tools to manage the complexity and heterogeneity of distributed data center infrastructures which allow to create virtual clusters on demand including public, private and hybrid clouds.

This approach requires to develop an extension to the previous DIRAC Virtual Manager Server, developed for Amazon EC2, allowing the connection with the cloud managers.

In the OpenNebula case, the development has been based on the CERN Virtual Machine image with appropriate contextualization, while in the case of CloudStack, the infrastructure has been kept more general allowing other Virtual Machine sources and operating systems.

In both cases, CernVM File System has been used to facilitate software distribution to the computing nodes. With the resulting infrastructure, users are allowed to use cloud resources transparently through a friendly interface like DIRAC Web Portal.

The main purpose of this integration is a system that can manage cloud and grid resources at the same time. Users from different communities do not need to care about the installation of the standard software that is available at the nodes, nor the operating system of the host machine which is transparent to the user. In this paper we analyse the overhead of the virtual layer, with some tests comparing the proposed approach with the existing Grid solution.

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