

## Using virtualized computing resources with the DIRAC Interware

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Multiple scientific communities are using computationally intensive applications in their research activities. They are largely relying on national and international distributed computing infrastructures, which are mostly based on well-known grid technologies. However, with a progressively wide adoption of the cloud technologies more and more computing power is available in a form of groups of dynamically created virtual machines. The machines can be of general purpose or specialized virtual appliances suitable for a particular application. This provides a very high level of flexibility in using computing resources but makes it quite difficult to manage large amount of cloud computing power by an average user. On the other hand, still most of the computing resources are available through grid infrastructures. Therefore, it is necessary to provide a transparent user access interface to both types of computing infrastructures in order to enlarge the overall available power and to ensure a smooth transition to the use of the new technology. The DIRAC Interware project offers software and multiple ready to use components to build distributed computing infrastructures. It provides tools to integrate various types of computing resources including grid and cloud systems. DIRAC users see cloud resources as logical entities in the same way as grid sites. The DIRAC Workload Management System allows combination of grid, cloud and other resources within the same complex workflow. In this contribution we will describe the recent progress in the development of the cloud management subsystem of the DIRAC Project, its architecture and main components. We will demonstrate how the combined configuration, usage and monitoring of the grid, cloud and other computational resources is performed. We will present how resources provided by cloud federation infrastructures are made available via the DIRAC services. We will give several examples of their usage by large high energy physics experiments and other scientific communities.

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