

# Exploring private and commercial clouds for BESIII

*Tuesday 11 October 2016 16:30 (15 minutes)*

The BESIII experiment located in Beijing is an electron-positron collision experiment to study Tau-Charm physics. Now in its middle age BESIII has aggregated more than 1PB raw data and the distributed computing system has been built up based on DIRAC and put into productions since 2012 to deal with peak demands. Nowadays cloud becomes popular ways to provide resources among BESIII collaborations and VMDIRAC is the first method we adopted to integrate cloud resources, which is an extension in DIRAC of implementing elastic cloud resource scheduling. Instead of submitting pilot jobs, VMDIRAC starts VMs equipped with Job agents through cloud managers according to the demands of DIRAC task queue. The paper firstly will present how we adapt and add the extensions to VMDIRAC to fit into BESIII cases. We also try to share the experiences of using VMDIRAC to integrate heterogeneous cloud resources including OpenStack, OpenNebula and Amazon. The cloudinit has been adopted as the standard way to do contextualization. Also we will describe the performance and price comparisons between private and public clouds in order to give suggestions to BESIII collaborations on resource plans.

In the second part, with the experience of using VMDIRAC, we try to present the design and implementation of a new way of integrating cloud. In this method a CE-like frontend system for cloud has been introduced to start VMs, and accept and assign pilot jobs to the cloud. Instead of changing DIRAC original architecture of pilot-based workload management, the system can keep a uniform architecture to manage cloud same as other resources. In this way, the life cycle of pilots can be well tracked and accounted in DIRAC. At last the paper also will try to compare it with VMDIRAC and figure out the best user cases for two ways.

## Secondary Keyword (Optional)

Distributed workload management

## Primary Keyword (Mandatory)

Cloud technologies

## Tertiary Keyword (Optional)

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**Session Classification:** Posters A / Break

**Track Classification:** Track 3: Distributed Computing