21st International Conference on Computing in High Energy and Nuclear Physics **CHEP2015** Okinawa Japan: April 13 - 17, 2015

Contribution ID: **294** Type: **oral presentation**

Utilizing cloud computing resources for BelleII

Tuesday 14 April 2015 17:15 (15 minutes)

The BelleII experiment is developing a global computing system for the simulation of MC data prior its collecting real collision data in the next few years. The system utilizes the grid middleware used in the WLCG and uses the DIRAC workload manager. We describe how IaaS cloud resources are being integrated into the BelleII production computing system in Australia and Canada. The IaaS resources include HEP as well as opportunistic and commercial clouds.

In Canada, the cloud resources are managed by a DIRAC installation at the University of Victoria, which acts as a slave to the DIRAC instance at KEK. A workload management service running on the DIRAC server at the University of Victoria submits pilot jobs to an HTCondor queue dedicated to the distributed cloud system. The CloudScheduler VM provisioning service boots the VMs based on the HTCondor queue. The distributed cloud uses resources in Europe and North America including Amazon EC2.

Australia provides it's contribution to the Belle II Distributed Computing solution via CPU resources supplied by the NeCTAR Open Stack cloud. The Australian solution employs a Dynamic Torque Batch system with cloud-based worker nodes as a backend to an EGI CREAM-CE. The DIRAC interware sees this a conventional grid cluster with no further configuration or tuning required. The worker nodes employ an SL6 operating system configured via puppet and with the Belle II application software provided via CVMFS. At the time of writing, the Australian system efficiently supplies 350 worker nodes to the Belle II Distributed Computing solution.

All the clouds have been successfully used in BelleII MC production campaigns, producing a substantial fraction of the simulated data samples.

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Session Classification: Track 7 Session

Track Classification: Track7: Clouds and virtualization