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ALICE Job Submission to A Cloud without Dedicated Storage Element.

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The constant need for virtual resources at LHC experiments can be explained by a lack of computing resources and also by flexibility that gives virtualization for providing new platforms and computing power. Researches for virtual resource integration into ALICE Grid environment have been done by many teams [1][2][3].

In our report we present an compilation of existing approaches which include cloud access using htCondor [4] using MCVN image [5] and CEPH FS [6] for storing data and for running virtual machines. The work has been performed on distributed resources of Bogolyubov Institute of Theoretical Physics (Ukraine), Saint Petersburg State University (Russia), and CERN (Switzerland). The tests and performance estimations for the suggested approach have been presented.

References:

Mikolaj Krzewicki, David Rohr, Sergey Gorbunov, et al. The ALICE High Level Trigger: status and plans. *Journal of Physics: Conference Series* Volume 664 (2015) 082023 (<http://iopscience.iop.org/article/10.1088/1742-6596/664/8/082023/pdf>)

Berzano D, Ganis G et al. PROOF as a Service on the Cloud: a Virtual Analysis Facility based on the CernVM ecosystem—in proceedings of Computing in High Energy and Nuclear Physics (CHEP) 2013.

Mikhail Kompaniets, Oksana Shadura, Pavlo Svirin, Volodymyr Yurchenko, Andrey Zarochentsev "Integration of XRootD into the cloud infrastructure for ALICE data analysis", *Journal of Physics: Conference Series*, Volume 664 (2015), Clouds and Virtualization (<http://iopscience.iop.org/article/10.1088/1742-6596/664/2/022036/meta>)
htCondor web site (<https://research.cs.wisc.edu/htcondor/>)

B Segal et al.; "LHC Cloud Computing with CernVM", Proceedings of the XIII. International Workshop on Advanced Computing and Analysis Techniques in Physics Research (ACAT10), Jaipur, 2010, PoS ACAT(2010)004
CEPH web site (<http://docs.ceph.com/docs/master/#>)

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