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Helix Nebula and CERN: A Symbiotic Approach to Exploiting Commercial Clouds

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The recent paradigm shift toward cloud computing in IT, and general interest in “Big Data” in particular, have demonstrated that the computing requirements of HEP are no longer globally unique. Indeed, the CERN IT department and LHC experiments have already made significant R&D investments in delivering and exploiting cloud computing resources. While a number of technical evaluations of interesting commercial offerings from global IT enterprises have been performed by various physics labs, further technical, security, sociological, and legal issues need to be addressed before their large-scale adoption by the research community can be envisaged.

Helix Nebula - the Science Cloud is an initiative that explores these questions by joining the forces of three European research institutes (CERN, ESA and EMBL) with leading European commercial IT enterprises. The goals of Helix Nebula are to establish a cloud platform federating multiple commercial cloud providers, along with new business models, which can sustain the cloud marketplace for years to come.

This contribution will summarize the participation of CERN in Helix Nebula. We will explain CERN’s flagship use-case and the model used to integrate several cloud providers with an LHC experiment’s workload management system. During the first proof of concept, this project contributed over 40.000 CPU-days of Monte Carlo production throughput to the ATLAS experiment with marginal manpower required. CERN’s experience, together with that of ESA and EMBL, is providing a great insight into the cloud computing industry and highlighted several challenges that are being tackled in order to ease the export of the scientific workloads to the cloud environments.

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