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SuperB evaluation of Dirac Distributed Infrastructure

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Description of the Work

The recently founded Nicola Cabibbo Lab will host the SuperB experiment: an asymmetric energy e^+e^- collider and detector that will provide a uniquely sensitive probe of New Physics in the flavor sector of the Standard Model. Heavy quark and heavy lepton studies requires data sample of 50 ab^{-1} and a $1e36 \text{ cm}^{-2} \text{ s}^{-1}$ as luminosity target. DIRAC Distributed Infrastructure evaluation for use in the SuperB experiment will be reported in this work. The use cases End User Analysis and Monte Carlo Production have been fine tuned and heavily tested. We will describe the test bed layout including DIRAC version 5 and new version 6, configuration in terms of sites and sub services. The efficiency test results will be presented about SuperB end user analysis and Monte Carlo Simulation workflows. Performance and failure studies have been measured with different DIRAC setup: in terms of data management system, a fine grain study has been brought on for DIRAC File Catalogue system against LFC (LHC File Catalogue) in terms of features, reliability and performance. A particular care have been placed on interoperability OSG-EGI Grid flavor evaluation. Moreover the DIRAC Cloud capabilities have been subject of specific interest, experience in Cloud general resource exploitation will be presented. The presented work will include, as conclusion, a comparative analysis among Dirac system and other submission systems available in the HEP community with pros and cons of each system.

Conclusions

This activity was quite important in order to evaluate the functionalities needed to support the distributed computation of an HEP experiment like SuperB.

The results of the test will surely drive the definition of the computing model of the SuperB, and in order to understand which job and data-management system could be suitable for running in production in the next years.

Moreover this kind of activities will be of interest for others VO that are looking for a tool that provides the fundamental features needed to carry-on a complex computing activity on a grid computing environment like EGI and OSG.

Impact

DIRAC Distributed Infrastructure evaluation will brought SuperB community to the choice on adapting such an infrastructure as main actor in all the major distributed tasks an HEP experiment can be involved. In fact Dirac propose a complete data management environment covering several use cases: from mass data transfer as FTS intelligent wrapper to job data management for stage in and out operations. The workload management includes a pilot factory and implementation of various policy regarding the resubmission operation, job brokering and fail over procedures.

Indeed in this work we will present all the features tested in order to obtain a fail-tolerant solution for the two main distributed use cases that SuperB will fulfill in the future, Montecarlo Production and End user analysis. In particular we will focus on the capabilities of managing both the input and the output files of both those uses cases, together with the possibility to provide the right data-driven match-making .

We will report also about the test executed on the advanced functionalities provided by the DIRAC File catalogue like the metadata management and the ancestor functionalities.

Starting from the results of this work we can evaluate if the Dirac way of modeling distributed resources could be pushed beyond other solutions as general distributed resource exploitation framework for small and middle VO community size.

Overview (For the conference guide)

The recently founded Nicola Cabibbo Lab will host the SuperB experiment: an asymmetric energy e^+e^- collider and detector that will provide a uniquely sensitive probe of New Physics in the flavor sector of the Standard Model.

SuperB distributed computing group performed a detailed evaluation of DIRAC Distributed Infrastructure in terms of service capabilities, efficiency and reliability for two main use cases: end user analysis and Montecarlo simulation production. The new Dirac release 6 has been configured to respond to SuperB requirements all over the majority of Dirac functionalities. Data management different setup have been considered: the native Dirac File Catalogue system against LFC (LHC File Catalogue) in terms of features, reliability and performance. Test bed and configuration descriptions has been reported including test and evaluation results, using sites that belongs to the EGI grid distributed infrastructure together and sites that exploits the OSG middleware.

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