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## **ILCDIRAC, a DIRAC extension for the Linear Collider community**

*Monday, 14 October 2013 15:00 (45 minutes)*

ILCDIRAC was initially developed in the context of the CLIC Conceptual Design Report (CDR), published in 2012-2013. It provides a convenient interface for the mass production of the simulation events needed for the physics performance studies of the two detectors concepts considered, ILD and SID. It was since used in the ILC Detailed Baseline Detector (DBD) studies of the SID detector concept, and is currently moving towards a complete unification of the production systems for the whole Linear Collider community. The CALICE collaboration uses part of the ILC software tools and can transparently use ILCDIRAC for its activities.

ILCDIRAC extends the core functionality of DIRAC for multiple aspects: There are currently 14 applications supported, which have very different inherent interfaces.

ILCDIRAC simplifies this situation for user convenience and maximum flexibility. For that purpose the relationship between application and

job definition was reviewed and they are completely separated. The base application and job classes are designed in a generic way, allowing for simple extension. This design is independent of the Linear Collider use case and can be applied in other contexts. Another specificity of ILCDIRAC is the management of the so called Overlay. The Linear Collider experiments will be subject to intense machine induced backgrounds and physics backgrounds like gamma gamma -> hadrons. For realistic studies these backgrounds need to be included in the simulation.

Instead of repeating the simulation of these background events, they are overlaid to the signal events during digitisation. The overlay files are randomly selected from a pool of available files and supplied to the job.

The constraint in that system is the fact that many events are needed as input (up to 200 background events per signal event), so the overlay files represent a very large sample per job to be obtained from the Storage Elements. To avoid data access issues, the system prevents too many concurrent jobs to query the Storage Elements at the same time, avoiding problems due to Storage Element overload.

The design of the software management of ILCDIRAC ensures maximum availability by using the shared area when/where possible. In case the shared area has no "Role" protection, typical for OSG sites, a locking procedure is implemented to ensure that no job will overwrite an existing software being installed. The procedure also validates the input software tar balls and their content via md5 check sum verifications.

These ILCDIRAC specific aspects rely heavily on the DIRAC features, in particular the File Catalog, which was mostly developed for ILCDIRAC. In addition, the Transformation System is used to produce all the events, in particular for the CLIC CDR and the SID DBD. It successfully generated, simulated, reconstructed more than 100 million events in 2.5 years, not counting for the user activities, and the File Catalog contains nearly 7 million files corresponding to approximately 1 PB.

### **Summary**

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