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## Dark Energy Survey Computing on FermiGrid

The Dark Energy Survey (DES) uses a CCD camera installed in the Blanco telescope in Cerro Tololo, Chile. The goal of the survey is to study the effect known as Dark Energy.

DES uses FermiGrid for nightly processing, for quality assessment of images, and for the detection of type 1A Super Novae. Nightly processing needs to be carried out for each of the 105 nights in a season that DES acquires data, and must be completed before observations begin on the following night. This was seen as feasible on FermiGrid because the requirements for memory and CPU were similar to those of HEP jobs. FermiGrid used some HEP computing techniques – among them, the CernVM File System (CVMFS) for storing software, and disks on the worker nodes for each job's scratch space – that were novel to cosmology experiments accustomed to using HPC machines.

At the same time, we learned of other compute requirements which were not well served by the existing model, but were still well suited to the basic approach of loosely-coupled, high throughput computing used in HEP. We are working to support workflows with large memory requirements, workflows that require multi-core cpus, and workflows that cache calibration data on the worker nodes.

DES started running production on FermiGrid in August of 2014. We present how we are addressing some notable problems with the current system, including the variable amount of time it takes for files to be visible on worker nodes after they're first uploaded to CVMFS, low CPU efficiency, and jobs hanging while finishing.

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