

Deployment of DCAF for CDF grid

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Abstract: To fully distribute computing for CDF (Collider Detector at Fermilab), one needs three basic components: a data handling system (SAM), a system managing local compute and storage resources (DCAF) and a global scheduler and resource broker allocating the incoming jobs (JIM). The data handling system SAM (Sequential Access to data via Metadata) allows a stable and user friendly access to the data from local sites. This year DCAF (Decentralized CDF Analysis Farm) was successfully installed and tested at many sites to address the needed CPU power. To allocate the resources in an improved way and to hide these layers from the user JIM (Job and Information Management) has to be deployed and the interplay of these three systems needs to be studied.

Data handling system SAM

The data handling system SAM [1] is part of the production versions of the CDF software and is quite stable. It exhibits a live time of about 95% and therefore will be deployed in future for users. Analysis jobs of users can easily work with SAM and retrieve the data they need. Datasets representing a query on the metadata can be translated into a list of files. A SAM job starts a project and keeps track of the files already consumed. The whole process is transparent to the user. The installation procedure of a local SAM station has been simplified. As protocol grid-ftp can be chosen.

Analysis Farms DCAF

DCAF [2], the managing system for computing and storage resources,

consists of a batch system for large farms and a storage system. It is in use at Fermilab and a release for deployment at remote institutions is available. DCAF addresses the batch system on its computer farm with the help of sandboxes. Therefore this system already handles a basic requirement for GRID deployment. This resource should then present the GRID Data handling system with a single interface for cluster systems making GRID deployment of systems easier for those groups who are already part of the Fermilab computing environment.

DCAF sites consist of a head node handling the job submission and worker nodes executing the jobs.

Job and Information Management JIM

JIM [3] handles the remote job submission, data processing and status monitoring. This system is still under development but reaching expert user status. JIM has already been installed at Glasgow [4]. JIM is comprised of one or more of the following components: a JIM client allows job submission, a submission site keeps track of resources and an execution site runs the jobs. Although this system is still under development, it has shown a 95% success rate for Monte Carlo production for the D0 experiment. JIM testing and deployment for CDF is scheduled for the winter conference season.

Implementation and Deployment of DCAF

There are over a dozen installed DCAF systems in various states of operation, including three production DCAF sites located in Italy, Taiwan and Korea. At the moment the total CPU available at these three sites is about 460 GHz. The newly installed DCAF systems use as batch system FBSNG [4] which used to be the standard batch system at Fermilab. One CAF farm at Fermilab uses CONDOR [5]. In future a migration of many sites to CONDOR is foreseen. In contrast to the already existing CAF systems at Fermilab the off-site farms rely on using SAM for data management and transfer. The interplay of SAM with DCAF has been tested throughout the last months and a few complications due to different approaches of DCAF and SAM have been found and need to be solved. An issue which needs to be investigated further is the end of a SAM project. An example is given:

The batch system CONDOR uses a fair share system which can stop jobs of

one user if another user submits enough jobs. The files already retrieved by the jobs of the first user are considered to be consumed in the SAM database and therefore will not be analyzed. So an adaptation of these systems is necessary at some points.

The newly installed DCAF systems will be used for user's analysis jobs or Monte Carlo production. The DCAFs will shortly be opened for users. For testing purposes it is planned to install all three systems, SAM, DCAF and JIM at one site, so that the interplay between all systems can be tested.

References

- [1] <http://cdfdb.fnal.gov/sam>
- [2] <http://cdfcaf.fnal.gov/>
- [3] <http://www-d0.fnal.gov/computing/grid/>
- [4] M. Burgon-Lyon, Deployment of JIM, Nottingham, 2004
- [5] <http://www-isd.fnal.gov/fbsng/>
- [6] <http://www.cs.wisc.edu/condor/>