

## **Large Scale Eos Data Management and Performance Test (LST2010)**

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CERN IT-DSS group is working on a Data Storage Systems to be used by LHC experiments. ATLAS Distributed Computing (ADC) team is invited to participate in a pilot project.

CERN IT-DSS and ADC will set up a Grid site, it will be used by IT-DSS to evaluate different data management technologies for the a realistic set of LHC applications.

The site will be comprised of up to 800 TB disk storage and, for example, 1000 CPU cores (1000 cores is an average number and it can be higher during peak test and lower during routine operation). The disk space will be organized as ATLAS space token using technologies evaluating by IT-DSS. It will be populated with ATLAS RAW and derived data (ESD, AOD, DESD, NTUP). ATLAS data processing software, conditions data, database releases will be installed on the site. NB : all the data will have a limited lifetime and should be considered as transient.

After initial tuning and pre-testing the site will be handed over to the ADC team and it will be used for ATLAS data (re)processing and analysis for the period of the three to four months (test status will be evaluated bi-weekly by IT-DSS and ADC). Site robustness, ease of data access and efficiency of processing will be evaluated. The need for other Large Scale Test phases will be identified after the first series of tests will be completed.

In no event the test site will be considered as an extra ATLAS site after the tests were completed. ATLAS will be given the possibility to replicate any useful data produced to other sites, before facilities will be handed back for CERN IT use.

### **Aim of the data storage tests**

IT-DSS will initially propose one data handling scenarios implemented using an xrootd-based setup including the SRM and FTS/Gridftp gateways to the storage pools. Once put into production, the solution will be monitored and operational experience will be summarized, including any usage feedback that may come from ATLAS. In case of technical difficulties, an alternate scenario could be defined later, based on a Posix-lite distributed file system(s) also equipped with the SRM and FTS/Gridftp gateways.

### **Aim of the ATLAS data processing and analysis tests**

ATLAS will be gaining the operational experience for the storage solution under test while running normal ATLAS production and distributed analysis jobs. The efficiency of the data analysis tasks will be evaluated and ATLAS software will be further scrutinized and tuned to achieve the best possible performance numbers. Special attention will be paid to the new data access features like TTreeCache introduced in the 5.26 version of Root.

LST2010 Organization. LST2010 will be conducted by IT-DSS and ADC teams. It will be split into several test phases. Each test phase will have the predefined number of steps.

**Possible steps within one single test phase** (for indication only, as these need to be further refined):

1. Preparation and pre-testing
  - a. Storage set up and configuration
  - b. ATLAS queues set up and configuration. Uploading test data.
  - c. HammerCloud test (submission analysis jobs)
  - d. Storage configuration tuning (if needed)
2. Tuning
  - a. Set up ATLAS Grid site
  - b. Upload ATLAS data
  - c. Run large scale HammerCloud test for several days
  - d. Final tuning
3. Test Running
  - a. Declare site as 'ATLAS production and analysis' grid site, allow production and analysis jobs brokering to the site

### **Operations and Coordination**

- a. Overall coordination will be done by IT-DSS Group Leader and ADC Coordinator
- b. LST2010 day-by-day coordination will be performed by 2 coordinators (one from IT-DSS, one from ADC)
- c. Daily meetings during Preparatory and Tuning steps
- d. ATLAS Computing shifts will follow site issues during Production step. The procedure may be different from the other sites
- e. Wash-up common meeting after each phase completion

### **Timescale**

Jul 1 : kick-off meeting

Jul 7 : LST plan (series 1)

Jul 8 - Aug 1 : steps 1 (Preparation and pre-testing) and 2 (tuning) of xrootd based setup

Aug 1 onwards : step 3 (Test Running) of the xrootd based setup

In parallel, the DSS group will evaluate various storage possibilities including the deployment of GPFS at the backend. The DSS group will also offer and document the possibility to access the storage element using mounted file system and posix interfaces using fuse.

Depending on the test results and following the review of the initial performance test, the DSS group may also investigate the possibility to offer native posix access (using off the shelves NFS interfaces or specific proprietary clients) or integrating through development the file system access into the present AFS file space.