

# Studies with the ATLAS Trigger and Data Acquisition "pre-series" setup

*Monday, 13 February 2006 16:40 (20 minutes)*

The ATLAS experiment at LHC will start taking data in 2007. As preparative work, a full vertical slice of the final higher level trigger and data acquisition (TDAQ) chain, "the pre-series", has been installed in the ATLAS experimental zone. In the pre-series setup, detector data are received by the readout system and next partially analyzed by the second level trigger (LVL2). On acceptance by LVL2 all data are passed through the event building (EB) and the event filter (EF) farms; selected events are written to mass storage.

The pre-series setup was used to validate the technology and implementation choices by comparing the final ATLAS readout requirements, to the results of performance, functionality and stability studies. These results were also used to validate the simulations of the components and subsequently to model the full size ATLAS system. The model was used to further confirm the ability of the final system to meet the requirements and to obtain indications on event building rate, latencies of the various stages, buffer occupancies of the network switches, etc. This note summarizes these studies together with other optimization investigations such as number of application instances per CPU and choice of network protocols. For the first time, realistic LVL2 and EF algorithms were utilized in such a large and realistic test-bed. Continuous deployment and test will take place during the assembly of the full ATLAS TDAQ system. The interfacing of the pre-series with one of the sub-detectors has also been successfully tested in ATLAS experimental zone.

We show that all the components which are not running reconstruction algorithms match the final ATLAS requirements. For the others, we calculate the amount of time per event that could be allocated to run these not yet finalized algorithms. Based on the calculations, we estimate the computing power necessary for using the present implementation of the ATLAS reconstruction software.

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**Session Classification:** Distributed Event production and Processing

**Track Classification:** Distributed Event production and processing