

OHP: An Online Histogram Presenter for the ATLAS experiment

Thursday 16 February 2006 14:00 (18 minutes)

ATLAS is one of the four experiments under construction along the Large Hadron Collider ring at CERN. During the last few years much effort has gone in carrying out test beam sessions that allowed to assess the performance of ATLAS sub-detectors. During the data taking we have started the development of an histogram display application designed to satisfy the needs of all ATLAS sub-detectors groups. The requirements that have driven the design of this application are: possibility to display histograms produced by many different producers, possibility to use it both as a configurable presenter and as a browser, possibility to manage user actions on histograms, possibility to allow comparison with reference histograms, high integration with the ATLAS DAQ software, minimization of the network traffic between presenter and producers.

A first prototype of this application has been implemented and extensively used at the 2004 ATLAS Combined Test Beam and, from this experience, an upgraded application has been developed to be used in the ATLAS commissioning in 2007. The presentation will describe the program architecture and its interactions with the ATLAS DAQ software, including the first results obtained from the performance tests.

Summary

One component of the ATLAS Data Acquisition and Trigger System (TDAQ) is the Online Histogram Service (OHS) which can be used as histogram transient store. OHP access histograms, generate by any producer, through this service. To minimize the network traffic, the histogram are accessed through a mixed push/pull approach. A notification of the availability of an updated histogram is automatically sent to OHP as soon as it is published in the OHS. OHP, if the histogram must be displayed in the on-focus window, gets the histogram object from OHS.

The histogram presenter, based on the Qt libraries and on ROOT framework is at the same time a browser and a presenter. The first functionality is implemented building at start time a graphic directory structure that allows to access any histogram stored in the OHS. The directory structure is built according to the histogram names which are defined following a strict convention. The second functionality, the presenter, is implemented building a set of windows where a subset of histograms are displayed. Both the histograms to be shown and their organization in windows are defined through a configuration file. In this mode it is also possible to display reference histograms.

The histograms are managed in ROOT format thus all the operations allowed in ROOT (zoom, fitting,...) are also allowed in the presenter windows.

In addition to that the presenter is able to send back to the producers commands like rebin and reset of histograms.

A sub-system for plug-ins has been also developed allowing for user code to be executed inside the presenter. This system allows the user to develop a library that can interact with the presenter, for example drawing in the windows graphical objects, or to execute quality-check algorithms on the histograms.

The presentation will include a description of the program architecture and of its interaction with the ATLAS TDAQ software, including the first results obtained from the performance tests.

Future possible upgrades will also be discussed.

Primary authors: Dr DOTTI, Andrea (Università and INFN Pisa); Dr RODA, Chiara (Università and INFN)

Pisa); Dr SALVATORE, Daniela (Università and INFN Cosenza); Dr CIMINO, Danilo (Università di Pisa); Dr GAUDIO, Gabriella (INFN Pavia); Dr DELLA PIETRA, Massimo (Università and INFN Napoli); Dr ADRAGNA, Paolo (Queen Mary, University of London); Dr ZEMA, Pasquale Federico (Università and INFN Cosenza and CERN); Dr FERRARI, Roberto (Università and INFN Pavia); Dr VANDELLI, Wainer (Università and INFN Pavia)

Presenter: Dr DOTTI, Andrea (Università and INFN Pisa)

Session Classification: Event Processing Applications

Track Classification: Event processing applications