

Control and monitoring of on-line trigger algorithms using a SCADA system

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LHCb has an integrated Experiment Control System (ECS), based on the commercial SCADA system PVSS. The novelty of this control system is that, in addition to the usual control and monitoring of all experimental equipment, it also provides control and monitoring for software processes, namely the on-line trigger algorithms.

The trigger decisions are computed by algorithms on an event filter farm of around 2000 PCs. They are prepared using Gaudi, the LHCb software framework. Gaucho, the GAUdi Component Helping Online, was developed to allow the control and monitoring of Gaudi algorithms. Using Gaucho, algorithms can be monitored from the run control system provided by the ECS. To achieve this, Gaucho implements a hierarchical control system using Finite State Machines.

Gaucho consists of three parts: a C++ package integrated with Gaudi, the communications package DIM, and a PVSS backend providing the user interface.

Using the PVSS user interface (the run control), algorithms can be stopped/started and counters and histograms can be followed in real-time. The results are combined at the level of nodes, subfarms and the full farm, so that it is easy to verify the correct functioning of the trigger.

In this article we describe the Gaucho architecture, the experience of monitoring a large number of software processes and some requirements for future extensions.

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