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CONTROL AND CONFIGURATION OF THE ATLAS TRIGGER AND DATA ACQUISITION SYSTEM DURING DATA TAKING ACTIVITIES

The ATLAS experiment at the Large Hadron Collider at CERN relies on a complex and highly distributed Trigger and Data Acquisition (TDAQ) system to gather and select particle collision data at unprecedented energy and rates.
The control and configuration (CC) system is responsible for all the software required to configure and control the ATLAS data taking. This ranges from high level applications, such as the graphical user interfaces and the desktops used within the ATLAS control room, to low level packages, such as access, process and resource management.
Currently the CC system is required to supervise more than 15000 processes running on more than 1500 computers. At these scales, issues such as access, process and resource management, distribution of configuration data and access to them, run control, diagnostic and especially error recovery become predominant to guarantee a high availability of the TDAQ system and minimize the dead time of the experiment.
And it is indeed during the data taking activities that the CC system has shown its strength and maturity, featuring a great scalability against the always increasing number of software processes in the TDAQ system (corresponding to the growing of the High Level Trigger farm) and implementing several automatic error recovery procedures in complex and sophisticated scenarios (e.g., disabling a detector busy readout without the need of stopping the full data taking session). As a result several critical actions are performed without the intervention of the operator, greatly enhancing the whole experiment data taking efficiency.
This paper gives an overview of the functionalities of the various CC system components. Particular emphasis will be given to the design choices taken to address the TDAQ system efficiency requirements. We will also highlight some precious lessons learnt in more than one year of data taking leading the CC system to an high level of reliability. Finally we will conclude with an assessment of the present components and with an outlook on possible improvements for the future.

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