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A rule-based control and verification framework for ATLAS Trigger-DAQ

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In order to meet the requirements of ATLAS data taking, the ATLAS Trigger-DAQ system is composed of O(1000) of applications running on more than 2000 computers in a network. With such system size, s/w and h/w failures are quite often. To minimize system downtime, the Trigger-DAQ control system shall include advanced verification and diagnostics facilities. The operator should use tests and expertise of the TDAQ and detectors developers in order to diagnose and recover from errors, if possible automatically. The TDAQ control system is built as a distributed tree of controllers, where behavior of each controller is defined in a rule-based language allowing easy customization. The control system also includes verification framework which allow users to develop and configure tests for any component in the system with different levels of complexity. It can be used as a stand-alone test facility for a small detector installation, as part of the general TDAQ initialization procedure, and for diagnosing the problems which may occur during the run time. The system is currently being used in TDAQ commissioning at the ATLAS pit and by subdetectors for stand-alone verification of the hardware before it is finally installed. The paper describes the architecture and implementation of TDAQ control system with more emphasis on the new features developed for the verification framework, features requested by users during it's exploitation in real environment. Results from scalability tests performed in 2005 are also presented.

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