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SWATCH: common control SW for the uTCA-based upgraded CMS L1 Trigger

The CMS (Compact Muon Solenoid) L1 (Level-1) Trigger electronics are composed of a large number of different cards based on the VMEBus standard. The majority of the system is being replaced to adapt the trigger to the higher collision rates the LHC will deliver after the LS1 (Long Shutdown 1), the first phase on the CMS upgrade program. As a consequence, the software that controls, monitors and tests the hardware will need to be re-written.

The upgraded trigger will consist of a set of general purpose boards of similar technology that follow the uTCA specification, thus resulting in a more homogeneous system. A great effort has been made to identify the common firmware blocks and components shared across different cards, regardless of the role they play within the trigger data path. A similar line of work has been followed in order to identify all possible common functionalities in the control software, as well as in the database where the hardware initialisation and configuration data are stored. This will not only increase the homogeneity on the software and database sides, but it will also reduce the manpower needed to accommodate the online SW to the changes on hardware.

Due to the fact that the upgrade will take place in different stages, it has been taken into consideration that these new components had to be integrated in the current SW framework.

This paper presents the design of the control SW and configuration database for the upgraded L1 Trigger.

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