World Academy of Science, Engineering and Technology
International Journal of Nuclear and Quantum Engineering
Vol:11, No:09, 2017

The Communication Library DIALOG for iFDAQ of the COMPASS Experiment

Authors : Y. Bai, M. Bodlak, V. Frolov, S. Huber, V. Jary, I. Konorov, D. Levit, J. Novy, D. Steffen, O. Subrt, M. Virius

Abstract : Modern experiments in high energy physics impose great demands on the reliability, the efficiency, and the data rate of Data Acquisition Systems (DAQ). This contribution focuses on the development and deployment of the new communication library DIALOG for the intelligent, FPGA-based Data Acquisition System (iFDAQ) of the COMPASS experiment at CERN. The iFDAQ utilizing a hardware event builder is designed to be able to readout data at the maximum rate of the experiment. The DIALOG library is a communication system both for distributed and mixed environments, it provides a network transparent inter-process communication layer. Using the high-performance and modern C++ framework Qt and its Qt Network API, the DIALOG library presents an alternative to the previously used DIM library. The DIALOG library was fully incorporated to all processes in the iFDAQ during the run 2016. From the software point of view, it might be considered as a significant improvement of iFDAQ in comparison with the previous run. To extend the possibilities of debugging, the online monitoring of communication among processes via DIALOG GUI is a desirable feature. In the paper, we present the DIALOG library from several insights and discuss it in a detailed way. Moreover, the efficiency measurement and comparison with the DIM library with respect to the iFDAQ requirements is provided.

Keywords : data acquisition system, DIALOG library, DIM library, FPGA, Qt framework, TCP/IP
Conference Title : ICHEP 2017 : International Conference on High Energy Physics
Conference Location : Paris, France
Conference Dates : September 21-22, 2017