Event recording data acquisition system and experiment data management system for neutron experiments at MLF, J-PARC

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Neutron scattering experiments are a powerful probe to investigate a phenomenon of the materials and life science. The Materials and Life Science Experimental Facility (MLF) of the Japan Proton Accelerator Research Complex (J-PARC) is the one of the most intense pulsed neutron experimental facility in the world. In MLF, 18 neutron experimental instruments have already been under operation and various measurements are carried out by many users. These instruments are composed of neutron detectors, sample environment and neutron optics devices. The signals from these components and the neutron source are transformed into the digital signals by the data acquisition (DAQ) electronics \cite{1} and recorded as the event data with the time in the DAQ computers by “DAQ Middleware” \cite{2}. The DAQ system produces the enormous measurement event data (~GB) under various measurement conditions. Simultaneously, the measurement meta-data indicating each measurement condition is recorded in XML format by the MLF control software framework “IROHA” \cite{3}. These measurement event data and meta-data are collected in the MLF common storage and cataloged by the MLF Experimental Database based on the commercial XML database. The database system provides the web interface for the experiment data management and the remote data analysis for users. In this presentation, we will show the details of the DAQ system and the experiment data management system at MLF, J-PARC.

\cite{1} S. Satoh \textit{et al.}, Nucl. Instr. And Meth. A 600 103-106 (2009).
\cite{2} K. Nakayoshi \textit{et al.}, Nucl. Instr. and Meth. A623 537-539 (2010).
\cite{3} T. Nakatani \textit{et al.}, Proceedings of ICALEPCS2009 673-675 (2009).