Online Data Monitoring Framework based on Histogram Packaging in Network Distributed Data Acquisition Systems

Content:
We developed a new general software framework for online data monitoring, which provides a way to collect information from online systems, including data acquisition, and to display the information to shifters far from experimental sites. The monitoring framework consists of two sub-systems; a monitoring data handler called "Monitor Server" and graphical user interface (GUI) "Monitor Viewer".

In this framework, the online systems work as monitoring data sources and they create sets of histograms named "Histogram Package". Monitor Server collects the packages from data sources though TCP connections and provides them to multiple Monitor Viewers. We defined a protocol for passing Histogram Packages though the network communications. Therefore, Monitor Server can receive packages form data sources even if they are working on different platforms or written in other languages.

Monitor Viewer is available through Internet and free from additional plug-ins or libraries like ROOT. We developed two types of viewers based on platform-independent technologies with functionalities of communicating through Internet and making graphical plots by themselves. One is based on Java with GUIs by Swing and the other is HTML technologies on web browsers, especially Ajax and Canvas. The former has high performance of data transfer and the latter provides easy access as it is simple web page but works like an application.

This monitoring framework has been developed for the Double Chooz reactor neutrino oscillation experiment in France, but can be extended for general appliance to be used in other experiments.

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