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The time synchronization of CSNS neutron Instrument

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In CSNS(China Spallation Neutron Source) neutron instrument, the time of proton hit the target is called T_0 , which is the start point of TOF of neutron. T_0 fanout system will provide the exactly T_0 signal for detector electronics. But, this system lack of the information to synchronize the metadata from control system and the neutron data from different detector. In CSNS, a real time synchronization system is deployed to index the neutron data from different detector electronics and metadata from control system or other system. This time synchronization system use the UTC time from GPS as the time base and synchronize all node by White Rabbit network. All detector electronics, measurement node and control server spread in 100m² are connected to this system by different way. The metadata of last sample set can be retrieved from index server and all history data can be obtained from history database for physical analysis. Some device and computer are developed in CSNS site, and a demo system is also established. In this paper, the architecture of this synchronization and synchronization way are explained, and some performance of this demo system are also illustrated in this paper.

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