

# BESIII Data Acquisition System

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BEPCII is designed with a peak luminosity of  $10^{33} \text{cm}^{-2} \text{sec}^{-1}$ . After the Level 1 trigger, the event rate is estimated to be around 4000Hz at  $J/\psi$  peak. A pipelined front-end electronic system is designed and developed and the BESIII DAQ system is accomplished to satisfy the requirement of event readout and processing with such a high event rate.

BESIII DAQ system consists of about 100 high performance computers. The system can be divided into two subsystems: approximately 40 readout VME crates as the front end and 42 IBM eServerBlade HS20 as the online computer farm. The communications between the two subsystems and among computer nodes are realized by high speed optical links, high speed Ethernet switches. The BESIII data acquisition system is designed with a capacity of 80 MB/s for reading out data from VME crates. The online computer farms must have a throughput of 50 MB/s and capability of writing data to tape must exceed 40 MB/s after the event filtering. Multi-level buffering, parallel processing, high-speed VME readout, high-performance computing and network transmission techniques are introduced in the BESIII DAQ design. The goal of the DAQ design is to achieve high reliability, maintainability, stability, scalability and portability. The system is highly scalable and can be expanded easily when need arises. The DAQ software used in BESIII was developed based on the framework of Atlas TDAQ software. It accomplishes the data collection, assembling, filtering and recording of event data. It also provides additional control and test functions.

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