

# Architecture and implementation of the ALICE Data-Acquisition System

*Monday, February 13, 2006 5:00 PM (25 minutes)*

ALICE (A Large Ion Collider Experiment) is the heavy-ion detector designed to study the physics of strongly interacting matter and the quark-gluon plasma at the CERN Large Hadron Collider (LHC). A large bandwidth and flexible Data Acquisition System (DAQ) is required to collect sufficient statistics in the short running time available per year for heavy ion and to accommodate very different requirements originated from the large set of detectors and the different beams used. The DAQ system has been designed, implemented, and intensively tested. It has reached maturity and is being installed at the experimental area for tests and commissioning of detectors. It is heavily based on commodity hardware and open-source software but it also includes specific devices for custom needs. The interaction of thousands of DAQ entities turns out to be the core of this challenging project. We will present the overall ALICE data-acquisition architecture, showing how the data flow is handled from the front-end electronics to the permanent data storage. Then some implementation choices (PCs, networks, databases) will be discussed, in particular the usage of tools for controlling and synchronizing the elements of this diversified environment. Practical aspects of deployment and infrastructure running will be covered as well, including performance tests achieved so far.

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**Session Classification:** Online Computing

**Track Classification:** Online Computing