DQTree
 the configuration histograms every time they are updated
from the database
 Main features both online and offline.

DQMF is a data driven distributed scalable framework to monitor data quality both online and offline.

Main features of the framework
- Reading the configuration information from the database
- Finding and getting all the available input histograms every time they are updated
- Executing predefined tests, as specified in the configuration
- Producing results and making them available
- Writing to the database

DQRegions
- Single data quality (DQ) tests are handled by DQParameters. Each DQParameter specifies what input histogram(s) to use, what algorithm (DQAlgorithm) to apply and the thresholds to classify the result (DQResult) as good or bad.
- DQParameters are grouped in DQRegions.
- DQRegions also have DQResults associated. The mechanism to combine the results of the subparameters is specified in the configuration. DQRegions can be grouped in mother DQRegions, thus creating a DQ tree.

DQAgent
- DQ agents are the applications at the core of the framework. These run the actual algorithms online. Input and output mechanisms are implemented as plugins, thus providing a large degree of flexibility. The checks, thresholds and parameters are loaded from the configuration database.

Data Quality Monitoring

The ATLAS Data Acquisition system

The ATLAS detector
The ATLAS experiment is one of the generic detectors designed and built to record the output of the proton-proton collisions provided by the Large Hadron Collider at CERN, Geneva.

Data Flow is responsible for collecting data fragments, serving them to trigger processors and sending them to mass storage. Online data quality monitoring analyses data from all subsystems at all stages of Data Flow.

ATLAS online data quality monitoring

Cristobal Cuencam Almenar, Yale
Alina Corso-Radu, Serguei Kolos, Kevin Slagle, Anyes Taffard, UCI
Haleth Hadavand, Yuriy Ilchenko, SMU

12th Topical Seminar on Innovative Particle and Radiation Detectors, Siena, June 7th-10th 2010

Monitoring infrastructure

A subset of the Data Acquisition system is devoted to monitor the performance of each element of the Data Flow and Trigger chains and the quality of the data being recorded.

Monitoring main features
- Access data at all levels of DataFlow and Trigger and produce on-line histograms
- Analyze operational conditions of the different hardware elements
- Perform automatic checks on the histograms and operational data made available by other applications
- Archive all the data and results produced online
- Provide easy and fast visualization, locally and remotely, of all the information made available for shifters and experts.

Data Quality Monitoring Display

The Data Quality Monitoring Display (DQMD) is an application for easy visualization of data quality status of each subsystem. The main panel provides an overview and Alarms and Logs tabs have been added for enhanced control or errors. There is one button per subsystem. Clicking on them brings up a detailed panel with the relevant subsystem data quality tree, histograms and results. Clicking on Alarms or Log entries also brings up a detailed panel with further information.

Current status and conclusions

- So far, the framework handles
  - 20 DQAgents
  - More than 75000 DQParameters
  - Organized in more than 15000 DQRegions
  - More than 15000 new results per minute
- These figures correspond only for the DQ framework. Event sampling, information extraction and histogram generation and publishing use other processes and resources.
- The feedback provided by system experts and shifters has resulted on many upgrades, especially in visualization tools.
- DQMC used by most systems to generate layouts
- DQMD always used in most desks in the ATLAS control room to ensure good data quality taking and analyzing good data to make our first discoveries.
- This same framework is reused offline to assess DQ and set online DQ flags. The good runs lists for the first physics results were generated using this offline DQ assessment.
- DQMF is actively being used to ensure good data taking with collisions runs at 7 TeV. It won’t discover new physics.
- But makes sure we are taking and analyzing good data to make our first discoveries.

Data Quality Monitoring

The Data Quality Monitoring Framework (DQMF) is a data driven distributed and scalable framework to monitor data quality both online and offline.

Main features of the framework
- Reading the configuration information from the database
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