ALICE DAQ @ Athens

Spring 2005 Status Report

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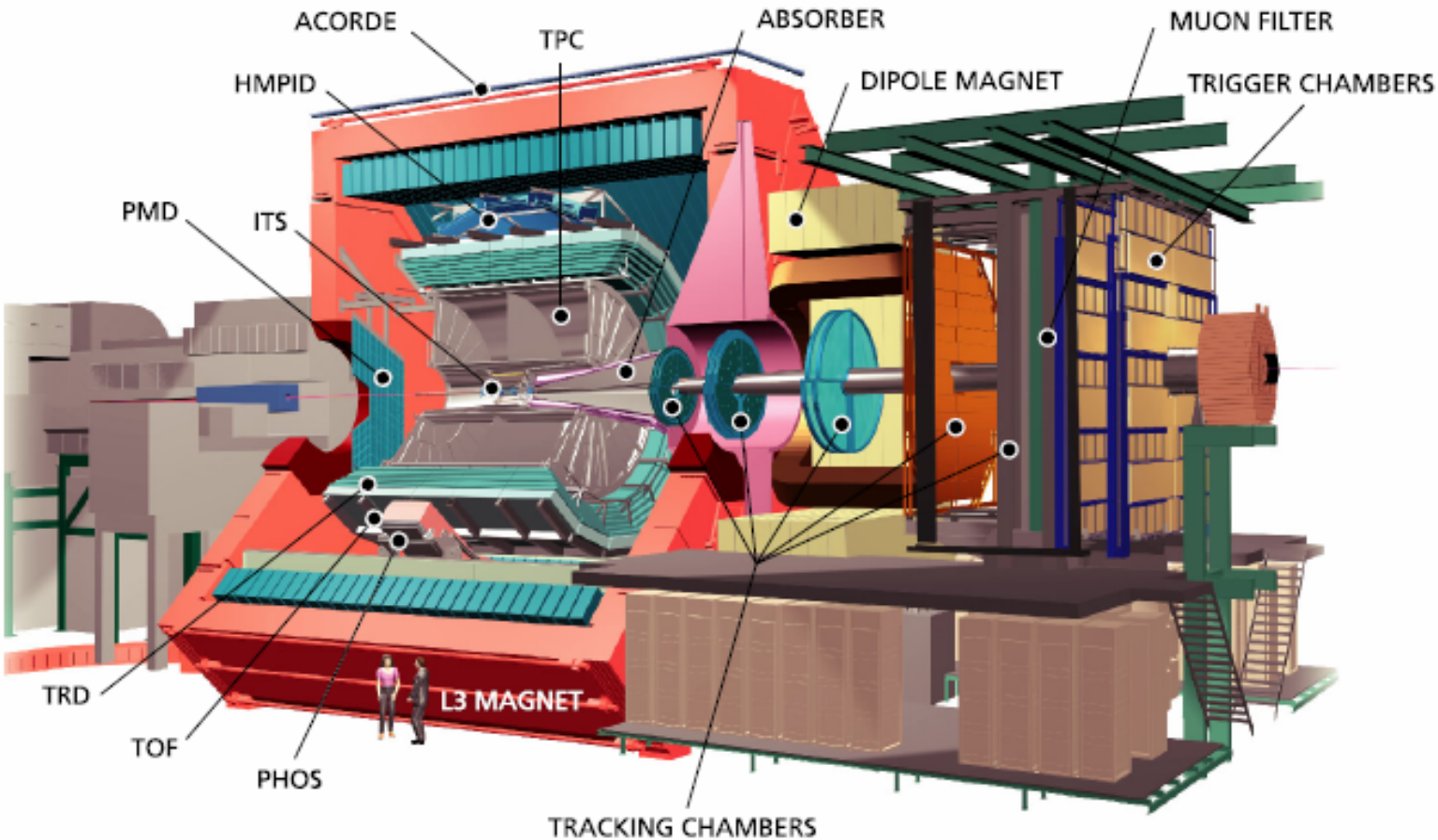
Outline

- ALICE DAQ Overview
- Athens Responsibilities
- Status
- Future Plans

ALICE Detector



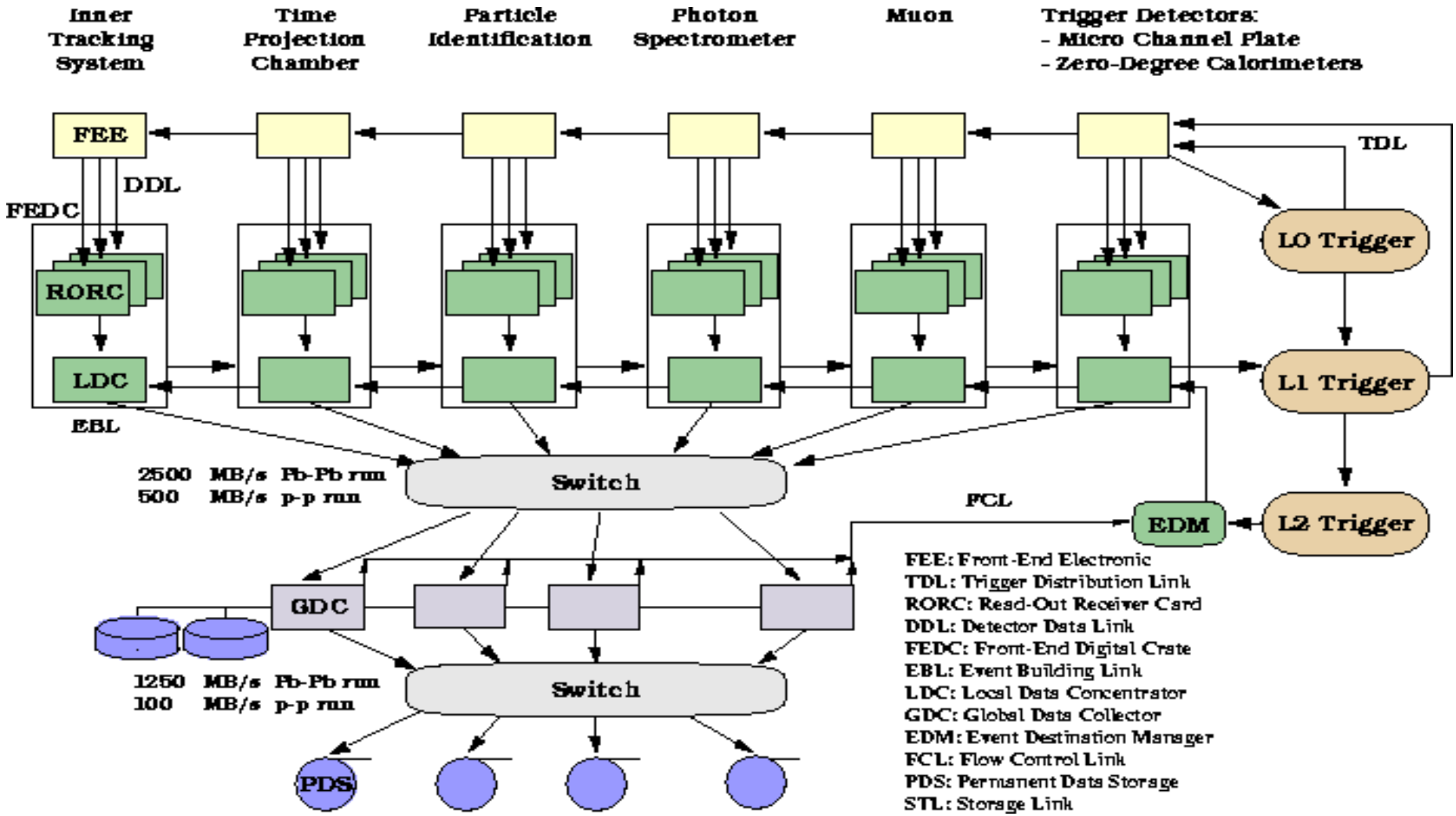
Overview of the Forward Detectors

- FMD (Forward Multiplicity Detector) NBI+INR
  - 5 Si-strip Ring counters with 51.200 channels
  - $1.7 < \eta < 5.0$; $-1.7 < \eta < -3.4$
  - Precise off-line charged particle multiplicity for A+A, p+p
  - Fluctuations event-by-event, flow analysis

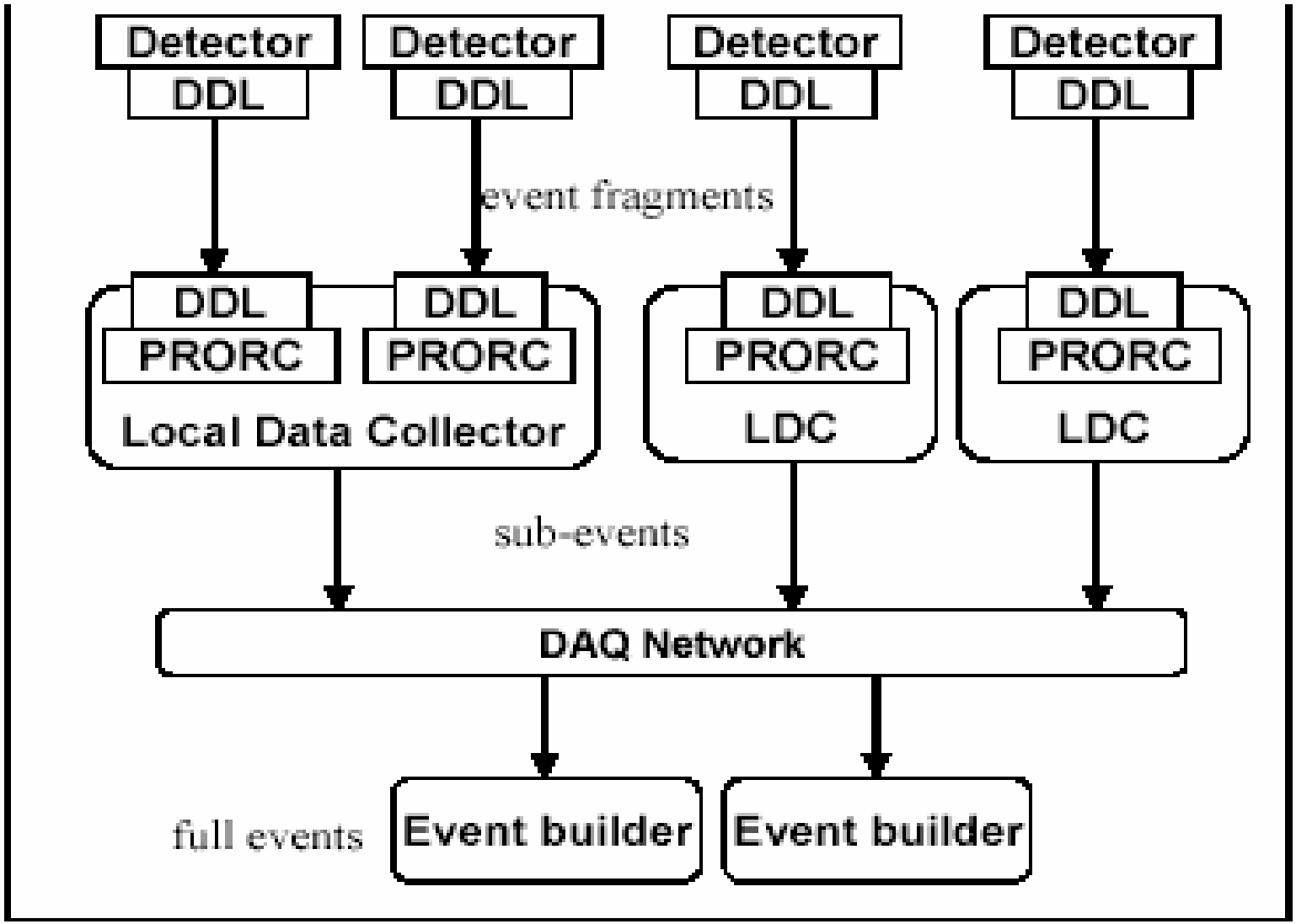
- V0 (Centrality and collision vertex) Lyon+Mexico
  - 2 arrays of 32 plastic scintillator tiles w. fiber+PMT
  - $2.8 < \eta < 5.1$; $-1.7 < \eta < -3.7$
  - Main L0 MinBias for p+p and A+A and centrality trigger A+A
  - Background (Beam-Gas) rejection, TRD wakeup

- T0 (Beam-Beam Detector) Jyvæskyla+MEPhI,INR,Budker,Kurchatov
  - 2 arrays of 12 Cerenkov radiators + PM tubes
  - $4.5 < \eta < 5.0$; $-2.9 < \eta < -3.3$
  - Fast timing L0 signal (τ=50ps), online vertex determination
  - Main time reference, TRD wakeup, backup for MinBias trigger

DAQ Architecture (1)



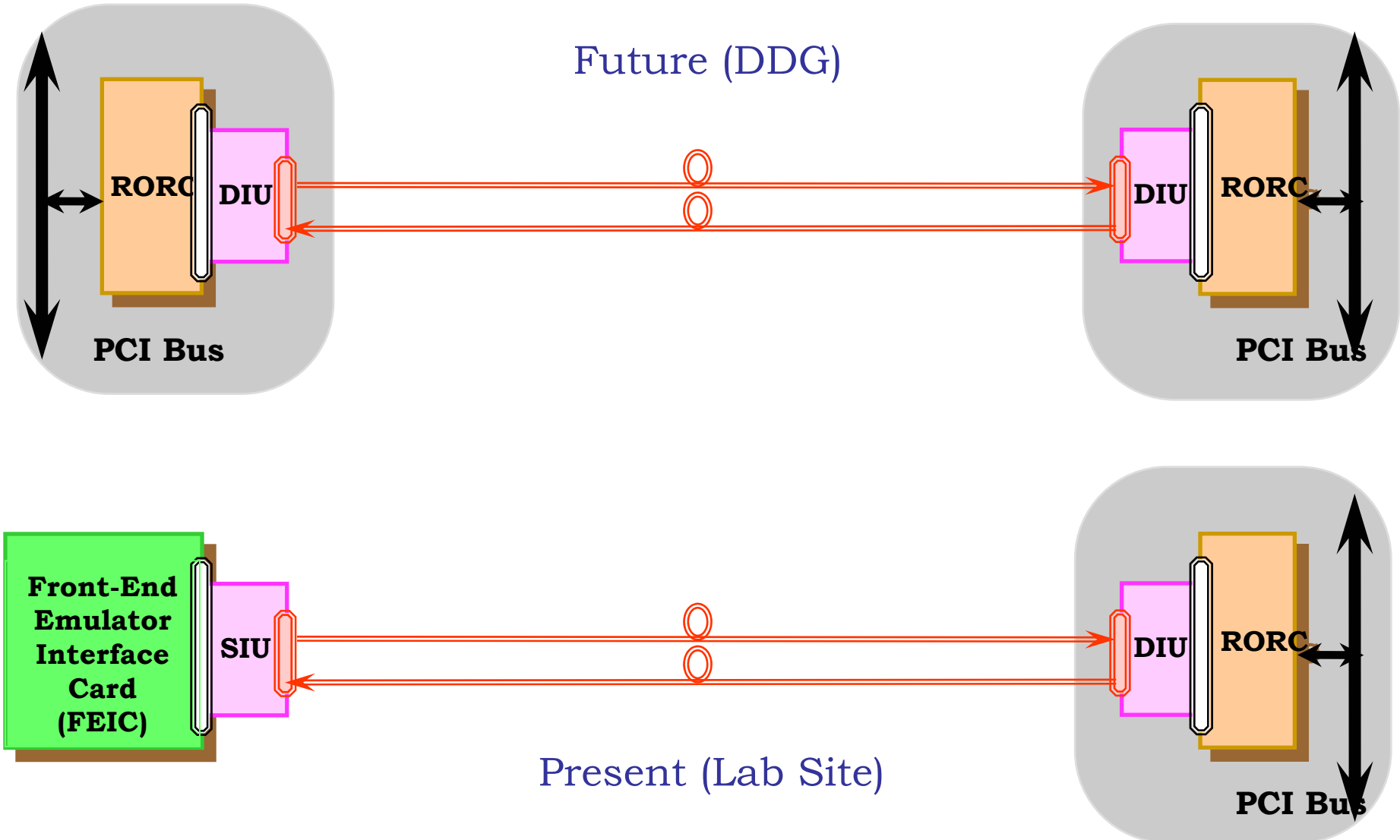
DAQ Architecture (2)



Introduction

- The Athens group has undertaken the responsibility to work for the part of the DAQ system concerning the Forward detectors **(FMD, T0 (aka START), V0)**
- Of primary interest are Run Control and Readout, Online Data Monitoring and Detector Performance Monitoring through the usage of DATE, AFFAIR and MOOD respectively.
- Development of software will be performed on a lab DDL system and beam tests are also planned before commisioning.

Stand-alone DDL setup



Hardware Configuration @ Athens

- "Detector": **FEMU**+**SIU** connected through the standard **DDL** optical link to the **DIU**+**pRORC** card.

  FEMU requires 5V DC to operate given through a standard lab **power supply**
- "LDC": Pentium III @ 0.8 GHz, 640MB RAM, 2x40GB HDD, 1 p-RORC
- Monitoring host: Pentium IV @ 2.4 GHz, 512MB RAM, 40GB HDD

  (And all other machines through ssh to the above)
- p-RORC (1 DDL/32bit/33Mhz)=1/2 of a D-RORC (2 DDL/64bit/66Mhz)

DATE:
Data Acquisition and Test Environment

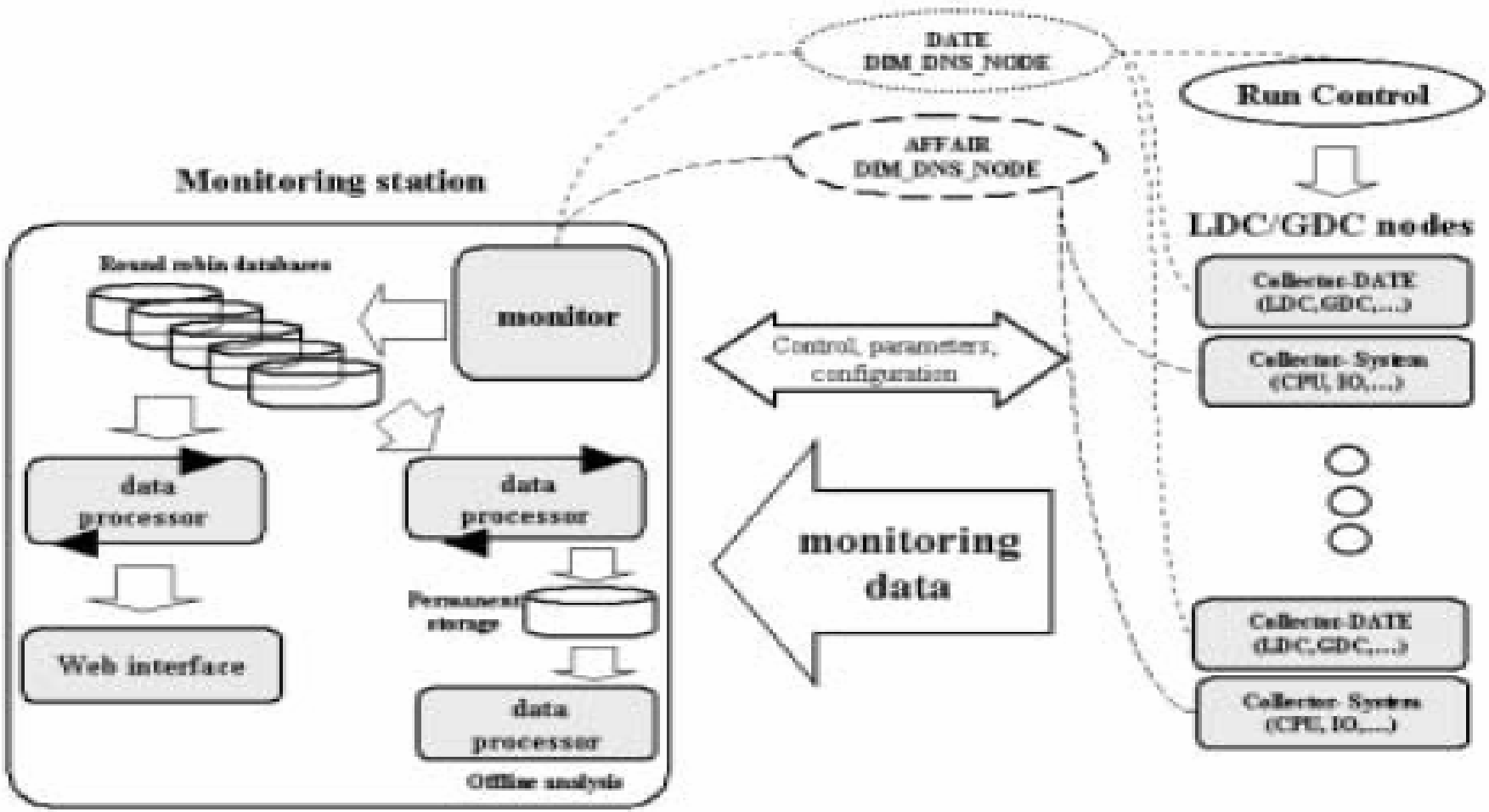
It is a software system that performs data-acquisition activities in a multiprocessor distributed environment. It's functions include (through a series of modules-packages):

- Dataflow control (Parallel data streams moving independently and concurrently)
- Detector readout
- Event building (eventBuilder)
- Load balancing (Event Distribution Manager, edm)
- Run Control
- Online monitoring
  - Event Dump
  - Detector analysis (MOOD)
- Information logger/browser
- Run bookkeeping
- Performance monitoring (AFFAIR)
- Test-event generation for tuning and debugging

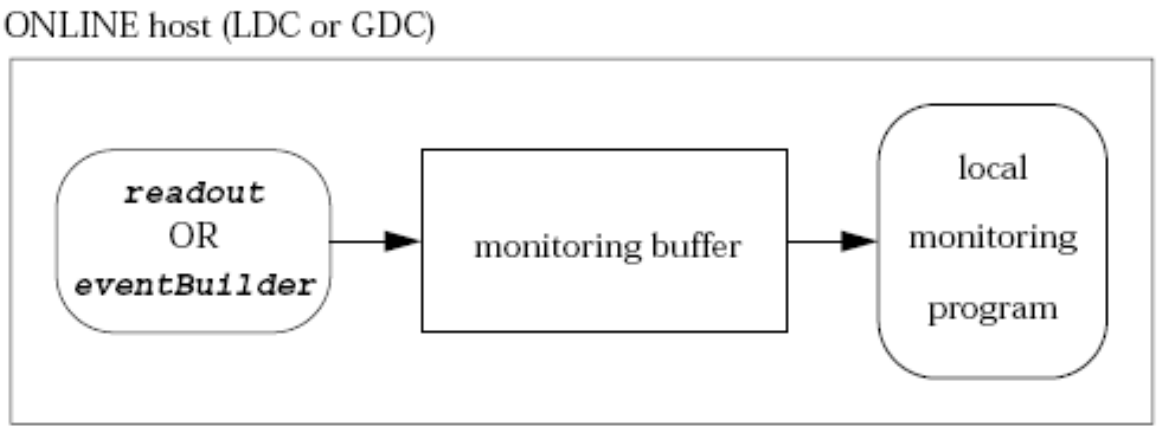
AFFAIR:
Performance Monitoring System

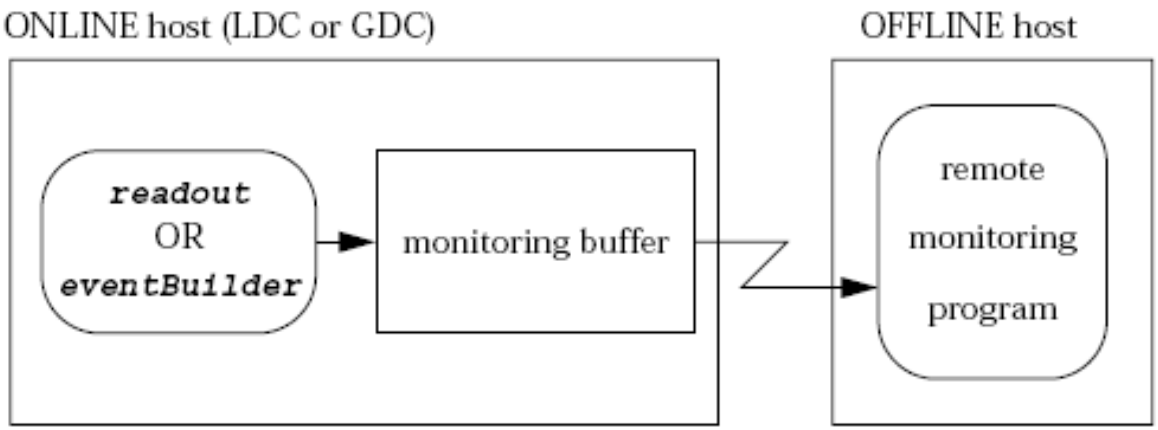
- AFFAIR is the DATE package used for monitoring and presenting the performance of the ALICE DAQ components (LDCs, GDCs and the network resources or in general hosts where DATE processes are running).
- It collects, archives and presents in form of ROOT histograms performance data.
- Is is controlled by the DATE RunControl subsystem. At SOR:
  - A CollectorSystem process is started in every machine running a DATE package
  - A CollectorDATE process is started on every LDC and GDC
  - A Monitor process is started on some specific machines to perform the actual monitoring by copying performance data to TDS
  - A DataProcessor process is started on specific machines to visualise performance data coming from the TDS or to store them on PDS.

AFFAIR:
Performance Monitoring System



Online Data Monitoring in ALICE DAQ: General Concepts





The DATE online monitoring, local and remote configurations

MOOD:
Monitor Of Online Data

- MOOD is the DATE package used for monitoring and presenting the online actual data. It is a client written to take advantage of the monitoring API of DATE.
- It collects, archives and presents data coming from LDCs and GDCs in form of ROOT histograms.

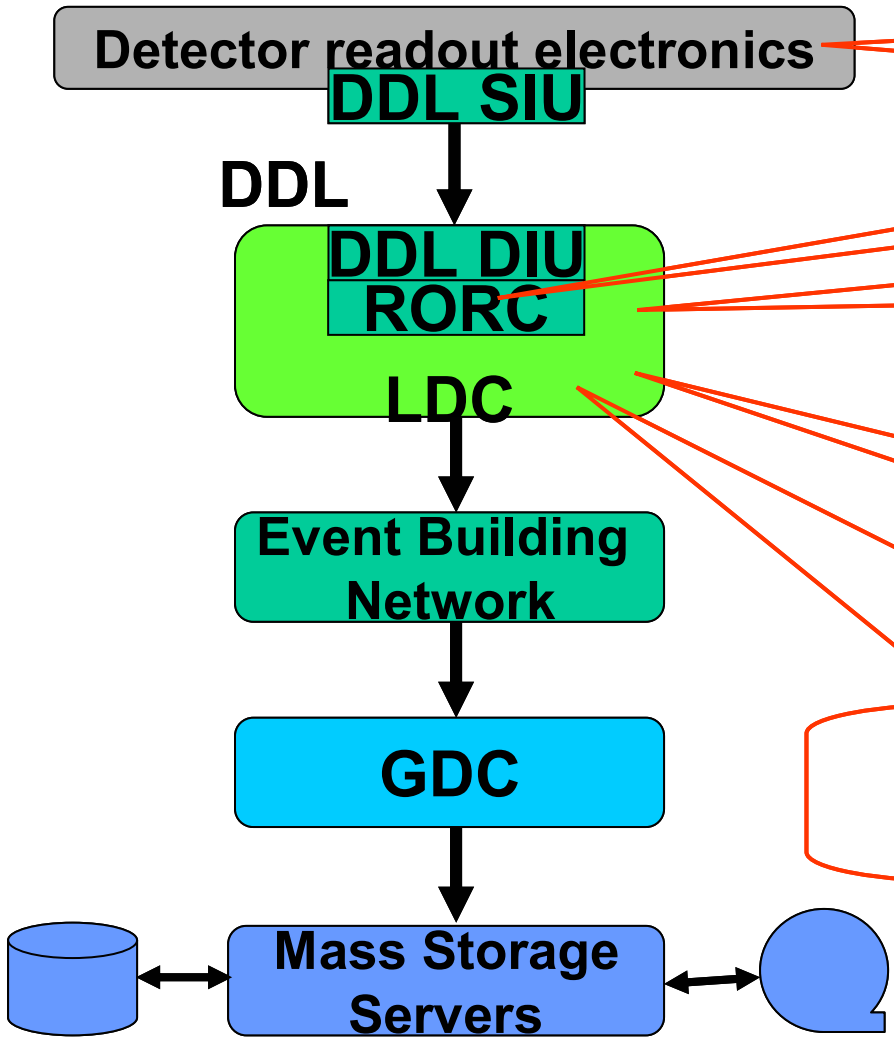
Software Configuration @ Athens (1)

- Migration to SLC 3.0.4 already done on all machines (http://cern.ch/linux)
- Our LDC has the /date (DATE version 5.6) and /dateSite (Specific installation files) directories physically. The monitoring host accesses these through NFS (http://aldwww.cern.ch)
- 128 MB of RAM are used through PHYSMEM package of DATE as LDC buffer
- The DAQ network has been setup using the dateNetwork utility. This setups the necessary connections between our LDC and Monitoring machines by installing appropriate system services.
- We are in the process of manipulating and fine-tuning further the necessary configuration files for our specific setup(s).

Software Configuration @ Athens (2)

- Due to our team's involvement in PPR authoring, we keep 6 active and up-to-date installations of AliRoot, the offline simulation and reconstruction software of ALICE. This is helpful for producing simulated DAQ data files.
- MOOD (latest version v3-49) is installed and running containing also our development for the 3 detectors
- AFFAIR is installed without configuration for the moment

Test Data generation options



COLE Overview

- **CO**nfigurable **L**DC **E**mulator is designed to create ALICE-like events
- Features that are helpful for our work include:
  - Simple configuration
  - Detector payload is loaded in the predefined LDC memory region – **Ready for monitoring**
  - With the aid of AliRoot we can therefore monitor directly raw data from a specific detector (prepared in a disc file)

DDG Overview

- The program supplies the DAQ with simulated data: it reads sub-events from files or generates data patterns according to the user request.
- The program works with integrated D-RORC cards as shown earlier.
- The program can handle more than one DDL channel (maximum 12 channels).
- It's main function of interest for us is that it generates DDL headers and gives data to D-RORC using DDL protocol.

DATE System Status

DONE:

- Configure the DATE v5.6 system (almost production version) for our DAQ system setup

TODO:

- Test the DAQ process of the LDC for other equipments except DDL, especially COLE and DDG (future)

MOOD System Status

DONE:

- Contacts with the detector experts to discus their monitoring needs
- Visualize some data generated by the FEMU
- Visual monitoring interface for the T0, V0 detectors (preliminary)
- Data decoder for the FMD (preliminary)

TODO:

- Visual interface for the FMD
- Data decoders for the T0, V0 detectors
- Test our packages in real test enviroment (test beams)

AFFAIR System Status

DONE:

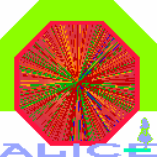
- Installation

TODO:

- Configuration for our system
- Keep in touch with the detector experts and the ALICE DAQ group to further discus their requirements

Future plans

- Our efforts focus primarily in the efficient=fast decoding of the online data for the monitoring and the successful selection of the right monitoring parameters for AFFAIR.
- During 2005 we expect to test, debug and improve our software contribution by participating in the test runs of the ALICE Forward Detectors.
- After that, we expect that our final version will be ready for real data taking in time (before 2007).



Thank you!