CALICE Data Model

Data handling and software background from recent combined test beam

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External Software

Most data treatment uses common software tools:

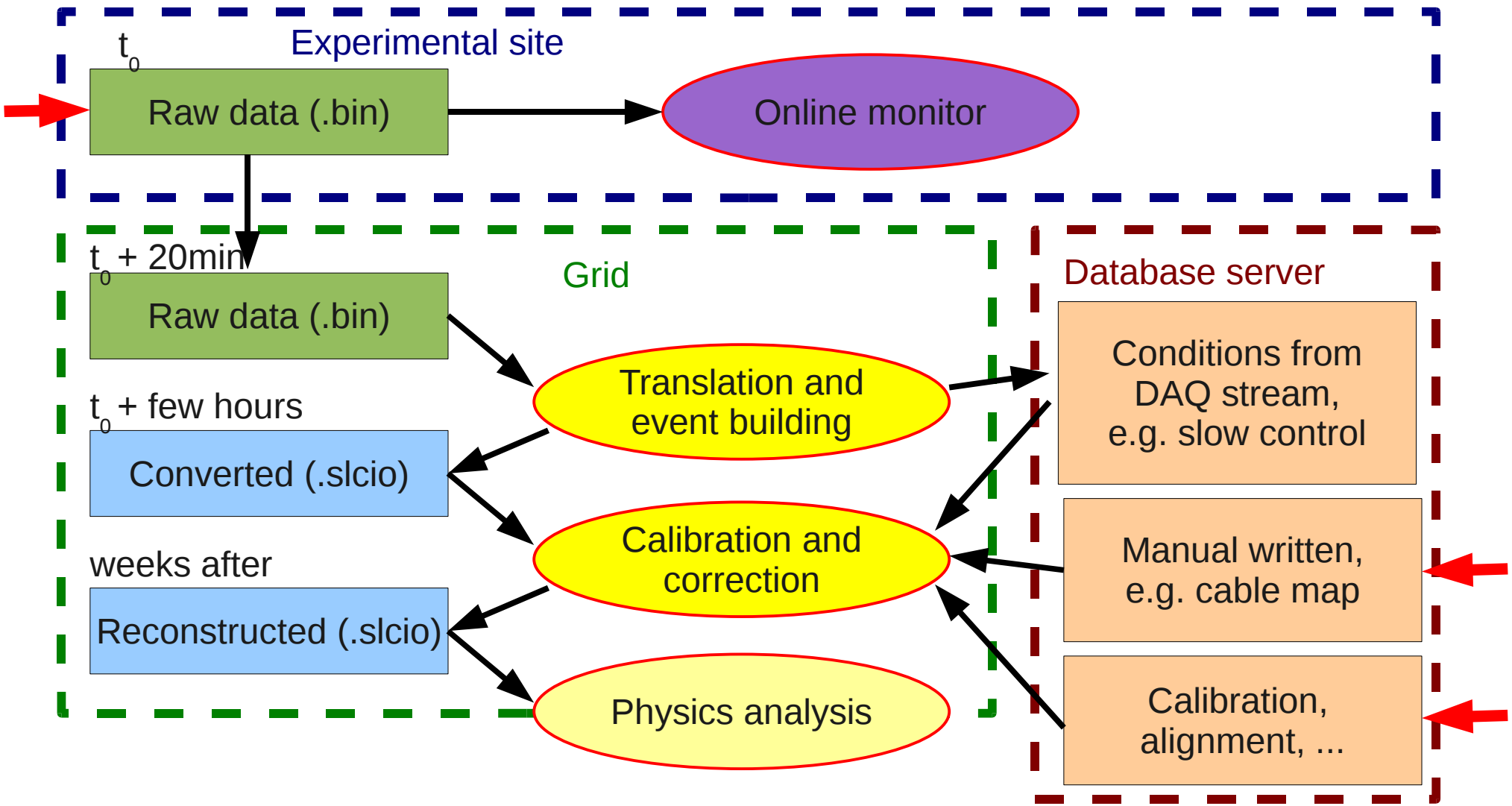
- Data storage: LCIO
- Data processing: Marlin
- Conditions handling: LCCD + MySQL database
- Simulation: MOKKA
- Grid computing to handle large data volume and to have access to large computing power

All of these tools are still improving, and it is sometimes tedeous to learn them. However, we would not be where we are if it was not to them!

CALICE Developments

- Online data format
- Tracking:
  2-D space points only, independent measurements in horizontal/ and vertical dimension
- Alignment:
  adopted ECal scheme of mapping and alignment, patched for TCMT and HCal cell size
- Channel mapping:
  depends on DAQ elements; similar for all detectors at the moment, but this will change
- Geometry (neighbours etc.): implicit only

Data Flow

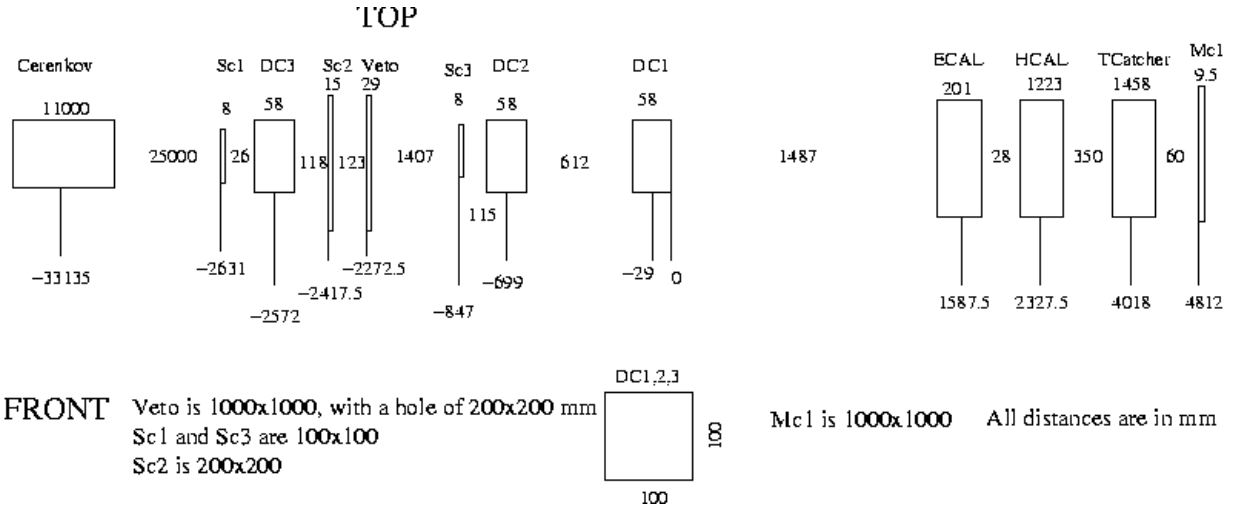

Experimental site
t0
Raw data (.bin)
Online monitor
Grid
t0 + 20min
Raw data (.bin)
t0 + few hours
Converted (.slcio)
weeks after
Reconstructed (.slcio)
Translation and event building
Calibration and correction
Physics analysis
Database server
Conditions from DAQ stream, e.g. slow control
Manual written, e.g. cable map
Calibration, alignment, ...

Data Formats

- Binary data format: DAQ-motivated and time-tagged data containers ('records'), no time ordering
- Raw LCIO files: CALICE-specific classes implementing `lcio::LCGenericObject` corresponding to DAQ data records, bundled to events
- Database: classes similar to those of raw LCIO files, whose information is valid longer than one event
- Reconstructed LCIO files: standard LCIO classes for calorimeter data, CALICE-specific for tracking. Some CALICE conventions apply for units and cell ID encoding

Simulation

- Detailed shower simulation including beam instrumentation using MOKKA/Geant 4



- Digitization using LCIO/Marlin/LCCD; partially identical reconstruction for data and MC; partially using digiSim
- Hot topic: Independent geometry description in data (LCCD-based conditions) and MOKKA (special database for free parameters)