CALICE Software Framework

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CALICE Collaboration

Applying/Testing ILC Software Tools in ILC Detector Development

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Introduction

CALICE collaboration is preparing/performing large scale testbeam
(See Calo Session)

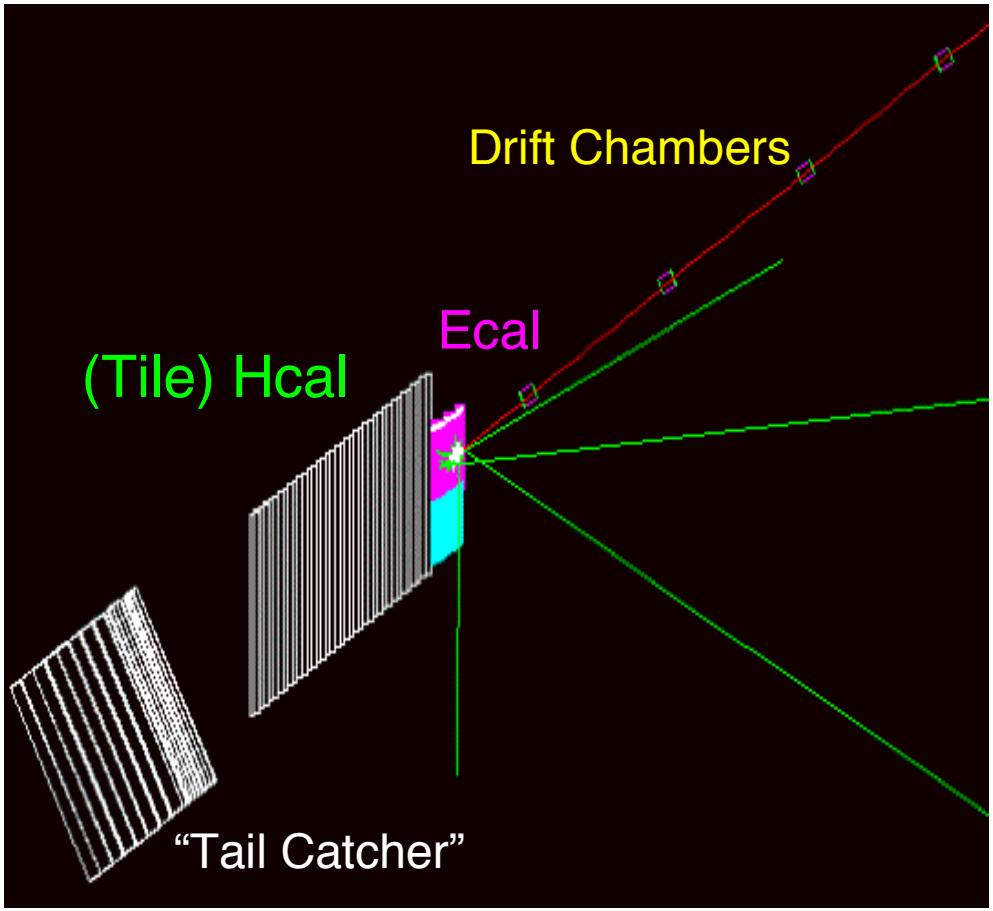
Testbeam program poses software “challenges”

- Detailed simulation of testbeam setup

- Data processing from Raw Data to final Clusters in user friendly way

- Handling of Conditions Data

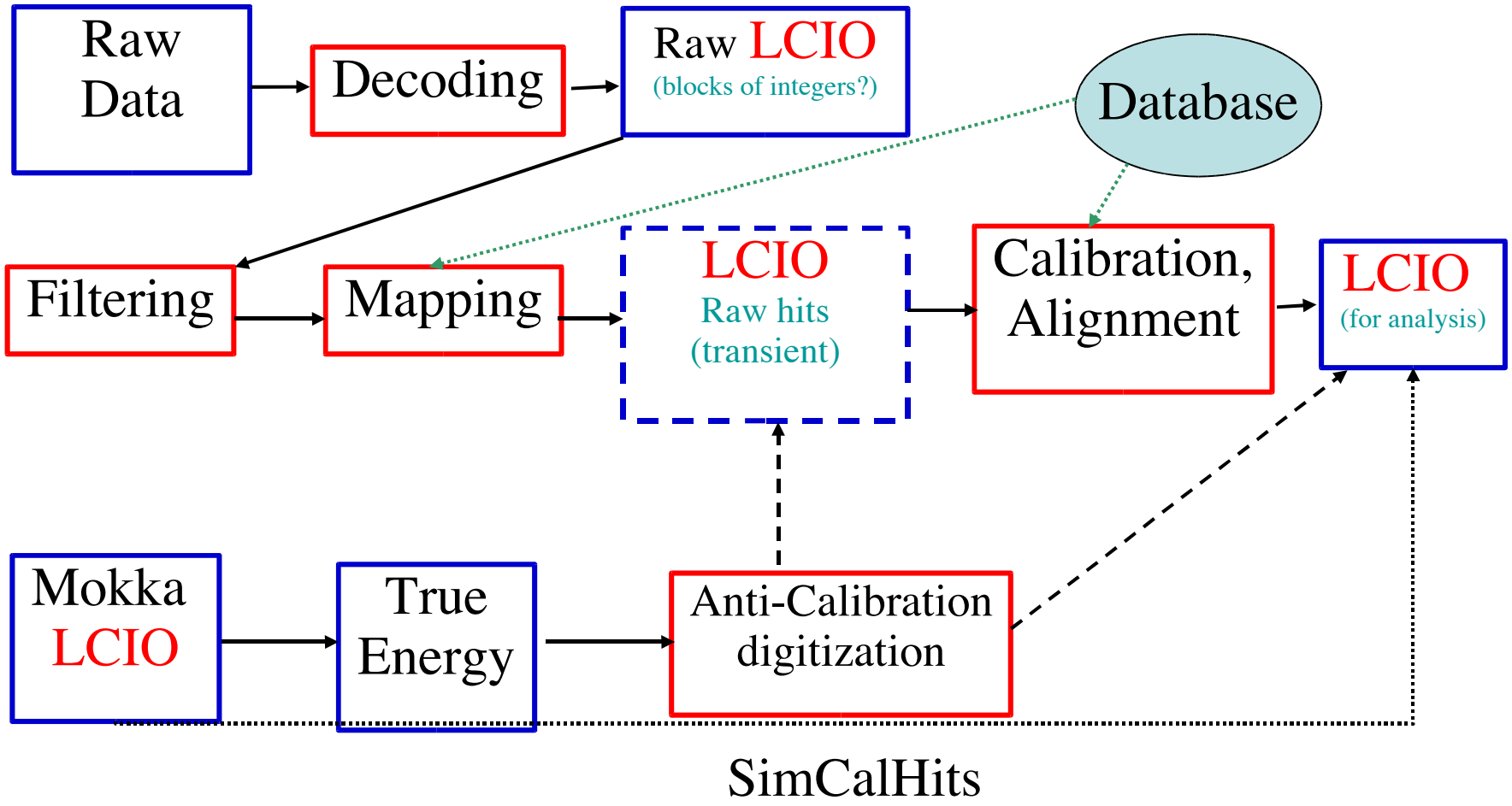
Testbeam software is to be developped within ILC framework



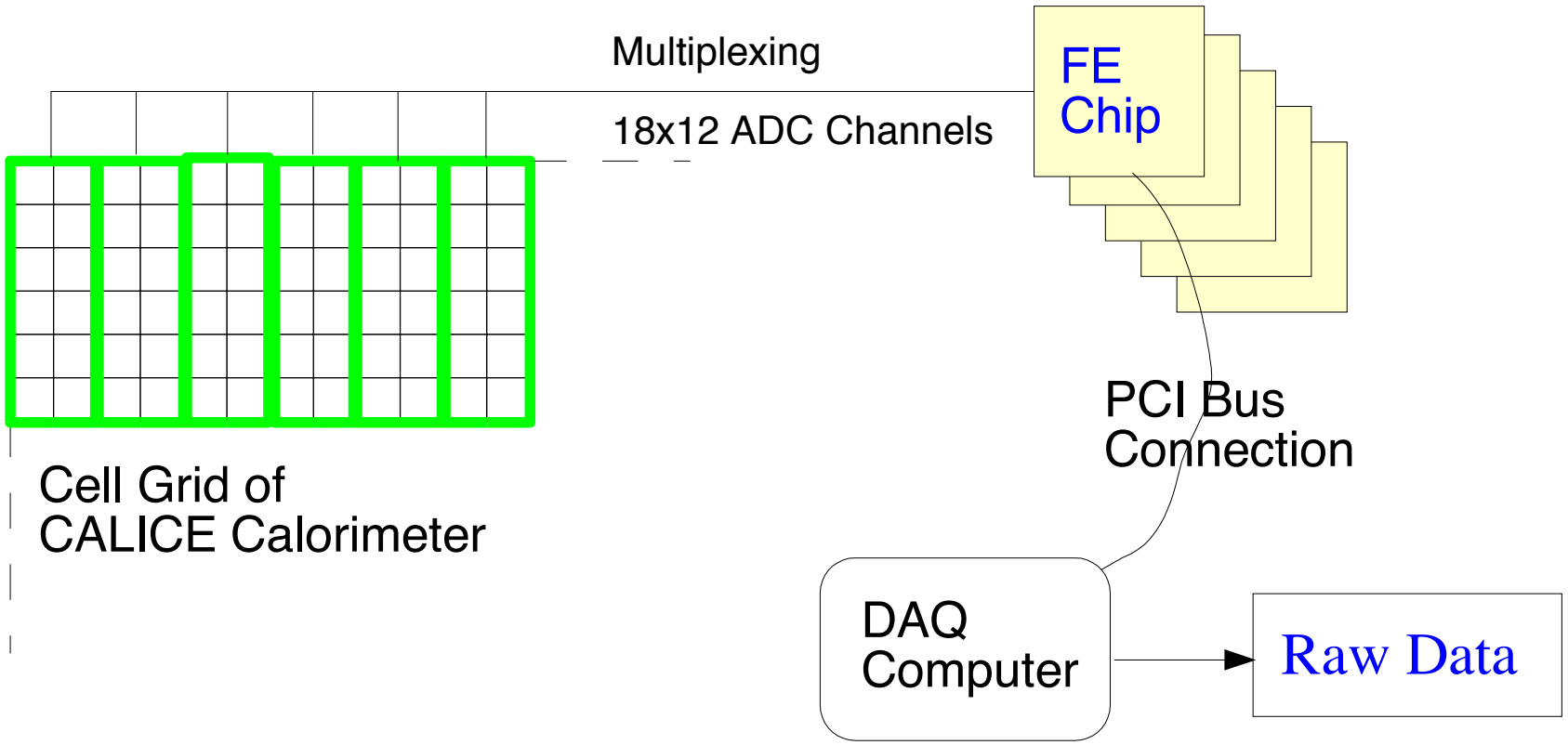
Complete testbeam setup available in Mokka TB07

Dataflow in CALICE Testbeam

LCIO as backbone of Testbeam Analysis



CALICE DAQ Scheme – Poor Man's View



- DAQ is organized 'hardware friendly'
  Data received and stored as sequence of 32 bit integers
  Needs expert knowledge to analyze the data

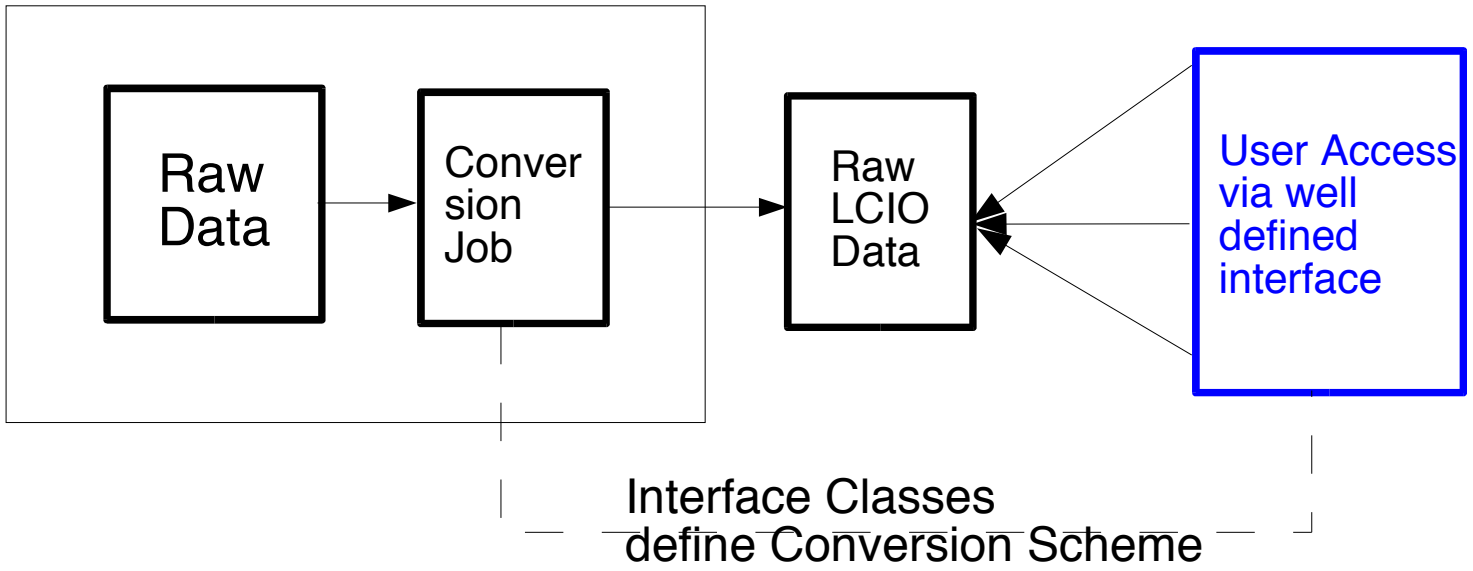
- 'Many' people should get involved in calibration/monitoring

- Provide data in 'user friendly' format

Raw Data Conversion to LCIO

Raw Data should be available in LCIO Format

Requirements: - 'Intelligent' Conversion from Raw Data to LCIO Raw Data
- Provide all Info on Raw Data also in LCIO Raw Data in a user friendly way

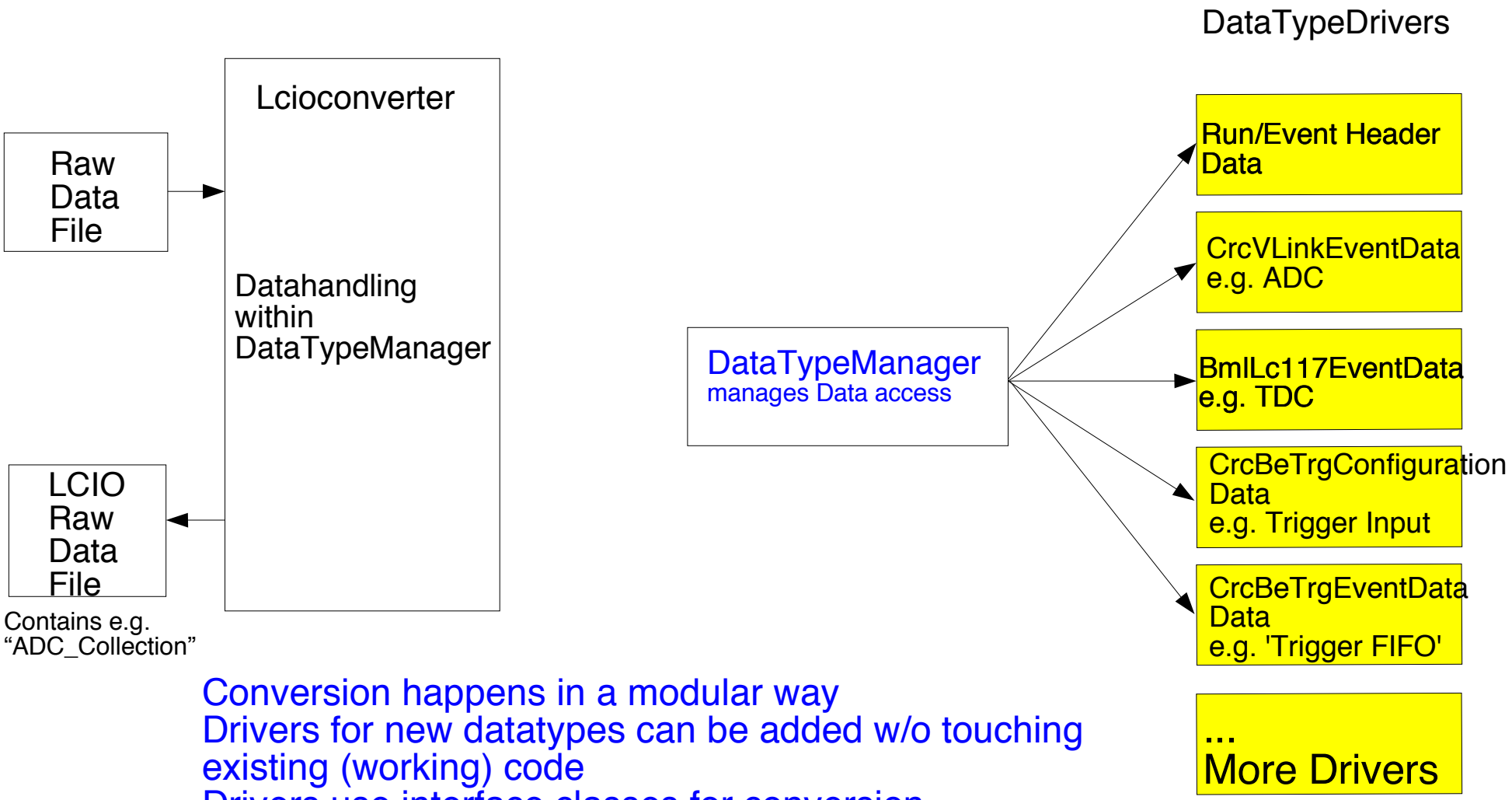


Interface is to be completely decoupled from online software

Dedicated Interface Classes are defined using LCIOGenericObjects

Conversion to LCIO

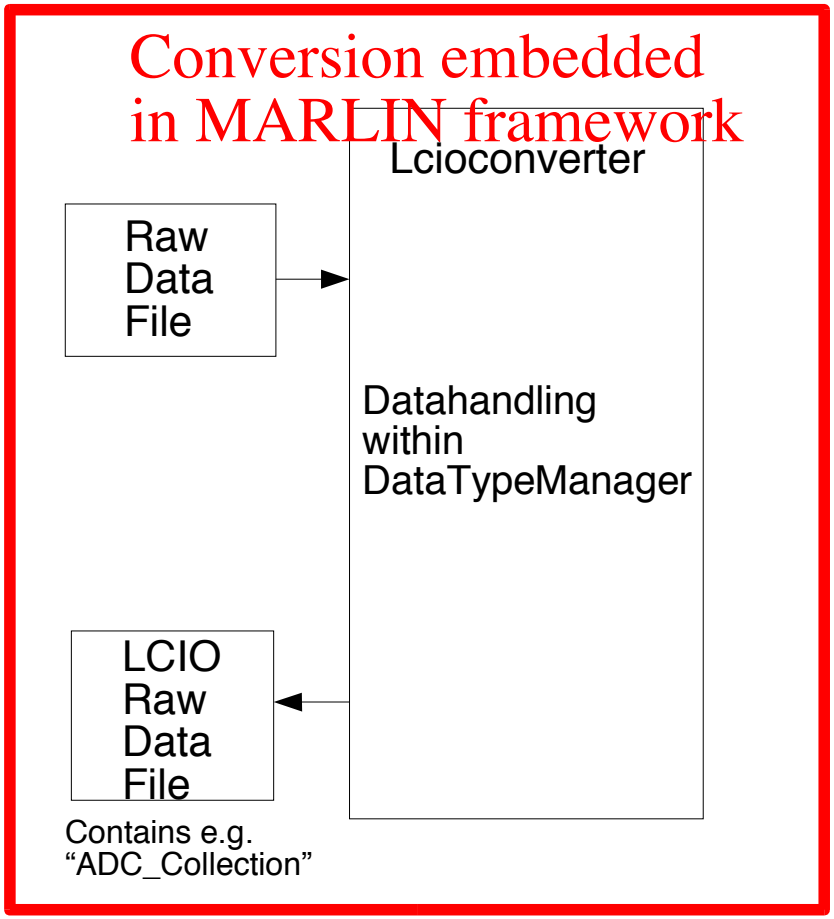
Documentation: `http://www-flc.desy.de/store/hcal/simsoft/calice_soft/lcioconverter/v01-00-pre/doc/`

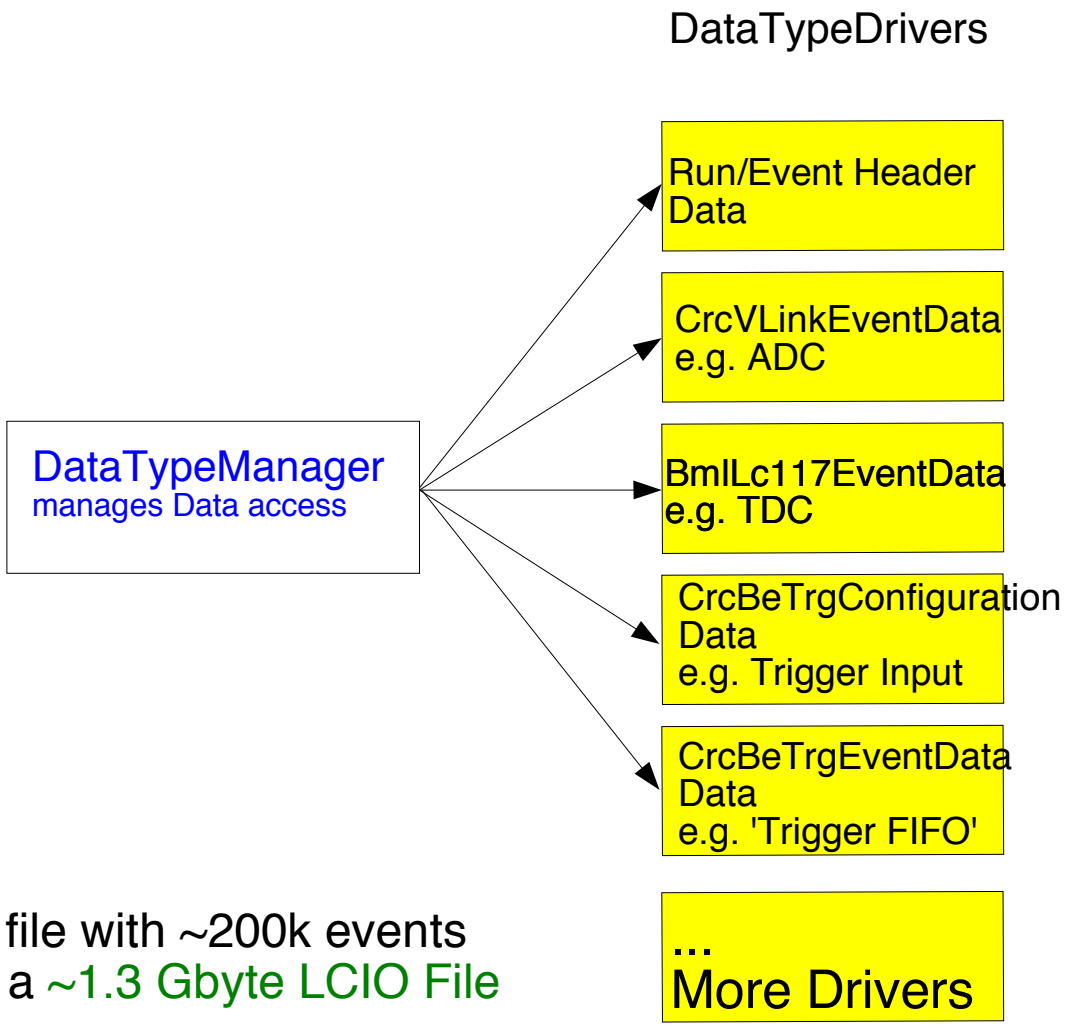


Conversion happens in a modular way
Drivers for new datatypes can be added w/o touching existing (working) code
Drivers use interface classes for conversion

Conversion to LCIO

Documentation: `http://www-flc.desy.de/store/hcal/simsoft/calice_soft/lcioconverter/v01-03/doc/`





- Filesize: 2 Gbyte Raw Data file with ~200k events
  (currently) leads to a ~1.3 Gbyte LCIO File

- Conversion time: 15 Minutes per File
  Intel(R) Pentium(R) 4 CPU 2.40GHz

Major Software Release

Release comprises four packages

1) calice_lcioconv v01-03: Conversion of native Raw Data to LCIO

Most interesting for users:
2) calice_reco: v01-02: Interface classes to access the converted data
Reconstruction software under development
Version for Ecal exist (see later)

3) calice_online v01-01: Software tools needed to access the native raw data in the conversion job

4) calice_cddata v01-01: Small routines to populate the Calice database with conditions data entries
More on database issues later

Please consult the calice software archives for further details
e.g. Hints on example jobs
http://www.listserv.cclrc.ac.uk/archives/calice-sw.html

Converted Files and Data Access

- Ecal data from february are converted with new release
  Runs 100050-100224
  Software is in use to convert data taken with first Hcal Modules

- Data are centrally stored in DESY dCache pool
  e.g. For Hcal
  /pnfs/desy.de/calice/tb-desy/<year>/native/<month>/dat
  /pnfs/desy.de/calice/tb-desy/<year>/raw/<month>/conv_prelim

- Ecal Data are registered in the Grid
  Access is pretty easy after you have your certificate and are registered
  to the Virtual Organisation 'calice'

  lcg-cp lfn:RunXXXXXX_lfn.slcio <your local directory>

  or create local replicas, see http://grid.desy.de for details

Datatypes currently available after conversion

- ADC Data
- TDC Data
- Event Data
- Trigger Data

} Persistent in LCIO file

- Hardware Configuration Data
  (Conditions Data)
  Made Persistent in Database

Handling of Conditions Data

Application of LCCD for Testbeam Data Processing

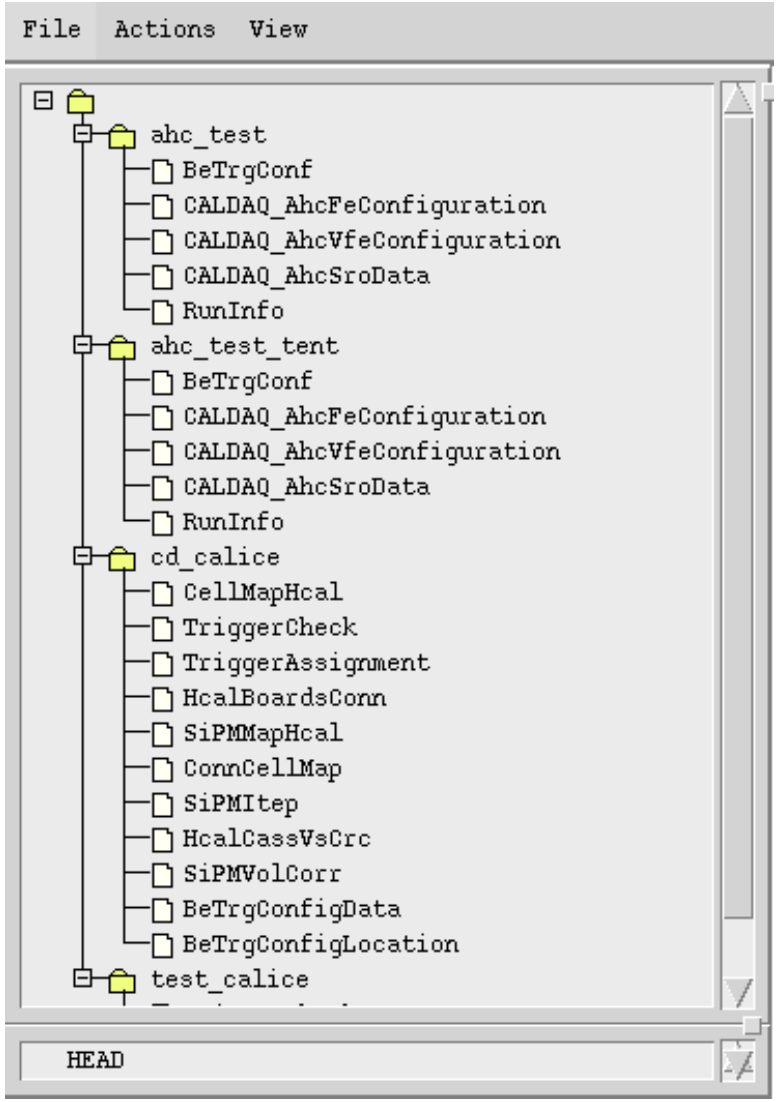
- LCCD – Linear Collider Conditions Data Framework:
  - Software package providing an Interface to conditions data
    - database
    - LCIO files

    Author Frank Gaede, DESY

- Conditions Data:
  - all data that is needed for analysis/reconstruction besides the actual event data
  - typically has lifetime (validity range) longer than one event
    - can change on various timescales, e.g. seconds to years
    - need for tagging mechanism, e.g. for calibration constants
    - Realized by using CondDBMySQL package (Lisbon ATLAS Group)

- Conditions Data for CALICE are centrally stored in a MySQL database which is hosted by DESY

Current Content of Database



Started Project to visualize
Conditions Data
(S.Schmidt, M.Schenk, R.P.)

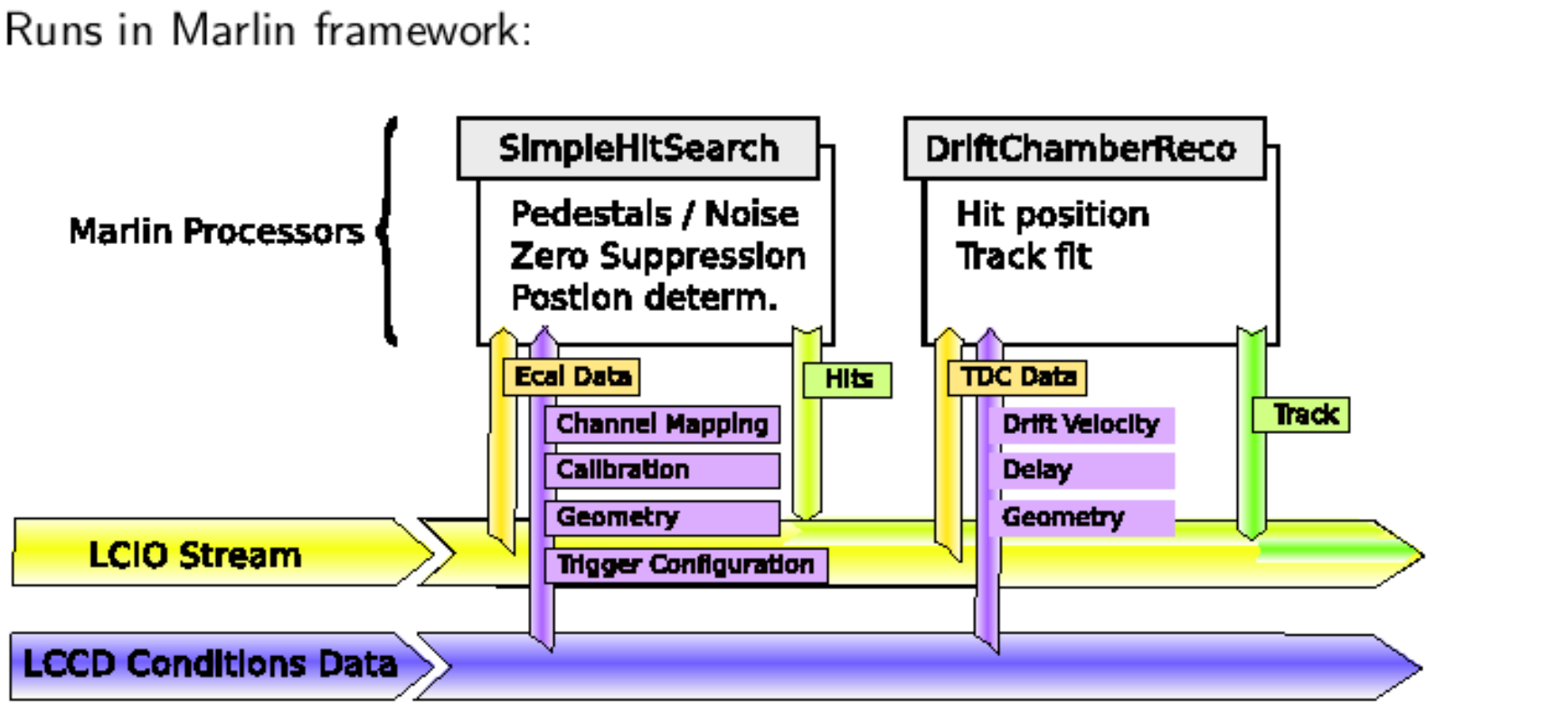
Trigger Info: Assignment of triggerbits
Trigger Configuration
Info to validate Trigger information

Cell Mappings: Relation electronic channel and
geometrical channel
Relation SiPM Number and geometrical channel
Dedicated info on SiPMs

Hardware configuration during data taking.

Reconstruction Software

Reconstruction uses LCIO objects as input



G. Gaycken, LLR

Plan to provide a set of calibrated data for high level analysis
e.g. Clustering using MAGIC (see C. Ainsleys talk)

Summary and Outlook

Significant progress in infrastructure to process calice data

- CALICE uses general ILC Software tools for data processing
- Major release of calice software end of August
  Next major release in preparation, e.g. Reconstruction Processors
- Database server installed at DESY
  flccaldb01.desy.de
- Tests of complete chain were successful
  First conversion of Ecal into LCIO
  Automized chain used for conversion of Hcal Data
- Calice Data are available on the Grid
- Need to increase the user community