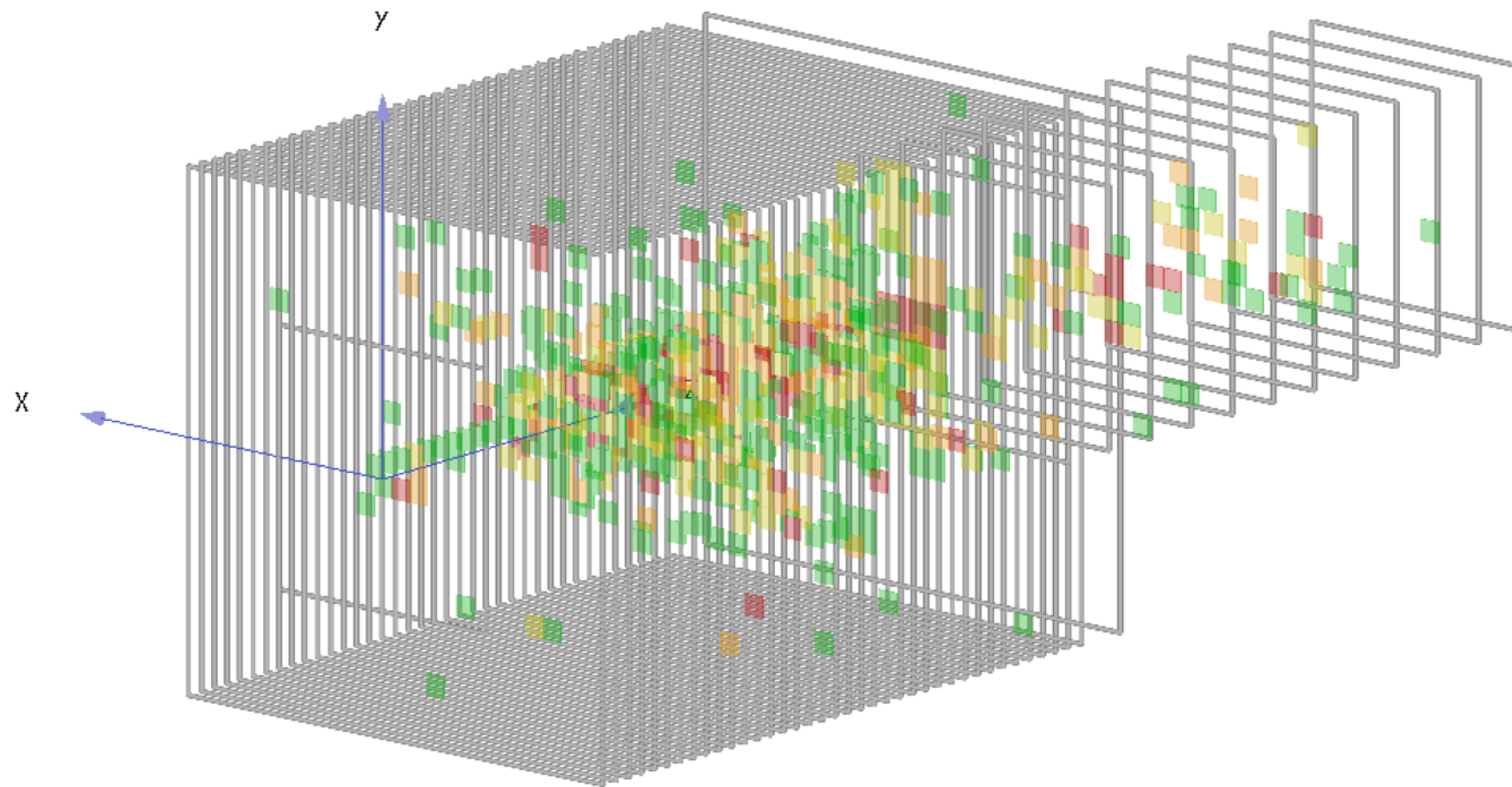


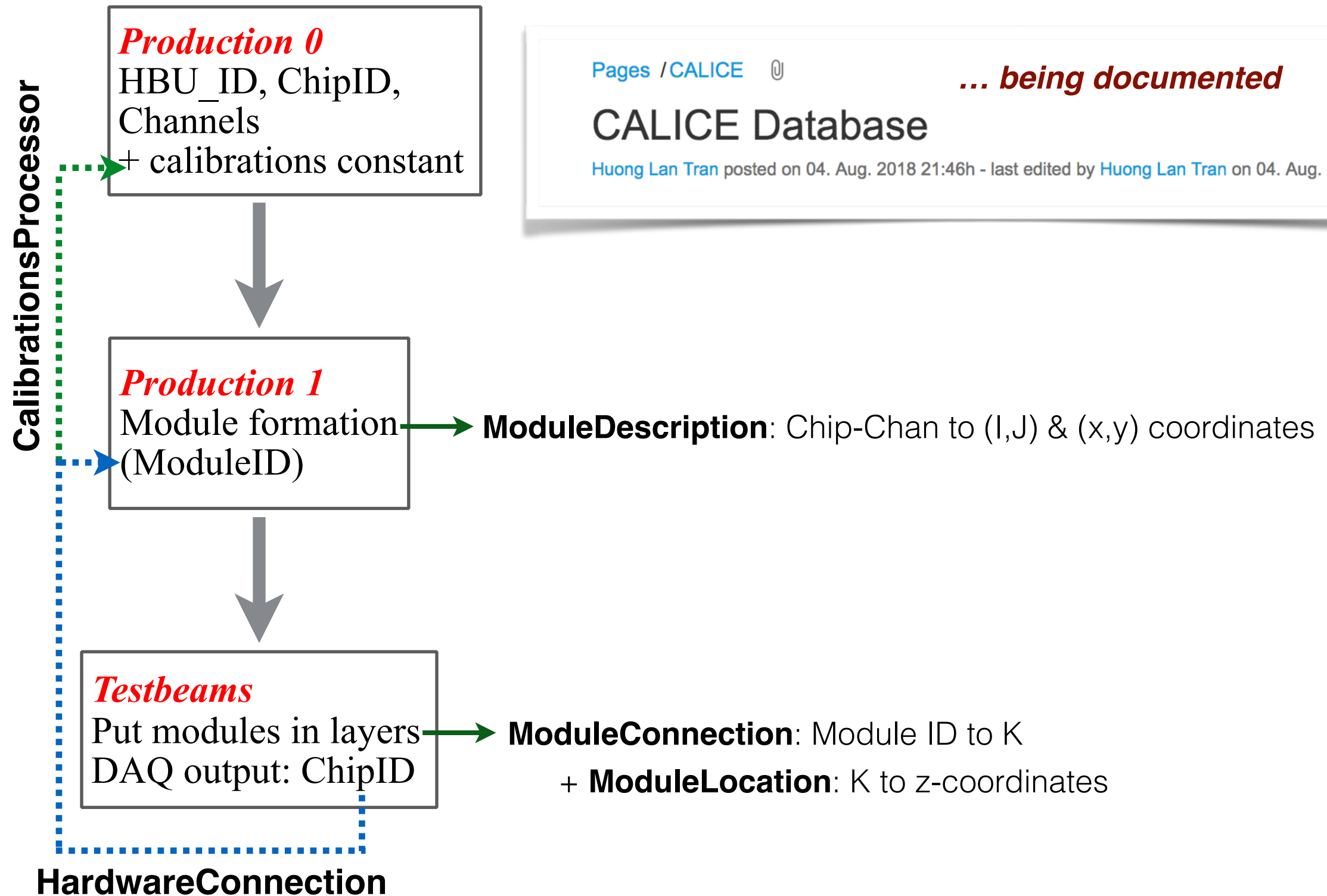


Database/Simulation/Software



Eldwan Brianne, Christian Graf
Yuji Sudo, Huong Lan Tran
Tokyo analysis workshop
6.8.2018

Database

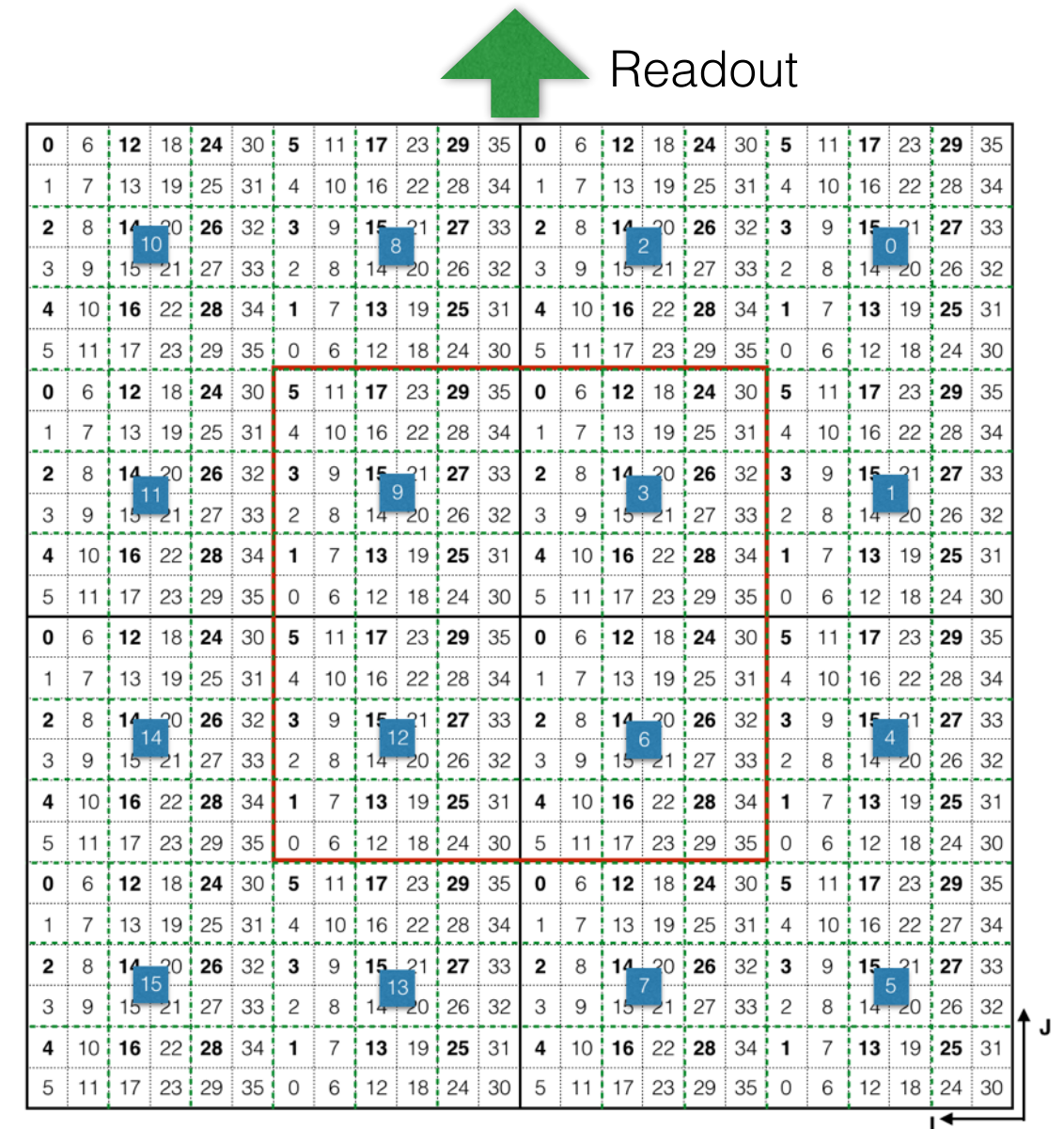


Database

Module description: give a correspondence between module channels and I-J coordinates

Example: a 2x2 HBU module has 576 channels, the I,J coordinates go from 1 to 24.

- Very strict correspondence (1-to-1 between channel and I-J coordinates)
- For HBU, two different module type are defined:
 - Module with single HBU: Module type **1**
 - Module with 2x2 HBU: Module type **2**
- For previous beam tests with EBU modules, I,J translation is a bit more complicated due to geometry of EBUs: EBU tiles are 5x45 mm and different readout types (with respect to tile direction) are tested:
 - Vertical EBU with bottom readout: Module type **3**
 - Horizontal EBU with baseline readout: Module type **4**
 - Vertical EBU with baseline readout: Module type **5**
- **June/July 2018 test beam:**
 - “Tokyo” module: Module type **6**



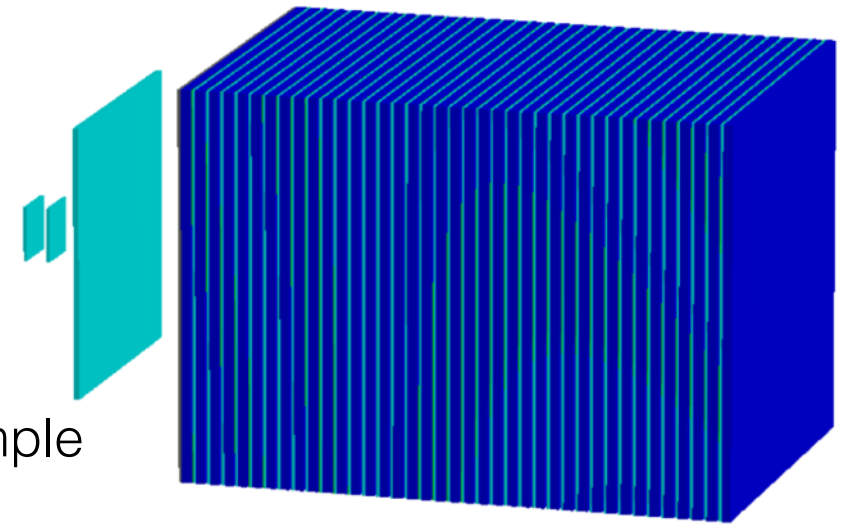
Simulation

May2018 testbeam:

- Detector simulation uncomplicated
 - 38 modules of 2x2 HBU put in 38 consecutive layers
- Simulated samples after reconstruction:

/nfs/dust/ilc/group/flchcal/MCProd_May2018/r4828_v01/reco/

e- & pi- (10, 30, 50, 100 & 150 GeV), 50-100k events per each sample



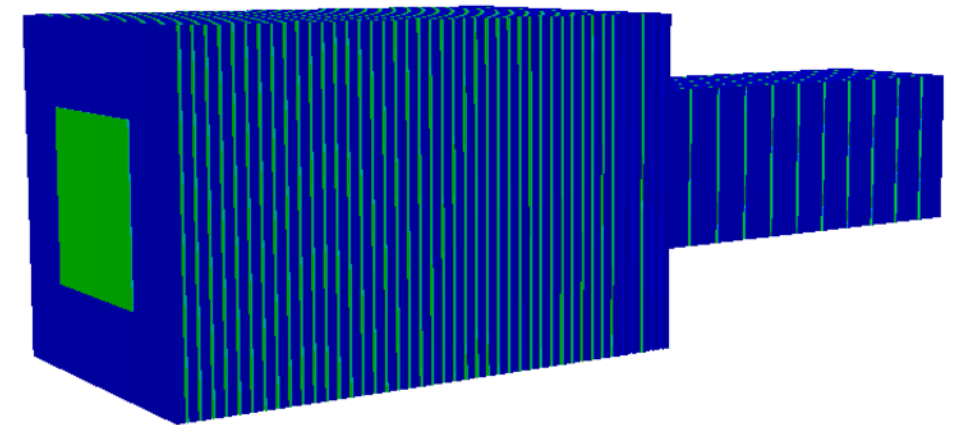
June2018 testbeam:

- Detector simulation more complex with 3 different module types
 - Single HBU, 2x2 HBU, 2x2 HBU with 6x6 cm² tiles
- Simulated samples:

/nfs/dust/ilc/group/flchcal/MCProd_June2018/sim/

e- & pi- (10, 30, 50, 100 & 150 GeV)

~50k events per each sample



- **Simulation steering files are found here:**

/afs/desy.de/group/flc/hcal/calice_soft/pre-v04-11/calice_dd_testbeams/

Software: analysis chain

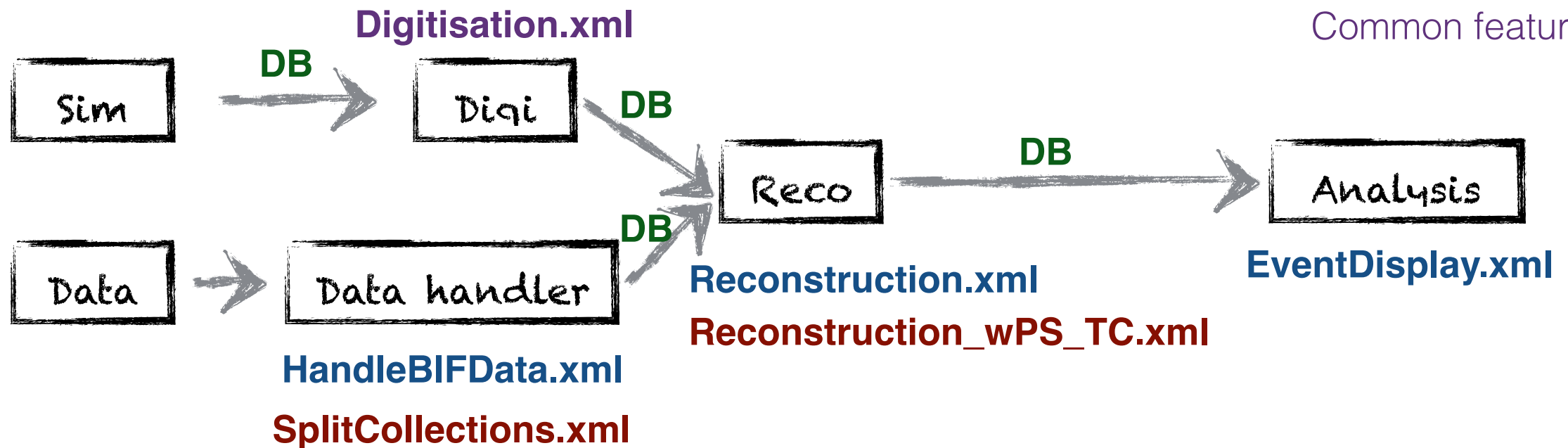
- All steering files needed are found here:

/afs/desy.de/group/flc/hcal/calice_soft/pre-v04-11/calice_steering/

May testbeam

June testbeam

Common features



- **Digitisation:** Trigger simulation, Run time (simulation has no time so need to give it a time corresponds to testbeam time in order to read the database), MIP to GeV conversion, ROC threshold, SiPM saturation simulation, time smearing
- **HandleBIFData & SplitCollections:** To write BIF data into desired hit collections (For June/ July test beam: 3 collections like in simulation (PreShower, HCAL, Tail Catcher))
- **Reconstruction:** Calibrate hit energy using pedestal, gain, MIP, etc. calibration constants
- **Event display:** Display events after reconstruction

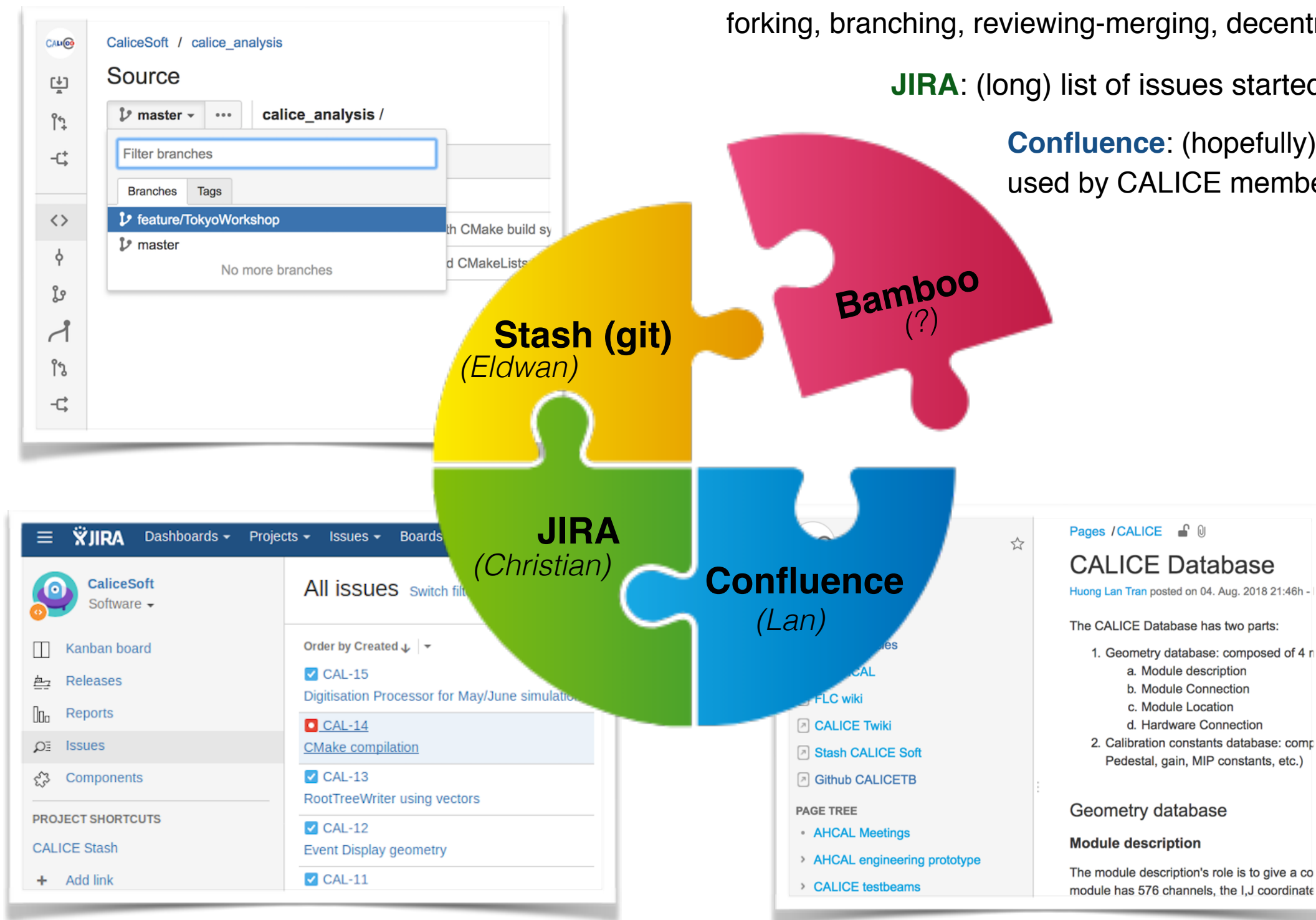
Software management

- Successfully moved to more manageable frameworks provided by DESY

Stash: So far works quite well, all functionalities tested: forking, branching, reviewing-merging, decentralised

JIRA: (long) list of issues started to form

Confluence: (hopefully) has been used by CALICE members for info



Outlook

- **AHCAL technological prototype** with impressive progress over last few years:
 - Different hardware and configuration motivates some improvements/changes in simulation, database and reconstruction
- **Simulation** framework: well established, still more to be understood (additional material, beamline simulation, etc.)
 - Once well understood, mass production on GRID
- **Database**: Now better understood by more people, used by more processors to avoid complications in coding
 - *ModuleDescription* and *HardwareConnection* are kept long-term (adding when having new hardwares)
- **Software**:
 - Successfully moved to better manageable frameworks
 - Only works if we take it seriously