Software Coordinator's Report

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ILD SW&Ana Meeting, Mar 22, 2017

Outline

- LC Software Hands-on Meeting at CERN
- News on Simulation
- Reconstruction PFA

- this week LC software experts from all three concepts meet at CERN to work on software and discuss common issues and plans:
  - **transition of iLCSoft to to Github**
  - restructuring of iLCSoft packages
  - implement (some) missing features
  - resource coordination
  - work on iLCDirac

Transition of iLCSoft to Github

- almost all iLCSoft packages are now on **`https://github.com/iLCSoft`**:

  - LCIO
  - Marlin
  - lcgeo
  - Clupatra
  - MarlinFastJet
  - MarlinTrkProcessors
  - Overlay
  - MarlinDD4hep
  - DDMarlinPandora
  - CED
  - CEDViewer
  - CondDBMySQL
  - ConformalTracking
  - DDKalTest
  - FastJetClustering
  - ForwardTracking
  - GEAR
  - iLCInstall
  - iLCUtil
  - ILDConfig
  - ILDPerformance
  - KalDet
  - KalTest
  - KiTrack
  - KiTrackMarlin
  - LCCD
  - LCFIVertex
  - LCTuple
  - MarlinKinfit
  - MarlinKinfitProcessors
  - MarlinReco
  - MarlinTrk
  - MarlinUtil
  - MemoryMonitor
  - RAIDA

- some packages are on other GitHub repositories:

  - AidaSoft/DD4hep
  - AidaSoft/aidaTT
  - lcfiplus/LCFIPlus
  - FCALSW/FCalClusterer
  - PandoraPFA/PandoraPFA
  - PandoraPFA/PandoraSDK
  - PandoraPFA/LCContent
  - PandoraPFA/PandoraAnalyis
  - danerdaner/LICH

Transition of iLCSoft to Github

- packages not yet on `https://github.com/iLCSoft`:
  - leave it to authors/package maintainers if they want join iLCSoft
  - or create their own GitHub repository

- BBQ
- Druid
- Eutelescope
- Garlic
- MarlinTPC
- PathFinder
- Physsim

- let us know if you want to include your package in GitHub/iLCSoft

Some Technicalities of transition to Github

- in transition made sure all packages have a
  - LICENCE file
    - if they use *LCIO* or *Marlin* we have added: **GPLv3**
  - a README.md with
    - basic introduction to package
    - **copyright** statement, e.g.
    - copyright: the *package_name* authors
  - AUTHORS file
    - listing authors that have made *significant* contributions
  - ./doc/ReleaseNotes.md

let us know if any of these files are not correct or incomplete

- in particular the AUTHORS file

Implications of transition to GitHub

- everyone contributing to iLCSoft needs to get a **GitHub account**
  - at `https://github.com` - using their real name

basic GitHub workflow

- create a fork of the package repository
- make your changes in a dedicated *feature branch*
- commit (push) to your private fork of the repository
- create a Pull Request (PR) on the GitHub page
- experts will review your changes and eventually merge them

- see `https://github.com/iLCSoft/ilcsoftDoc` for details
- will have a Git tutorial at the ILD workshop in Lyon

Why move to Github ?

- using git and GitHub forces a rather steep learning curve on people used to SVN - but

many advantages of using git and GitHub

- **Review Mechanism**
  - everyone can review and comment on PRs
  - no experimental or sloppy code gets merged into the main repository
  - (users can push this to their own forks)
- **Continuous Integration**:
  - every PR starts *builds and test* for different compilers
  - only if these are successful the PR will be merged
- **Static Code checking**
  - will set up *Coverity* services for all packages
  - finds *logical flaws* in code
- users and account management done by GitHub

restructuring iLCSoft packages

- managing ~40 packages is not trivial
- could potentially simplify maintenance and release cycles by combining into larger **meta packages**
- need to account for:
  - main authors/librarians
  - list of main developers
  - package dependencies
  - leave generic packages stand alone

- started this week with investigating potential package structure

restructuring iLCSoft packages - some first ideas:

- LCTrackingCore
  - core tracking libraries - no Marlin processors
  - aidaTT, MarlinTrk, KiTrack, KiTrackMarlin (rename ?)
- MarlinTracking
  - marlin packages with tracking processors
  - Clupatra, ForwardTracking, MarlinTrkProcessors, ConformalTracking
- merge FastJetClustering into MarlinFastJet and then to MarlinReco
- potentially move more marlin packages to MarlinReco
  - phase out packages that are not used and/or not maintained from MarlinReco
- *details to be worked out* as we go along

other topics this week

- track selection in DDMarlinPandora
  - working on proper selection cuts for TPC and all-Silicon tracking
  - complete set of good tracks
  - no double counting
- missing features
  - ILDCellID0 -> LCTrackerCellID
  - LCTrackerCellID::encoder_string -> LCTrackerCellID::encoding_string()
- work on iLCDirac
  - main goal for ILD:
  - get production scripts running for large scale MC production with new software chain
  - work planned for rest of the week

coordination of resource usage

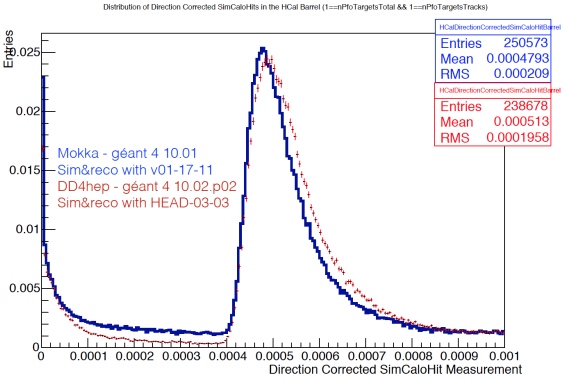
- discussed on Monday
- main production sites:
  - CLICdp - CERN
  - ILD - DESY, KEK
  - SiD - RAL (PNNL)
- use these primarily for storage
- how about CPU ?
- => use all available sites as long as we have no MC mass production scheduled
  - then allocate main production sites as needed

News on simulation

- FCAL has nominated B.Pawlik and S.Lukic to work on the implementation of forward calorimeters
- reviewed and updated version of LCal and LHCal
- implemented new L*
  - moved BeamCal closer to IP
- A.Perez will use this for pair-bg simulations using a realistic field map for the solenoid and the anti-DID
- still need test and validation of models and field maps
- work in progress ...

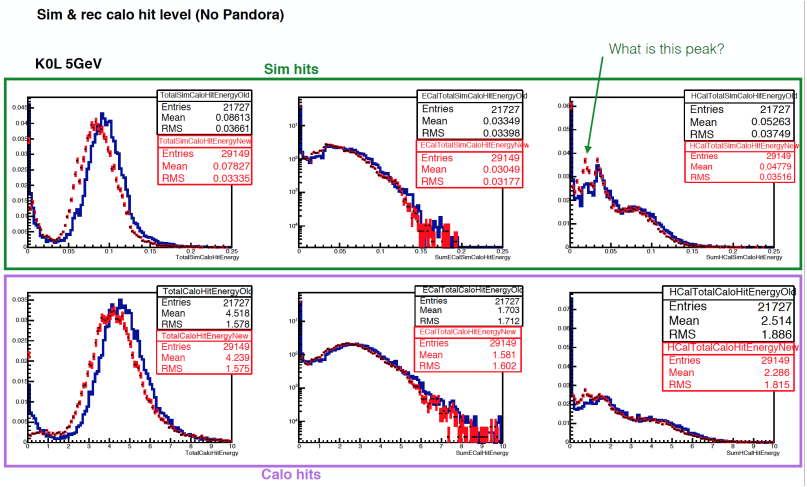
Reconstruction - PFA L.Tran

- tracking down differences in JER between Mokka and DD4hep based sim/reco
  - looking at single particle's hits and clusters
- observe differences already at single hit level (MIP) and total hit energies
- need to check simulation settings:
  - range cut (100 micron)
  - physics list (QGSP_BERT)
  - Birk's law
  - shower mode (timing)
  - ...



also observed with *same* Geant4 version

Reconstruction - PFA L.Tran



- observe significant differences also in total calorimeter hit energies (w/o PandoraPFA)
- mostly in **HCal**
- different *Digitizers* !?
  - low energy spectra
- continue to investigate

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