LArSoft Coordination Meeting

Release and project report

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Today's agenda and speakers

- Release and project report (Erica)
- CI validation workflow updates (Vito di Benedetto)
- AOB

Releases

- Since the last LCM on Dec 5 (!!):
  - v06_60_00 released Dec 14, 2017
    - Geometry service uses GenVector exclusively
    - Pandora changes
    - PMA uses new recob::Track conventions
  - v06_61_00 released Dec 19. 2017
    - More updates to track produces for compliance with recob::Track conventions
  - v06_62_00 released Jan 2, 2018
    - Re-designed BackTrackerService
    - trk::BezierTrack fully deprecated (issue #15446)
  - v06_63_00 released Jan 11, 2018
    - Added charge data to SpacePoint (via association with proxy for access)
    - caffe added so SLF distributions

Releases

- This week
  - Plan to migrate to *art* 2.09.03
    - Migration schedule had been delayed due to failures in DUNE CI tests
    - Those have been fixed
    - Skipping *art* 2.09.02 due to a bug

Thread safety of *art* services in LArSoft

- Met with art team regarding thread safety on art services
  - Services that have a fixed state defined before event processing are fine
  - Services with state that changes during event processing are problematic

    Examples include:
    - **All existing services** that access conditions data stored in a database
      - DetectorProperties
      - LArProperties
      - PedestalRetrievalAlg
      - etc.
    - **DetectorClocks**

Thread safety of *art* services in LArSoft

- The solution: re-architect all mutable services as follows
  - Calculate a state based on chosen data source
    - E.g., a database given run, sub-run, event and channel numbers
  - Store the result in the run, sub-run or event records, as appropriate
  - Access the necessary data at the point of use

- Features of this model
  - The service proper is stateless, so intrinsically thread safe
  - The service provider obtains it's state from the art run / sub-run / event record, which is thread safe by design
  - Solves the problem of how to calculate new conditions state (e.g., identifying channels that are chirping) on the fly, and have the results used in the same job by the relevant service provider

Thread safety of *art* services in LArSoft

- The plan
  - Review services to find those with thread safety issues
  - Propose solutions under the new model
  - Confer with art team to review the new designs
  - Proceed with implementation
    - Will probably need help from code authors
- Also:
  - Discuss other areas that might need to be addressed given how *art* will do multi-threading
  - Provide feedback to art team regarding how *art* can better support multi-threading

Handling of floats and CI tests

- Have noted some recurring issues in certain CI tests
  - Observed changes in data product related to how the code was using floats / integers
    - Unexpected based solely on the commits that preceded the change
    - We consider these to be bugs
  - Sometimes also see data product changes across platforms

- Some of these issues would be resolved with numerically stable floating point comparisons
  - LArSoft has utilities for comparing floats with (fixed) tolerances
    - larcorealg/larcorealg/CoreUtils/RealComparisons.h
  - Reminder to please use them or the equivalent when comparing floats

    Avoid irreproducible results!!

Space points with charge information

- A 3D position with charge information is needed
  - eg, for 3D pattern recognition algorithms, pixel detectors
- LArSoft proposed changes to recob::SpacePoint back in Sept.
  - Add charge information by association + proxy class to assist navigation
  - Make changes that clarify recob::SpacePoint as a 3D point abstraction
    - Complement those made to recob::Vertex to clarify role as fitted vertex abstraction
  - See https://indico.fnal.gov/event/15227/ for details
    - Also tracked in issue #18619
- This work is completed, and is now available in LArSoft
  - See Doxygen documentation for details

Platform support

- Support policy for El Capitan has been “best effort”
  - But have routinely built and distributed libraries
- With the migration to art 2.09.x, support policy for El Capitan changes to “unsupported”
  - Due to unresolved difficulties in building genie and lhapdf under El Capitan

Please let us know if this change results in undue hardships

Other news

- trk::BezierTrack has been fully deprecated
  - Still accessed in some code
    - Calorimetry, FeatureTracker, TrackTimeAssoc, BeamFlashCompatibilityCheck
  - Need help in fixing this
  - We request that experiments / authors remove all references to it
    - Please help us find someone who can do this

- LArG4 documentation
  - Added a new chapter describing conventions in output previously described only in the code
  - Includes, for instance, meaning of negative track ID's in sim:IDE
  - Feedback on this and all other documentation is encouraged

The end