Framework & Tracking @ LAL

Hadrien Grasland

LAL – Orsay

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Framework: moving forward

- DataHandles MR[1] is now ready for experiment evaluation
- A few experiment-specific concerns being resolved
- Once that’s in, can build conditions support on top of it…

[1] https://gitlab.cern.ch/gaudi/Gaudi/merge_requests/462

GSoC: Linear algebra activities

- **Goal:** Study xtensor stack as an Eigen alternative for ACTS
- **Current status:**
  - xsimd as a boost.SIMD alternative: OK
  - Matrix sum: OK (after xtensor contributions)
  - Matrix product and inversion: Not ready
    (Padded matrix storage needed, being integrated)
  - Student staying a bit more to compensate for a late start
- **Summary:** Promising, but will need more work after GSoC

CHEP: Numerical analysis studies

- **Goal:** Evaluate Verrou[2] (valgrind-based floating-point code instrumentation) for validation & single-precision studies
- **Current status:**
  - Presentation on Verrou + ACTS given at CHEP[3]
  - Found many classic FP smells… mostly in the test suite
  - Not a very effective tool for 32-bit float studies at the time, but has gotten dedicated support since
  - This aspect will be studied further for CHEP proceedings
- **CHEP feedback:** Needs better packaging to be attractive!

[2] https://github.com/edf-hpc/verrou
[3] https://indico.cern.ch/event/587955/contributions/2938061/

Packaging experiments

- Automating some builds & installations using Spack
  - **Goal 1:** Make “tricky” software easier for others to install
  - **Goal 2:** Reduce maintenance effort of my dev environment
- Time-consuming, but significant long-term benefits
  - Dockerfiles shrinking by a 10x factor
  - Local installs can be done with a one-liner
  - Build tricks shared with other spack users
- Current status:
  - **Done:** Templight, Verrou, ACTS (w/o DD4hep)
  - **In progress:** Gaudi, DD4hep

Longer-term targets

- Finish Gaudi conditions (once experiments are ready…)
- Resume Belle 2 tracking optimization effort
- Help ILC with Marlin parallelization & ACTS integration

Questions? Comments?