DUNE Software Architecture/Management

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DUNE Software Architecture and Management Meeting

January 17, 2025

Debugger Availability

- The forge_tools ddt license expired at the beginning of the year.
- I noticed it on January 9, 2025 – license server @ FNAL was unreachable on the network.
- Started INC000001186808 to track this request.
- Received word that the forge debugger license will not be renewed.
- Contacted Erica Snider and Marc Paterno about this.
- Is there a big enough community? Any money for such things?
- Alternatives: gdb CLI, ddd.
- I could not install ddd in my own SL7 container due to ftp.scientificlinux.org not responding to a yum request for SL7 RPMs.
- Upgrading the SL7 container may be difficult going forwards.

Geometry: GDML-Making Scripts

- GDML maintainers often move on to new roles, and new effort is recruited to modify GDML files.
- Many of our GDML files are constructed from Perl scripts in dunecore/Geometry/gdml – they are called from bash scripts in the same directory.
- Anselmo Meregaglia wanted to run a GDML-maker script in a SL7 container with dunesw set up and found he lacked LibXML.pm
- Long ago, when I did this when there was only SL7 (and no AL9), I had to install these things myself. Old instructions (do not follow!)
  https://cdcvs.fnal.gov/redmine/projects/dunetpc/wiki/_Tips_on_how_to_regenerate_these_
- SL7 is older than the MicroBooNE scripts our scripts were based on.

Geometry: GDML-Making Scripts

- Anselmo started RITM2297249, asking for libXML.pm to be installed.
- Tom found that the GDML-making scripts ran under AL9 on the dunegpvms – the necessary Perl modules were already installed.
- Only one minor hiccup – gdmlMaterials.pm is in dunecore/Geometry/gdml and needs to be included – not a system module. Just export PERLLIB="." to pick up modules in the current working directory.
- Workflow requires a mixture of SL7 container sessions and an AL9 session to create and test new geometries.
- We should complete the transition to AL9!

A More General Issue: Standalone Code

- dunesw contains runnable *art* plug-ins and necessary auxiliary files.
- It also contains documentation, example code, and various other un-built things that are meant to be run outside of the framework, possibly with special resources.
- duneexamples has gallery scripts. The GDML-making Perl scripts are another example. I also provide little standalone scripts and programs that emit electronics channel map information.
- We'd like to be able to distribute tools that are not built in the framework and are meant for experts to run in development and construction activities but not in user jobs.

Moving to ggd

- The Perl scripts are clunky and new users don't want to maintain them.
- Brett's ggd takes Python classes and emits GDML.
- DUNE's inputs are at:
  https://github.com/dune/duneggd
  and they rely on Brett's ggd:
  https://github.com/brettviren/gegede
- Nice talk by Nitish at the ProtoDUNE DRA meeting on Jan 15 about making FD-VD (and workspace) geometries with ggd
  https://indico.fnal.gov/event/67725/
- Questions: versioning! (no tags yet on duneggd, but Brett's repo is tagged. There's an 11-year-old fork of gegede in the DUNE github org). Tying versions to dunesw versions? Code and GDML often depend on one another.
- Perl scripts are included in dunecore. But the directory they're in is getting cluttered. Better solution as we move forwards? Scaling issues with many detectors, workspaces, versions.

More Automation Needed in GDML-Making Scripts

- It was mentioned at the DRA meeting on Jan 15 after Nitish's talk that there is some hand-editing of GDML files.
- Lots of code in dunesw's tree is hand-edited!
- But GDML files are made with scripts – some changes require rerunning the scripts as they change much of the GDML file.
- When debugging a geometry (and the bug sometimes isn't even in the GDML but in the associated code), or when adding new features, I find I have to repeatedly run the GDML-making script.
- Example – the refactoring modifiction
- A hand-editing step in this loop adds error-proneness: https://cdcvs.fnal.gov/redmine/projects/larg4/wiki/Migrating_to_the_refactored_larg4

is often accomplished by hand-editing a preamble in the GDML file.

dunetrigger

- Added to the dunesw stack as of v10_01_03d01 (Dec. 9, 2024)
- Some teething on adding a new product to the stack (my lack of knowledge of where everything is).
- Much of it is UPS-specific – we should write a wiki page with a list of everything that needs modification when a new Spack package is created.
- Roger Huang has volunteered to update the dunetrigger product with his PR that I copied from Wes's version.
- Issues with versioning of trigger algorithms and data products, as well as interface to WireCell brought up.
- Barnali suggests writing out small MC samples with raw digits so we can run the trigger sim at least on those.
- Dom suggests integrating it with WireCell so we can have more stats.

Spack Status

- Kyle has been helping Tom with trying out Spack MPD.
- Unit tests now work!
- Marc Mengel helped Tom with upstreams.yaml syntax
- Tingjun was able to follow Nathaniel Rowe's sbndcode spack build. Lots of bespoke handling of external packages
- I think MPD is the way forwards – supported by SciSoft and Marc's proposal to the LArSoft Coordination Meeting promised regular releases of LArSoft in Spack

- V says they are doing NOvA's spack releases.

CI Status

- Service Desk ticket submitted RITM2291872 to ask for a duneci account, needed for token authentication for updating reference histograms
- Progress on Jan 9, 2025: duneci account added (some slowness in getting a shared account created – different from a user account)
- To-do: Test if ref. histos can be updated – I suspect further changes are needed in the DUNE CI config files to use the duneci account to update the reference histograms.
- Also to-do: Write more CI tests.
- Example – Tom refactored (copied!) the PDHD decoder and channel map for PDVD. That way we don't risk breaking PDHD decoding when PDVD-specific changes are made. Need a test! But we're not done yet – TDE is not yet integrated in the DAQ.