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Mu2e Computing Status Report to SCD

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SCD Projects Meeting

September 1, 2022

General Comments

- August was a slow month due to vacations.
- Re-baselining:
  - DOE Review
    - BCP Review Sep 13-15
    - There will also be an ICR (not yet scheduled)
    - We will release the new Project and Operations schedules after.
  - Goal: ESAAB approval by Dec 2022.
- Collaboration meeting
  - Late October/Early November: date TBA

Slow dataset prestaging times

- Mentioned in May report, page 8
  - These have continued through the summer
- Recent example completed this week:
  - 18 days for 9700 files each ~22MB; total ~210 GB.
  - 28 SFA packs; contiguous files on a single volume
- Reason:
  - Processed in chunks of ~3 SFA packs so we paid ~10 tape mount latencies, each of order 1.5 days
- RITM1498073 to discuss ways to improve this
  - One improvement is already in the pipeline
- Mu2e will educate our colleagues to be aware of issues like this when when designing their workflows.

Running POMS jobs at NERSC via HepCloud

- Last issue is returning files to FNAL.
- Driver: typical 2 day turn around for each iteration
  - We have heard that there is a fast queue for small jobs but we don't know how to access it via HepCloud.
- Staff transition:
  - Our expert, Roberto Soleti (Chamberlin Fellow, LBL), has started a tenrure-track postion and is no longer on Mu2e.
  - New expert-in-training: Sophie Middleton (post-doc Caltech)
    - On vacation until next week
    - Ray Culbertson and I will help mentor her

TDAQ and Moving Data to Long Term Storage

- Pieces of the TDAQ system are in the Mu2e Hall
  - Includes the main buffer disk, hybrid SSD/HDD, and its hosts
  - Ray is installing and configuring the software to prepare for moving data from the disk buffer to dCache.
- An early measurement will be disk bandwidth:
  - Data stream is split into O(10-20) files
    - Some large and some small.
  - TDAQ will be writing at ~300 MB/s
  - Next step: copy to dCache
  - Would like to sustain 2x nominal in catchup mode
    - Is there bandwidth to do this?
    - Is there bandwidth to do more online DQM?

Communications tools

- Created Mu2e LDAP groups: members, retired, noncollab
  - Eventually “members” will have higher level access
- Mu2e web site transitioned to SSO only
  - Using the OR of these groups
  - Group password retired!
- DocDB
  - Anyone in these LDAP groups has access to group mu2e
  - Reviewers still access via group password
    - Will retire this in favour of lightweight accounts post review.

Ongoing work

- Nightly validation fails ~twice a month due to xrootd issues
  - Usually overloads by other groups.
- Support for test beams and vertical slice tests
- Calibration of cosmic ray data from Tracker VST
  - Exercising the conditions system
- Starting to use the MDC2020 output
  - Prototype alignment and calibration codes
  - Design special runs needed to support alignment, calibration, and background measurement.
  - Next generation self-paced tutorials
- Onboarding the Stopping Target Monitor (STM) into TDAQ and offline processing.
- I am preparing a review of data flow and handling from the detectors to physics analysis.

Backup Slides

Mu2e Sensitivity Update Paper

- Target Journal: MDPI Universe
- Paused for Snowmass and August vacations
- All that remains is to establish the author list
  - In progress

Understanding Calibration/Alignment

- Generate each dataset with 3 variants of calibration/alignment:
  - "Perfect": what we have done all along
  - "Startup": our best guess at an as-installed detector
  - "Best": our best guess at the asymptotic best we can do after we have completed calibration and alignment using data
- First look at misaligned/miscalibrated tracker:
  - "Best" has only minor loss of efficiency/resolution
    - Without any attempt to retune algorithms
  - "Startup" has ~20% loss in efficiency and degraded resolution
    - Without any attempt to retune algorithms
    - Encouraging