Muon g-2 AEM Update

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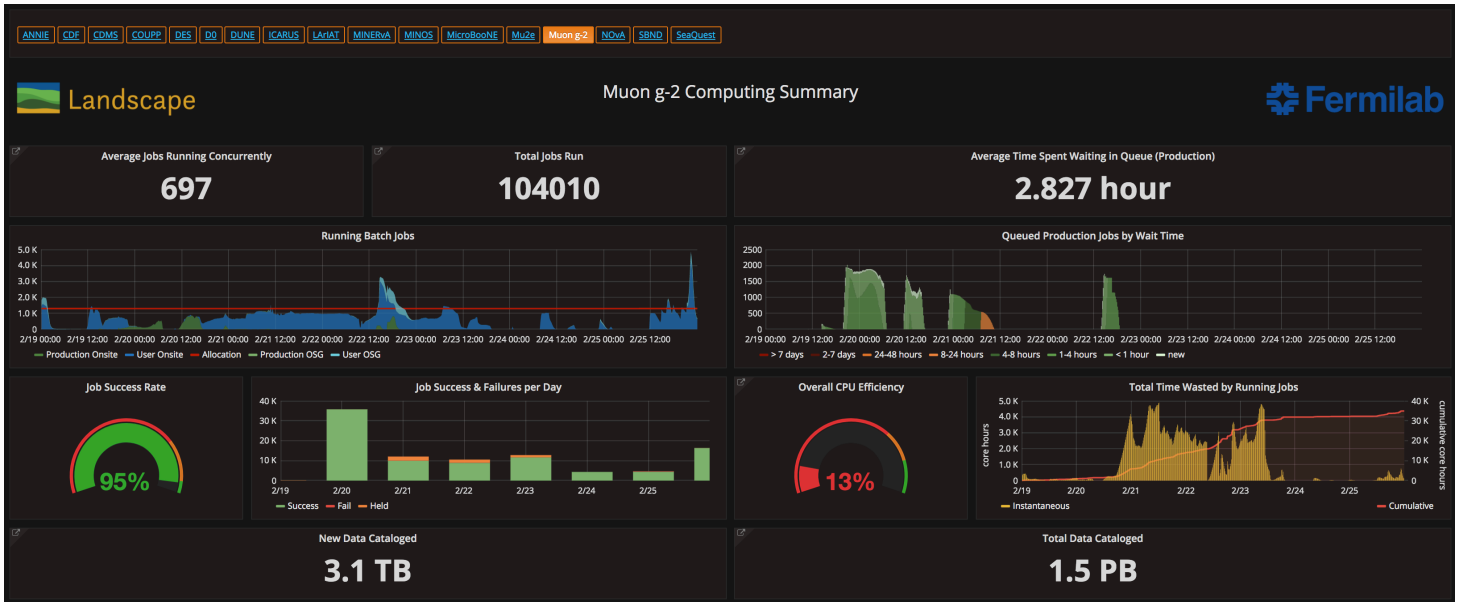
Computing 1/2



- We think we understand the low efficiency problems and are working on mitigations
  - We have unpacking jobs that take the raw binary output of the DAQ and convert those data into structures compatible with our offline system (art)
  - Because we have 24 independent calorimeter data banks, we made that unpacking code multithreaded to simultaneously unpack that data.
  - The multithreaded nature is important for our many-core nearline system in order to quickly process the data for data quality checks
  - The multithreaded nature was thought to be benign for offline reconstruction on FermiGrid, perhaps offering some slight speed improvement

Computing 2/2

- What we found out with profiling tools is that the multithreaded nature is not benign on FermiGrid.
  - An unpacking jobs requests the "default" number of threads when it starts up.
  - FermiGrid is configured such that the default number of threads is the maximum number of possible threads on the node
  - Hence, there can be tens of threads that do nothing per unpacking job
  - That leads to the very poor efficiency values
  - Running those unpacking jobs single threaded will increase the efficiency greatly. We're looking into how to do that without changing our code
  - The multi-threaded version of art, when released in the next few months, will also solve this problem as we can do more things multi-threaded and keep the CPU time high

Recovery of Quad system

- Last week the quad system was deformed
  - Broken Standoffs on inner plate
  - Broken Standoffs on outer plate
  - Distortion of inner plate

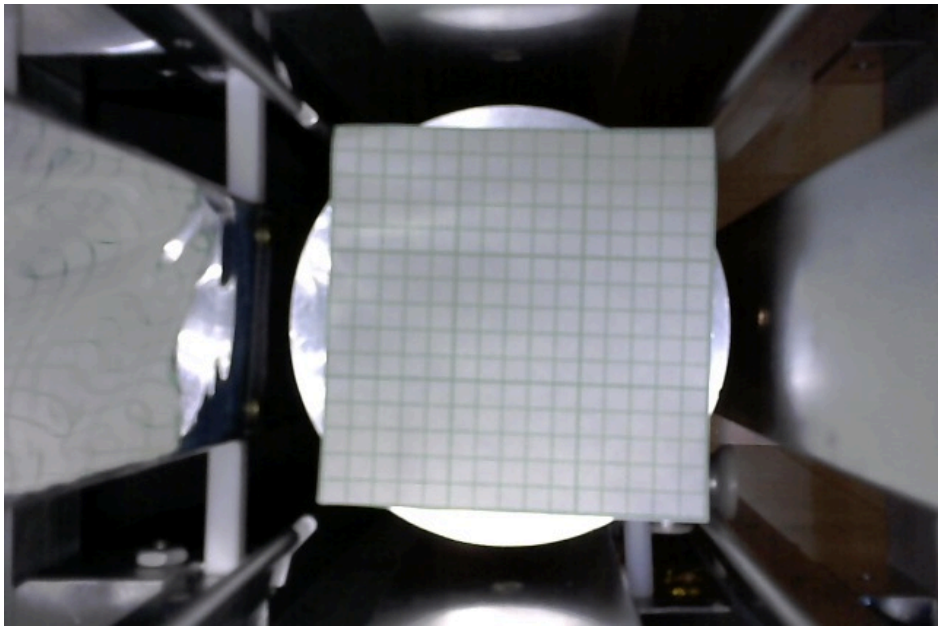
- Fri 2/16, Mon 2/19, Tue 2/20
  - Assessment and planning
  - Removal of inner plate

- Wed 2/21
  - Inspection of outer foil (thinner, as beam passes through it), checked out ok.
  - Detached remaining standoffs
  - Extracted inner plate, refurbished

Recovery of Quad system

- Thurs 2/22
  - Installed new standoffs on outer plate
  - Verified alignment of outer plate at few mm level

- Fri 2/23
  - Reinstalled inner plate, verified alignment
  - Verified trolley passes
  - Secured grid and took photos
  - Visual analysis of grid permits distortion estimates



- Sat 2/24
  - Cleaning
  - Reinstalled electrical
  - Checkout @atm to 1.6 kV

Plans forward

- Mon 2/26
  - Separate team inspected cleaning
  - Sealing the Vacuum
  - Purge with dry Nitrogen
- Tue 2/27
  - Pump down and leak check
- Wed 2/28
  - Checkout to 10/15 kV after 24 hours of pumping
- Thu 3/1
  - Checkout to 14.4/20.2 kV (nominal) after 48 hours of pumping
  - Test nominal run conditions with beam

Other Systems

- Kicker refurbishment
- Exchange of dry engine in cryo plant
- Noise reduction for fiber harps
- Re-tune plunging probe
  - Ramp magnet Monday Feb 26th, calibrate center trolley probe
- Aim to re-establish beam on Wed
  - Quads below nominal
  - Timing adjustments for kickers
  - Enable upstream tuning by AD
- Aim to re-establish nominal conditions on Thu
  - Note: we were not fully running prior to quad incident
  - Some systems need to complete their tuneups with field/beam