sPHENIX Update

Chris Pinkenburg (BNL)

57 weeks till first beam

MDC2 started Dec 1st

Catching up with our simulation needs

Requested Samples [edit | edit source]

ongoing

20M MB hijing (0-20fm) production link https://github.com/sPHENIX-Collaboration/MDC2/tree/main/submit/fm_0_20
10M MB pp production link (use MB as flag) https://github.com/sPHENIX-Collaboration/MDC2/tree/main/submit/HF_pp200_signal

Jet Structure [edit | edit source]

50M dijet events, q^2 20-30GeV^2
1-3M gamma-jet

HF [edit | edit source]

50M c-cbar production link (use Charm as flag) https://github.com/sPHENIX-Collaboration/MDC2/tree/main/submit/HF_pp200_signal
50M b-bbar production link (use Bottom as flag) https://github.com/sPHENIX-Collaboration/MDC2/tree/main/submit/HF_pp200_signal
1M c-jet
1M b-jet
50M inclusive jet
1M d-zero --> k- + pi+
1M d+ --> k- + pi+ + pi+
1M lamda_c+ --> p + K- + pi+
2M J/Psi --> lepton-lepton
5M b --> D-X
3M b --> J/Psi X
100M MB pp production link (use MB as flag) https://github.com/sPHENIX-Collaboration/MDC2/tree/main/submit/HF_pp200_signal

Developing list, close to our computing plan presented in March 2021

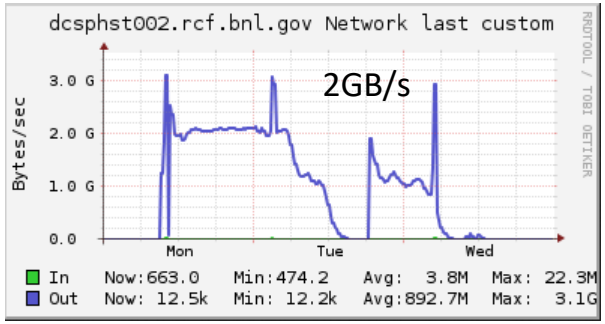
Each project involves multiple processing passes:

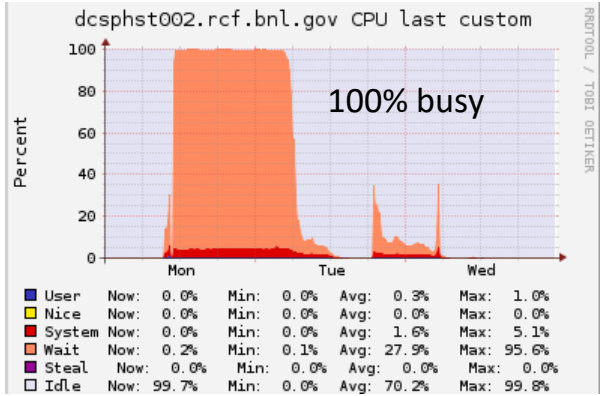
- GEANT4*
- Pileup (we will have multiple events in the tpc)
- TPC electron drift*
- Tracking (close to real data)
- Calorimeter Clustering
- Jet Reco, particle flow,…

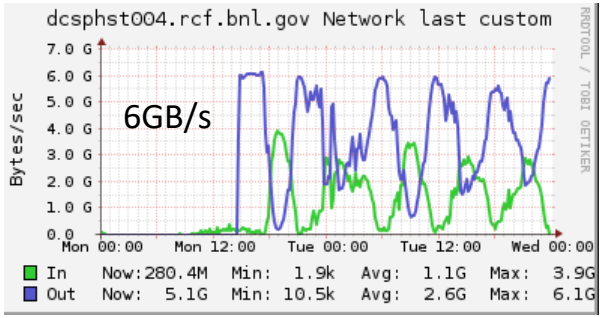
*) Cpu intensive

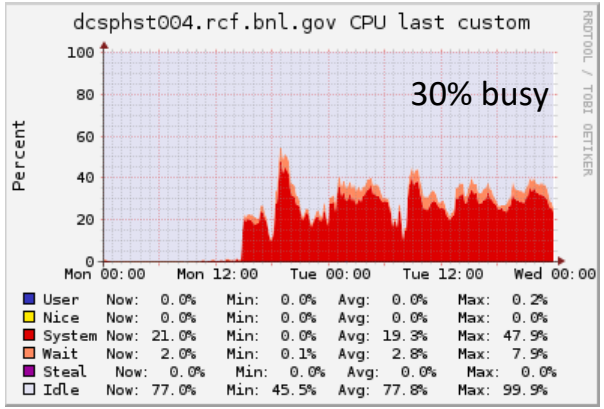
Using (and kicking the tires) of new cpu hardware and take closer look at storage

First MDC2 Result









Plans for Storage

- Older simulation data still reside in dCache
  - Being superseded by MDC2 production
  - Once we have working samples for analysis dCache storage can be wiped and will be moved to lustre
- MinIO works to access lustre on shared pool
  - Lower performance
  - Started processing cpu intensive MDC2 parts on shared pool
  - Direct access from ROOT possible, need to evaluate feasibility at scale

Performance

We have now a stable controlled environment allowing reproducible characterization of our performance

Jobs run under prmon (hsf process monitor)

BirdView

MONITORING SYSTEM
STAR & sPHENIX

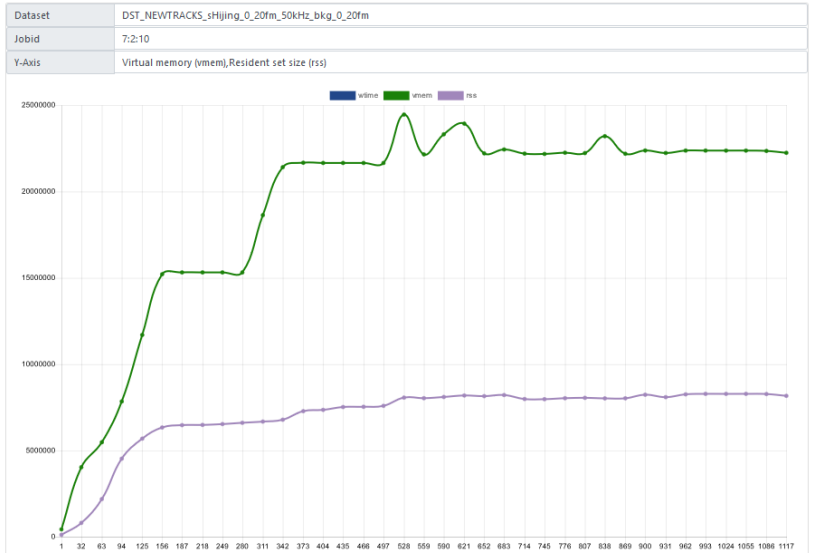
Work in progress

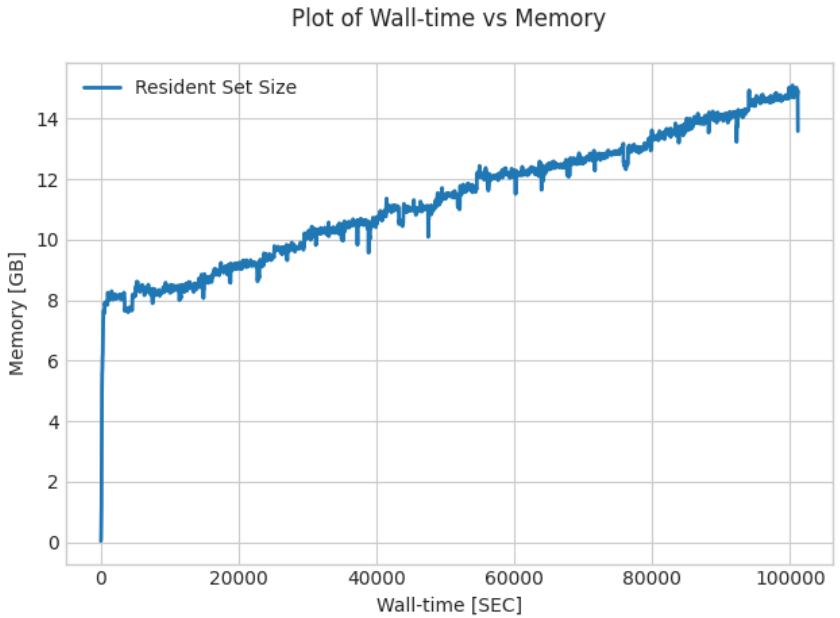
Aggregate and job by job display

Performance Tracking

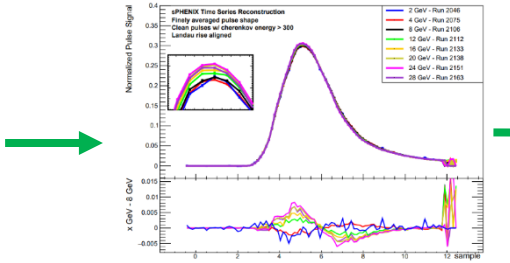
We can test snapshots of our tracking on large scale – turnaround time few hours for 500 events

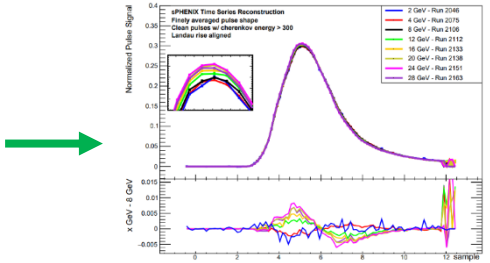
- Controlled environment extremely important, conclusive measurement were impossible on the shared pool
- 30 hours for 10k, Yes – we have a memory leak, investigating





Current Workflow (January 2022)





…x20

75% data reduction

75% data reduction

Calorimeter Clustering

x40

1st pass tracking

2nd pass tracking

Particle Flow

HPSS

x1

Aggregation

Analysis

Reduced data format likely ROOT → random access
All DST content in single file to enable analysis from tape

Next steps

- Conditions DB is making nice progress – include (calorimeter) calibrations into MDC2 processing
  - Need to see about cvmfs for calibrations produced during pipeline
- Good progress on the distortion correction, distortions can be applied to our simulated data, working on “undistorting”
- Jason Webb (NPPS) has been identified as our PanDa person
  - Make use of Rucio as soon as it is available
- Getting ready to emulate the “real” dataflow (40 input files)
- Fix problems as they arise, speed up code, reduce memory consumption

Summary

- Getting our hands on the new hardware as early as possible was tremendously helpful
  - Can we keep using the loaners until the full complement of “our” nodes is online?
  - We need a controlled environment for our development
    - But crash and burn is expected
- The MDC2 serves two purposes
  - Ongoing - providing simulations needed for analysis
  - Shorter term: campaigns to characterize aspects of our data processing (e.g. calibrations)
  - Idling cpu’s are not foreseen