COMPUTING & SOFTWARE

Durga Rajaram

CM 47
February 13, 2017

COMPUTING & SOFTWARE

- Controls & Monitoring
  - H/w controls, Run Control, archiver, alarm handler….
- Online
  - Trigger, DAQ, Readout monitoring, online reconstruction
- Offline
  - Detector reconstruction, simulation, globals
- Infrastructure
  - Data curation, processing, database, networking

CONTROLS & MONITORING

- Personnel:
  - Pierrick has left MICE – thanks for his efforts.
  - Ajit Kurup has taken over as C&M coordinator
- Several changes, improvements, ongoing work
  - Channel IOCs, channel control GUI
  - Restructuring of tracker IOC software
  - Target and DS state machines
  - AK picking up pieces, documenting, stabilizing PRO, cleaning up
- C&M rolling review held: to address autonomous ramp:
  - Review of channel controls, communications, software
  - Generated actions to make channel controls more robust

- More from Ajit on Wednesday...

ONLINE

- Personnel:
  - Yordan has left MICE – thanks for all the hard work
  - Ed Overton has taken over as Online coordinator
- DAQ readout & software:
  - Software: stable, has rollback functionality
  - Hardware: tracker timing needs to be redone
  - Hall probe readout now in raw data
    - Requires PVs being available, regardless of readback validity
- Trigger:
  - New firmware was developed: to be debugged with beam
- Online Recon: automagically always runs, plots saved run-by-run
- More from Ed…

OFFLINE

- Reconstruction
  - Currently @ MAUS v2.7.0
  - Detectors reconstruction software stable
    - Track recon inefficiency is highest priority; being addressed
    - TOF-Tracker discrepancy
  - Globals structure reworked to include matching+fitting+PID
    - Global (matching) ~ ready for MAUS
    - Fitting needs to be added
    - Performance (efficiency, purity) & speed to be understood
- Geometry & Fields:
    - Default field map does not include PRY effect
    - Have updated field maps from Holger
- Resources: several staff leaving/left (global fitting, pid, geometry)

Infrastructure (Spares, Monitoring..)

- Need to ensure availability of hot-swappable spares
  - Target:
    - RATS needs to be built on spare machine
  - Tracker:
    - Need h/w card for tracker IOC to be hot-swappable (PCI card & crate controller in-procurement)
    - Need spare fully working VME buffer board
  - DAQ:
    - Failover computer now in place & up-to-date

Infrastructure (Database)

- Absorber table implemented & information being written to by Run Control
- Geometry corrections table implemented & used
  - Analysis-based, disentangles "hall survey" from alignment
- Cooling channel information
  - Has been in CDB for a while, written to by Run Control
  - Some issues to address – sometimes not written, or improper information
  - Cooling channel "tag" added to run-information (makes it easier to select runs based on channel settings)
- Reconstruction quality
  - Table designed, implemented. Tested on pre-prod DB for TOF, EMR

Data Processing

- Offline reconstruction now routinely done in MLCR
  - Automatically triggered at the end of each run
  - Output: Reconstructed ROOT, cards, logs, calib, geometry
  - Online reconstruction plots now bundled with output
- Reprocessing currently being done in MLCR
  - Takes ~ week
  - Can be moved to GRID
- Globals:
  - Not currently included in reconstruction workflow
  - Can be enabled once new global structure is in
    - May need to "sample" for "fast-recontruction" (in MLCR)
- Still to-do:
  - Reconstruction quality flags (done for TOF, EMR)

Data Curation

- Data-mover & Reco-mover are run automatically
  - End-of-run triggers file-compactor
  - In turn triggers data-mover
  - Copies to permanent storage
  - Shifters must pay attention to file-compactor failures (reported in RC)
- Reco-mover is triggered by MLCR-reconstruction & files copied to permanent storage
  - Reconstructed output also stored on reco.mice.rl.ac.uk for ease of access
- Disk space on DAQ & micestore machines need to be cleared out periodically
  - Not fully automated

MC Processing

- Since CM46
  - Pushing simulations through GRID
  - http://micewww.pp.rl.ac.uk/projects/analysis/wiki/MCProduction
- Issues
  - Beam-input is the main inefficiency
    - Limited libraries at the moment
    - No libraries (yet) for the "pion beam" settings
  - Being addressed now by generating on GRID & streamlining generation+simulation
    - Inefficiency in G4BL hand-off, MC speed remain issues but not a problem on GRID

Summary

- Major improvements in all areas
  - Run Control, channel controls, documentation
  - DAQ stable, prescale trigger capability in development
  - MAUS in production, tracker inefficiency being addressed
  - Fast-reconstruction routine & stable
  - MC production structure in place, G4BL kicking off
- Looking forward to more data