

MINOS+ Batch Affairs

...from the eyes of the \$var Coordinator

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Objectives – var=BATCH

- ▶ Primary directive: without this, there is nothing
- ▶ Two types of processing
 - ▶ KEEPUP
 - ▶ Data processed nightly for calibration and data quality purposes
 - ▶ Roughly 120 jobs × 4 hours / night
 - ▶ Submission scripts were ancient until migration to SL6 prompted migration in September
 - ▶ Cron job
 - ▶ PRODUCTION
 - ▶ Analysis-level ntuples reconstructed post-calibration for various physics investigations
 - ▶ Requires both Monte Carlo set processing and data reconstruction spanning months – years of data
 - Tens of thousands of jobs!
 - Thankfully, I have updated these scripts as well to use the new jobsub tools

Mesh with CD PPG

- ▶ We have sustainable scripts running steadily; however, there is room for improvement and areas of concern
 - ▶ My personal certificate is currently used
 - ▶ We'd like to switch to a host cert that doesn't need to be renewed weekly
 - ▶ OSG remote site usage
 - ▶ New scripts move us in the right direction (old ones were written in '99) but there are legacy pieces that will likely have to be addressed
 - Tarballs, monitoring, version control
 - MINOS has manpower issues in this area - however, we are moving forward

Aside for the lingering things...

- ▶ **Tarballs**
 - ▶ Used to extract code used by reconstruction
 - ▶ While the code inside the tarballs has been committed {and updated by me} to CVS, the tarballs themselves are independent entities
 - Moving away from them is non-trivial – would require some version handling to be made for the tarballs themselves
- ▶ **Monitoring**
 - ▶ All monitoring is done via text lists
 - ▶ NOvA and MINERvA probably have more modern tools that will make the MINOS side a bit different for the CD group
 - However, I think we'd be uncomfortable with moving away from this as we've had it in place for bookkeeping for over a decade
- ▶ **Version Control**
 - ▶ The submission scripts do not live in CVS and we have not started using CVMFS for production
- ▶ These are things to think about moving forward...

Mesh with CD PPG II

- ▶ Learning how to respond to job failures and resubmit
 - ▶ This is where training takes some investment time
 - ▶ Each incident typically has its own circumstances that yield different responses
 - Choosing the right one is important as we are dealing with detector data
 - Essentially restricted to ‘as-it-happens’ learning
 - ▶ Having sat in on some of the training that has already occurred, I really cannot stress the point enough
 - ▶ It takes time – and things happening – to really make the mesh a success, in my opinion

Overview of Migrations

- ▶ **SAM → SAMWEB ☺**
 - ▶ Scripts that generate input subrun lists for keepup
- ▶ **condor_glidein → jobsub ☺**
 - ▶ Howie's scripts predated even minos_jobsub
 - ▶ New scripts – as mentioned use jobsub
 - ▶ Transition came with paradigm shift
 - ▶ One cluster/one subrun → one cluster/one list
 - ▶ ifdh commands have been embraced
- ▶ **Script reduction ☺☺☺**
 - ▶ Seven scripts reduced to three
 - ▶ keepup_lists – generates nightly list of subruns using samweb
 - ▶ KEYGEAR_listbuilder – performs checks, generates corrected list, and submits job to grid
 - ▶ AMBROSIA_submit – grid job, runs reconstruction software
 - Returns standard ntuple for analysis purposes
 - ▶ These scripts have redmine documentation!

Objectives – var=MC

- ▶ Primary directive: deliver usable simulation files to analysis groups
 - ▶ Sensitivities, comparisons, predicted extrapolations
 - ▶ Important for reviews
 - ▶ Necessary for results!
- ▶ Unlike data, production of Monte Carlo only comes in large dumps of jobs
 - ▶ Process is also a bit different from the data chain

Two hats at once

- ▶ **Beam simulation done with FLUGG**
 - ▶ FLUKA + GEANT4 combination
 - ▶ 1000 jobs for each beam type
 - ▶ Usually two for a production pass
 - ▶ A whole lot more for systematics
 - Systematic files have been moved to dcache and fall into the NuMI-X jurisdiction
- ▶ **Beam simulation ntp's shipped to TACC for singles generation**
 - ▶ Outputs are returned to FNAL for overlay processing and reconstruction

A Similar State

- ▶ MC submission scripts also required a complete overhaul in September
 - ▶ Moved to a two script format that functions similarly to the data scripts
 - ▶ Minor differences handle the subtleties, but scripts perform same functionality
 - ▶ TRIGGERMC_listbuilder – corrects an input list, establishes arguments, submits job to grid
 - ▶ WINGMC_submit – reconstruction task that runs on grid node
 - ▶ Returns standard tuple for analysis purposes
- ▶ The same potential areas for improvement exist in this chain as well

Production Summary

- ▶ The MINOS chains have come a long way
 - ▶ Predated jobsub, but now we're getting there...
 - ▶ Jobsub client capable
 - ▶ Ifdh usage integrated into both data and MC chains
 - ▶ Far more sustainable and teachable code
- ▶ Outside the chains mentioned, we have ROUNDUP
 - ▶ Collects output files, concatenates, moves files to pnfs
 - ▶ Migration to samweb as well
 - ▶ Marek has been monitoring this process
- ▶ Where we need/want to go...
 - ▶ CVMFS, tarball control & version regulation
 - ▶ Move entire chain to dcache
 - ▶ The proverbial OSG offsite submission

var=NueAnalysis

- ▶ MINOS nue appearance analysis generate the most computationally intensive tool we have
 - ▶ Library Event Matching
 - ▶ Matches the topologies of input events to a large library of simulated singles
 - ▶ While it is analysis specific, the scope of job submission eclipses even production
 - Meaning, I foresee areas of overlap with production goals (offsite submission, for example)
 - ▶ Software predates jobsub & uses a caltech-driven dag submission format
 - None of this is compatible with the new setup
 - Meeting with Ken led to conclusion that it would be better to just scrap the code and rewrite from scratch

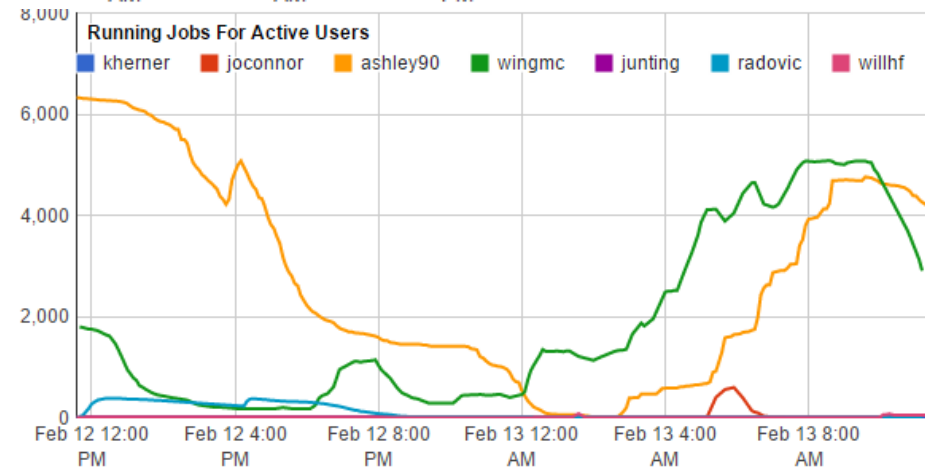
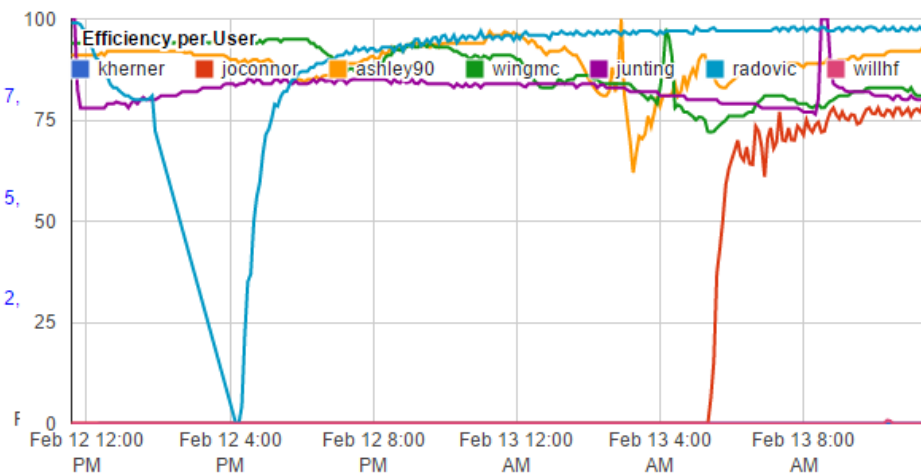
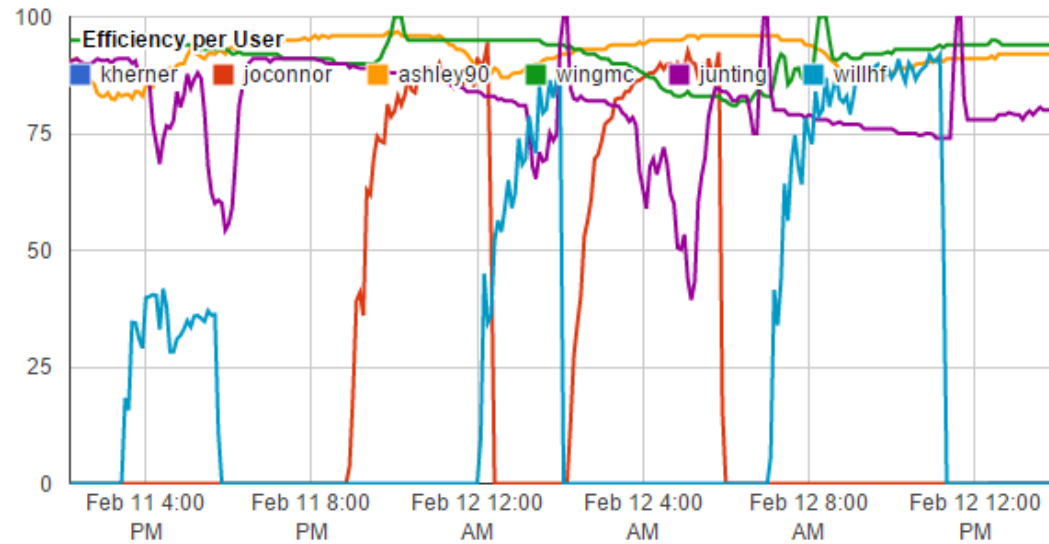
var=NueAnalysis – Current Status

- ▶ Jobsub dag conversion
 - ▶ Main process script functions via new jobsub tools
 - ▶ Secondary combining script does not
 - ▶ Some peculiarity in ifdh
- ▶ Lingering issues
 - ▶ Test release necessary - /minos/app area
 - ▶ Library files necessary
 - ▶ Currently being read out of /minos/app, however, if we ever want to move this to OSG offsite submissions, a lot needs to be done in terms of library storage and handling of test releases
 - ▶ Dag tools
 - ▶ Documentation on how to resubmit rescue files does not seem to exist – or at least I haven't been able to find it
 - How to get them? What submission process should be? Etc...

Comments on Lingering Issues

- ▶ Ken has been extremely helpful in understanding the new jobsub dag client
 - ▶ Working out the rescue stuff will be important
- ▶ ifdh has some issues with handling large numbers of files
- ▶ How to handle library and test release is definitely an area of overlap
 - ▶ Is CVMFS the answer? How to deploy? Etc...
 - ▶ Bottom-line: offsite submission is a secondary goal at this point
 - Moving the archaic infrastructure forward to just work on jobsub is top priority
 - Nonetheless, establishing the framework for such a transition is a goal that overlaps with batch processes. Would be good **and is probably essential** to receive some manpower help to make this happen

Nue LEM Matching



Concluding Thoughts

- ▶ A lot of progress has been made in the last 5 months
 - ▶ Production tasks updated
 - ▶ Running with new jobsub tools
 - ▶ Making use of ifdh
 - ▶ Some kinks remain to get us fully OSG capable
 - ▶ MC is in essentially equivalent state
 - ▶ Nue analysis moving out of the sect of the arcane and into new light
 - ▶ Running jobs on grid
 - ▶ Fewer issues every day
- ▶ The mesh will come from learning routine responses to errors and assisting in ironing out the lingering problems