

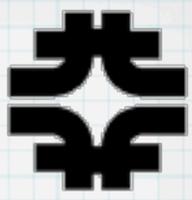
# MINOS+ BeamData

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Robert Hatcher

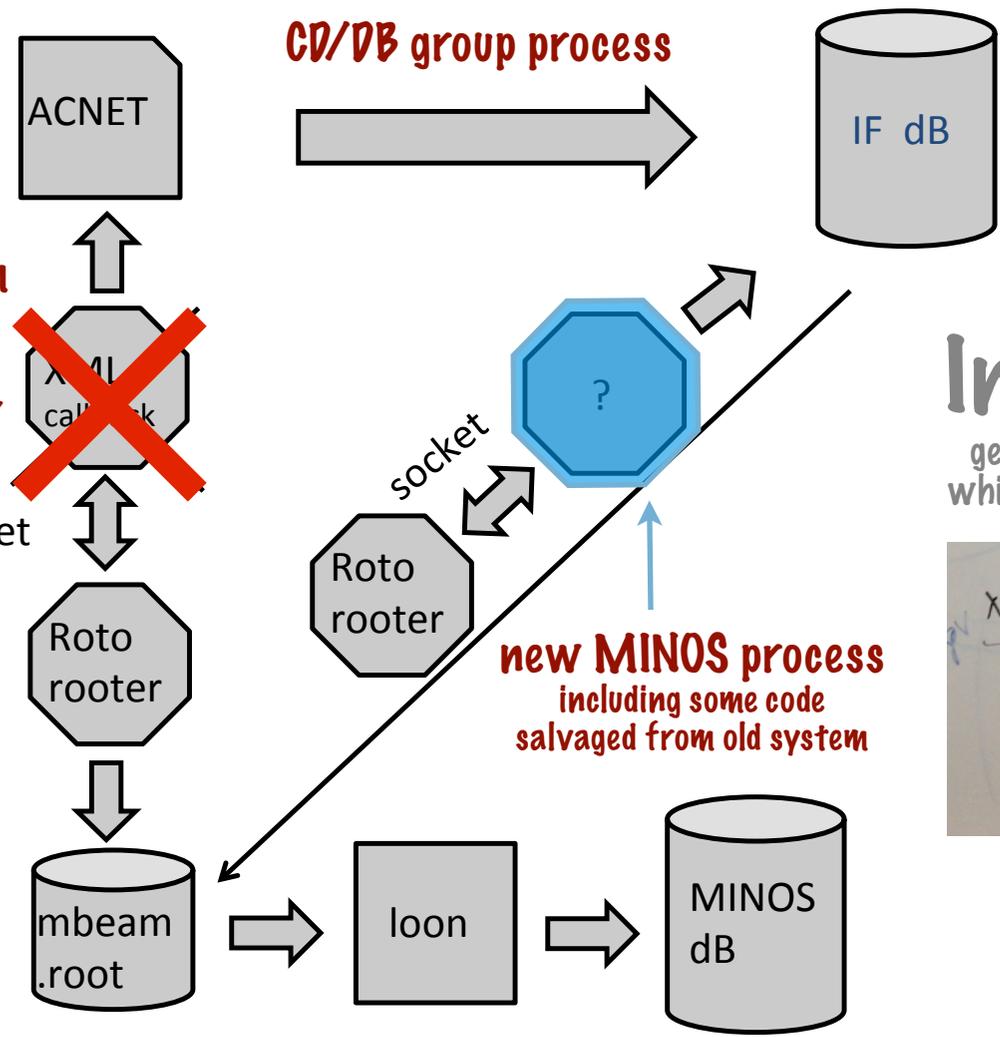
Fermilab Computing Division

MINOS Collaboration Mtg 2013-09-25



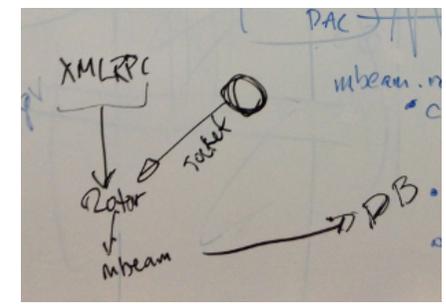
# XML-RPC is dead

**XML-RPC  
Callback System**  
clunky, prone to miss  
spills waiting for  
timeout on one device,  
network issues, too  
many independent  
accessors



## Initial Plan

general concept predates  
whiteboard photo 2013-01

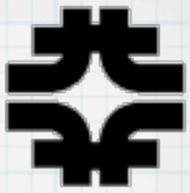


Fitting beam width,  
calibrations,  
data reformatting

Based on  
R.Hatcher's scheme

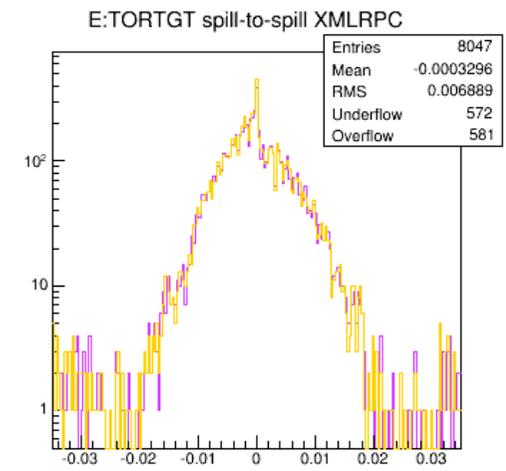
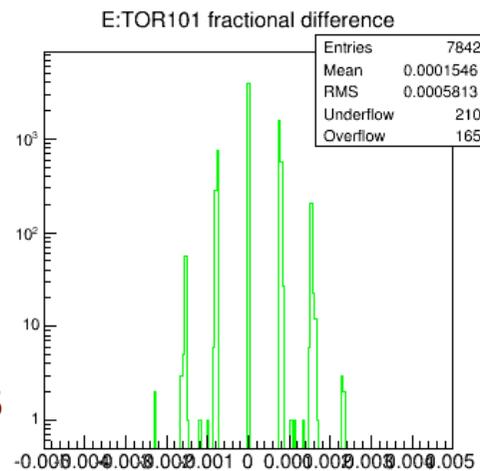
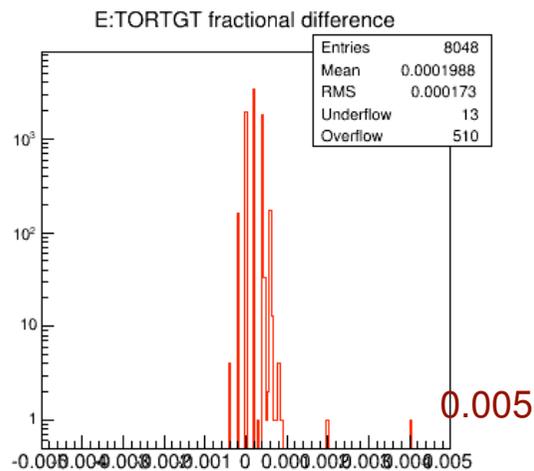
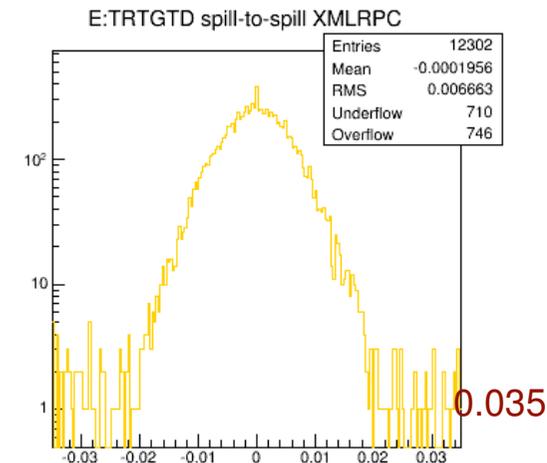
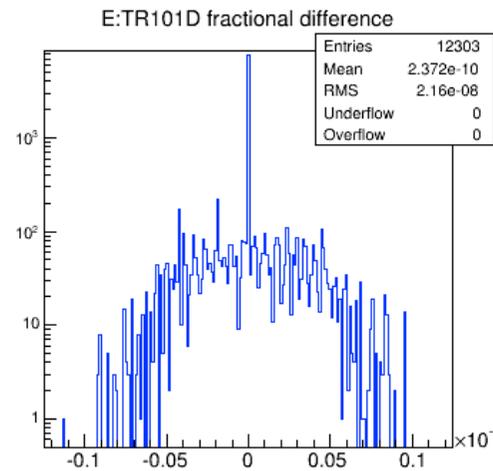
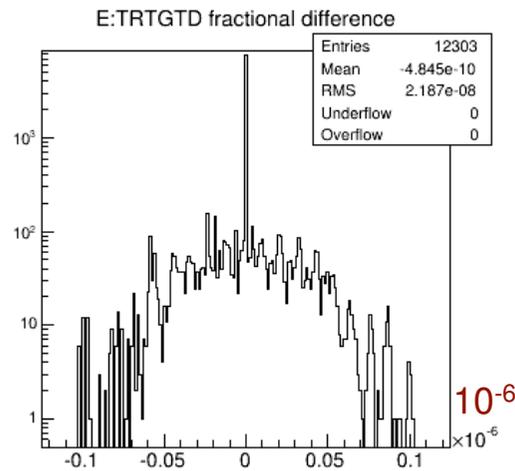


# Interlude: Validation



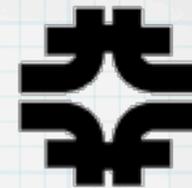
- Joseph Kiveni & Robert Hatcher
  - compare MINOS acquired data to IFBeamDB data
  - both systems were active for some overlap period (several months early 2012)
  - new system seems to have fewer missing spills
  - toroid (POT) info most critical

spill-to-spill  
variation

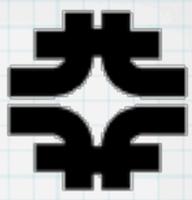




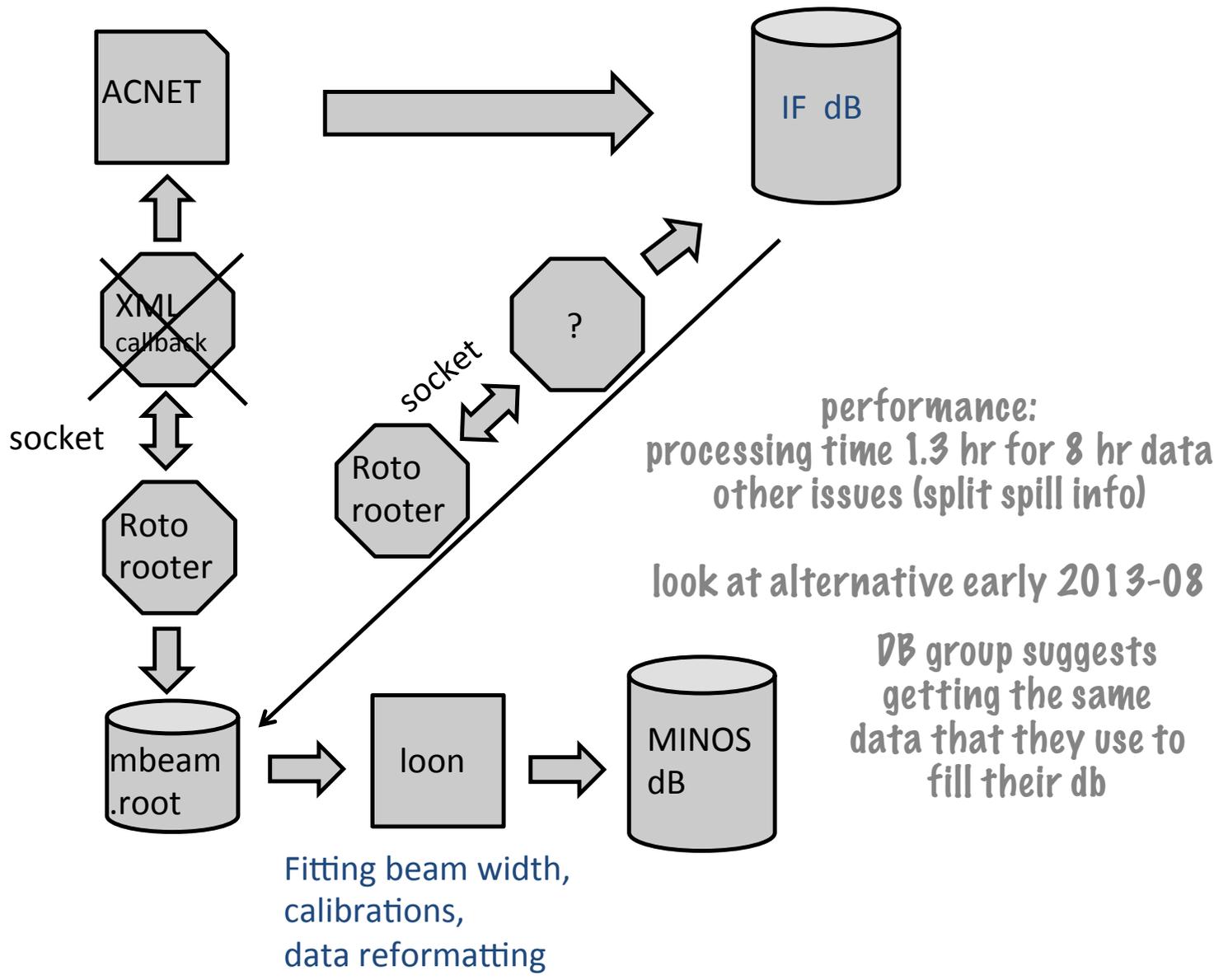
# SWIC “problem”



- ifbtoroot (IFBeamDB to .mbeam.root)
  - succeeded at reading IFBeam DB and writing MINOS-formatted ROOT files
- tried processing those through the normal chain to fill BeamMonSpill
  - BeamMonSpill is condensed data put in MINOS DB
    - offline matches DAQ events via BDSpillAccessor & BMSpillAna
  - internal cross checks in processes was rejecting all records
- SWIC-readout (not all being SWICs) embed timestamp in 4 of their 216 data words
  - the data recorded as part of one spill was tagged as previous spill
- (spoiler) IFBeamDB was collecting data at \$A9 while MINOS was \$A9+500ms
  - not enough time for SWIC digitizer/formatter to complete processing
  - so when requested it gave the data it had in hand
- Request DB Group change when data is collected
  - not quite clear exactly when this happened (needs documentation)
    - but really only horn scans and very low intensity before the change
- NuMI\_Physics “bundle” tied to event-label + {devices}
  - e,a9 ⇒ e,a9,e,500
  - access to prior data broke until new bundle NuMI\_Physics\_A9 defined
  - after some delay, eventually defined last week



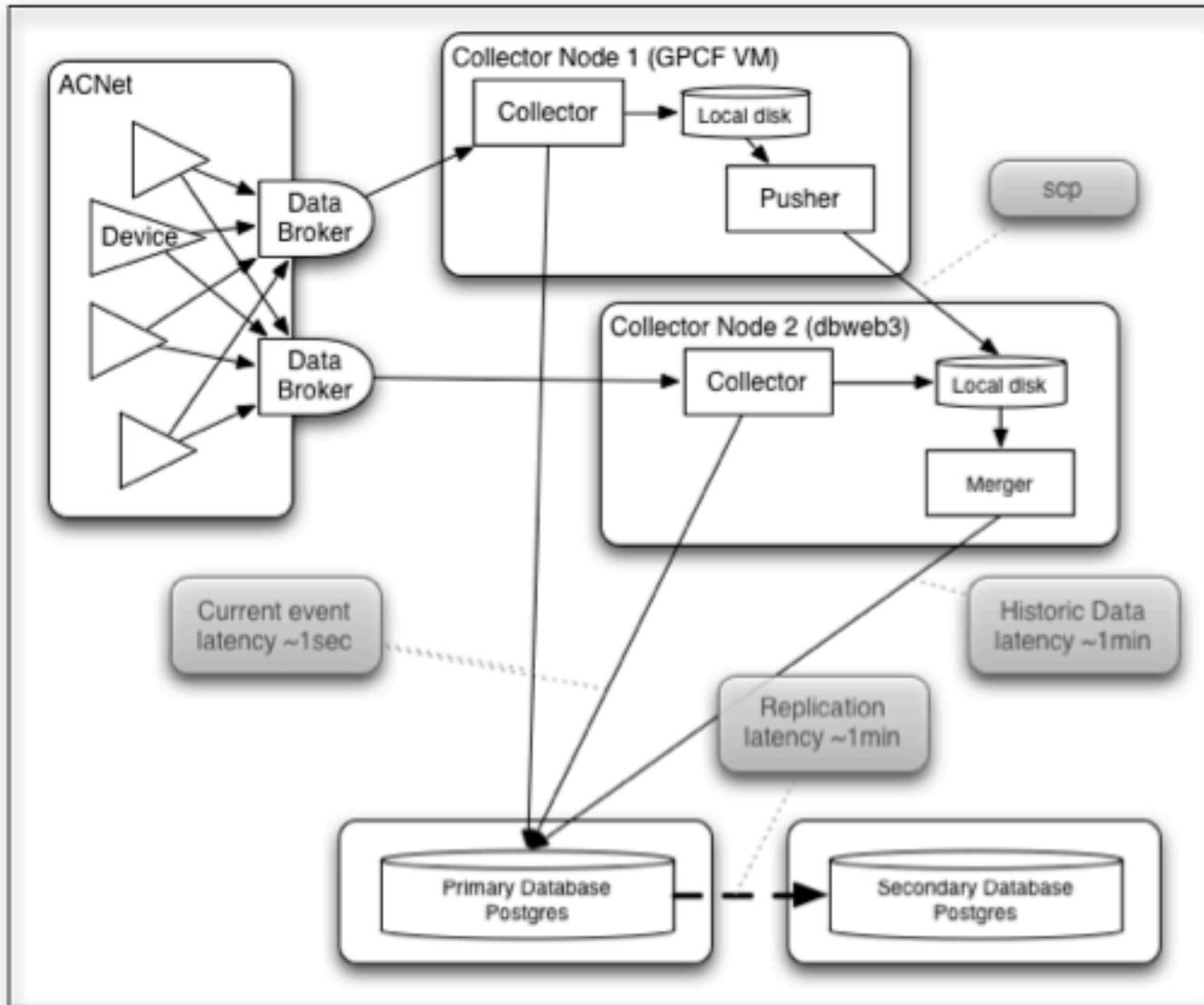
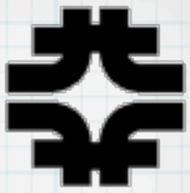
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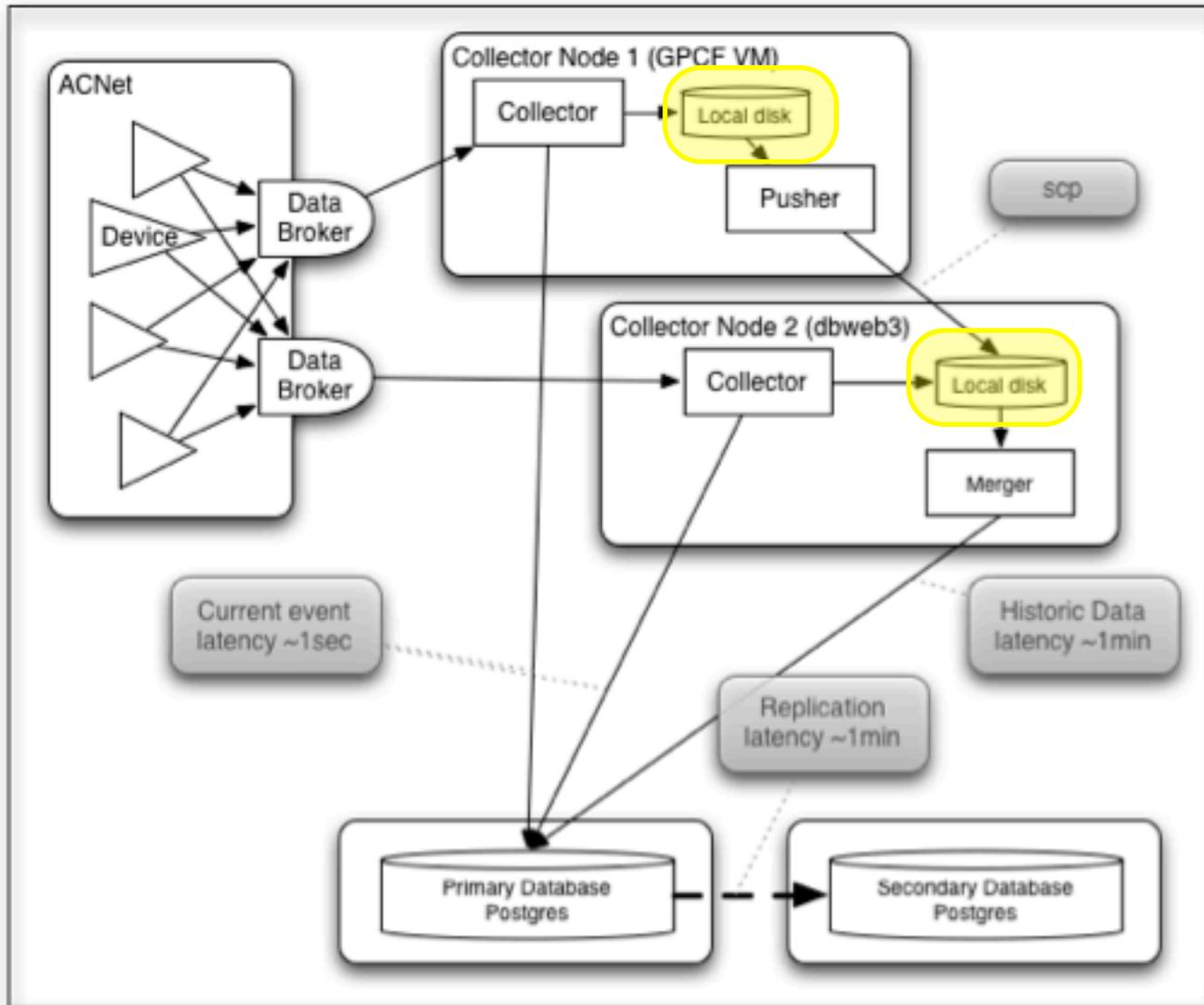
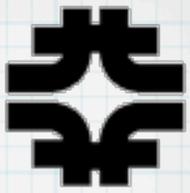
# IFBeamDB Collector System



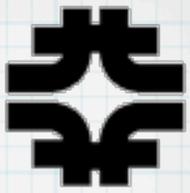
- collectors on two independent nodes at separate locations
- two sets of devices “bundles”
  - NuMI\_Physics
  - NuMI\_Monitoring
- each goes into two databases:
  - real time
  - “historic”
- access via bundle checks both
- real time db
  - ~1 sec latency
  - 1 hr data retention
  - access individual devices
- historic db
  - few minute latency (typical)
    - may be up to 24 hr
  - indefinite/1 month retention
    - Physics/Monitoring
  - access via “bundle”



# IFBeamDB Collector System

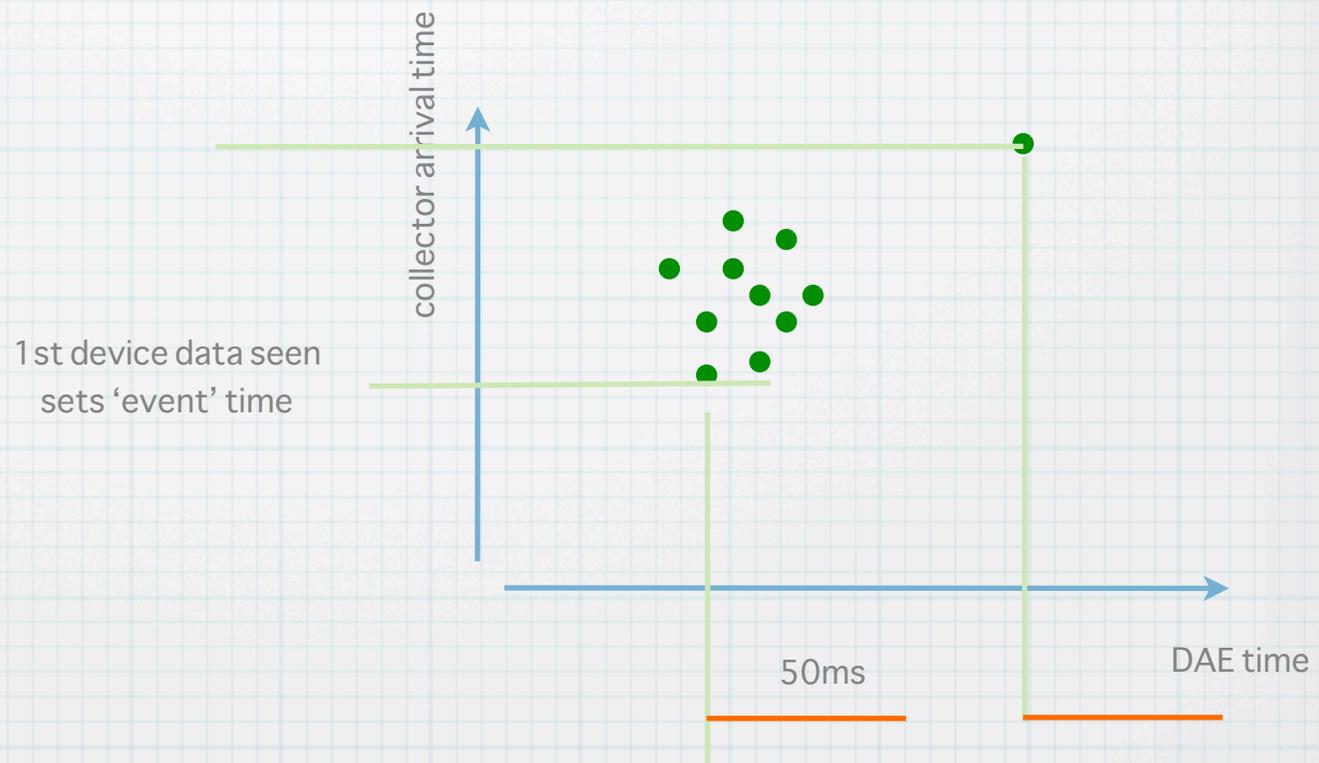


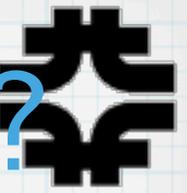
- copy of collector file get pushed to /minos/app for our own processing
- skip going through multiple databases on the way to ours
- LOTS of little files (each ~10 min of real time) x 2 primary bundles x 2 collectors
  - any given spill data in 4 files
- MINOS processes
  - catalogue\_cf
  - cf2rr
  - cf2root
  - bdcfcron



# “spills”

- Collectors receive asynchronously from brokers
  - first received data sets an ‘event’ time
  - data collected and associated w/ that ‘event’
  - until data is more than 50ms later
  - # ‘events’ != # spills -- MINOS does some extra merging



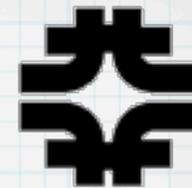


# Cuts: spill-to-spill No Longer?

- Sam C. doesn't want to have profile monitor in every spill
  - accumulated radiation damage concerns
  - means E:MTGTDS[] device data not valid every spill
    - will stale data be in the collector file stream?
- Potential use of baffle temperature as a measure
  - thermal inertia ... can't be used on spill-by-spill basis
  - devices E:BAFT1 & E:BAFT2 **are** being read out (NuMI\_Physics)
- Need for (additional) beam quality cut
  - DB table BeamMonSpill check for individual spills
  - new DB table to blank out periods of data



# Documents



- Keep-Up Processing and Beam Data Acquisition
  - <http://minos-docdb.fnal.gov/cgi-bin/RetrieveFile?docid=10051;filename=MINOSKeepUp.pdf>
    - a plan ...
    - emphasis on beam data but could start of family of documents (DCS flow, etc)
- Beam Data Acquisition ... Post XML-RPC
  - <http://minos-docdb.fnal.gov/cgi-bin/RetrieveFile?docid=10062;filename=BeamDataPlan.pdf>
    - details about collector files and processing
- Time Skew in SWIC Timestamps ...
  - <http://minos-docdb.fnal.gov/cgi-bin/RetrieveFile?docid=10052;filename=SWICskew.pdf>
    - why \$A9 isn't when we want to collect data from front-end devices
    - or what was known back in 2005 ... and overlooked this time