

Tracker DAQ and calibration plans

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MICE Collaboration Meeting, University of Glasgow

27th June 2012

DAQ and calibration needs

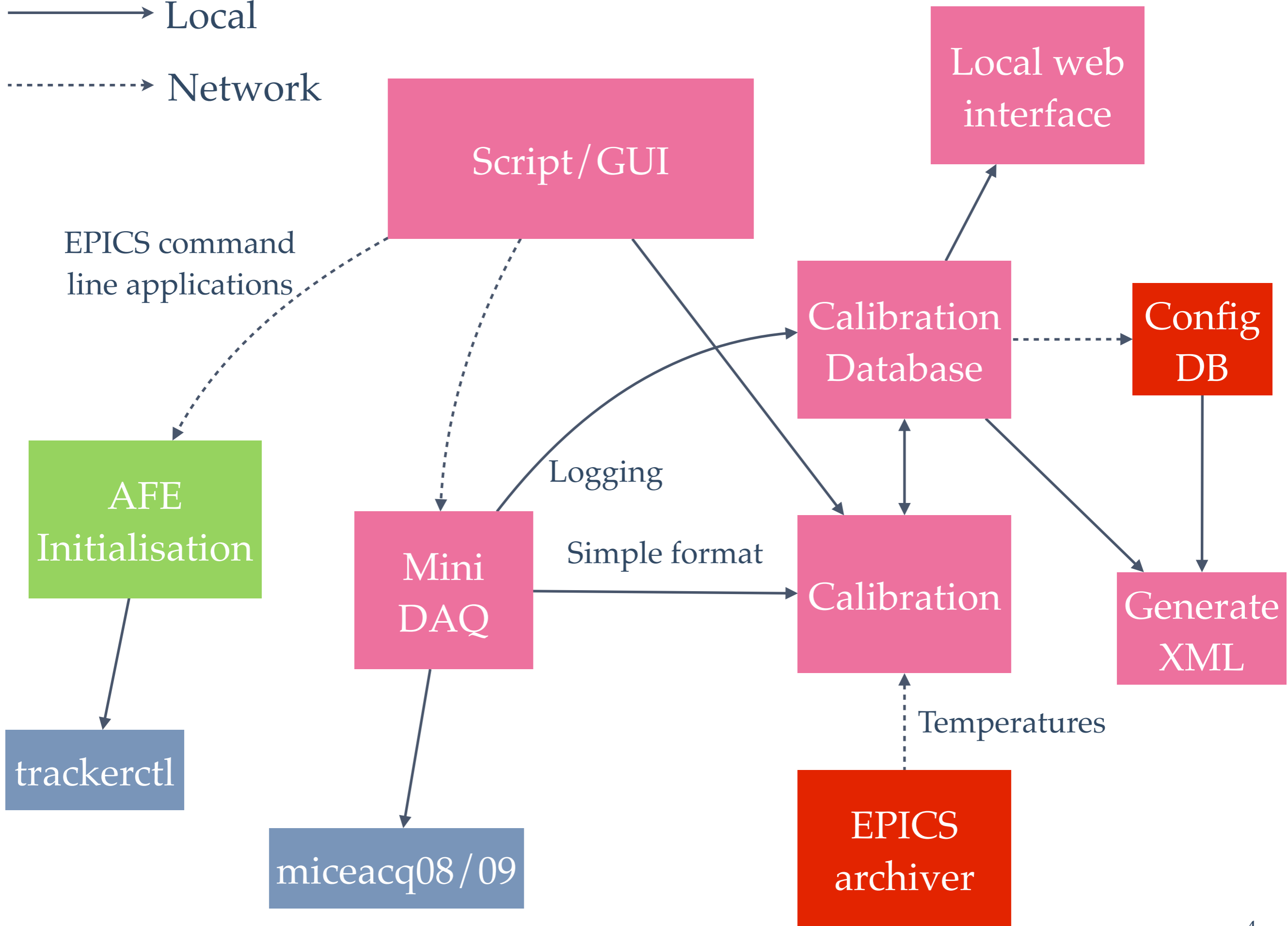
- Need to be able to take large amounts of calibration data quickly (~100 runs per session) and regularly (weekly)
- DATE, AFEInit and the MLCR DAQ and trigger system is a lot of overhead for small, low level functions
- Need to correlate with environment (VLPC and local temperatures)
- Addition of “digital” discriminator in VLSB

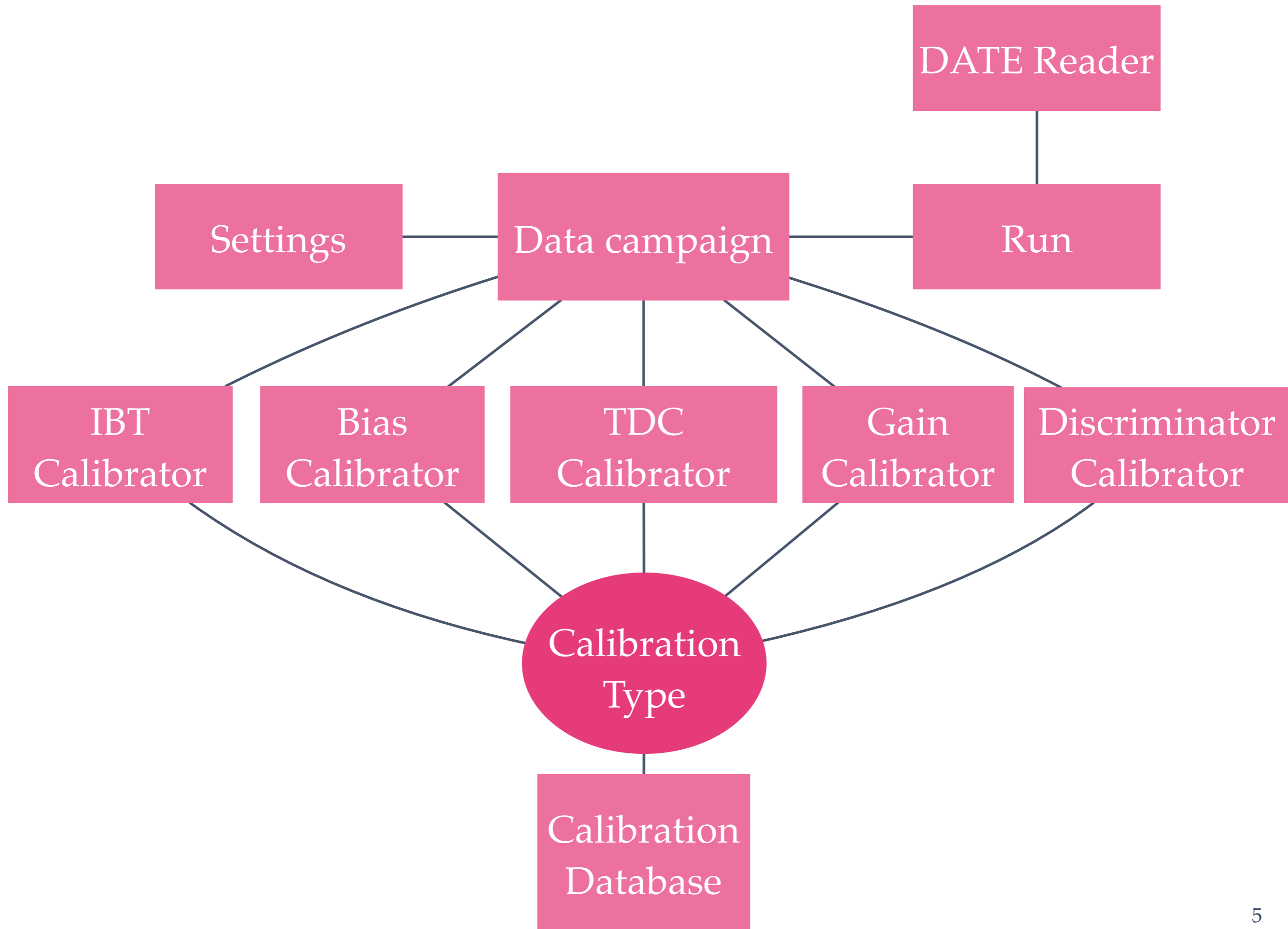
Mini-DAQ

- DATE format - lots of headers, 32bits per trigger per channel
- MLCR setup - 3ms active in 2.55s. Data accessibility.
- Use mini-DAQ with direct VME access to take calibration data. New version of DATE moving towards this functionality with separation between DATE event loop in C and VME processes in C++
- Trigger as fast and often as possible - limit only by digitisation and readout time
- Build histograms online and write bin values at the end of the run -
Maximum $(256 \times 32) \text{ADC} + (256 \times 32) \text{TDC} + (2 \times 32) \text{Disc} = 2.008 \text{KB}$ per channel

→ Local

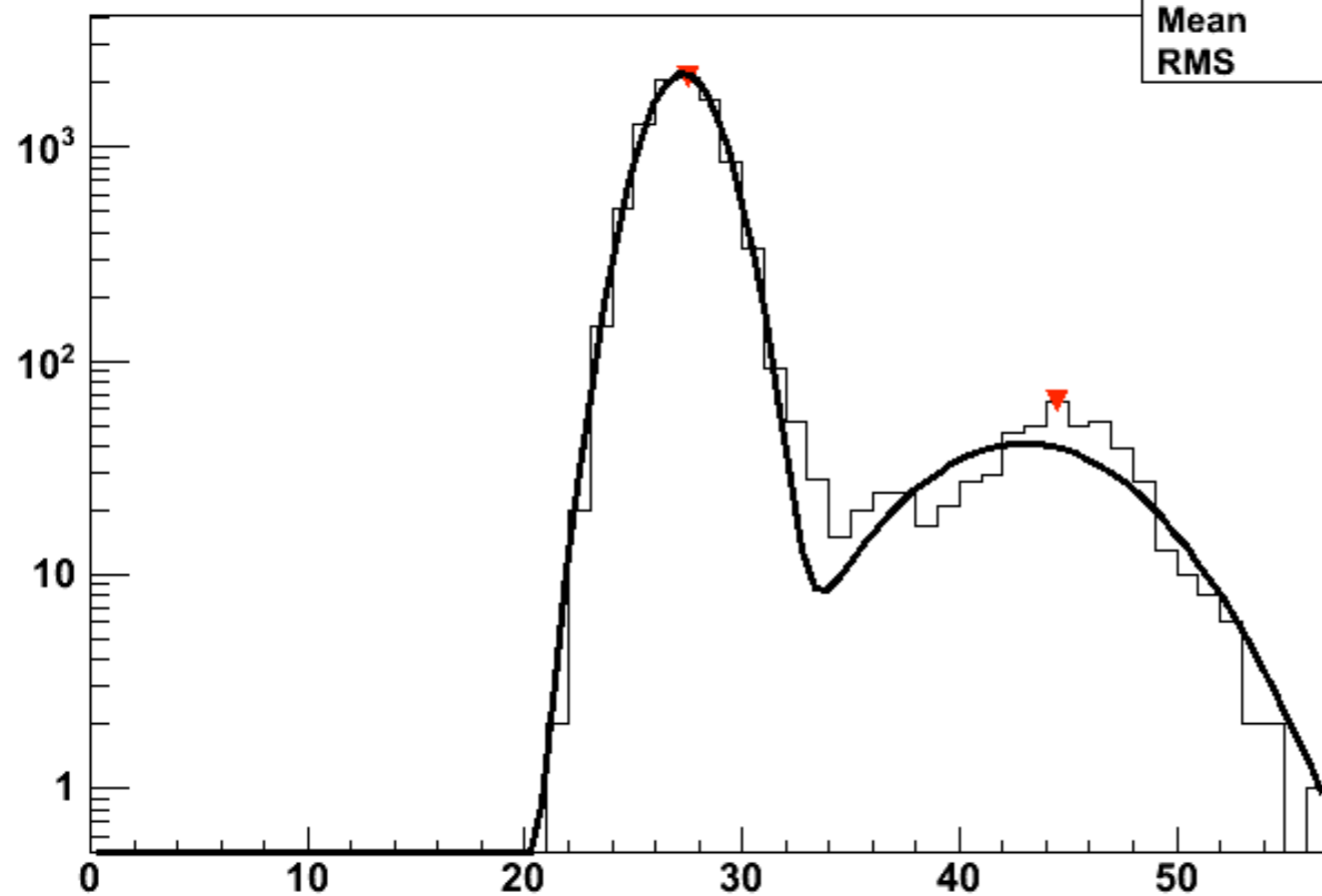
⋯ Network



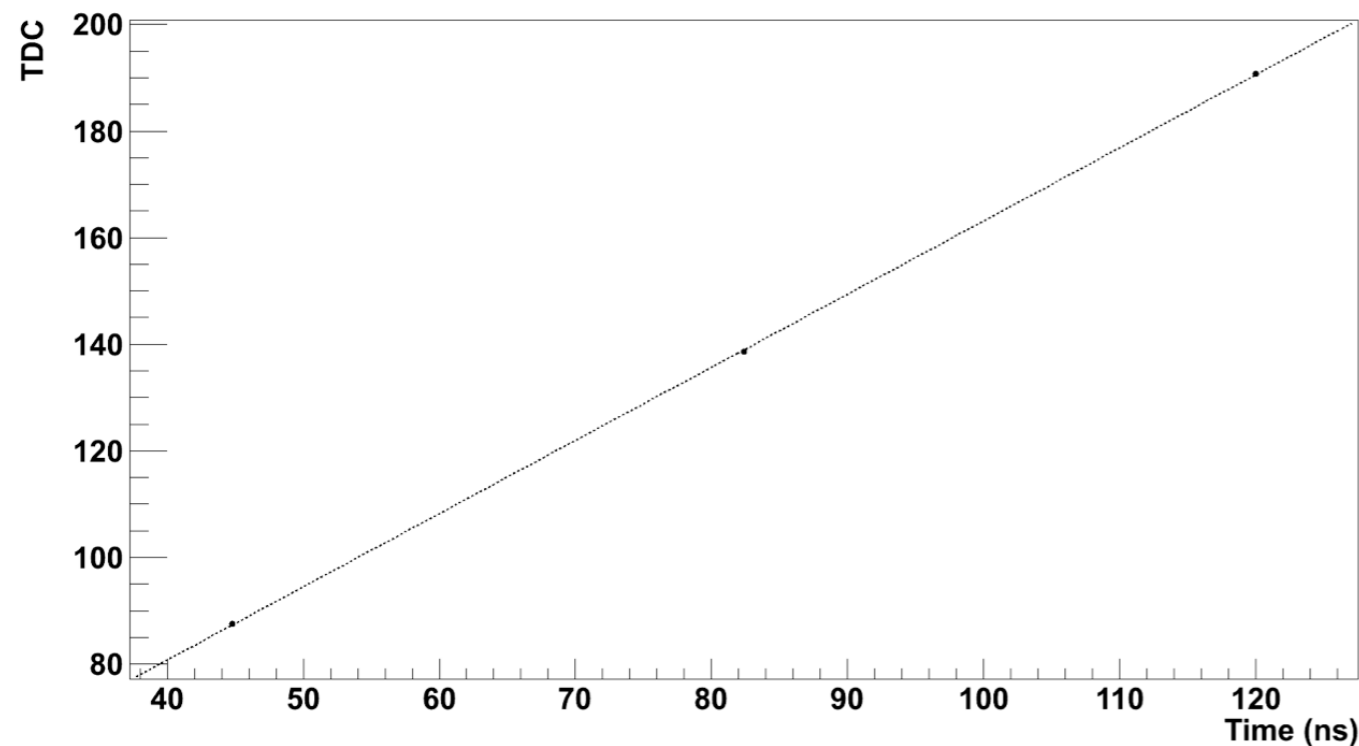


Board: 0 Bank: 0 Channel: 83

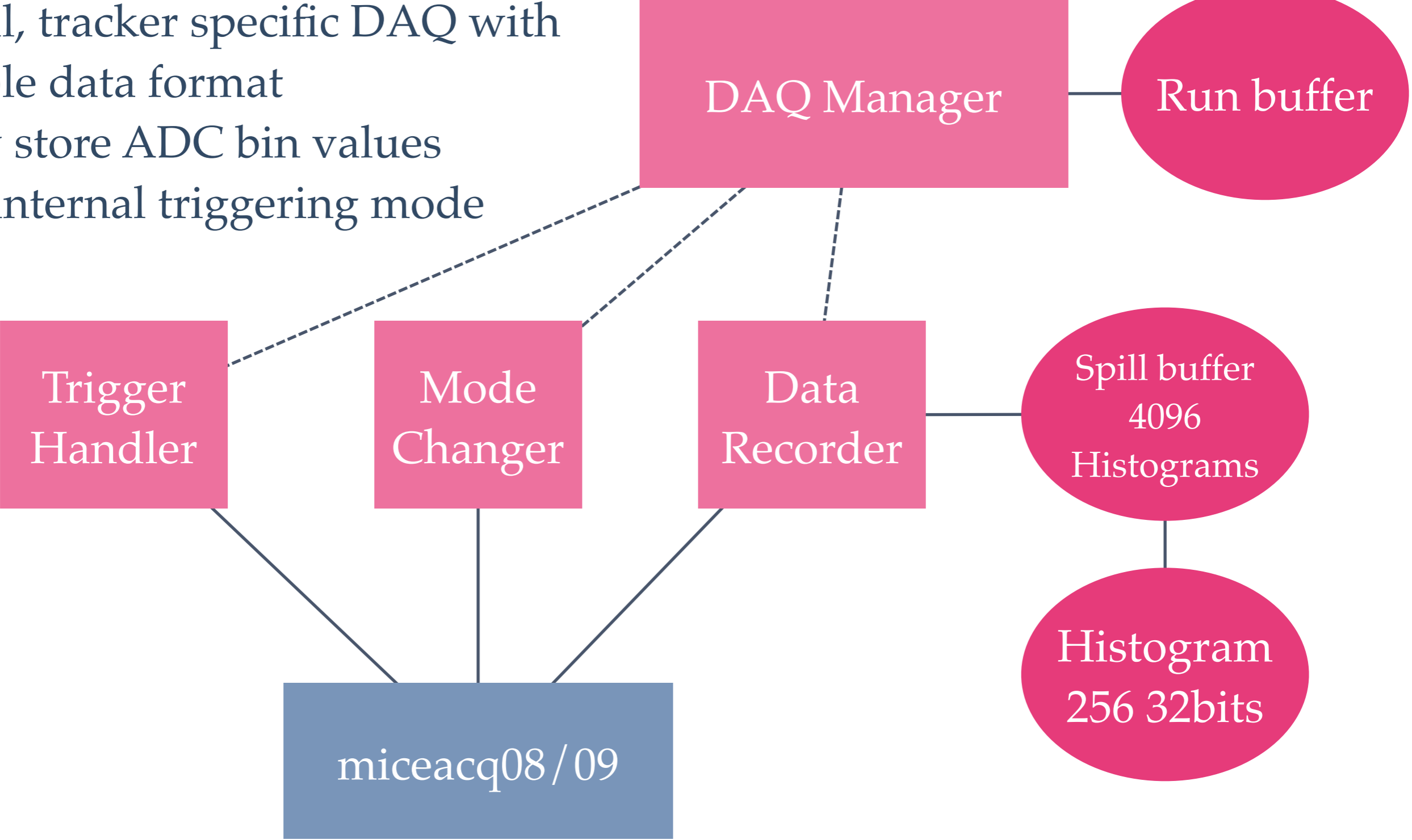
| | |
|-------------|-------|
| 3845-0-0-83 | |
| Entries | 9701 |
| Mean | 28.23 |
| RMS | 4.195 |



- Improving peak finding
 - Used for dark count and gain
 - Feeds into bias calibration
 - Added routines for discriminator, IBT and TDC
-
- Need to produce reference run for simple comparison at start of shift (KS test with pedestal / LED run)



Small, tracker specific DAQ with simple data format
Only store ADC bin values
Use internal triggering mode



Need to avoid combing data from both trackers over the network in real time. Either separate or return summary file

Requirements

- Easy / scriptable setting of bias, V_{Th} , V_{Ref} , I_{Bt} , injection map, injection level, injection delay, pipeline depth
- Logging of VLPC temperatures (obtained via 1553) in EPICS archive as well as sensor readings
- Lock on 1553 to prevent command overlapping
- Easy access to tracker specific values from archive
- Tables and write access to ConfigDB

Work to apportion...

- Efficiency study - why doesn't $10\text{PE} = 100\%$ hits?
- Data from the single station - does the light yield change with momentum?
- Timing runs from the single station test