

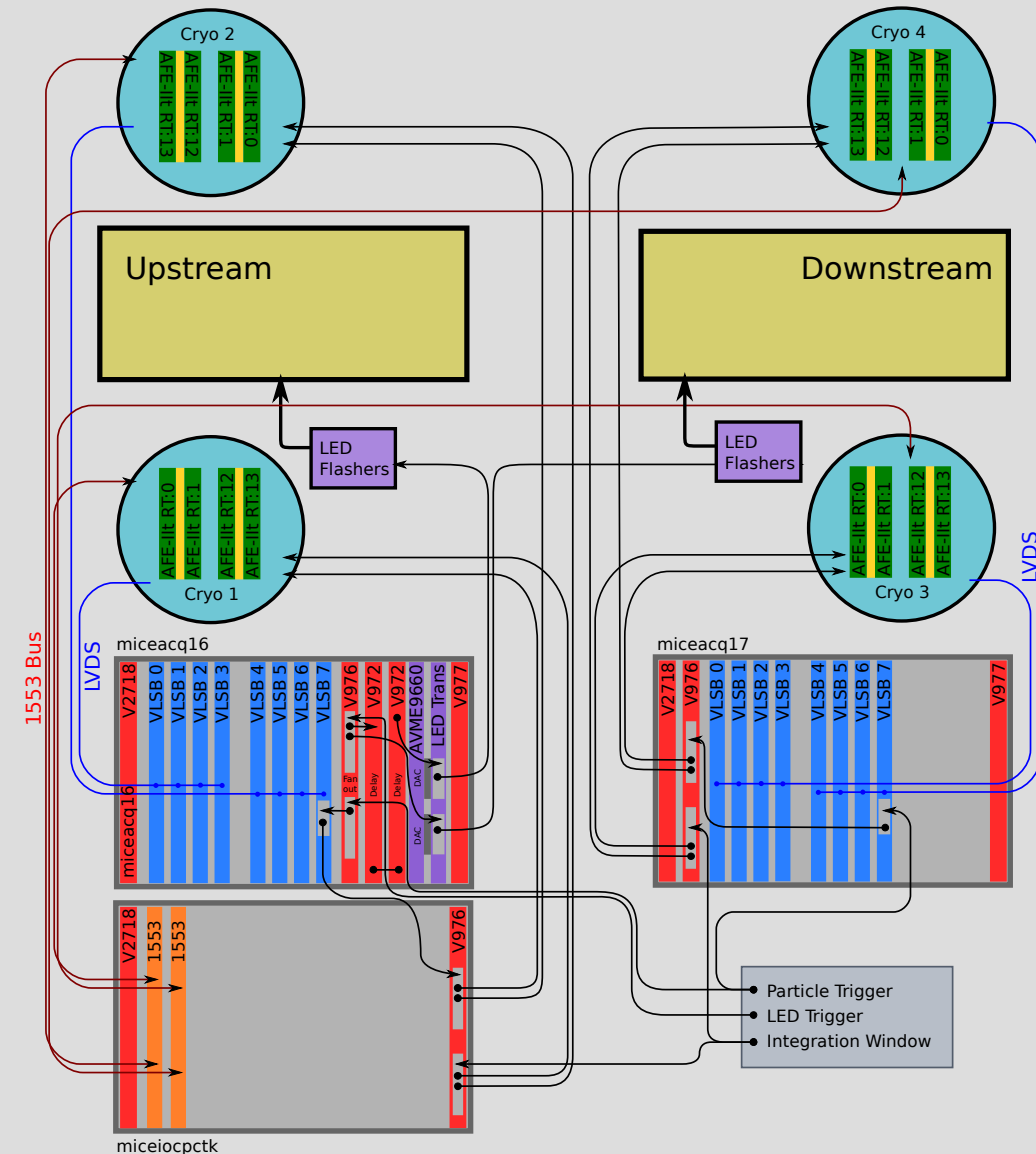
Tracker DAQ

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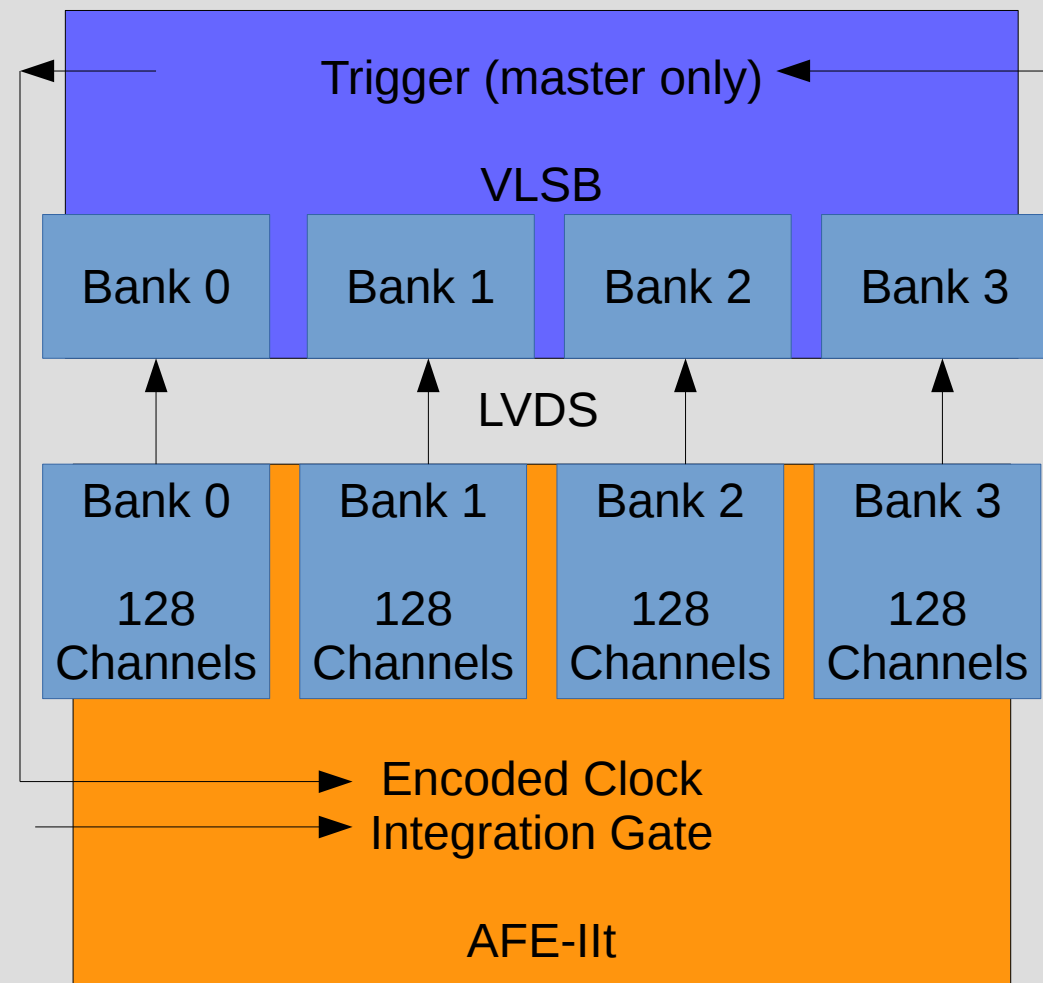
System Overview

- Tracker system is made of many components
- Whole system diagram is almost complete ->



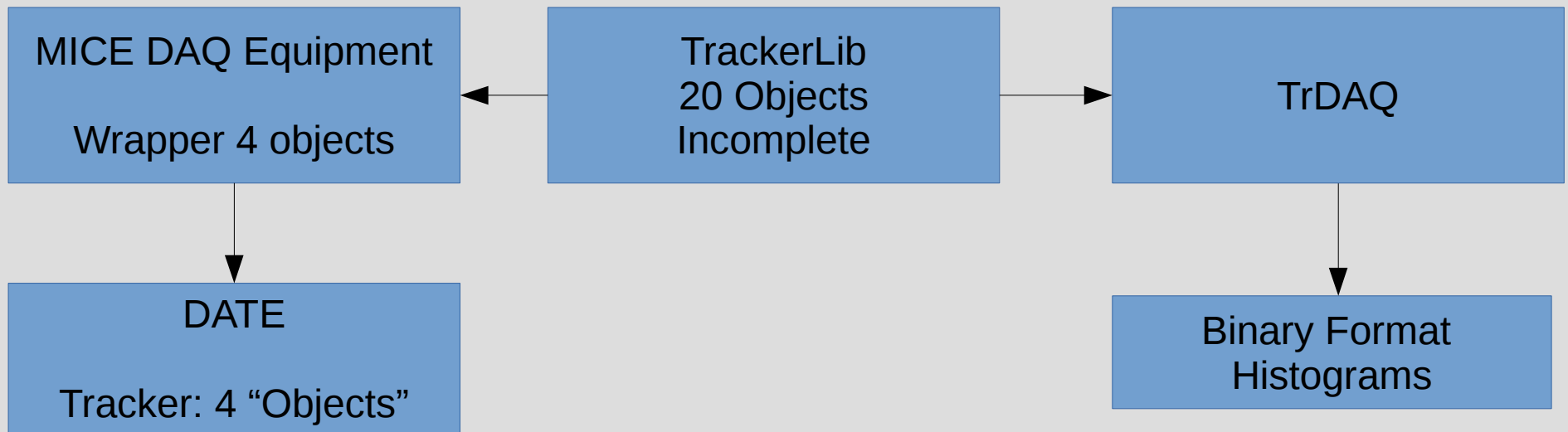
Data Corruption

- Analogue Front End boards send data to buffers over LVDS
- Had instances of data corruption on links.
- Hardware implements CRC & phase checking
- Paul Rubinov came to the lab:
 - Helped solve LVDS corruption issues (damaged cable)
 - Helped utilise status register on VLSBs
- These registers are now checked in the readout.



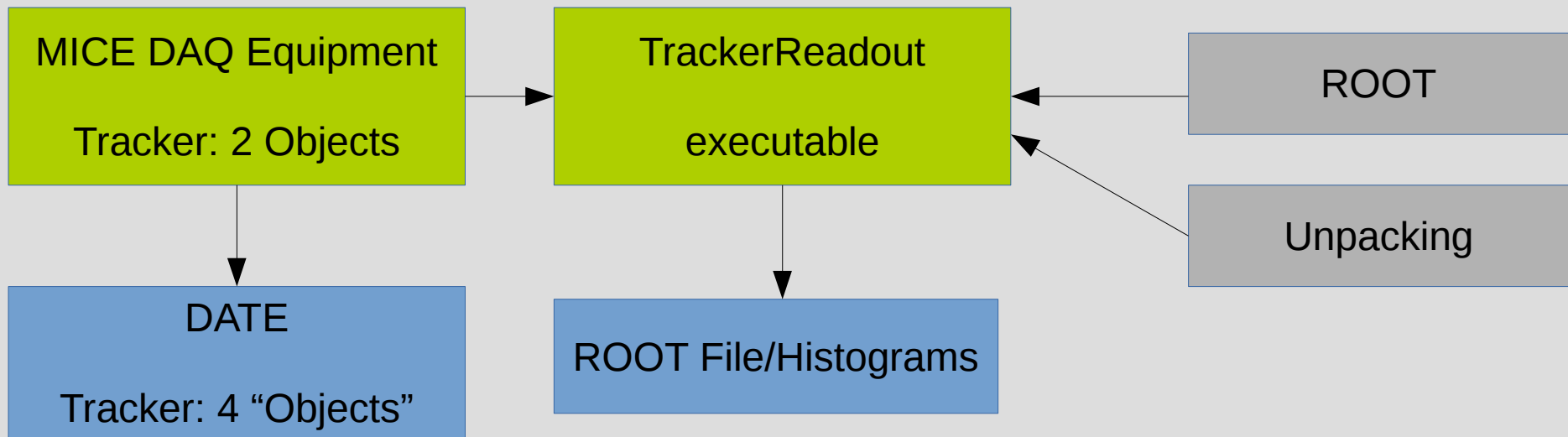
Old DAQ Code

- Existing code used TrackerLib
 - 20 Objects, some incomplete complex functionality.
- MICE DAQ Equipment wraps this for DATE
- TrDAQ application provides standalone readout.
 - Writes to custom binary file.



New DAQ Code

- Substantial reduction in code quantity (-20 objects)
- Tracker is implemented entirely as MICE DAQ Equipment.
 - Uses standard interface / messaging
- Standalone TrackerReadout uses unpacking and ROOT to generate ROOT file.
- Tested with beam.



DAQ Additions

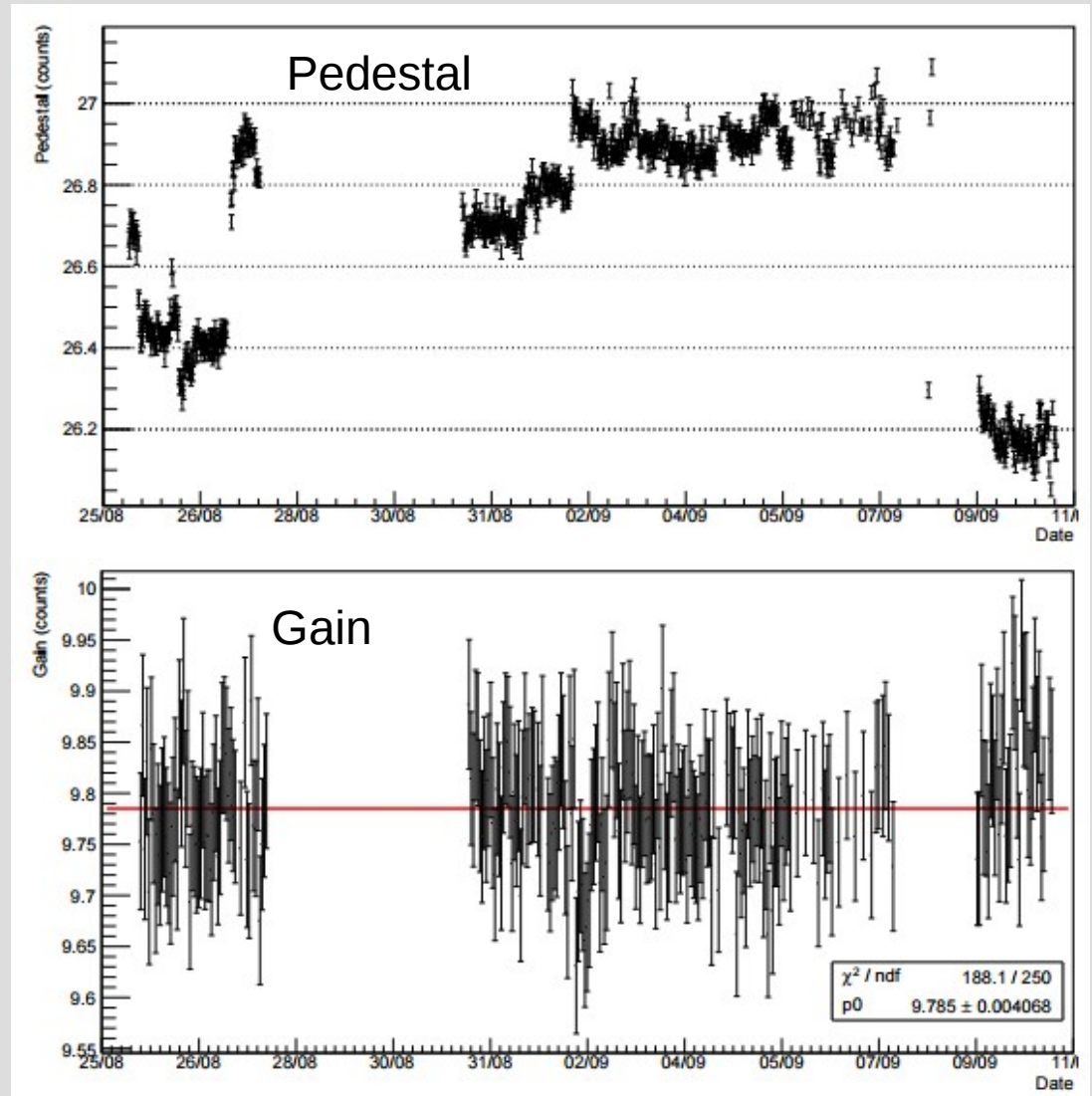
- Internal trigger modes
 - Space is present in code, but not implemented
- Data Checks
 - Registers are checked
 - Corrupted data is to be deleted by the DAQ
 - **Not finished implementation/testing**

Standalone readout

- Standalone readout of the detector has been present in both versions.
- This is used for processing calibration/pedestal data
- Calibration of Biases/ADCs is handled using pyROOT scripts/GUIs
- Reading into pyROOT was handled using TrDAQReader module.
- Extensions to the TrDAQReader module allow auto-detection and compatible output for both DAQ codes.
 - DAQ changes are transparent to calibration codes
 - Loading ROOT files is faster than the old binary files

Soak Test

- “Soak tested” for two weeks of “continuous” readout.
 - Gaps are caused by manually pausing the readout and software errors.
- Checked data for corruption and errors from the electronics
 - Found none
- Monitored pedestals & gain of each channel →
- Gain is very stable
- Pedestal drifts considerably.



Conclusion

- Old DAQ code was bulky
- New code, which is more concise has been written and tested
- New code maintains functionality of old code.
 - Additional output logs
 - Some features still to be added
- Soak test has demonstrated readout over extended period.