Offline Interfaces

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ProtoDUNE SP Beamline Review

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Raw Data - What and Where Are They?

- Fiber tracker and cherenkov data (discriminated hits) will be recorded in a separate Beams database.
  - Data are only accessible after each spill. Latency is expected to be ~seconds.
  - Data format is under discussion, but will certainly include channel id, timestamp (from White Rabbit timing system)
- pLAPPD ToF data will be recorded via the TPC DAQ. Full waveforms available.
- Details of the low-momentum ToF readout is under discussion, but the data will be recorded via the TPC DAQ. Possible to use the pLAPPD electronics.
- All Beam database data will be replicated to a PostgreSQL database at FNAL (likely at CERN too), in a standard schema and format that is used for other FNAL neutrino experiments. This will facilitate offline access.

Raw Data Monitoring

- CESAR will be used to monitor the fiber tracker and Cherenkov data.
- The DAQ online monitor will be used to monitor the ToF data.
- The Data Quality Monitor (DQM) will be run as an offline process, but in quasi-real time.
  - Need to correlate beam data with TPC data.
  - APIs exist to extract data from CERN database directly. We plan to record a copy of these data either on a local disk or in a local PostgreSQL database for the DQM. Details are under discussion/negotiation.

Raw Data Merging

- Eventually we want to merge the beam data with the TPC data in the same file.
- When this process actually happens is under discussion, but it should be straightforward.
  - Match spill data with TPC trigger data via timestamp.
  - All beamline instrumentation data will be recorded as “AuxDetDigits”.

Testing

- Raw data recording and monitoring:
  - Tests of the fiber monitor electronics (this Fall) will include recording data into the Beam database and displaying the data via CESAR.
  - pLAPPD testing at Fermilab includes recording data via an artdaq process and monitoring via the LArIAT DQM. We will re-use as much as possible of the LArIAT DAQ software to read out the V1742.
- Merging:
  - An offline “data challenge” is scheduled for October 2017.
  - We will have at least a mock database available by the end of this summer to test and develop the offline merging.