OpFlash to WCT/BEE

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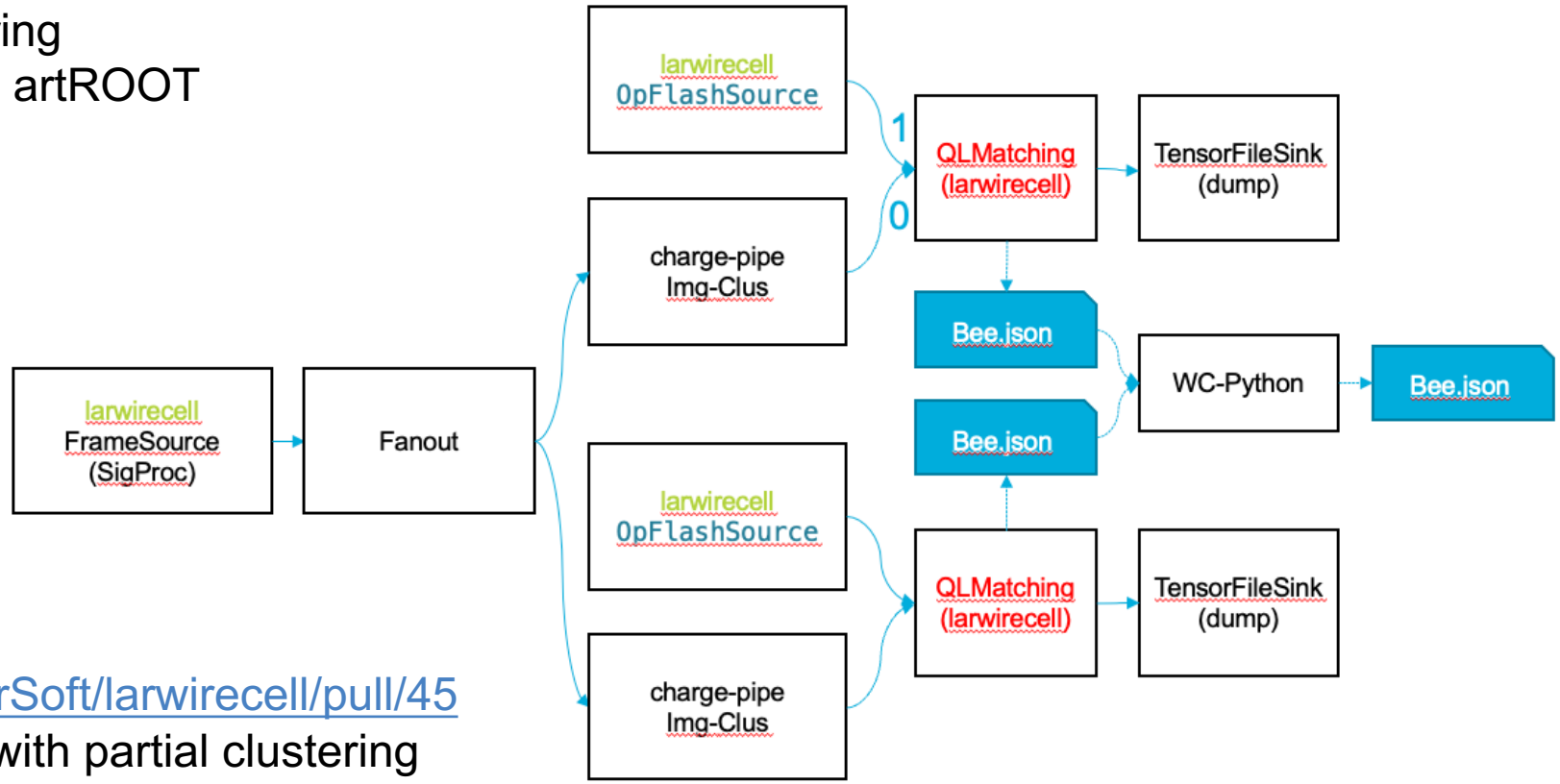
Brief review

- charge: Wire-Cell imaging-clustering
- light: reconstructed OpFlash from artROOT
- 1st setp: per-APA matching



Links:

1. larwirecell: https://github.com/LArSoft/larwirecell/pull/45
2. WCT, clustering branch merged with partial clustering
3. QLMatching: https://github.com/WireCell/wire-cell-dev
4. cfg: https://github.com/HaiwangYu/sbnd-op

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Summary

Progress:

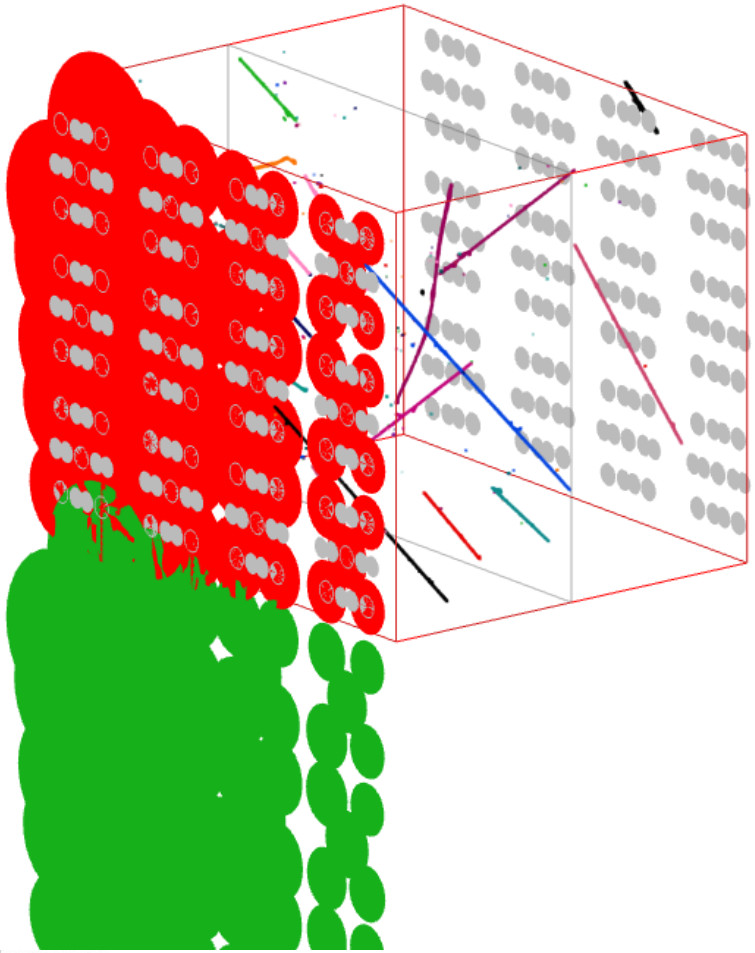
- Using numbers from Ewerton, looks OK to me.
  - time_offset: -200 * wc.us,
  - drift_speed: drift_sign * 1.6 * wc.mm / wc.us,
- Made a python script to merge Q+L in 2 APAs into one
  - BEE sample
- mv QLMatch to larwirecell/qlmatch
  - currently no larsoft dependencies
  - makes libWireCellQLMatch.so

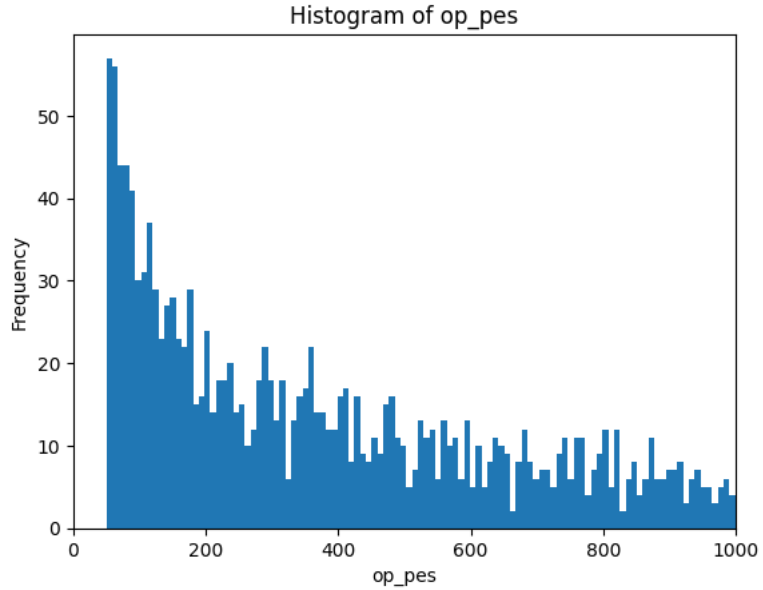
to-do:

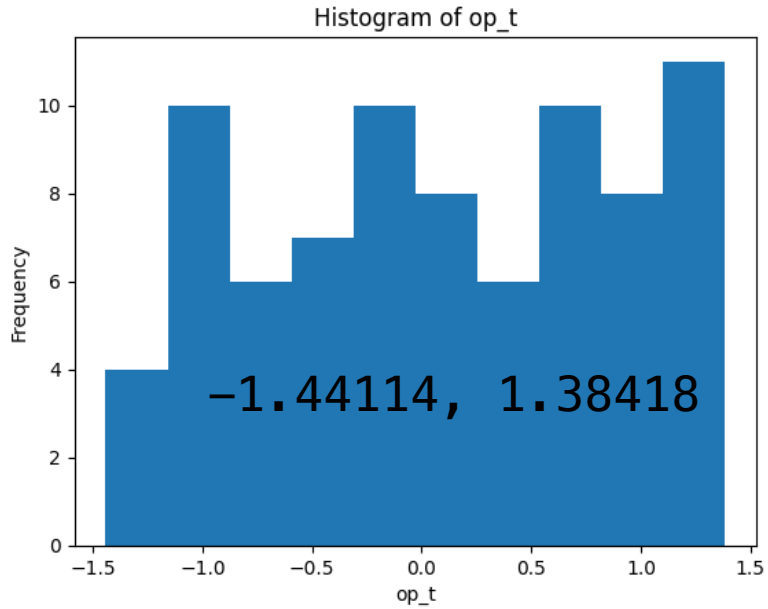
- op_t unit and range?
- PE unit or range
- adjust the file structure acoording to Chao's suggestions
- make wirecell 0.28.0 ups
- need to discuss with Lynn/Ewerton/Hanyu about next step plans

Latest BEE sample

https://www.phy.bnl.gov/twister/bee/set/922ce692-dd39-4890-8c9d-a01902dd389b/event/1/







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backups

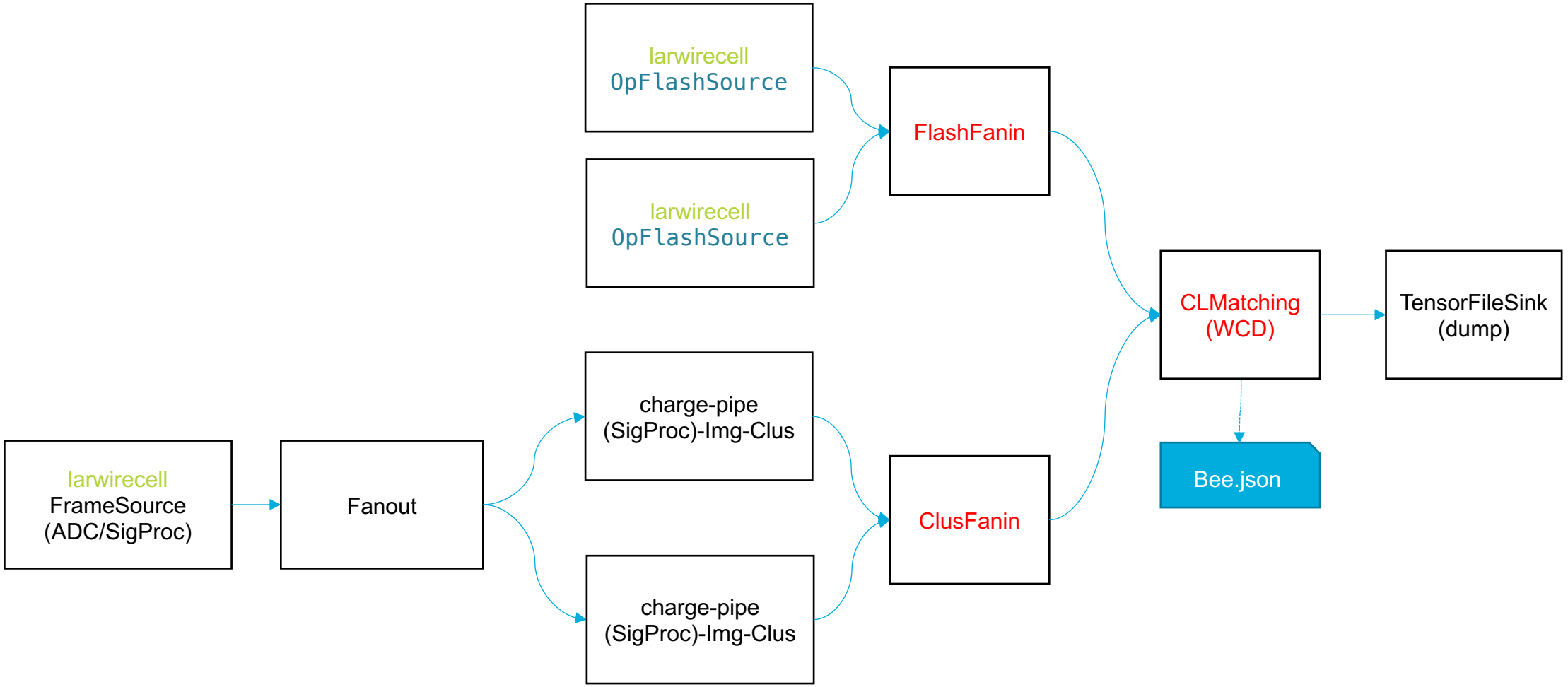
Chao's comment

- In op.json,
  - the "op_cluster_ids" (not "cluster_ids") should be an array of arrays. In this example, it should be an 80-element array, each element is an array of matched cluster ids (can be an array of 0, 1, or more clusters). Since we didn't do the matching yet, you can assume **each flash matches every clusters.** This is easier for further development.
- The event number should start with 0, not 1.
- sort the flashes according to the flash time

Chao's comment

- In "op_t", there are 80 flashes, but all the flash time is around +- 1 microsec. Is the unit correct?
- What is the PMT readout window in sbnd?
- In microboone the PMT self triggers (cosmic discriminator) during a period of 6.4 ms around the trigger time.
- So I was expecting the flash time spans several thousand microsec over one event.

- For the PEs, a PMT often sees **thousands** of PEs in a flash. In microboone this number is about **20 PEs**. I'm wondering
  - 1) if the unit is indeed PE;
  - 2) if commissioning sees similar high PEs;
  - 3) is the reason for high PE because of the closer distance?

matching all APAs together

- Need ClusFanin and FlashFanin
- Need multi-APA matching alg.