



# Online SN pointing status

OSNP meeting – 13/06/2024



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# MC production

LEP production plans:

<https://docs.google.com/spreadsheets/d/1e10upjwiyozqhb3qPF6VFGiMh-bApoO5NdOR3zbiB1s/edit#gid=1368833049>

Reminder: 1x2x6 with no raw digits, 1x2x2 with raw digits. Actually, why not all 1x2x2? LowE events occupy very little space anyway...

From original plan, advanced two proposals for 1x2x2, seem to be approved:

- use chosen direction from a catalog, not isotropic
- 350 events x 2000 directions

Proposed also for large 1x2x6 production (with no raw digits), but some resistance.

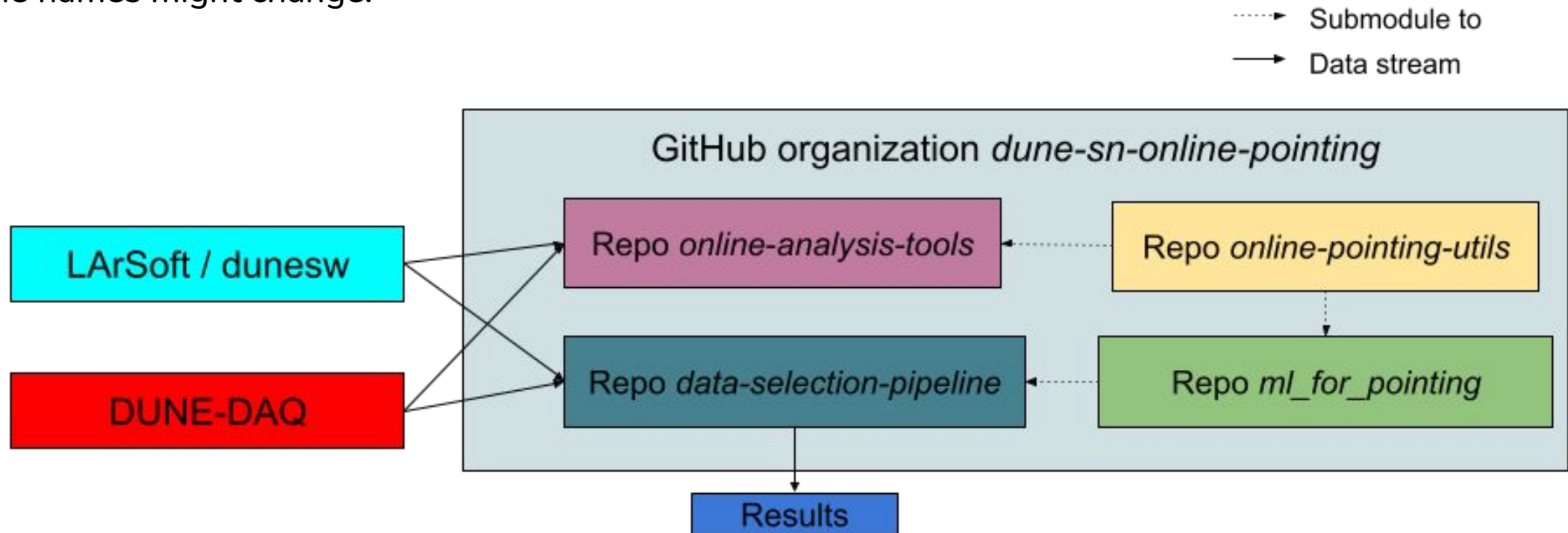
# OSNP code framework

Already have a first version of a whole framework for the OSNP. Several repos, in continuous development, here: <https://github.com/orgs/dune-sn-online-pointing/repositories> . Some are already legacy, tidying up soon.

Time and energy consuming, but there's no alternative :) Mix of python, cpp, bash.

<https://github.com/dune-sn-online-pointing/online-analysis-tools> being set up, almost ready.

Some names might change.



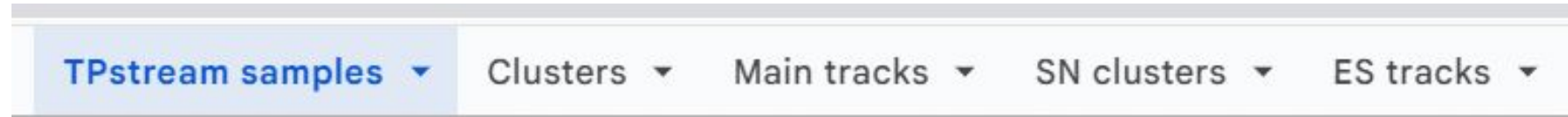
# Samples

- Started to put together a [document](#) with the list of available samples

## SN Trigger Primitives samples

Path	Name	Bkg	ES	CC	SN spectrum	Emin	Emax	TP thr
/eos/user/e/evilla/dune/sn-data/c	prodmarley_nue_flat_clean_du	n			y	30	70	30
/eos/user/e/evilla/dune/sn-data								
/eos/user/e/evilla/dune/sn-data								
/eos/user/e/evilla/dune/sn-data								
/eos/user/e/evilla/dune/sn-data								

- Need to add also the available cluster files, specifying the options used for creation (time consuming, don't want to cluster every time)



Moving to a new location with more space, in common area: /

**eos/experiment/neutplatform/dune/sn-online-pointing**. Freeing up space from old data, currently dune/ is full.

To get writing access, enrol in [eos-experiment-cenf-general-writers](#) from here:

<https://e-groups.cern.ch/e-groups/EgroupsSearch.do> . Will put here all data that we use for easier access.

# Samples to generate

Still using text, but started to work on new modules by Wesley and Hamza, to have TP streaming to standard root output:

- much easier handling in jobs and across versions
- should include wirecell detsim
- proper object usage

One important change: include true direction of outgoing electron, to be used as truth for the training!!

-> **almost ready**

In order of priority:

- waveforms for Harry's studies, with truth label (what process)
  - code ready, updated to have equal bkg rates
- SN neutrinos in random directions, SN spectrum -> for test
  - **done, Dario has results**
- SN neutrinos in random directions, 2-70 MeV flat -> for training of the pointing
  - finishing debugging

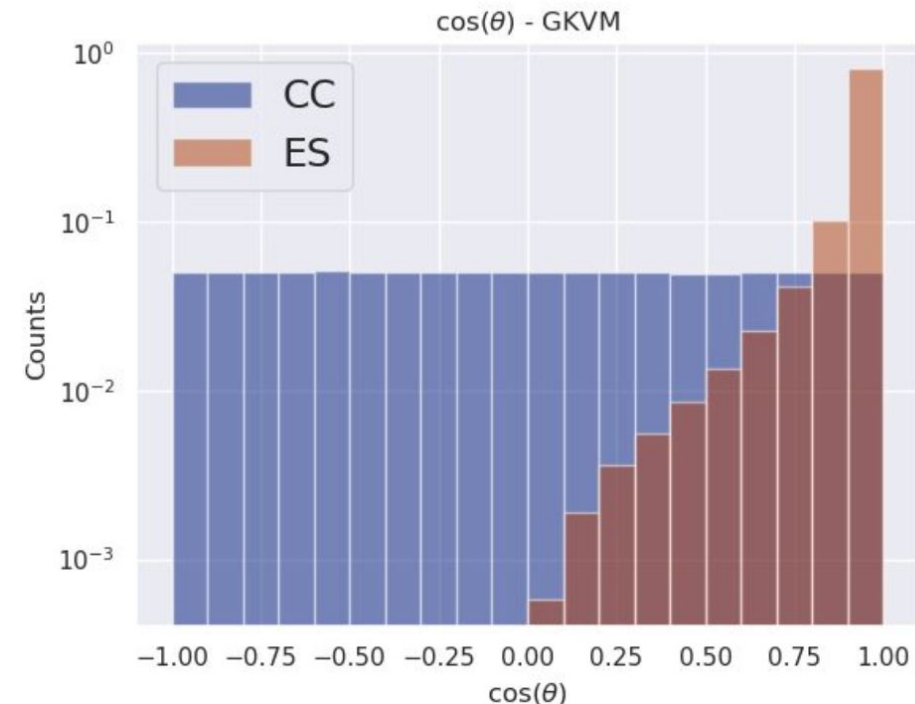
Else?

# Analysis

Setting up repo to put all analysis tools we have around. Almost ready to start adding code we have around.

Upcoming:

- See expected spread of direction of electrons from the physics. In picture the cos, take a look at the angle  
-> know target resolution for 100% accuracy
- See expected electron energy spectrum for different energy bins  
-> Seems to be flat at whatever energy!
- See at test level, using network trained on 30-70 MeV, how different the performances are bin by bin  
-> see if very high energy electrons help or are misleading due to bremsstrahlung.



# Plans (me)

Short term (these days, net of schools and else):

- updated waveform dump model to include truth about where the waveforms are generated from
- updating printing of TPs
- more background events for Harry

Increase amount of time dedicated to new larsoft modules with lar-trigger group.

Next to next week: case-specific larsoft tutorial for Dario and Harry (and whoever wants to). If ready, with new stuff, otherwise with old TPStreamer module (concepts are the same).

ALL

find better acronym: proposals are OPS or COPS

# Backup



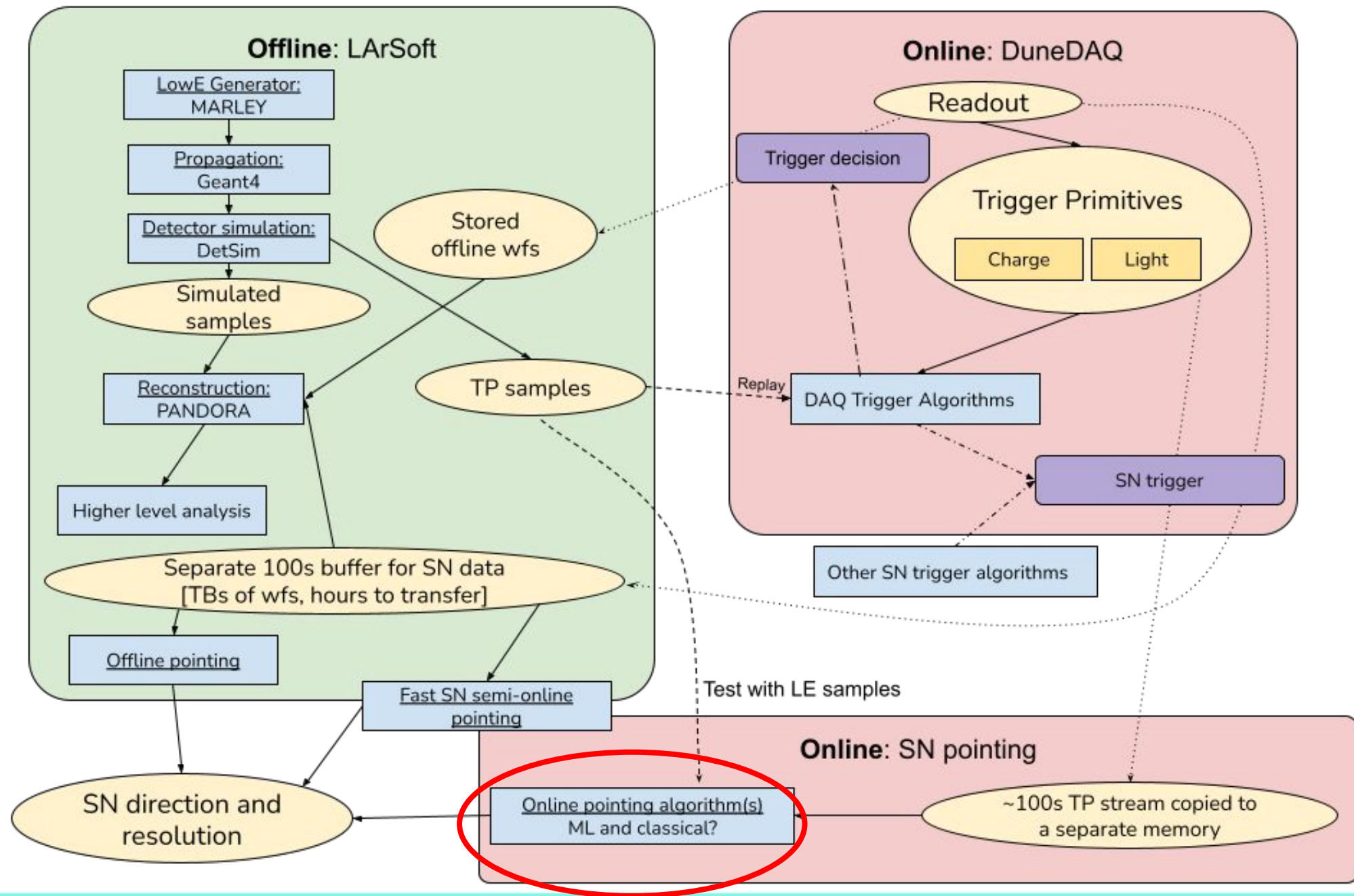
# Team

- Emanuele
- Dario: ML for data selection and pointing
- Harry: calibration and background studies, ML efficiency and optimization

# Organizational tools

- Google Drive: <https://drive.google.com/drive/folders/1OFjfICWEx6oz1LuxBZKucMJA1hctqzqA>
- Trello (ask for access in case):  
<https://trello.com/invite/b/dLY8Levk/ATTI2f67823132856e2f23e4cf97d8729fc5B50A74B0/sn-pointing>
- Slack channel in DUNE: #ml-for-sn-pointing (private)
- Overleaf for tech notes (it's time to start): <https://www.overleaf.com/2191934912fyxxzbpstvrs#2d9b5a>
- Outlook and Indico events for weekly meetings, setting up as a series starting next week  
<https://indico.cern.ch/category/18513/>

# Context

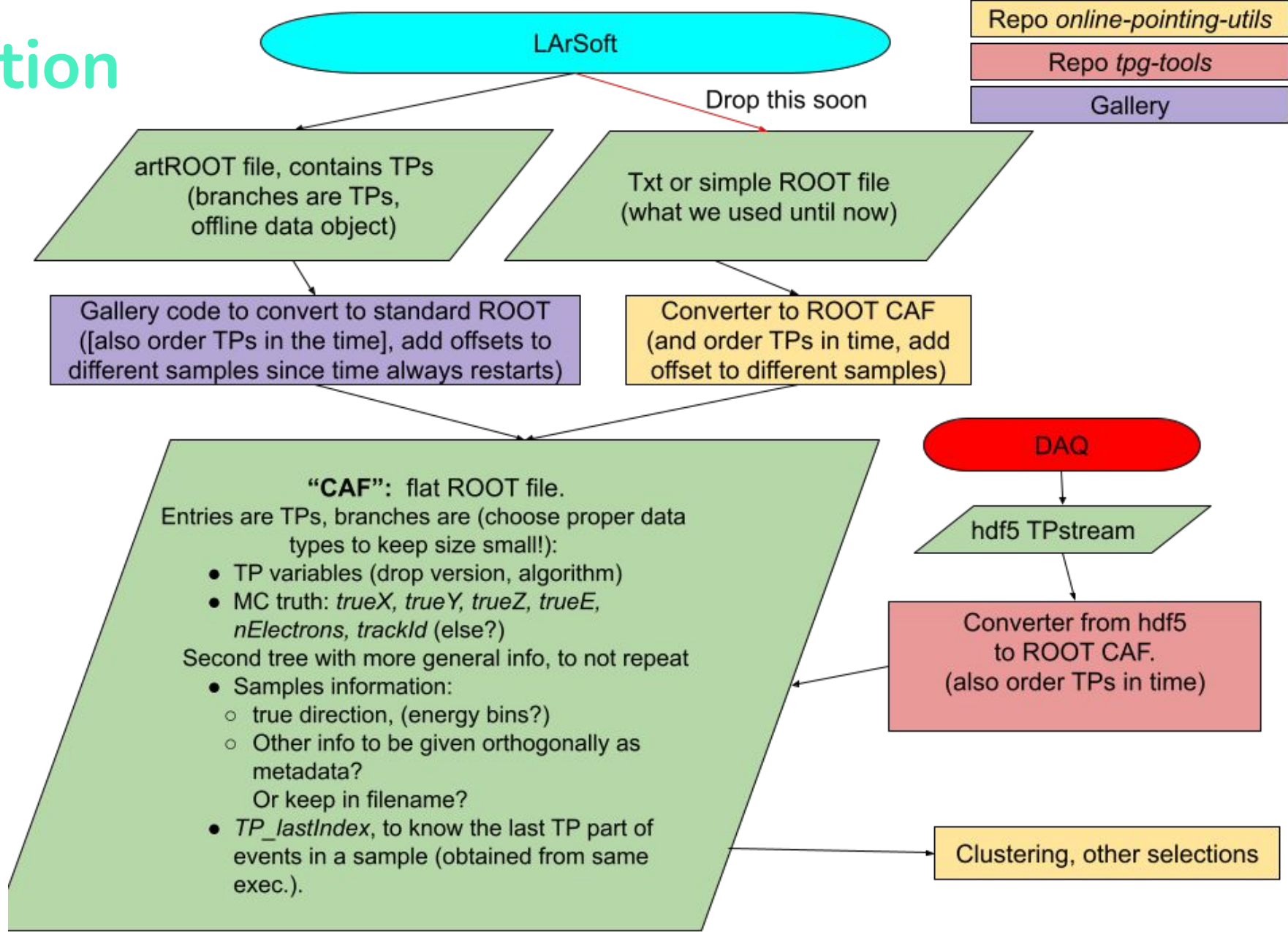


# Samples generation

As everybody knows, larsoft is painful and not set up to simulate the DAQ properly.

Currently still using text output format, but moving to standard root output as soon as possible.

Ongoing effort to simulate the DAQ in a better way, Slack channel #lar-trigger.



- Repo *online-pointing-utils*
- Repo *tpg-tools*
- Gallery