Detector 1 : DAQ WG 5/24/22
Agenda

- Discussion of WG operations
- Discussion of Detector Contacts
- Summary of streaming workshop
  - * List of topics, short highlights of what discussed
  - * Go over list of questions
- Next streaming workshops
- AOB

WG operation discussion

- The mailing list is: eic-projdet-daq-l@lists.bnl.gov, so please sign-up if not signed up.
- Indico page: https://indico.bnl.gov/category/409/
- Wiki: https://wiki.bnl.gov/eic-project-detector/index.php/DAQ
- Intend to record meetings and send minutes to the mailing list
- Plan Schedule will alternate Tuesday afternoon with Thursday Morning. Skip a week between Thursday and Tuesday.
  - Thursday, June 2 @ 9am
  - Tuesday, June 14 @ 3pm
- Jo, Alexandre, Chris and I will meet weekly and will rotate the leading of the meetings among the four of us
- Please send suggested discussion items &/or concerns to one or all of us (or to the general mailing list)
- An important goal is good communication with detector groups. We would like to have a standing agenda item to be updates from the readout relevant activities of the detector, software, and integration groups. However, even short presentations (say 5 minutes) * 10 groups would lead to very long meetings, and most groups will not have significant (DAQ) activity each week. How do we handle this?
  - Short emailed/verbal report from each representative each week to conveners to be compiled &/or prioritized?
  - Rotate reports 3 per DAQ meeting?
  - Something else?

Preliminary Detector Contacts

Detector	Contact From DAQ	From Detector	Meeting Times
Tracking (Silicon)	Jo Schambach*	Jo Schambach	Thursday @ 1pm
Tracking (MPGD)	(Iraqli Mandjavidze)	Kondo Gnanvo	
PID (TOF)	Tonko Ljubicic*	Tonko Ljubicic	Monday @ 11:30am
PID (Cherenkov)	Alexandre*	(Pietro Antonioli)	Friday @ 8:30am
dRICH simulation	(don't need an assignment)		Wednesday @ 12pm
Calorimetry	(2?)*	Oskar Hartbrich	
Far Forward	(Jeff or Chris)*	(Alex Jentsch)	Tuesday @ 9am (bi-weekly)
Far Backward	(Jeff or Chris)*		Thursday @ 9am
Computing	(choose from all convener?)	Sylvester(*)	Wednesday @ 11am
Simulation/QA	(choose from all convener?)*	Andreas	Thursday @ 2pm
Global Integration	(choose from all convener?)*		Monday @ 9am

- Goal is to setup dialogs, attend meetings, understand requirements and assumptions
- Names in parenthesis have provided significant info, but haven't accepted any role…
- Asterix represent the go-to for compiling information
- Please volunteer! Even if you are not willing to be the go-to responsible for getting information it is useful to know who has been attending which meetings.

Summary of Streaming Workshop

Session	Comments
Streaming Readout Status	History, project detector description, future goals: One important point was using heterogenous computing & distributed facilities to blend of DAQ/Offline. "read the physics plots in real time"
Streaming DAQ	LHCb, streaming CODA, ECCE & Athena Proposals. (Diverse examples of streaming, details of proposals and of challenges going forwards)
Streaming Readout Data	ZeroMQ in RDA3, Allen at LHCb (Frameworks), PODio, Alice Data Framework (Data models)
ASIC & Microelectronics	BNL Instrumentation, Timing Systems (recovered clock vs high precision), Electo-optical interface, Frontend electronics from project perspective (stressed a few holes such as maroc3).
Streaming Readout in NHEP	4d track reconstruction (TPC very tough), ERSAP, TRIDAS (useful frameworks), ML on FPGA (advantages of FEP in electronics), Multiscale monitoring, ML for calibration (Adjust calibration in real time)
"Panel Discussion"	Compiled a list of burning questions…

Live notes at :
https://docs.google.com/document/d/1vFz1Z9c4Ck7eaE_eMcJgzg_UNUsYwC1OnygzlX95yic/edit#heading=h.175xdrpf8ddv

Topics/Questions:

1.Do we agree on a coordinated effort on a streaming readout system in the NP community?
    1. Can we agree on a baseline / common system?
    2. Will we have common services for the front end? E.g., power distribution scheme.

2.Timeline for design and development of a streaming readout system for the EIC
    1. Is there any need for R&D?
    2. Can we build a simple test setup? How will we scale it up? Can we use it for test beam?
    3. Chris and Marco emphasize urgency.
    4. How is the stream aggregation done?
    5. How are we building events? Do we need to build events online?
    6. Generalize electrical - optical interface
    7. What protocols are used for the DAQ?
    8. Hardware and software (data handling, communication; calibrations, reconstruction, analysis)
    9. We need good simulations of the entire data stream (emphasis on digitization)
    10. Interface of streaming readout and experimental control, including slow control, and also accelerator control
    11. Is there a requirement for analysis-ready data from the beamline?
    12. What computing resources are required directly at the experiments?
    13. How will we handle firmware and software updates well?

3.What are the biases in the design and implementation and how to prevent them?

4.What are the computing resources needed for the streaming readout?
    1. What are the available and affordable resources?

5.How can we manage background and noise reliably?
    1. Yulia emphasis on background and noise.

6.For each detector component: How will we handle calibrations? Do we need a triggered system for calibrations? What are the requirements for calibrations? What would be the required turnaround time for calibrations?
    1. Torri emphasis on calibration.
    2. Jeff emphasis on detector-specific requirements for the DAQ.

7. FPGA:
    1. Early aggregation: Is there a need for data processing before the frontend?
        1. David emphasis on the possibility for such a system.
    2. Do we want FPGAs at the frontend? What are the limitations and challenges?

8.How do we coordinate the purchase of front-end electronics?

9.How do we coordinate the purchase of other components, e.g., GPUs?

10.We have to define the clock distribution. How will it be done?
    1. Timing system needs to allow for simultaneous test of the detector components.

11.What are the boundaries between DAQ, online and offline data processing? Will this be fully integrated?

12.We need data quality monitoring for each layer of the read out and data processing, including feedback for accelerator control.

Next Streaming Workshop

- Because of the importance of the EIC detector in streaming DAQ at this point, the schedule of next meeting(s) was pushed to the conveners of Detector-1 DAQ WG.
  - Timing of the meeting
    - 6 Months is traditional: would be late November/early December
  - Format of meeting is also up for discussion. Should we have smaller/more frequent/focused meetings? For example:
    - Electrical-optical interface
    - Timing system,
    - Ai/ML &/or FEP hardware
    - Streaming model, offline interface/integration, Data models
    - Software Frameworks

    - (Survey of existing Streaming DAQ setups/methods) (part of every discussion or separate)

AOB…