Results from eRD23 report, and Q/A

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EIC eRD review: "Findings"

The collaboration has continued to hold meetings and workshops (the latest last November) to good effect. The collaboration argues that presently available technology for streaming readout (SRO) can handle the data transmission and storage problems inherent in a streaming readout for an EIC detector. They also acknowledge that the real limitations in such schemes come from the cost of storing data. For instance, the presentation mentions that sPHENIX is doing streaming tests at 18Tb/s. Saving that much data (about 20,000,000 TB per accelerator year) would cost order $1B in disk per annum – unlikely given ONP's present operations budget. In the proposal, but not so much in the presentation, the proponents acknowledge that different types or levels of triggers / filters / feature finders / reconstruction may be applicable for different sub-detectors.

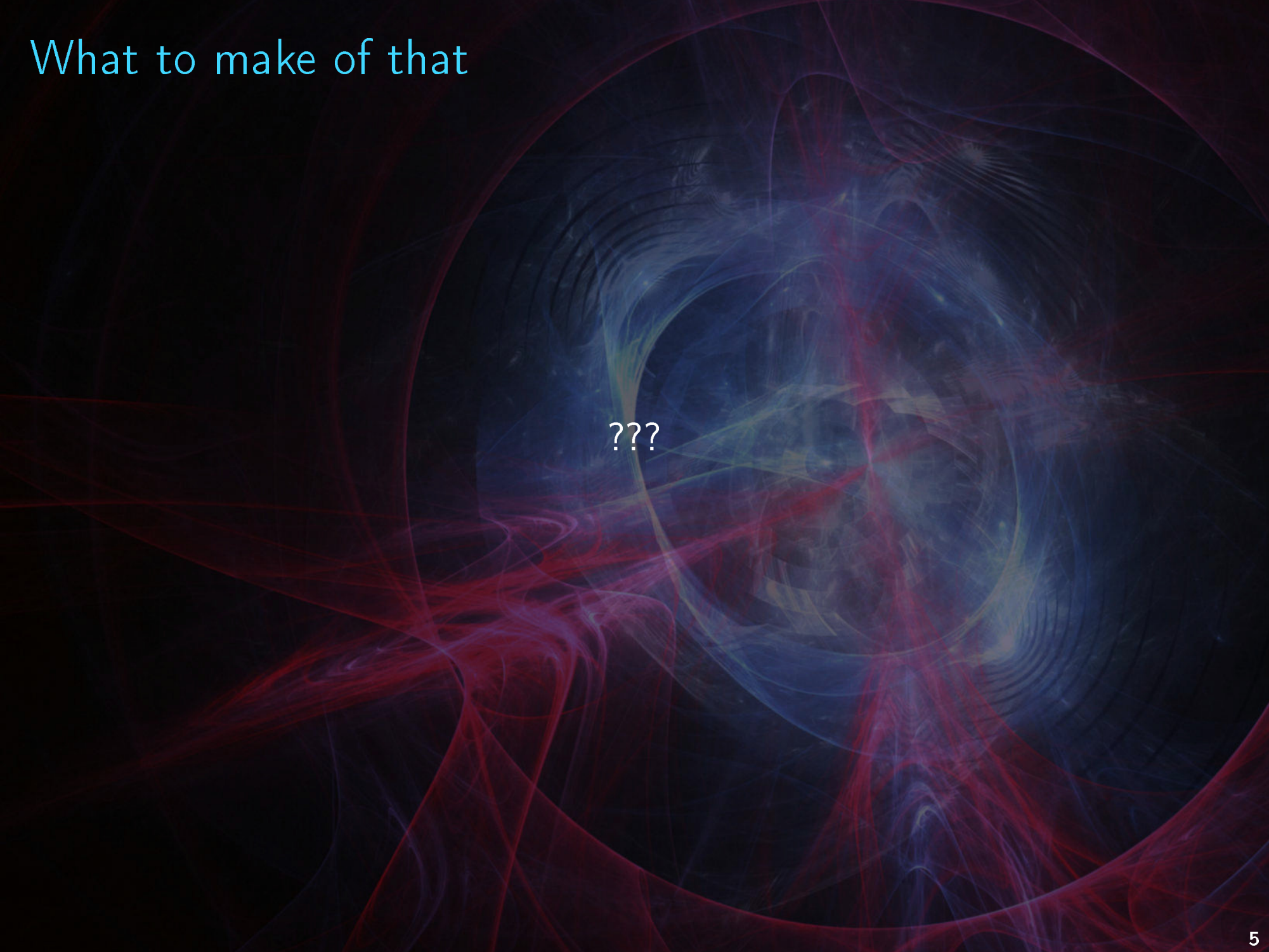
EIC eRD review: "Comments"

The proponents point out, quite reasonably, that detector readout cannot be an "afterthought" but must be included in the detector TDR. However, the proponents seem to be under the impression that a new ASIC for some sub-detector would need many years of development. Specification of or understanding the requirements for some new ASIC could indeed take a good deal of time but implementing a solution to those requirements should not take a long time if those requirements are technically feasible. The presentation focuses on "integrating SRO into detector design". This may not be the correct focus since the challenge is not, as the collaboration points out, to just move data but to filter that data down to a size that could actually be stored.

EIC eRD review: "Recommendation"

The committee recommends that the collaboration concentrate future efforts on understanding on how to reduce the size of the data stream so that an EIC detector could actually afford to store the resultant stream. What combination of hardware triggers, firmware feature extraction, software feature extraction, low level reconstruction, data compression or other schemes could reduce the data volume to a manageable size. It seems likely that it will turn out to be optimal to use different strategies for different sub-detectors and different data streams.

What to make of that



Questions/Answers by Thomas and Rolf: Q1

Q1: Do you see the readout group as part of a detector proposal, or something which is more at home with the hosting lab? Or, in other words: Where/how do you see the transition from “Should be the concern of the detector collaboration" to “Should be the concern of the hosting lab" and maybe back, in the scope of <detector FE> -- <DAQ readout to/through the counting house> --- <Data silo> -- <HPC> --<Analysis>

Q1a) Maybe you could comment on your views on "exclusivity" of contributions with regard to the detector proposal.

Questions/Answers by Thomas and Rolf: A1

Thomas: Yes, I see the DAQ+RO Electronics as part of the detector proposal and an integral part of the collaboration(s). But as with all detector components the project will be more involved than we are used to. This is the new DOE model. The project is already pretty active on the ASIC front talking to companies and labs. DAQ + RO electronic will be funded out of the project and all computing that is part of the DAQ. Say streaming data compression or the like. The moment the data gets transferred out of the CR. The projects funding ends. Storage, computing, reconstruction, microDSTs, more storage, analysis resources, all will have to come from operation funding and will be in the hands of the respective departments at BNL/JLab or other Tier X facilities. (1a) I guess there will be certainly not two ASICs of each type so much will be shared in terms of RO electronics. In the proposals/collaborations I am sure there will be people with slightly different ideas on how the DAQ will be implemented so I am assuming some level of divergence.

Questions/Answers by Thomas and Rolf: Q2/A2

Q2: If two detectors will be built, do you expect to use the same DAQ and software infrastructure, or do you expect this to be two different groups?
Thomas: I expect two different groups but again I assume much of the RO electronic might be shared. Also note that the IP8 detector will come later than IP6 which might affect the solutions chosen.

Questions/Answers by Thomas and Rolf: Q3/A3

Q3: What funding opportunities do you expect? How can we finance the work of students/universities (it's somewhat clearer for the labs). Will the eRD program continue / change shape / be discontinued?
Thomas: As said above this is funded out of the project and there is (or will be) a Control Account Manager (CAM) for this. R&D is certainly targeted.

Questions/Answers by Thomas and Rolf: Q4/A4

Q4: What points do you see critical? I.e. What capabilities should the SRO community demonstrate/focus on?
Thomas: Clock distribution and interface/requirement definition with yet to be determined detector systems. I was ALICE LHCC referee during the time they developed their streaming readout and saw electronic coordinators that had to produce a ton of electronics (literally) being confronted with ever changing requirements. One example is the SAMPA for the TPC with all the digital voodo to do zero suppression. Well it turned out in the last minute that there were not enough channels on the SAMPA to define a good baseline. So just before everything was settled they decided to send all data up from the pit to the CR where the data from several Sampas had to be combined and only then could the data be zerosuppressed. Needless to say that this meant a complete overhaul of everything. These are the kinds of things that I thing will be very crucial.

Questions/Answers by Thomas Q5/A5

Q5: Do you see storage cost as a major issue (I maintain that this cost would occur in any case, but it sets the aimed-for operation point for SRO.)
Thomas: Storage cost (tapes) is an operation issue. For RHIC it is quite a bit but unless the requirement would be exorbitant (> RHIC) I would not worry.