Streaming Readout Workshop SRO-XII

Dec 2 – 4, 2024
University of Tokyo
Asia/Tokyo timezone

Discussion on Collaboration between SPADI-A, Jlab, BNL, other facilities to build SRO DAQ/Computing

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Quick (my biased) recap (I)

- A lot of developments on SRO framework at different facilities
  - JLab : CODA, JANA2, EJFAT, ERSAP
  - BNL : RCDAQ
  - Japan NP: nestDAQ, artemis
- A lot of developments on real-time data processing using AI/ML and hardware acceleration (FPGA and GPU)
  - Reconstruction, noise reduction, data encoding and decoding,
- A lot of developments for ASICs and FECs supporting SRO
- A lot of considerations have been made for ePIC SRO DAQ

Quick (my biased) recap (II)

- SRO workshop focuses on SRO dvelopment for the EIC/ePIC
- It is extremely important for both EIC and other projects at many facilities such as JLab, FRIB, J-PARC, RIBF, RCNP, etc to profit from on-going SRO developments.

- Having solid (and unified) SRO systems, "standardization" across the many projects, will be important.
  - Ultimately, if all experiments use the same framework, barriers between different experiments can be gone and it would become much easier and become more realistic for more people to join the different experiments.
  - Moreover, succession of SRO technologies can be maintained easily by the entire SRO community.

How we move forward

- Interactions between different experiments will be important.
  - For example, personally, I am very much interested in testing scalarbility of nestDAQ and CODA using large systems in sPHENIX…
  - I am also very much interested in how CODA and rcdaq can develop nestDAQ and how nestDAQ can develop CODA and rcdaq.
  - My plan is to start sending people in BNL or JLab to have more interactions with ePIC.
  - For example, (if this benefits collaboration), we will start building some slice test setup (mini-scale testbeds for E0(-E1-E2)) to integrate SRO components and SRO orchestrations, and to start benchmarking/development/verification of full chains.

- How about we will newly establish "global SRO consortium"?
  - Interact more strongly with each other across different projects
  - Share infrastructure, beamtime, testbench, etc
  - Share new technologies and experiences
  - Attract more people and inclease human resources
  - Organize schools or handson sessions regulary
  - Develop the next generation of human resources

Global SRO consortium?

- HSF can provide some hints to us? https://hepsoftwarefoundation.org/

HSF
HEP Software Foundation

The HEP Software Foundation facilitates cooperation and common efforts in High Energy Physics software and computing internationally.

Meetings

The HSF holds regular meetings in its activity areas and has bi-weekly coordination meetings as well. All are welcome to join these public meetings and other HSF activities.

- HSF Coordination Meeting #278, 21 November 2024
- HSF Steering Group Meeting, 19 November 2024
- HSF Coordination Meeting #277, 7 November 2024

Upcoming HSF and community events »

Full list of past meetings »

HSF Seminars

We have started a series of HSF Seminars, to cover topics of general interest for software in high-energy physics.

HSF
HEP Software Foundation
Seminar

In our very first seminar Uwe Acosta introduced the discussion of *Julia in high-energy physics: a paradigm shift or just another tool?* and then Jeff Bezanson followed up with *Julia as a Statically-Compiled Language*.

Suggestions for future topics for the seminar series are very welcome - just contact the organisers.

Activities

We organise many activities and events and we support HSF affiliated projects. We help communication within the community through our discussion forums and technical notes.

The HSF can also write letters of collaboration and cooperation to project proposals.

How to get involved »

HSF Activities

HSF activities are focused mainly on community led groups that organise around particular domains with the aim of increasing communication between developers, providing a platform for discussion of interesting problems and novel solutions developments, and fostering the adoption of common software between different communities.

- Data Analysis
- Detector Simulation
- Physics Generators
- Season of Docs
- Google Summer of Code
- intelligent Data Delivery Service
- JuliaHEP - Julia in HEP
- Licensing
- PyHEP - Python in HEP
- Reconstruction and Software Triggers
- Reviews
- Software Developer Tools and Packaging
- HSF Training

Global SRO consortium?

- Possible areas of activities
  - ASICs for SRO
  - FEC
  - Timing Distribution
  - Data transfer (protocol) and data aggregation (PCIe400, FELIX, COTS)
  - SRO framework (frame building, data transportation from N to M, load balancing)
  - Streamed data processing and calibration
  - AI/ML and hardware accelerations
  - Controls, Monitoring, Database
  - Computing, Networking and Data management (ex, Rucio, Ceph)
  - Application (medical imaging, imaging of nuclear fusion reactor, backend of quantum computing, etc)

- What do you think about this idea? If positive, how to move forward?
- Joint budget requests?