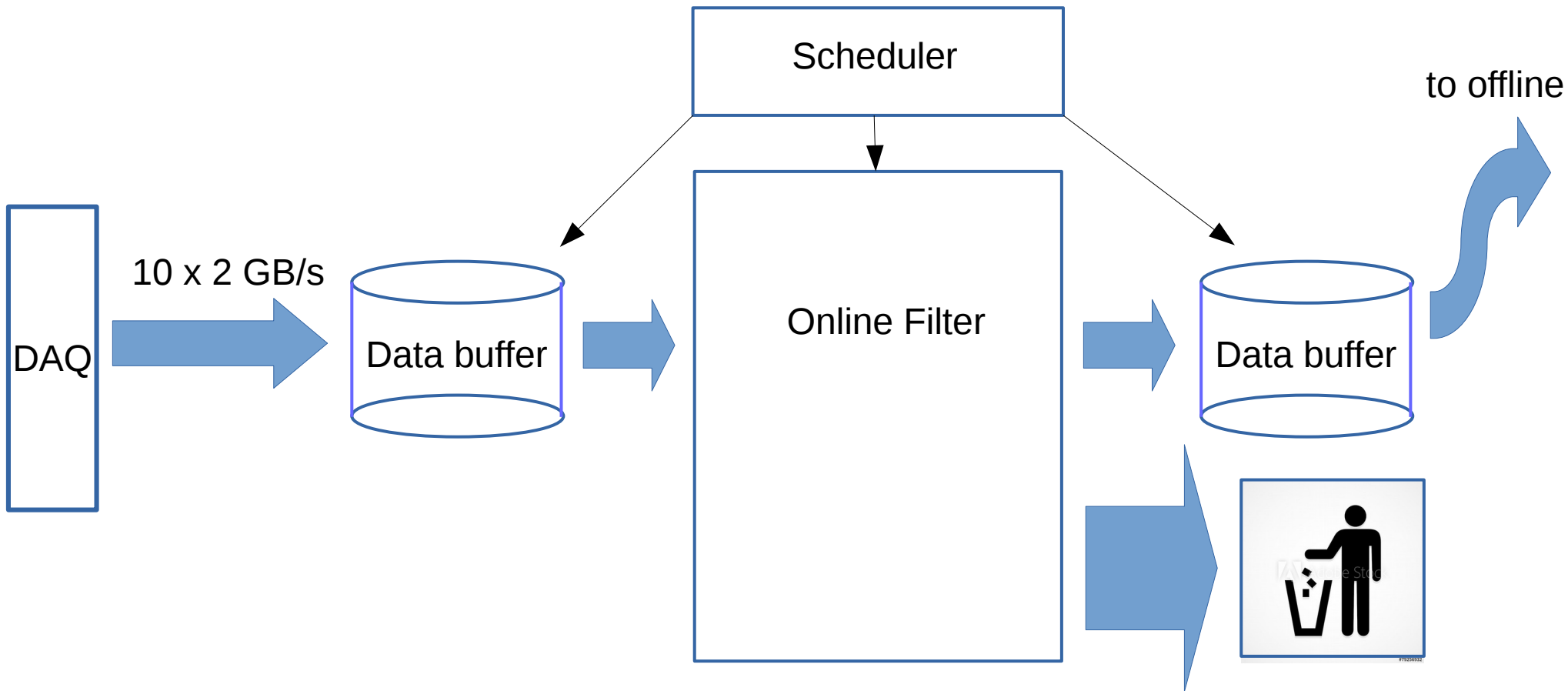


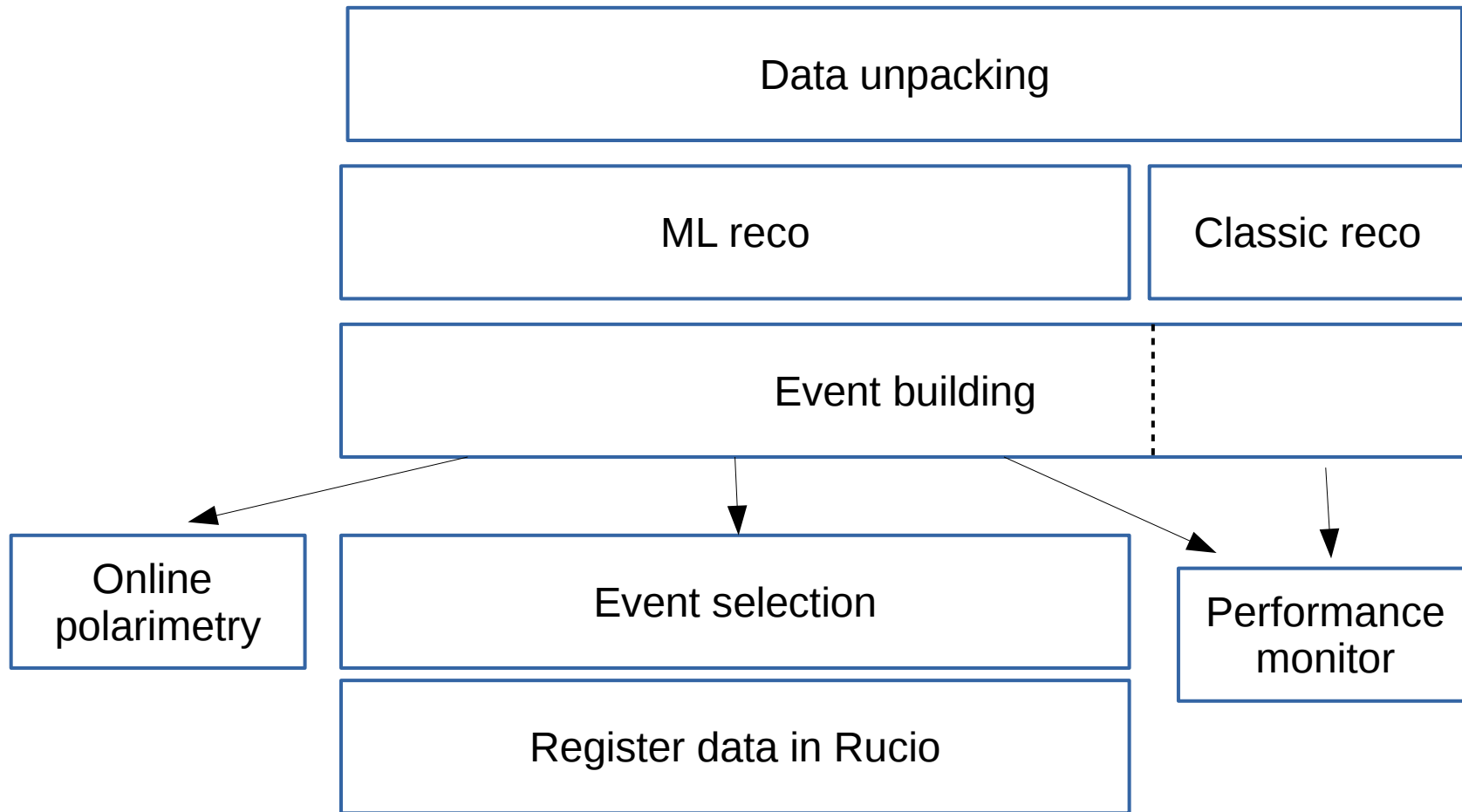
First considerations of the online filter

A. Zhemchugov
02 February 2021

Online Filter Layout



Online filter operation



Data unpacking

- **Input:** bytestream from the DAQ
- **Output:** raw hits (channel-signal) grouped by time slices, with a timestamp

We do not need to reproduce the bytestream in the MC for future developments, but we do need time slices with raw hits (and possible pile-ups)

ML reconstruction

- Track reconstruction => Ntrk, Pt[Ntrk], Pz[Ntrk]?
- Primary vertex reconstruction => Vtxx, Vtxy, Vtxz
- ECAL => Ncluster, Energy[Ncluster], Position[Ncluster]
- π^0 reconstruction, ZDC, BBC for online polarimetry ?
- RS, PID ??

Classic reconstruction

- The same as ML reconstruction but using traditional algorithms
- Assume that calibration constants and alignment are not available
- Assume that noise level is not known *a priori*

Event building

- **Input:** several (2 or 3) consecutive time slices selected by a sliding window, with reconstructed data
- Event building is based on timing and reconstructed primary vertex position
- **Output:** event structure, consisting of a set of raw hits and reconstructed information (primary vertex, tracks, clusters)
- Shall we consider HDF5 as an output data format?

Event selection

- We need a preliminary set of physics criteria to select interesting events, and relevant pre-scale factors for the output data streams
- Decision of the event selector is an input for the data management system (datasets, metadata)

Preliminary task list

- Data unpacking — [subdetectors + DAQ group?](#)
- Dedicated MC simulation (time slices with labels for ML training, noise)
- Scheduler and core framework, ML implementation, HDF5 IO, Interface to Rucio - [Anna Belova ?](#)
- ML reconstruction
 - Tracking - [group of Gennady Ososkov ?](#)
 - Primary vertex - [Ekaterina Rezvaya](#)
 - ECAL
- Classic reconstruction
 - Tracking
 - Primary vertex
 - ECAL
- Event building
- Physics selection criteria and data streams, performance monitoring - [Mikhail Zhabitsky ?](#)
- Local polarimetry
- Event selector