

Online Histogramming System and perspectives of integration with DQA

Ilnur Gabdrakhmanov

VBLHEP, JINR

Dubna 2020

6th Collaboration Meeting of the BM@N Experiment at the NICA Facility



Construct unified QA system based on the present online monitoring system and the offline QA with the following capabilities:

- ▶ Convenient histogram sets of basic/raw distributions in order to check the equipment state/decoding correctness and higher level (hits, tracks, vertices) in order to check tracking algorithm
- ▶ Easy selection (for the primary and reference) of any past or current run with automatic grouping of runs with the same physical conditions
- ▶ Unified and modular code structure for the purpose of flexibility/scalability

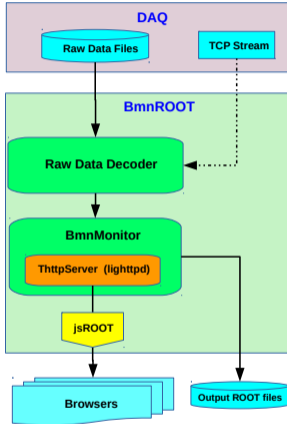
Online Monitoring (I. Gabdrakhmanov, S. Merts)

- ▷ Online data decoding and filling of web histograms
- ▷ Reference run can be selected from automatically grouped list of runs with the same physical conditions
 - Superimposing of 2 runs is not flexible

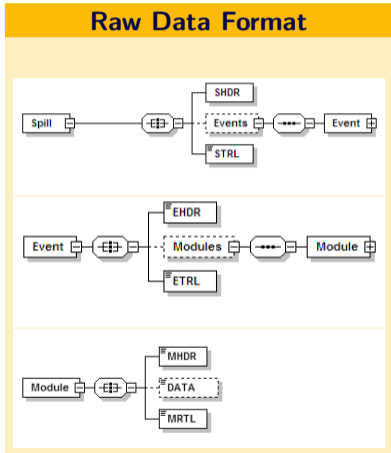
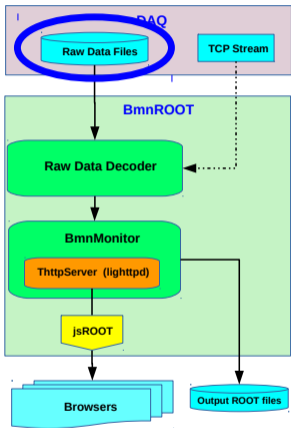
Offline QA system (P. Batyuk)

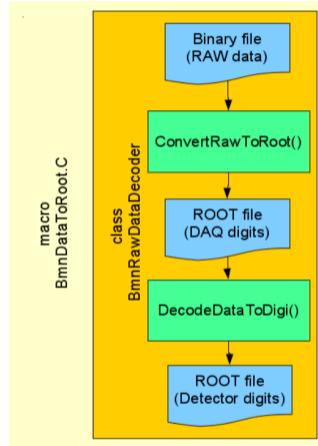
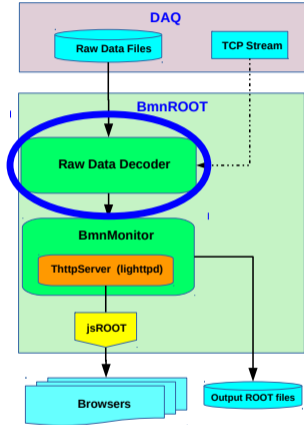
- ▷ Wide range of histograms from basic detector ones up to track parameter distributions
- ▷ Both main and reference runs can be selected from any period/run from offline disk data
 - There is no autoselection

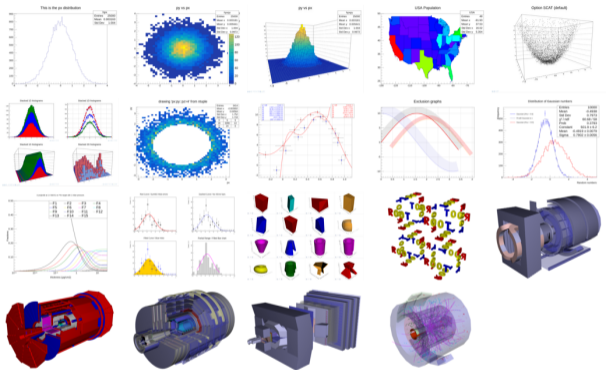
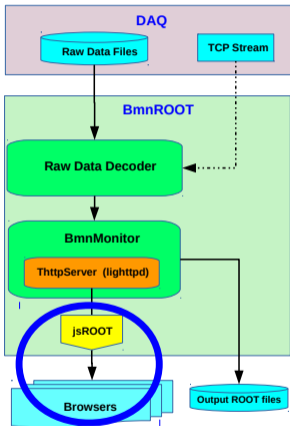
Both systems use THttpServer class with lighttpd web server as a base for the frontend.



- 1 Online monitoring system for the BM@N experiment I.R. Gabdrakhmanov, M.N. Kapishin, S.P. Mertz, CEUR Workshop Proceedings (CEUR-WS.org), ISSN:1613-0073, RWTH Aachen University, 2023, 155-160, 2017
- 2 Software Development for the BM@N Experiment at NICA: Challenges and Status Gertsenberger K., Merts S., Gabdrakhmanov I., Filozova I., Alexandrov I., Alexandrov E., Moshkin A., Chebotov A., EPJ Web of Conferences, EDP Sciences, 226, 03008, 2020
- 3 Development of the BM@N Web Monitoring Ilnur Gabdrakhmanov Sergei Merts, EPJ Web of Conferences, EDP Sciences - Web of Conferences, 226, 03007, 2020







jsROOT website

<https://root.cern.ch/js/>

What does it use as an engine?

- ▷ HTTP server inROOT (a class called THttpServer)
- ▷ Lighttpd server on host to provide a WebUI for users

Brief use description

- ▷ [WebUI](#) displays histograms got from a file produced by [offline histogram producer](#)
- ▷ Class [BmnQaOffline](#)
- ▷ Class [BmnQaMonitor](#)

offlineQA.C

```
void offlineQA(TString digiFile = "",
              TString dstBMN = "",
              TString dstCBM = "",
              TString out = "",
              Int_t nEvents) {

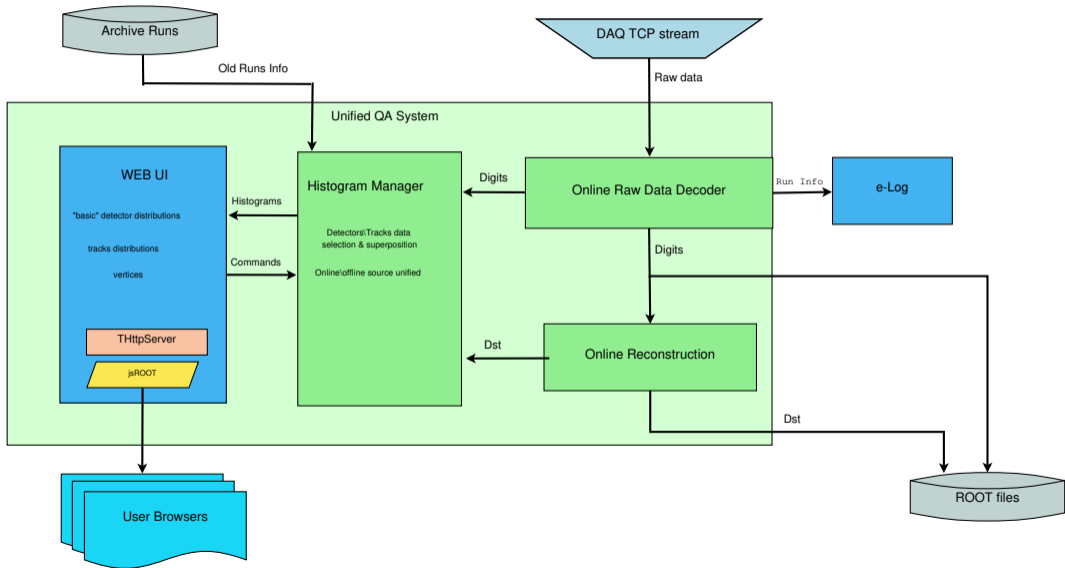
    bmnloadlibs(); // load libraries

    TStopwatch timer;
    timer.Start();
    FairRunAna* fRunAna = new FairRunAna();
    ...
    BmnQaOffline* qaSystem = new BmnQaOffline(dstBMN);
    fRunAna->AddTask(qaSystem);

    fRunAna->Init();
    fRunAna->Run(0, nEvents);
    ...
}
```

startWebServer.C

```
void startWebServer() {
    BmnQaMonitor* mon = new BmnQaMonitor();
    mon->SetHistoDir("/nfs/RUN7_res/QA/output");
}
```

Development roadmap:

- ▷ Implement merging
- ▷ Insert online reconstruction into the processing chain
- ▷ Refactor data transferring and decoding part
- ▷ Parallelize as much stages as possible
- ▷ Unify data exchange format with other BM@N information systems

Thank you!