Status of the Online Processing System for the BM@N experiment

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Targets and goals

The purpose of online processing system is selective data processing (digitization of events and fast reconstruction) and monitoring of the data of the ongoing experiment.

The system must have **high performance**, since the volume of data is large enough and the processes of digitization and reconstruction take a long time.

Choice of solutions for implementation

Message exchange

FairMQ* is a messaging library focused on building modular systems for data processing in high energy physics experiments.

It represents an abstraction over various messaging technologies such as ZeroMQ, Nanomsg, etc.

Deployment

DDS* (Dynamic Deployment System) is a set of tools that facilitates the process of system deployment.

As a Remote Manipulator System (RMS), it initially provides SSH or SLURM, but also allows you to use other methods.

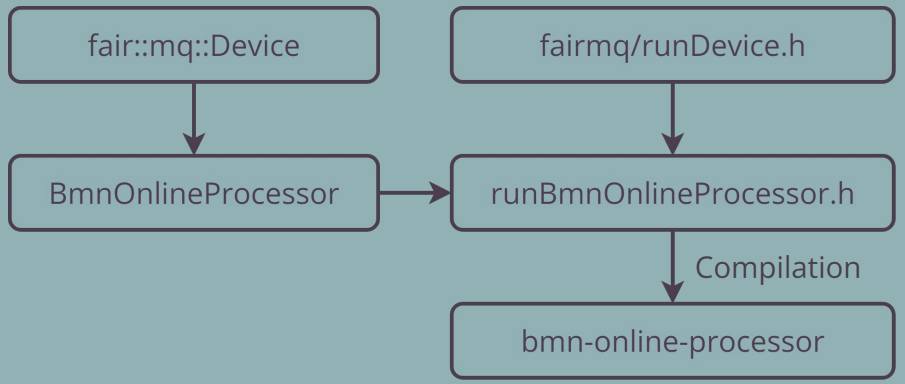
* Developed by the FAIR collaboration at the GSI Institute, Germany.

FairMQ Device

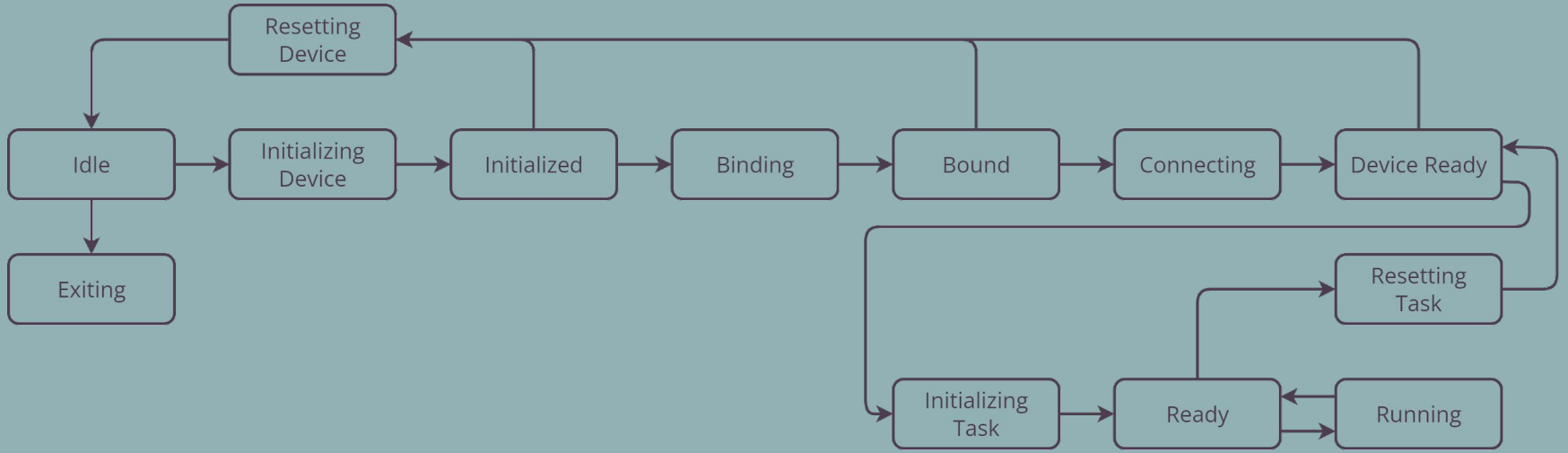
The FairMQ Device is an executable file.

To create a FairMQ Device, you need to:

1. Implement the fair::mq::Device base class;
2. Create a file, include the implemented class and the special file runDevice.h;
3. Compile this file into an executable format.



Life cycle of FairMQ Device



Comparison of reconstruction processes

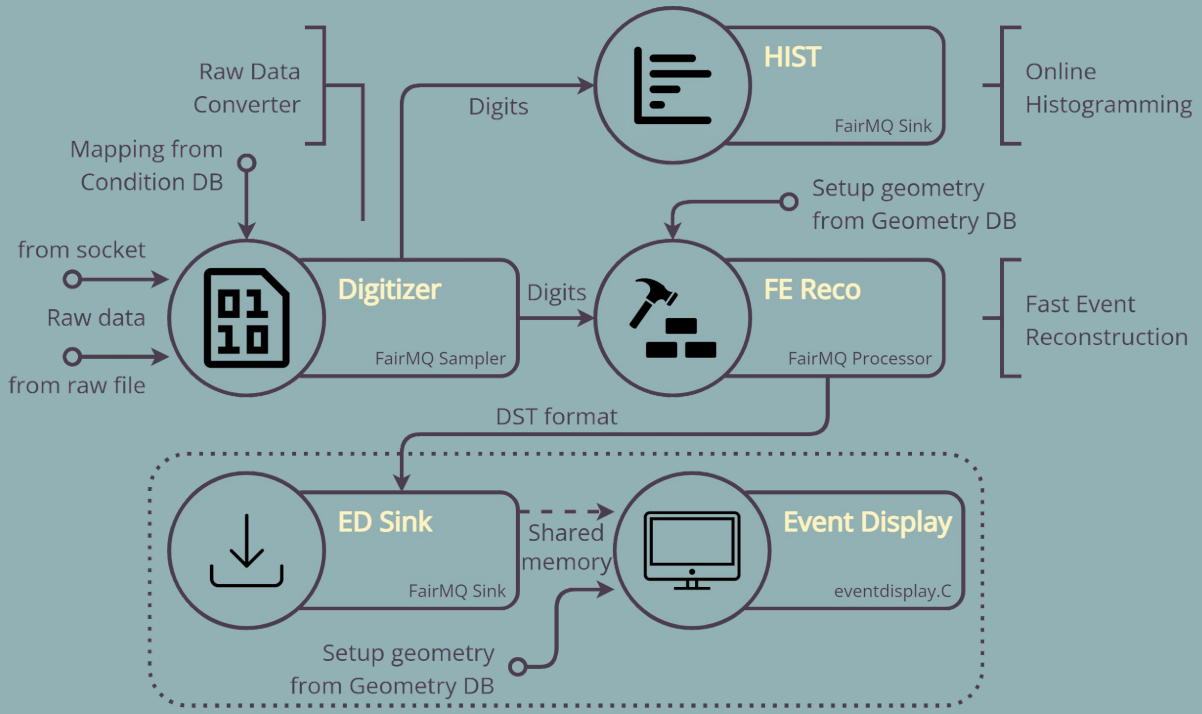
run_reco_bmn.C

FairRunAna is used to store and manage the list of tasks (initialization, execution, completion).

FairMQ Device

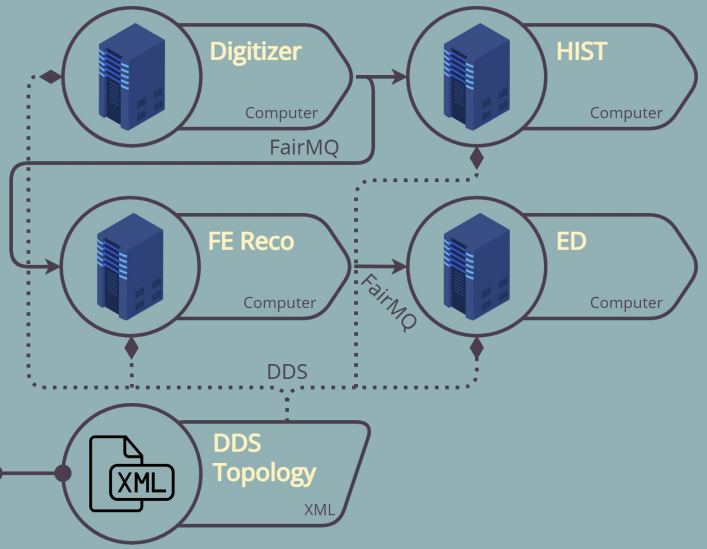
Tasks are stored in a special array. They are managed through a sequential call to the methods InitTask, Exec and FinishTask when the Device is in the Running state.

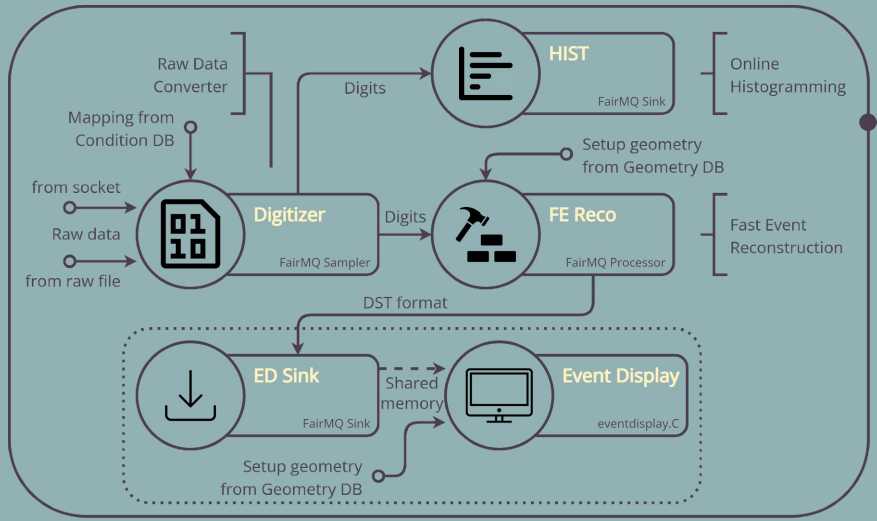
Diagram of the online processing system



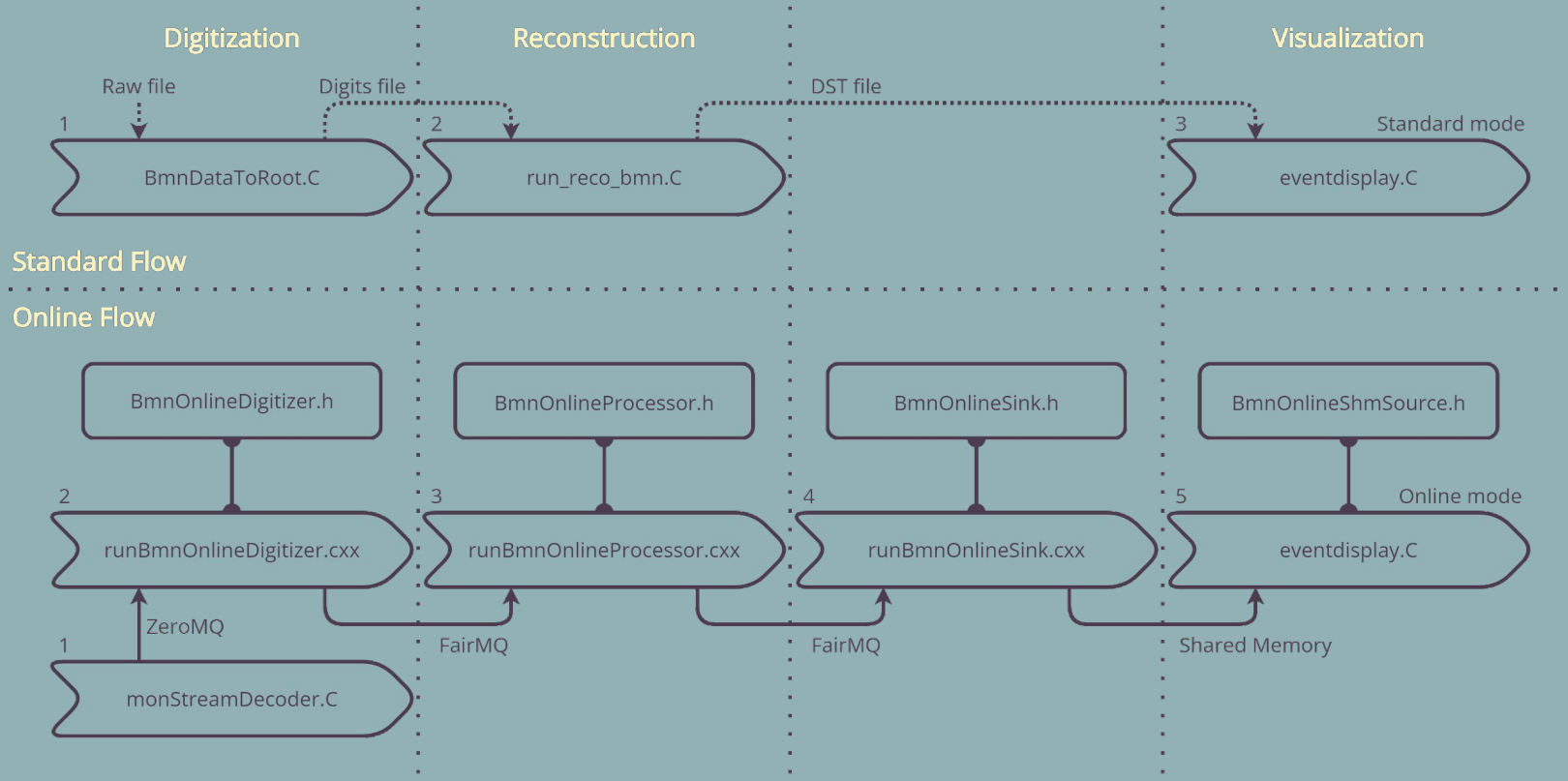
System deployment diagram

The rules by which deployment takes place is called a topology (it is an XML file).

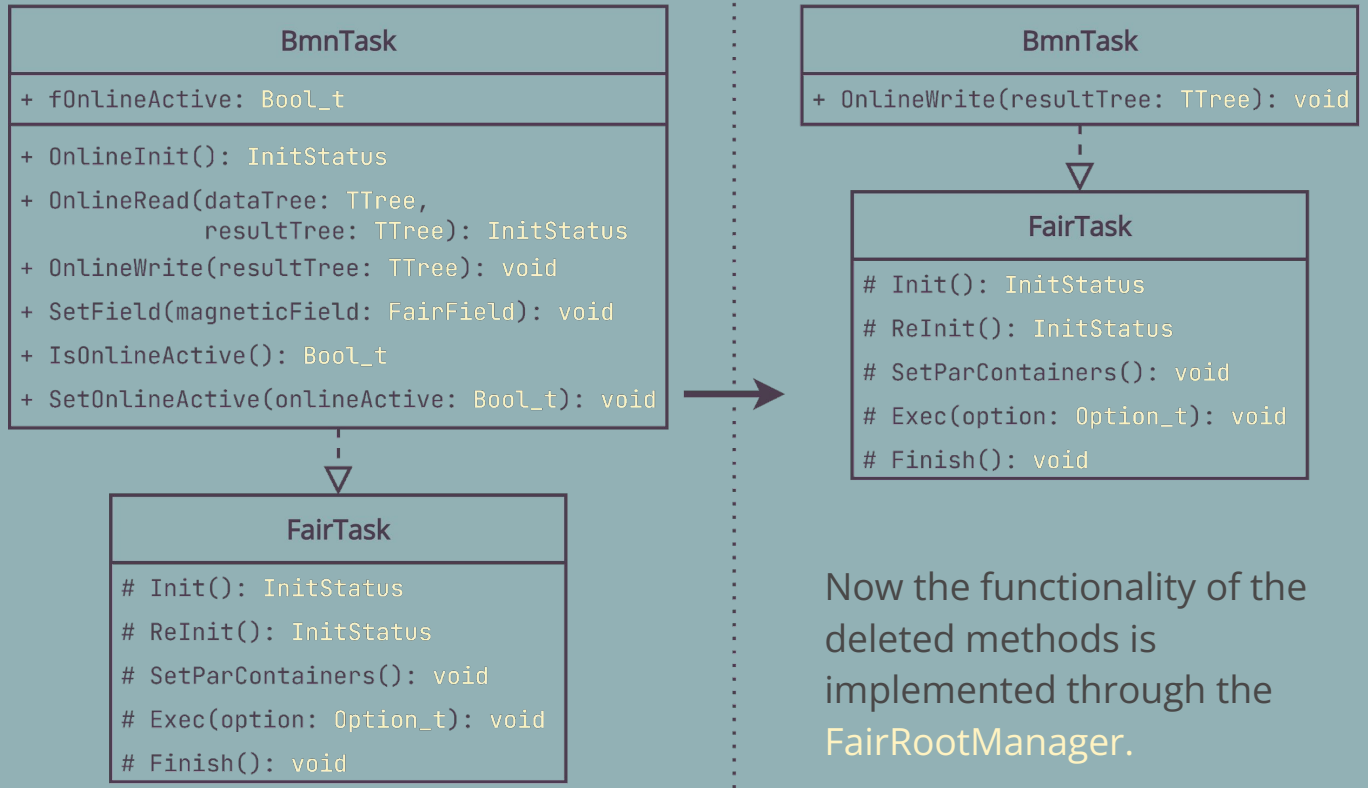




Implemented solution



Updates



Now the functionality of the deleted methods is implemented through the FairRootManager.

Future plans

- Perform integration with the online configuration system.

Conclusion

- Integration with the monStreamDecoder.C macro was performed using the developed BmnOnlineDigitizer;
- Implemented a new approach using FairRootManager.

Thank you for your attention!