

Status of the FairRoot framework

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The FairRoot framework is an object oriented simulation, reconstruction and data analysis framework based on ROOT [1]. It includes core services for detector simulation and offline analysis. The framework delivers base classes which enable the users to easily construct their experimental setup in a fast and convenient way. By using the Virtual Monte Carlo concept it is possible to perform the simulations using either Geant3 or Geant4 without changing the user code or the geometry description. Extending the task mechanism of ROOT it is possible to implement complex analysis tasks in a convenient way. Using the FairCuda interface of the framework it is possible to run special tasks also on GPU. Data I/O, as well as parameter handling and data base connections are also handled by the framework. Since some of the experiments will not have a experimental setup with a conventional trigger system, the framework can handle also free flowing input stream of detector data. For this task the framework provides classes to create out of event based simulation data the needed time sorted input stream of detector data. There are also tools to do radiation studies and to visualize the simulated data. A CMake-CDash based building and monitoring system is also part of the FairRoot services which helps to build and test the framework on many different platforms in an automatic way, including also Continuous Integration.

The framework, is designed to optimize the accessibility for beginners and developers, to be flexible (i.e. able to cope with future developments), and to enhance synergy between the different physics experiments within the FAIR project. However the framework is meanwhile also used outside FAIR project by the MPD project at Dubna [2] and the EIC project at BNL [3]

Time based simulation

The time based simulation support in FairRoot is available for all experiments. At present only some detectors in PANDA did the full implementation of there detectors to handle the time based simulation (i.e: MVD, LMD and STT have the full implementation). Work is ongoing by the different detector groups and soon the system should be ready for PANDA.

Database support

The parameter handling in FairRoot has been extended. The connection to storage database is implemented via a database interface which provides a simple and uniform concept regardless of the data being accessed, this is described in details in this report by D. Bertini. et.al [4]

Support the realtime pipeline-processing

Extensions for supporting realtime pipeline-processing scenarios of the online analysis are being developed within the FairRoot framework. This new development is described in more details in a separate report [5].

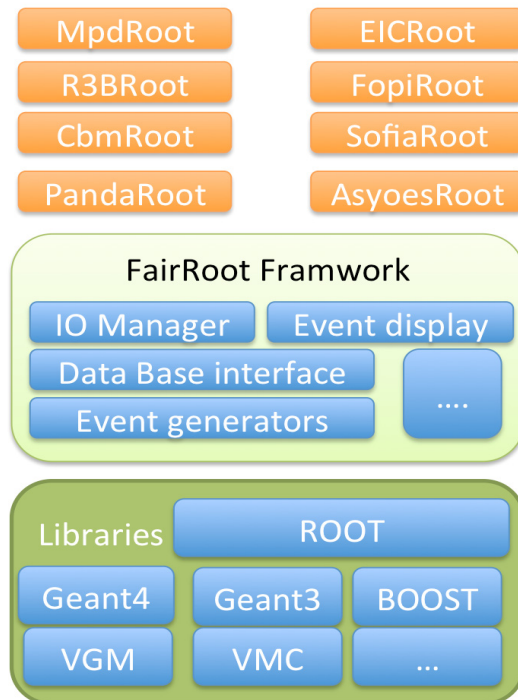


Figure 1: FairRoot at different experiments

References

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