Contribution ID: **491**   Type: **not specified**

Designing the computing for the future experiments

Tuesday 15 October 2013 11:45 (45 minutes)

For many experiments, e.g. those at the LHC, design choices made a very long time ago for the compute and trigger model are still used today. The incoming experiments have the opportunity to make new choices based on the current state of computing technology and novel ways to design the reconstruction frameworks, using the experience from previous experiments as well as already existing software packages developed outside the collaboration and used and by a larger community.

This talk will show the computing decisions and the current developments of the Panda experiment at FAIR - Darmstadt (Germany), which will take data starting from 2018. One of the key features is a modular software framework with a dynamic data structure based on ROOT, in common to other experiments outside FAIR, with the possibility to run simulation and analysis on grid but open to different middleware technologies such as the cloud. Due to the high data rate, a special attention is also given to the online reconstruction of the continuous data stream coming from a trigger-less DAQ system, where the pre-processing for event selection is done online and concurrency is the key feature to achieve the requested high performances; all the efforts to develop a modular multi-core architecture, supporting also FPGA and GPU units, will be here presented together with the results obtained so far.

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Session Classification: Plenaries