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Sustainability studies of big data processing in real time for HEP

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The LHCb collaboration is currently using a pioneer system of data filtering in the trigger system, based on real-time particle reconstruction using Graphics Processing Units (GPUs). This corresponds to processing 5 TB/s of data and has required a huge amount of hardware and software developments. Among them, the corresponding power consumption and sustainability is an imperative matter in view of the next high luminosity era for the LHC collider, which will largely increase the output data rate. In the context of the High-Low project at IFIC in Valencia, several studies have been performed to understand how to optimize the energy usage in terms of the computing architectures and the efficiency of the algorithms which are running on them. In addition, a strategy is designed to evaluate the potential impact of quantum computing as it begins to enter in the field.

Significance

Studies of sustainability based on software and hardware optimization are crucial for the future of HEP.

References

https://indico.cern.ch/event/1338689/contributions/6015393/

Experiment context, if any

Partially, LHCb experiment at LHC (CERN).

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