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Blockchain for Large Scale Scientific Computing

Thursday, 12 July 2018 09:00 (30 minutes)

The HL-LHC will present enormous storage and computational demands, creating a total dataset of up to 200 Exabytes and requiring commensurate computing power to record, reconstruct, calibrate, and analyze these data. Addressing these needs for the HL-LHC will require innovative approaches to deliver the necessary processing and storage resources. The "blockchain" is a recent technology for accessing very large pools of computing and storage space, while also ensuring accurate processing of that data. This is the technology underpinning cryptocurrency platforms such as Bitcoin and Ethereum. Blockchain processing networks are, by their nature, highly distributed systems; exploiting them will allow access to a so-far untapped high-quality, global computing and storage network. Ethereum in particular already makes provisions to ensure accurate execution of delivered code, making it a favorable testbed for applications in HEP. The implementation of blockchain technology in the context of particle physics experiments will be explained, defining relevant units of work, and how this work can be distributed safely across worldwide computing nodes. Furthermore, a proof of concept in a simplified analysis workflow where we have embedded the workflow and its results into the blockchain will be demonstrated.

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