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Multi-core supports in JUNO distributed computing

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The IHEP distributed computing system has been built on DIRAC to integrate heterogeneous resources from collaboration institutes and commercial resource providers for data processing of IHEP experiments, and began to support JUNO in 2015. The Jiangmen Underground Neutrino Observatory (JUNO) is a multipurpose neutrino experiment located in southern China to start in 2019. The study on applying parallel computing in JUNO software is on-going to fasten JUNO data processes, and fully use capability of multi-core and many-core CPUs. Therefore, it is necessary for the IHEP distributed computing system to explore the way to support single-core and multi-core jobs in a consistent way. A series of changes on job descriptions, scheduling and accounting will be considered and discussed. The pilot-based scheduling with mixture of single-core and multi-core jobs is the most complicated part. In the report, two ways of scheduling and their efficiency has been studied, one way using separated pilots for single-core and multi-core jobs, and the other using dynamic partitionable common pilots for both jobs. Their advantages and disadvantages will be discussed.

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