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Evolution of CMS workload management towards multicore job support

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The successful exploitation of the multicore processor architectures available at the computing sites is a key element of the LHC distributed computing system in the coming era of the LHC Run 2. High-pileup complex-collision events represent a challenge for the traditional sequential programming in terms of memory and processing time budget. The CMS data production and processing framework has introduced the parallel execution of the reconstruction and simulation algorithms to overcome these limitations.

CMS plans to execute the data reconstruction and simulation as multicore processing yet supporting single-core processing for other tasks difficult to parallelize, such as user analysis. The CMS strategy for job management across the Grid thus aims at integrating single and multicore job scheduling. This is accomplished by scheduling multicore pilots with dynamic partitioning of the allocated resources, capable of running jobs with various core counts within a single pilot.

An extensive test programme has been conducted to enable multicore scheduling with the various local batch systems available at CMS sites. Scale tests have been run to optimize the scheduling strategy and to ensure the most efficient use of the distributed resources. This contribution will present in detail the evolution of the CMS job management and resource provisioning systems in order to support this hybrid scheduling model, as well as its optimization and deployment, which will enable CMS to transition to a multicore production model by the restart of the LHC.

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