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Multi-core job submission and grid resource scheduling for ATLAS AthenaMP

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AthenaMP is the multi-core implementation of the ATLAS software framework and allows the efficient sharing of memory pages between multiple threads of execution. This has now been validated for production and delivers a significant reduction on overall memory footprint with negligible CPU overhead.

Before AthenaMP can be routinely run on the LHC Computing Grid, it must be determined how the computing resources available to ATLAS can best exploit the notable improvements delivered by switching to this multi-process model. In particular, there is a need to identify and assess the potential impact of scheduling issues where single core and multi-core job queues have access to the same underlying resources.

A study into the effectiveness and scalability of AthenaMP in a production environment will be presented. Submitting AthenaMP tasks to the Tier-0 and candidate Tier-2 sites will allow detailed measurement of worker node performance and also highlight the relative performance of local resource management systems (LRMS) in handling large volumes of multi-core jobs.

Best practices for configuring the main LRMS implementations currently used by Tier-2 sites will be identified in the context of multi-core job optimisation. There will also be a discussion on how existing Grid middleware and the ATLAS job submission pilot model could use scheduling information to increase the overall efficiency of multi-core job throughput.

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