Parallel Computing in Urban Drainage Modeling: A Parallel Version of EPA SWMM

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ABSTRACT

The hydrodynamic rain-fall run-off simulation model SWMM is state of the art in research and practice. In order to reduce the burden of long simulation runs and use the extra power of modern multi-core computers a parallel version of SWMM is presented. The challenge was to modify the software in such a minimal way that the changes may find its way into the several commercial and non-commercial tools that depend on SWMM for its calculations. A pragmatic approach to identify and enhance the most runtime intense parts of the software was chosen in order to keep the code changes as low as possible. The enhanced software was then benchmarked on four different input scenarios ranging from a very small village to a medium sized city. In the investigated sewer systems a speedup of six to ten times on a twelve core system was realised, thus decreasing the execution time to an acceptable level even for tedious system analysis.

KEYWORDS

Multi-Core, OpenMP, Parallel Computing, SWMM, Urban Drainage Modelling