

Important Information about SNSWP3D (v1.0)

For the UMT benchmark, SNSWP3D is responsible for the bulk of the time. The SNSWP3D routine includes the most challenging loops that govern overall performance and the greatest opportunity for speeding up the benchmark. In the benchmark, all parallelism, both MPI and OpenMP, are controlled outside of the SNSWP3D routine. Even so, there still remains a very large potential for light-weight thread parallelism in this one routine.

The nature of ASC code development efforts at LLNL do make use of compiler flags, including for individual compilation files and, when necessary, simple compiler directives before individual loops. Whole-scale algorithm changes are not practical for LLNL's very large installed code base, so major algorithm changes will be scored as having dramatically less value than the above mentioned parallelization techniques during procurement evaluations.

UMT version 1.3 differs from earlier versions in the following two ways. First, version 1.3 uses a somewhat different "centering" in the numerical discretization of the underlying radiation transport equations. The total amount of arithmetic has been reduced somewhat, but the essential character of the challenging loops in SNSWP3D and the potential for lightweight thread parallelism has not changed. Second, much generality has been removed from the benchmark in an effort to simplify the operational issues of running large parallel problems.