

Abstract Submitted
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Turbulence Simulation using many Graphics Processors¹ ALI KHAJEH-SAEED, J. BLAIR PEROT, University of Massachusetts Amherst, Mechanical and Industrial Engineering, Amherst, MA 01003, United States — Unsteady simulations of turbulence are performed using up to 64 graphics processors on the NSF XSEDE supercomputer, Lincoln, located at NCSA. For a 512^3 simulations the performance of 16 GPUs (Tesla S1070) is about 45 times faster than that obtained with the same number of CPU cores of quad-core Intel Harpertown processors on the same machine. The code is optimized to use the fast shared-memory on the GPUs and to use communication/computation overlapping. Results show that the computation time is now so fast that even for large problems, with up to 8 million unknowns per GPU, the MPI communication time controls the scaling behavior of the CFD algorithm.

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