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Feasibility of Amazon Cloud Computing Platform for Parallel Multi-phase Flow Simulations¹ COLE FRENIERE, ASHISH PATHAK, MEHDI RAESSI, University of Massachusetts Dartmouth, UNIVERSITY OF MASSACHUSETTS DARTMOUTH TEAM — The feasibility of Amazon’s Elastic Compute Cloud (EC2) service is evaluated as a resource for multi-phase flow simulations. The results for two multi-phase flow solvers are presented: a 2D GPU-accelerated serial code and a 3D MPI-parallel GPU-accelerated solver. In both cases, the interaction of two-fluid flow with a moving solid phase is captured, and a GPU pressure Poisson solver is used. A virtual cloud cluster is compared to a conventional high-performance computing cluster at the researchers university in terms of performance and cost. The accuracy of the results obtained on Amazons Cloud, where the GPUs are single-precision, is the same as those obtained on the university cluster with double-precision GPUs. The parallel code is benchmarked on clusters of varying size, with strong and weak scaling curves. The steps necessary to outsource the data to the cloud, as well as acquiring the appropriate hardware and software stacks are outlined. Amazons HPC cloud is competitive with the university cluster, but there are some performance limitations that will be discussed in the presentation.

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