



OpenFOAM computational performance: double vs mixed precision

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Mixed precision is a recent feature implemented in OpenFOAM (v1906) that allows users to run simulations with double precision linear algebra and single precision for the rest of the code (including I/O). For a bandwidth-limited code as OpenFOAM, mixed precision is expected to speed up calculations since significantly reduces memory usage and obviously I/O. We present test results for incompressible and compressible applications considering the driven cavity and a supersonic starting turbulent jet. Our results confirm computation speed up but with significant differences on performance gain depending on fluid solver and machine hardware. Comparison with double precision solutions, preliminary validation as well as profiling analysis will be used to discuss mixed precision advantages and applicability. From this perspective, these outcomes represent a step forward for improving the computational efficiency of models that are used to predict complex volcanic multiphase flow phenomena of our interest, like volcanic plumes.