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Performance Optimization of a Lattice Boltzmann Program

Objectives

- Collaborate with reservoir engineer at BP to enhance a Lattice Boltzmann program to estimate porous rock permeability

Accomplishments

- Added parallel input/output
- Resolved instability issues by switching to double-precision computation
- Built solid side-wall boundary condition
- Accelerated the program by 3x on KNL through improving load balance and automatic loop vectorization

Impact

- The program is now in production and being embedded in BP workflows to enhance reservoir characterization

