Performance Benchmark for MotorBike Case (1000 Steps)

OpenFOAM Performance Evaluation

October 26, 2024

Decomposer and Distributor

For this case, the following settings were used in the `decomposeParDict`:

- Decomposer: `hierarchical` for the first 4 tests, `scotch` for the next 4 tests
- Distributor: `ptscotch`

Benchmark Results

The following table summarizes the benchmark results for the motorBike case with 1000 time steps, using different core counts. The `real`, `user`, and `sys` times are measured for each run:

Number of Cores	Decomposer	Real Time (s)	User Time (s)	System Time (s)	Speedup	Efficiency
1	hierarchical	19.717	19.186	0.240	–	–
2	hierarchical	13.757	26.631	0.791	1.43	0.715
4	hierarchical	12.824	49.726	0.889	1.54	0.385
6	hierarchical	15.553	1 : 30.964	1.128	1.27	0.211
8	hierarchical	13.924	1 : 48.001	1.548	1.42	0.177
1	scotch	19.491	19.231	0.210	–	–
2	scotch	13.021	25.113	0.826	1.50	0.75
4	scotch	11.928	46.048	1.001	1.63	0.41
6	scotch	15.526	1 : 30.603	1.300	1.25	0.208
8	scotch	13.541	1 : 45.021	1.477	1.44	0.18

Speedup and Efficiency

The general formulas used for calculating speedup and efficiency are as follows:

$$\text{Speedup} = \frac{\text{Time on 1 core}}{\text{Time on N cores}}$$

$$\text{Efficiency} = \frac{\text{Speedup}}{\text{Number of Cores}}$$