

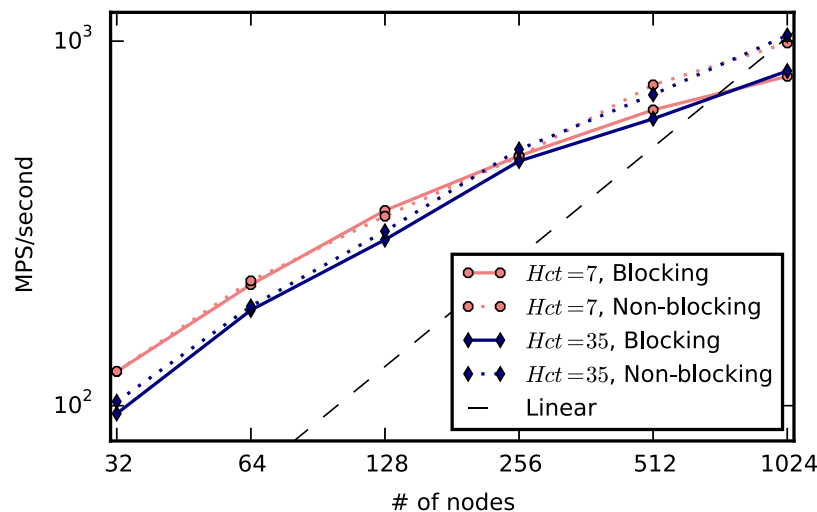
Strong & Weak Scalings

The benchmarks were run on Titan at the Oak Ridge National Laboratory.

Systems with two different Hematocrit (Hct), 7 and 35, were benchmarked. Each Red Blood Cell is represented by 500 tDPD particles. The number of total tDPD particles is the sum of tDPD solvent particles and RBC particles. The metric (million particles) · (steps per second), or **MPS/second**, is used for absolute performance characterization and comparison across different systems.

Strong scaling with a system volume of 2,097,152 is shown in Figure below. It is clearly seen that the non-blocking MPI implementation of the angle term in Red Blood Cell computation is more efficient at large node counts. The slowly diverging absolute performance plots reveal the increasing penalty caused by blocking MPI communications. Switching to non-blocking reduces the execution time by approximately 25% in the case of 1,024 nodes. Weak scaling of system volume of 32,768 per node also shows nearly linear scalability. The non-blocking implementation clearly delivers a better scalability.

Strong Scaling



Weak Scaling

