Musubi Performance Assessment Summary

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The Musubi Audit found that overall the application was performing efficiently. Nevertheless, there was definite room for improvement and suggestions were made that would have a noticeable reduction in the runtime of the application and hence save resources.

The main inefficiency in the audit was the computational load imbalance that degraded with increasing number of processes. The communication efficiency was generally good but the overlapping of computation and communication was not working optimally and the load imbalances were propagated between the processes. There was also found to be room for improvement in the computational performance of the code as the Instructions Per Cycle (IPC) was low for that platform due to inefficiencies in the memory access pattern.

Musubi is a Lattice Boltzmann CFD code that uses a distributed parallel octree mesh data structure. It is developed at the University of Siegen where it is used for general flow analysis of an incompressible medium in complex geometries.

A full technical report can be found at
https://pop-coe.eu/sites/default/files/pop_files/pop-ar-musubi.pdf

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