Computer Science Clinic

Final Report for
Sandia National Laboratories

Midyear Update

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What went well

What didn't go well

Our initial plan for this semester called for a fully re-engineered Intrepid package using Kokkos by early December, which we would present in a seminar during our site visit to Sandia at the end of the semester. However, we have run into a few setbacks, and are therefore unlikely to meet that goal.

Originally, we had hoped to find a working algorithm using Kokkos that yielded speedup comparable to hand-coded Cuda and OpenMP for Intrepid tensor contractions. However, our prototype Kokkos implementations have lagged in speed performance, even when taking into account coalescence and memory layout. We have since abandoned Kokkos multidimensional Views for the moment, instead using single-dimension Kokkos views in order to have finer control over the memory layout. While this approach is yielding promising results with Kokkos OpenMP, both the Kokkos Cuda and manual Cuda implementations have been disappointingly slow.

We are continuing to work on getting speedup from Kokkos and manual Cuda, but we feel it would be counterproductive to work on more Intrepid kernels until we have our single prototype kernel producing performance gains on the expected order of magnitude. Therefore, given the amount of time left in the semester, it is likely that we will have to settle for presenting our prototype kernel instead of a fully reworked Intrepid package in December.

Plans for next semester