GPU accelerated computing

Final Report: Analysis of N-body problem running times

Elias Huber and Sam Rouppe van der Voort

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Abstract

Final report for the GPU accelerated computing course. We compare running times of a N-body code for different hardware configurations. Here we use either GPUs or CPUs with 1-4 nodes to accelerate the computing.
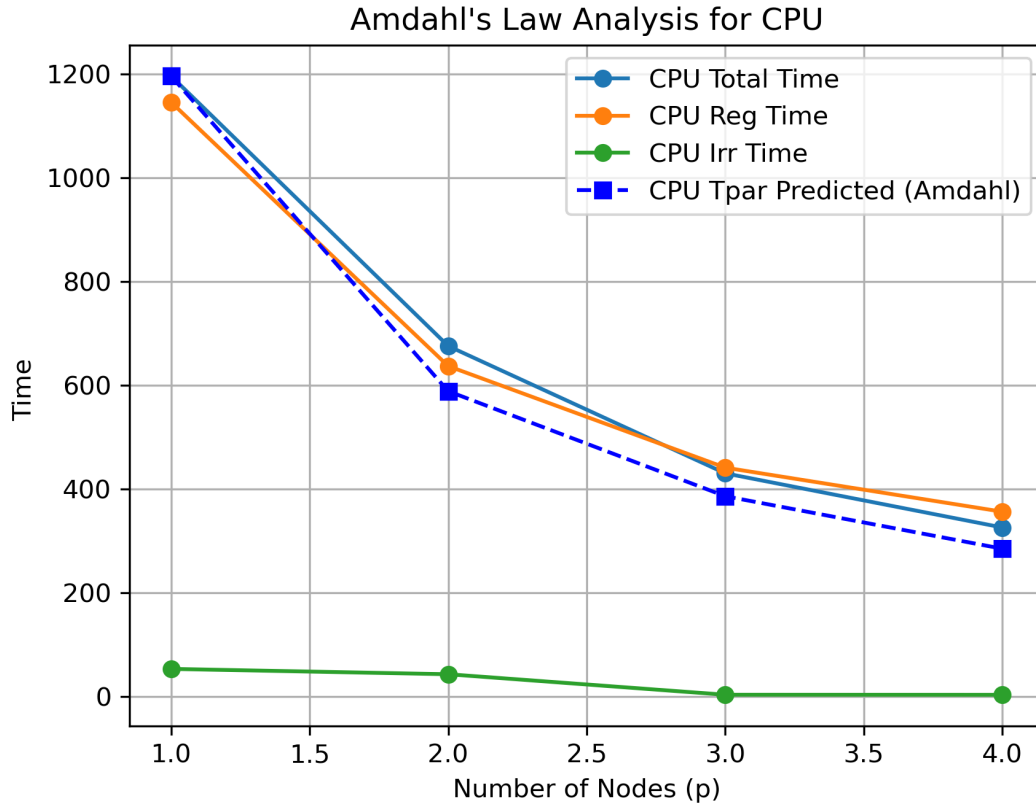
1 Data

Figure 1: These plots show $T_{\text{Total}}, T_{\text{Reg}}, T_{\text{Irr}}$ in seconds and the corresponding parallel time T_{par} as well as the expected theoretical parallel time.

For the CPU times shown in Figure 1 observe that Amdahl's law seems to deliver a reliable prediction for a lower bound for the total runtime.

For the GPU times shown in Figure 2 observe that Amdahl's law seems to deliver a reliable prediction for a lower bound but the lines diverge more than for the CPU. We also see that the
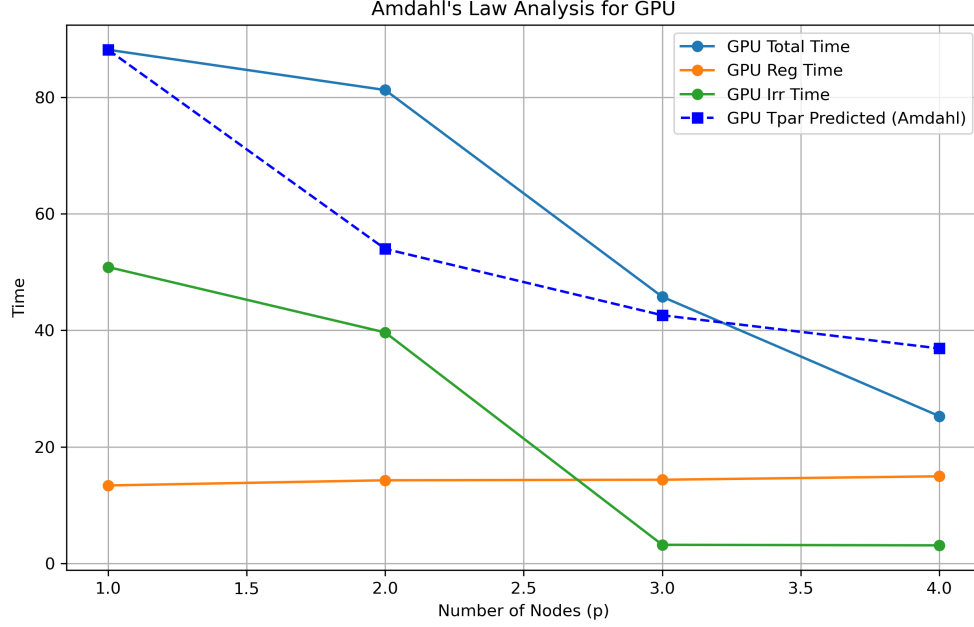
Figure 2: These plots show $T_{\text{Total}}, T_{\text{Reg}}, T_{\text{Irr}}$ in seconds and the corresponding parallel time T_{par} as well as the expected theoretical parallel time

parallelization possible with the GPU speeds up the program significantly. We think that the run time for 2 task per node is an outlier since it is high over the Amdahls law prediction. The first measurement might also be an outlier since it determines the shape of the prediction influencing the curve for later values.