Jose Garay

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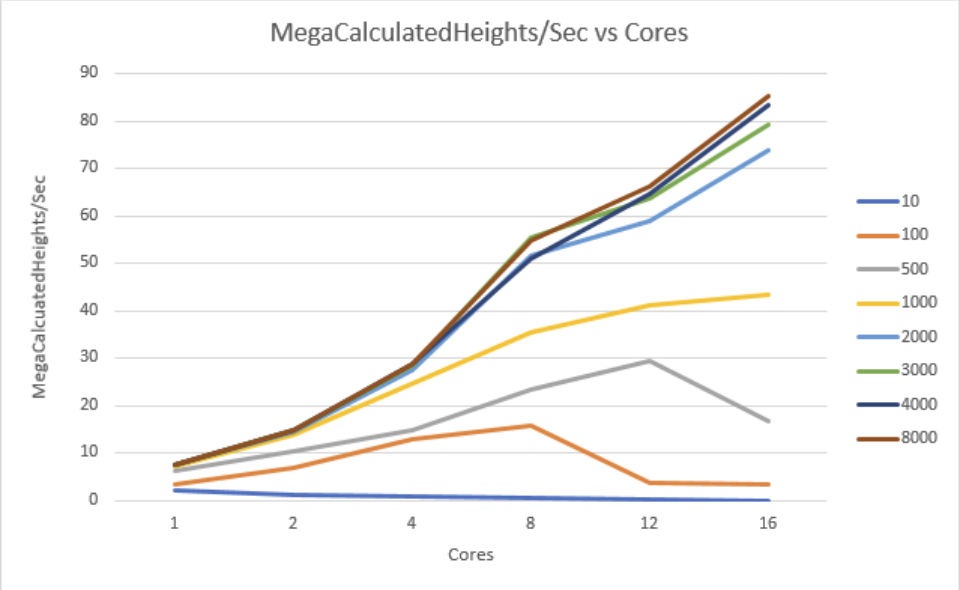
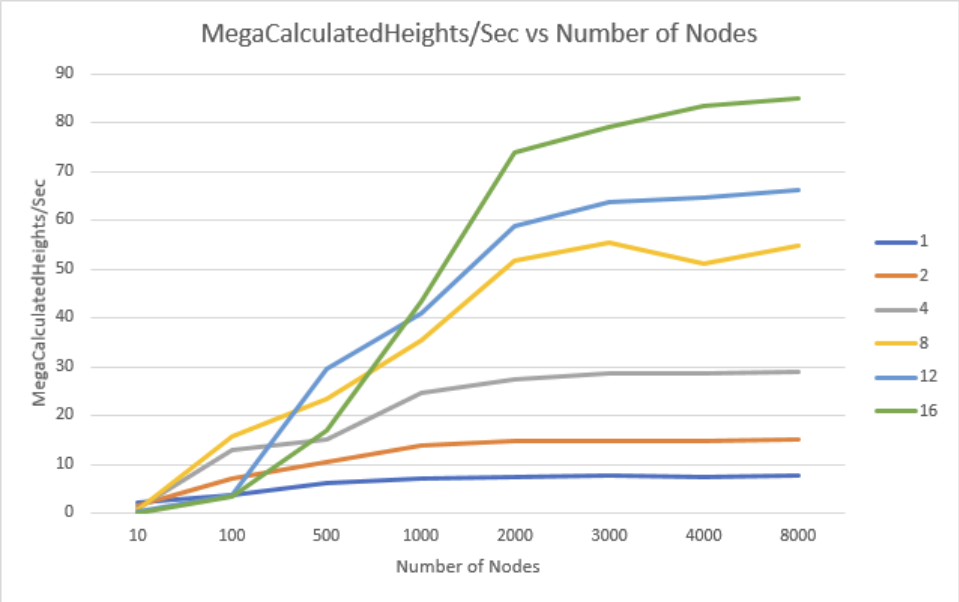
Project 2: Numeric Integration with OpenMP Reduction

I ran this on my home desktop. I have a Ryzen 3700X 8-core 16 thread processor that I was excited to try out. According to the results the volume should be 6.49 though I suspect it's 6.48. Results got a little wonky when using higher subdivisions that I'm not sure that I can explain other than maybe an overflow occurred with such large subdivisions. Overall, I was seeing an increase in performance with an interesting thing when looking at Cores v MegaCalculatedHeights graph and data. When there was a lowish number of nodes, the cost of creating more threads had a negative effect on overall performance as seen when there are 100 nodes and 500 nodes (The dips at the ends of the chart). However, when there are enough nodes, the number of threads tremendously increases performance. The Number of Nodes v MegaCalcHeights also tells this story in a different way. When there are a low number of nodes, the cost of creating threads negatively impact performance as seen in megacalculatedheights v number of nodes. 2 threads perform about twice as well as 12 or 16! Using the 8000 nodes and 16 threads to calculate my Fp: (16/15) * (1-(1/11.27)) = 0.97. The maximum speedup I calculated for that same data set is 35.78!





		Nodes							
	MegaHeights	10	100	500	1000	2000	3000	4000	8000
Cores	1	2.28	3.62	6.18	7.2	7.44	7.55	7.46	7.55
	2	1.38	7.11	10.38	13.89	14.71	14.84	14.84	14.98
	4	0.95	12.99	14.96	24.76	27.49	28.58	28.76	28.95
	8	0.56	15.84	23.4	35.56	51.77	55.39	51.1	54.92
	12	0.4	3.79	29.54	41.05	58.89	63.66	64.75	66.31
	16	0.03	3.48	16.82	43.45	73.98	79.3	83.43	85.12
	SpeedUp	N/A	0.96	2.72	6.03	9.94	10.50	11.18	11.27
	Fp	N/A	-0.04	0.67	0.89	0.96	0.97	0.97	0.97

MaxSpeedUp	35.78
Average	6.35
Standard Dev	0.41
High	6.76
Low	5.94
Predicted Volume	6.49

		Nodes							
	Volume	10	100	500	1000	2000	3000	4000	8000
Cores	1	5.86	6.46	6.48	6.49	6.43	6.75	6.65	4
	2	5.86	6.46	6.48	6.49	6.46	6.48	6.5	6.08
	4	5.86	6.46	6.48	6.48	6.49	6.42	6.44	6.66
	8	5.86	6.46	6.48	6.48	6.48	6.5	6.45	6.47
	12	5.86	6.46	6.48	6.48	6.48	6.49	6.47	6.46
	16	5.86	6.46	6.48	6.48	6.48	6.49	6.49	6.43