

Project Title: Monte Carlo Simulation

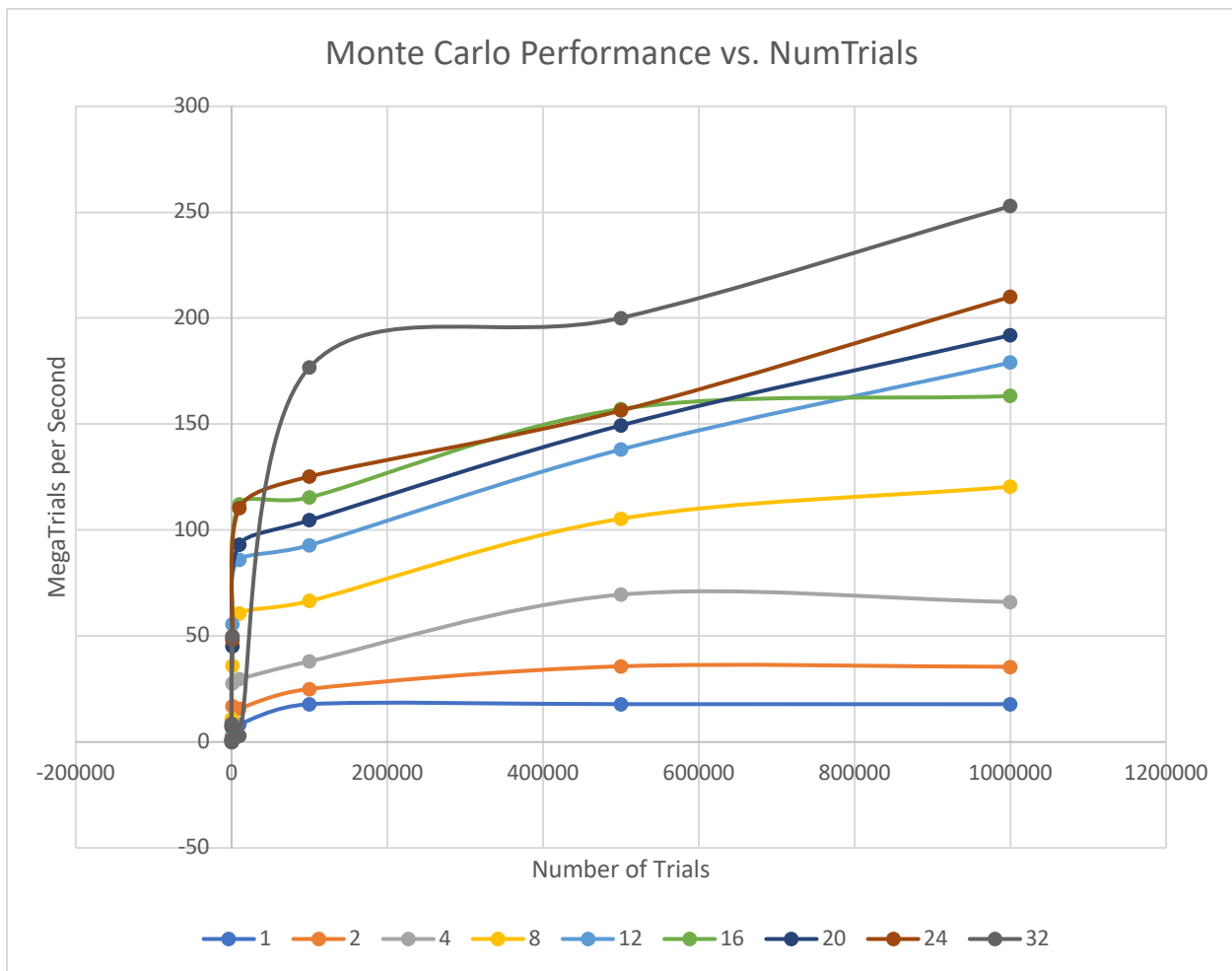
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I ran my project on the Rabbit server and got the following result.

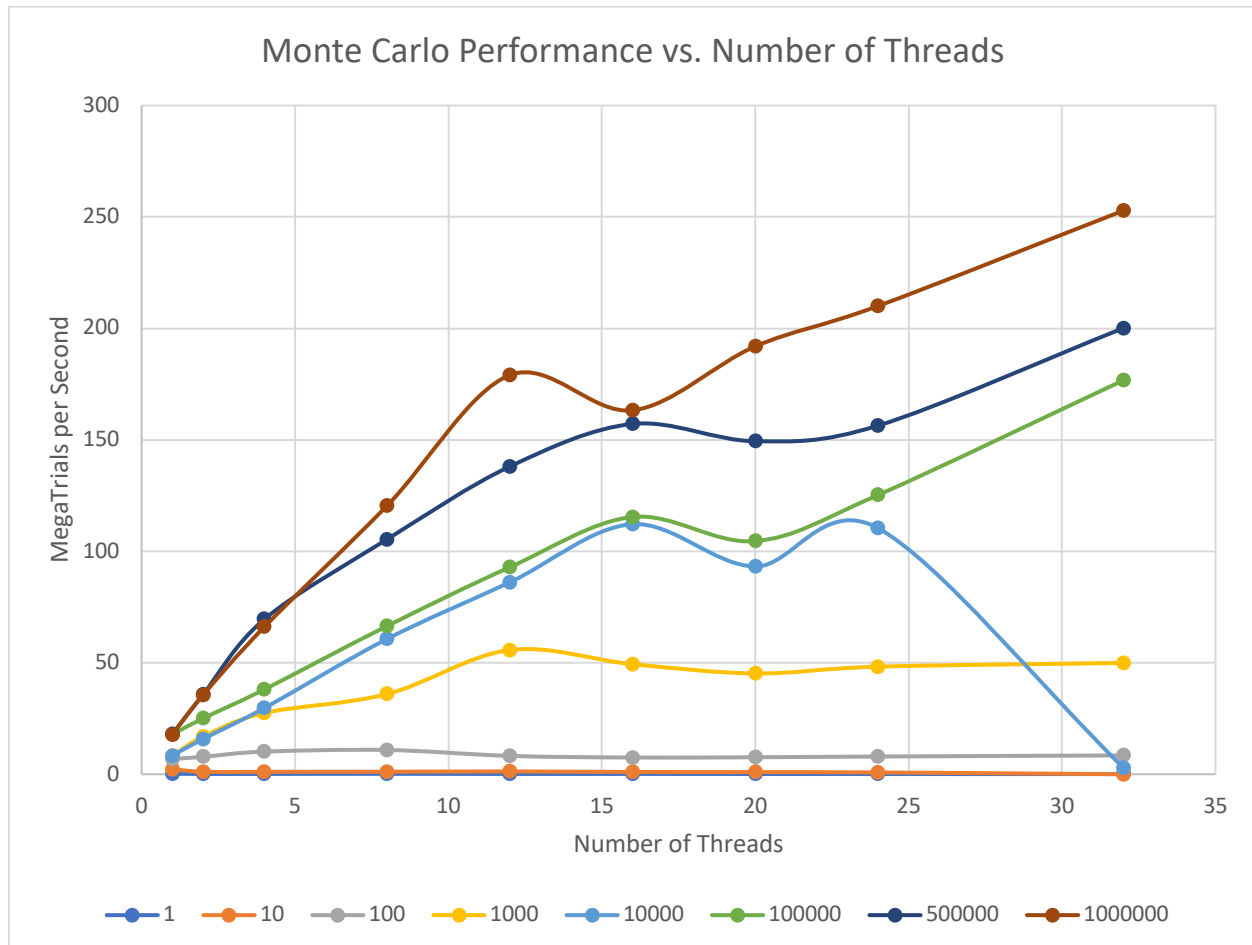
Threads\Tries	1	10	100	1000	10000	100000	500000	1000000
1	0.24	2.28	6.85	8.29	8.37	17.86	17.86	17.82
2	0.13	1.1	7.82	16.82	15.8	25.04	35.71	35.48
4	0.14	1.11	10.15	27.49	29.68	38.05	69.54	66.09
8	0.2	1.13	10.88	35.96	60.69	66.48	105.37	120.47
12	0.13	1.26	8.23	55.73	86.1	92.86	138.04	179.04
16	0.15	1.02	7.5	49.37	112.16	115.41	157.14	163.25
20	0.11	0.95	7.62	45.23	93.2	104.59	149.4	191.93
24	0.09	0.81	7.95	48.25	110.39	125.27	156.39	210.04
32	0.08	0	8.45	49.95	2.91	176.73	200.13	252.85

As I Plot the Graph for Peak Performance vs. Number of Trials, I get the following graph:



This graph can provide insight into how the program scales with increasing thread and trial counts.

As I switch the column – rows, I get the following Graph:



Based on the performance graph, it can be observed that the program's performance increases steadily until 12 threads and then experiences fluctuations before increasing significantly. This behavior could be attributed to the server configuration, which likely has 12 cores.

Using the maximum number of trials and threads, the estimated probability of success is 26.86. Additionally, the performance graph shows stable values up to 12 threads, indicating that the program scales well with increasing thread count and Monte Carlo trial count.

To quantify the program's parallel efficiency, the speedup for 12 threads is calculated to be 10.05. Using Amdahl's Law, the parallel fraction is estimated to be 0.98, indicating that the program is highly parallelizable.

Overall, the performance results and calculations suggest that the program has good scalability with increasing thread count and trial count, but there may be limits to the performance gains that can be achieved due to the server's hardware limitations or other factors.