Project #2

OpenMP: Numeric Integration with OpenMP

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on osu server

1. Results for a variety of NUMNODES values

Thread = 1

NUMT	1	1	1	1	1	1	1	1
NUMNODES	2	4	8	16	32	64	128	256
volume	27	28.77778	28.70929	28.69245	28.68868	28.68781	28.68758	28.68747
MegaTrialsPerSecond	4.329604	8.103712	11.3774	12.56412	12.91537	13.01282	12.98537	13.48721

Thread = 2

NUMT	2	2	2	2	2	2	2	2
NUMNODES	2	4	8	16	32	64	128	256
volume	27	28.77778	28.70929	28.69245	28.68867	28.68781	28.68762	28.68759
MegaTrialsPerSecond	2.058949	7.975798	16.1162	22.97158	25.15009	25.75572	26.02772	25.88864

Thread = 4

NUMT	4	4	4	4	4	4	4	4
NUMNODES	2	4	8	16	32	64	128	256
volume	27	28.77778	28.70928	28.69245	28.68867	28.68779	28.68755	28.68749
MegaTrialsPerSecond	1.883758	6.51246	20.56238	36.59184	46.89149	50.69561	51.77401	51.61613

2. Results for a variety of NUMT values

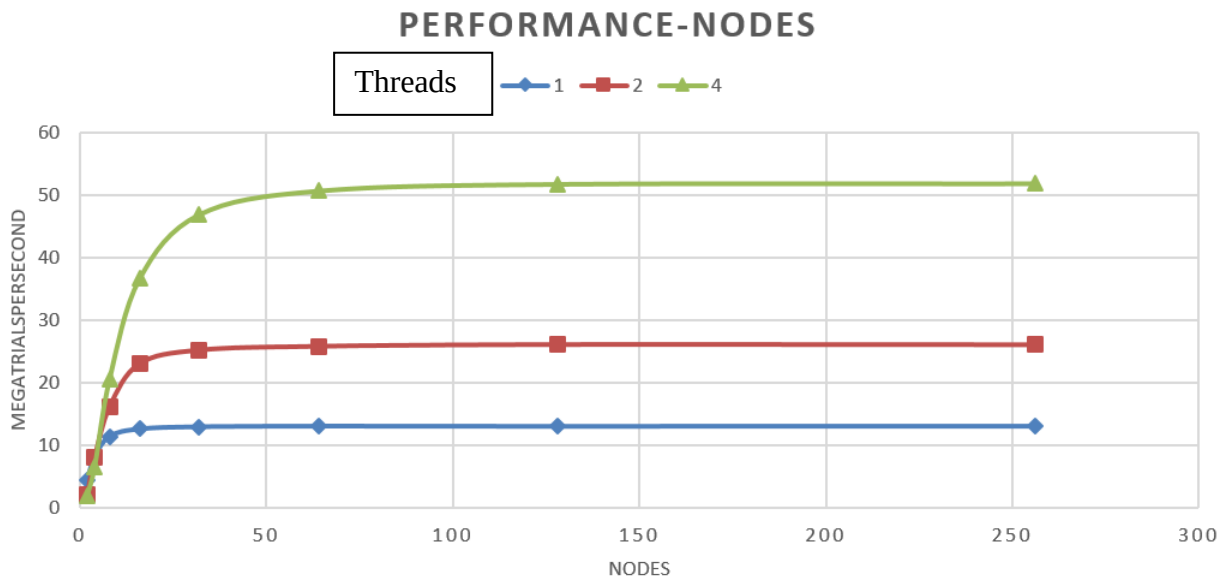
	1	2	4

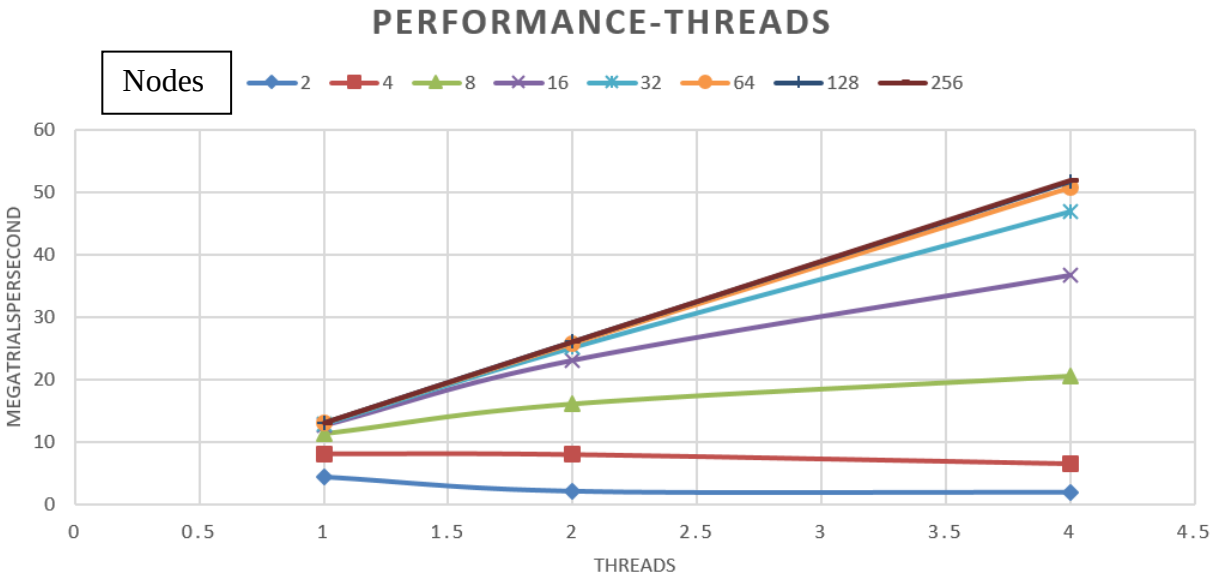
2	4.329604	2.058949	1.883758
4	8.103712	7.975798	6.51246
8	11.3774	16.1162	20.56238
16	12.56412	22.97158	36.59184
32	12.91537	25.15009	46.89149
64	13.01282	25.75572	50.69561
128	12.98537	26.02772	51.77401
256	13.48721	25.88864	51.61613

3. Tables

	2	4	8	16	32	64	128	256
1	4.329604	8.103712	11.3774	12.56412	12.91537	13.01282	12.98537	13.48721
2	2.058949	7.975798	16.1162	22.97158	25.15009	25.75572	26.02772	25.88864
4	1.883758	6.51246	20.56238	36.59184	46.89149	50.69561	51.77401	51.61613

4. Graphs





Explanation: at the beginning, thread 1 tends to have better performance since it has less false sharing. Lower thread will have easier computation when there is a small node number and vice versa.

5. Correct volume

28.7

6. Parallel Fraction and Max spoeedup possible

Fp = (NUMT/(NUMT-1))(1 - (1/Speedup))

	256
1	13.48721
2	25.88864
4	51.61613

Speedup(2, 1) = 1.92

Speedup(4, 1) = 3.83

Fp(2) = 0.9583

Fp(4) = 0.9852

Fp(avg) = 0.97175

The Fp is 0.9852

Max speed up = 1/Fs = 1/(1 - Fp) = 67.567567