

MPI Ping-Pong tries to send and receive a message with a certain size. For this reason, an experiment was designed to measure the timing performance of 100,000 communications of different sized message. The results are presented at tables 1 and 2 for eight separate measurements as well as a plot (Fig1) representing a trend line for each measurement. According to results, communication time remained almost same with increasing the message size until a particular size which could be 64 or 128 bytes in this experiment. Furthermore, time of communication increased linearly with rising the size of message beyond the mentioned particular size which is clearly recognizable from fig 1. It is noteworthy to say that the results of first measurement was slightly different from the rest of measurements which might be due to cold start of the application, therefore, a warm-up communication would be recommended in order to achieve more accurate results.

Table 1. Timing result of eight separate measurements for 100,000 communications in MPI Ping-Pong

Size (Bytes)	Meas1 (ms)	Meas2 (ms)	Meas3 (ms)	Meas4 (ms)	Meas5 (ms)	Meas6 (ms)	Meas7 (ms)	Meas8 (ms)	Min (ms)	Max (ms)	Average (ms)
4	27.40	50.04	48.94	49.00	53.52	48.94	49.60	48.55	27.40	53.52	47.00
8	19.30	50.08	48.77	48.91	63.91	48.63	49.13	48.94	19.30	63.91	47.21
16	19.54	50.12	48.92	48.58	53.41	48.65	48.74	48.69	19.54	53.41	45.83
32	19.93	51.55	50.40	51.81	62.50	47.48	49.57	48.85	19.93	62.50	47.76
64	20.38	54.02	51.90	51.16	57.18	43.78	45.71	44.24	20.38	57.18	46.05
128	20.84	55.16	53.49	53.32	55.16	53.14	53.01	53.11	20.84	55.16	49.66
256	23.08	58.07	57.35	57.42	58.32	57.44	57.35	57.37	23.08	58.32	53.30
512	29.61	80.91	80.35	80.33	80.77	80.39	79.95	79.81	29.61	80.91	74.02
1024	39.56	113.66	113.91	113.61	113.87	112.98	112.99	112.58	39.56	113.91	104.14
2048	59.73	177.12	177.56	178.10	176.57	176.21	176.39	176.11	59.73	178.10	162.23
4096	96.32	310.58	310.46	310.84	310.94	310.56	310.61	310.47	96.32	310.94	283.85
8192	392.40	510.65	511.29	521.56	512.45	514.34	513.42	512.19	392.40	521.56	498.54
16384	943.10	942.22	942.17	942.38	943.96	944.54	942.45	942.62	942.17	944.54	942.93
32768	1718.53	1722.45	1714.17	1724.68	1728.89	1732.83	1717.53	1727.61	1714.17	1732.83	1723.34

Table 2. Timing result per single communication of eight separate measurements in MPI Ping-Pong

Size (Bytes)	Meas1 (ms)	Meas2 (ms)	Meas3 (ms)	Meas4 (ms)	Meas5 (ms)	Meas6 (ms)	Meas7 (ms)	Meas8 (ms)
4	0.00027	0.00050	0.00049	0.00049	0.00054	0.00049	0.00050	0.00049
8	0.00019	0.00050	0.00049	0.00049	0.00064	0.00049	0.00049	0.00049
16	0.00020	0.00050	0.00049	0.00049	0.00053	0.00049	0.00049	0.00049
32	0.00020	0.00052	0.00050	0.00052	0.00063	0.00047	0.00050	0.00049
64	0.00020	0.00054	0.00052	0.00051	0.00057	0.00044	0.00046	0.00044
128	0.00021	0.00055	0.00053	0.00053	0.00055	0.00053	0.00053	0.00053
256	0.00023	0.00058	0.00057	0.00057	0.00058	0.00057	0.00057	0.00057
512	0.00030	0.00081	0.00080	0.00080	0.00081	0.00080	0.00080	0.00080
1024	0.00040	0.00114	0.00114	0.00114	0.00114	0.00113	0.00113	0.00113
2048	0.00060	0.00177	0.00178	0.00178	0.00177	0.00176	0.00176	0.00176
4096	0.00096	0.00311	0.00310	0.00311	0.00311	0.00311	0.00311	0.00310
8192	0.00392	0.00511	0.00511	0.00522	0.00512	0.00514	0.00513	0.00512
16384	0.00943	0.00942	0.00942	0.00942	0.00944	0.00945	0.00942	0.00943
32768	0.01719	0.01722	0.01714	0.01725	0.01729	0.01733	0.01718	0.01728

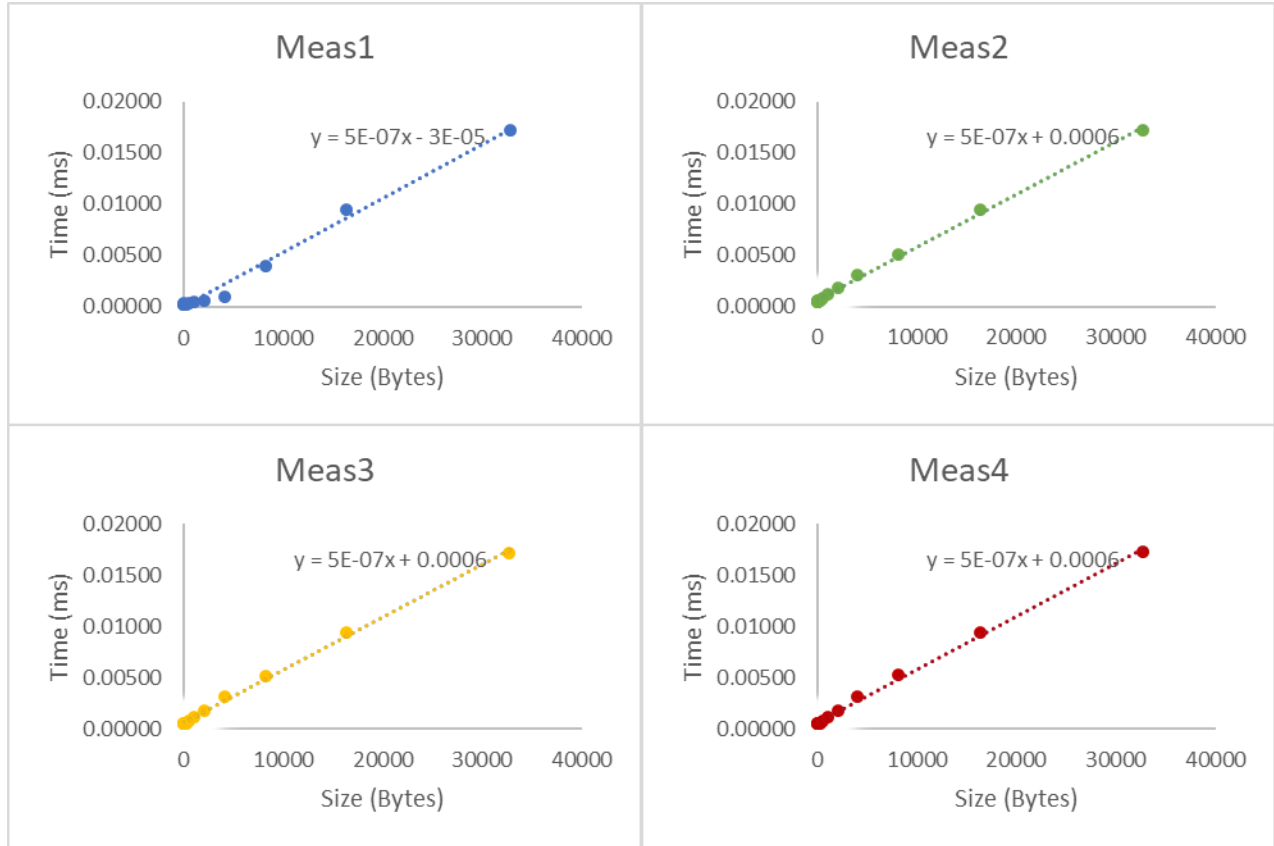


Fig 1. Time of communication of a single exchange (send and receive) for each message size. Trend line shows the least squares fit to the simple performance (time as a function of size  $\text{Time} = s + r \cdot \text{Size}$ ).