# CS 5220 – 2015-10-06 Preclass Questions

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0. I spent roughly 2 hours on this assignment the day before lecture.

1. The slides were pretty clear, though one thing I'm still confused about is what exactly is doing the message passing when using MPI? Do threads send messages, or is message passing at the level of a processor, a computer, or all of the above?

2. (a) Running the ping-pong script using the Intel implementation of MPI, we get the output shown in Table 1.

| | |
|---|---|
| 1 | 6.6205e-07 |
| 1001 | 1.26583e-06 |
| 2001 | 1.60071e-06 |
| 3001 | 8.9515e-07 |
| 4001 | 1.08444e-06 |
| 5001 | 1.24288e-06 |
| 6001 | 1.42984e-06 |
| 7001 | 1.6082e-06 |
| 8001 | 1.78244e-06 |
| 9001 | 1.94475e-06 |
| 10001 | 2.13511e-06 |
| 11001 | 2.3036e-06 |
| 12001 | 2.4666e-06 |
| 13001 | 2.61552e-06 |
| 14001 | 2.7857e-06 |
| 15001 | 2.95797e-06 |
| 16001 | 3.19682e-06 |

Table 1: Intel MPI

(b) Running the ping-pong script using the Intel implementation of MPI, we get the output shown in Table 2. The performance is very similar to that of the Intel MPI library.

(c) Say it takes $3 \times 10^{-6}$ seconds to send an MPI message. At a rate of 2.40 GHz, two nodes can complete $14,400$ floating point operations in the time it takes to send a single message.

| | |
|---|---|
| 1 | 4.86375e-07 |
| 1001 | 1.25883e-06 |
| 2001 | 1.67457e-06 |
| 3001 | 1.00342e-06 |
| 4001 | 1.02524e-06 |
| 5001 | 2.01144e-06 |
| 6001 | 2.28883e-06 |
| 7001 | 2.31887e-06 |
| 8001 | 2.52062e-06 |
| 9001 | 2.6876e-06 |
| 10001 | 2.8843e-06 |
| 11001 | 3.03124e-06 |
| 12001 | 3.09701e-06 |
| 13001 | 3.2832e-06 |
| 14001 | 3.41718e-06 |
| 15001 | 3.68358e-06 |
| 16001 | 3.81287e-06 |

Table 2: OpenMPI