CSCI 415 Assignment 2

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## 0.1 Machine Description

The machine specs these benchmarks were ran on feature a **2 numa node architecture**, complete with **6 cores per node** and **2 processing units per core**. L3 cache is shared across cores, at **15 MB**. The L2 and L1 caches are separate for each core, with **L2 at 256kb** in size. L1 is comprised of two separate caches, one for instructions and one for data. Both of these are **32kb** in size each.

## 0.2 Results

Figure 1:
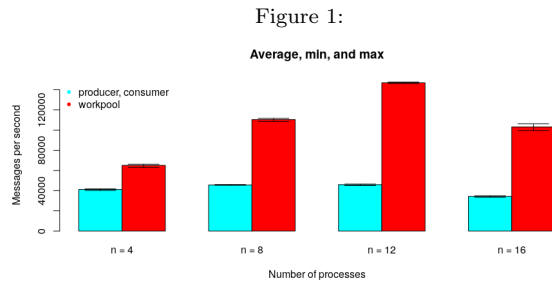


## 0.2.1 Thoughts

Overall, the model with the most average throughput appears to be the workpool. Socket connections can naturally be cached, so it's reasonable to assume that the lack of consistency in process 2 process communication buffers doesn't really offer any real overhead. On a macro scale, we're multiplying the amount of consume counters by 2 (wrt to the producer consumer model), and there isn't a need for a strict ordering (at the application level) in terms of what is processed and when. The broker model has a component that utilizes serialization more so than the workpool model. Each work pool only sends data after it's received an ack from a different process as well, so during the non-ack period it can continue consuming work from other processes, and thus increment the counter at a more frequent rate until that ack is finally received. It's a minor aspect that shines best when a significant amount processes are all sending to the same destination, but it does contribute a role especially since the random seed that's used (at the microsecond level) has a reasonable chance of being a similar value across processes.

## 0.2.2 Figures

1. Producer, consumer

   - n = 4; average = 44146, max = 41754, min = 40082
   - n = 8; average = 45606, max = 46031, min = 45331
   - n = 12; average = 45964, max = 46544, min = 44972
   - n = 16; average = 34281, max = 34952, min = 33444

2. Workpool

   - n = 4; average = 65048, max = 66170, min = 62996
   - n = 8; average = 110444, max = 111615, min = 108674
   - n = 12; average = 146851, max = 147636, min = 146143
   - n = 16; average = 103162, max = 106228, min = 99607