**Parallel Computing**

**Assignment-8**

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**Q: 2) How would you increase communication and computation overlap?   
A:** Communication and computation overlap can be increased by Asynchronous communication. It can improve a great deal on application scalability and hide communication latency. The MPI standard defines non-blocking communication routines to improve application performance by overlapping communication and computation. There are different Non-blocking point-to-point communication as well as Non-blocking collective communication, helpful in this process. These interfaces provide a basic building block at the API level, achieving overlap for a single operation, but lack a systematic way to overlap communication and computation together.

An alternative mechanism is to use threads for overlap. But this approach would require an MPI implementation that offers MPI\_THREAD\_MULTIPLE support. Unfortunately, current MPI implementations either do not support this thread level or support it only preliminarily with a global lock that leads to limiting the adoption of threads in MPI in practice.

Reference: Stack Overflow, Paper: MPI+ULT: Overlapping Communication and Computation with User-Level Threads by Huiwei Lu, Sangmin Seo and Pavan Balaji

**Extra Credit Question:**

**Q: Repeat experiments on that implmentation. Is it faster?   
A:** Comparing the strong scaling experiments between the block implementation of Point-to-point communication (8-2 block data partition) and the block implementation by using communicators (8-3), I found that the speed-up in the communicator implementation is slightly faster than the point-to point implementation as the speedup was a little better as we increase the number of processors where-as not much significant effect was seen in the weak scaling experiment.