Matrix Vector multiplication is done on matrix size of NxN and vector size of N;

Parallel programming is using 4 cores with 1 master and 3 slaves. 3 cores calculate and 1 gather.

All parallel execution time is calculated using MPI\_Wtime() in mpi.h

All serial execution time is calculated using clock(); in time.h

All time listed below are average of 5 execution time

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Matrix column/row size | Serial | MPI Send receive | MPI reduce | OMP |
| 50 | 0.000010 | 0.000064 | 0.000041 | 0.000095 |
| 500 | 0.000789 | 0.002212 | 0.000980 | 0.000965 |
| 5000 | 0.079741 | 0.148460 | 0.040199 | 0.020176 |