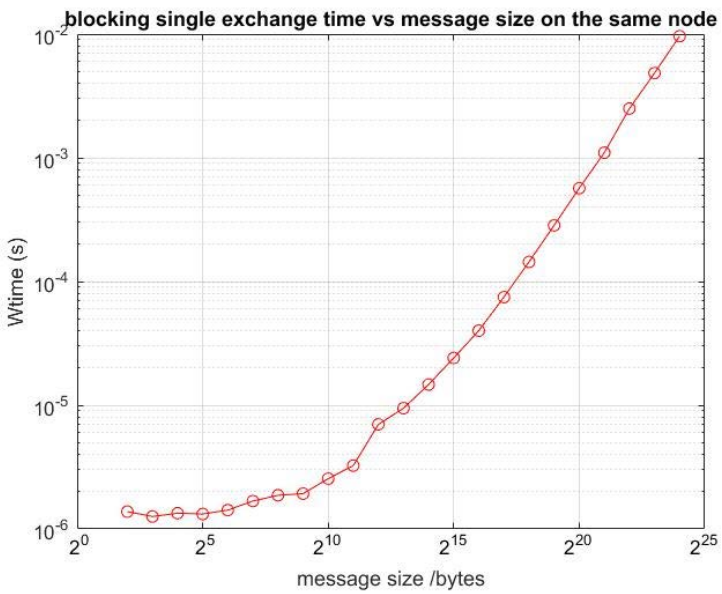
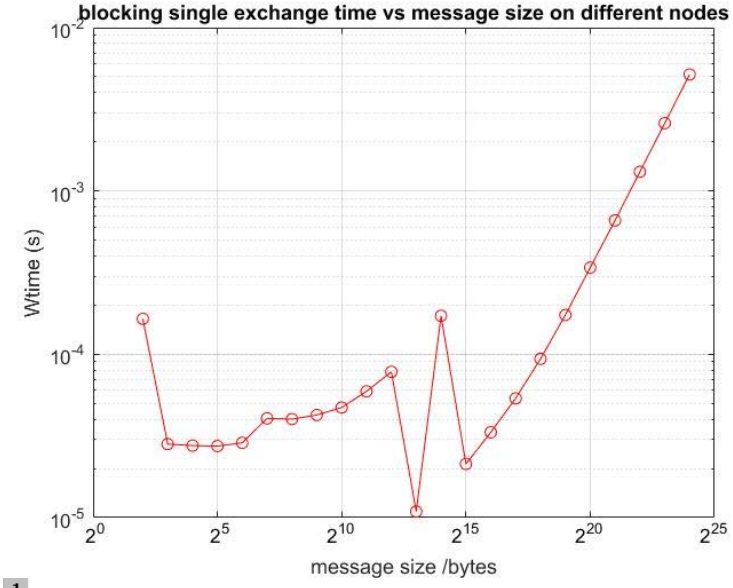
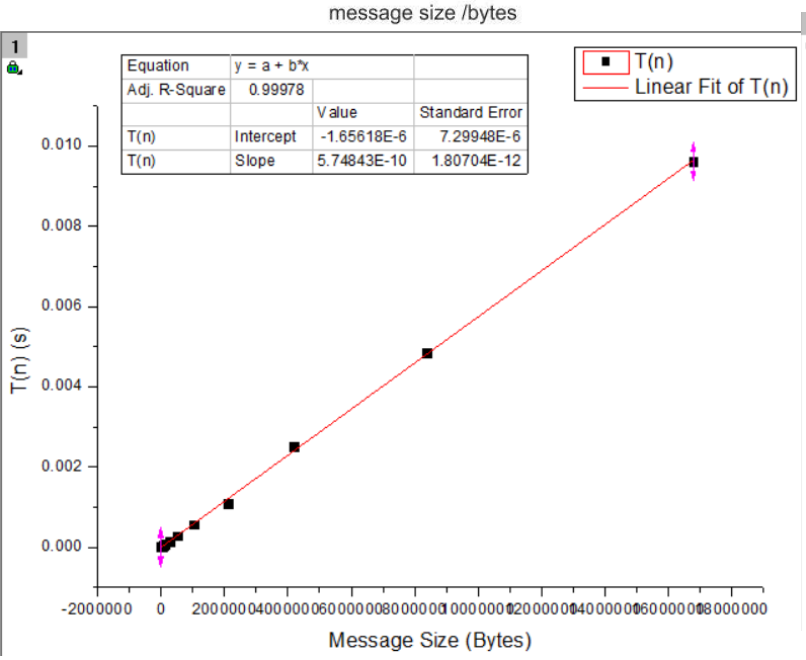
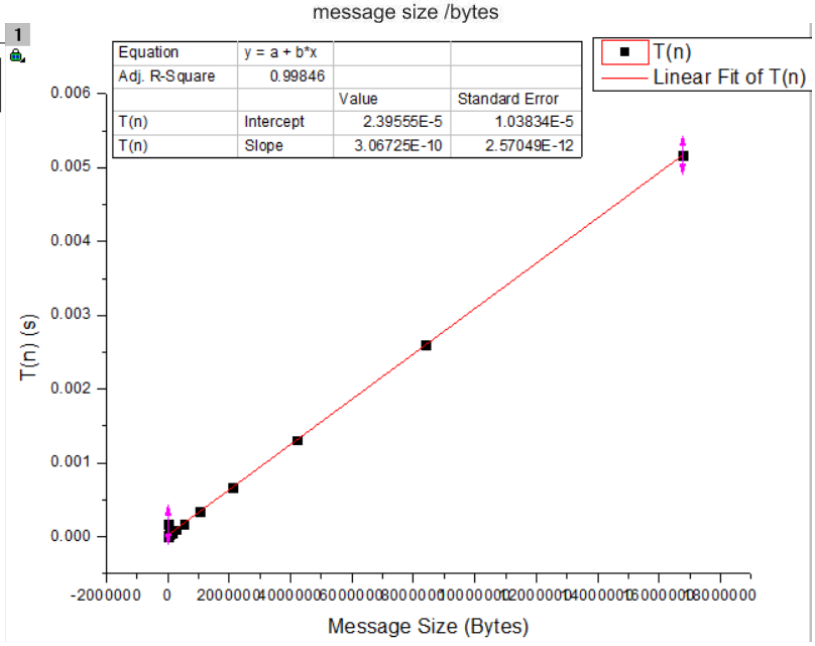
1.









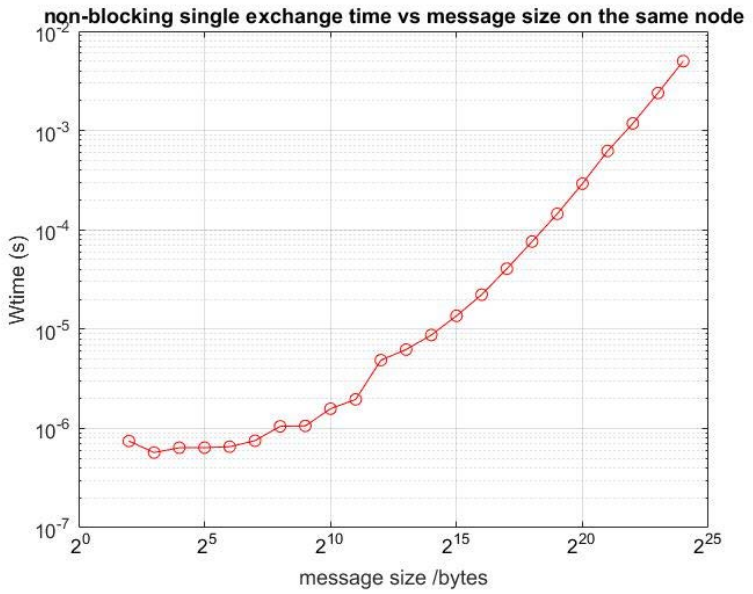
$$T(n) = \alpha + \beta * n$$

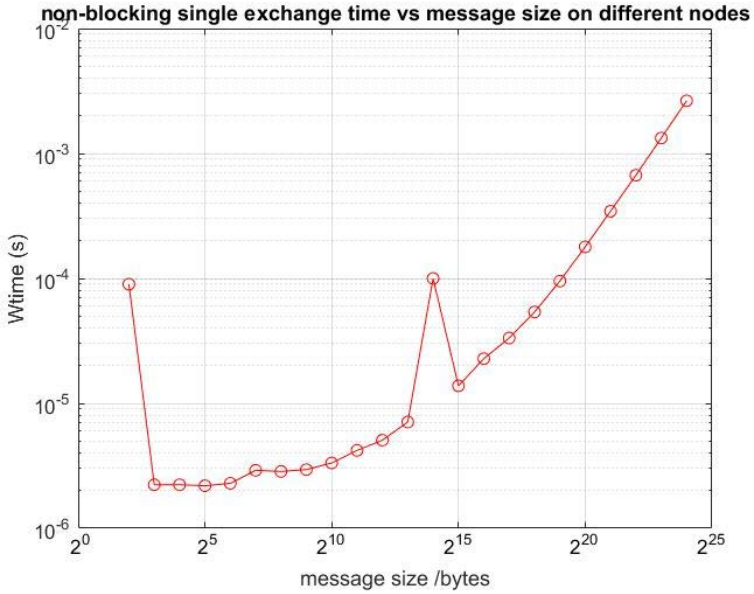
The bandwidth = $1/\beta$ = 1/Slope, Latency = α.

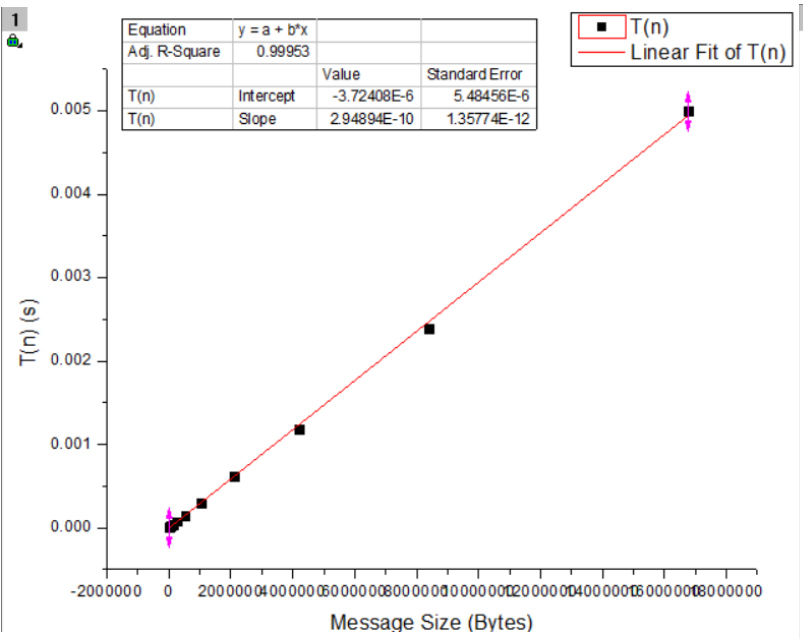
Case	Bandwidth (GB/s)	Latency (s)
Blocking same node	1.74	1.66E-6
Blocking different nodes	3.26	1.90E-5

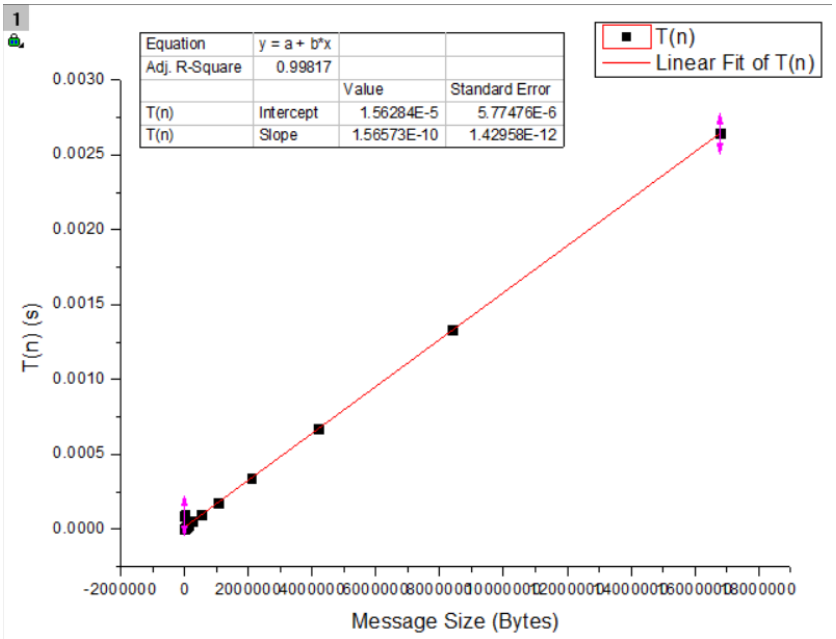
The difference between the two plots, a) the communication time between different nodes is larger than that within the same node in small message size which means the latency is larger; b) there is a jump at message size equal to 2^13 and 2^14 bytes.

2.









Case	Bandwidth (GB/s)	Latency (s)
Non-blocking same node	3.39	4.90E-7
Non-blocking different nodes	6.39	1.20E-6

Compared to blocking communication, the latency of non-blocking communication is smaller and the bandwidth is larger for both cases respectively. Because the Isend and Irecv don't have to wait until the message is sent or received, the non-blocking communication is more efficient.

For the code, please see the attached c files.