The following 2 graphs show the relationship between Error Rate and transmission.

As the error rate increases, the throughput drops linearly.

The following graphs show the relationship between package size and transmission.

As the package size increases, the time taken to transmit all the data following a negative exponential trend.

As for the reason for linearity between error rate and data rate, assume that band width, link length, queuing time are all constant, the amount of data transferred over unit time—raw data rate(throughput when error rate is 0) should remain unchanged. And as error rate increases, the amount of data needed to be sent over increase. So the relationship should be throughput(errorRate) = throughput(errorRate=0) \* (1 - errorRate) as throughput = dataSize/transmission time = dataSize/((dataSize/(1-p))/raw data rate) = (1-p) \* raw data rate = (1 - p) \* throughput(when error rate is 0)

Data length versus data rate is different. As data size increase, the number of RTT required is decreasing but there is a limit to that—1, which means as data length grows, data rate will increase as well to a certain limit.

Experiments are done on local machine and therefore network is not the factor that may cause error margin here. However, as CPU usage varies, processing time will be different for each transmission and therefore the usage of CPU when experiment is being conducted will affect the result.