**EE3204 Lab Assignment Report**

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1, Objective and Background

The purpose of the lab is to familiarize with socket programming in Linux environment using C. Three different sets of examples are provided to show how to implement basic TCP and UDP protocols sockets, with or without acknowledgement. The assignment is to achieve a simplified version of stop-and-wait ARQ under UDP protocol.

2, Findings

Different sets of parameters are applied for the testing, and the results can be found below:

It can be observed that a rough linearity exists between the error rate and the data rate. the reason is that: data rate = data rate (error = 0) \* (1-error rate). Data rate (error = 0) is a constant when the transmission time, propagation time, and queuing time are all constant, which is true for a specific, unchanged file.

On the other hand, the time is affected in this way: data rate = file size / total elapse time. Total elapse time = total amount of bytes transmitted / data rate(error rate = 0), and total amount = file size \* (1+error rate). Hence, when the error rate is increasing, the time should also increase.

When it comes to data length (which is essentially the frame size), things are different according to different network settings. Data rate is affected by the three processes: transmission, propagation, and queuing. However, when the frame size changes, how the three processes will change may not be determined by only looking at the frame size. In this specific case, when the error rate is fixed (20%), the product: N\*(Tf+2Tp) is increased when the frame size increased, and that’s why the time needed for communication is increased, and the average data rate in decreased. However, for a different network setting the result may not be held. For example, when the protocol is changed from UDP to TCP while the file remains unchanged (the experiment from last year’s assignment), the increase of frame size will actually result in a decrease in time and an increase in data rate.

3, Notes

The experiments are all carried out on a single local Linux machine, so the result is only applicable for this situation. As stated in part 2, when settings of the network changes, data rate and time may behave differently.