

Network Assignment Documentation

Implementing a Reliable Data Transport Protocol

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Problem statement:

The network communication in the upper two stages was provided through a reliable transfer protocol (TCP/IP). In this stage, we are required to implement a reliable transfer service on top of the UDP/IP protocol. In other words, we need to implement a service that guarantees the arrival of datagrams in the correct order on top of the UDP/IP protocol, along with congestion control.

Organization:

The code is organized in Three Main directories.

util:

This directory includes 2 classes to be used in the Server and Client classes.

server :

Server accepts incoming connection requests from clients and send the required file.

This directory has 2 classes the Server class and RequestHandler class which has some helper functions.

client:

Client send the file name to the server. This directory includes the client class.

How to run code:

- The server file is filled with the required information as the assignment pdf stated
- The server class is run
- the client file is filled with information required as the assignment assignment pdf stated
- The client class is run

Network System Analysis:

- You should provide a comparison between stop-and-wait and selective repeat strategies in terms of throughput, based on a

series of transfers of large. Your test runs should be performed with at least the following PLP values: 1%, 5%, 10% and 30%.

The throughput is calculated by multiplying the number of packets sent by the packet's size then the result is divided by the time elapsed from sending the request until receiving the file.

Stop and Wait:

	1.00%	5.00%	10.00%	30.00%
1	5.25MB/s	5.79MB/s	5.39MB/s	4.75MB/s
2	5.56MB/s	6.48MB/s	5.7MB/s	5.38MB/s
3	5.66MB/s	5.5MB/s	5.38MB/s	6.29MB/s
4	6.8MB/s	5.64MB/s	6.025MB/s	6.1MB/s
5	7.029MB/s	5.755MB/s	6.45MB/s	5.426MB/s
Average	5.98MB/s	5.82MB/s	5.76MB/s	5.63MB/s

Selective Repeat:

	1.00%	5.00%	10.00%	30.00%
1	6.14MB/s	5.8MB/s	6.55MB/s	5.9MB/s
2	7.708MB/s	6.6MB/s	6.55MB/s	7.69MB/s
3	8.4MB/s	7.9MB/s	6.6MB/s	6.19MB/s
4	8.1MB/s	8.07MB/s	7.3MB/s	6.02MB/s
5	8.2MB/s	8.3MB/s	6.6MB/s	6.49MB/s
Average	7.708MB/s	7.2MB/s	6.7MB/s	6.29MB/s

- **congestion control analysis:**

By sending a file from the server and tracking the window size with the time, when the window size reaches 1, this means that a segment loss is detected due to timeout.

