COMP 7005
Project
User Guide

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Purpose

Installing

Obtaining

```
git clone https://github.com/BScACS-T2/reliable-udp
```

Building

Server

```
mkdir server/cmake-build-debug
cd cmake-build-debug
cmake ../CMakeLists.txt
make
```

Client

```
mkdir client/cmake-build-debug
cd cmake-build-debug
cmake ../CMakeLists.txt
make
```

Client

```
mkdir proxy/cmake-build-debug
cd cmake-build-debug
cmake ../CMakeLists.txt
make
```

GUI

Running

Server

./server -C <IP address of the Client> -c <Client port> -S <IP address of the server> -s <Server port>

Client

./client -C <IP address of the Client> -c <Client port> -S <IP address of the server> -s <Server port> -w <window size>

Proxy

./proxy -C <IP address of the Client> -c <Client port> -S <IP address of the server> -s <Server port> -P <IP address of the Proxy> -D <drop rate for the client> -d <drop rate for the server> -L <delay rate for the client> -l <delay rate for the server> -E <corruption rate>

GUI

python3 main.py

Features

- Client can read from stdin and send a packet with that data to the server
- Client can send up to window_size packets without receiving an acknowledgment
- If the window is full, client will buffer the packets and send them once the window becomes available
- Proxy can delay, drop or corrupt either the client or the server packets
- Can dynamically change the drop, delay or corruption rates
- Client will cumulatively ACK packets

Examples

Client Options

```
Options:
  -h                    Display this help message
  -C <value>            Option 'C' (required) with value, Sets the IP client_addr
  -c <value>            Option 'c' (required) with value, Sets the client port
  -S <value>            Option 'S' (required) with value, Sets the IP server_addr
  -s <value>            Option 's' (required) with value, Sets the server port
  -w <value>            Option 'w' (required) with value, Sets the window size
```

Running Client using IPv4

```
  🍎  📁 ~/CLionProjects/reliable-udp/source/client/cmake-build-debug    🐱 ⑂ main !3
   ./client -C 192.168.1.80 -c 60000 -S 192.168.1.80 -s 8000 -w 5
binding to: 192.168.1.80:60000
Bound to socket: 192.168.1.80:60000
binding to: 192.168.1.80:61001
Bound to socket: 192.168.1.80:61001
Resent packet with seq number: 0
```

Running Client using IPv6

```
  🍎  📁 ~/C/reliable-udp/s/c/cmake-build-debug    🐱 ⑂ main !3
   ./client -C 2605:8d80:482:83ce:10d9:74b8:7472:d373 -c 60000 -w 5 -S 2605:8d80:
482:83ce:1ce7:97f0:8664:31f7 -s 8000
binding to: 2605:8d80:482:83ce:10d9:74b8:7472:d373:60000
Bound to socket: 2605:8d80:482:83ce:10d9:74b8:7472:d373:60000
binding to: 2605:8d80:482:83ce:10d9:74b8:7472:d373:61001
Bound to socket: 2605:8d80:482:83ce:10d9:74b8:7472:d373:61001
Server packet with ack number: 1 flag: 3 received
removing packet with expected ack number: 1 at index: 0

Enter string below [ctrl + d] to quit
█
```

Server Options

```
Options:
  -h                   Display this help message
  -C <value>           Option 'C' (required) with value, Sets the IP client_addr
  -c <value>           Option 'c' (required) with value, Sets the client port
  -S <value>           Option 'S' (required) with value, Sets the IP server_addr
  -s <value>           Option 's' (required) with value, Sets the server port
```

Running Server using IPv4

```
  🍎  📁 ~/CLionProjects/reliable-udp/source/server/cmake-build-debug    🐱 ⑂ main !3
   ./server -S 192.168.1.80 -s 60001 -C 192.168.1.80 -c 8050
binding to: 192.168.1.80:60001
Bound to socket: 192.168.1.80:60001
binding to: 192.168.1.80:61000
Bound to socket: 192.168.1.80:61000
█
```

4

Running Client using IPv6

```
 ~/C/reliable-udp/s/s/cmake-build-debug        main ↑13 *1 !2 ?2
 ./server -S 2605:8d80:482:83ce:1c03:5b7b:1367:2817 -c 8050  -C 2605:8d80:482
:83ce:1ce7:97f0:8664:31f7 -s 60001
binding to: 2605:8d80:482:83ce:1c03:5b7b:1367:2817:60001
Bound to socket: 2605:8d80:482:83ce:1c03:5b7b:1367:2817:60001
binding to: 2605:8d80:482:83ce:1c03:5b7b:1367:2817:61000
Bound to socket: 2605:8d80:482:83ce:1c03:5b7b:1367:2817:61000
```

Proxy Options

```
Options:
  -h                      Display this help message
  -C <value>              Option 'C' (required) with value, Sets the IP client_addr
  -c <value>              Option 'c' (required) with value, Sets the client port
  -S <value>              Option 'S' (required) with value, Sets the IP server_addr
  -s <value>              Option 's' (required) with value, Sets the server port
  -P <value>              Option 'P' (required) with value, Sets the IP proxy_addr
  -D <value>              Option 'D' (required) with value, Sets the client drop rate
  -d <value>              Option 'd' (required) with value, Sets the server drop rate
  -L <value>              Option 'L' (required) with value, Sets the client delay rate
  -l <value>              Option 'l' (required) with value, Sets the server delay rate
  -E <value>              Option 'E' (required) with value, Sets the corruption rate
```

Running Proxy using IPv4


```
 🍎  ≥ ~/CLionProjects/reliable-udp/source/proxy/cmake-build-debug  ☺ ⅄ main !3
 ./proxy -C 192.168.1.80 -c 60000 -S 192.168.1.80 -s 60001 -P 192.168.1.80
Binding to: 192.168.1.80:8000
Bound to socket: 192.168.1.80:8000
Binding to: 192.168.1.80:8050
Bound to socket: 192.168.1.80:8050
Binding to: 192.168.1.80:61060
Bound to socket: 192.168.1.80:61060

Dynamic Proxy Lossiness Value:
1. Client Losiness
2. Server Losiness
3. Data Corruption
4. Exit
Enter your Answer: 
```

Running Proxy using IPv6


```
 🍎  ≥ ~/CL/reliable-udp/s/p/cmake-build-debug  ☺ ⅄ main ↑84 ?1
 ./proxy -C 2605:8d80:482:83ce:10d9:74b8:7472:d373 -S 2605:8d80:482:83ce:1c03
:5b7b:1367:2817 -P 2605:8d80:482:83ce:1ce7:97f0:8664:31f7 -s 60001 -c 60000 -D
0 -L 0 -d 0 -l 0 -E 0
Binding to: 2605:8d80:482:83ce:1ce7:97f0:8664:31f7:8000
Bound to socket: 2605:8d80:482:83ce:1ce7:97f0:8664:31f7:8000
Binding to: 2605:8d80:482:83ce:1ce7:97f0:8664:31f7:8050
Bound to socket: 2605:8d80:482:83ce:1ce7:97f0:8664:31f7:8050
Binding to: 2605:8d80:482:83ce:1ce7:97f0:8664:31f7:61060
Bound to socket: 2605:8d80:482:83ce:1ce7:97f0:8664:31f7:61060

Dynamic Proxy Lossiness Value:
1. Client Losiness
2. Server Losiness
3. Data Corruption
4. Exit
```

Client's Drop and Delay rate menu

```
Dynamic Proxy Lossiness Value:
1. Client Losiness
2. Server Losiness
3. Data Corruption
4. Exit
Enter your Answer: 1
1
Client Drop and Delay rate:
1. Drop Rate
2. Delay Rate
3. Back
Enter your Answer: █
```

Server's Drop and Delay rate menu

```
Dynamic Proxy Lossiness Value:
1. Client Losiness
2. Server Losiness
3. Data Corruption
4. Exit
Enter your Answer: 2
Server Drop and Delay rate:
1. Drop Rate
2. Delay Rate
3. Back
Enter your Answer: █
```

Data Corruption menu

```
Dynamic Proxy Lossiness Value:
1. Client Losiness
2. Server Losiness
3. Data Corruption
4. Exit
Enter your Answer: 3
Enter Data Corruption's Rate: █
```

Running GUI

```
  ~/C/reliable-udp/s/GUI    main ↑5 *1 !4 ?1
python3 main.py
```