Reliable Protocol
User Guide

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Purpose

Reliable Protocol is for sending messages:

- Sending a message from sender to receiver.
- The Proxy is for simulating a lossy network.
- GUI that gives real-time data on loss, delays, ACK, data of packets

Prerequisites

To follow these instructions, you will need:

- Python Environment
- External Libraries
    - matplotlib
    - tkinter
- Hardware Requirements
    - At least 4-devices are recommended, but it is possible to work with less
    - Devices connected to the same network.
    - Make sure you know the IP address of the devices you are using.

Installing

Obtaining

You will find our code under sources from the zip we submitted, or you can obtain our code under sources from Git Hub.

`git clone:` https://github.com/AshBeast/project-7005.git

Running

```
python3 gui.py [GUI IP] [GUI port]
python3 proxy.py [Receiver IP] [Receiver Port] [Listen Port]
python3 receiver.py [Listen Port]
python3 sender.py [Proxy IP] [Proxy Port]
```

GUI:

Variable	Purpose
`GUI IP`	the IP address of the gui for statistic of proxy, receiver, and proxy
`GUI port`	the port number of the gui for statistic of proxy, receiver, and proxy

Proxy:

Variable	Purpose
Receiver IP	IP address of the receiver to which the proxy forwards the data.
Receiver Port	the port number of the receiver for data
Listen Port	Port for the socket to listen from for incoming data and ACK packets

Receiver:

Variable	Purpose
Listen Port	Port for the socket to listen from for incoming data and ACK packets

Proxy:

Variable	Purpose
`Proxy IP`	Holds the IP address of the receiver to which the proxy forwards the data.
`Proxy Port`	Stores the port number of the receiver for data

Features

- Send keyboard input from sender to receiver with proxy acting as a network in between
- Set drop and delays for ACKs and Data packets probability chance
- (Bonus mark) change the drop and delay probabilities dynamically
- Connect sender, receiver and proxy to GUI.
- After finishing the program the sender, receiver or proxy information on that run is saved to text file for record keeping.

Built-in Commands

Our reliable protocol supports the following built-in commands:

Command	Purpose
control-c	Start shutdown process

Limitations

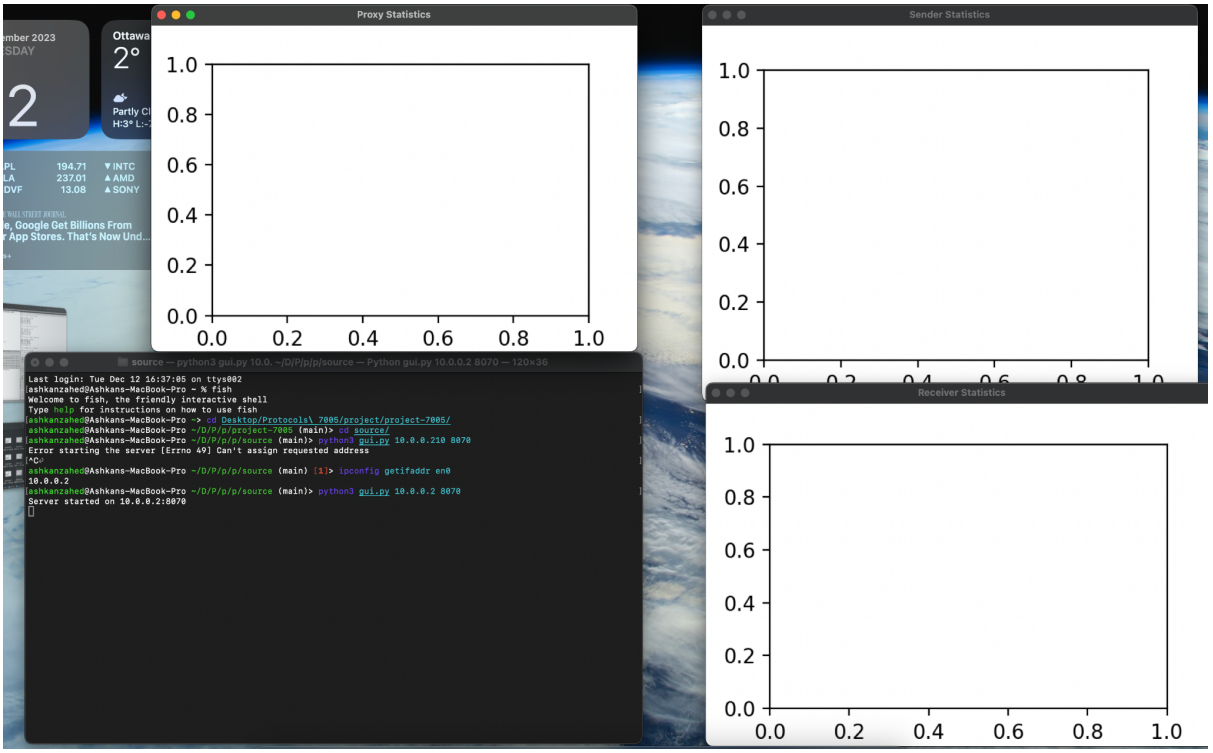
- You must connect to GUI or choose not first before giving keyboard input to the sender

Example

Simple Example on how to run our project.

Start GUI

python3 gui.py [GUI IP Address] [GUI port]



GUI Connection Prompt and set up

After starting the proxy, the sender or the receiver, a prompt will ask you if you want to connect to the GUI
If type “yes” you will be prompted to give the GUI IP address and port

```
[ashkanzahed@Ashkans-MacBook-Pro ~/D/P/p/p/source (main)> python3 proxy.py 10.0.0.2 8080 8090
Do you want to connect to the GUI? (yes/no): yes
Enter the GUI IP address: 10.0.0.2
Enter the GUI port: 8070
```

If you type anything else, you will not connect to the GUI

Start proxy

python3 proxy.py [Receiver IP] [Receiver port] [Listen Port]

After GUI is set up for proxy, you will be prompted to provide the probability of dropping and delaying ACK and data packets.

```
[ashkanzahed@Ashkans-MacBook-Pro ~/D/P/p/p/source (main)> python3 proxy.py 10.0.0.2 8080 8090
Do you want to connect to the GUI? (yes/no): yes
Enter the GUI IP address: 10.0.0.2
Enter the GUI port: 8070
Enter percentage to drop data (0-100): 0
Enter percentage to drop ACK (0-100): 0
Enter percentage to delay data packets (0-100): 0
Enter percentage to delay ACK packets (0-100): 0
```

If your input is invalid, it will prompt again for that input.

Dynamic probability change proxy

After starting the proxy, you can change the probability that you set before following the instructions on the image

```
[ashkanzahed@Ashkans-MacBook-Pro ~/D/P/p/p/source (main)> python3 proxy.py 10.0.0.2 8080 8090
Do you want to connect to the GUI? (yes/no): yes
Enter the GUI IP address: 10.0.0.2
Enter the GUI port: 8070
Enter percentage to drop data (0-100): 0
Enter percentage to drop ACK (0-100): 0
Enter percentage to delay data packets (0-100): 0
Enter percentage to delay ACK packets (0-100): 0
```

Invalid inputs will result in the options being shown again

Start receiver

python3 receiver.py [Listen Port]

Once you start the receiver you can start the sender and the message will show here

Start and use sender

python3 sender.py [Proxy IP address] [Proxy port]

Once

```
[ashkanzahed@Ashkans-MacBook-Pro ~/D/P/p/p/source (main)> python3 sender.py 10.0.0.210 8080
Do you want to connect to the GUI? (yes/no): yes
Enter the GUI IP address: 10.0.0.210
Enter the GUI port: 8070
message1
Received ACK: 1:ACK
message2
Received ACK: 2:ACK
<test_message1.txt
Received ACK: 3:ACK
Received ACK: 4:ACK
Received ACK: 5:ACK
Received ACK: 6:ACK
```

Example of GUI

Heres what the gui can look like: