



Report Projectwork: Chat TCP in C

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Task

Implementation of a simple chat in C.

The architecture must be client server and the communication must be implemented with sockets.

Client must connect to the Server to communicate with other Clients.

Each Client is identified by username.

The Server must manage connections and allows the exchange of messages between Clients.

A Client can also broadcast a message to all active Clients connected to the Server.

Software Environment

Distributor ID: Ubuntu
































Description: Ubuntu 20.04.3 LTS

Release: 20.04

Codename: focal

File List

Here is a list of all documented files with brief descriptions:

 client.h	Client header file
 server.h	Server header file
▼  library	
▼  include	
 gui.h	
 hashtable.h	
 infoHashtable.h	
 infoList.h	
 list.h	
 message.h	Definition of struct Message
 queue.h	
 redblackTree.h	
 TBST.h	
 tcp_socket.h	Implementation of tcp socket both for client and server
 TinfoBST.h	
 treeNode.h	
▼  src	
 gui.c	
 hashtable.c	
 infoList.c	
 list.c	
 message.c	
 queue.c	
 redblackTree.c	
 TBST.c	
 tcp_socket.c	
 TinfoBST.c	
 treeNode.c	
 test.c	
▼  src	
 client.c	Client Implementation of gagchat

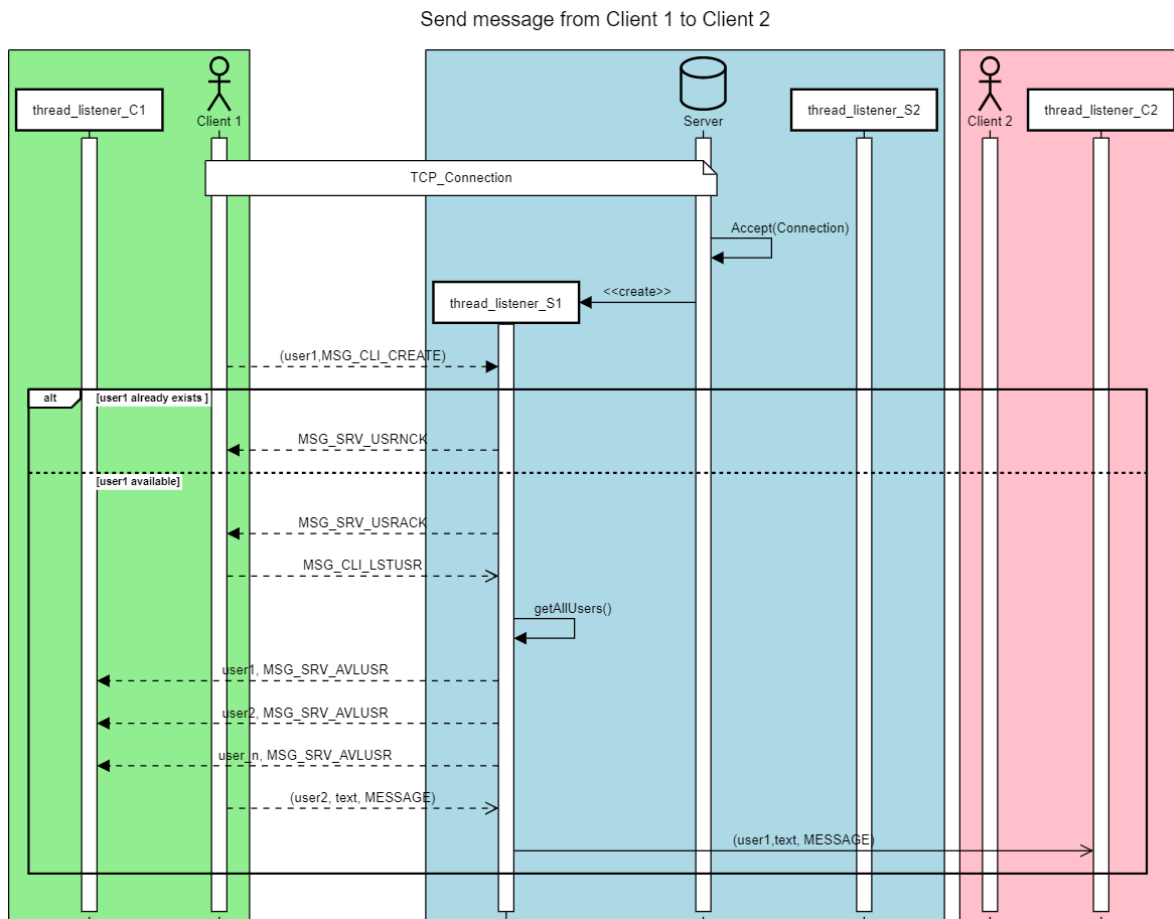
Communication Protocol

The communication protocol is characterized by the exchange of Messages between Client and Server. The basic message sent by parties is characterized by three params:

- user (string): the username string.
- text (string): the text string.
- code (int): a control code exchanged by parties, to simplify communication between client and server. There are many different codes:
 - **MESSAGE**: Normal Message directed to specified user.
 - **MSG_CLI_CREATE**: Request for creating a new user (specified by user).
 - **MSG_SRV_USRACK**: User is accepted by the server.
 - **MSG_SRV_USRNCK**: User is NOT accepted by the server.
 - **MSG_SRV_USRNRC**: User is NOT reachable from the server.
 - **MSG_CLI_LSTUSR**: Client request for the available list of users.
 - **MSG_SRV_AVLUSR**: Available user for client (specified by text).

The protocol is simple. Clients connects to the server and needs to specify first his desired Username. If the server notice that the username is already present, it sends a message **MSG_SRV_USRNCK**, otherwise it sends **MSG_SRV_USRACK** message. When Client receives the USRACK message, he can perform three types of queries to server:

- **MSG_CLI_LSTUSR** message: client ask to server to show its list of users. Server answers with n **MSG_SRV_AVLUSR** messages (with n number of users)
- **MESSAGE**: Normal Message directed to specified user.
 - If the specified user is represented by keyword **all**, server sends the message to all connected Users.



Documentation

For the code documentation, see the attached file refman.pdf.

How To Run

1. Extract the project on a generic dir.
2. Launch the command `make`.
3. `./server` command to execute Server
4. `./client ip` command to execute Client.
 - a. Ip must be a valid ip address. If you are running client on the same machine as server, run `./client 127.0.0.1`

Demo Interfaces

Client username insertion.

```
xeymad@DESKTOP-PLIAVCS:/mnt/c/Users/Fisso_Casa/Documents/GitHub/gagchat$ ./client 127.0.0.1
Please Enter a Username
> peppe
Server: Requested User is not available. Try again.    3
> xeymad
```

```
+-----+
| Welcome xeymad |
|               |
| Make your choice, insert: |
| -show_all-> show all connected users |
| -username-> open the chat with the user "username" |
|               |
+-----+
Insert-> 
```

Server visualization.

```
xeymad@DESKTOP-PLIAVCS:/mnt/c/Users/Fisso_Casa/Documents/GitHub/gagchat$ ./server
Server running...waiting for connections.
[ServerInfo]: request with connection_fd 4
peppe: Nice one this time!    1
[ServerInfo]: accepted username peppe
[ServerInfo]: request with connection_fd 5
mario: Nice one this time!    1
[ServerInfo]: accepted username mario
[ServerInfo]: request with connection_fd 6
giggi: Nice one this time!    1
[ServerInfo]: accepted username giggi
mario: Nice one this time!    5
giggi: Nice one this time!    5
mario: hey    0
giggi: ciao    0
giggi: come stai    0
[ServerInfo]: request with connection_fd 7
peppe: Nice one this time!    1
xeymad: Nice one this time!    1
[ServerInfo]: accepted username xeymad
[ServerInfo]: Disconnecting user xeymad
[ServerInfo]: request with connection_fd 8
peppe: Nice one this time!    1
xeymad: Nice one this time!    1
[ServerInfo]: accepted username xeymad
```

Client interface for commands.

```
+-----+
| Welcome giggi                                     |
| Make your choice, insert:                         |
| -show_all-> show all connected users              |
| -username-> open the chat with the user "username"|
+-----+

Insert-> show_all
```

```
+-----+
| Welcome giggi                                     |
| Make your choice, insert:                         |
| -show_all-> show all connected users              |
| -username-> open the chat with the user "username"|
+-----+

| ~ giggi                                           |
| ~ mario                                           |
| ~ peppe                                           |
mario
> hey

                                     <-giggi
                                     +-----+
                                     | hey          |
                                     +-----+

mario->
+-----+
| ciao                                           |
+-----+

mario->
+-----+
| come stai                                     |
+-----+
```

Client send to all.

```
+-----+
| Welcome xeymad                                    |
| Make your choice, insert:                         |
| -show_all-> show all connected users              |
| -username-> open the chat with the user "username"|
+-----+

Insert-> all
> ciao ragazzi

                                     <-xeymad
                                     +-----+
                                     | ciao ragazzi  |
                                     +-----+

> come state?

                                     <-xeymad
                                     +-----+
                                     | come state?   |
                                     +-----+
```

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