GROUP MESSAGE SYSTEM

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Implementation details

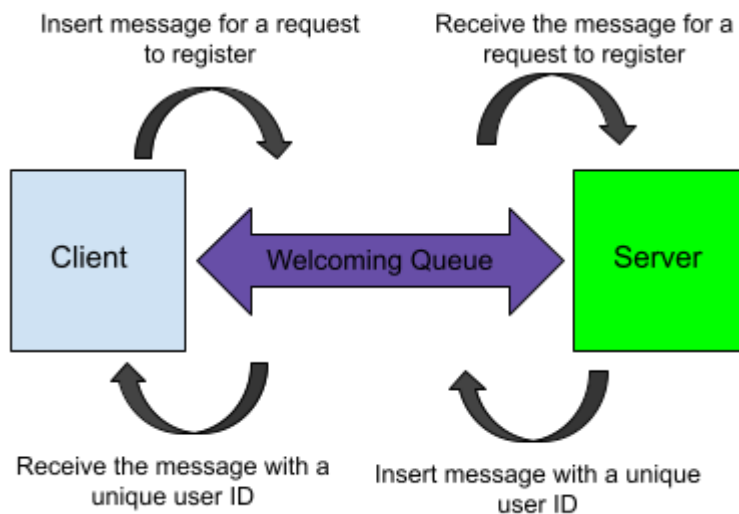The server is run first which creates a welcoming message queue using a globally known key.

- Registration: The clients at runtime are asked if they have been registered with the client already or not. If they're not, the client opens the welcoming queue at its end and sends a registration request on that queue. The server reads that message to create a new user ID, sends it on the welcoming queue for the client to read. The client uses the user ID information to create a new unique message queue which is accessible to the client and the server only. The server also maintains an array of users which contains their message queue ids as well.

- Group Creation: The client sends a request to the server to create a new group with a specific group name. The server maintains an array of structures for the groups created, where in each structure, it maintains the group name, number of participants and the user IDs of all participants. It returns the group ID created as well.

- Joining a group: The client requests the server to join a particular group by specifying its ID and the server adds the user's ID to the data structure it maintains.

- Sending messages (Private and Group): The client makes a message and states the group ID of the group to send the group message, or the user ID of the user to send the private message. The server receives this message and routes the messages to the respective clients using their respective private message queues by the help of the data structures it maintains.

- Receiving messages (Private and Group): The client specifies the group ID of the group to read a group message or the user ID of the user to receive a private message. The message queue is searched for that particular sender or group and the message is read if it exists or can be read.

- Set Auto Delete option: The client sets a time interval (in seconds). If the receiver reads the message within this time interval, it's fine. Else the user won't be able to access the message. This is achieved by putting a time stamp in the message and also the allowed accessible duration of the same.

All these options are accessible to the client by a menu and switch case model in an infinite loop until the user chooses to exit the program or there occurs an error in any of the functions.
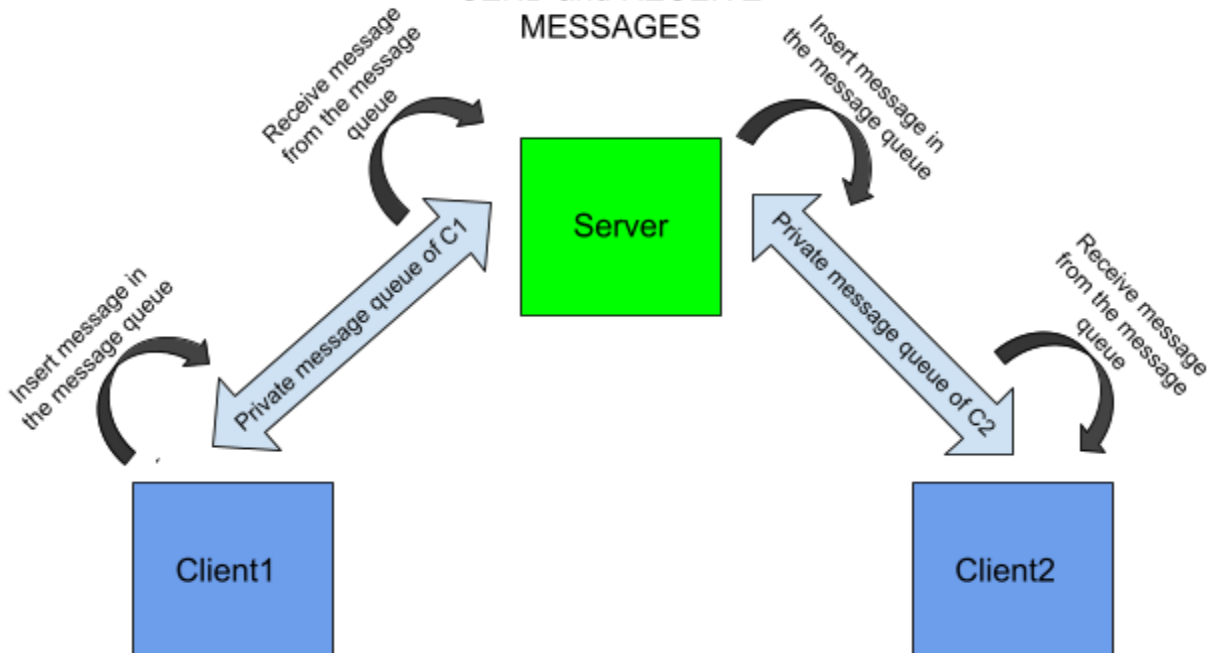
Offline Mode

When the client program is not running, it is said to be in offline mode. Another user can still send messages to the offline client. The server puts the messages into the message queue of the offline user. When the user comes back online, he can read the message from the message queue normally.

REGISTRATION

Insert message for a request to register

Receive the message for a request to register

Client — Welcoming Queue — Server

Receive the message with a unique user ID

Insert message with a unique user ID

SEND and RECEIVE MESSAGES

Receive message from the message queue

Insert message in the message queue

Private message queue of C1

Server

Insert message in the message queue

Private message queue of C2

Receive message from the message queue

Insert message in the message queue

Client1

Client2

Execution Steps

1. Use the Makefile to compile both the server and client
2. Execute the server application in a shell terminal using the command → ./server
3. For every new client, open a new terminal window and execute the client using the command → ./client
4. In each client, select the different options to create/join a group, send/receive messages.

Screen Shots

Registration

```
Pranalis-MacBook-Air:Q3 pranalisancheti$ ./    Pranalis-MacBook-Air:Q3 pranalisancheti$ ./a.    Pranalis-MacBook-Air:Q3 pranalisancheti$ gc
a.out                                           out                                              c -o run msgq_server.c
Please enter your user id if registered els     Please enter your user id if registered else     Pranalis-MacBook-Air:Q3 pranalisancheti$ ./
e enter 0 : 0                                   enter 0 : 0                                       run
step one                                        step one
step two                                        step two
step three                                      step three
step 4                                          step 4
Registration request sent                       Registration request sent
Acknowledgement received!                       Acknowledgement received!
Your user id is 101                             Your user id is 102
Choose a service from the menu :                Choose a service from the menu :
0 - CREATE_GROUP                                0 - CREATE_GROUP
1 - LIST_GROUP                                  1 - LIST_GROUP
2 - JOIN_GROUP                                  2 - JOIN_GROUP
3 - SEND_PVT                                    3 - SEND_PVT
4 - SEND_GRP                                    4 - SEND_GRP
5 - RECV_MES_GRP                                5 - RECV_MES_GRP
6 - RECV_MES_PVT                                6 - RECV_MES_PVT
7 - REGISTER                                    7 - REGISTER
8 - EXIT                                        8 - EXIT
9 - SET AUTO DELETE                             9 - SET AUTO DELETE
```

Create Group

```
Choose a service from the menu :
0 - CREATE_GROUP
1 - LIST_GROUP
2 - JOIN_GROUP
3 - SEND_PVT
4 - SEND_GRP
5 - RECV_MES_GRP
6 - RECV_MES_PVT
7 - REGISTER
8 - EXIT
9 - SET AUTO DELETE
0
enter group name:group1
Successfully created the group 10
Choose a service from the menu :
0 - CREATE_GROUP
1 - LIST_GROUP
2 - JOIN_GROUP
3 - SEND_PVT
4 - SEND_GRP
5 - RECV_MES_GRP
6 - RECV_MES_PVT
7 - REGISTER
8 - EXIT
9 - SET AUTO DELETE
```

Join group

```
Choose a service from the menu :
0 - CREATE_GROUP
1 - LIST_GROUP
2 - JOIN_GROUP
3 - SEND_PVT
4 - SEND_GRP
5 - RECV_MES_GRP
6 - RECV_MES_PVT
7 - REGISTER
8 - EXIT
9 - SET AUTO DELETE
2
Enter group id : 10
Sent joining request
Successfully joined the group 10
Choose a service from the menu :
0 - CREATE_GROUP
1 - LIST_GROUP
2 - JOIN_GROUP
3 - SEND_PVT
4 - SEND_GRP
5 - RECV_MES_GRP
6 - RECV_MES_PVT
7 - REGISTER
8 - EXIT
9 - SET AUTO DELETE
```

Send and Receive Private Message

```
Choose a service from the menu :          enter group name:group1
0 - CREATE_GROUP                          Successfully created the group 10
1 - LIST_GROUP                            Choose a service from the menu :
2 - JOIN_GROUP                            0 - CREATE_GROUP
3 - SEND_PVT                              1 - LIST_GROUP
4 - SEND_GRP                              2 - JOIN_GROUP
5 - RECV_MES_GRP                          3 - SEND_PVT
6 - RECV_MES_PVT                          4 - SEND_GRP
7 - REGISTER                              5 - RECV_MES_GRP
8 - EXIT                                  6 - RECV_MES_PVT
9 - SET AUTO DELETE                       7 - REGISTER
3                                         8 - EXIT
Enter USER id to send message : 102       9 - SET AUTO DELETE
Enter message to be sent                  6
Hello                                     Please enter user id to read the message from : 101
value of dur is -1   ... -1               Received a message from user id 101
Private message request sent              Content : Hello
Choose a service from the menu :          Choose a service from the menu :
0 - CREATE_GROUP                          0 - CREATE_GROUP
1 - LIST_GROUP                            1 - LIST_GROUP
2 - JOIN_GROUP                            2 - JOIN_GROUP
3 - SEND_PVT                              3 - SEND_PVT
4 - SEND_GRP                              4 - SEND_GRP
5 - RECV_MES_GRP                          5 - RECV_MES_GRP
6 - RECV_MES_PVT                          6 - RECV_MES_PVT
7 - REGISTER                              7 - REGISTER
8 - EXIT                                  8 - EXIT
9 - SET AUTO DELETE                       9 - SET AUTO DELETE
```

Send and Receive Group Message

```
Choose a service from the menu :
0 - CREATE_GROUP
1 - LIST_GROUP
2 - JOIN_GROUP
3 - SEND_PVT
4 - SEND_GRP
5 - RECV_MES_GRP
6 - RECV_MES_PVT
7 - REGISTER
8 - EXIT
9 - SET AUTO DELETE
4
Enter group id to send message : 10
Enter message to be sent
Hi group
Group message request sent
Choose a service from the menu :
0 - CREATE_GROUP
1 - LIST_GROUP
2 - JOIN_GROUP
3 - SEND_PVT
4 - SEND_GRP
5 - RECV_MES_GRP
6 - RECV_MES_PVT
7 - REGISTER
8 - EXIT
9 - SET AUTO DELETE
```

```
Choose a service from the menu :
0 - CREATE_GROUP
1 - LIST_GROUP
2 - JOIN_GROUP
3 - SEND_PVT
4 - SEND_GRP
5 - RECV_MES_GRP
6 - RECV_MES_PVT
7 - REGISTER
8 - EXIT
9 - SET AUTO DELETE
5
Please enter the group id to read message from : 10
Received a message from group id 10
Sender of the message is 101
Content : Hi group
Choose a service from the menu :
0 - CREATE_GROUP
1 - LIST_GROUP
2 - JOIN_GROUP
3 - SEND_PVT
4 - SEND_GRP
5 - RECV_MES_GRP
6 - RECV_MES_PVT
7 - REGISTER
8 - EXIT
9 - SET AUTO DELETE
```

Set Auto Delete and Testing

```
Group message request sent
Choose a service from the menu :
0 - CREATE_GROUP
1 - LIST_GROUP
2 - JOIN_GROUP
3 - SEND_PVT
4 - SEND_GRP
5 - RECV_MES_GRP
6 - RECV_MES_PVT
7 - REGISTER
8 - EXIT
9 - SET AUTO DELETE
9
Please enter the auto delete duration in seconds: 2
Any messages sent by you will be deleted if the receiver isn
't active within 2 seconds
Choose a service from the menu :
0 - CREATE_GROUP
1 - LIST_GROUP
2 - JOIN_GROUP
3 - SEND_PVT
4 - SEND_GRP
5 - RECV_MES_GRP
6 - RECV_MES_PVT
7 - REGISTER
8 - EXIT
9 - SET AUTO DELETE
3
Enter USER id to send message : 102
Enter message to be sent
Timed message
value of dur is 2   ... 2
Private message request sent
Choose a service from the menu :
0 - CREATE_GROUP
1 - LIST_GROUP
2 - JOIN_GROUP
3 - SEND_PVT
4 - SEND_GRP
5 - RECV_MES_GRP
6 - RECV_MES_PVT
7 - REGISTER
8 - EXIT
9 - SET AUTO DELETE
```

```
Received a message from user id 101
Content : Hello
Choose a service from the menu :
0 - CREATE_GROUP
1 - LIST_GROUP
2 - JOIN_GROUP
3 - SEND_PVT
4 - SEND_GRP
5 - RECV_MES_GRP
6 - RECV_MES_PVT
7 - REGISTER
8 - EXIT
9 - SET AUTO DELETE
5
Please enter the group id to read message from : 10
Received a message from group id 10
Sender of the message is 101
Content : Hi group
Choose a service from the menu :
0 - CREATE_GROUP
1 - LIST_GROUP
2 - JOIN_GROUP
3 - SEND_PVT
4 - SEND_GRP
5 - RECV_MES_GRP
6 - RECV_MES_PVT
7 - REGISTER
8 - EXIT
9 - SET AUTO DELETE
6
Please enter user id to read the message from : 101
This message was deleted as you joined a bit late
You have no new messages from this user
Choose a service from the menu :
0 - CREATE_GROUP
1 - LIST_GROUP
2 - JOIN_GROUP
3 - SEND_PVT
4 - SEND_GRP
5 - RECV_MES_GRP
6 - RECV_MES_PVT
7 - REGISTER
8 - EXIT
9 - SET AUTO DELETE
```