

TCP Multi-Client Chat Server

- Compile **server.c** and **client.c** programs
- Run the server by using `./server`
- We can note the PORT to which the server is Listening for Client Connections as below:

```
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc server.c -o server && ./server
TCP Server Bound to Port: 8080
TCP Server Waiting for Client Requests...
█
```

- Run the client program by using `./client` in another terminal
- The user is **prompted to Enter a Username**.
- Once Username is entered, a **WELCOME TO CHATROOM** message is shown and in the Server side, details about new connection (PORT and IP of client) is shown.

Client-1:

```
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc client.c -o client && ./client
Please enter your name: Person_1
```

```
----- WELCOME TO THE CHATROOM -----
█
```

Server:

```
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc server.c -o server && ./server
TCP Server Bound to Port: 8080
TCP Server Waiting for Client Requests...
New connection at 127.0.0.1 : 42876
█
```

- Since only Person_1 is currently in chat, **the list of Online Members is Empty and is not shown**.
- When we create another Terminal window and run the client program, we can see that in this Client's Terminal (Client-2), it shows that **Person_1 is present! message**.

Client-2:

```
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc client.c -o client && ./client
Please enter your name: Person_2
```

```
----- WELCOME TO THE CHATROOM -----
Person_1 is present!
```

- In Client-1 we can see that, **Person_2 joined the chat! message** is shown and in the Server we can see another new connection message for the Client-2 as shown below:

Client-1:

```
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc client.c -o client && ./client
Please enter your name: Person_1
```

```
----- WELCOME TO THE CHATROOM -----
Person_2 joined the chat!
```

Server:

```
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc server.c -o server && ./server
TCP Server Bound to Port: 8080
TCP Server Waiting for Client Requests...
New connection at 127.0.0.1 : 42876
New connection at 127.0.0.1 : 42882
```

- When we add another Client to the Chatroom, the list of people present in the chatroom already is displayed (Person_1 and Person_2) and the following outputs are obtained in each other clients and the server:

The image shows four terminal windows arranged in a 2x2 grid, all with the title 'gokulsreekumar@ubuntu: ~/Codes/Networks/TCP_Chat'.
Top-left (Server):
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat\$ gcc server.c -o server && ./server
TCP Server Bound to Port: 8080
TCP Server Waiting for Client Requests...
New connection at 127.0.0.1 : 42876
New connection at 127.0.0.1 : 42882
New connection at 127.0.0.1 : 42886
Bottom-left (Person_2):
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat\$ gcc client.c -o client && ./client
Please enter your name: Person_2
----- WELCOME TO THE CHATROOM -----
Person_1 is present!
Person_3 joined the chat!
Bottom-right (Person_3):
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat\$ gcc client.c -o client && ./client
Please enter your name: Person_3
----- WELCOME TO THE CHATROOM -----
Person_1 is present!
Person_2 is present!
Top-right (Person_1):
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat\$ gcc client.c -o client && ./client
Please enter your name: Person_1
----- WELCOME TO THE CHATROOM -----
Person_2 joined the chat!
Person_3 joined the chat!

- When Chats start, from the perspective of Person_1, we can see:

```
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc client.c -o client && ./client
Please enter your name: Person_1

----- WELCOME TO THE CHATROOM -----
Person_2 joined the chat!
Person_3 joined the chat!
Hello Everyone!
How is things going?
Person_2 > Hey, Going all fine!
Person_3 > Yeah, all fine, what about you?
```

- From **perspective of Person_2** we can see:

```
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc client.c -o client && ./client
Please enter your name: Person_2

----- WELCOME TO THE CHATROOM -----
Person_1 is present!
Person_3 joined the chat!
Person_1 > Hello Everyone!
Person_1 > How is things going?
Hey, Going all fine!
Person_3 > Yeah, all fine, what about you?
█
```

- And from **perspective of Person_3** as:

```
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc client.c -o client && ./client
Please enter your name: Person_3

----- WELCOME TO THE CHATROOM -----
Person_1 is present!
Person_2 is present!
Person_1 > Hello Everyone!
Person_1 > How is things going?
Person_2 > Hey, Going all fine!
Yeah, all fine, what about you?
█
```

- All messages are **logged and visible in the server, in the format: client_name > message**, shown as below:

```
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc server.c -o server && ./server
TCP Server Bound to Port: 8080
TCP Server Waiting for Client Requests...
New connection at 127.0.0.1 : 42876
New connection at 127.0.0.1 : 42882
New connection at 127.0.0.1 : 42886
Person_1 > Hello Everyone!
Person_1 > How is things going?
Person_2 > Hey, Going all fine!
Person_3 > Yeah, all fine, what about you?
█
```

- We can use the word **“tata”** for leaving the Chat Room.
- If Person_3 leaves the Chatroom a message saying, **Person_3 left the chat!**, is send to **ALL other connected clients in the chat (here, Person_1 and Person_2)** and also in the **Server side we can see Person_3 left the chat! Message as well as it's corresponding Socket which hot hung up:**

```
gokulsreekumar@ubuntu: ~/Codes/Networks/TCP_Chat
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc server.c -o server && ./server
TCP Server Bound to Port: 8080
TCP Server Waiting for Client Requests...
New connection at 127.0.0.1 : 42876
New connection at 127.0.0.1 : 42882
New connection at 127.0.0.1 : 42886
Person_1 > Hello Everyone!
Person_1 > How is things going?
Person_2 > Hey, Going all fine!
Person_3 > Yeah, all fine, what about you?
Person_3 left the chat
Socket with FD: 6 Hung Up
█

gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc client.c -o client && ./client
Please enter your name: Person_1
----- WELCOME TO THE CHATROOM -----
Person_2 joined the chat!
Person_3 joined the chat!
Hello Everyone!
How is things going?
Person_2 > Hey, Going all fine!
Person_3 > Yeah, all fine, what about you?
Person_3 left the chat!
█

gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc client.c -o client && ./client
Please enter your name: Person_2
----- WELCOME TO THE CHATROOM -----
Person_1 is present!
Person_3 joined the chat!
Person_1 > Hello Everyone!
Person_1 > How is things going?
Hey, Going all fine!
Person_3 > Yeah, all fine, what about you?
Person_3 left the chat!
█

gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc client.c -o client && ./client
Please enter your name: Person_3
----- WELCOME TO THE CHATROOM -----
Person_1 is present!
Person_2 is present!
Person_1 > Hello Everyone!
Person_1 > How is things going?
Person_2 > Hey, Going all fine!
Yeah, all fine, what about you?
tata
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$
```

- If another client now joins, then Person_1 and Person_2 (not Person_3) is listed as being present:

```
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc client.c -o client && ./client
Please enter your name: Person_3
----- WELCOME TO THE CHATROOM -----
Person_1 is present!
Person_2 is present!
Person_1 > Hello Everyone!
Person_1 > How is things going?
Person_2 > Hey, Going all fine!
Yeah, all fine, what about you?
tata
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc client.c -o client && ./client
Please enter your name: Person_4
----- WELCOME TO THE CHATROOM -----
Person_1 is present!
Person_2 is present!
█
```

- We can use “tata” to exit from All the clients, and then Close the Running Server by using Control-C Keys, essentially closing the Chat Room.

```
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$ gcc server.c -o server && ./server
TCP Server Bound to Port: 8080
TCP Server Waiting for Client Requests...
New connection at 127.0.0.1 : 42876
New connection at 127.0.0.1 : 42882
New connection at 127.0.0.1 : 42886
Person_1 > Hello Everyone!
Person_1 > How is things going?
Person_2 > Hey, Going all fine!
Person_3 > Yeah, all fine, what about you?
Person_3 left the chat
Socket with FD: 6 Hung Up
New connection at 127.0.0.1 : 42900
Person_1 left the chat
Socket with FD: 4 Hung Up
Person_2 left the chat
Socket with FD: 5 Hung Up
Person_4 left the chat
Socket with FD: 6 Hung Up
^C
gokulsreekumar@ubuntu:~/Codes/Networks/TCP_Chat$
```