

Chatter Project Report

How to keep track of clients within the server?

The way I implemented this is to keep two sets, one that holds the ServerWorkers which are basically the client threads, and the client's username. The username set is mostly used to simplify retrieving client's usernames without having to go through each ServerWorker to do it. Each ServerWorker is a unique thread which holds the majority of the interaction methods. Keeping a list of the ServerWorker threads allows the clients to loop through each thread and broadcast a message to that client. When the client leaves the chat, both the ServerWorker thread and username are removed from their respective sets.

How do we add/remove a client from the list?

Since adding and removing clients from the sets can create race conditions, we make the sets synchronized as well as synchronizing the 2 methods involving adding and removing clients. A ServerWorker is created when a connection is made but a client is not added to the chat unless they provide a valid username within 3 attempts. A client is added to the list when they provide a valid username which is checked by the Server against the user's database. Once added the user has access to the chat and can participate. When a user types **logout** they are removed from the sets and essentially break out of the I/O loop, closing the socket.

How do we broadcast a message to the other clients?

Since each ServerWorker is created with an instance of the Server, it has access to the list of users that are currently online. When a client sends a message the ServerWorker gets the list of online users and sends the message to the output stream of each one in the set. Each ServerWorker has a method `send()` which takes in a message String and uses that ServerWorker instance's OutputStream to write to the client's terminal.

Getting online users and sending private messages?

There are two extra commands that allow clients to request a list of currently online users as well as send a message to a specific user. By typing the command **users** the ServerWorker gets the list of usernames currently logged in and outputs the results to that client's terminal. By typing the command `private <user> <message>` a client can send a direct message to the user specified (if they are logged in) which is outputted to the recipient's terminal.