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Abstract:

This describes the communication protocol to be used for an IRC protocol. It consists of a client, which is any socket program capable of connecting to a server. Developed for the Internetworking Protocols course at Portland State University.

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1. Introduction

This describes an Internet Relay Chat (IRC) protocol by which clients can communicate with each other. This is accomplished by using a central server which receives messages and “relays” them to connected users.

Users are able to make or join rooms, which are groups of users subscribed to the same message stream. Any message sent to that room is forwarded to all users currently in that room.

Users can also send private messages directly to other users.

2. Basic Information

All communication methods in this protocol take place over TCP/IP, with the server listening for connections on port 5000. Clients connect to this port and maintain a persistent connection to the server, sending messages and requests to the server over an open channel. Similarly, the server can also reply in the same manner. The messaging protocol is asynchronous, meaning the client can send messages to the server at any time and vice versa.

Termination of connection can be done by either server or client and can happen at any time for any reason. An error message may be sent to the other party to inform the reason for the connection terminating.

3. Client Messages

This section describes the messages sent by client to server. Clients will automatically join a “lobby” room upon establishing connection. Any unique requests (such as join or whisper) will be distinguished by the first character in the message string. The character must start with a backwards slash ‘/’ to indicate a command.

3.1. First message sent to the server

Before other messages can be sent to the server, the connecting client must provide a chat name to better identify themselves.

The server must associate the client’s chat name with the socket connection of the user. This initial message to the server is preceded by “>>name” to indicate the initial set up of the user’s name.

3.2. Server Lobby

All clients will join the server lobby by default. The lobby itself is a room and clients will not be able to leave it unless they disconnect from the server. Upon joining the server, presently active clients will be notified of their presence.

3.3. Lists – Users and Rooms

Sent by client to get a list either of online users in a room, or a list of active rooms on the server.

To get a list of rooms, client must send ‘/room’ as the first word in the message. A list of active rooms including number of subscribed users will be displayed.

To get a list of users in a room, the message must be formatted like the following:
/online room_name

If client does not provide a room name, a list of active users in lobby will be provided.

3.4. Creating and Joining Rooms

Clients can create and join rooms with a message format of the following:
/join room_name

If no rooms with the same name exist, then it will be created and client will join that room. If a room with that name already exists, then client will join that room. Upon joining that room, a notification will be sent to other clients already in that room.

3.5. Leaving a Room

For client to leave a room, the message sent to server must be formatted as the following:

/leave room_name

Upon leaving the room, a message will be broadcasted to other users in the room to notify the decrease of clients in the same message stream.

3.6. Sending Messages

By default, messages that are not preceded with a valid command word will be broadcasted to the lobby.

To send a message to a room, the client message must be formatted as the following:

`/msg room_name message`

If client wants to send a message to multiple rooms that they are subscribed to, then the message must be formatted as the following:

`/mmsg room1,room2,room3 message`

Client is also able to do a private message to another client active in the server:

`/w username message`

4. Server Messages

4.1. Forwarding Messages to Clients

Messages starting with `‘/w’` indicates the special request “whisper” and is a private message meant for a specific client. Server will relay this to the specified client. If the specified client is not connected or not reachable, server will notify sender client about the failure to relay the message.

Messages starting with `‘/msg/’` indicates the special request “message” and is meant for a specific room. Server will broadcast to all clients subscribed to the specified room. If the specified room does not exist, server will notify sender client. Also, if sender client is not subscribed to that room themselves, then server will also notify them of the error.

A variation of room-specific messaging is the special request `‘/mmsg’`, which is to send one message to multiple rooms that the client is subscribed to. If client is not subscribed to any of the rooms, server will notify the client for every room in the provided list that the client is not in.

Messages from client that do not start with a special request command will be broadcasted to all users in the lobby.

4.2. Listing Response

There are two kinds of lists that server can provide: (a) rooms and (b) users.

Messages starting with `/rooms` indicates the special request to list existing active rooms in the server. Server will provide a list of all the rooms and the number of clients subscribed to those rooms.

Messages starting with `/online` indicates the special request to list active clients in the server. If a room name is provided, server will return a list of client names in that room. If no room is specified, then a list of clients in lobby will be provided.

4.3. Creating and Joining Room Response

Messages starting with `/join` indicates joining a room on the server and following this word is the room name. If the provided room name matches the name of an existing room in the server, client will join that room. If the room doesn't exist, it will be created and named with what client provided in the message. If no name is provided, server will notify sender client about the error.

4.4. Leave Room Response

Messages starting with `/leave` indicates leaving a room on the server that the client is subscribed into. Following this word should be the name of the room client wants to leave. If client was in the specified room, client will leave that room. Server will send a notification to sender client if no room name was provided or if client was not in the room.

5. Error Handling

When server unexpectedly shuts down or disconnects, clients will notify user and close the client program.

When clients disconnect unexpectedly, server cleans up by removing disconnected client from subscribed rooms and broadcasting to all clients to notify about the client leaving the server.

6. Conclusion and Future Work

Messages that the client receives needs to be formatted and displayed more cleanly. More informative error reporting should be done regarding clients disconnecting.