Portland State University - CS 594

Internetworking Protocol

Internet Relay Chat Project

By: Sri Lakshmi Polavarapu

Apurupa Bodha

Sahithi Mothe

.

TABLE OF CONTENT

1. Introduction

This RFC represents a protocol in which several clients communicate with one other. There is a server which sends, and receives messages from different users and there are users who can create new rooms, join the existing rooms, exit rooms and can also send personal messages to the other users without involving everyone from the group. If a group of users are a part of a same room, any message sent by one user is received by all the users in the room.

Client

This is single server architecture. Therefore, all the users are connected to a single server. Client can have a name length up to 20 characters along with underscore, which is used for the identification of the client. Clients requests the services mentioned by the server.

Server

Although the IRC defined has multiple server architecture, to provide a common point for all the clients to connect, a single server is used as the pillar for this IRC. Server provides services.

Room:

A user can either create a different room or join a a room, which is already existing. It is created by the user who joins the channel first. A room is typically a group of users where several users can communicate with each other. A user can join a room just by referring with the room name. If all the users in the room leaves, the room does not exist anymore.

The performance of a room is that, when a user tries to join a room using the "$join room_name" command. If the room with the name mentioned is not present in the list or not available, then a new room is created with the name given by the user. Now this room is available for all the other users to join and can also view. Other users can see the list of rooms available using the $list command.

2.   Specification

Mode of Communication

Through rooms and private chats, this program facilitates One to One, One to Many, and One to All forms of communication. A message sent in the room by a user is received by the server, which then distributes it to every user present in that room—not just the sender.

Character Codes

Each message may consist of any number of characters from the set of ASCII. Here the space acts as a delimiter.

Messages

The important parts of any message are the command's name, transaction ID and the payload. All these parts are separated by space. Here the transaction ID which is an unsigned integer increments the value by 1 whenever a message is sent by the client. However, it the value remains 0 for the server to client messages. This ID is useful for tracing the client's side process.

Replies

Almost all the messages sent requires generate a reply. The most common reply is the numeric reply. It consists of the transaction ID and status of the request sent. It represents a value 0 for a fruitful request and a non-zero for a request with any errors. A client cannot generate this type of request. Any such messages received by a server will generate an error response.

3. Message Infrastructure

Create room

At the start there are no rooms available. The first user who starts this application can create a room using the "$join room_name" command. This created room by the first user will now be visible to all the other users where they can join and start communicating.

```
$join room1
room1 created
```

Join room

A user can view the rooms available to join using the "$list" command which displays all the available rooms created by other users. User can join any of the listed rooms using the "$join room_name" command.

```
$list
List of available roomdetails:
room1man
```
We also get the number of users present in that room.

Exit room

A user can exit the room using the "$leave room_name" command at any point of time but the room from where the user left will still be available to other users as there are also other users in the room. Otherwise, if there are no users in the room, the room does not exist anymore to anyone.

```
$leave room1
You left the room
```

4.   IRC Concepts

One-to-one communication

Here, there are just two hosts communicating with each other. This could take the shape of a client request to a server or a private conversation where the sender and recipient are both present in the room but the discussion is hidden from view by any other clients. The message is initially sent by the client to the server, which forwards it to the client that is meant to receive it. This is achieved by using the "$personal user_name" command

```
$personal man
[personal message] xyz:
```

One-to-many communication

This communication takes place when a room is first created and many users join that room and start communicating with each other. When a user of that room sends a message in that room, that message is viewed by all the other users who are part of that room.

One-to-all communication

A client can send a broadcast message that will be delivered to each and every client and server.

5. Error Handling

a) 'You are not part of any room' message willbe displayed, if the users tries to leave the room, which is not part of.

```
$leave room2
You are not part of any room
```

b) The servers, rooms and the clients are notified before if a clients crashes.

```
['man']
exception occured  [WinError 10054] An existing connection was forcibly closed by the remote host
nick name is man2
room
```

c) Similarly, if the server crashes, the clients are logged out and will be notified with a "Server not responding" message.

```
$join room
room created
hello
[room] man: hello
Server not responding
```

d) A user cannot send a message if he is not the part of the room.

e) A client generally cannot communicate with a client who does not exist in the same room.

```
$personal xyz
User not found
```

6. Conclusion & Future Work

Message sharing has been expanded to include broadcast or private communications between a single server and several clients. The implementation of inter-room interaction has taken place. A few security measures and a media sharing function could further expand this application. Removing duplicate user names and room passwords is one of the security features. Transport protocols based on cryptography can enable media sharing.