CSC3002F – NETWORKING REPORT

Assignment 1

Pieter Janse van Rensburg (JNSPIE007)

Yamkela Venfolo (VNFYAM001)

Pierre Madziakapita (MDZPIE001)

APRIL 6, 2017

1. HOW TO USE THE APPLICATION:

For each terminal do the following:

- Firstly, open a terminal emulator on your Linux distribution.
- Ensure you are within the CSC3002F_Assignment1 Directory and if you are not use the "cd" command to change your current directory to the aforementioned one.

The following depends on intended use of the terminal:

- Type: "*java -cp bin Server"* to start the server of the chat application. It only takes one command "Exit" which shuts down the server. Only 1 server should be running on a machine at a time. It listens for connections on port 1337.
- Type "*java -cp bin Client"* to start a client of the chat applications. Note multiple clients may be running at the same time. The various commands the Client may use are explained in the client's graphical user interface.

2. OVERVIEW OF THE CHAT APPLICATION'S FUNCTIONALITY:

Our chat application allows 1-to-1 private chats between clients as well as for clients to broadcast messages to all other clients on the server (similar to IRC channels). It is based on, and implements, a client-server architecture that uses TCP sockets to send data between clients and the server. In constructing our chat application, we have taken a lot of issues into consideration including: bandwidth (since this is a major issue in South Africa where it is relatively expensive to acquire data), security (since clients may value their privacy and would want to ensure that other clients can't see their private conversations) and reusability (ensuring that a client's identity cannot be stolen or "spoofed" should they go offline i.e. giving the client a reusable persistent account).

The first time a client attempts to establish a connection to the server, it will ask for their login credentials. If these login credentials are unique the client will be registered on the server as a new client. This is done to ensure that each client has a unique username and therefore cannot have their identity stolen or "spoofed" should they go offline (unless their password is stolen) and this is achieved through storing the client's username and password into text file on the server. If the client establishes a connection to the server afterwards, they will be able to use their username and password to login under their account while connecting to the server and thus will be able to exchange messages with other clients under the name with which they registered (which is unique).

The absolute path of images to be sent must be specified by the source client. If it is in the CSC3002F_Assignment 1 directory then only the image's name must be specified. The sending of an image from a source client to a destination client requires consent from the destination client, and hence we have implemented a mechanism to achieve this in our server - should it receive an image from a source client. The server will notify the destination client that an image was sent from the source client (identifying them through their distinct username) and will only

proceed to send the image once a response of "Yes" has been received from the destination client. However, if the image is not accepted (i.e. a response of "No" is given), then the server will delete the image to not infringe on the source client's privacy. All this is done by waiting for the destination client to finish entering their current command so that System.in can be used to accept or decline their confirmation (this is seen by the line "Waiting for Previous Input to Finish on System.in"). If a client disconnects from the system (willingly or unwillingly), other clients will be notified since messages cannot be sent to offline clients. This is achieved through updating a contact list consisting of all online clients on the server which each client connected to the server has access to.

Clients are also able to send text messages to each other. This is done by allowing the source client to choose a client to send the text message to from the list on online clients. A text message sent to a specific client will not be seen by any other client on the server.

Lastly, our server allows for the sending of text and image messages from a source client to all other clients on the server. This allows server wide conversations to take place in which all clients connected to the server at that time can partake in. As stated in the previous paragraph receipt of an image message will require the consent of the respective destination client.

3. IMAGES OF THE CHAT APPLICATION RUNNING IN THE TERMINAL:

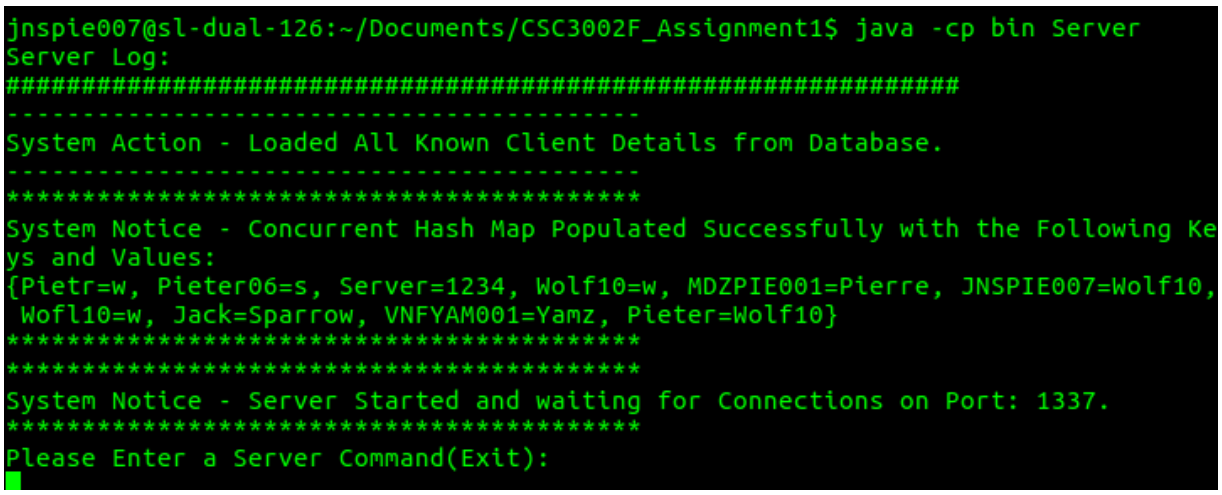

Figure 1 - The Server successfully starting up, loading all Client details from a text file & waiting for a Server command

```
jnspie007@sl-dual-126:~/Documents/CSC3002F_Assignment1$ java -cp bin Client
Please enter the IP/DNS address of the Server
localhost
************************************************************************
System Notice - Client has Succesfully connected to the Server
************************************************************************
Please enter a Username:
JNSPIE007
Please enter a Password:
Wolf10
************************************************************************
System Notice - JNSPIE007, you have logged in successfully.
************************************************************************
```

Figure 2 - The Client JNSPIE007 logging in successfully after entering their username and password

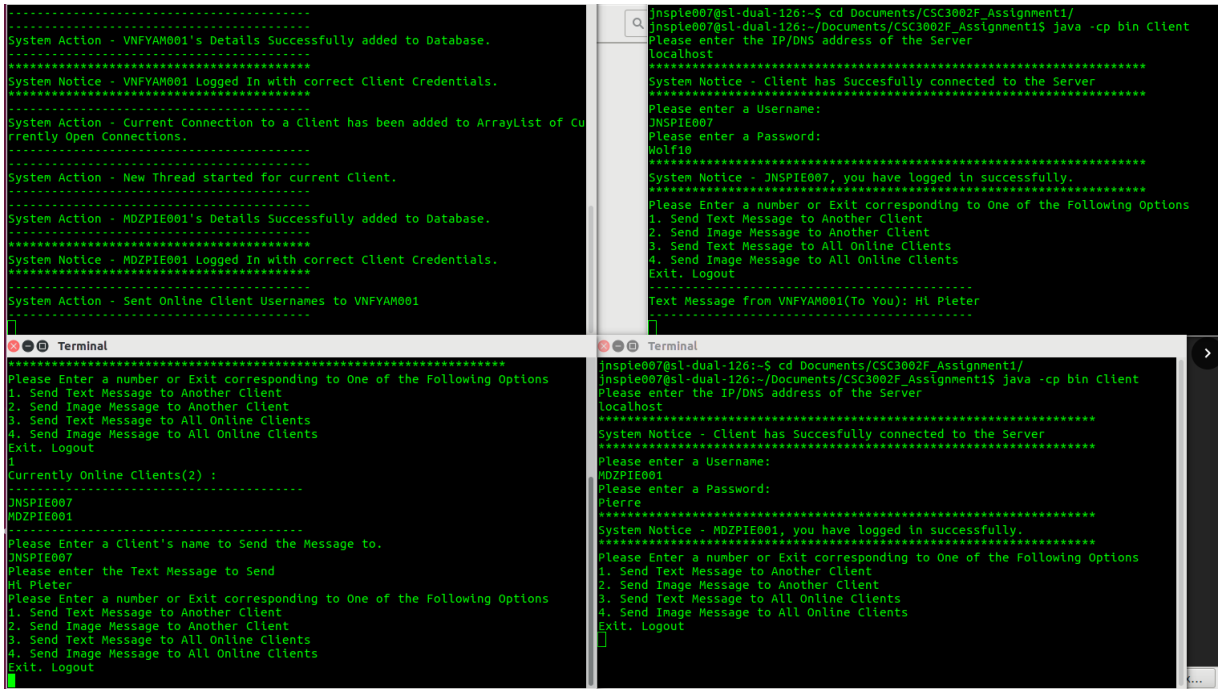

Figure 3 - The Client VNFYAM001 (Bottom Left) sending a Text Message "Hi Pieter" to Client JNSPIE007 (Top Right)

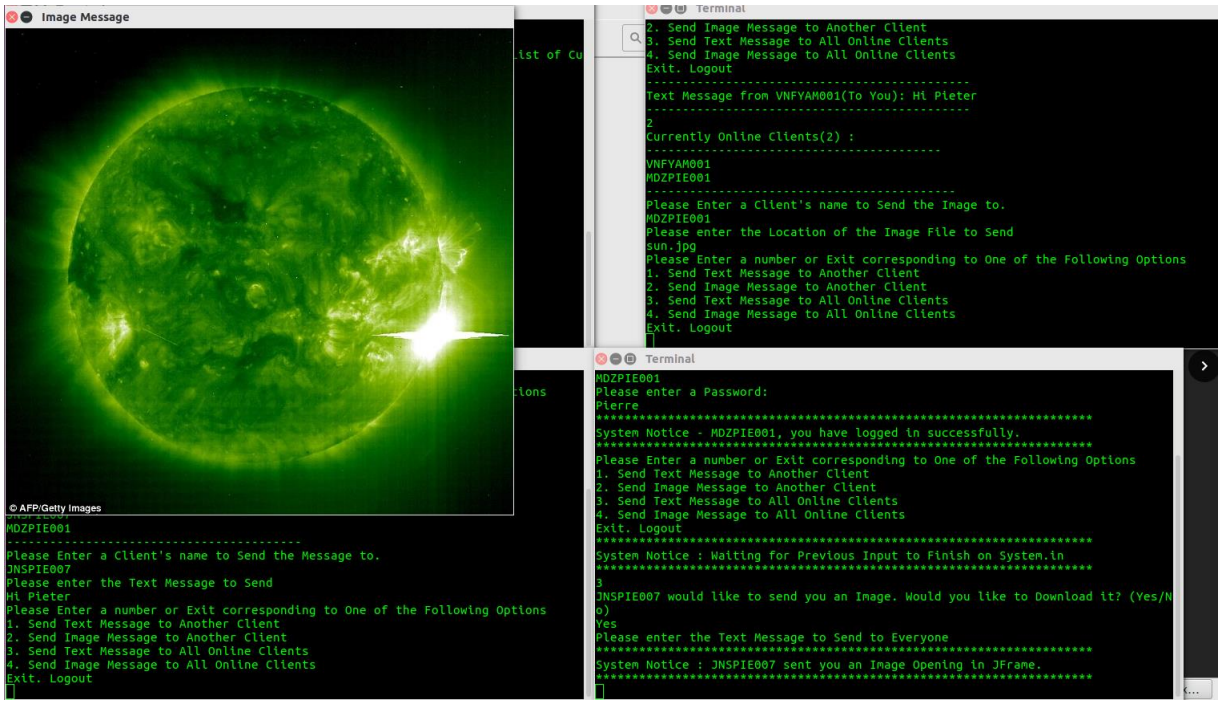

Figure 4 - The Client JNSPIE007 (Top Right) sending an Image Message (Top Left) to Client MDZPIE001 who has confirmed they have received it (Bottom Right).

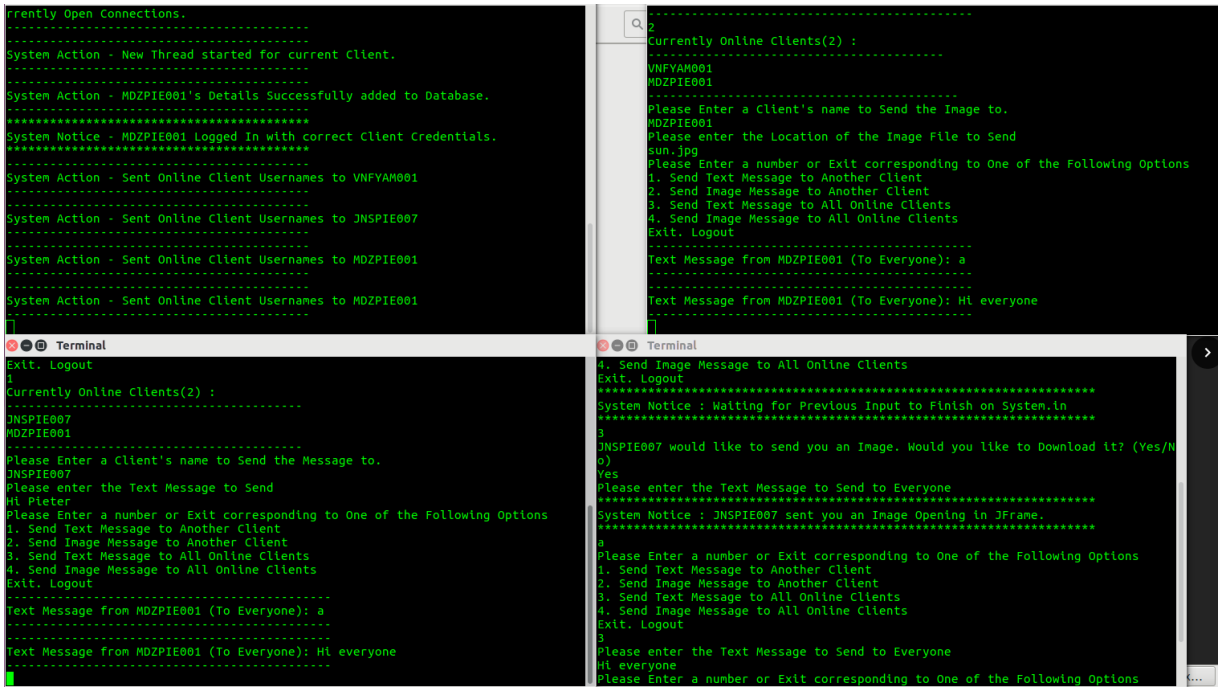

Figure 5 – The Client MDZPIE001 (Bottom Right) sending a Text Message "Hi everyone" to all other online Clients (Top Right & Bottom Left).

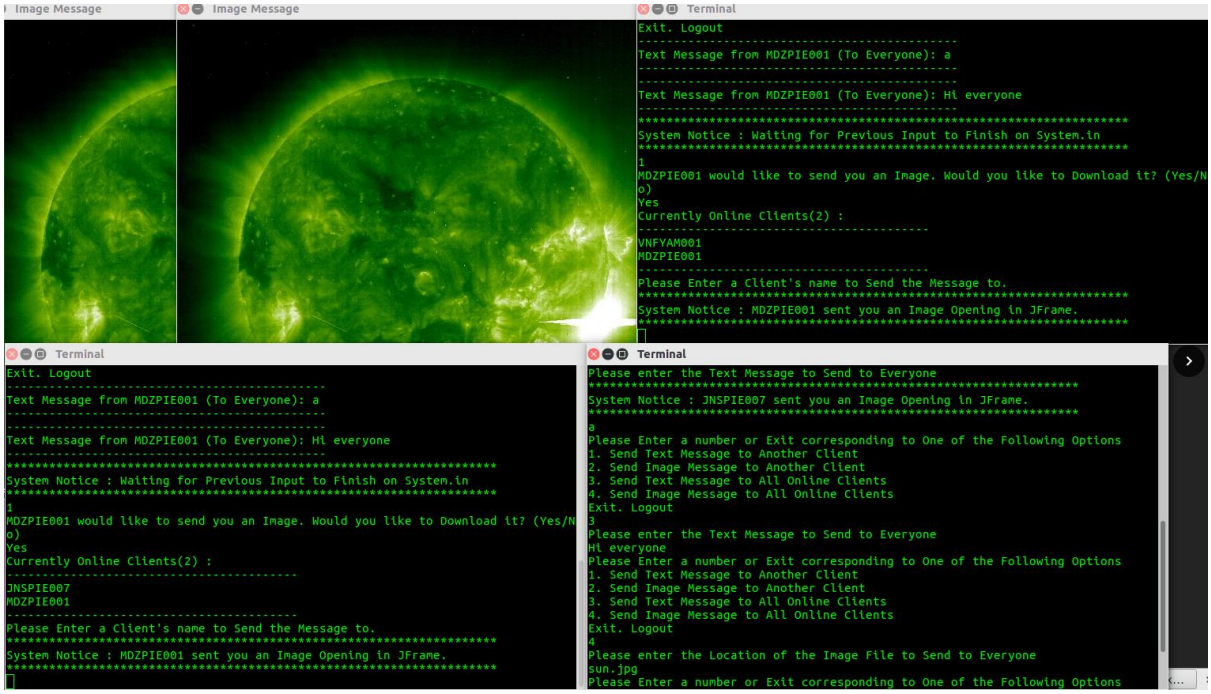

Figure 6 – The Client MDZPIE001 (Bottom Right) sending an Image Message (Top Left) to all other Clients (Bottom Left & Top Right) who have confirmed they wish to receive it.