|  |
| --- |
| Implementation Generic Blue icon |
| Application Design & Implementation Document  Protocol Design & Proposed Implementation Software Architecture & Implementation |
| |  |  |  | | --- | --- | --- | | Deirdre Lee | 3/12/24 | Distributed Computing | |

Contents

[Part 1: Protocol Design 1](#_Toc162346166)

[1. Objectives and overview 1](#_Toc162346167)

[2. Design Philosophy 2](#_Toc162346168)

[3. Protocol for Client-Server Communication 2](#_Toc162346169)

[4. Pseudo-code for Functional Requirements 2](#_Toc162346170)

[4.1. Client Side 2](#_Toc162346175)

[4.2. Server Side 3](#_Toc162346176)

[5. Inter-process Communication 3](#_Toc162346181)

[5.1. Sequence of Inter-process Communication 3](#_Toc162346183)

[6. Conclusion 3](#_Toc162346184)

[Part 2: Application Implementation 3](#_Toc162346185)

[1. Objectives and Overview 4](#_Toc162346186)

[2. Source Files 4](#_Toc162346187)

[3. Tiers 4](#_Toc162346188)

[3.1. Application Tier 4](#_Toc162346189)

[3.2. Presentation Tier 4](#_Toc162346190)

[3.3. Session Tier 4](#_Toc162346191)

[4. UML Diagrams 4](#_Toc162346192)

[5. Sample Input & Output Data 4](#_Toc162346193)

[6. Running Instructions 4](#_Toc162346194)

[6.1. IDE Used 4](#_Toc162346195)

[6.2. Username/Password 5](#_Toc162346196)

[6.3. Dependencies 5](#_Toc162346197)

[6.4. Steps to Run: 5](#_Toc162346198)

[7. Conclusion 5](#_Toc162346199)

[8. Link to Project Repository 5](#_Toc162346200)

[References 5](#_Toc162346201)

# Part 1: Protocol Design

# Objectives and overview

An overview of the protocol's objectives and role in governing client-server communication…

# Design Philosophy

This protocol facilitates communication between clients and a server prioritising simplicity, security and concurrency. It offers the following functionality: allow users to log in, upload messages to the server, download single or all messages from the server, and log out. Security measures are implemented to ensure secure communication and authentication, while concurrency is achieved through asynchronous or non-blocking I/O by the server.

# Protocol for Client-Server Communication

A secure connection will be established using Secure Sockets Layer/Transport Layer Security (SSL/TLS).

The client will communicate with the server using TCP/IP as outlined in the requirements.

The server will be equipped to manage concurrent communication through the use of asynchronous I/O.

Messages will be exchanged between the client and server in plaintext format. Messages will follow a predefined structure, as outlined both below and in the protocol document, with appropriate error messages provided for incorrect input.

SSL/TLS will be used to encrypt and decrypt communication between the client and the server for the duration of the session.

# 

# 

# Pseudo-code for Functional Requirements



## Client Side

* Connect to the server
* Establish an initial handshake to establish a secure connection
* Send requests to the server
* Receive responses from the server
* Close the connection ( LOGOUT ) when done

## Server Side

* Listen for incoming client connections
* Accept client connections and establish communication
* Receive requests from the client(s)
* Process requests and generate responses
* Send responses to the client(s)
* Close the connection with the client(s) when done



# Inter-process Communication

In the system, communication between the client and the server processes is facilitated through a secure connection established using SSL/TLS.



## Sequence of Inter-process Communication

* The client initiates a connection request to the server using SSL/TLS.
* The server listens for incoming client connections and accepts them.
* Upon successful connection establishment, the client and server perform an SSL/TLS handshake to establish a secure communication channel.
* The client acknowledges the server's acknowledgement over the secure connection.
* The client sends requests to the server.
* The server processes requests.
* The server sends back responses to the client.
* Communication continues until the session is terminated by either the client or the server.

# Conclusion

Summarise the key points of the protocol specification and emphasise its importance for ensuring proper communication between clients and servers…

# **Part 2: Application Implementation**

# Objectives and Overview

A description of the application, its purpose, and its functionalities…

# Source Files

List and briefly describe the source files used in the application…

# Tiers

## Application Tier

Explanation of its role and functionalities…

Sequence diagrams and code sections for interesting code…

## Presentation Tier

Explanation of its role and functionalities…

Sequence diagrams and code sections for interesting code…

## Session Tier

Explanation of its role and functionalities…

Sequence diagrams and code sections for interesting code…

# UML Diagrams

Include UML class diagrams representing the structure of the code…client and server

# Sample Input & Output Data

Include sample input/output data in the form of screenshots or textual representation.

# Running Instructions

## IDE Used

The IDE used when building, testing and running the application is VSCode. I have also run it using IntelliJ with no apparent issues.

## Username/Password

The login credentials for the application is lowercase ‘admin’ for the username and for the password. Authentication entails checking there are two words provided, as shown in Fig 1, and that they match the hardcoded values, as shown in Fig 2.

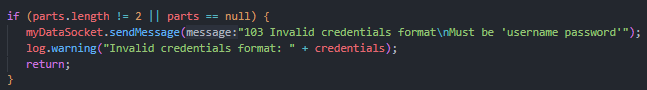


Fig 1



Fig 2

## Dependencies

No additional dependencies are needed for the application.

## Steps to Run:

Step 1: Description of the first step…

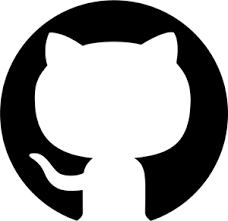
Step 2: Description of the second step…

Step 3: Description of the third step…

# Conclusion

Summarise the key points covered in the documentation…

# Link to Project Repository

 <https://github.com/EmoSense/distributed_computing>

C:\Users\Deirdre\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\D63FA85E.tmp <https://deetralee.atlassian.net/jira/software/projects/DC/boards/3>

# References

**There are no sources in the current document.**