



SANDESH- THE CHAT APPLICATION

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A CN PBL Project Report

On

CHAT APPLICATION

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CERTIFICATE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

This is to certify that the Project report entitled, **“CHAT APPLICATION”** submitted by **“Prasad Sutar, Ashwith Bhatt, Siddhant Powar, Harnish Savsani”** (Roll No.(s) 2, 9, 10 &12), in partial fulfillment for the award of the degree of **“Bachelor of Technology”** in **“COMPUTER SCIENCE AND ENGINEERING”** at KIT's College of Engineering, Kolhapur is a record of their own work carried out under our supervision and guidance.

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ABSTRACT

Teleconferencing or Chatting, is a method of using technology to bring people and ideas together despite of the geographical barriers. The technology has been available for years but the acceptance it was quit recent. Our project is an example of a Web-Socket. It is made up of 2 applications the client application, which runs on the users Device and server application, which runs on any Device on the network. To start chatting client should get connected to server where they can do private and group chat security measures were taken during the last one. All these chat applications support text messages to be sent between the users in the instant they press Enter key.

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1. Introduction

The "Online Chat Application" has been developed to override the problems prevailing in the practicing manual system. This software is supported to eliminate and in some cases reduce the hardships faced by this existing system. Moreover this system is designed for the particular need of the company to carry out operations in a smooth and effective manner.

The application is reduced as much as possible to avoid errors while entering the data. No formal knowledge is needed for the user to use this system. Thus by this all it proves it is user-friendly. Online Chat Application, as described above, can lead to error free, secure, reliable and fast management system. It can assist the user to concentrate on their other activities rather than to concentrate on the record keeping. Thus it will help organization in better utilization of resources.

Information of Chat User and Group Chat. Every Online Chat Application has different Chat Profile needs, therefore we design exclusive employee management systems that are adapted to your managerial requirements. This is designed to assist in strategic planning, and will help you ensure that your organization is equipped with the right level of information and details for your future goals. Also, for those busy executives who are always on the go, our systems come with remote access features which will allow you to manage your workforce anytime, at all times. These systems will ultimately allow you to better manage resources.



1.1.1 Problem Statement

This project is to create a chat application with server and users to enable the user to chat with each other. To develop an instant messaging solution to enable user to seamlessly communicate with each other. The project should be very easy to use enabling even a novice person to use it. Chat rooms have become a popular way to support a forum for n-way conversation or discussion among a set of people with interest in a common topic. Chat applications range from simple, text-based ones to entire virtual worlds with exotic graphics. In this project you are required to implement a simple text-based chat client/server application.

1.1.2 Problem Description

Email, newsgroup and messaging applications provide means for communication among people but these are one-way mechanisms and they do not provide an easy way to carry on a real-time conversation or discussion with people involved. Chat room extends the one-way messaging concept to accommodate multi-way communication among a set of people.

1.2 Purposes

- The purpose of the chat application is to allow users be able to the chat with each other, like a normal chat application.
- The users will be able to chat with each other, not only from user to user, but also group chatting will be developed.
- To provide free and secure chatting with no any chat history storage.
- To provide users to create room of their choice so that they broadcast message to each other in group.
- To provide user with instant messaging service.
- To provide user with multiple language chatting.



1.3 Scope

For the scope of the project, the project will be tested as the program is being developed. a menu will be developed and tested, a client/server interface will be developed and tested, and GUI's will be developed and tested, for the users' benefits. When the chat application is near completion, more testing will be done in order to make it less buggy or more user friendly.

- Our project aims at General Communication between the Users, i.e. we have tried to computerize various processes of Online Chat Application.
- System is a Simple Chat application which Supports TextMessaging.
- To ensure the Security no message is saved in anyDatabase.
- No formal knowledge is needed for the user to use this system.
- The limitation of chat application is that it does not support audio conversation. To overcome this limitations we are concurrently working on better technologies.



1.4 System Analysis

System analysis is the way of studying a system with an eye on solving its problem using computer. It is the most essential part of the development of a project of a system analysis.

System analysis consists of system element, process and technology. To analyze a system, has to study the systems in details.

The analyst has to understand the functioning and concept of the system in detail, before design the appropriate computer based system that will meet all the requirements of the existing system. The system analyst has to carry out a customary approach to use the computer for problem solving.

The above steps constitute the logical framework for the system Analysis

After the preliminary investigation and feasibility study, the scope of the defined and comparable items are set forth and hence detailed investigation is executed. This allows the system analyst to comprehend the full scope of the project. Soon after the Implementation of the newly developed system followed by the training of the users, the system analysis is included.

1.4.1 Existing system

When the existing system was studied, it was found having some problems, existing system was very time consuming and was not very efficient. The drawback of the existing system has resulted in to the development of new system, which is very user friendly and effective. Existing system was also very low in performance.

While developing the new system all requirements of the end user was taken into consideration. These have been maximum efforts towards overcoming the drawbacks of the existing system, while the new system was designed & developed.



1.4.2 Limitations of present system

- There is no private chatting option had been available.
- There is no any Room creating option.
- The Performance of existing systems very low.
- The system does not maintain the list of active user.
- Less Security, since messages have been stored.

1.4.3 Proposed Work

The system to be developed here is an Chat facility.

- It is a centralized system.
- It is Client-Server system with centralized server.
- All local clients are connected to the centralized server web service.
- There is a two way communication between different clients and server.
- This chat application can be used for group discussion.
- It allows users to view another logged in users.



1.4.4 Advantages of Proposed Work

- Faster Support.
- Real Time Text Preview.
- No Waiting Queues.
- Easy to update information
- Low Barriers
- Chat Security
- Increased Efficiency/Reduced Cost



1.5 Definitions

1. NodeJS

- Node.js is an open source server environment
- Node.js is free
- Node.js runs on various platforms (Windows, Linux, Unix, Mac OS X, etc.)
- Node.js uses JavaScript on the server.
- Node.js files contain tasks that will be executed on certain events.

Here is how Node.js handles a file request:

- a. Sends the task to the computer's file system.
- b. Ready to handle the next request.
- c. When the file system has opened and read the file, the server returns the content to the client.

Advantages

- Node.js eliminates the waiting, and simply continues with the next request.
- Node.js runs single-threaded, non-blocking, asynchronously programming, which is very memory efficient.

2. Socket.IO

Socket.IO is a library that enables real-time, bidirectional and event-based communication between the browser and the server. It consists of:

- a Node.js server
- a JavaScript client library for the browser (which can be also run from Node.js)

3. WebSocket API



The Web Socket API is an advanced technology that makes it possible to open a two-way interactive communication session between the user's browser and a server. With this API, you can send messages to a server and receive event-driven responses without having to poll the server for a reply.

Interfaces:

- The primary interface for connecting to a Web Socket server and then sending and receiving data on the connection.
- The event sent by the Web Socket object when a message is received from the server.
- The event sent by the Web Socket object when the connection closes

4. Visual Studio Code

The platform used for coding or implementation of chat application is Visual Studio Code as Visual Studio Code combines the simplicity of a source code editor with powerful developer tooling, like IntelliSense code completion and debugging.

5. Server

A Server is a computer that provides data to other computers. It may serve data to systems on a local area network (LAN) or a wide area network (WAN) over the Internet.

Many types of servers exist, including web servers, mail servers, and file servers. Each type runs software specific to the purpose of the server. For example, a Web server may run Apache HTTP Server or Microsoft IIS, which both provide access to websites over the Internet. A mail server may run a program like Exim or eMail, which provides SMTP services for sending and receiving email. A file server might use Samba or the operating system's built-in file sharing services to share files over a network.



6. Client

Businesses have clients and servers have clients. In both instances, there exists a one-to-many relationship. Just like a business may have several clients, a server can communicate with multiple clients. In computer networking, this is called the client-server model.

A client is any device that communicates with a server. It may be a desktop computer, laptop, smartphone, or any other network-compatible device. In a home network, "smart" devices, such as Wi-Fi-enabled thermostats, lights, and appliances, are considered clients. In an office network, systems that access files from network-attached storage are clients of the file server. Most networks allow client-to-client communication, though the data flows through a central point, such as a router or switch.

7. Heroku

Heroku is a cloud platform as a service (PaaS) supporting several programming languages. One of the first cloud platforms, Heroku has been in development since June 2007, when it supported only the Ruby programming language, but now supports Java, Node.js, Scala, Clojure, Python, PHP, and Go. For this reason, Heroku is said to be a polyglot platform as it has features for a developer to build, run and scale applications in a similar manner across most languages.



2. Overall Description

2.1 System Architecture

In this phase, a logical system is built which fulfils the given requirements. Design phase of software development deals with transforming the client's requirements into a logically working system. Normally, design is performed in the following in the following two steps

1. Primary Design Phase :

In this phase, the system is designed at block level. The blocks are created on the basis of analysis done in the problem identification phase. Different blocks are created for different functions emphasis is put on minimizing the information flow between blocks. Thus, all activities which require more interaction are kept in one block

2. Secondary Design Phase :

In the secondary phase the detailed design of every block is performed. The general tasks involved in the design process are the following:

- i. Design various blocks for overall system processes.
- ii. Design smaller compact and workable modules in each block.
- iii. Design various database structures.
- iv. Specify details of programs to achieve desired functionality.
- v. Design the form of inputs and outputs of the system.
- vi. Perform documentation of the design.
- vii. System reviews.



2.2 Product Functions

- **Main Menu**

When the client runs the chat application, the client will see the main menu, which will welcome them, At the main menu, the client will have the choice to Join the Room for the chat application or exit it.

- **Join**

The user must enter his username, room name, password in order to join the chat so that they can send messages to those who are online, and must be able to leave room if the user wants to leave.

- **Online menu**

After the client is Joined, the client can choose to send a message, only if another client is online, check who is online, and be able to leave room when the client wants to, which will be by hitting the leave room button .

- **Users Online**

When the client wants to see who is online, the interface is provided with chat-sidebar which contains Room name and all the users who have joined the particular room.

- **Message**

When the client wants to message the user, He/She can directly start typing and by hitting the send button or by enter key the message will be delivered to all other users who have joined that particular room.

- **Chat history**

In order to ensure that user messages are secure, no chat history is saved in database.



3. Specific Requirements

3.1 User Interface Design

User Interface Design is concerned with the dialogue between a user and the computer. It is concerned with everything from starting the system or logging into the system to the eventual presentation of desired inputs and outputs. The overall flow of screens and messages is called a dialogue.

The following steps are various guidelines for User Interface Design:

- i. The system user should always be aware of what to do next.
- ii. The screen should be formatted so that various types of information, instructions and messages always appear in the same general display area.
- iii. Message, instructions or information should be displayed long enough to allow the system user to read them.
- iv. Use display attributes sparingly.
- v. Default values for fields and answers to be entered by the user should be specified.
- vi. A user should not be allowed to proceed without correcting an error.
- vii. The system user should never get an operating system message or fatal error.



3.2 Requirements

- System needs to help the internal staff to keep information of Chat User and find them as per various queries.
- System also needs a search area.
- It also needs a security system to prevent data.

3.2.1 Functional Requirement

This section will cover the functional requirements of the chat application.

i. **Login Menu function**

This functional requirement is for prompting the user with the option to register for the chat application, logging in, or exit the program. It will take the form of a GUI

ii. **Login function** (Login Menu aspect)

This aspect will ask for the username and password. Errors will occur if a space is left blank, the username doesn't exist, or the password doesn't match with the username. If the username and password matches, you are online and able to message anyone else online.

iii. **Exit** (Login Menu aspect)

This aspect will close the chat application.

Online Menu function This function will give the option of seeing who is online, the option of sending a message to whoever is online, and the option to logout.

iv. **Send a message** (Online Menu Aspect)

This aspect will give the user the ability to send a message to whoever they want who is online and selected by the user.



v. **Logout** (Online Menu aspect)

This aspect will give the option to logout of the chat application and will go back to the login menu.

3.2.2 Non-Functional Requirements

These are the nonfunctional requirements of the chat application. This is basically the section that deals with the quality of the chat application rather than the functionalities of the application.

i. **User Friendly**

The chat application needs to be user friendly, when using its user interface.

ii. **GUI**

By using GUI's, it should make the application more user friendly and better to use instead of a command line. Buttons will be used.



4. Modules And Designs

- **Chat User Management Module** : Used for managing the information and details of the Chat User.
- **Chat Module** : Used for managing the Chat details.
- **Group Chat Module** : Used for managing the GroupChat information.
- **Room Module** : Used for managing the rooms.
- **Users Module** : Used for managing the users of the system.

4.1 Flow Chart

Whenever user visits the Sandesh Web App, He/She will be directed to the join page. In which they have to enter a Username, New Room Name/ Existing Room Name and New Room Password/ Existing Room Password. If Room Name and Room Password is already present then they will be joined to that particular room or else the new room will be created. After which the user can chat.

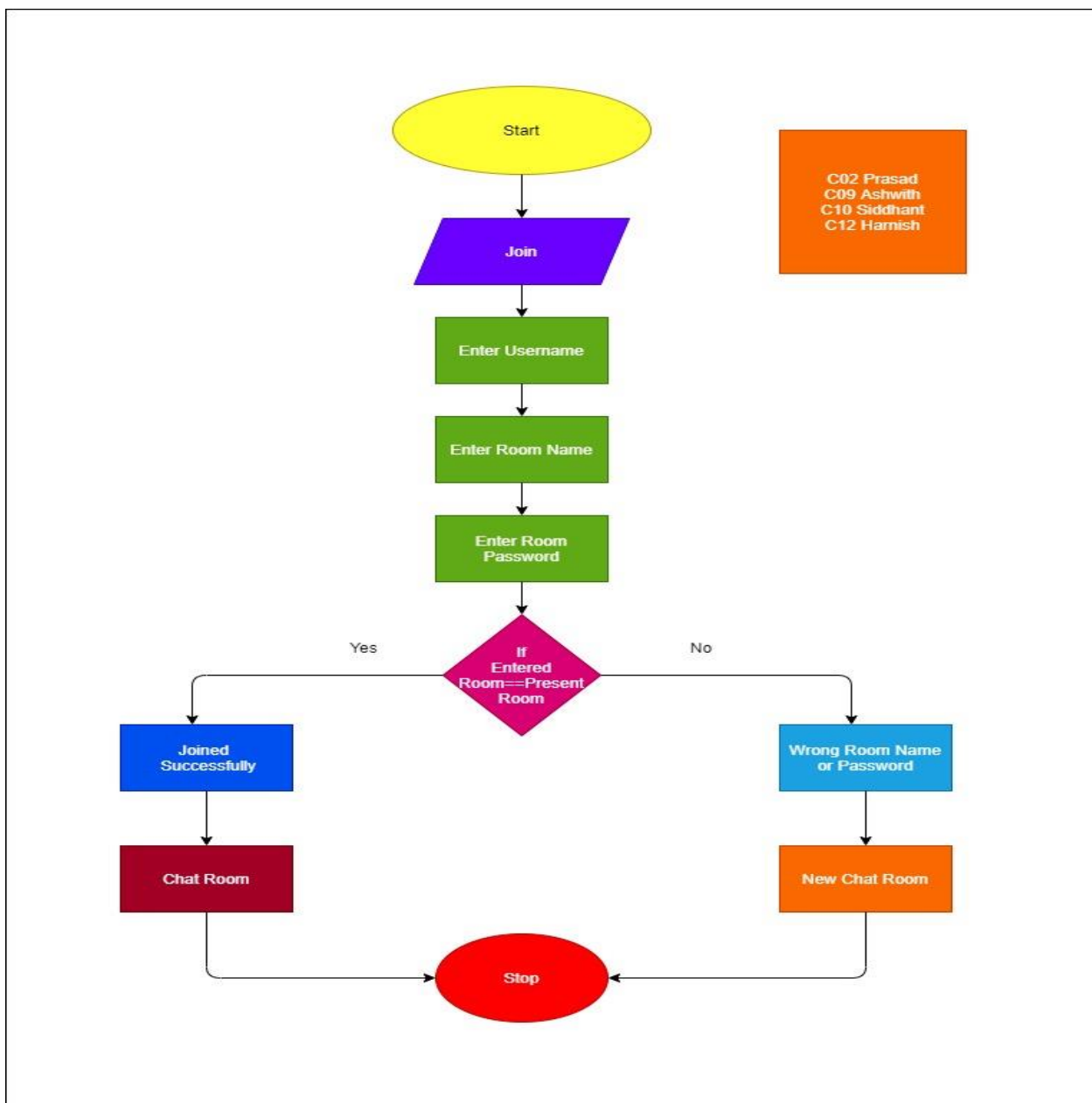


Fig. 4.1 : Flow Chart

4.2 Data Flow Diagram

- **Chat User Module** : Used for managing the information and details of the Chat User.
- **Chat Module** : Used for managing the Chat details.
- **Group Chat Module** : Used for managing the GroupChat information.
- **Room Module** : Used for managing the rooms.
- **Users Module** : Used for managing the users of the system.

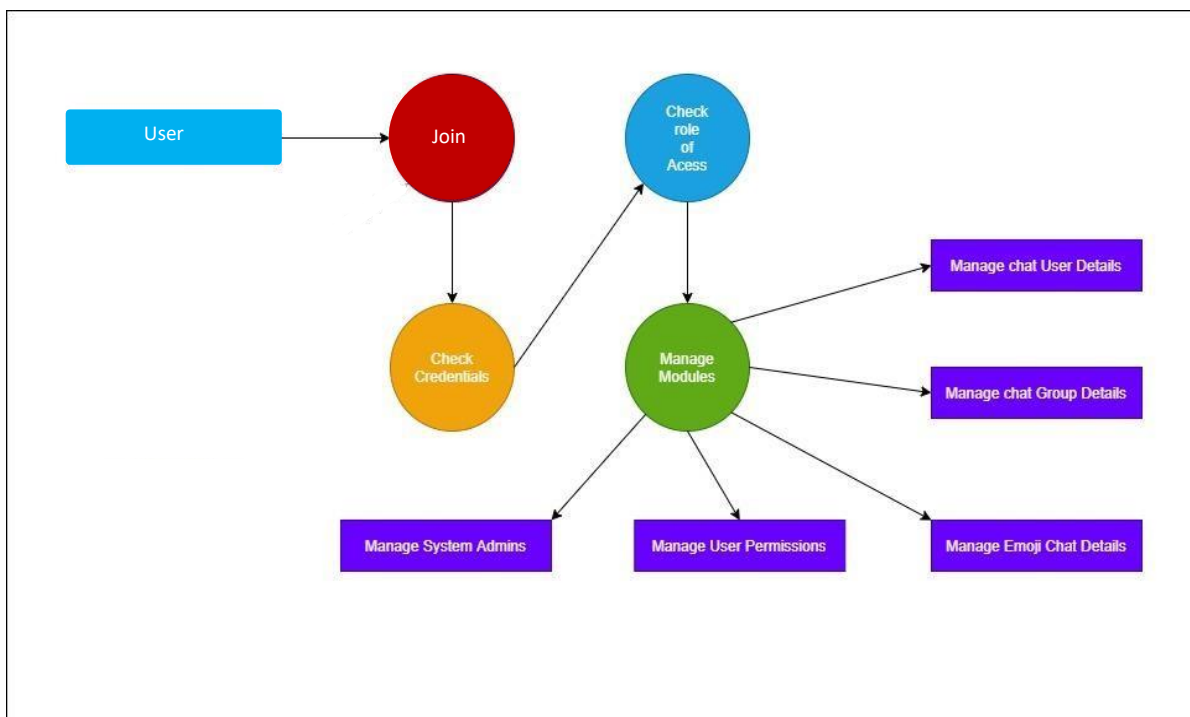


Fig. 4.2 : Data Flow Diagram

4.3 Backend Sequence Diagram

First as user makes request for respective browser for Sandesh, that request will be carried by browser to Sandesh. And then Sandesh will send the respectively code module to Brower which will be visible for client. Then after Entering respective room name and room password the WebSocket will be created between the Sandesh Server and User, Now setup ready for sending and receiving the messages. And this process continues for number of times.

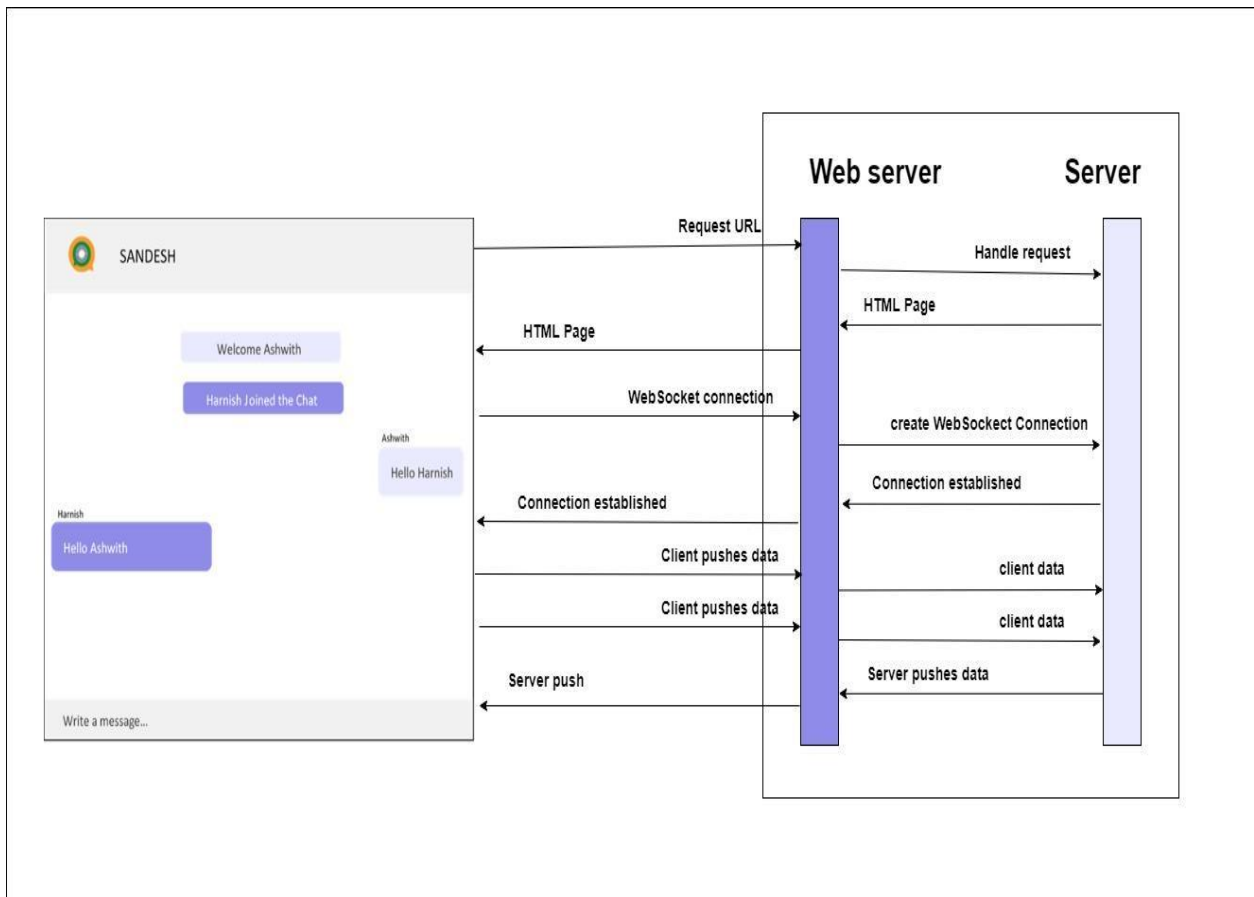


Fig. 4.3 : Backend Sequence Diagram

5. Final GUI

5.1 Landing Page

It consist of basic information about the Sandesh.

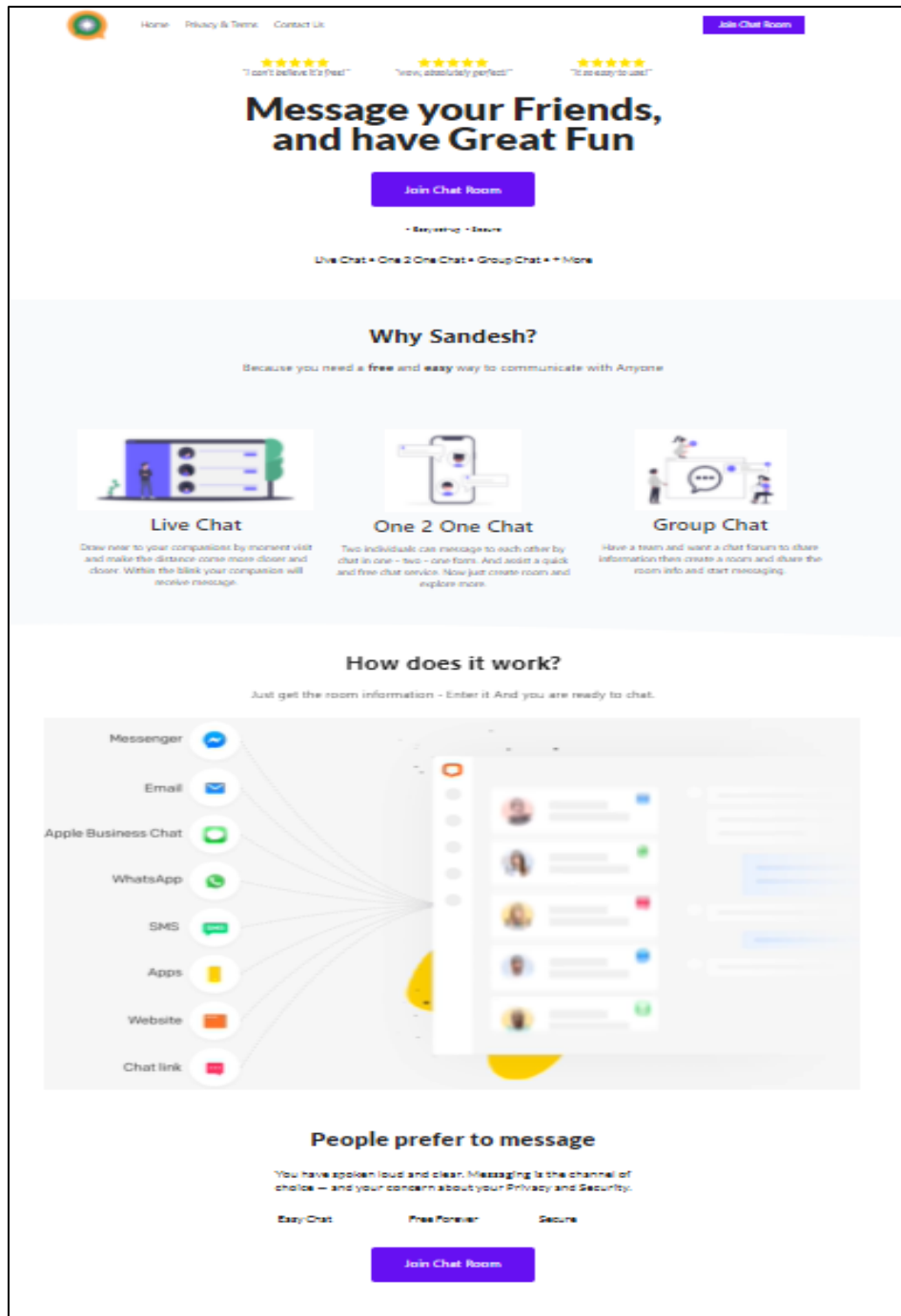
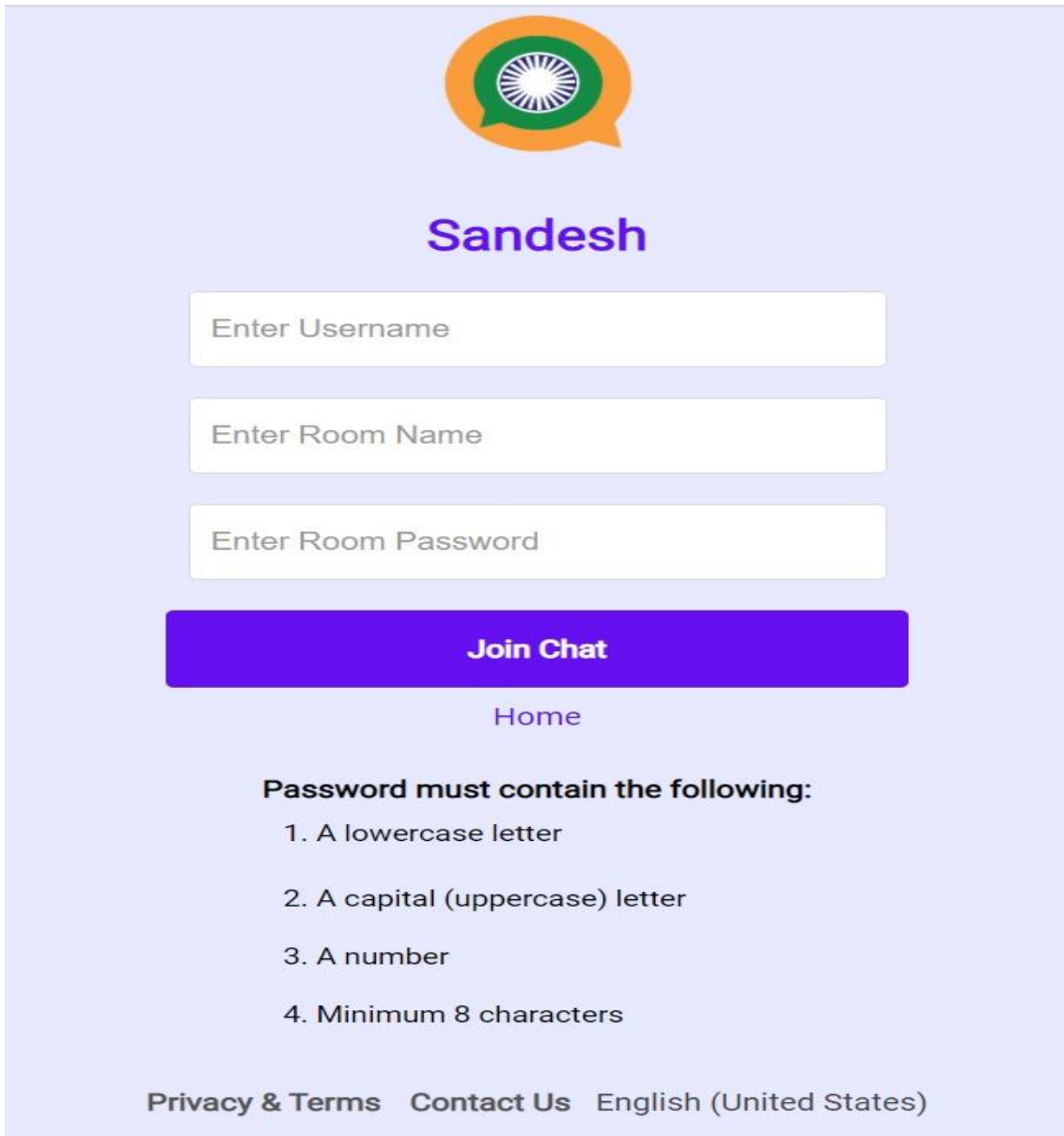


Fig. 5.1 : Landing Page

5.2 Joining Interface

On this page the user have to enter the particular username, Room Name and Room Password. And Password is Validated on basis of a lowercase character, a uppercase character, a number and minimum length must be of eight characters



The image shows a web interface for a chat application named "Sandesh". At the top center is a logo featuring a green speech bubble with a white Ashoka Chakra inside, set against an orange circular background. Below the logo, the word "Sandesh" is written in a bold, purple font. There are three white input fields with light gray borders, each containing a placeholder text: "Enter Username", "Enter Room Name", and "Enter Room Password". Below these fields is a prominent purple button with the text "Join Chat" in white. Under the button is a link labeled "Home" in purple. A section titled "Password must contain the following:" lists four requirements: 1. A lowercase letter, 2. A capital (uppercase) letter, 3. A number, and 4. Minimum 8 characters. At the bottom of the interface, there are three links: "Privacy & Terms", "Contact Us", and "English (United States)".

Fig. 5.2 : Joining Interface

5.3 Chat Interface

When a Particular User joins new room, He/She is welcomed by Sandesh Bot.



Fig. 5.3.1 : Chat Interface with admin

As another user joins, the Bot will indicate it by displaying particular name.



Fig. 5.3.2 : Chat Interface with participants

5.4 Group Chat Interface

Number of users can type the message and it get displays on the message container.

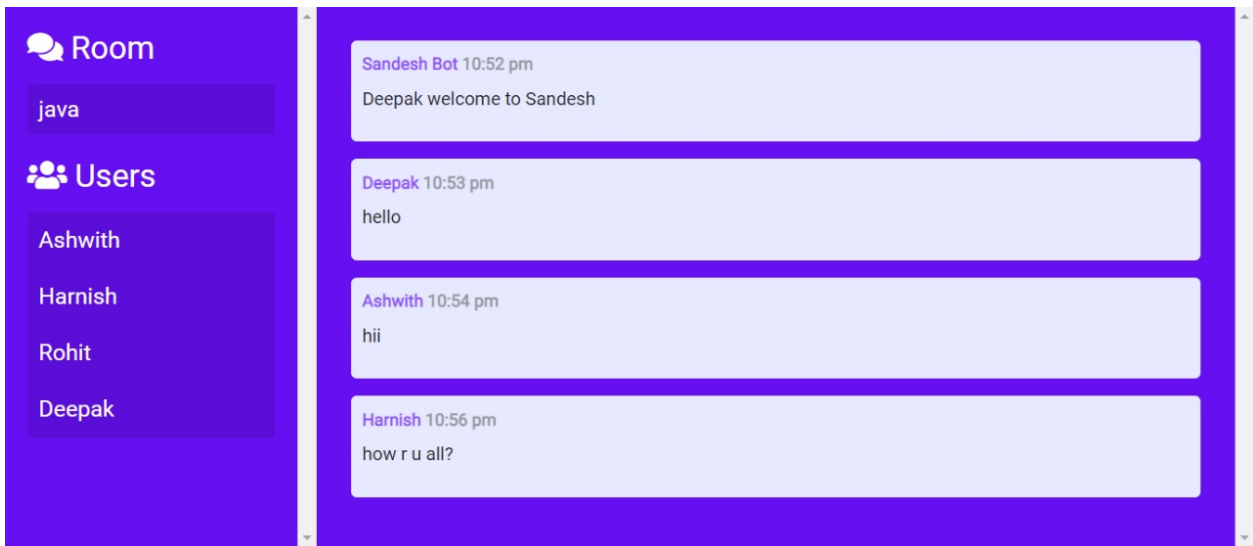


Fig.5.4.1 : Group Chat

Each Message bubble is formatted with Senders name, time at which the message has send and message content.



Fig. 5.4.2 : Message Bubble

5.5 Chat Sidebar

The Sandesh Web App provide a chat sidebar which consist of Room Name in which User have joined and also displays all the users currently present in the room

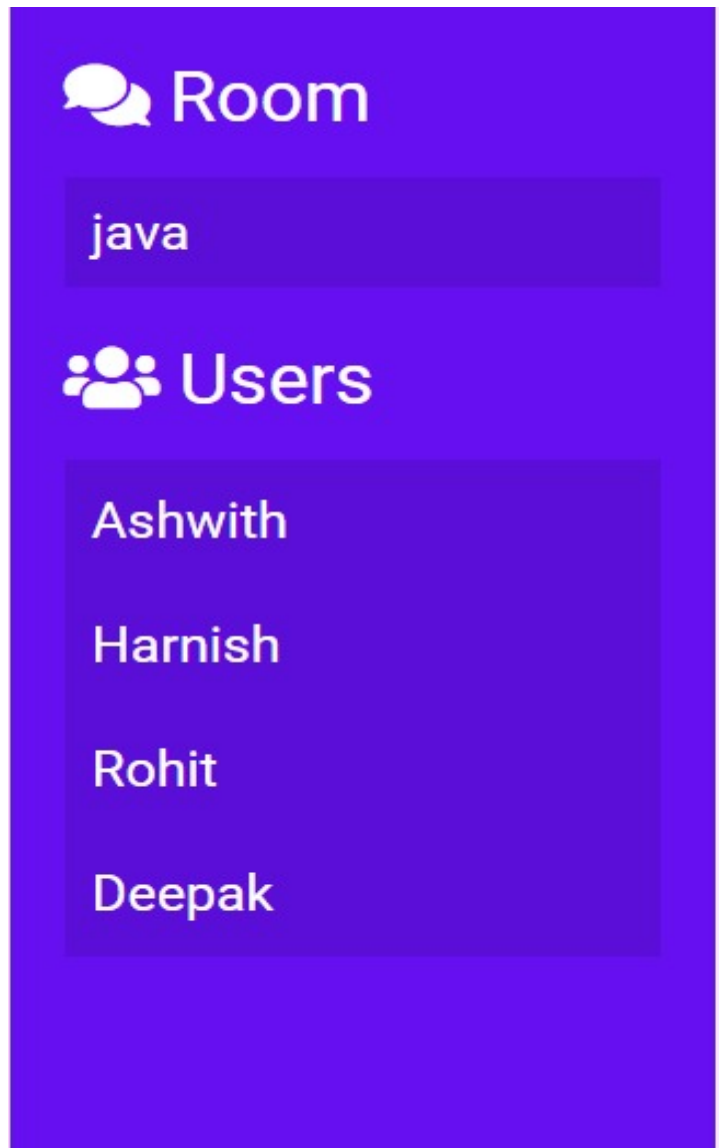


Fig. 5.5 : Chat Sidebar

6. Environmental Setup

6.1 Software

Name of Component	Specification
Operating System	Windows, Linux
Language	HTML, CSS, JavaScript
Tools	NodeJS/ExpressJs, VsCode
Devices	Any
Brower	Any

6.2 Hardware

Name of Component	Specification
Processor	More equal to i3
RAM	4GB
Hard Disk	20GB
Monitor	Any
Keyboard	122

7. References

Socket programming by Michael J. Donahoo

- <https://socket.io/docs/v3/index.html>
- <https://nodejs.org/en/docs/>
- <https://expressjs.com/>