# **Hangout - Technical Design Document**

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## 1. Introduction and System Overview

Hangout is a real-time chat application developed using the MERN stack. The application enables users to register, log in, select an avatar, and communicate with other registered users in real time. It offers a seamless chatting experience with support for emojis.

#### **Key Features:**

- User registration and login with password hashing.
- Avatar selection using the Multiavatar API.
- Real-time messaging using Socket.IO.
- Deployment on AWS Elastic Beanstalk (backend) and AWS Amplify (frontend).

### 2. Architecture

Hangout follows a three-tier architecture comprising:

- **Frontend**: Built with React.js, responsible for user interaction and interface.
- **Backend API**: Developed using Node.js and Express.js, handling server-side logic and database operations.
- **Database**: MongoDB for storing user and message data.

#### **Component Interactions:**

- The frontend communicates with the backend API for user authentication, avatar selection, and messaging operations.
- The backend uses MongoDB for persistent storage of user and message data.
- Real-time communication is facilitated by Socket.IO between the frontend and backend.

# 3. Backend Design

**Technologies Used:** Node.js, Express.js, MongoDB, Mongoose, bcrypt, dotenv.

### **Project Structure:-**

### **API Design:**

- POST /api/auth/register: Registers a new user.
- **POST /api/auth/login**: Logs in an existing user.
- **POST /api/auth/logout**: Logs out a user.
- **GET /api/auth/allUsers**: Fetches all registered users.
- **POST /api/messages/addMsg**: Sends a message.
- **GET /api/messages/getMsg**: Retrieves chat history between users.
- **POST /api/auth/setAvatar**: Sets a user's avatar.

#### **Database Schema:**

```
- User Model:
```

```
username: String (required, unique, min: 3, max: 20), email: String (required, unique, max: 50), password: String (required, min: 8), isAvatarImageSet: Boolean (default: false), avatarImage: String (default: "").
```

- Message Model:

```
message.text: String (required),
```

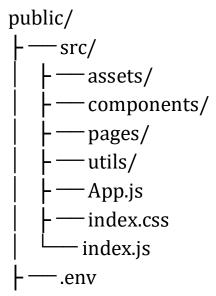
users: Array,

sender: ObjectId (ref: User, required).

## 4. Frontend Design

**Technologies Used:** React.js, Styled Components, React Router DOM, Socket.IO client.

### **Project Structure:-**



## **Routing:**

- /register: User registration page.
- /login: User login page.
- /setAvatar: Avatar selection page.
- /: Chat interface page.

## 5. Real-Time Chat Implementation

Real-time communication in Hangout is powered by Socket.IO. This enables instant message delivery between users.

The backend serves as the WebSocket server, while the frontend uses the Socket.IO client library.

## **6. Security Considerations**

- Passwords are hashed using bcrypt before storage in the database.
- Plain text passwords are never logged or stored.

# 7. Deployment Plan

- Backend Deployment: Hosted on AWS (Elastic Beanstalk).
- Frontend Deployment: Hosted on AWS (Amplify).
- **Database Hosting**: MongoDB Atlas

## 8. Future Enhancements

- Adding Google Login for seamless authentication.
- Group chats to enable multiple users to communicate simultaneously.
- File sharing capabilities within chat.

### 9. Conclusion

Hangout combines real-time communication and modern web technologies to create a user-friendly chat application. Its scalable architecture and deployment on AWS ensure reliability, while future enhancements aim to improve user experience further.