# Detailed Design Document: ChatSynergy

## 1. Introduction

### 1.1 Purpose

This document aims to present a comprehensive overview of ChatSynergy's design and architecture, encompassing features, functionality, and technical specifications.

### 1.2 Scope

ChatSynergy, as a chatting app, endeavors to provide users with a dynamic platform for real-time communication, fostering seamless conversations, and interactive features to enhance the overall chatting experience.

### 1.3 Objectives

* Make it easy for users to chat by creating a simple and friendly interface in ChatSynergy.
* Keep user information safe with strong security measures.
* Allow ChatSynergy to grow and handle more users in the future.
* Let users work together by making it easy to share and collaborate on chats and activities.

## 2. System Overview

### 2.1 System Architecture

ChatSynergy employs a client-server architecture with a responsive web-based front end for user interactions and a robust back-end server handling core logic, ensuring an efficient and dynamic chatting experience.

### 2.2 Key Features

* Real-Time Communication Integration - Developed a chat application along with Socket.io for real-time messaging capabilities. Implemented Socket.io for seamless, instant messaging functionality, allowing users to communicate in real-time.
* Authentication and Authorization - Implemented secure authentication and authorization mechanisms using JSON Web Tokens (JWT).
* Online user Status and Global State Management.

### 2.4 Technologies Used

* React - React is a JavaScript library for building user interfaces. It allows developers to create reusable UI components that efficiently update and render in response to data changes, enabling the creation of dynamic and interactive web applications.
* Express - It is a lightweight and flexible web application framework for Node.js, simplifying the creation of server-side applications and APIs. It offers robust routing, middleware support, and HTTP request/response handling capabilities for building scalable and efficient web servers.
* MongoDB – It is a popular NoSQL database management system that uses a flexible, document-oriented data model.
* JWT - JWT, or JSON Web Token, is a compact and self-contained method for securely transmitting information between parties as a JSON object. It is commonly used for authentication and authorization in web applications.
* Additional tools/libraries as needed.

## 3. Database Design

3.1 Entity-Relationship Diagram

User Entity:

* *UserID (Primary Key)*
* *Username:* User's chosen name.
* *Fullname: User’s full name*
* *Password:* Secure authentication.

Message:

* *Sender ID:* Sender's User ID.
* *Receiver ID:* Receiver’s User ID
* *message:* Message content.

Conversations:

* *Participants: Sender’s & Receiver’s ID*
* *Messages: data between sender’s & receiver’s*

## 4. Database Diagram

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## 5. API Design

* ChatSynergy platform's API is designed following the REST architectural style. The API is implemented using Node.js and Express.js. It uses JSON for data exchange and follows standard HTTP request methods such as GET, POST, PUT, and DELETE.
  + /signup (POST) – Create a new user account
  + /login (POST) – Log in existing user
  + /logout (POST) – Log out from application
  + /:id (GET) – Get messages between two users
  + /send/:id (POST) – Send message between two users
  + / (GET) – Get users information to show on the homepage
* In conclusion, the REST API design for the ChatSynergy ed-tech platform is a crucial part of the project. The API endpoints and their functionalities are designed to ensure seamless communication between the front-end and back-end of the application. By following RESTful principles, the API will be scalable, maintainable, and reliable. The sample API requests and responses provided above illustrate how each endpoint will function and what kind of data it will accept or return. With this API design, Chatty will be able to provide a smooth user experience while ensuring security and stability.