

## Comprehensive Project Documentation

### Real-Time Chat Application - Full Stack Documentation

This is a feature-rich, production-ready real-time chat application built with Node.js/Express backend and Flutter frontend. The application supports direct messaging, group chats, media sharing, and advanced messaging features.

#### Project Overview

A full-stack, real-time messaging application supporting:

- One-to-one direct messaging
- Group chats with admin controls
- Media sharing (images, videos, audio, documents)
- Message reactions and replies
- Typing indicators and read receipts
- User presence (online/offline/away/busy)
- Message editing and deletion
- Profile management
- Password reset functionality
- Built-in calculator (unique feature)

#### Architecture

High-Level Architecture:

Flutter App <--> Node.js Express Server <--> MongoDB

Backend Technology Stack:

Node.js, Express, Socket.io, MongoDB, Mongoose, JWT, bcryptjs, Multer, Helmet, CORS, Rate Limiting

Frontend Technology Stack:

Flutter, GetX, http, socket\_io\_client, shared\_preferences, flutter\_secure\_storage, image\_picker, file\_picker, just\_audio, record

## Features Summary:

- Authentication & User Management
- Direct Messaging (real-time, reactions, replies, media, status)
- Group Chats (admins, permissions, mute, read receipts)
- User Presence Tracking
- Media and File Uploads
- Security (JWT, bcrypt, helmet, rate limiting)
- Built-in calculator