

## CHATAPPLICATION PROJECT SUMMARY

### OVERVIEW

- \* Real-time 1-to-1 chat application with WhatsApp-like UX.
- \* Supports text, media, audio calls, and video calls.
- \* WebRTC for peer-to-peer calls with TURN for NAT traversal.
- \* Socket.io used for real-time messaging and signaling.
- \* Firebase Storage used for file uploads.
- \* Deployed with frontend on Vercel and backend on Render.

### CORE FEATURES

- \* User authentication with Firebase.
- \* One-to-one chat with typing and file attachments.
- \* Image preview (modal) and document link preview.
- \* Real-time unread badges and sidebar message previews.
- \* Online status indicator for users (green dot).
- \* Notification sound for new incoming messages.
- \* Call notifications with ringtone when receiving calls.
- \* Separate scrollable sidebar and chat area.
- \* Responsive layout for mobile/tablet (WhatsApp-style layout).

### MESSAGING FLOW

- \* Messages stored in MongoDB via Mongoose.
- \* Real-time delivery using Socket.io 'sendMessage' / 'receiveMessage'.
- \* Message status tracking:
  - \* Sent (single tick)
  - \* Delivered (double gray tick)
  - \* Seen (double blue tick)
- \* Delivered status is emitted when receiver gets message.
- \* Seen status is emitted when receiver opens the chat and the app is focused.

### AUDIO & VIDEO CALLING

- \* 1-to-1 WebRTC calls with audio and video.
- \* TURN support (Twilio NTS) for calls across different networks.
- \* ICE candidate queuing until remote description is set.
- \* Stream handling via 'ontrack' and safe playback re-tries.
- \* Call controls: start, accept, reject, hang up.
- \* Auto-cleanup of tracks and peer connection on end.

### UI / UX HIGHLIGHTS

- \* WhatsApp-inspired layout and call button placement.
- \* Separate scrollable chat list and message pane.
- \* Link and long text wrapping in message bubbles.
- \* Chat bubbles styled with sender context.
- \* Last message preview under user name in sidebar.
- \* "Scroll to latest" floating button when user scrolls up.

### NOTIFICATIONS