Team Chat App : Deliverable 3 – Project Phase 1

Requirements

Phase 1 Implemented Requirements:

1. Real-time Messaging & File Sharing: Implemented a core messaging system supporting text and file messages across different chat settings for one on one and inside a general group setting, utilizing Socket.io for seamless, real-time communication.
- Established backend services for efficient message delivery using socket.io, including text and various file types like pdfs using UploadThing where we could upload them and the recipients can view them in their browser with the url generated, and along with emoji for text with frontend components designed for intuitive message display using react emoji mart npm package.

2. User Management with user signup, signout, delete and signin the user account via Clerk:
- Integrated Clerk Service API which gives the built in functionalities for all streamlined user authentication and authorization, enabling users to authenticate and register using their Google accounts, thus prioritizing security and user convenience.
- Facilitated a simplified account management process, where the intricacies of account creation, editing, and deletion are managed securely by leveraging Clerk's robust infrastructure.

3. UI Customization and Themes:
- Introduced customizable UI themes, specifically implementing dark, light and system default mode, enhancing user experience by allowing personalization according to user preferences using next js ui components.
- Implemented frontend logic for theme toggling and ensured user theme preferences are remembered across sessions for consistent user experience.

4. Invite Code Functionality for Group Channels for friends invite:
- Developed an invite code system allowing admin to invite his friends, focusing on easy expansion and collaboration within group settings where we can invite friends through the invite code system to the friend list channels.
- Ensured unique, shareable invite codes for each group channel can be generated and utilized for channel access.

5. Create server:
- Implemented create server functionality for making the app functional with group channel, one on one communication, invite friends and file sharing. Where the admin has the capability to create his server and invite his friends to communicate.

6. Clarifications and Justifications Based on Feedback:
- Addressed feedback regarding the lack of a conventional friends system by clarifying our approach to focus on group dynamics through shareable invite links for friends, aligning with our project objectives to streamline user interactions within a group-centric communication platform.
- Justified the design decision to utilize Clerk for authentication and Google accounts for all authentication processes, emphasizing the enhancement of security measures and user convenience without compromising the application's integrity and usability.

Phase 2 development deliverable plan has been changed a bit, as we are planning to not include shared calendars and task management features to support team coordination and project management with the chat application, as we think it is not relevant to the team chat application, and this app is purely for the purpose of chatting through text, audio or video channels, or through direct one on one communication or group channel communication. And we are planning to keep the admin and user specific role functionalities like Role Assignment, and additional functionalities like kicking out members from channels in phase 2, and adding a search bar for quickly navigating for channels and users in the server.

 # Phase 2 Updated: Enhancements and Integrations (Mar 19 - Apr 8, 2024)
Objectives & Requirements: Prioritization of Functionalities (1 to 4, 1 being top priority and rest follows order):
1.Video and Audio Calls: Leverage WebRTC for implementing direct peer-to-peer communication channels, offering users enhanced interaction options beyond text.
2.Server & Channel Management: Tools for users, especially admins, to create and manage communication spaces, including permissions and settings for channels within servers.
3. Additional features: Include admin and user specific role functionalities like Role Assignment, kicking out members within the channels.
4. Add search filtering for the users to search for channels and user for communication

Criticality: Video and audio calls are identified as the top priority due to their critical role in enhancing communication capabilities and user engagement. Server and channel management tools follow closely behind, ensuring efficient organization and control over communication spaces within the application. And the functionalities like Role Assignment, kicking out members will be useful for the governance of the server. Search filter is also important to navigate quickly for communication.

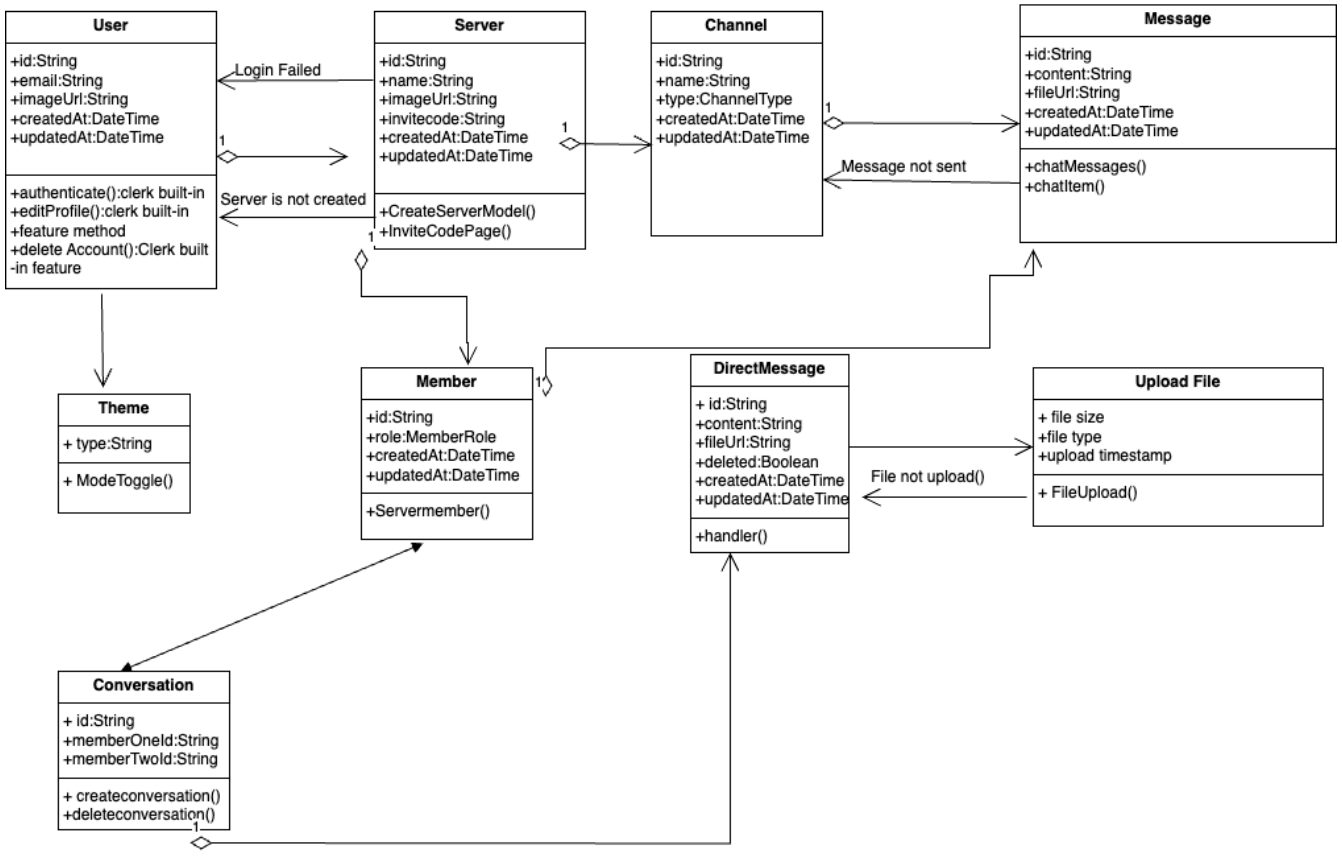
 # Phase 3 Updated: Testing, Final Review, and Handover (Apr 9 - Apr 29, 2024)
Objectives & Requirements: Prioritization of Functionalities (1 to 3, 1 being top priority and rest follows order):
1.Comprehensive Testing: Execute a series of unit tests and other tests to ensure each component functions as expected and the system as a whole operates seamlessly.

2.Security Audits: Conduct security assessments to identify vulnerabilities, applying fixes and enhancements to ensure robust protection of user data and interactions.
3.User Feedback Collection: Engage real users in testing to gather insights and feedback for refining the application, enhancing usability, and ensuring the product meets market needs.

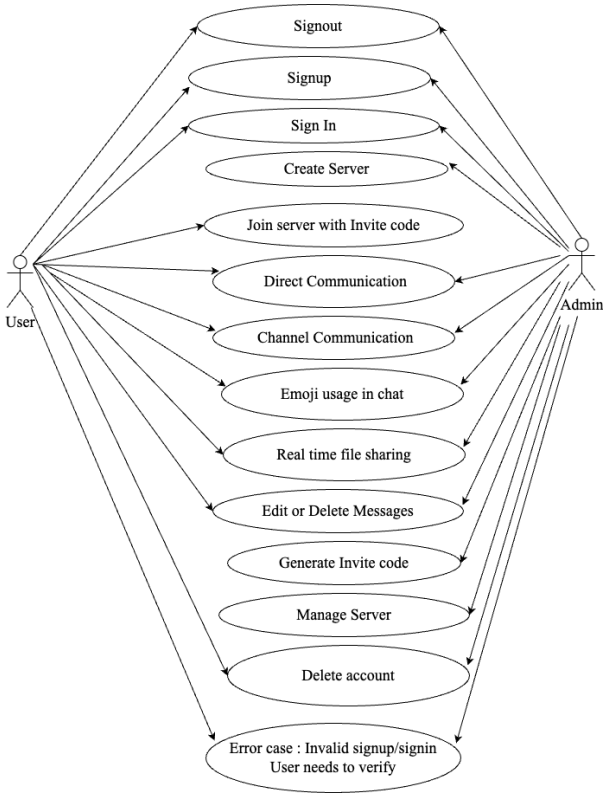
Criticality: Comprehensive testing is identified as the top priority due to its critical role in ensuring the reliability, stability, and functionality of the application. Security audits follow closely behind, as they are essential for protecting user data and interactions from potential threats and vulnerabilities. User feedback collection, while valuable for enhancing usability and meeting market needs, is considered less critical but still significant for iterative improvements and user satisfaction. Prioritizing these functionalities appropriately.

UML design

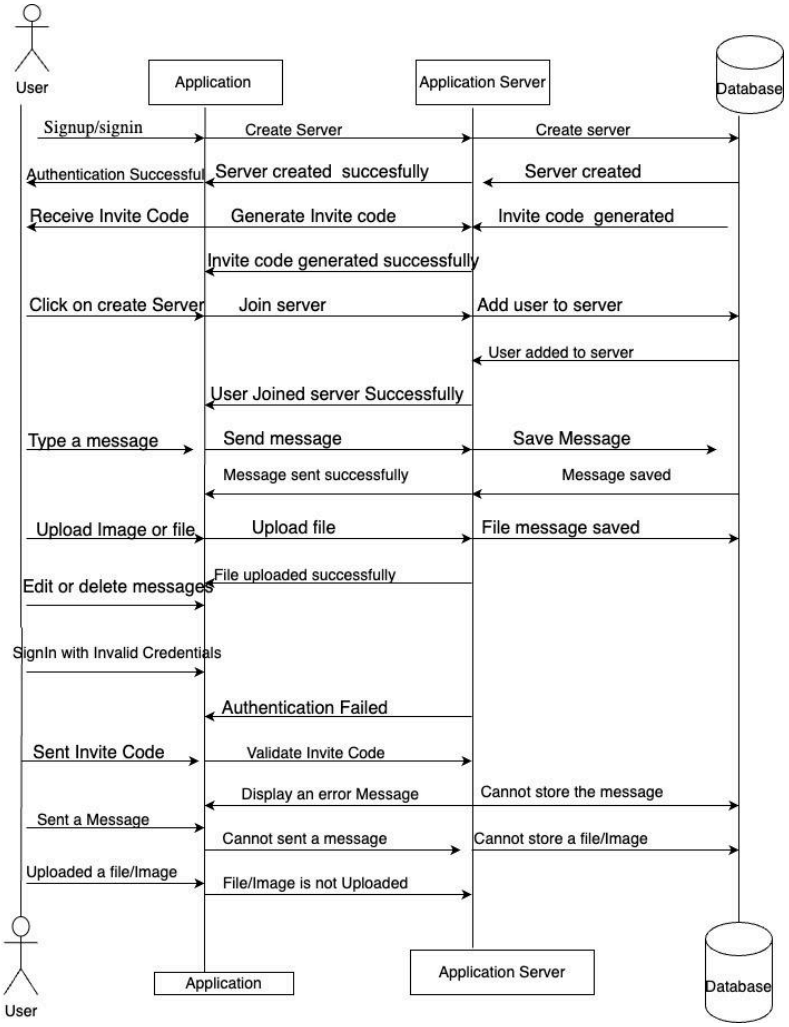
The following are the various UML diagrams for phase 1: **Class diagram**



Use case diagram



Sequence diagram



Test Cases

User Registration, authentication, signout and deletion via Clerk:

1. Test User signup through clerk authentication service:
Description: This test verifies if a user can successfully sign up with his google account.
Input: User directly sign up with his existing google account.
Expected Output: User is sign up successfully using clerk authentication service.

2.Test User Authentication sign in and sign out:
Description: This test verifies if a registered user can sign in securely and sign out after signing in to the app.
Input: User signup using google account and signs out using signout option.
Expected Output: User is authenticated successfully and granted access to the app if he signs in and sign out when he clicks on sign out after signing in.

3. Test Invalid User Authentication:
Description: This test checks the system's response to invalid login credentials.
Input: User logs in with unregistered google account.
Expected Output: User receives an authentication error message and is not granted access.

4. Test user Delete action his profile via clerk services:
Description: This test checks the app response to delete user from the app.
Input: User clicks on delete account option provided by clerk.
Expected Output: User account gets deleted.

Create Server:

5. Test if the create server is working fine:
Description: This test checks if a server can be created within which channels can be created in the future for communication and one on one communication.
Input: User clicks on create server options providing server name and image.
Expected Output: New server that is specific to the user gets created where the created user is now the admin, and he can invite his friends for one on one communication with general channel being common.

Invite Code functionality for friends:
6. Test Invite friends code url generation:
Description: This test checks if the admin of the server can generate invite code to invite his friends to his server.
Input: Clicks on the invite people button where the invite url will be generated or we can even generate new code by clicking generate a new link button in invite modal.
Expected Output: Generates invite friends url.

7. Test if the friends can join the server using the invite code:
Description: This test checks if the friend is able to join the server using the generated invite code by using it in the browser.
Input: Friend pastes the invite code url in his browser and registers his account using clerk.
Expected Output:user should be able to join the server of this friend through invite code and see his name in the left column below the general channel.

Real time messaging:
8. Test communication in general channel and in one on on one communication where general is set as default for a server:
Description: This test checks if the messages can be sent in the general channel and direct communication through socket.
Input: Type a message in the chat input of the general channel or select a user in the user column and enter a chat message from chat input.
Expected Output: Receives successful message from both general channels and on direct message in one on one communication.

9. Chat with emojis:
Description: This test checks if we can send emoji as messages.
Input: User clicks on the emoji option on the chat input and sends a message.
Expected Output:Successful can communicate with emojis.

10. Edit and delete messages:
Description: This test checks we can edit and delete the sent messages.
Input: User clicks on edit and delete option for the messages he sent.

Expected Output:Successful can edit and delete his messages.

Real time file sharing:
11. Test functionality of file sharing:
Description: This test checks if the images and pdf are sent..
Input:Upload image and pdf from the chat.
Expected Output: Receives successful message from both general channels and on direct one on one communication where upon clicking them will opens up in the new tab in the browser.

UI customization and themes :
12. Test functionality of UI themes:
Description: This test checks if the user can switch between dark, light and system default modes.
Input: Click on the button to toggle between dark,light and system default modes.
Expected Output: The UI toggles between dark,light and system default modes.

User Manual

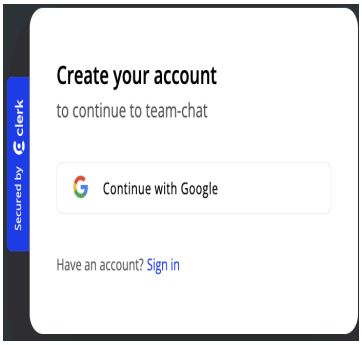
Before you can use the application, please make sure your system meets the following requirements:
Operating System: Windows, macOS, or Linux
Web Browser: Chrome, Firefox, Safari, or Edge

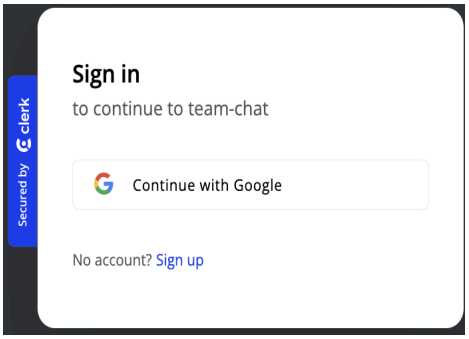
Installation
Downloading the Application
1. Request the latest version of the application from our team member or repository or TA.
2.Extract the downloaded archive to your preferred location.

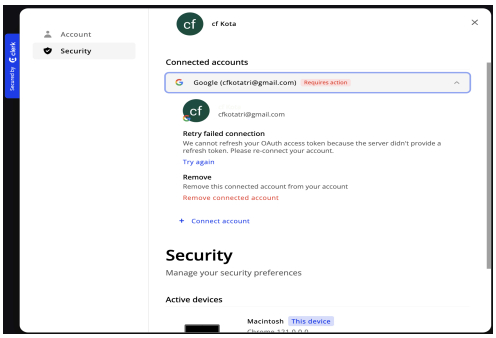
Installing required libraries and Running the application
1.Navigate to the root directory of the app.
2.Install all the packages listed on package.json using npm: npm i
3.Build the next js app: npm run build
4.Start the app locally: npm run dev
5.Visit port http://localhost:3000/ on successfully building and running the application.

Using the Application

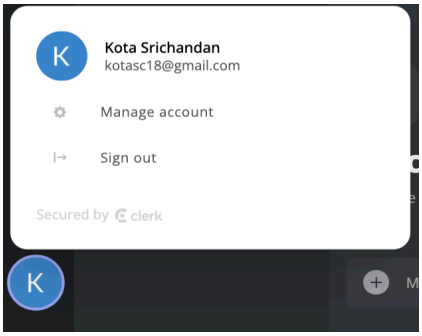
User Registration, sign in
1.Create your account using Clerk by sign up and sign in using your google account.
2.Sign In using your registered google account.
3.Try sign up and sign in again if you did not do the sign in or registration properly, the app indicates “requires action” on your account if you haven’t set up your account properly.

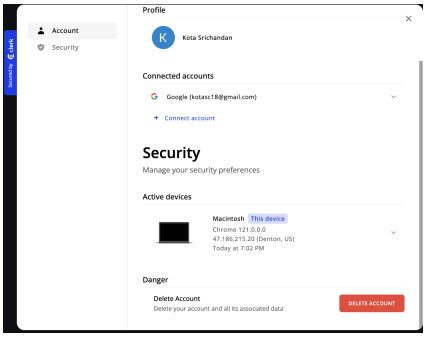


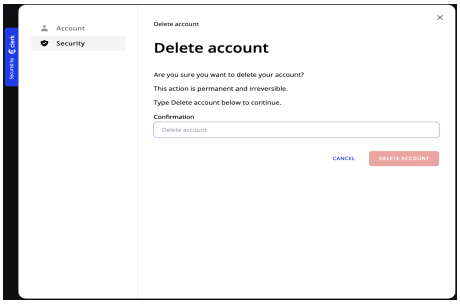




User Sign out and Delete account:
1.Click on the sign out button after signing to the app.
2.Click on delete account upon clicking on Manage Account to delete your account and confirm your delete account after typing “Delete account” in confirm delete screen



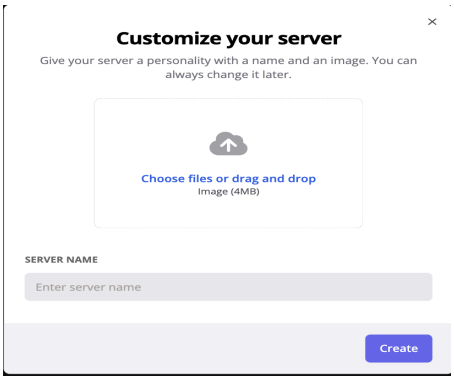


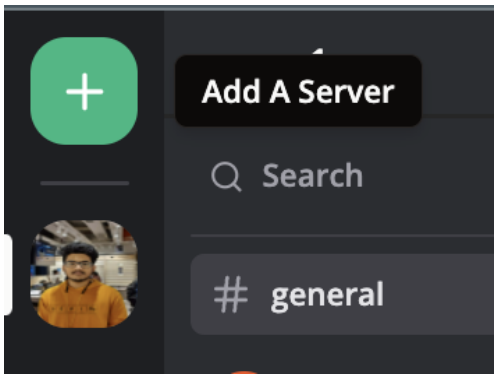


Create server:

1.Create your own server by providing the name and image of your server.

2.And create any additional servers by clicking on the add server button (+) with your custom name and image.

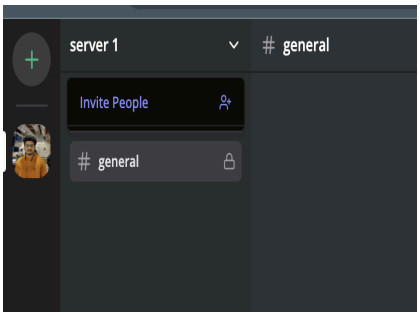


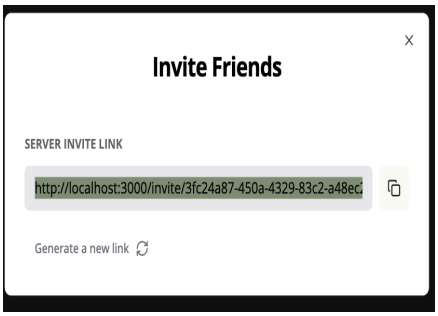


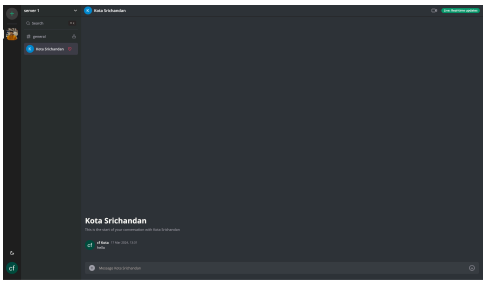
Invite friends:

1.Generate your invite code url to invite your friends to your server, by clicking on the invite people button on your server, this generates a new invite code link, if it expires try to generate a new one using the “generate a link” button.

2.After successful invite code link generation, invite your friends by sharing your invite link, and after your friend pastes this link in his browser he will be added to your server after he does the registration and signing process, and he will be shown with his name as mentioned in his google account name.



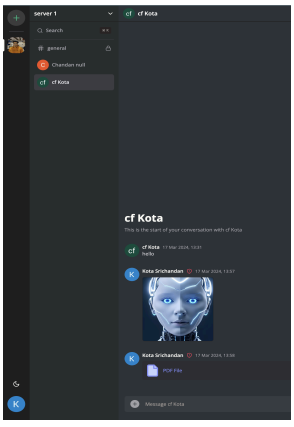


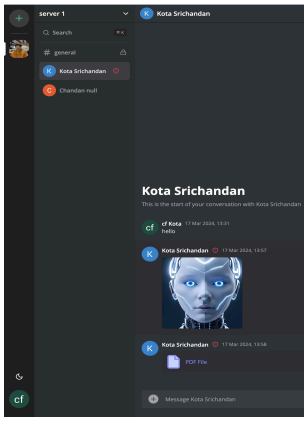


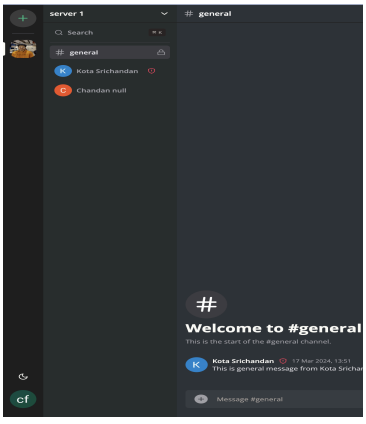
Real time messaging in direct messages and common channels like “general”:

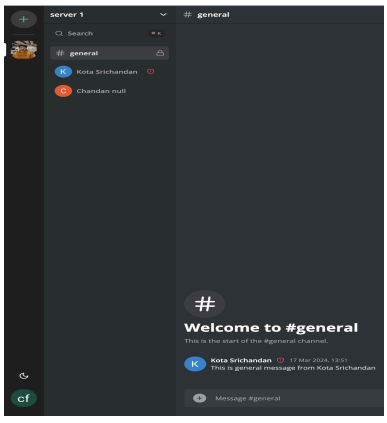
1.Try sending out messages in the “general” channel which is a default channel provided for every server using the chat input box.

2.Try sending out messages by manually selecting the users you want to have direct one on one communication which will be below the “general” channel and use the chat input field to type your messages and press enter to send messages.

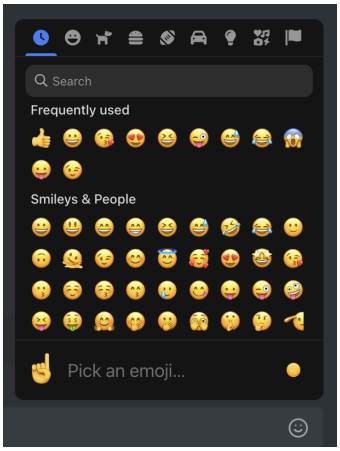


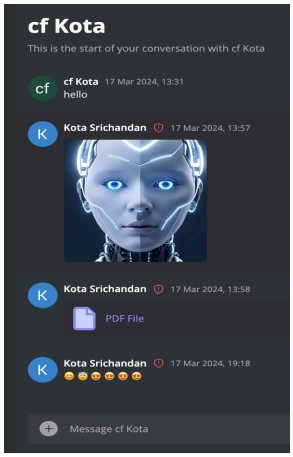






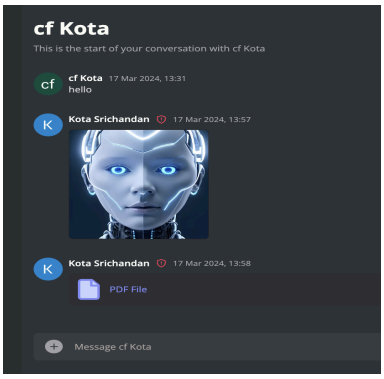
Emoji during communication: Use emoji during communication by clicking on the emoji button the chat input field, and use your desired emoji for communication.

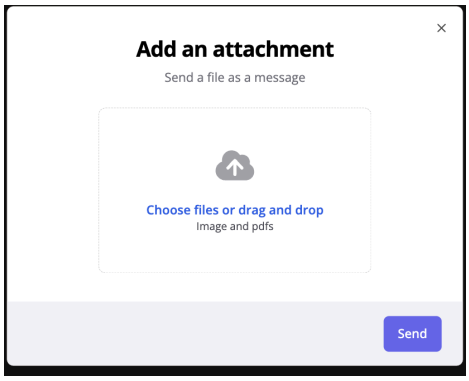




Real time pdf and images sharing:

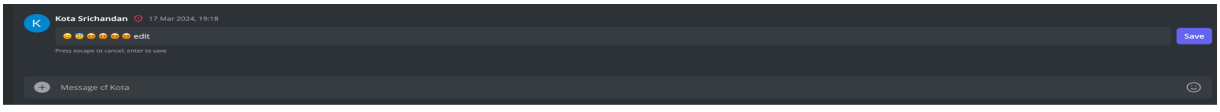
1. Share your pdf and images during communication on both one on one communication and channels like “general” using the upload button in the chat input field (+).
2.Then attach your attachments in the attach modal and click on send to send them.

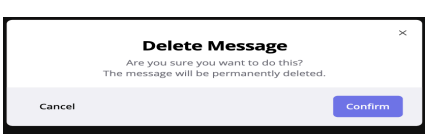


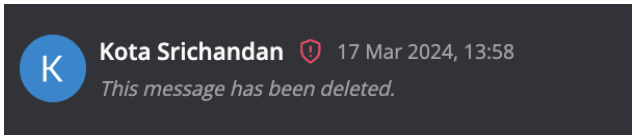


Edit and delete messages during communication:

1**.** Use edit and delete features for your messages during communication.
2. click on the edit and delete button on messages after sending them to edit or delete the message. For editing upon editing the message click on the save to save the edited message. For delete confirm if you really want to delete the message in delete modal.
3. After deleting the message “This message has been deleted” text will be shown in place of the deleted message.

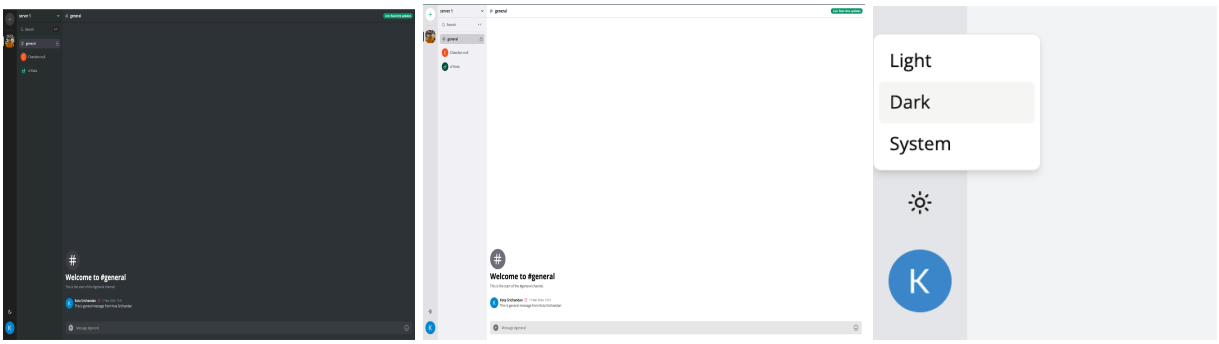






UI theme customization:

1.Click on the theme customization button to customize your theme for dark, light or keep it system default for UI customization.



Compile and Run application

Installing required libraries and Running the application
Prerequisites :
0. A computer with at least 8GB Ram.
1. Need to have node.js and npm run installed
2. A text editor like VS code
3. Git (Optional) for cloning the repo
4. Web Browser (Chrome or Safari)

After prerequisites :
1.Navigate to the root directory of the app (team-chat-app).
2.Install all the packages listed on package.json using npm: **npm install**
3. Make sure to set your **env** file with "NEXT_PUBLIC_CLERK_PUBLISHABLE_KEY", "CLERK_SECRET_KEY" which are clerk authentication service api keys for user authentication, "NEXT_PUBLIC_CLERK_SIGN_IN_URL", "NEXT_PUBLIC_CLERK_SIGN_UP_URL" for handling both sign up and signin services, "NEXT_PUBLIC_CLERK_AFTER_SIGN_IN_URL", "NEXT_PUBLIC_CLERK_AFTER_SIGN_UP_URL" for handling after sign up and signin services. "UPLOADTHING_SECRET", "UPLOADTHING_APP_ID" for using UploadThing service which is for file sharing of images and pdfs, and "DATABASE_URL" for using the prisma DB for this go to planet scale website to create the DB.

Check these website docs for additional queries :
Prisma DB : https://app.planetscale.com/
Clerk : https://dashboard.clerk.com/
UploadThing : https://uploadthing.com/

Ignore if the env file exists or if ".env-example" exists then rename it to ".env"
As for now, i have updated all the **env** file parameters with the values that i have created, you can use them to run the app:
Use this snippet to add your .env file in the top directory inside "team-chat-app" folder as ".env" to run the app successfully.

```
NEXT_PUBLIC_CLERK_PUBLISHABLE_KEY=pk_test_cGxlYXNlZC1ibHVlZ2lsbC03Ny5jbGVyay5hY2NvdW50cy5kZXYk
CLERK_SECRET_KEY=sk_test_0M8YmK3QM3C1MNPRfdybv128XnWRkj7CfePe5MPCtE
NEXT_PUBLIC_CLERK_SIGN_IN_URL=/sign-in
NEXT_PUBLIC_CLERK_SIGN_UP_URL=/sign-up
NEXT_PUBLIC_CLERK_AFTER_SIGN_IN_URL=/
NEXT_PUBLIC_CLERK_AFTER_SIGN_UP_URL=/

UPLOADTHING_SECRET=sk_live_3d1e2ac22dd353d9d4107a36bece3751024386c780dd1e3f453c69a514c4f6a6
UPLOADTHING_APP_ID=5m3h3jfb5c

DATABASE_URL='mysql://6nqmdyrej4lyj0rimbac:pscale_pw_DXV9IbqWr8EKWqyjtzLyyAl26bBgc2yJYc1MU9X74Jp@a
ws.connect.psdb.cloud/discord-tutorial?sslaccept=strict'
```

4.Build the next js app: **npm run build**
5. Start the app locally: **npm run dev**
6.Visit port http://localhost:3000/ on successfully building and running the application.

Troubleshooting while compile and run

Typical Problems and Solutions
Problem: Problem with any of the dependency or next js app
Solution:Try to delete node_modules directory and install the dependencies again using “npm install” without changing anything in package.json.
Problem: error during any functionality breaking in the app.
Solution: Re-build the app using “npm run build” and run it again using “npm run dev”.
To learn more about Next.js, take a look at the following resources:

https://nextjs.org/docs - learn about Next.js features and API.

Testing the Application

The procedures below should be followed to compile and execute the test cases for the team chat web application:
1.Make sure the project is already setup by building the next js app.
2.Run the app using “npm run dev”
3.Visit 127.0.0.1:3000 to explore the websites and related features.
4.Make sure to use your own env file for testing your own app with your updated parameters..
5.Make sure to create your account and create a server to test various test cases.

Feedback and Actions

The partner SE group provided our team with insightful criticism throughout the peer review session. Here is a rundown of the main ideas raised:
Feedback Received During Peer Review Session:
1. Technical Proficiency and Security Measures: Reviewers praised the technical architecture and the secure integration of authentication and authorization mechanisms through Clerk. The choice of technologies and the emphasis on security were seen as strengths of the project.
2. User Interface and Experience: Feedback highlighted the user interface's intuitiveness and the application's ease of use, especially the implementation of real-time messaging and file sharing. However, suggestions were made for further improvements to enhance accessibility and user engagement.
3. Documentation and Knowledge Sharing: The comprehensive documentation of technical implementations and architectural decisions was well-received. However, it was suggested that more detailed usage guides and API documentation could facilitate better understanding and collaboration.
4. Team Collaboration: The effective team collaboration and communication were commended. The reviewers appreciated the regular team meetings, clear role allocations, and the supportive environment that contributed to the project's progress.

Actions Taken Based on the Feedback:
1. Enhancing UX and UI: In response to the suggestions for improving the user interface, the team plans to adopt a more user-centered design approach. This includes conducting iterative testing and incorporating user feedback to refine navigation and interactions, making the application more intuitive and accessible.
2. Improving Documentation: To address the feedback on documentation, the team has committed to developing more detailed usage guides and enhancing API documentation. This effort aims to make onboarding easier for new team members and external contributors, ensuring that knowledge is accessible and maintainable.
3. Focusing on Security and Performance Optimization: Encouraged by the positive feedback on the project's technical proficiency and security measures, the team will continue to prioritize these aspects. Future plans include exploring advanced security protocols and optimizing the application for performance and scalability.
4. Maintaining Strong Team Dynamics: The team recognizes the value of effective collaboration and communication highlighted during the review session. Moving forward, we plan to maintain our supportive environment, encourage more open feedback, and engage all team members in decision-making processes to further enhance teamwork and project outcomes.

Reflection

What Has Been Accomplished:
1. Implementation of Microservices Architecture: Successfully implementing a robust microservices architecture utilizing a sophisticated tech stack, including Next.js, React, Socket.io, Prisma, and MySQL. This foundational work supports the application's core functionalities like real-time messaging and file sharing.
2. Integration of Clerk for Secure Authentication: By integrating Clerk for authentication and authorization, we've established a secure and seamless login process. This choice underscores our commitment to safeguarding user data and ensuring a trustworthy user experience.

3. Efficient Team Collaboration: The project benefited significantly from strong team collaboration. Regular meetings, clear communication, and effective role distribution have been key to maintaining high levels of productivity and motivation among team members.
4. User Interface Development: The development of a functional and visually appealing user interface, considering both aesthetics and user experience. This achievement reflects the team's capability in frontend development and design.

What Went Well:
1. Technical Selection and Implementation: The decision-making process behind selecting our technology stack and the successful implementation of chosen technologies stood out as a major success. These technologies have proven to be well-suited for the project's needs, facilitating real-time interactions and efficient data management.
2. Security and User Authentication: Our focus on security, particularly through the use of Clerk for handling user authentication and authorization, was a highlight. This approach has significantly enhanced the application's security, making it reliable for users.
3. Team Dynamics and Support: The strong dynamics within the team, characterized by mutual support and effective collaboration, contributed greatly to the phase's success. The ability to work cohesively and support each other through challenges has been a defining strength.
4. Initial User Interface and Experience: The initial development of the user interface and the attention to creating a positive user experience were well-received. Efforts to make the interface intuitive and engaging have laid a good foundation for further UX improvements.

Areas for Improvement:
1. Documentation and Knowledge Sharing: While the project's documentation covers technical aspects well, there is room for improvement in creating more detailed usage guides and API documentation. This will facilitate easier onboarding for new team members and contribute to the project's long-term maintainability.
2. Feedback Loops and User Testing: Establishing more structured feedback loops and conducting extensive user testing can provide valuable insights into user needs and preferences. This will be essential for prioritizing future development efforts and ensuring the application remains relevant and user-friendly.

Member Contribution Table

Here is the member contributions table for Phase 3, including details of each team member's contributions, overall contribution percentage, and any relevant notes:

Member Name	Contribution Description	Overall Contribution (%)	Note
Srichandan Kota	- Led system design and technological selection, focusing on microservices architecture and security planning and GitHub.	12.5%	Exhibited outstanding leadership and decision-making in system design, ensuring a robust and scalable foundation for the application and Github
Swapna Sonti	- Developed front-end components, particularly for UI customization themes and real-time messaging functionalities. - Worked on the JS part of the system to add more dynamic functionalities to the front-end	12.5%	Played a pivotal role in front-end development, enhancing the application's interactivity and visual appeal
Sandeep Chowdary Ari	- Engineered the backend for real-time communication and managed server and channel functionalities	12.5%	Essential in establishing a reliable and efficient backend system, facilitating seamless communication across the application
Venkata Sai Shankar Koppula	- Directed UI/UX design efforts, focusing on usability, accessibility, and implementing dark and light modes	12.5%	Significantly contributed to the application's design, improving user experience and accessibility through thoughtful design choices.
Shivanandha Reddy Vasudevula	- Managed database architecture, ensuring data integrity and optimizing data management strategies	12.5%	His expertise in database architecture enhanced data handling efficiency, supporting the application's core functionalities.
Gana Deekshith	- Led the integration of secure authentication flows, detailing security protocols and user verification processes.	12.5%	Bolstered the application's security framework, ensuring user data protection and a trustworthy environment.
Kantumutchu Dinesh	- Spearheaded the file sharing implementation and contributed to the real-time messaging system using Socket.io. Enhanced data handling for efficient communication and file exchange within the application.	12.5%	His pivotal role in integrating file sharing and optimizing real-time communication channels significantly bolstered the application's functionality, ensuring seamless interactions and data exchange.
Bhanu Prasad Krishna Murthy	- Led documentation efforts and developed the application's security framework, focusing on authentication and authorization.	12.5%	His comprehensive documentation and focus on security have been vital in establishing a solid foundation for the project.