

Chat Byte Software Requirement Specification

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1. Introduction

1.1.Purpose:

The purpose of this SRS document is to provide a detailed overview of our software product Chat-byte, a web-based communication platform, its parameters and goals. This document describes the project's target audience and its user interface, hardware and software requirements. It defines how our client, team and audience see the product and its functionality

1.2.Objective:

The primary objective of Chat-byte is to create a user-friendly and secure chatting web app that provides real-time communication across various devices. Key goals include ensuring privacy through end-to-end encryption, integrating with third-party services for an enhanced user experience, and implementing effective monetization strategies. The aim is to establish brand recognition, achieve financial viability, and create a scalable platform that caters to a diverse user base.

1.3.Goals:

- **User-Centric Experience:**
Create an intuitive and user-friendly interface to ensure accessibility for users of all technical levels.
- **Real-Time Communication:**
Implement robust real-time messaging protocols for instantaneous and engaging conversations with multimedia support, emojis, and other interactive elements.
- **Cross-Platform Compatibility:**
Enable seamless access across various devices and platforms.
- **Integration with Third-party Services:**
Enhance user experience by integrating with popular third-party services.
- **Scalability:**
Design the app infrastructure to accommodate a growing user base without compromising performance or security.

1.4.Scope:

Chat-byte aims to create a user-friendly and secure communication platform that facilitates real-time messaging, voice, and video communication across various devices. The platform will prioritize privacy through end-to-end encryption, integrate with third-party services for enhanced user experience, and implement effective monetization strategies.

- **Device and OS Compatibility:**
While efforts are made to ensure cross-platform functionality, limitations may exist on certain devices or operating systems that do not support specific features or updates.
- **Third-Party Integration Reliance:**
The functionality of integrated third-party services is contingent on their availability and compatibility. Changes or disruptions to these services may impact Chat-byte performance.
- **Internet Connection Dependency:**
The app relies on an internet connection for real-time communication. Users in areas with poor or no internet connectivity may experience limitations in app functionality.

1.5.References:

- **Documentation references:**
 - Reactjs: <https://legacy.reactjs.org/docs/create-a-new-react-app.html>
 - Nextjs: <https://nextjs.org/docs>
 - SQL: <https://www.prisma.io/docs/orm/overview/databases/mysql>
- **Video References:**
 - Nextjs:<https://www.youtube.com/watch?v=9P8mASSREYM&list=PLC3y8-rFHvwgC9mj0qv972IO5DmD-H0ZH>
 - SQL:<https://www.youtube.com/watch?v=pVKT4N-Cgb8&list=PLsjUcU8CQXGFFAhJI6qTA8owv3z9jBbpd>
- **Books References:**
 - JavaScript and HTML5 Now by Kyle Simpson
 - MASTERING HTML, CSS by Laura Lemay (Author)

2. Overall Description

2.1.Product Perspective

Chat-byte is a standalone communication platform that aims to provide users with a seamless and enjoyable communication experience.

2.2.Product Functions/ Features

- **Screen Sharing:**

Chat-byte introduces a screen-sharing feature, allowing users to share their screens during video calls or collaborative sessions. This feature is particularly valuable for virtual meetings, presentations, or helping others troubleshoot technical issues seamlessly within the app.
- **Member management:**

Empowering users with control, Chat-byte includes member management features such as the ability to kick members, change roles from guest to moderator, ensuring a streamlined and organized community environment.
- **Create communities:**

Users can create and manage communities within Chat-byte, fostering a sense of belonging and enabling like-minded individuals to connect based on shared interests, hobbies, or professional affiliations.
- **Moder Beautiful UI:**

Chat-byte boasts a visually appealing and aesthetically pleasing user interface, combining functionality with a modern design to enhance the overall user experience.
- **Light / Dark mode:**

Catering to user preferences, Chat-byte offers both light and dark mode options. Users can choose their preferred theme for personalized comfort and reduced eye strain, providing a customizable and enjoyable user experience.

2.3. User Classes and Characteristics

- **Users:**
 - **Characteristics:** who interact with the platform
 - **Roles:** Users can create accounts, join communities, participate in chat channels, and interact with other users through text, voice, and video communication.
- **Moderators:**
 - **Characteristics:** Moderators are users entrusted with managing and moderating communities within Chat-byte. They typically possess strong leadership skills, communication abilities, and a sense of responsibility.
 - **Roles:** Moderators have additional privileges compared to regular users, including the ability to enforce community guidelines, remove inappropriate content, and manage member permissions.
- **Administrators:**
 - **Characteristics:** Administrators are individuals responsible for overseeing the overall operation and administration of Chat-byte. They often have decision-making authority, technical expertise, and a deep understanding of the platform's goals and objectives.
 - **Roles:** Administrators have the highest level of access and control within Chat-byte. They are responsible for platform governance, strategic decision-making, and ensuring compliance with legal and regulatory requirements.

2.4. Operating Environment

- **Platform Compatibility:**

Chat-byte is designed to operate as a web-based application accessible through modern web browsers. This includes popular browsers such as Google Chrome, Mozilla Firefox, Safari, and Microsoft Edge. The platform is optimized for compatibility with the latest versions of these browsers to ensure a seamless user experience across devices and operating systems.
- **Device Compatibility:**

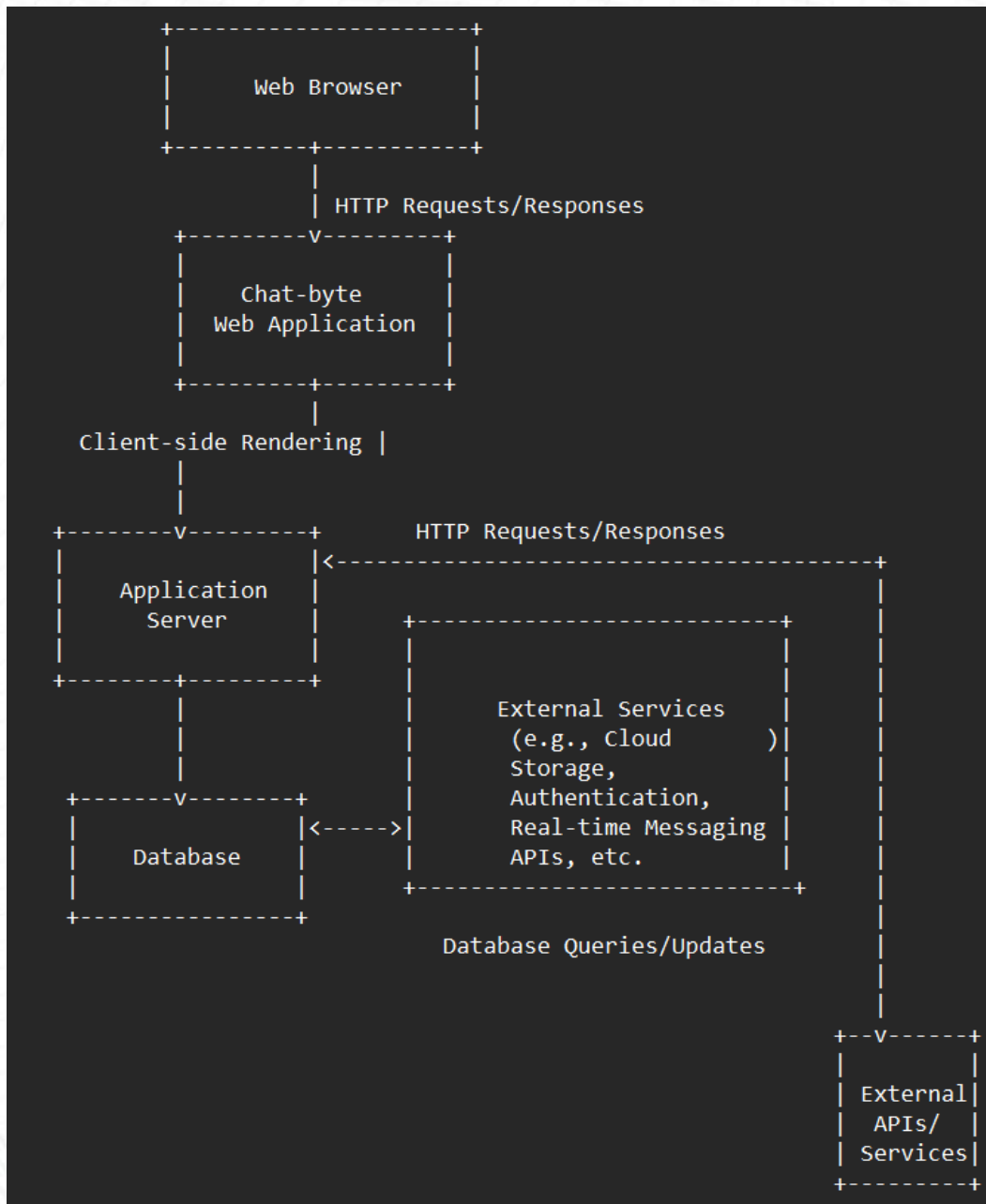
Chat-byte is compatible with a wide range of devices, including desktop computers, laptops, tablets, and smartphones. The platform's responsive design and adaptive layout ensure optimal performance and usability on different screen sizes and resolutions.

2.5. Design and Implementation

- **Technology Stack:** Chat-byte will be developed using a specific technology stack, including TypeScript, React.js, Next.js, and MySQL. These technologies have been chosen based on their compatibility, performance, scalability, and community support. Constraints related to the availability of skilled developers, licensing costs, and compatibility with existing systems may influence the selection of the technology stack.
- **User Interface Design:** The design of Chat-byte's user interface (UI) should adhere to specific design guidelines, branding requirements, and usability principles. Constraints such as platform

limitations, device capabilities, and user preferences may impact the UI design decisions. Additionally, the UI design should prioritize accessibility, responsiveness, and compatibility with different screen sizes and resolutions.

- **Development Team:** Skilled developers, UI/UX designers, Frontend and Backend developers, Database administrators. The successful implementation of Chat-byte depends on the expertise and skills of the development team. Constraints related to the availability of skilled developers, resource allocation, and team dynamics may impact the project's timeline and success. Collaboration tools, training programs, and ongoing support can help mitigate these constraints and ensure effective teamwork.
- **Block Diagram/ DFD:**



2.6. User Documentation

- Comprehensive user documentation will be provided to guide users on how to use the platform effectively.

2.7. Assumptions and Dependencies

- **Assumptions:** Assumptions about user behavior, technology trends, and market dynamics will be validated through user research and feedback.
- **Dependencies:** Dependencies on third-party services, libraries, frameworks, and APIs will be identified and managed to ensure smooth integration and functionality.
 - **LiveKit** is an open source WebRTC stack that gives you everything needed to build scalable and real-time video, audio, and data experiences in your applications.
 - **Prisma** is an open-source ORM (Object-Relational Mapping) tool that provides a type-safe and intuitive way of accessing databases.
 - **Clerk's** integration gives Supabase developers another incredible option for handling authentication

3. External Interface Requirements

3.1. User Interfaces

- **Login Page:**

The login page serves as the entry point for users to access Chat-byte's features and functionalities. It should provide a secure and user-friendly authentication experience, enforcing strong authentication mechanisms to protect user credentials and prevent unauthorized access. Performance requirements dictate that the login process is fast and responsive, with minimal latency. Safety and security measures, such as encryption of authentication data and protection against brute force attacks, ensure the confidentiality and integrity of user login information. Moreover, software quality attributes such as reliability and usability contribute to the overall quality of the login page by ensuring its robustness and ease of use.
- **Dashboard**

The dashboard is a central hub where users can access key information and navigate to various sections of Chat-byte. It should provide a clear and organized overview of the user's activities, including recent conversations, notifications, and community updates. Performance requirements ensure that the dashboard loads quickly and updates in real-time to reflect the latest information. Safety and security measures protect sensitive data displayed on the dashboard, such as user profiles and chat history. Software quality attributes such as usability and maintainability contribute to the overall quality of the dashboard by ensuring its ease of navigation and adaptability to user preferences.
- **Chat Channels**

Chat channels are dedicated spaces within Chat-byte where users can engage in real-time communication with each other. They should provide a seamless and interactive chat experience, supporting text, voice, and video messages. Performance requirements dictate that messages is

delivered instantly, with minimal latency, even in channels with a large number of participants. Safety and security measures protect user privacy and prevent unauthorized access to chat content. Software quality attributes such as reliability and scalability ensure that chat channels remain accessible and responsive under varying user loads and usage patterns.

- **Community Creation Page:**

The community creation page allows users to create new communities within Chat-byte, fostering collaboration and engagement among like-minded individuals. It should provide an intuitive and streamlined interface for defining community settings, including the community name, description, and membership rules. Performance requirements ensure that the community creation process is fast and responsive, with minimal latency. Safety and security measures protect community data and prevent unauthorized access to community settings. Software quality attributes such as usability and maintainability contribute to the overall quality of the community creation page by ensuring its ease of use and adaptability to user needs.

- **Settings Page**

The settings page enables users to customize and configure their Chat-byte experience according to their preferences and requirements. It should provide a comprehensive set of options for managing account settings, notification preferences, privacy controls, and theme customization. Performance requirements ensure that the settings page loads quickly and responds to user inputs without delay. Safety and security measures protect sensitive user data stored in settings, such as account credentials and privacy settings. Software quality attributes such as usability and accessibility ensure that the settings page is easy to navigate and understand for users of all skill levels.

3.2. Hardware Interfaces

- **Computer/Laptop:** 1.6 GHz or faster processor, 1 GB of RAM
- **Stable Internet Connection**

3.3. Software Interfaces

- **Visual Studio Code:**
VS Code, is a source-code editor developed by Microsoft
- **Node.js:**
Node.js is a cross-platform, open-source JavaScript runtime environment
- **Next.js:**
Next.js is an open-source web development framework created by the private company Vercel providing React-based web applications with server-side rendering and static website generation
- **React.js:**
React is a free and open-source front-end JavaScript library for building user interfaces based on components.
- **MySQL:**
MySQL is an open-source relational database management system.

4. System Features

4.1.Real-Time Messaging

Chat-byte will support real-time messaging functionality, allowing users to send and receive text, voice, and video messages instantly. This feature ensures seamless communication and enables users to engage in conversations with individuals and groups in real time.

4.2.Community Creation and Management

Users will have the ability to create and manage communities within Chat-byte. This feature enables users to connect with like-minded individuals based on shared interests, hobbies, or professional affiliations. Community creators can define community rules, invite members, and moderate discussions to foster a positive and engaging community environment.

4.3.Channel-based Communication

Chat-byte will support channel-based communication, allowing users to create and participate in chat channels dedicated to specific topics, projects, or interests. This feature enables organized and focused discussions within communities, making it easier for users to find relevant content and engage with others who share their interests.

4.4.Screen Sharing

Chat-byte will include a screen-sharing feature that allows users to share their screens during video calls or collaborative sessions. This feature is particularly valuable for virtual meetings, presentations, or helping others troubleshoot technical issues seamlessly within the app.

4.5.Member Management

Community moderators and administrators will have access to member management features, allowing them to manage community membership, roles, and permissions. This includes the ability to kick members, change roles from guest to moderator, and ensure a streamlined and organized community environment.

4.6.Customizable Themes:

Chat-byte will offer customizable themes, including light and dark mode options, to cater to user preferences and enhance the visual appeal of the platform. Users can choose their preferred theme for personalized comfort and reduced eye strain, providing a customizable and enjoyable user experience.

4.7.Multimedia Sharing:

Chat-byte will enable users to share multimedia content such as images, videos, documents, and links within chat channels and conversations. This feature enhances communication and collaboration by providing users with the ability to share rich media content relevant to their discussions

4.8.Notification:

This feature enables users to stay informed without being overwhelmed by excessive notifications

5. Other Non-functional Requirements

5.1. Performance Requirements

- **Scalability:** The platform is able to handle a large number of concurrent users and chat channels without significant degradation in performance. This includes horizontal and vertical scalability to accommodate increasing user loads and resource demands.
- **Response Time:** Chat-byte should respond to user interactions, such as sending messages, loading content, and navigating between screens, within milliseconds to ensure a seamless and responsive user experience
- **Resource Utilization:**
The platform should optimize resource utilization, including CPU, memory, storage, and network bandwidth, to maximize efficiency and minimize wastage. Efficient resource management ensures that Chat-byte operates cost-effectively and can handle peak loads without exceeding resource limits.

5.2. Safety Requirements

- **Data Encryption:** Chat-byte should implement robust encryption algorithms, such as AES (Advanced Encryption Standard), for encrypting user data in transit and at rest. This ensures that sensitive information, such as messages, multimedia content, and user credentials, remains confidential and secure.
- **Authentication and Authorization:** The platform enforces strong authentication mechanisms, such as password hashing, multi-factor authentication (MFA), and OAuth, to verify the identity of users and prevent unauthorized access to accounts and resources. Role-based access control (RBAC) is implemented to restrict user permissions based on their roles and privileges.


5.3. Software Quality Attributes

- **Reliability:** Chat-byte is reliable and resilient, with minimal downtime and service disruptions. This includes robust error handling, fault tolerance, and graceful degradation mechanisms to ensure continuous operation and availability, even in the event of failures or unexpected conditions.
- **Usability:** Chat-byte is user-friendly and intuitive, with a clean and consistent user interface that promotes ease of use and navigation. This includes usability testing, user feedback mechanisms, and accessibility features to accommodate diverse user needs and preferences and ensure an inclusive user experience.
- **Performance Efficiency:** The platform is efficient in terms of resource utilization, response times, and scalability to meet user demands and performance expectations. This includes performance profiling, optimization techniques, and load testing to identify and address bottlenecks and performance issues proactively.

6. Appendix A: Glossary

Table 1 explains the most commonly used terms in this SRS document.

S.no	TERM	DEFINITION
1)	Server	Servers are the different spaces made on chat-byte either by community or friend groups for some interest
2)	Channel	A channel is a group made inside a server that has 3 types: text, audio, and video.
3)	Admin	Admin is the person who creates the server/channel
4)	Moderator	The moderator is the person assigned by the admin who has the same powers as the admin



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**Regards
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