

THE REAL TIME CHAT APP_____

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Abstract: A chat application, also referred to as an online tool or program, facilitates direct communication among users or those simultaneously utilizing the internet. This software enables users to engage in conversations regardless of their geographical separation. To accommodate a sizable user base, the chat program must possess multi-platform capabilities and operate in real-time. The initial stages of launching any application or service entail various challenges, and one significant hurdle is the selection of development tools, languages, stacks, or frameworks. Constructing a real-time application involves addressing issues such as ensuring low-latency message delivery, necessitating minimal data transfers across the network to mitigate latency. Additional challenges include dealing with SMS texting and obtaining cross- platform permissions for Android. The objective of this paper is to develop a chat program comprising users and a server to facilitate seamless communication between users. The ultimate goal is to deliver an exceptionally user-friendly instant messaging solution that even beginners can navigate effortlessly.

Keywords: SMS, Novice, latency, Real time application.

1. INTRODUCTION

Communication refers to the interchange of messages among individuals, a concept that has existed

since the inception of humanity. The evolution of communication technologies began with inventions such as television, the telegraph, and, eventually, the telephone in the 1800s, enabling distant communication. Notably, telephone communication has experienced rapid expansion, particularly in voice calls, data transfers, and mobile wireless technologies.

The objective behind the development of computer networks and telecommunications technologies is to enhance human communication. Over time, significant efforts have been invested in integrating devices seamlessly and providing services without differentiation. Utilizing technology to overcome geographical barriers and foster connections between people and ideas is achieved through avenues like chat rooms. Despite the existence of this technology for some time, its widespread adoption is relatively recent. Our paper exemplifies a chat server, comprising two applications: a server program operating on any networked PC and a client application running on the user's mobile device. To initiate chatting and participate in both group and private conversations, our customers need to connect to the server.

2. BACKGROUND & MOTIVATION

Considering the diverse array of cultures on the continent and the widespread use of pidgin English, which is Nigeria's distinctive mode of communication, real-time chat applications hold the promise of becoming a widely embraced socializing tool across Africa, with a specific focus on the West African subregion. A grassroots pilot initiative has already gained traction in Nigeria. With the estimated population of Nigeria surpassing 200 million people, the country serves as a viable commercial space and a key focal point for the application. The introduction of the real-time chat app is poised to be a positive development, catering to the needs of the average Nigerian citizen. This includes individuals such as local peasant farmers, market women, artisans, low-income earners, the less privileged, and those belonging to the lower social strata, who constitute a significant portion of the population. This accessibility is facilitated by the increasing acceptance of adult literacy in Africa and various government initiatives aimed at promoting education at the grassroots level.

The incorporation of the Pidgin English feature is particularly noteworthy as it helps break down barriers between proponents of Queen's English, fostering a more inclusive environment. This inclusivity not only enhances enjoyment but also encourages the exchange of ideas, contributing to increased cross-pollination of thoughts and ultimately benefiting the economy. While acknowledging the pioneers of comparable innovations that address technological disparities, it's equally crucial to acknowledge that the fundamental functionality of the real-time chat app, originally integrated into messaging services, has progressed to a point where it enables convenient financial transactions.

3. OBJECTIVE

3.1. MESSAGING

Messaging stands out as one of the primary functions of the REAL TIME CHAT APP. Similar to other social apps, you have a list of ongoing conversations, offering a valuable feature that extends beyond the conventional method of gathering contact information. Once everything is operational, you'll be surprised at how many individuals can effortlessly share their details by simply scanning their phones. This is made possible by assigning each user of the REAL TIME CHAT APP a unique QR code, serving as a personalized barcode. Adding another user to the app involves scanning their QR code.

Moreover, REAL TIME CHAT APP users can search for nearby individuals and include them in their contact list by utilizing a phone number. Positioned as the predominant mode of communication for individuals in Nigeria and sub-Saharan Africa, the REAL TIME CHAT APP holds the potential to unlock significant social opportunities. Users may opt for the REAL TIME CHAT APP over email, even in professional settings. The inclusion of built-in plug-ins enabling photo and video uploads, along with the ability for contacts to provide comments, will transcend geographical barriers. This feature facilitates the exchange of knowledge, allowing a broader audience to appreciate the breathtaking landscapes of Africa without physically visiting those locations.

3.2. FILE TRANSFER

The advanced architecture of the REAL TIME CHAT APP allows individuals to seamlessly transfer data of any size, encompassing photos, movies, and large document files such as zip, dmg, and more. This functionality is achieved by connecting your smartphone, whether it operates on iOS or Android, to the REAL TIME CHAT program.

This software is distinctive in that it seamlessly aligns with your specific use case, alleviating the need for manual uploading and downloading of files. Your smartphone serves as a host, enabling cost-free file downloads, thereby enhancing overall convenience. Level three headings should be both italicized and left-aligned. Similarly, the numbering for level three headings, such as 3.2.1, 3.2.2, and so forth, should follow the sequence of level two headings.

3.3. SOCIAL BARRIER BREAKER

The aim of the Pidgin English feature in the REAL TIME CHAT APP is to foster inclusive interactions

and facilitate the formation of new connections, irrespective of social status. Much like the BBC Pidgin, which is bridging the gap between newsrooms and the lower socio-economic classes, the REAL TIME CHAT APP aspires to return humanity to its fundamental state, eliminating the disparities that some individuals may have over others.

The objective of the Pidgin English feature in the REAL TIME CHAT APP is to ensure that individuals engage with others in a fair and inclusive manner, fostering the creation of new friendships without consideration of social hierarchy. Much like the BBC Pidgin, which is narrowing the gap between newsrooms and the less privileged, the REAL TIME CHAT APP strives to return humanity to its inherent state, devoid of the advantages that certain individuals may hold over others.

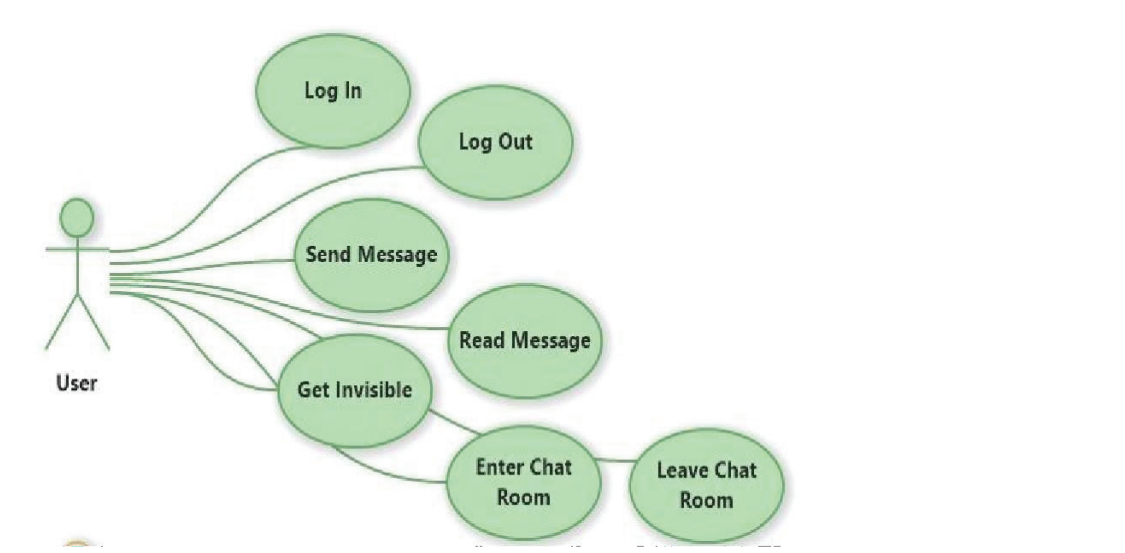


Fig1: User Diagram

4. RESEARCH METHODS

This study employs In a survey, an open-source platform designed for online survey administration. To assess user demographics, patterns of feature utilization on WhatsApp, usage frequency, motivations, and the influence on personal and social aspects, a comprehensive form was developed. The focus of this study is to examine the utilization and impact of the WhatsApp mobile application on consumers in Northern India.

The objectives for the study are:

1. Evaluate the usage frequency of WhatsApp and its popular services.

2. Determine the positive or negative effects resulting from the use of WhatsApp.
3. Examine the frequency and nature of interactions among WhatsApp users.
4. Investigate the most favored features of WhatsApp among adults (those aged 18 and above).
5. Assess user satisfaction levels with WhatsApp.
6. Explore the impact of WhatsApp on the social and personal lives of individuals.

Participants were able to express their views on WhatsApp Messenger and underscore specific features they find appealing through responses to open-ended questions. This approach provided the researcher with additional insights into WhatsApp Messenger and user viewpoints. The selection of study participants involved the use of judgmental sampling. Additionally, certain questions were formulated to assess the accuracy of responses and gauge users' commitment to completing the form.

5. FEATURES

- Easy to Sign in & Sign out
- Messaging
- Data security
- File transfer
- Offline Backup
- New color mode

5.1. CHARACTERISTICS AND ADVANTAGES

1. Messages sent through the real-time chat app can auto-delete and are strongly encrypted.
2. Cloud-based real-time chat apps enable message access across multiple devices.
3. Real-time chat apps transmit messages more rapidly compared to other applications, employing distributed servers, as seen in Telegram.
4. Real-time chat applications are consistently free, with no recurring costs—only occasional advertisements.
5. Secure real-time chat apps safeguard messages from cyber threats, and robust platforms like Telegram offer unlimited media and chat storage.
6. Operational efficiency
7. User-friendly interface
8. Privacy protection
9. Cultivating unity

6. FUNCTIONAL AND NON-FUNCTIONAL REQUIREMENTS

6.1. FUNCTIONAL REQUIREMENTS

6.1.1. USER REGISTRATION

To register for the application, users must provide a functional phone number during the installation process. Failure to complete this step will result in the application closing. The user's phone number will serve as the unique identifier for their Chat Application account.

Adding New Contacts

The program should identify every contact in the user's phone book. If any of these contacts have user accounts on the Chat Application, they must be promptly added to the user's contact list.

6.1.2. SEND MESSAGE

All contacts listed in the user's chat application should be capable of receiving instant messages. An asterisk (*) should be displayed next to the sent message to notify the user when the message has been successfully delivered to the intended recipient.

6.1.3. BROADCAST MESSAGE

Users should have the ability to create contact groups. Broadcasting messages to these groups should be a feasible option for users.

6.1.4. MESSAGE STATUS

The user should be able to determine whether the intended recipient has read the message. Two ticks will appear next to the message to indicate that it has been read by the recipient.

6.2. NON-FUNCTIONAL REQUIREMENTS

6.2.1. PRIVACY

Messages shared between users should be encrypted to maintain privacy.

6.2.2. ROBUSTNESS

To ensure recoverability in case a user's device malfunctions, it is essential to maintain a backup of their conversation history on remote database servers.

6.2.3. PERFORMANCE

Application must be lightweight and must send messages instantly.

7. DESIGN & IMPLEMENTATION

The development of this application will leverage fundamental tools, including:

1. Visual Studio: Recognized as the premier code editor for Java and socket IO development.
2. Command Prompt: A utility for compiling and executing programs on the system.
3. SocketIO: Employed to construct a server essential for the proper functioning of our software.
4. The initial step in the development process involves creating a directory and installing necessary dependencies, establishing an environment for both the chat client (front end) and chat server (back end).
5. Message routing from sender to recipient occurs through the chat server, which additionally manages various back-end operations not stored locally on the user's device.

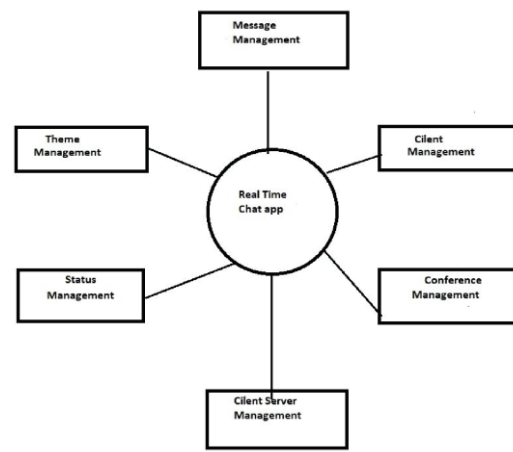


Fig 2: Zero Level DFD Diagram

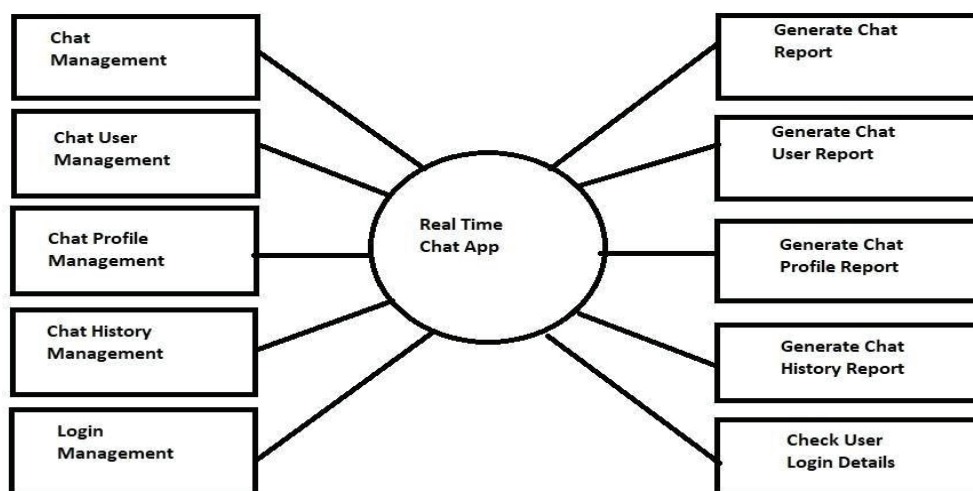


Fig 3: First Level DFD Diagram

8. TECHNOLOGY USED

8.1. JAVA

Java is a high-level, class-based, object-oriented programming language that is designed to have as few implementation dependencies as possible. It is a general-purpose programming language intended to let programmers write once, run anywhere meaning that compiled Java code can run on all platforms that support Java without the need to recompile. Developers use Java to construct applications in laptops, data centres, game consoles, scientific supercomputers, cell phones, and other devices. Java is the world's third most popular programming language, after Python and C – according to the TIOBE index, which evaluates programming language popularity.

8.2. SOCKET

A socket is one endpoint of a two-way communication link between two programs running on the network. A socket is bound to a port number so that the TCP layer can identify the application that data is destined to be sent to. The java.net package in the Java platform provides a class, Socket, that implements one side of a two-way connection between your Java program and another program on the network.

The Socket class sits on top of a platform-dependent implementation, hiding the details of any particular system from your Java program. By using the java.net.Socket class instead of relying on native code, your Java programs can communicate over the network in a platform-independent fashion.

8.3. SERVER

A server instance designed to provide resources for the corresponding chat service is referred to as a chat server. The server receives messages from users of chat clients and subsequently disseminates them to the designated recipients. The server-side of a client/server socket connection can be implemented in a system-independent manner using the Java.Net class `ServerSocket`. If, for any reason (such as the port being in use), the `ServerSocket` constructor is unable to listen on the specified port, it throws an exception.

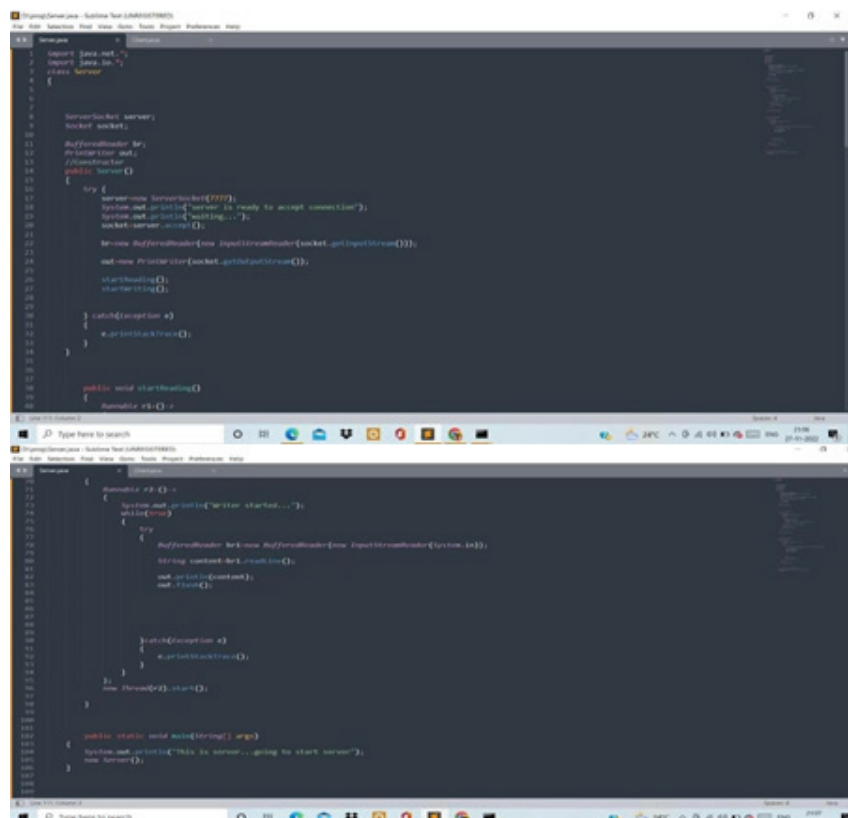


Fig 4 : Server Side

8.4. CLIENT

On its end of the conversation, a client application establishes a socket and attempts to connect it to a server. In this context, the term “caller” refers to the initiator of a method or service. When discussing web services, the server that processes requests is referred to as the server, and the client calling the web service is the ‘client.’ When one server calls another, it can also be considered a client. Once the sender inputs a message and clicks the “send” button, the recipient can view the reply within their chat or instant messaging program. Real- time communication among multiple computer users is facilitated by chat clients

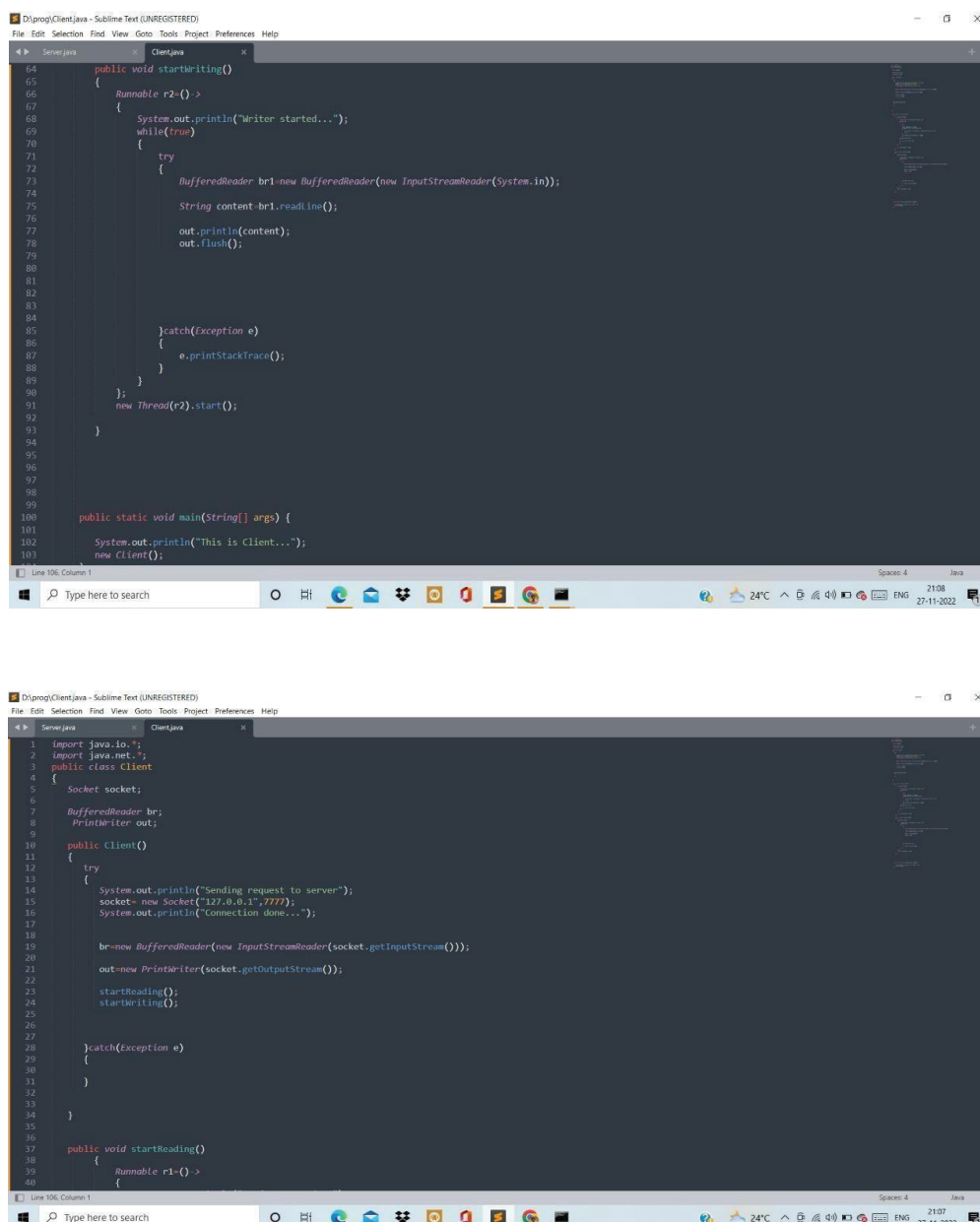


Fig 5: Client side

8.5. VISUAL STUDIO CODE

Visual Studio Code is a free coding editor that helps you start coding quickly. Use it to code in any programming language, without switching editors. Visual Studio Code has support for many languages, including Python, Java, C++, JavaScript, and more. Visual Studio Code is a streamlined code editor with support for development operations like debugging, task running, and version control. It aims to provide

just the tools a developer needs for a quick code-build-debug cycle and leaves more complex workflows to fuller featured IDEs, such as Visual Studio IDE.

9. CONCLUSION

In summary, the Real Time Chat Application stands out as a delightful and distinctive smartphone software. Installing and utilizing the application brings forth numerous advantages. One notable benefit is the provision of a unique QR code for the application. Scanning this code simplifies the process of adding new friends, who instantly become part of our network. WeChat offers a wide array of features, including voice chat, walkie-talkie functionality, video calls, and more. While the walkie-talkie can be used for convoy activities or other engagements, it requires internet access. Without an internet connection, certain features may be inaccessible. Conversely, the WeChat app is available at no cost. Unlike WhatsApp, which involves payment at a specific juncture, WeChat's subscription is also free. With this program, we have the ability to oversee our contact list, determine who becomes friends with us, and regulate who can view our moments.

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