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Android Chatting App

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Abstract-
Voice over Internet Protocol (VoIP) is a technology that allows users to make voice or video calls using a broadband internet connection or mobile internet service. In this project, we will learn the basics of VOIP in the application by using firebase as a backend or connection module between user and user, user to multiple users, and multiple users in a group or multiple groups. Our Chat App can be a social media tool that utilizes technological advances, allowing users to talk and share media. It gives you a feeling of being connected to the people you know. It is commonly used to send text messages, voice messaging, make voice and video calls, share updates and photos, share places, improve local pidgin English, play games, and make financial transactions.

Keywords: Android Application , Agaro .io SDK , Flutter SDK , WebRTC 4.0, Voice and Audio Interface , Firebase SDK.

1. Introduction

There are a number of published papers outlining the various ways in which voice and data networks can “combine” into a single global communication network. This paper deals with the technical aspects of implementing VoIP, without speculating on the timetable. A large number of factors involved in making a high quality VoIP call. These features include speech codec, packaging, packet loss, delays, delay delays, hence the QoS provision specification. Other features involved in making an effective VoIP call include decision-making protocol, call management, security concerns, as well as NAT and firewall interruption capability.

Although VoIP involves digital voice transmission in packets, the phone itself can be analog or digital. The voice can be digitized and coded before or simultaneously packaging. Many factors determine voice quality, including codec selection, echo control, packet loss, delay, jitter variation, and network configuration. Packet loss causes voice loss and jumping. Some codec algorithms can repair a few lost voice packets. Generally, only one packet can be lost in a short period of time for codec editing algorithms to work. When the end-to-end delay becomes too far away, the conversation begins to sound like two sides talking on Citizens Band radio. The buffer on the receiving device always compensates for jitter (change of delay).

2. Statement of Problem

Starting any app or service has many limitations but, one of the many problems is what tool, language, stack, or framework for creating your service or application. Creating a real-time application should work with message delivery slow delays, payout data transfer rates, network, should be as low as possible. Other problems include SMS messages and cross-platform permissions for android and IOS.

• Messaging
Texting to one person is the main use of our app. like other social networking apps, you have a list of personal conversations. This feature is important as you will be adding people in different ways and in the usual way of collecting data. When fully functional, you will be amazed at how people will need to scan their phones during data collection. this is usually done as each user of our app will have one way to connect by phone number. The great public power of our app will be released because it will be one of the many ways people communicate in Nagpur. Even if we do business, people will prefer our app to send an email. With the inbuilt plug-in, which allows people to upload photos, videos and contacts can comment on them, 3 then the natural barrier will be broken and information will increase.

• File transfer
With the hidden design of the app, people will be ready to share files without size restrictions from photos, videos, to large document files like zip, dmg, and so on. As long as you have a smartphone with android or iOS running on it, it is often linked to our app to see this. The distinction of this app is that it works seamlessly with your operating case and saves you the type of download and download file because the mobile device becomes the number to download files with the help of your smartphone when downloading. cost, thus helping the planet to get closer together.

3. Objective

1. Echo reduction, packet loss, using clear data bandwidth.
2. Use of Firebase as a single point unit for all functions.
3. Use Ago.io as the SDK to achieve a brilliant audio and video interface.
4. Creating an android app that can support all devices and can work on older phones and new generation android phones.
5. Data transfer between two or more android phones in a second and a half seconds
6. Use local service within 24 hours.
7. Reduce jitter between sound frequencies.
8. Increase audio bitrate in calls from 128 kbps to 320 kbps.
9. Increase video clarity from 360p to 1080p.

4. Literature Survey

The great advantage of VoIP is that it is a cheaper option for calls. Another important benefit is having the ability to combine calls with business data. It means you will use call center style technology for each incoming call that catches on-screen scammers with customer details. otherwise, you can add 'Click the call button to your website.

If you consider that a typical job spends many hours a year on the phone, it is easy to see why VoIP is attracting so much attention. Many large corporations from banks to retail companies use voice telephones. due to the high cost of internet access (such as Broadband) is declining, VoIP is now accessible to small businesses. Some telecommunications companies and Internet Service Providers (ISPs) now offer voice-based IP deals for small businesses. Traditional calls work by assigning an entire call to each call. With VoIP, voice data is compressed, and with VoIP, in your network, you will increase calls and increase the volume of calls without using an additional cable.

• ***Strength***

PBX (Private Branch Exchange) phone systems have a port number for connecting phones. VoIP systems offer great flexibility as you will use 'a few real users per socket network.

• ***Reduce operating costs***

Because the VoIP-enabled system is software-based instead of hardware, it is easy to manage and maintain the system.

• ***Improve productivity***

VoIP treats the voice as if it were other silent data, so users can attach documents to voice messages or participate in virtual meetings using shared data and video conferencing.

• ***Wireless***

With wireless LAN in place, mobile devices such as PDAs and smartphones can use your VoIP system. If you are installing a wireless LAN, you may want to make sure you have the appropriate security guarantees available, such as firewall or encryption.

• ***Improved customer service***

By adding a ‘Click to speak’ button on the Internet, VoIP-enabled business can put web users in touch with customer care staff. You will also evaluate the use of customer relationship management (CRM) software. Incoming calls can automatically trigger pops with customer account information and link to history.

• ***Reliable call management***

Voice-related services, such as tracking me, call ID, call, and broadcast message, are easy to maintain and can be updated as required by your staff.

• ***Adaptability***

Virtual Private Network (VPN) is a given amount of bandwidth on a public Internet where public access is restricted by encryption. If your company has its own VPN and integrates it with VoIP, you will find a fully functional office where there is a broadband connection. Greenfield areas are usually operational and operate in minutes and not weeks.

• ***VOIP analysis***

To create the right network design it is important to understand all the caves and the internal functioning of communication technologies. This section describes the many problems facing Voice IP.

5. Proposed Work (With System Architecture)

Our proposal for voice and call features should not be limited to 200 kbps (360p), we need the more advanced WebRTC side to increase bitrate and pixel density to increase video clarity and reduce jitter and packet loss. Technically it is possible when each app member is connected to a specific ISP high bandwidth and a stable connection that can support the configuration we suggest.

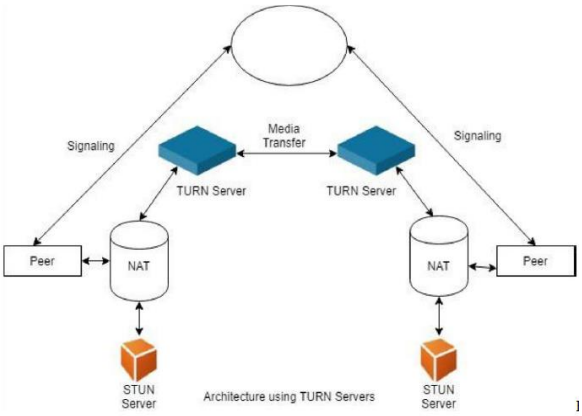


Fig No 1. shows the way the past and present connection is made between the peers (users) to connect between them.

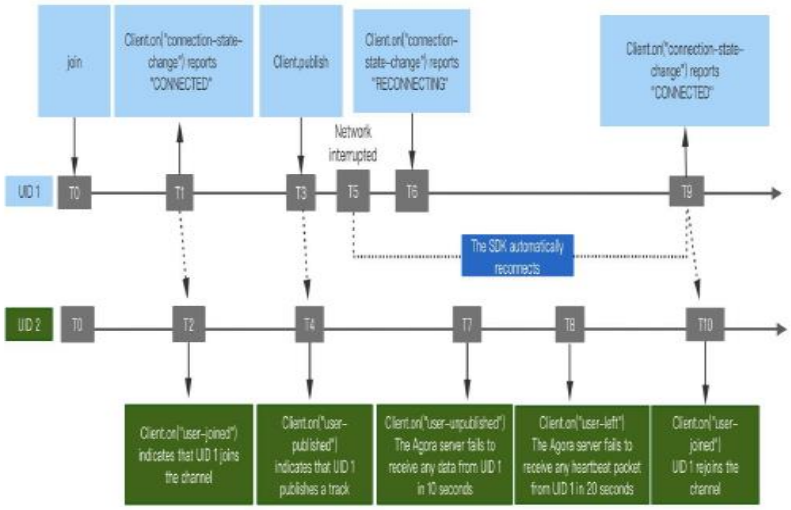


Fig No 2. shows the way should be in the future connecting

6. Techniques

1. WEbRTC 4.x

WebRTC 4.x is the latest trend on the market with sophisticated technical background to give better results which we need in increasing the video and calls bitrate output.

2. Firebase for maintaining connection stable between users.

Firebase is a Google platform SDK which has multiple servers in whole over world and can keep the connection stable as long as it is needed between users, multiple users, and multiple groups.

3. Different Smart phones with different possibility of results.

Every smartphone has a different hardware and software capability, and give us the results which we need accordingly and find a single channel line where everyone using smart phones can have better video and voice calls in higher bitrate and clarity with reducing the jitter and packet loss in between the users.

7. Hardware and Software Requirements

1. **Android Smart Phone**
ARM Processor with minimum of 1 GB Ram and internal memory of 512 MB.

2. **Firebase**
Firebase is a Backend-as-a-Service (Baas). It provides developers with a variety of tools and services to help them develop quality apps, grow their user base, and earn profit. It is built on Google's infrastructure.
Firebase is categorized as a NoSQL database program, which stores data in JSON-like documents.

3. **Agaro.io**
The Real-Time Engagement Platform for meaningful human connections.People engage longer when they see, hear, and interact with each other. With Agora, you can embed vivid voice and video in any application, on any device, anywhere.

8. Modules

- **Image Sharing**

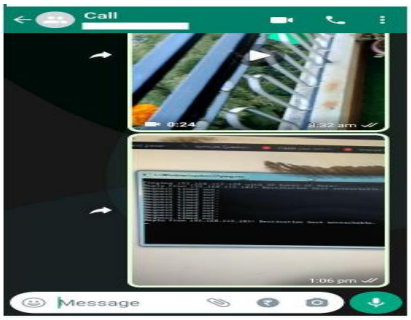


Fig No 3. Shows how the images are shared between users who are in different phones and virtual phone particularly androids.

- **Video Sharing**

Fig No 4. Shows how the videos are shared between users who are in different phones and virtual phone particularly androids.

- **Audio Sharing**

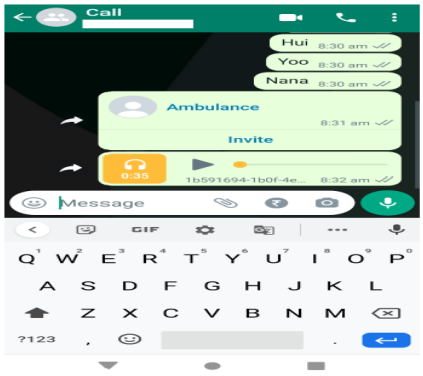


Fig No 5. Shows how the audio messages are shared between users who are in different phones and virtual phone particularly androids.

- **Contact Sharing**

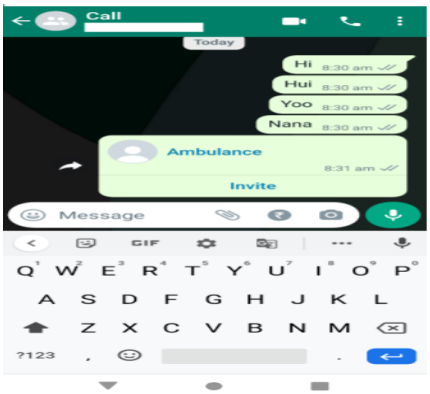


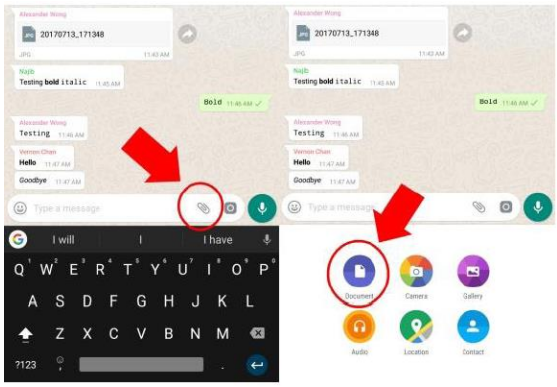
Fig No 6. Shows how the contacts are shared between users who are in different phones and virtual phone particularly androids.

- **Location Sharing**

Fig No 7.Shows how the location sharing between users who are in different phones and virtual phone particularly androids.

- **File Sharing**

Files sharing are nothing but sharing of data of phones from sd card or internal space between users through WEB or internet in a cloud space.



- Emoji Support
- Higher Bitrate Voice Calling ie from 128kbps to 320 kbps
- Higher Bitrate Video Calling ie from 360p to 1080p.

9. Conclusion

In conclusion we came up with a rigorous test and bitrate conversion based on unusual jitter and packet loss, we realized that we were on the right track to get better communication between users using the Ago.io framework instead of WebRTC 3.0 or less, lower latency and higher clarity. That When we use any high-tech Information Technology infrastructure we hope to be more efficient in video calling and clearer voice calling with a clearer video interface than buggy 360p. And this Agro.io framework gives us this ability to achieve the things we want to achieve in this project.

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