e-ISSN:2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

VIDEO CONFERENCING SOLUTION THROUGH OPEN SOURCE SOFTWARE

Prasanna Bisen*[1], Prinkal*[2], Dr Neha Agrawal*[3], Ms. Meenu Garg*[4]

*[1,2,3,4]MAIT, Department Of Information Technology, Delhi, India.

ABSTRACT

Video conferencing is a technology that allows users in different locations to hold face-to-face meetings without having to move to a single location together. ... Uses for video conferencing include holding routine meetings, negotiating business deals, and interviewing job candidates.

I. INTRODUCTION

The pandemic brings us a new reality where people cannot be near each other and social relationships take a new breath. Staying at home is not easy for anyone, and that is why the video calls are gaining popularity. Online conference apps help to maintain business and family connections when you can't all appear in the same room. In existing system video conferencing setup is a cost effective process which require costly equipment with high quality sound and video systems. By using communiqué technology we can implement a video conferencing system with low cost and high efficiency. There is a wealth of video conferencing and video chat apps to choose from. However, if you're talking about personal matters or discussing the details of a business contract, you need to know the service you're using will protect your privacy. Maybe it's the privacy issues, the security issues, or just the whole misrepresenting its encryption thing. Regardless of the specific reason, you know that there has to be a better video-conferencing tool out there, and you're determined to find it. Though such system already exists and used for long time now, but now the adoption has increased multifold. The usage in classrooms, for example now almost video-conferencing is almost universal among school, university and offices across the globe and forced us to do Work-from-Home for their employee, necessitating the need for virtual meetings and conferences give references. All of this has put previously existing solution to server test, not This project will overcome the problem and effects of data security and privacy violation done by video service provider. We are proposing an alternative way to make a more secure video call, improved by an open-source community that will reduce the data breaching and increases the video call security on the internet not least in terms of scale. A variety of solutions have become popular -Zoom, Microsoft Teams, Cisco WebEx, to name a few. However, all of these tools are proprietary platforms, thereby not just in-creasing the cost of adoption but also raising critical privacy concerns. It is in this context that the need for a privacy-preserving / privacy-respecting video conferencing system be-comes the need of the hour. Many governments and government establishments across the world have either issued warning about their usage or directly banned these applications. Such a VC system must also be:

- Scalable - able to cater to an increased number of users, quickly
- Privacy preserving - should give the option to self-host and the source code should be freely available for public scrutiny
- Secure - communications must be encrypted and prevent eavesdropping
- Robust - able to with st and network failures, system errors cerate

It is an open-source JavaScript WebRTC application and can be used for videoconferencing. One can share desktop and presentations and with just a link can invite new members for videoconference. It can be used by downloading the app or directly in a browser and it is compatible with any recent browser. Every user can use Jitsi.org servers or can download and install the server software on a Linux-based machine.

II. BACKGROUND

Jitsi is a set of open-source projects that allows you to easily build and deploy secure videoconferencing solutions. At the heart of Jitsi are Jitsi Video bridge and Jitsi Meet, which let you have conferences on the internet, while other projects in the community enable other features such as audio, dial-in, recording, and simulcasting[1].

Aws (Amazon web service) provide infrastructure service to business in the form of web service now commonly known as cloud computing.

e-ISSN:2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

2.A Specific jitsi-meet Project

Jitsi Meet – Secure, Simple and Scalable Video Conferences that you use as a embed in your web application

Jitsi Videobridge – the media server engine that powers all of Jitsi's multi-party video conferences

Jigasi – a gateway service that connects SIP telephony to a Jitsi Video bridge conference

Jibri – a broadcaster and recorder used for saving video call recordings and streaming to YouTube Live

Jidesha – a Chrome and Firefox extension for screen sharing

2.B Specific Aws tools

Ec2 Service

III. SYSTEM UNDER TEST AND ENVIRONMENT

A) Cloud and Network Settings

Cloud and Network Settings All tests were done using Amazon Web Services (AWS)Elastic Compute Cloud (EC2). Each SFU and each of its connecting web client apps were run on separate Virtual Machines (VMs) in the same AWS Virtual Private Cloud(VPC) to avoid network fluctuations and interference. The instance types for the VMs used are described in Table I.

B) Web Client Applications

To test our server with the parameter to collect useful information, we made the following modification to corresponding web client apps:

- increase the maximum number of participants per meeting room to 40
- support for displaying up to 9 videos with the exact same dimensions as the original test video (540×360 pixels)

C) Metrics and Probing

1) Client-side: Video Verification

Once a<video>element has been loaded, we verify that it displays a video and that it is neither blank, static nor a frozen image.

2) Client-Side: Video Quality Assessment

Chrome will be launched with a fixed window size of 1980×1280 pixels, and the screenshots are taken using the jitsi function which will generate a PNG file of the same dimensions

IV. RESULT

1. Quantitative Results

Below figure represent the rate of success and failures that occur during the test

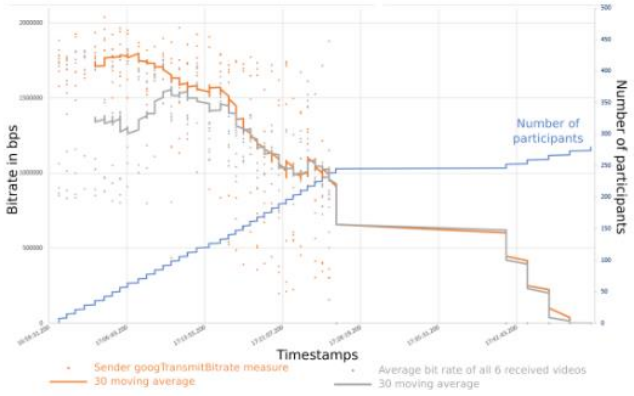

Fig 1 (success and failure rate)

e-ISSN:2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

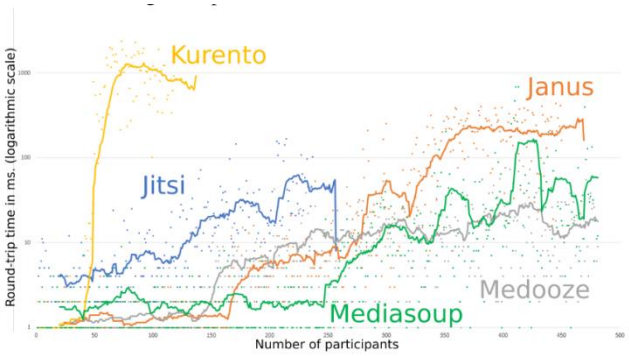

Fig 2 (Number of participants vs round trip)

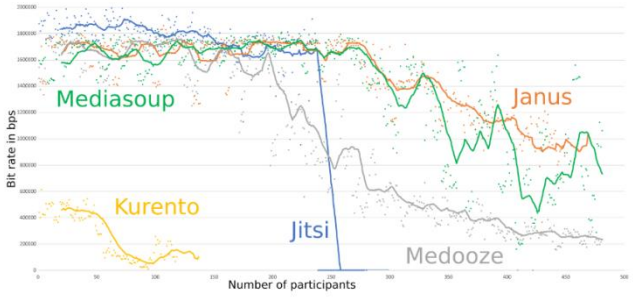

Fig 3 (Number of participants vs Bit Rate)

Jitsi is able to keep about the same image quality score for the whole test. Even when 200 participants have joined the test, image quality remains stable,

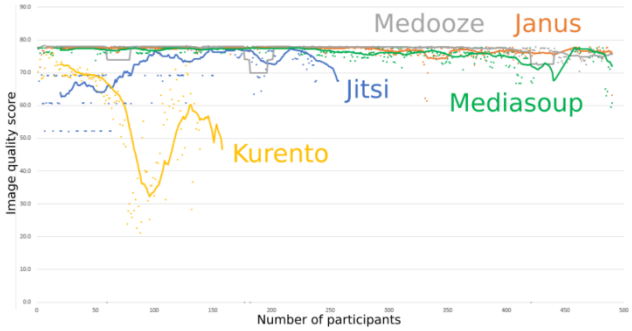

Fig 4 (number of participants vs video quality)

2. Video Quality Assessment

Estimation of video quality scores is presented in Fig. 4c.One may expect video quality to deteriorate as the average bit rate measured falls down, but the graphs of video quality remain remarkably flat until the end of the test.

V. LIMITATION

1. Only 210 participant can join a room at a time. After 210 participant room automatic disconnected from all the user from the room
2. We cant create two room of same name. If we try to create two room with same name then it will treat as single room

VI. ANALYSIS

This study exhibits interesting behavior of aws and jitsi meet that have been evaluated when they have to handle an increase in the number of room and peers in the jitsi meet Jitsi has some internal problem that makes it suddenly stop transmitting videos when there are more than 245 peers in the test.

e-ISSN:2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

Figures and Tables

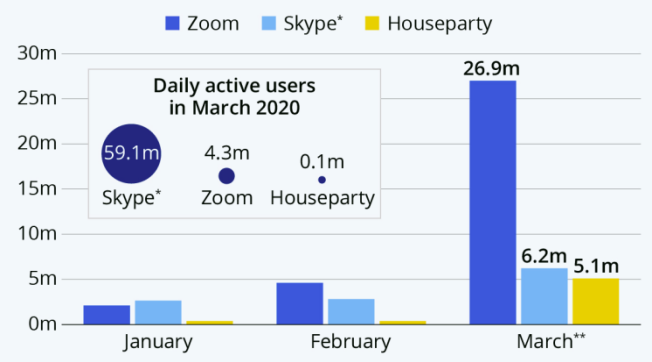

Fig 5 surge in Demand of video confessing.

Table 1 (Overview of the sender's video statistics collected on each web client)

	SFU	(A) Available send bandwidth (bps)	(B) Actual encoder bit rate sent (bps)	(C) Transmit bit rate sent (bps)	(D) Target encoder bit rate sent (bps)	(E) Average bit rate video sent (bps)	(F) Sender googRtt (ms)
MIN (value > 0 only)	Jitsi	113,118	153,952	156,744	113,118	130,881	1
	Janus	744,557	676,624	690,904	744,557	611,518	1
	Medooze	92,471	79,440	83,184	92,474	94,565	1
	Kurento	34,476	28,088	32,272	34,476	35,501	1
	Mediasoup	93,617	91,488	95,576	93,617	93,860	1
MAX	Jitsi	8,342,878	2,397,504	2,544,144	1,700,000	2,218,333	168
	Janus	5,000,000	2,081,072	2,108,224	1,700,000	1,963,089	435
	Medooze	9,130,857	2,782,136	4,660,656	1,700,000	4,052,553	103
	Kurento	600,000	893,912	1,003,728	600,000	676,504	2,371
	Mediasoup	7,184,000	2,049,872	2,088,776	1,700,000	2,131,814	688
Average	Jitsi	2,830,383	1,360,703	1,392,607	1,362,722	1,388,670	18
	Janus	4,210,276	1,647,705	1,677,538	1,641,714	1,682,062	61
	Medooze	2,309,558	1,000,979	1,045,173	1,009,288	1,044,573	10
	Kurento	369,775	335,393	359,979	356,457	359,540	576
	Mediasoup	2,326,640	1,385,142	1,416,096	1,401,947	1,414,368	18
% bit rate > 1 Mbps (columns (A) to (E)) % RTT > 50 ms (column (F))	Jitsi	65.4%	65.4%	65.7%	65.4%	65.7%	6.4%
	Janus	98.9%	98.4%	98.4%	98.4%	98.9%	27.8%
	Medooze	47.4%	47.4%	47.8%	47.8%	48.6%	1.9%
	Kurento	0.0%	0.0%	0.8%	0.0%	0.0%	59.3%
	Mediasoup	77.6%	76.1%	76.9%	77.6%	76.3%	6.5%

VII. CONCLUSION AND FUTURE SCOPE

We have show that it is now possible to create videoconferencing solution hosted on our own server . Several bugs and oddities have been found and reported to their respective team in the process This work was focused on the testing system, and not on the tests themselves. In the future we would like to add ssh certificate to ensure our user to is end to end encrypted ,for example using certbot we can ensure encryption . We would like to extend this work to variations by hosting this service on specified urls and making changes in UI according to our needs

ACKNOWLEDGMENT

We would like to thanks Boris Grozev (Jitsi), dr Neha Agrawal () and other media server experts who provided live feed back as early as possible

VIII. REFERENCES

[1] https://jitsi.org/what-is-jitsi/

[2] https://indiarxiv.org/e94u3/

[3] https://scihub.scihubtw.tw/https:/ieeexplore.ieee.org/abstract/document/8567642.