

Virtual Classroom on LAN

Rohit Kumar¹, Anmol Singh Matharu², Prabjyot Singh Solar³

¹(Information Technology, Mumbai University, K.C.College of Engineering, India)

²(Information Technology, Mumbai University, K.C.College of Engineering, India)

³(Information Technology, Mumbai University, K.C.College of Engineering, India)

Abstract: In today's world video conferencing plays a key role in communication areas. The communication may be point to point or may be multipoint communication.

This sought out the geographical gap to minimum level. This is widely used in many sectors let it be for corporate world i.e., for business conference or for education purpose i.e., for distance learning, remote education, teleshopping, group design & remote operation, which are necessary for various group activities. This paper proposes a video conferencing system that works on lan along with the internet facility if needed.

Keywords: lan, video conferencing system, virtual classroom

I. Introduction

In this digital era, video conferencing system has now become an unavoidable segment of advanced society. This furnishes many facilities such as right to equal education quality, medical facility and also a lot useful for industrial and commercial development of a country. All this is totally possible due to the high growth in the fields of image processing, video capturing, compression technique etc.

Our primary focus is on education that will be very must useful for our future generations. This enables all people to get into telelearning, for the purpose of learning people from all over the world will get connected. Video conferencing system is a very powerful too 1 with an alloy of visual and acoustical components of communication which helps in the learners to interact with each other.

Everyone uses internet, some would be heavy users and some would be mild users. Heavy users i.e., heavy data consumer would be knowing best what are the issues with the internet, when the internet goes off. For instance you are working on internet and suddenly internet goes off or any related problems occur then everything gets messed up.

Similarly in the situation of video conferencing, as long as everything works fine and all the required resources are available to work on internet that's well and good but when we face any interruptions with internet like packet drop, low bandwidth etc, we are in hectic situation. So when an institution is connected on the same lan then we don't need any internet connection.

II. Distance Learning

Distance learning many a times known by the name of e-learning. This is normalized teaching and learning system particularly designed to support remotely education using electronic equipments.

Just because e-learning is a lot inexpensive to support and not bind to limited area, this offers n numbers of opportunities where traditional approach of teaching was considered or was delivered.

Individuals facing problem like scheduling of time or distance related problem would be benefited from this as this system provides all those solution of the problems that aroused earlier.

Popular technology of distance learning are :-

- Voice centric technology – includes CD or mp3 recording
- Video centric technology – includes instruction videos, DVD etc.
- Computer centric technology – delivers over internet

III. Advantages & Disadvantages Of Video Conferencing

A. Advantage:-

- No time constraint – Video conferencing can take place anytime and basically anywhere in the world. Time constraint doesn't impose on this.
- No cost travel – This system is the replacement of in-person meeting.
- Easy communication – Communication made easy by video conferencing with a lot tools like whiteboard, file sharing etc.
- Increased productivity – With this system, time and distance barriers is eliminated thus, meeting can take place anytime, anywhere and with awesome tools decisions can be taken fast and effectively.

B. Disadvantage :-

- Lack of personal interaction: Many a meeting that require personal touch that won't be conveyed unlike face to face meeting.
- Technical problems: This is one of the major drawbacks that this needs a technical person always to run or in the absence of that person leads to high difficulties for the company.
- High cost of setup: For a startups or a small size companies would have to bear the cost of the setup which leads to increase of budgets for them.

IV. Other Open Source Video Conferencing Software

A. Jitsi

Jitsi[1] is an open source video conferencing software. It is totally based on two tools – Jitsi video bridge and Jitsi meet. They both together work to facilitate video conferencing software. This furnishes audio, recording, dial-in and simulcasting. On their website it's mentioned that Jitsi meet is an open source and that to an alternative option for Skype.

You can even download their software locally on your computer to start video conferencing or one can even use their free version of web based video conferencing tool. They even provide the well built document which will help users to setup the Jitsi on your own servers.

Jitsi apps are available on Android as well as iOS. Jitsi works on JavaScript and some react components. It has a great UI (User Interface).

Features –

- Audio & Video support
- Recording
- Chat
- Scalability
- Live streaming
- Jitsi is compatible with WebRTC (Real time communication)
- Jitsi supports video routing.
- Web, Android, iOS, React-native, and Electron apps
- Ubuntu and Debian package available for hassle free installation

B. Apache OpenMeetings

The open source Apache foundation is with heavy range of projects and from that we have OpenMeetings[2]. It furnishes video conferencing with many other features including instant messaging, whiteboard and collaboration document editing. For the purpose of streaming, this uses an API (Application Program Interface) of other open source software which is a Red5 streaming server used for remoting & streaming. This user is provided with an option to choose multiple resolutions of camera such as 4:3, 16:9 or 3:2. OpenMeetings video conferencing software provides four modes of usage ie., audio & video, audio only, video only and picture only.

After recording, the session can be downloaded in AVI/FLV files.

Features –

- Audio and Video Conferencing
- Meeting recording
- Screen sharing
- Drag and Drop File-Explore
- File Explorer
- Moderating System
- Multi-Whiteboard and Chat
- User and room management
- A wide range of document formats (PDF, DOC, ODT, PPT, etc)
- Private message center
- Plan meetings with integrated calendar
- Polls and Votes
- Backup

C. BigBlueButton

BigBlueButton[3] is another great & powerful open source web conferencing system, specialized for students, teachers and schools. It is also self hosted program like others. This allows users to use many features including sharing of audio, video, slides, chats and desktop with others.

You can use a feature called creating poll and record the conference alike OpenMeetings. Whiteboard feature in BigBlueButton has an awesome ability to zoom, draw & write, highlight on the presentation.

BigBlueButton is built on top of LMS (Learning Management System) to meet WCAG 2.0 accessibility standards. It is well integrated with Canvas, Drupal, Atutor, Chamilo, Fedena, Moodle, Sakai, Tiki Wiki CMS, Wordpress, LTI, RedMine and Schoology.

Features –

- Audio & Video conferencing
- Slides
- Chat room
- Private message
- Live whiteboard
- Conferencing Record
- Polls and Votes

D. Mconf

Another great and dedicated video conferencing software based on an open source software ie., BigBlueButton.Mconf[4] – Live is its web based video conferencing software that is very well customized edition of their basement ie., BigBlueButton. In addition to BigBlueButton’s feature they added many feature such as layout module, video dock, guest feature, global audio, etc.

Other than Mconf-Live, they also have Mconf – Web and Mconf – mobile client. Mconf-Web is web based video conferencing application which is developed on Ruby on Rails to furnish GUI (Graphical User Interface) between Mconf& user. In this they provide all users a separate web conferencing room in which they can discuss in their group space where likeminded people discuss with each other.

Mconf-mobile client is an app available for both Android &iOS. This is developed on Adobe Air framework.

Features –

- Audio/video conferencing
- Presentations and whiteboard
- File explorer and sharing
- Recording
- Transparent integration
- Customization and visual identity
- Screen sharing
- Whiteboard
- Chat rooms
- User and room management
- Moderating system
- Meeting planner and calendar
- Mobile applications

V. Types Of Video Conferencing Technology

A. Desktop Video Conferencing:

This video conferencing technology is commonly used by many people and organizations. This has been developed to satiate the industries requirement for video conferencing technology. This furnishes H.323 voice, application & video sharing.

This comes with easy installations, bulky hardware and add-in boards. This is one of the most affordable video conferencing technologies. Many users are satiated with this technology.

If anyone doesn’t have desktop they may use laptop for their purpose. Many people prefer this system. As both device ie., desktop & laptop has built in speakers and microphones in it. This facilitates effective & fast communication.

B. Integrated Video Conferencing:

This is one of the newest video conferencing technologies. This type of technology is often used in conference rooms or in classroom in which we have multiple participants. This technology includes centralized location, routed processors, the cameras and other video devices.

C. Monitor Codec:

This is rated as one of the best video conferencing technology as this offers the minimum disruption to the video conferencing system. This comes with double duty hardware. This saves time by transforming the computer to video call display when required and revert it back when calls ended or disconnected.

D. External Codec:

This technology requires an external display, camera, speakers and microphone. This fits to an individual who wishes to roam around when on call as this freedom is given by codec. For the videoconferencing to be successful, negotiation of video and audio codec must be there by the both participants. Common Codec video conferencing systems are H.264, H.261 and H.263+.

E. Room-based Technology:

This type of technology is use when multiple people wanted to communicate via video conferencing. With this below considerations should also look onto:

- How many sites will be on a video call?
- How many locations will initiate a call?
- How many displays will be used?

This technology will let participant hosts very high quality videoconference in effortless manner.

F. Telepresence Video Conferencing:

This technology includes a series of technology which allow the person in communication or discussion would feel as if physically they are present in front of them. This is one of the closest representations of a life-like meeting, because all the persons make eye contact with each other.

G. Multiway Technology:

This is the exact representation of new video conferencing technology. This system is a lot useful for business people who have established many premises at different locations and also wanted to get into a collaborative meeting. Because of the, we needed multiway capabilities as we need more than one video conferencing system in call. Many manufacturers offer 4-way, 6-way and 8-way multiway technology solutions.

VI. Features

- A. Electronic whiteboard** -- This feature gives privilege to video conference participants to draw or write on the board and can also upload image or documents. This also has the capability to host more pages which can be easily accessible b the participants. Other functionalities include zooming, pointers, etc.
- B. Screen sharing** – This feature sets up privileges for multiple participants to communicate via program that is running on a single machine. With this feature if a participant is not having the particular software for the document then also they can view the document.
- C. File transfer** – In this feature one participant can send or receive any file from other participant. All is required is FTP server & FTP client.
- D. Recording** – In this feature, we can record the audio & video that’s currently going on. After recording we may play the recorded video in the ongoing video conferencing for all participants to view.
- E. Chat room** – With this feature participant can chat with group or can personally chat with each other.
- F. Calendar Integration** – With this feature anyone with the invitation can automatically add the event to their work calendars.
- G. Moderation** – This feature allows the host of the conference to add, drop and mute participants.
- H. SIP compatibility** – This helps the video conferencing system to work effectively and flawlessly with the company’s SIP (Session Initiation Protocol) compatible desk phone.

VII. Conclusion

The use of video conferencing application is not only limited to conferencing between corporate but also can be implemented to learning phase. It can be molded to such a product that can provide ease of getting connected to a faraway teacher. With such an interactive application we can get the feel of teacher teaching in a classroom full of students including two way interactions.

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