

# Critical Evaluation of Software Based Videoconference Solution for Telemedicine

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## Abstract

*Video-conference is one of the main features of any telemedicine technology platform. Currently, telemedicine platforms deployed across the country are hardware based. For mass scale deployment it will work out expensive. Alternate video-conference solution based on software needs to be worked out which not only meet the purpose but also work out cheaper and can be configured in portable telemedicine platform. A study to this effect was carried out at the School of Telemedicine and Biomedical Informatics, SGPGIMS, Lucknow to evaluate the video-conference based on IP solutions available currently on the following parameters - quality of video and audio, option of VoIP (Voice over Internet Protocol), compatibility with industry standard protocols, ease of installation & integration, user friendliness and machine dependency, conference recording, features of desktop and application sharing, file transfer and power point sharing, optimum bandwidth requirement etc. Result of comparative evaluation forms the basis of this study.*

## 1. Introduction

The emergence of IP-based Web and video conferencing, accomplished by installing software on one server and providing access to other individuals on standard PCs with broadband Internet connections, will undoubtedly add to the eventual widespread adoption of telemedicine and telehealth programs throughout the country and the world. As the cost of PCs and video conferencing software decreases, it will make traveling great distances for diagnosis and consultations a thing of the past much like the doctor house call. It is very difficult to bring people from heterogeneous network in a same conference whereas in case of software based video conferencing people from anywhere in the world can attend the conference using their own PC. Several solutions are now available in the market but limited information could be found in the literature comparing and evaluating the technical features of these products suitable for integration in telemedicine platform<sup>1</sup>. A comparative study was undertaken at the School of Telemedicine and Biomedical informatics, Sanjay Gandhi Postgraduate Institute of Medical Sciences (SGPGIMS), Lucknow for evaluation of various IP based video-conference solutions with a set up pre-determined criteria to find out the solutions appropriate for telemedicine purpose.

## 2. Material and Method

Currently available IP based video-conference solutions integrated into a low cost telemedicine platform using both wired and wireless broad band were included for the study. Following software products were included - Team viewer®, Skype®, Netmeeting®, Webex®, Polycom PVX®, Vennfer® and People-Link®. For proof of concept study remote telemedicine partners were connected with broadband internet up to 256 Kbps. A low cost telemedicine platform was designed on a portable Personal Computer (PC) based on Intel Atom processor (Daman et al., 2010a). Both the native camera and webcam were used for video-conference. The following features were taken into account for evaluation - Quality of video and audio, Option of VoIP (Voice over Internet Protocol) and support most of the Industry standard protocols., Installation setup, user friendliness and machine dependency, conference recording, Features of desktop and application sharing, File transfer and power point sharing, Optimum bandwidth requirement. Different types of connectivity modes i.e both wired and wireless based on IP were used during the video-conference session (Daman et al., 2010b).



### 3. Result

The result of the comparative study was summarized in Table 1 and Table 2. Detail technical features of each solution studied are given below.

Table 1: Summary of comparative technical features of IP based Video-conference software

Software	AS	V	A	F T	M C	R	HD
Team Viewer	✓	✓	✓	✓	×	×	×
Skype	✓	✓	✓	✓	✓	×	✓
Netmeeting	✓	✓	✓	✓	✓	×	×
Webex	✓	✓	✓	✓	✓	✓	×
People Link	✓	✓	✓	✓	✓	✓	✓
Polycom PVX	✓	✓	✓	✓	×	×	×
Vennfer unicast	✓	✓	✓	×	✓	×	×

Table 2: Summary of network support of IP based Video-conference software

Software	Public Network (Internet)	Any Private Network
Team Viewer	✓	×
Skype	✓	×
Netmeeting	✓	✓
Webex	✓	×
People Link	✓	✓
Polycom PVX	Static IP Required	IP required
Vennfer unicast	Static IP required	IP required

#### 3.1 Team Viewer

Team viewer® establishes connections to any PC or server all around the world within just a few seconds. One can control the remote partner's PC as if one is sitting right in front of it. Application sharing, file transfer features and video conferencing are available but there is no provision for multi-point video conferencing. The person would call up the customer to ask his unique number which is visible in his Team viewer ID and accordingly the user can connect to the customer and the remote support can be done. File transfer, VPN (Virtual Private Network) & chat are the other facilities which are included in the software (<http://www.teamviewer.com/index.aspx>).

#### 3.2 Skype

Skype® is a software application that allows users to make telephone calls over the Internet. Calls to other users of the service, and in some countries to free-of-charge numbers are free, while calls to other landlines and mobile phones can be made for a fee. Additional features include instant messaging, file transfer and video conferencing. High Definition (HD) conferencing is feasible with Multi-point conferencing after making a group of participants ([www.skype.com/](http://www.skype.com/)).

#### 3.3 NetMeeting

Microsoft NetMeeting® is a VoIP and multi-point videoconferencing client included in many versions of Microsoft Windows (from Windows 95 OSR2 to Windows XP). It uses the H.323 protocol for video and audio conferencing, and is interoperable with Open H.323-based clients such as Ekiga, and Internet Locator Service (ILS) as reflector. It also uses a slightly modified version of the ITU T.120 Protocol for white board, application sharing, desktop sharing, remote desktop sharing (RDS) and file transfers. The secondary Whiteboard in NetMeeting 2.1 and later utilizes the H.324 protocol. Current versions of windows are not supporting net meeting. It is degraded by Microsoft to promote their other applications like Windows messenger and Windows Live Meeting ([http://en.wikipedia.org/wiki/Microsoft\\_NetMeeting](http://en.wikipedia.org/wiki/Microsoft_NetMeeting)).

#### 3.4 Webex

WebEx® Communications Inc. is a CISCO company that provides on-demand collaboration, online meeting, web conferencing and video conferencing applications. The product family includes Meeting Center, Training Center, Event Center, Support Center, Sales Center, Meet Me Now, PC Now, WebEx AIM Pro Business Edition, WebEx Web Office, WebEx Connect, and others. It is ideal for online meetings, webinars, trainings etc and user has to pay on annual or monthly basis. HD Video Conferencing is currently not available ([www.webex.co.in](http://www.webex.co.in)).

#### 3.5 People Link

PeopleLink's video conferencing is one of the web based video-conferencing software. The solution also features, among others, AEC (acoustic echo cancellation), AGC (automatic gain control), and NR (noise reduction) designed for conferencing applications featuring MPEG4 and H264 video compression algorithms. PeopleLink's VC Conference has an excellent bandwidth adaptability and video compression rate, hence, with its patented



code stream control and bandwidth adaptability mechanisms, ensuring ideal visual effects even with a poor networking condition. The in-built video multi-channel multiplexing technology allows an existing video channel to be multiplexed by multiple video signals for transmission of video data in a coordinated way, thereby enabling video data to be transmitted in an organic way, improving transmission efficiency, saving network bandwidth, and streamlining transmission. Its Web-based Administration, Moderation, and Monitoring tools give the ability to set-up, launch and manage in a safe environment. HTTP proxy support ensures users can chat securely behind a firewall. Highly scalable properly configured environments can easily handle events up to 50,000 users. The system supports PSTN and VoIP services by allowing telephones and mobiles to access the conference. Multiple telephones can access the conference simultaneously (<http://www.peoplelink.in>).

### 3.6 Polycom PVX

Polycom PVX® is easy to set up and is ideal for remote workers or remote sites to communicate visually with organizational offices. With the help of polycom PVX persons can easily share data with other conference participants. It delivers quality video at VGA resolution and enables users with the ability to show their PC desktop using Polycom People+Content™ technology ([www.polycom.com/pvxtrial](http://www.polycom.com/pvxtrial)).

### 3.7 Vennfer Unicast

Vennfer® is IP based video conferencing software solution that enables real-time audio, video, and data communication over LAN, WAN (leased lines, VSATs, VPNs) and broadband by using TCP/IP multicasting technology using a software based MPEG 4 Codec, thus conserving real time bandwidth in case of synchronous audio and video delivery at multipoint locations ([www.intellisysin.com](http://www.intellisysin.com)). AS: Application Sharing; V: Video; A: Audio; FT: File Transfer; MC: Multi-conferencing; R: Recording; HD: High Definition

## 4. Discussion

Telemedicine technology consists visual communication solution, communication media, exchange of multimedia data, IT equipments with the integration of medical equipments & display device. Most of the Indian Telemedicine solutions are configured with hardware based video conferencing system. With wider acceptance of software based video-conference solutions, design of low end telemedicine platform is feasible which would work out cost-effective. All the conferencing

products were tested and checked for proof of concept (POC) for designing a low cost telemedicine platform. The evaluation was carried out on the basis of their functioning and transmission of both video and audio. Team viewer has the ability of remote desktop sharing and conferencing but multipoint video conferencing is not there along with recording facility. Skype has all necessary features for video conferencing. Multiple video conferencing is possible only after creating a group. Products like Vennfer and People Link has an advantage of having a perpetual license i.e. it can be hosted in one's own server hence it's a onetime investment while lots of others like CISCO's Webex, Radvision's Scopio are sophisticated browser based product with a yearly rental. There is no provision of hosting their server at one's workplace. PeopleLink is a good solution to implement as it has all the necessary features which can suffice a good conferencing. Products like Webex, Skype, and Teamviewer works only in Internet / Public network. Polycom PVX works only in local area network and it requires Static IP in Public Network. Multi-conferencing in PVX is possible only if network has any external MCU. Vennfer and People Link are flexible and can extend to any kind of network. The quality of audio and video communication was satisfactory, as was the ease of exchange of information. It is not the substitute of traditional face to face communication but is an alternative when physical contact is not necessary.

## 5. Conclusion

- Telemedicine platform designed on software based video conferencing system is ideal for rural and mobile healthcare setting and would be cost-effective over and above hardware based video conferencing solutions.
- Anyone can use internet web conferencing software based video conferencing system to communicate with others. There is no restriction of using a particular PC or location.
- Evolving software solutions will help to further the growth, acceptance and adoption of telemedicine initiatives. Keeping telemedicine costs low will enable providers to reach out to a broader audience, including those in rural regions and low-income patients who can't afford to travel long distances for care.
- Newer concepts in telehealth like mobile communication based telemedicine platform so called mHealth using wireless broad band communication like WiMax and 3G/4G has opened new vistas for incorporating Software

based VC platform into the newly designed devices.

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