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Web Conferencing for Business

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ASSESSMENT OF WEB CONFERENCING TECHNOLOGIES



Yves Mekongo & David Laratta

“Despite mobile communications and collaboration tools becoming more commonplace in the business environment, many business leaders are failing to exploit them fully and enable their employees to work more efficiently, and crucially, more cost effectively”. Wayne Mason, director Imago Group LLC

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ABSTRACT

Many companies are investing to offer their workforce the best collaboration and web conferencing products they can afford. Many Information Technology scholars believe that efficient collaboration technologies for all are no longer a nice to have but a must have (M2 Presswire, 2014). To that effect, there is a dilemma many corporations and leaders face today when it comes to online collaboration and in which products to invest; Wayne Mayson cited above, claims that many leaders are failing to exploit mobile communications and collaboration tools despite their emergence and their growing accessibility in the market place. The results from this analysis and the proposed methodology will be based on a Voice of Customers approach which providing a high level of flexibility for products comparison. This document prescribes a methodology for products assessment based on the general description of six web conferencing products and their feature specifications. The six products are Skype, AnyMeeting, Google+ Hangouts, Adobe Connect Pro, Cisco WebEx and Citrix GoToMeeting. Those six products are split between free and fee based products. The example given in this paper shows Adobe Connect Pro as the better fee based product and Google+ Hangouts as the better free product.

WEB CONFERENCING EVOLUTION

Over the past couple of decades, the world has witnessed drastic changes affecting the way people do business globally. Many companies are investing to offer their workforce the best collaboration and web conferencing products they can afford. Many Information Technology scholars believe that efficient collaboration technologies for all are no longer a nice to have but a must have (M2 Presswire, 2014). In the quote in the cover page above, Wayne Mason, director of Imago Group brings about the dilemma that many corporations and leaders face today when choosing between web conferencing products.

Web conferencing is a form of real-time-communication through which users connect over the Internet and use features such as texting, voice over Internet Protocol and motion video. Applications for web conferencing include meetings, training events, lectures, or short presentations. There are some general distinctions between web conferencing, audio conferencing and video conferencing. At a basic level, web conferencing focused on content sharing while video conferencing focused on provided face to face interaction. However, it has been really difficult as of late to distinguish between web conferencing and video conferencing. Web conferencing has added two-way video capabilities to the sharing of content. Many additional changes and additions have transformed the two separate technologies into very similar offering.

The web conferencing market was projected to reach \$4.12 billion this year (Frost & Sullivan, 2014). Figure A below illustrates the growing use of web conferencing technologies in various industries and reflects the usability and the need for them. According to the figure, high technology companies utilize web conferencing technologies the most. Banking and financial services follow them with 21% of the general use of web conferencing across industries. Interestingly, the government officials and workers do not rely on web conferencing as much as other industries. That being said, the number of government employees is significantly smaller compared to the other industries represented in the figure so the market share below number is not representative of web conferencing adaptation in government services.

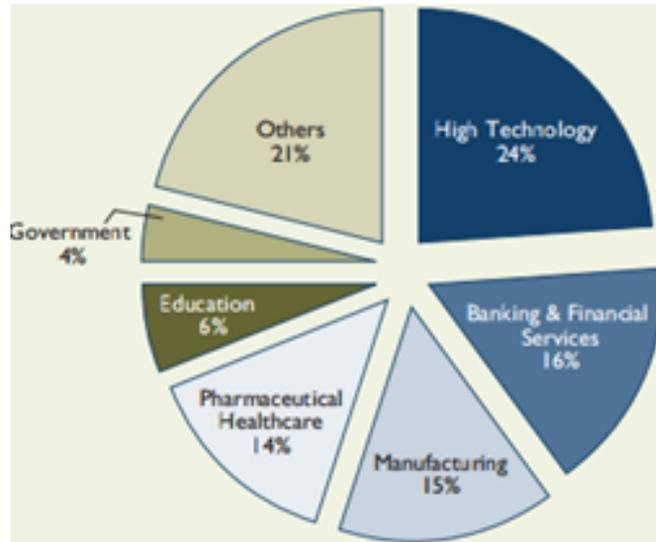


Figure A: Web Conferencing Usage by Industry (Frost & Sullivan)

Why Web Conferencing?

Many web conferencing advocates argue that web conferencing reduces an incredible amount of travel cost and enables companies to utilize those savings on other projects (Lorette, 2014). Considering travel time, distance, travel expenses, charge for meeting room, average hourly rate, phone costs and monthly flat rates, traveling and holding a meeting at a customer's site versus setting up an online meeting will show some interesting results.

Convenience and ease are also crucial in a web conferencing environment. Having an appropriate web conferencing technology enables all users to actively participate in the meetings while enjoying their preferred settings: "technology has made virtual meetings extremely effective and depending on the meeting agenda, a viable alternative to being physically present to discuss business with a customer" (Cote, 2014).

The cost efficiency of web conferencing also ties into new business strategies. Chowdary Sudhir supports the ability for people to collaborate to be mission critical for any organization and that visual collaboration has now evolved from just being a cost-saving tool to a strategic

business advantage (Chowdhary, 2014). Figure B from Frost & Sullivan below illustrates the percentage of people working away from their office desks in North America in the year 2011. Based on their studies and analysis, only 16% of the North American workforce performs fully and solely from their office desk. Figure B is a clear indicator that today's working force needs appropriate web conferencing tools to work remotely and managers must take that into account when developing their internal and external communication strategy.

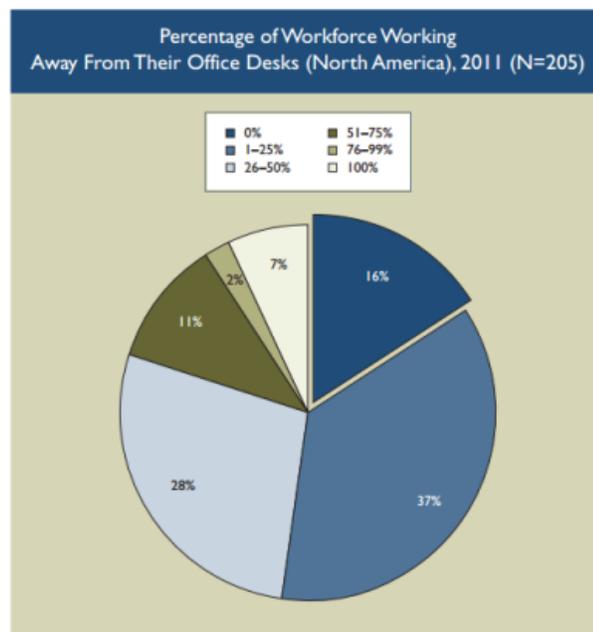


Figure B: North American Remote Workforce, 2011 (Frost & Sullivan)

Early challenges

In the mid 2000's video conferencing was a technology that had promised much but delivered little. The claim was that the systems installed by businesses in the late 1990s and at the start of the twenty first century were unreliable, expensive and produced poor quality sound and video (Pritchard, 2014). In the last quarter of 2013, the International Data Corporation (IDC) indicated a decline in equipment revenue for the video conferencing and telepresence

market of 9.7%. Video infrastructure equipment, including hardware for multi-point control declined 16.7%, and room-based video systems followed with a 5% decrease (IDC, 2014).

Example of Current Web Conferencing Technology Assessment

Gartner's web conferencing magic quadrant(Figure C) is recommended tool for technologies assessment and subject matter references. It categorizes the vendors based on two dimensions; the horizontal axis represents the vision and the ability to execute is translated to the vertical axis. The four resulting quadrants illustrates a competitive positioning of technology providers in the market. It is made of four general categories; leaders, visionaries, niche players, and challengers. The leaders execute well against their current vision and are well positioned for tomorrow. The visionaries understand where the market is going or have a vision for changing market rules but they do not yet execute well. The niche players focus successfully on a small segment, or are unfocused and do not out-innovate or outperform the other categories. Challengers execute well today or may dominate a large segment; however, they do not demonstrate an understanding of market direction (Gartner, 2014).



Figure C: Gartner Magic Quadrant for Web Conferencing (December 2012)

InfoTech Research Group is also a leader in providing Information Technology recommendations. Their web conferencing solution, the “vendor landscape”, paints a slightly different picture compared to Gartner’s web conferencing quadrant methodology. InfoTech web conferencing vendor landscape(Figure E) includes champions, emerging players, innovators and market pillars. InfoTech web conferencing vendor landscape feeds from both a product evaluation and a vendor evaluation. The product evaluation considers features, affordability, usability and architecture; and on the other hand, the vendor evaluation looks at viability, strategy, reach and channel. Amongst the technologies analyzed in this paper, Adobe Connect and Cisco WebEx stand out as champions while GoToMeeting is placed as an emerging player

in the vendor landscape. Figure D below is an illustration of the InfoTech product and vendor evaluation on the different features and the final output of the study.



Figure E: InfoTech Web Conferencing Vendor Landscape

	Product				Vendor			
	Features	Usability	Affordability	Architecture	Viability	Strategy	Reach	Channel
Adobe Connect	●	●	◐	●	●	◐	◐	●
Cisco WebEx	◐	●	◐	◐	●	◐	●	●
Citrix GoToMeeting	◐	●	◐	◐	◐	◐	◐	◐
IBM LotusLive	◐	◐	◐	◐	◐	◐	●	●
IBM Lotus Sametime	◐	◐	◐	◐	◐	◐	●	●
Microsoft Lync	◐	◐	◐	◐	●	◐	●	●

Figure D: Infotech Harvey Ball analysis Harvey Ball scores are indicative of absolute performance ratings but are not an exact correlation. Exceptional performance receives a full black ball, poor performance an empty one, with a range in between.

THE PRODUCTS AND USE CASE EXAMPLES

In 2012, Skype enjoyed roughly 34% of the international call market share (Fierce Wireless, 2014). With Skype, users have the ability to video chat worldwide for free. Skype's free features include account creation, video and voice calls to any registered Skype users, instant messaging and file sharing. Parliament Tutors is a private company that offers private tutoring and preparation for all subjects and tests. Parliament Tutors has relied on Skype for recruiting and training. Parliament Tutors includes Skype as part of the company business plan and give the students the options to meet online from remote areas (Emerson, 2014).

Founded by Costin Tuculescu, the beta version of AnyMeeting was launched in 2009 as Freebinar. Tuculescu's inspiration was to deliver a free ad-supported software business model to bring to the market a web conferencing service. Now under the name AnyMeeting, it has enjoyed a decent level of success with 200,000 registered users and thousands of meetings per month. According to the online blogger Ken Molay, AnyMeeting surged in the small business market for web conferencing solutions by "tapping big-name service providers in a way that is unusual for the web conferencing industry" (Molay, 2013). Following up on their initiative to increase their small market share, one of their action items was to partner with Comcast, Staples App Center and the UPS Store through distribution arrangements.

The latest version of Google+ Hangouts is a free web conferencing application launched in 2013. This application comes out of the emergence of Google Talk, Messenger, and Hangouts. InQuicker, a health-care company, uses Google+ Hangouts to revamp their in-office meetings. By allowing their teams to use Google+ Hangouts for web conferencing meetings, the teams are able to enjoy the many perks of the features that come with the product. InQuicker found that the less formal meetings were both more productive and happier. It helped the group to stop

looking at meetings as a “speed bump” and let everyone stay focused on the task at hand, doing actual work (Barone, 2012).

Adobe Connect Pro is Flash based software with audio, video and multimedia capabilities. Formerly part of the Adobe Acrobat family, Adobe Connect Pro was developed by Presedia, the starter company of Presidia Publishing System. The “first generation” Adobe Connect included PowerPoint-to-Flash Plugin and a training module. Presidia was acquired by Macromedia which was later acquired by Adobe. Tina Hudson gives an example of a course in Applied Behavior Analysis using Adobe Connect Pro at the University of Kentucky. According to her, it allowed the instructors to create a classroom environment suited for the needs of the students in the class (Hudson et al, 2014). Another use case example is the giant in business process and document technology Xerox leveraging Adobe Connect Pro to support training for thousands of employees worldwide. A Xerox manager of global learning raved about Adobe Connect Pro’s deliverables. He claimed that the Adobe solution provides a level of interactivity and security that allowed them to replicate an in-person training experience without the hassles and expenses of actually being onsite (Paz, 2010).

Cisco WebEx is also amongst the leaders in the web conferencing sphere. Its parent company Cisco aims at delivering world class video experiences via telepresence solutions. Palomar Health Hospital in California uses WebEx to connect the medical staff to the patients remotely and efficiently.

Citrix GoToMeeting technology was developed in July 2004 through the combination of the two earlier technologies, GoToMyPC and GoToAssist. GoToWebinar in 2006 and GoToTraining in 2010 expanded GoToMeeting capabilities to accommodate bigger audiences. Even though the focus here is on the fee based package; on March 31, 2014 Citrix GoToMeeting

worked with Google to develop a new free version of GoToMeeting. It allows users to web conference with up to 3 participants.

THE METHOD

Voice of Customer Rubric

The Voice of the Customers (VOC) is an Information Technology term describing the capture of customers' preferences and expectations. The VOC methodology is a widely used technique producing a detailed description of customer wants and needs that are organized hierarchically through prioritization of relative importance. This solution recommendation is based on a Voice of Customers approach providing a high level of flexibility. This document will offer an assessment methodology for potential end users based on the description of six web conferencing products and some of their feature specifications. The potential web conferencing users will utilize a suitable and dynamic web conferencing grid in consideration of their size and business needs. In other words, the description of the considered features and specifications will be helpful to users when evaluating each of the products discussed here or otherwise based on their affinity with the technology and personal preference.

The Weighing and Grading Methodology

There are eleven web product features considered. They are cost, user participation, audiovisual, operating systems and browsers, hardware, file sharing, white boarding, chat, screen sharing, recording and polling. The end users will assess how important the features are to their web conferencing experience independently from any specific product. The feature assessment will bring about a numeric weight ranging from 1 to 11; with 1 being the most important and 11 being the least important.

Following that, the end users will dive into the product specifications and grade them individually. The grades will be grouped into three numerical categories: 1, 2 and 3. “1” translates to good, “2” translate to fair and “3” translates to poor. Good means the feature specification meeting and exceeding the end users need. For a feature to be fair, it would need to not be the best in class but get the job done. Finally poor means that the feature does not meet the need of the end users in regard to their web conferencing expectations.

After the end user grades the product’s specifications for all the products included in the assessment, they multiply those grades with the weights from the independent features. The resulting numbers are to be summed to give a score to each product and it will reflect how the end users feel about them. The products with the lowest scores are the better ones. Below is a visual representation of the weighting and grading methodology.

Step 1: Give the features a weight by ranking them in order of importance. In this case, 1 to 11 since there is 11 features.

FEATURES	<i>Ranking/Weight</i> 1 to 11
<i>Feature 1</i>	
<i>Feature 2</i>	
<i>Feature 3</i>	
<i>Feature 4</i>	
<i>Feature 5</i>	
<i>Feature 6</i>	
<i>Feature 7</i>	
<i>Feature 8</i>	
<i>Feature 9</i>	
<i>Feature 10</i>	
<i>Feature 11</i>	

THE FEATURES

Cost: It is crucial to make sound cost analysis assessments when looking at web conferencing technologies. The technologies and products discussed here are both free and fee based. Skype, AnyMeeting and Google+ Hangouts are free; Adobe Connect Pro, Cisco WebEx and Citrix GoToMeeting are fee based products. It is important to those again that the fee products considered have additional capabilities that come at the cost but this research focuses on their free packages.

Number of Users: The number of users per meeting is very important for corporations and businesses which utilize web conferencing to communicate remotely with colleagues and business partners.

Audiovisual: A web conferencing meeting with top quality sound and image is critical when collaborating verbally over the Internet.

Operating Systems and Browsers: Web conferencing products are to be compatible with machine readable instructions that direct the machine to perform specific functions over the Internet.

Hardware: Web conferencing products must work efficiently on as many physical devices as possible to provide a greater range of options for users around the world.

File Sharing: The system should have the capability to send and receive files through a web conferencing tool is always plus.

Screen Sharing: Screen sharing allows remote sharing of displays. Users at a remote computer or devices can see what is happening on the presenter's screen.

Whiteboarding: There is great benefit to being able to use whiteboarding in web conferencing: "whiteboarding impacts the message development, the deployment of that message into an

effective visual whiteboard, and the delivery skills necessary to bring that story to life”
(Corporation Visions).

Chat: Online chatting facilitates point to point communications as well as multicast communications from one sender to many receivers in web conferencing.

Recording: Online meetings may be recorded. End users may want to save the meetings or portions of the meeting for future use.

Polling: Polling is a way spark interaction and engagement of an online audience by discovering the trends and the subjects of discussion. The polling feature can also be used for servicing of product. In other words, the product owner can refer to feedback from participants to get a pulse of what is working or not as well as security issues.

THE FEATURES SPECIFICATIONS PER PRODUCT

Skype

Cost: The free Skype package has a low direct cost impact.

Number of Participants: Users can have audio group calls with up to 25 people but only up to 10 people can do video conferencing.

Audiovisual: For one to one high definition video, the users need at least 1 Mbps. For each additional user, Skype needs another 1 Mbps per added participant for a comfortable video conferencing.

Operating Systems and Browsers: Skype runs on a number of platforms including Microsoft Windows, OS X, Linux, Android, BlackBerry 10, iOS and Symbian.

Hardware: Skype is used over phone lines, Xbox One consoles, televisions, cell phones, laptops, desktops and tablet devices. For recent Windows and Macintosh machines, Skype requires at least 1 GHz Intel processor and 1GB of memory are needed.

File sharing: Files of any size can be shared through Skype with the appropriate upload and download speed requirements.

Screen sharing: One after the other, up to ten users can share their screen during online conference calls. The presenter can also be seen at the same time he or she is screen sharing.

Whiteboarding: IDroo is Skype's whiteboard add on. It must be installed by all participants in order to enjoy the full features.

Chat: Instant text messaging is available through Skype meetings' configuration. Users can chat individually or with entire groups.

Recording: Skype does not offer any recording or archiving. However, Skype is compatible with recording applications such as MP3 Skype Recorder and Pamela which are often recommended free plugins for those purposes.

Polling: Skype does not have polling or surveying associated with its free package.

AnyMeeting

Cost: AnyMeeting offers three different web conferencing packages but the focus here is be on the free package.

Number of Participants: The free package allows for a maximum size of 200 attendees and up to six active cameras for video conferencing.

Audiovisual: AnyMeeting allows attendees to video conference with up to 6 people at once.

Operating Systems and Browsers: The minimum operating system requirements for presenters and attendees are Windows XP and higher and Mac OSX 10.6 and higher. For browsers compatibility, AnyMeeting requires Internet Explorer, Mozilla Firefox, Chrome or Safari.

Hardware: AnyMeeting is compatible with Windows PCs and Macs. For mobility, AnyMeeting can be used on iOS and Android mobile devices.

File sharing: File sharing is only available for the fee based packages of AnyMeeting.

Screen sharing: AnyMeeting's screen sharing allows users to display what is on their monitors.

Whiteboarding: AnyMeeting does not have a whiteboard.

Chat: AnyMeeting has a chat field that attendees can use to send a message to either a specific participant or to all the attendees.

Recording: For AnyMeeting, recording is only available for the Pro 25 and Pro 200 packages.

Polling: The host can create surveys and tests that are sent out to attendees after the meeting.

The results are then provided to the host of the meeting who has the option to share them.

Google+ Hangouts

Price: Google+ Hangout is a free application when used from client to client. There is an associated fee when making international calls to a mobile phone.

Number of Users: The maximum number of participants is 15 on video calls.

Audiovisual: Google Hangout offers high definition video conferencing when users have a 720 pixels capable camera and at least a 1.2 Mbps upload speed.

Operating Systems and Browsers: Google+ Hangouts supports the current version and the previous two versions of the following operating systems: Mac OS X, Windows, Chrome OS and Ubuntu. Google Chrome, Internet Explorer, Firefox and Safari are compatible browsers.

Hardware: Google+ Hangouts requires 2GHz dual core processor or greater. The ideal bandwidth is around 2.6 Mbps outbound and inbound from and to the participant. Google+ Hangouts is available on most mobile platforms.

File sharing: Users can upload a file that was already created on their desktop or they can create a file on Google Docs and share it on Hangouts.

Screen sharing: Users can share screens with Google+ Hangout's screen share application.

Whiteboarding: Google Hangouts+ has a virtual Whiteboard application called Web Whiteboard.

Chat: Since Google Hangouts+ is linked to Google accounts, there are two different applications you can chat with. Google+ Hangouts' chat allows users to chat with one user or groups of users.

Recording: The video sessions can be uploaded synchronously to YouTube and therefore archived over the web. Additionally, users can stream live broadcasts directly from outside websites.

Polling: Users can use a voting application to take polls and surveys. They can either take polls through message posts on their Google+ Profile page or they can use the Yes, No, Maybe voting application to ask questions and have users select from one of the three options.

Adobe Connect Pro

Price: Adobe Connect Pro has annual and monthly payment plans. The annual plan is \$45 per user per month. The monthly plan is \$55 per user per month. The Pay-Per-Use package (PPU) provides access to the full-featured Adobe Connect meetings without an up-front fee and you pay based on usage. The PPU web conferencing capabilities are available at an additional cost of \$0.32 per minute per user (service.adobe.com).

Number of Users: Adobe Connect Pro allows up to 100 Participants per named host audio and multimedia conference. Adobe Connect Pro provides integrated telephony which could allow 80,000 participants in one meeting.

Audiovisual: Adobe Connect enables participants to share webcam video streams into meetings at high resolution with active speaker indication.

Operating Systems and Browsers: Adobe Connect is compatible with all the major operating systems in the market.

Hardware: Adobe Connect Pro requires at least 512 MB of RAM for most operating systems but the optimum requirement is 1 GB for all of the major ones. Nearly all of the Adobe Connect Pro's hosting and collaboration capabilities on the desktop are tailored for mobile use.

File sharing: Documents shared in the File Share pod can be viewed but not downloaded by attendees. To enable attendees to download documents, a host or presenter must upload the documents to the File Share pod and grant them the right to download them.

Screen sharing: Adobe Connect Pro allows attendees to share their screen in 3 different ways. The desktop or Secure Desktop Sharing way allow users to share all of the contents of their desktop. If more than one monitor is being used, then users can select the desktop that they want to share. Another option that all users have is to share just their window. Window sharing allows users to share one or more windows that are open and running on their computer. Finally, through application sharing, Adobe Connect Pro allows users to share an authorized application and all of its related windows that are open and running on your computer.

Whiteboarding: Hosts and presenters are allowed to use the whiteboard to create text, geometrical figures and others freehand drawings in real time during a meeting. The whiteboard is composed of more than one page.

Chat: Attendees can use the chat pod to send a chat message to either a specific participant, the presenter, or to all the attendees.

Recording: With Adobe Connect Pro, video and audio portions of meeting can be captured and reused. There is a meeting slider during the playback that helps navigate the users to any point efficiently.

Polling: Organizers can create polls from the pods in Adobe Connect Pro. They have the option to choose either multiple choice or multiple answers. The results of the polls can come back in a percentage or number format.

Cisco WebEx

Cost: Cisco WebEx offers 4 different plans. Following the free plan, there is a Premium 8 plan for \$24 per month or \$19 per month for the whole year. The Premium 25 plan costs \$49 per month or \$39 per month for the annual plan. Lastly, the Premium 100 costs \$89 per month or \$69 per month over 12 months (webex.com/products).

Number of Users: The Premium 8 package allows up to 8 people per meeting. Premium 25 allows up to 25 people per meeting. Finally, Premium 100 allows up to 100 people per meeting.

Audiovisual: Cisco WebEx offers a high definition video stream with up to 7 participants only. Cisco WebEx also has high definition voice, delivering clear sounds quality when participants join via VoIP.

Operating Systems and Browsers: Cisco WebEx requires at least Windows XP for Windows machines and for Mac at least Mac OS X 10.6 Snow Leopard. The browser requirements are Mozilla Firefox, Apple Safari and Google Chrome and Internet Explorer.

Hardware: Cisco WebEx can be accessed on most hardware and mobile devices. When it comes to mobility, Cisco WebEx is compatible with iPad, iPhone, Android, Blackberry, and Windows Phone 8 devices. For Windows systems, WebEx requires at least 2 GB of RAM and with Mac operation systems, at least 512 MB of RAM is required.

File sharing: Through Cisco WebEx, files are securely sent among attendees. The host can monitor how many attendees have their file transfer window open and have downloaded the files.

Screen sharing: Attendees have the option to either share their whole screen or part of their screen. Once the item is brought into the conference, attendees can make changes to the document in real time using the annotation tool that Cisco WebEx provides.

Whiteboarding: The presenter can write or draw on WebEx's whiteboard and can also assign privileges to other participants of his or her choice.

Chat: Attendees have the option to chat with others through the WebEx chat pod.

Recording: WebEx allows users to record, archive and replay meetings.

Polling: The organizer can use polling to gather feedback, test knowledge, or take a vote during the conference. Once the poll is completed, the poll's results are instantly received. The organizer has the option to share the results with the attendees or save them for later analysis.

Citrix GoToMeeting

Price: GoToMeeting and GoToMeeting Pro can be tested for free for 30 days. GoToMeeting is \$16 per month if a yearly contract is chosen or \$19 per month without it. The Pro version costs \$39 per month if a yearly contract is chosen. Citrix GoToMeeting costs \$49 month to month without the annual contract.

Number of Users: The Pro package allows up to 25 participants per audio conferences and the Pro+ package allows up to 100 participants for audio web conference as well.

Audiovisual: Citrix GoToMeeting supports a total maximum resolution of 1920 pixels by 960 pixels at high definition.

Operating Systems and Browsers: Citrix GoToMeeting works with Windows 2003 and later Windows operating systems. The minimum requirement for a MAC is a 10.6 operating system. Citrix GoToMeeting can run on Safari, Internet Explorer, Mozilla Firefox, and Google Chrome browsers.

Hardware: The windows machine must have at least a processor of 2.4 GHz and 2GB of RAM. The MAC computer is to have a 2.4GHz Intel processor and 1GB of RAM.

File sharing: Citrix GoToMeeting uses the secure enterprise file sync and sharing service ShareFile. With ShareFile users can easily send and sync files up to 10 GB in size. Users can also monitor the sending and receiving of files via Microsoft Outlook when the ShareFile plugin is used.

Screen sharing: GoToMeeting's control panel offers the Screen Sharing Pane which provides the user access to several presentation controls such as "show my screen" and others.

Whiteboarding: GoToMeeting has a whiteboard but it is only accessible to the designated presenters.

Chat: GoToMeeting has a chat log that attendees can use to text to others participants. Attendees have the option to either message the whole group or just one individual.

Recording and archiving: Recordings can be archived up to 3.0 GB on the GoToWebinar website. The archived webinars are accessible for up to 12 months.

Polling: A maximum of 20 polls can be created with up to 25 questions each. After the polls are closed, the organizer can view and share the results immediately, during or after the session.

SAMPLE RUBLIC

The table below shows what the overall comparison tool may look like upon completion. It shows a gradual progression from left to right of the analysis and documentation. The first column lists the chosen features for the analysis. Those features may change based on companies or groups' preferences. Stemming from the number of features, the weight reflects the hierarchical ranking of the features based on their importance to the end user taking the survey. In this example, "the number of users" is the most important feature and hardware is the

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least important. Following the ranking, there are grades given to the eleven feature's specifications per products.

After multiplying the weights by the grades, the results show the overall values of feature for the particular product. The feature values are added together give out the general product scores. In the example above, Adobe Connect Pro is the product scoring the least and therefore the best tool to consider if looking for a fee based product. End users should make the differentiation between free based and fee based; Google+ Hangouts which comes second in the comparison is a free product and therefore shall be more appealing for a company or business looking to be more cost sensitive.

	Ranking/Weight	Scores Based On Features' Specifications Per Products (1 = Good, 2 = Fair, 3 = Poor)						Features "Rankings/weights" and specifications "Scores" are Compounded (Weight x Score)					
FEATURES	1 to 11	Skype	AnyMeeting	Google+ Hangouts	Adobe Connect Pro	Cisco WebEx	Citrix GoToMeeting	Skype	AnyMeeting	Google+ Hangouts	Adobe Connect Pro	Cisco WebEx	Citrix GoToMeeting
Cost	2	1	1	1	3	2	3	2	2	2	6	4	6
Number of Users	1	3	1	2	1	1	1	3	1	2	1	1	1
Audiovisual	10	2	1	1	1	2	1	20	10	10	10	20	10
Operating Systems and Browsers	9	1	1	1	1	1	1	9	9	9	9	9	9
Hardware	11	1	1	1	1	1	1	11	11	11	11	11	11
File Sharing	8	1	3	1	1	1	1	8	24	8	8	8	8
Screen Sharing	3	1	1	1	1	1	1	3	3	3	3	3	3
Whiteboarding	7	2	3	2	1	1	2	14	21	14	7	7	14
Chat	5	1	1	1	1	1	1	5	5	5	5	5	5
Recording	4	3	3	1	1	1	1	12	12	4	4	4	4
Polling	6	3	1	1	1	1	1	18	6	6	6	6	6
								TOTAL	105	104	74	70	78
								POSITION	6th	5th	2nd	1st	4th
Position	Products												
1	Adobe Connect Pro												
2	Google+ Hangouts												
3	Citrix GoToMeeting												
4	Cisco WebEx												
5	AnyMeeting												
6	Skype												

CONCERNS

Concern 1

Companies with several internal organizations and groups may have divergent opinions in regard to their web conferencing needs and wants. For cost effectiveness, it is important for those companies or corporations to come to a comprehensive agreement that satisfies most. That being said, it is not easy in those predicaments to pick out the outright fair winner: “if there are three or more candidates, any voting system which is not a dictatorship and which allows the possibility of any candidate winning, is susceptible to tactical voting; where voters have an incentive to vote in a way that doesn't reflect their personal preferences” (the guardian, 2001). The divergence in opinions may be a result of the confirmation bias which translates to interpreting or remembering information in a fashion that is suitable to one's own beliefs and hypotheses. On top of the specific business requirements, individuals or groups may have personal wants to their web conferencing experience. The related confirmation bias are polarization of opinion, the persistence of discredited beliefs and the over emphasis on dated information effects of.

A simple solution could be to take all the used rubrics and do an additional assessment of the final results. In fact, all the products' scores can be cumulated and the lowest scoring products will the winning web conferencing product to be chosen as a collaboration solution for the company or enterprise. Another strategic approach to overcome the confirmation bias dilemma is to elect amongst the groups, the one that the company deemed to be the more knowledgeable in the web conferencing space or the one willing to be the decision maker for the rest of the users. That group will have the responsibility to pick which conferencing product will be the next available technology for the many.

Concern 2

The fact that the lower the final assessment score is the better score is a bit counterintuitive if the assessment is not explained properly. In fact, when one thinks of a competitive scoring, the highest score usually equates to the better one in comparison to the others. That being said, the original ranking and weighing methodology drives the focus being on the lower scores; however, many will argue that it is always good to be first and not so good to be ranked after. With a reverse approach, the higher rank would translate to the better feature. Additionally the specification scoring methodology would have 1 being poor, 2 being fair and 3 being good. The products with the higher overall scores are the better ones at the end of the assessment. The number of features, which in this contextual example is 11, causes the weighting range to be very broad. It is definitely an issue worth mentioning and warrants the use of the same methodology by all potential end users of the rubric. The below shows that reversing the grading methodology will considerably affect the results of the assessment. Only the bottom two products remained in their position; the other four moved around in our hierarchical table.

ASSESSMENT OF WEB CONFERENCING TECHNOLOGIES

FEATURES	Ranking/Weight	Scores Based On Features' Specifications Per Products (1 = Poor, 2 = Fair, 3 = Good)						Features "Rankings/weights" and specifications "Scores" are Compounded (Weight x Score)					
	1 to 11	Skype	AnyMeeting	Google+ Hangouts	Adobe Connect Pro	Cisco WebEx	Citrix GoToMeeting	Skype	AnyMeeting	Google+ Hangouts	Adobe Connect Pro	Cisco WebEx	Citrix GoToMeeting
Cost	10	3	3	3	1	2	1	30	30	30	10	20	10
Number of Users	11	1	3	2	3	3	3	11	33	22	33	33	33
Audiovisual	2	2	3	3	3	2	3	4	6	6	6	4	6
Operating Systems and Browsers	3	3	3	3	3	3	3	9	9	9	9	9	9
Hardware	1	3	3	3	3	3	3	3	3	3	3	3	3
File Sharing	3	3	1	3	3	3	3	9	3	9	9	9	9
Screen Sharing	9	3	3	3	3	3	3	27	27	27	27	27	27
Whiteboarding	5	2	1	2	3	3	2	10	5	10	15	15	10
Chat	7	3	3	3	3	3	3	21	21	21	21	21	21
Recording	8	1	1	3	3	3	3	8	8	24	24	24	24
Polling	6	1	3	3	3	3	3	6	18	18	18	18	18
							TOTAL	138	163	179	175	183	170
							POSITION	6th	5th	2nd	3rd	1st	4th
Position	Products												
1	Cisco WebEx												
2	Google+ Hangouts												
3	Adobe Connect Pro												
4	Citrix GoToMeeting												
5	AnyMeeting												
6	Skype												

To test the two related assessment approaches and to elect one of them as the better one, a straight forward solution is to use them on the same target population. In other words each end user will use both assessment methodologies on the same set of products. The end users will then reflect on whether or not the numeric renditions of their assessment represent how they really felt about the technologies they were comparing.

LESSONS LEARNED

Putting together this analysis and recommendation had its share of challenges. As a lengthy project covered by two remote partners, staying on top on the agreed upon schedule was a bit difficult. Version control and change tracking are surely an area of improvement moving forward when facing similar challenges. Early in the project, there was a lot of wasted time and effort trying to understand which approach to take as far as focusing on the technologies specifications themselves or the business needs of the organizations. Since there are a plethora of companies out there with different size and needs, it was the smarter approach to focus on the individual stakeholders or decision makers and let them represent what their companies need and want. There was a lot of wasted effort finalizing that vision for the project and the recurring

changes created costly backlogs. Additionally, there were a lot of semantic and contextual mistakes that were discovered during the professor's periodic reviews and required timely investigations and corrective adjustments.

Immediately making the project advisor aware of the issues at hand is a best way to start remediating them. Discussion and brain storming amongst team members is always welcome but to keep the project on track, the team should not to let any research or disagreement on one particular topic or subtopic take too much time. There should be an agreement on how long it should take to get it resolved; and if that deadline is reached, ultimately the advisor has to be actively included and serve as the arbitrator. There are many roadblocks to be expected when working on similar projects and as important it is to determine the project plan and scope, including a change management process is vital.

CONCLUSION AND NEXT STEPS

Understanding business need and product capabilities is at the core of any web conferencing recommendation. The analysis proposed here is a flexible one that can be adjusted by whoever is leveraging it. In fact, the end users can change the attributes depending on which features they are interested in and how much importance they give them. The goal is to get the stakeholders to be part of the decision process and own the recommendation they make when it comes to a web conferencing solution for their organization. Companies and businesses must take their time examining what solutions will fit their current and future needs. The six web conferencing products discussed here all possess valuable features but again, the end users are the first assessors and are therefore in charge if making the right choices.

One of the next steps to be considered as a follow up to this exercise is to test this instrument in a larger corporate population and to analyze the results. Partnering companies can

organize a quick demonstration of the assessment methodology at a high level; leveraging a PowerPoint presentation or other presentation tools. The pilot candidates would be provided the products specifications and based on them would fill the rubric accordingly. It will provide a realistic test environment for both the assessment methodology and the rubric practicality.

Looking at the overall web conferencing landscape, 3D web conferencing technologies appear to be the next wave of pioneers in the field. With 3D avatars are used to represent each participant and are meant to boost engagement since they are representing the user's physique and overall body movements. Cisco rolled out a holographic web conferencing tool last year they are hoping will have people a thousand miles away feel like they are in the same room. As a demonstration, Cisco was able to launch an on-stage telepresence experience with an integrated Mursion 3D holographic projection technology.

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