ICT-KM Pilot Project on
Using Desktop Videoconferencing to Enhance Collaboration Among Communities of Practice in the CGIAR

Final Report: 2006

Presented by the
International Crops Research Institute for the Semi-Arid Topics
Patancheru PO 502324, Andhra Pradesh, India

May 2006
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- Rober Zomer, CSI Coordinator
- Anthony Collins, CIP (CG-IT Group)
- Dario Valori IPGRI (CGXchange)
- Michael Devlin, E-Publishing (until July 2005)
- V Balaji, Project Coordinator

Project Team:

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- Eddy De Pauw, ICARDA
- Robert Zomer, IWMI
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Technical Advice:

- Anthony Collins, CIP
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NARES Partners:

- Indian Space Research Organization (VRC Project)
- MS Swaminathan Research Foundation, India
- MANAGE-National Agric. Extension Management Agency, India.
Recapitulating the Minutes of the Meeting of the Steering Committee for the ICT-KM Project on Using Desktop Videoconferencing to Enhance Collaboration among Communities of Practice in the CGIAR

18-19 January 2005

Members Present:

JDH Keatinge, DDG-Research, ICRISAT (Chair)
Robert Zomer, Coordinator, CSI (CoP representative)
Michael Devlin, Coordinator, ICT-KM E-publishing project (CoP representative)
Anthony Collins, IT manager, CIP (also representing GCP)
V Balaji, Head/KMS, ICRISAT (Project Coordinator)

Unable to attend:

Dario Val ori, IT Manager, IPGRI (also representing VRC project); joined in for an hour via video link for part of the second day.

Summary of discussions and Recommendations:

- For wider acceptance, buy-in from more CoP’s should be sought
- Benefits, such as reduction in travel costs and effort, should be demonstrated; compatibility with face-to-face meetings should be evident to the users.
- Every effort should be made to make the user feel that technology assists and not dominates
- Improvement in collaboration and decision-making over audio conferencing should be evident to the users.
- Data capture from the user should include information on benefits (above) and anecdotes or qualitative information.
- Installation and operations should be easy to the user, and should not require frequent calls on the local IT administration; conflict with security/firewall management should be avoided.
- A step-by-step document for users and another one for ISA administrators should be prepared (A Collins offered to fine tune it prior to circulation).
- An initial set of five installations should start and the rest can go into a second installment; feedback from the first set should be used.
- Option 3 should be used in all installations; cost should not be the only criterion.
- More locations from Sub Saharan Africa should be included.
- A simple user survey tool like “Webmonkey” should be considered
- No milestones are necessary and the project should be completed in projected time.
- Identified users should be encouraged to buy equipment locally, to avoid delays in delivery and bill the project subject to price ceiling; PVX software licenses should be provided by the project to the users.
Introduction:

Video chat or conversation has become a wider practice in the last 12 months than ever before, and video conferencing is increasingly seen as an enterprise collaboration tool. There are various flavors of VC currently, ranging from that for the board room, the executive, for the small group, to the “personal” or desktop VC. In this project, we have focused on harnessing the power and advantages of the desktop VC to enhance collaboration. This project made an attempt to assess its effectiveness and value as a tool to support and enhance collaboration among various partner groups. It has suggested plans on how the rapidly emerging CGXChange (the former VRC) collaboration space may include desktop video as an integral tool.

The project had the following outputs and outcome expected of it:

- Reports and technical documents and the installation and commissioning of desktop VC equipment in ten pilot locations in the CGIAR.
- The outcome would be the capacity built in two CoPs in using VC facilities for more effective collaboration.
- A number of users outside the CoPs would also have started to use the VC to enhance collaboration within the CGIAR and with appropriate partners among ARIs and NARES.
- The lead center and the group of CG-based resource persons would have augmented their capacity to develop and operationalise a comprehensive system for using VC for collaboration. New means to enhance collaboration on the Challenge Programs would have been identified.
- A plan to introduce video as an additional tool in the VRC/CGXchange collaboration space would have been identified.

The project was successful in identifying viable technical options for desktop VC for CGIAR staff. (Details are provided in this report). It also included significant amount of trials with the NARES partners in India and ARI partners elsewhere, and it emerges that desktop VC can be viable option with at least some of the NARES. The Microsoft firewall used in the CGIAR imposes limitations on the use of VC from desktop in the LAN at the moment and that has limited effective
participation of CoP’s during the project period. However, this will be overcome with the integration of the Microsoft Live Communications Server (LCS) and client into the system-wide VPN that is under negotiation. This can be an important service that the CGXchange can offer. Alternatives to VPN use (involving IT administration) have been identified and the tool called “Flashmeeting” has been tested extensively and found useful.

**Technological Options Developed on the Project:**

The emphasis in this project is on equipping the individual with easy operations, and with minimum involvement of the local network administrator. The CoP leaders indicated that anything more complicated than a web upload might not be a “hit” with most users whose time is limited. The CoP leaders also recommended a set of eight champions in various locations. In some locations, more than one person would receive equipment from the project. This, however, was accepted, because active CoP’s are not necessarily bound to geographic factors. The first set of eight list of eight CoP-identified locations is: ICARDA, CIAT, CIMMYT, IWMI, CIP, and IPGRI.

Based on initial preferences, the project team examined a range of options, and ran experiments to test their effectiveness in terms of cost as well as communication. In the international market, desktop video conferencing on telephone lines is about to become a mass phenomenon. The equipment prices are dropping. The capacity of Instant Messengers to work with a variety of video capture equipment is steadily increasing. Given these trends, the project team designed a series of combination trials.

The first was to use a low cost video cam such as LogitechPro4K with an instant messenger (Yahoo!), which was dropped in favor of MS-NetMeeting. The second combination was to use LogitechP4K with an advanced encoding software, PVX from Polycom. The third option was to try Polycom Viavideo II with PVX software. Polycom desktop equipment and the software were chosen because these are easily sourced in most parts of the world, and the products have generally received good rating in independent reviews. The challenge of conducting a video session from behind a firewall was recognized and handled
separately. The trials were conducted within India, with help from a few NARS partners and ICT research institutes.

The results from these trials conducted over a period of six weeks are summarized below. The WIN XP2 PC’s had P4 processors and 256 MB RAM. The connection type was through IP on 80 per cent of the trials while the trials with the NARS partners were on ISDN. A low latency connection to the Internet is a must if IP is used as mode of connection.

**Option 1: LogitechP4K with MS NetMeeting**
- **Ease of set up:** excellent; **audio quality:** good; **video quality:** modest to good; **cost:** highly favorable

**Option 2: Logitech P4K with Polycom PVX**
- **Ease of set up:** good; **audio/video quality:** excellent; **cost:** favorable

**Option 3: Polycom Viavideo with PVX**
- **Ease of set up:** modest; **audio/video quality:** excellent to outstanding; **cost:** not unfavorable.

These results were presented in the CG-IT meeting in Penang in November 2004. The project coordinator recommended going for Option 2 in most cases, while Option 3 was to be tried on a small number of desks. The SC advised using Option 3 as the preferred option.

**The Challenges from the Microsoft ISA 2000 Firewall**

The CGIAR centers use the Microsoft ISA Firewall as an integral component of network security administration. This does not allow video to pass through unless several ports are opened. The general IT security considerations require that so many ports are not allowed in an open condition. In practice, this would mean a desktop VC user, a CoP member having to obtain a public IP to connect to another CoP member via the Internet. Under normal circumstances, a CoP member would have to negotiate such an arrangement with the IT administration each time a VC was planned, reducing the opportunities for a
spontaneous interaction with another CoP member. The ICRISAT-based project team used online as well as telephone-meetings with Microsoft engineers to identify a solution. Tests were carried out across locations on the Internet. The technical details are described in Annexure 1 and 2. The procedures were shared with the Steering Committee members and were then distributed to the CoP members in March 2005.

The challenge remained with using the Polycom Viavideo with PVX as well. Polycom technical support reported that there was no specific solution evolved to overcome this challenge, and Polycom Viavideo camera and PVX were thus limited in use because of the mandatory requirement of public IP for a desktop PC placed behind an MS ISA Firewall (Annexure 1). An effort to use ISA 2004 firewall was reported to the project coordination group from the ICARDA (Annexure 3). The tested option on this project is to create Network Address Translation (NAT) to the firewall.

**Use of Public Instant Messaging Clients**

During the last 12 months, the MSN Messenger and equivalent clients have acquired wider usage. The MSN Messenger was tested on this project extensively and was found to deliver generally modest quality video and audio even under conditions of high latency (average of 1000 milliseconds, on a Gilat-type VSAT connection (Annexure 4)). NAT to Firewall was a needed first step in this case.

The GoogleTalk client gave good results in general when the latency level was low (less than 500 milliseconds) and the MS-ISA 2000 firewall did not cause streaming problems. Skype 2 client (started testing in January 06) gave satisfactory results in the preliminary tests. Both these clients were tested with the freely downloaded “Festoon” plug-in (www.festoon.com). Both GoogleTalk and Skype 2 require broadband connectivity (sustained throughput of 50 KBPS or higher) and thus may not suit wider use in many CG centers.
Use of New Tools for Multi-party VC from the Desktop

We have been using extensively the Flashmeeting (www.flashmeeting.com) platform developed by the UK Open University for point-to-multipoint conferencing with ARI as well as NARES partners. This was recommended to the CoP partners in the first set of communications. The project team tested it extensively with the Catholic University in Leuven, Belgium, and with a number of agricultural universities in India. On one occasion, the Flashmeeting was used on desktop to enable a senior expert to address a group of learners (numbering 23). The distant expert (Erik Duval) used Flashmeeting to display screens on his PC to the remote group. The audio and video quality was excellent. The group of learners gave a feedback that the technology was highly useful in fulfilling the learning objective of the session (details in Annexure 5). Flashmeeting requires prior booking online and will enable a participant to interact with the group even if video stream does not go through (using only audio stream- sometimes necessary when a group member has no access to a web cam or has a low bandwidth connection). The MS-ISA Firewall challenge was overcome with the instructions provided by the Flashmeeting developers (also Annexure 5), when a “cheaper” webcam was used. In terms of ease of set up and user-friendliness of interface, Flashmeeting should be rated as a superior product.

We have also tested extensively the open source media player called the VLC player (www.videolan.org) which has an extensive developer community and support groups. The VLC player is a cross platform multimedia player (variety of codec’s are supported, all the way down from MPEG4) and can be configured (with some effort) as a video stream server. Its use as a VC client has been on the increase recently. This has been used on a high-latency satellite connection (average of 1400 milliseconds) with reasonable video and audio quality (bandwidth of shared 128 KBPS). The firewall challenge has remained a serious one even on this client, and a public IP is necessary. It is becoming popular with many NARES agencies that have started to avail satellite connectivity for distance learning support. A program has been ongoing since January 2006 with this system with a number of NARES institutions, some of them being community-based organizations. The feedback from the participants on this has been positive. The client provides for screen capture and delivery and file
transfer, making it an excellent tool for interactive discussions. We have tried up to four simultaneous conversations with positive feedback on video/audio quality, and the sessions were sustained for as long as three hours in tests. The details are provided in Annexure 6. (We would like to acknowledge the support of the Indian Space Research Organization in running these experiments with NARES partners). With the emerging interest in VLC as a video conferencing client, its potential use in VC in low bandwidth conditions should be considered a priority.

The Microsoft Office 2005 Communicator: the Live Communications Server Client

Following the interest in the CG-IT group in the potential adoption of the MSOffice 2005 Communicator as a standard instant messaging client across the system, the project staff tested its use as a VC client. Independently, the IT groups of IWMI and WorldFish Center carried out tests on the use of LCS client for VC and reported successful use and positive user feedback about the quality of audio and video. A basic number of licenses for the MS-LCS are already available with the CG-IT group, and we tested its use for VC between WorldFish Center and ICRISAT. The ease of set up was found to be excellent and the audio/video quality was found to be better than expected. The bandwidth requirements have not yet been estimated because the tests were carried out very recently. The conditions on both the user ends had broadband characteristics (low latency and sustained throughput of better than 40 KBPS).

The VC was set up using a virtual private network (VPN) connection which in effect means that one client was able to “talk” to the other “directly”. Without a VPN, VC was not possible. Independent tests for use as a voice-client between the ILRI campuses in Nairobi and Addis Ababa drew highly supportive user feedback, but the need for a VPN has been emphasized. The CG-IT group is currently engaged in discussions on the method of deployment of the LCS client. All the tests so far indicate its wide acceptability for messaging and collaboration within the CGIAR as an enterprise, and we believe it should be integrated with the CGXchange that offers multiple services to the CGIAR community and partners.
Essential Technical Recommendations

- Use of a mid-level webcam such as Logitech Pro 4000 or equivalent recommended, costing just under USD 100 a piece
  Use of very low end webcams is not recommended as many IM clients might not detect them
  Use of a more sophisticated camera (Polycom or equivalent), recommended earlier, is also not advised for the same reason applicable to low end cameras
- A number of instant messaging clients and peer-to-peer applications such as the GoogleTalk, Skype or the MSN Messenger have developed to a level that allows easy use of desktop video conferencing. Their use on a wider scale in the CGIAR should be assessed in the relatively limited availability of bandwidth in many CGIAR locations.
- Network security considerations, especially those relating to Firewall management, have implications for wider use of desktop VC in the CGIAR; from this point of view, a solution that has enterprise-wide applicability will be more appropriate.
- The discussions in the CG-IT group (March-April 2006) on wider use of the MS Live Communications Server (LCS) client are highly encouraging for the wider adoption of desktop VC as a tool to make collaboration even more effective without compromising network security considerations. In consultation with the Coordinator of ICT-KM projects, we have decided to purchase LCS clients for every CG center within the available resources. These licenses will be delivered via the web to every center as soon as they are available from the dealer (in early June 2006).
- The CGXchange (formerly the VRC) is rapidly emerging as the platform of choice for system-wide collaboration. It will be the ideal deployment method for the LCS clients which can be used for desktop videoconferencing on a wider scale in the CGIAR.
- Novel VC methods such as the UKOU’s Flashmeeting provide unique opportunities to deploy VC as a collaboration tool with a wide variety of partners. Their use may be studied in a CoP beyond this project period (wholly on a voluntary basis).
User Perceptions

The project Steering Committee had identified a total of 16 locations for deployment of VC equipment, and the two CoP champions provided lists of 12 CoP members. They were all approached with an invitation to participate in the project. Nine responses were received, covering the CIP, IWMI, CIAT, ICRAF, ICARDA and the IITA. ICRISAT became the tenth testing location. In some centers (ICRAF and ICARDA) more than one equipment was installed (as authorized by the SC). The center participants bought the equipment and billed the project while the PVX software licenses were delivered wherever Polycom equipment had been installed. The criteria for the Polycom equipment was not mandated by the project staff but individual champions chose them with inputs from the IT experts in the centers concerned. The detailed procedures developed at ICRISAT on this project were disseminated to the participants from the earliest stage. (The relevant exchange of messages is attached in Annexure 7).

On a parallel route, efforts were made to work with NARES and ARI partners without the provision of any equipment or software to them. The purpose was to obtain participants’ evaluation of the effectiveness of desktop VC as a tool in improving collaboration. Towards the last few months of the project, a national organization, the Indian Space Research Organization, donated equipment and expensive satellite-bandwidth to ICRISAT and invited the group in ICRISAT to join them in assessing the usefulness of desktop VC in improving expert-expert and expert-farmer interactions. There was also an opportunity to test and demonstrate the usefulness of desktop VC with rural organizations in a meeting presided over by a senior executive of Microsoft.

The firewall challenge has limited the use of desktop VC in the LAN environment in the CGIAR. This is why the project proponents strongly recommend the integration of VC with the CGXchange which is fast becoming an enterprise-wide platform for collaboration. The NARES partners have given highly positive ratings on the use of VC as tool in promoting inter-institutional collaboration. The NARES University faculty have been particularly appreciative of the use of Flashmeeting tool as an effective way to interact with ARI’s (Annexure 5). The rural organization partners have rated desktop VC as an outstanding tool to facilitate
dialogue and interaction between small groups. In the last eight weeks that this testing has been carried out, a rural organization representative suggested the desktop VC as possibly the best grant that the government agency has made to his organization because of the increased opportunity for dialogue with distant experts.

The usefulness of desktop VC as an effective tool to promote collaboration is established with NARES partners. There is no perception among them that this is a tool that excludes. The rapidly increasing availability of tools such as MSN messenger or the Googletalk with video capability has altered the NARES perception fundamentally. Thus, it is all the more reason why the CGIAR should adopt an enterprise-oriented approach to the deployment of desktop VC to enhance collaboration within the system and with NARES and ARI partners.

Evaluation

The project has generated the following outputs:

- Detailed technical procedures to use the desktop VC within the limits imposed by the existence of firewall (especially, the MS ISA 2000); these procedures have been developed using advanced documents provided by industry majors such as the Microsoft or Polycom. They have been tested extensively.
- Extensive tests on new products such as the GoogleTalk, Skype and MSN Messenger version 7 have been carried out for their bandwidth requirements and tolerance for latency levels.
- The CG-IT group’s preference for a single client across the system as an enterprise-wide solution has been independently confirmed as practical.
- New tools for desktop VC such as the Flashmeeting and the VLC Player have been tested.
- Extensive testing with NARES partners has established the acceptance of desktop VC among them as a non-excluding as well as useful tool for collaboration. A national partner has donated equipment as well as quality bandwidth to facilitate use of desktop VC for collaboration with NARES partners.
• VC equipment, relevant software and technical guidelines have been delivered to nine testing locations within the CGIAR.

The project duration was extended by four months to cover continued testing and development of technical specifications, and to accommodate NARES partners’ request to use desktop VC to enhance expert collaboration with them. This was also the period when the CGXchange was rolled out and the MS-LCS client was identified by the CG-IT community as the choice for a common IM client. The integration of desktop VC with CGXChange has emerged with even greater clarity in this period, justifying the extension sought.

Following the consensus arrived at within the CG-IT group, the project has purchased (with the approval of the ICT-KM program coordinator) 461 licenses of LCS standard client licenses which will be distributed via the web to every center (in equal numbers).
ISA CONFIGURATION FOR NETMEETING

(Developed by U Vijay Kumar for all the COP Participants in May 2005)

Note:

- Much of this document is sourced from ISA Server 2000 Building Firewalls for Windows 2000 by Dr.Thomas Shinder, Debra Littlejohn Shinder, Martin Grasdal Published by Syngress Publishing,Inc
- We have checked this setup many times over and found it ok.
- In case of any difficulties please contact
  - Vijay.kumar@cgiar.org

This configuration is useful for establishing a NetMeeting between two clients who are behind their respective firewalls (ISA 2000).

**Configuration involves mainly four steps:**

1. Installation and configuration of H.323 Gatekeeper
2. Configuration of H.323 Application Filter
3. Configuration of protocol rule supporting H.323 communications
4. Call routing rules

**Definition: H.323** is a protocol standard for multimedia communications. H.323 was designed to support real-time transfer of audio and video data over packet networks like IP. The standard involves several different protocols covering specific aspects of Internet telephony. The International Telecommunication Union (ITU-T) maintains H.323 and these related standards.

**Install and Configure the H.323 Gatekeeper**

The H.323 Gatekeeper service is an "add-in" to the base ISA Server installation. This can be installed when you install the core ISA Server components, or you can install it afterward. Use the **Add/Remove Programs** applet in the **Control Panel** to add the H.323 Gatekeeper service if you did not install it with the rest of the ISA Server.

There isn't too much configuration to be done for the Gatekeeper service in this scenario. However, you do need to configure which interface on which the Gatekeeper should be listening.

Open the **ISA Management** console, expand your server or array, and then click **H.323 Gatekeepers**. You should see the name of your ISA Server as a subnode. If you don't see this, right click on the **H.323 Gatekeepers** node and click **Add Gatekeeper**. Select **this computer** and click **OK**.

1. Right click on your ISA Server name and click **Properties**. When the dialog box opens click on the **Network** tab. Place a checkmark in the checkbox that represents the internal interface of your ISA Server. *Do not* select the external interface because you do not want or need the external interface to be a gatekeeper for external clients. (It won't work)
2. Click **OK**.
For our simple scenario of a NetMeeting client on the internal network, and an external NetMeeting client directly connected to the Internet, we do not need to create any routing rules.

**Configure the H.323 Application Filter**

Network Clients needing to participate in audio, video or data conferences can take advantage of the H.323 Applications Filter. Both Gatekeeper aware and non-Gatekeeper NetMeeting aware clients access the H.323 Application Filter. This Application Filter is enabled by default; however, if for some reason it becomes disabled, you will not be able to H.323 services.

The H.323 Application Filter can be configured by performing the following steps:

Open the **ISA Management** console, expand your server or array, and then expand the **Extensions** node in the left pane.

1. Double click the **H.323 Filter** in the right pane and then click the **Call Control** tab. You will see what appears in the figure below.

   ![H.323 Filter Properties](image)

   *The details of the option selected are given below*

   **Use this Gatekeeper**

   You can have the H.323 Gatekeeper service use the local Gatekeeper, or another Gatekeeper on your internal network. In the present example, and for most of the
configurations you’ll be working with, configure this option with the IP Address of the Internal interface of the ISA Server. Do not configure it to use the external interface.

**Allow incoming calls**

If you want clients on an external network (such as the Internet) to be able to initiate inbound calls to an internal NetMeeting client, you must enable this option.

**Allow outgoing calls**

If you want internal network clients to be able to initiate outbound calls to external NetMeeting clients, you need to enable this option. If you don’t enable this option, internal clients will only be able to participate in meetings with external clients when the external client initiates the call.

**Use DNS Gatekeeper lookup and LRQs for alias resolution**

“To enable DNS gatekeeper lookup, select the Use DNS gatekeeper lookup and LRQs for alias resolution check box.”

Let’s just take it for granted that you should have this option checked. It will provide you the greatest flexibility in name resolution for remote requests when you choose to call users using an email address.

The last three options:

- Allow Audio
- Allow Video
- Allow T.120 and application sharing

Are used to allow or deny these features server-wide. You cannot allow video for one group and audio for another group. Note that each option in this group has an impact on bandwidth, with application sharing and video being the biggest bandwidth hogs.

**Configure a Protocol Rule Supporting H.323 Communications**

After the Application Filter is enabled and configured, you need to create a Protocol Rule allowing outbound access for the H.323 Protocol. The Protocol Rule allows for outbound access control of H.323 communications. Although you can’t control the type (audio, video or data) on a user/group basis, you can control who can use the H.323 protocol.

To create the H.323 Protocol Rule, perform the following steps:

Open the ISA Management console, expand your server or array, and then expand the Access Policy node. Right click on the Protocol Rules node, click New and then click Rule.

1. Name the Rule **H.323 Outbound Access**, or name it something else if you like. Click Next.
2. On the Rule Action page, select Allow and click Next.
3. On the Protocols page, click the down-arrow and select the Selected Protocols option. Scroll through the list and select the H.323 protocol by putting a checkmark in the checkbox. Then click Next.
4. On the **Schedule** page, select the appropriate schedule, then click **Next**.
5. On the **Client Type** page, select the appropriate client type depending on how you want to control outbound access. In this example we'll select **Any request** and click **Next**.
6. Review the configuration selections and click **Finish**.

**Call Routing Rules**

This can be based on **E-mail address rules**

To create an e-mail address routing rule, perform the following steps:

1. Open the ISA Management console, expand your server or array, expand the H.323 Gatekeepers node and expand the call routing node. Right click on the phone number rules node, and click Add routing rule.
2. The welcome page for the New Routing Rule Wizard appears. Click next to continue.
3. The Domain Name suffix page appears as shown in figure below. Enter the domain name suffix for the e-mail rule. If you wish the rule to route a particular address, remove the check mark from the route all e-mail addresses that include this general DNS domain name. Click next.
5. Select the destination type as Gate keeper as shown in the next screen.

6. On the destination Name page, choose the appropriate Destination and click next.

7. Then click finish to complete the rule.
Configuration of NetMeeting Setup

To initialize NetMeeting in your PC:

Go to **Start → Run** and type **conf** as shown below:

![Run](image1)

Go to **Tools → Options**

![Options](image2)
Click the **General tab** and type the information options as shown below:

![General tab options](image1)

Click the **Security tab** and select the options as shown below:

![Security tab options](image2)
Click the **Audio tab** and select the options as shown below.

![Audio Options](image1)

Click the **video tab** and Select the options as shown below.

![Video Options](image2)
Go to Advanced Calling option in General Tab and Give the private IP Address of the gatekeeper and Account name.

Note: IP Address of gatekeeper is to be checked with system administrator.

To call a person in another organization, you need to know her/his e-mail id as given in the Netmeeting user directory, and dial as shown below.
MS-Portrait in place of Net Meeting: a suggestion from ICARDA

Microsoft Research has recently released an upgraded version of the MS-Portrait product originally designed for mobile video communication. A PC version that works with the MSN Messenger is also available for free download. According to the Portrait web site (http://research.microsoft.com/mcom/portrait/), “Microsoft Portrait is a research prototype for mobile video communication. It supports .NET Messenger Service, Session Initiation Protocol and Internet Locator Service on PCs, Pocket PCs, Handheld PCs and Smartphone. It runs on local area networks, dialup networks and even wireless networks with bandwidths as low as 9.6 kilobits/second. Microsoft Portrait delivers portrait-like video if users are in low bandwidths and displays full-color video if users are in broadband. In low bandwidths, portrait video possesses clearer shape, smoother motion, shorter latency and much cheaper computational cost than do conventional video technologies. Microsoft Portrait pursues providing presence notification, chat/voice/video functions anytime, anywhere, on any device”.

Colin Webster, ICARDA, wrote about the progressive replacement of MS-Net Meeting by MSN Messenger and suggested that Portrait plugged into MSN Messenger on a PC will likely have less of a problem in passing through the ISA 2004 firewall (see his message below; also extracted in Annexure 7). We are grateful to Colin for this valuable suggestion.
DVC through publicly available Instant Messengers on a public IP

(Annexure contributed by Asil Gerard Sylvester, Systems Officer – Research Informatics, ICRISAT)

The photos shown below are from a video conference held between Mr. Bradford Smith, Senior VP and General Counsel, Microsoft Corporation and women volunteers from villages in South India. The software used was a freely available instant messenger. The configuration was easy and the experience was also good. The audio and video quality suffered a bit because of high latency in the connection at the villagers end as it was a Gilat type VSAT connection (latency averaging around 1000 ms) but overall the participants found the experience to be useful.
DVC using FlashMeeting

(Asil Gerard Sylvester, Systems Officer – Research Informatics, ICRISAT helped configure and conduct the video conferencing through FlashMeeting and contributed this annexure with inputs from Dr S Dixit).

The FlashMeeting was pretty straightforward and easy to setup. All it needed was a Pentium IV based computer with a 64 bit or higher soundcard. The audio output of the computer was connected to the public address system of the conference room and the video output connected to an OHP. The setup was pretty straightforward.

One of the advantages of FlashMeeting being that it is accessible through an URL, http protocol, there was no need to download or install any software. Internet Explorer with flash plug-in was all that was needed to participate in the FlashMeeting. It connect through ports 1935 or 443 with http tunneling on port 80 which almost all firewalls allow. This provides a very easy interface for the user to configure the meeting and to participate. The FlashMeeting server seamlessly 'links' clients with different connection types and also provides a recording available for immediate web replay.

A web camera connected to our PC transmits real-time streaming video to the FlashMeeting conference. The audio and video qualities were top class, in fact comparable with some of the best video conferencing options available. There was also no need for a broadband internet connection at 10 Mbps line would also work fine. The audio was crystal clear and so was the video. The interface was also easy to master and go about it. It also features a chat window wherein simultaneously we could watch and hear a participant speaking while exchanging textual messages with other participants, this makes sharing URLs lot easier. A polling system was also incorporated into the interface.
Virtual Meeting with Prof. Erik Duval, Katholieke Universiteit Leuven, Leuven, Belgium on Learning Objects Repository and Metadata
Video Conferencing with the faculty from the University of Florida on the use of LMS
A closer look at a FlashMeeting screen, ICRISAT is seen near the right-top corner participating in the conference.

A simple DVC in progress using FlashMeeting

The photo above says it all, the simplicity with which FlashMeeting could be setup and run with just a desktop PC, webcam and computer speakers.
To start broadcasting, we have to click on the ‘broadcast’ button to begin broadcasting both our video and audio to everyone else in the meeting. When we have finished we click on the stop button to stop broadcasting our video and audio. Only one person can speak in the meeting, much like real time, this eliminates any overlaps or confusions. If any participants would like to say something then he/she raises an interrupt and then begins to broadcast his/her video and audio as soon as the previous person finishes his broadcast.

**End User feedback on Desktop Video Conferencing** – Dr. Sreenath Dixit

The set up was easy, and did not require technical much assistance. So those who do not have any computer technology can set this up. FlashMeeting enables the discussion leader to have control as a broadcaster, and every participant takes his/her turn to speak. The meeting runs in a very orderly fashion, each participant patiently taking his turn to speak and listen. The speaker is seen and heard by all the other participants in the video frame while images of the non-speakers appear as still images in a different frame on the screen. The voice and image qualities were both quite good. If for some reason the voice quality suffers, the participants have a chat option. This option can also be used to circulate the email ids of participants or any specific comment simultaneously to all the participants. This is going to be an interesting tool in the immediate future. Flash meeting is available to any user for free and requires advanced reservation at the site, [www.flashmeeting.com](http://www.flashmeeting.com)

**Feedback (%) from the participants (numbering 23) of a workshop on their experience of the video conferencing sessions held at ICRISAT**

<table>
<thead>
<tr>
<th>Remarks</th>
<th>Superior</th>
<th>Good Standard</th>
<th>Needs Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video Conference (VC) from Uni. of Florida</td>
<td>89</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>VC with Dr. Erik Duval</td>
<td>82</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>
Use of Desktop Video Conferencing with NARES partners

We have been using the two-way video conferencing facility provided to ICRISAT by the Indian Space Research Organization to assess its value in enhancing expert-community interaction. The ISRO has provided a PC (P4 2.4 MHz, 512 MB RAM with an Osprey video capture card and a web cam), a satellite modem and a standard VSAT dish. On the present trials, ICRISAT acts as an expert center with privileges to initiate connections. There are five centers located in India with a similar set up and they are all operated by NGO’s and community-based organizations. The India-based Swaminathan Research Foundation (www.mssrf.org) coordinates this testing process with the ISRO and other organizations. It also functions as an expert center on the network.

The VLC media player (www.videolan.org) was used in this test. This enables a “client” to stream into the network without the need for a server on the network. It can accommodate a variety of codecs and protocols including the HTTP. It was found on our tests to work satisfactorily even when the latency peaked at 1400 milli seconds, with reasonable-to-good audio and video quality.

During December 2005-March 2006, a number of trials were organized to gather user responses. One highly formal, ceremonial session was organized in January 2006. All the other sessions engaged experts from ICRISAT and NARES partners with the rural community organizations.

It was easy to set up a video interaction, and up to four locations were connected simultaneously on two occasions. The user perceptions (both the experts and the non-experts) found the audio/video quality satisfactory on most occasions and highly satisfactory in some events. The audio reception delay was found disconcerting in first-time users. The rural organizations found the DVC extremely valuable in discussing their problems with the experts, who could transfer photos or text on the same link. The ISRO has plans to expand the network, and ICRISAT, through the VASAT project (supported by ICT-KM program), plans to use this link to promote new extension processes.

Screenshots of configuration of VLC media player
Rural NGO members in DVC with an ICRISAT based expert
Sample messages from the correspondence with CSI COP members

From: Balaji, V (ICRISAT-IN)
Sent: Friday, May 20, 2005 7:57 PM
To: De-Pauw, Eddy (ICARDA); Hyman, Glenn Graham (CIAT); Hodson, Dave (CIMMYT); Coe, Richard (ICRAF); Kiepe, Paul (WARDA); Legg, Chris (IITA); Siermann, Joris (CIFOR)
Cc: Zomer, Robert (IWMI)
Subject: bounty from the video conferencing project for CSI champs!

Dear CSI Colleagues:

As agreed with Robert Zomer and the members of the steering committee for the desktop video-conferencing project, I am happy to invite you to avail a desktop video camera for yourself. That should enable to meet each other more frequently and to even greater advantage. Take it as our tribute to the wonderful work you are doing, now that you have started playing with the big boys!

You can buy a Polycom Viavideo II cam and bill us. The actual price in the Asia-Pacific region is about USD 660, but you can bill us for freight and related delivery charges as well. The project will reimburse your purchase at actuals subject to a ceiling of USD 750. I would greatly appreciate if you can send me the bills in about eight weeks from now. In case you do not want a Polycom Viavideo, you may buy a Logitech 4000 which provides excellent value for money. Reimbursement would be at actuals. If you buy Logitech 4000, we can reimburse for two cams. Within the allocation, you can also buy a headphone set that costs about USD 25. While Logitech cam can work with PIII upwards, Viavideo requires a P4 at 1.4 Ghz or up and 256 MB RAM or more.

Desktop video is easy and fun to work with once you get it to work. To get to that stage, you will need some help from your local IT administrator. You can use Microsoft Netmeeting which is easy for the IT administrator to configure. The attached PPT gives a step-by-step procedure for you and the attached document is for your IT administrator to set it all up and get it moving. It is important to tell you that your location should have something like 128 KBPS bandwidth or better for easy use of desktop VC. I may contact you on occasions to get your impressions about the usefulness or otherwise of desktop VC in furthering collaboration.

I am also happy to tell you that the new development at the UK Open University called Flashmeeting can help you bypass the firewall problems that your IT administrator must contend with. Use of Flashmeeting requires you to have Win XP platform and Flashplayer 7. Group meetings are possible and the voice/video quality is better than acceptable. Your group should have a leader who must book the session in advance at the site www.flashmeeting.com.

I hope you start out on using this interesting tool as soon as possible. Please do write me if you need further information.

Best!

Balaji

From: Zomer, Robert [mailto:r.zomer@cgiar.org]
Sent: Friday, May 20, 2005 11:10 PM
To: 'Balaji, V (ICRISAT-IN)'; 'De-Pauw, Eddy (ICARDA)'; 'Hyman, Glenn Graham (CIAT)'; 'Hodson,
Dave (CIMMYT); 'Coe, Richard (ICRAF); 'Kiepe, Paul (WARDA); 'Legg, Chris (IITA); 'Siermann, Joris (CIFOR)

Cc: 'Wood, Stanley (IFPRI)

Subject: RE: bounty from the video conferencing project for CSI champs!

Dear Balaji,,, et al..

Thanks for the bounty,, we are indeed looking forward to stare at each others mugs, on sceen, and in living daylight.. in fact, we had our first Skype online steering comm. conference and semi annual meeting last night. It went relatively well... I think,, course, there were no visual cues... so I did get the feeling that there was some kind of card game going on in the background.

I really do think that we could benefit from better, and more often, communication, so, at least until the novelty wears off, this is probably the right group of techno gear heads with patience enough to mess with installing this stuff... So, I must admit, we do have some mixed feelings about the effect of this technology on the work place, for example, the need to look awake when talking, and obvious implications for office furnishings...

although, to be honest, I gave an iSight video cam to my 89 year old mom and she installed and got it working, it works really pretty great. It really is qualitatively different than a phone call, and of course she's thrilled to see the grandkids. (However, now she complains that she doesn't see me enough because I never video call. )

By the way: Joris Siermann has told that he is moving from CIFOR soon, so I nominate Stanley Wood at IFPRI, to participate in his place, and who is also a member of the steering comm.

So, thanks again for your good efforts on our behalf. I will follow up with this group, and we will try and facilitate rapid adoption, (and send you the bill...)

Cheers... Robert

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From: Legg, Chris (IITA)
Sent: Monday, May 23, 2005 3:06 PM
To: Balaji, V (ICRISAT-IN)
Cc: Zomer, Robert (IWMI)
Subject: RE: bounty from the video conferencing project for CSI champs!

Balaji,

I have clearance from our IT manager to go ahead with purchase of the Polycom Viavideo, but will have problems obtaining it within your cost envelope. Except in very special circumstances, all purchases for IITA are made in the UK through our agents there. The best price that I can get on the web for a Polycom Viavideo II at the moment is UK£406, which is over US$800. By the time we add our purchasing agent’s fees and freight, it will be close to US$900. If no additional funding is available from ICT/KM, I will try to find the balance from one of our budgets.

Best regards,

Chris Legg

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Thanks very much. I will go ahead and order for my project budget here, and get reimbursement later.

Chris

-----Original Message-----
From: Venkataraman Balaji [mailto:v.balaji@cgiar.org]
Chris:

With approval from the relevant officers here, I am happy to mention that in this particular instance, project funds can be utilized to a higher limit of USD 900. Please do let me know if this is OK by you.

Best!

Balaji

---

Dear Balaji

Ric Coe passed this on to me. We'll obtain the equipment as recommended but does the project have any recommendations on where or how to configure the equipment. In particular, can this work from behind a firewall using an internal IP address or will we need to do NAT to link to a real IP address, or does it have to have a real IP address on the desktop? I've seen all options in use in different places.

Best regards

Ian

---

Ian,

Can you advise how to proceed on this. We should of course take advantage of the offer, but you need to decide what we buy and where it is set up.

I guess he needs a prompt response.

Thanks

Ric

Richard Coe

Head, Research Support Unit

ICRAF Nairobi Kenya

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Dear Zaid:

I just returned home to Hyderabad after spending a week with the relatives in mourning. I am most grateful for your kind help and hospitality during our meeting in Rome last week. Also for the visa support letter which I just received.
I am happy to give below an attachment in Word that describes the procedure for using ViaVideo II with Net Meeting. Yes, you can use it with a fixed IP, and we have tried out the procedure to use it from behind the firewall. Please do write me if the document lacks in details. The engineer who tested it extensively is Vijay Kumar who works with the IT unit. I will seek further info from him should you require.

Looking forward to meeting you and

With best regards

---------------------------------------------
From: Balaji, V (ICRISAT-IN)
Sent: Tuesday, June 07, 2005 5:35 PM
To: Abdul-Hadi, Zaid (ICARDA)
Subject: RE: bounty from the video conferencing project for CSI champs!

Zaid:

Please proceed with buying two and send me the invoices.

Best!

Balaji

---------------------------------------------
From: Balaji, V (ICRISAT-IN)
Sent: Tuesday, June 14, 2005 9:20 AM
To: Webster, Colin (ICARDA)
Cc: Abdul-Hadi, Zaid (ICARDA)
Subject: RE: bounty from the video conferencing project for CSI champs!

Dear Colin:

I am most grateful for your message. I am sorry for the delay in writing you. Yes, please do keep me advised and we will include your contribution in the project documents. Personally, I have been aiming at a wider use of Polycom PVX which is superb (excellent CODECs and outstanding video/audio quality) but Polycom clarified that they simply did not want to to have anything to do with ISA2000 or later versions! (probably are keen that every users accesses Polycom gateway?). I am checking out the link you have kindly provided.

I thank you again for your contribution and look forward to meeting you

Best!

Balaji

-----Original Message-----
From: Webster, Colin (ICARDA)
Sent: Thursday, June 09, 2005 10:24 AM
To: Balaji, V (ICRISAT-IN)
Cc: Abdul-Hadi, Zaid (ICARDA)
Subject: FW: bounty from the video conferencing project for CSI champs!

Dear Balaji,

Thank you for H323 tips on Netmeeting. However it seems Microsoft do not support it any longer with their current OS, and prefer clients to use MSN Messenger. Indeed there are some security concerns about using H323 due to the number of ports it has to open. Microsoft have a released MS Portrait which works with or without Messenger ( see http://research.microsoft.com/~jiangli/portrait/ ) which on first tests seems to work well through ISA 2004, and it uses only 3 static ports. I will let you know if this turns out be useful in practice.
-----Original Message-----
From: Balaji, V (ICRISAT-IN)
Sent: Wednesday, July 06, 2005 5:35 PM
To: Moore, Ian (ILRI - ICRAF)
Cc: Coe, Richard (ICRAF)
Subject: RE: bounty from the video conferencing project for CSI champs!

Ian:

Please go ahead and buy both! We are interested in promoting wider use!!

Best!

Balaji

-----Original Message-----
From: Moore, Ian (ILRI - ICRAF)
Sent: Wednesday, July 06, 2005 4:52 PM
To: Balaji, V (ICRISAT-IN)
Cc: Coe, Richard (ICRAF)
Subject: RE: bounty from the video conferencing project for CSI champs!

Dear Balaji

ICRAF has received a quote for the Polycom Viavideo II for USD 500 and for the Logitech quickcam pro 4000 USD 111 (see attachments). Are we bound by the upper cash limit or by the number of cameras the project will fund? If possible we would like to purchase one of each type of videocam for the project which will be within your USD 750 limit. Otherwise we will purchase the Polycom Viavideo alone.

We'll place the order as soon as you give the go ahead.

Best regards

Ian

From: Hyman, Glenn Graham (CIAT) [mailto:g.hyman@cgiar.org]
Sent: Friday, July 22, 2005 7:33 PM
To: Balaji, V (ICRISAT-IN)
Cc: Meneses, Carlos (CIAT); Jordan, Tania (CIAT); Zomer, Robert (IWMI); Cardona Rios, Jorge A. (CIAT); Legg, Chris (IITA); Hodson, Dave (CIMMYT)
Subject: RE: bounty from the video conferencing project for CSI champs!

Dear Balaji:

I apologize for taking so long to reply to this email.

We are proceeding with the purchase of the videocamera Polycom Viavideo II. We think this will improve our communication within the CSI framework. Carlos Meneses group will set this up and integrate this videoconferencing capability within CIAT’s larger IT infrastructure. I expect to send you the invoice early next week.

FYI – I just met with the World Bank’s Global Development Learning Network (www.gdln.org) team in Washington. As a CGIAR-CSI and GDLN event, several centers are going to hold a videoconference on “Policy Implications of Poverty and Food Insecurity Mapping Assessments” during the first week of
November this year. This can help test parts of the infrastructure you are building. CIAT, CIMMYT and IITA, among others, are expected to take on key roles in this videoconference. So, we believe the videoconferencing infrastructure that you are offering will have immediate application for this important event.

I will be in touch with you as things develop. Many thanks, Glenn

_________________________________________________________________

From:  Legg, Chris (IITA)
Sent:  Friday, February 17, 2006 4:06 PM
To:  Balaji, V (ICRISAT-IN)
Subject: RE: video conferencing

Balaji,

I cannot get through using ViaVideo. I get the message "the destination address is not serviced by the intermediate network through which the call is routed"

I also cannot reach you through Skype. I get the message "user not found"

It is possible that I have not configures the gatekeeper correctly. I will call in my computer manager and ask him for help. Perhaps we can try another video conference next week.

Chris

_________________________________________________________________

From:  Balaji, V (ICRISAT-IN)
Sent:  17 February 2006 09:01
To:  Legg, Chris (IITA); Vijaykumar, U (ICRISAT-IN)
Cc:  Modi, Pradyut (ICRISAT-IN)
Subject: RE: video conferencing

Hello Chris:

We will be using Polycom Viavideo device with PVX. I am confident it would work.

My skype name is "vbalaji15".

You're right, your time will be 1130 when it is 1600 in India.

I look forward to meeting you via video.

Balaji

_________________________________________________________________

From:  Legg, Chris (IITA)
Sent:  Friday, February 17, 2006 12:41 PM
To:  Vijaykumar, U (ICRISAT-IN)
Cc:  Balaji, V (ICRISAT-IN); Modi, Pradyut (ICRISAT-IN)
Subject: RE: video conferencing

Thank you very much for your trouble.

According to my calculations, 1600 Indian Standard Time is 1030 GMT and hence 1130 Nigerian time. Does that seem correct to you?

My IP addresses are as follows:

External WAN 83.229.26.250
I look forward to a successful test. If ViaVideo does not work, I am on Skype (no video yet) and my normal telephone (land line) is (234) 2241-2626 ext 2812 or cellphone (234) 08060894947

Best regards,

Chris

---

From: Vijaykumar, U (ICRISAT-IN)
Sent: 17 February 2006 07:20
To: Legg, Chris (IITA)
Cc: Balaji, V (ICRISAT-IN); Modi, Pradyut (ICRISAT-IN)
Subject: RE: video conferencing

Dear Chris,

As per your request, I am setting up the test setup of video conference with Polycom via Video and it will be available at 16:00 Indian standard time, the public IP Address of our end is 220.227.242.222. Please send details of your IP address to initiate the call from this end.

Regards,

Vijaykumar U.

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From: Balaji, V (ICRISAT-IN)
Sent: Thursday, February 16, 2006 4:43 PM
To: Legg, Chris (IITA)
Cc: Vijaykumar, U (ICRISAT-IN); Modi, Pradyut (ICRISAT-IN)
Subject: RE: video conferencing

Dear Chris:

I am very happy to learn that you have the device ready. There are no standard IP numbers across the system that we could use. I will arrange a test call with ICRISAT tomorrow. I am copying my colleague, Vijay Kumar, to send you the IP number to call from your end.

We will also try out Googletalk and Skype 2 which work with video. I will also arrange later this month a group meeting using “Flashmeeting” which allows for up to eight users to connect (this is a platform made available for free by the British Open U).

Best regards

Balaji

---

From: Legg, Chris (IITA)
Sent: Thursday, February 16, 2006 3:57 PM
To: Balaji, V (ICRISAT-IN)
Subject: video conferencing

Dear Balaji,
I have finally found time to set up my Polycom ViaVideo device, and would like to test it. Do you have addresses for any other users within the CGIAR system so that I can make some test calls?

Thanks,

Chris Legg

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Two important messages on the use of VC in LCS

-----Original Message-----
From: Moore, Ian (ILRI - ICRAF) [mailto:i.moore@cgiar.org]
Sent: Friday, March 24, 2006 12:11 PM
To: Lee, Hoong Fei (WorldFish)
Cc: CG-IT (LISTSERV); Cheam, Max (WorldFish)
Subject: LCS Inter-Centre voice and video

Dear Hoong Fei

Thanks to you and Max for assisting ILRI in setting up LCS on our sites in Nairobi and Addis. Yesterday we successfully tested the voice between the two sites and the quality was much better than the IVDN, a slight delay over two satellite hops but not too much.

When doing the configuration we realised that the ILRI subnets on the two sites are being routed through the site VPN to CGNET and so we did not need to set up a separate point-to-point site vpn for the voice to work (traffic better neighbours Kenya and Ethiopia pass through the USA anyway so not too much difference in latency). This also allows our frequent travellers between the two sites to update their Outlook without making and changes, they just connect to the network.

My question is do we know when Microsoft expect to resolve the problem of LCS voice and video passing through firewalls (ISA). If this is a long-term problem should we consider routing all traffic to our internal subnets through the VPN to CGNET and so we did not need to set up a separate point-to-point site vpn for the voice to work (traffic better neighbours Kenya and Ethiopia pass through the USA anyway so not too much difference in latency). This also allows our frequent travellers between the two sites to update their Outlook without making and changes, they just connect to the network.

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Second question is do we have a timetable for completing the external gateway configuration to other products such as yahoo messenger?

Some information that many of you may not be aware of is that CGNET are investigating how to integrate LCS with the existing IVDN gateway to call numbers on the public telephone network. This will be a facility comparable with Skype-Out.

Best regards

Ian

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From: Lee, Hoong Fei (WorldFish) [mailto:h.f.lee@cgiar.org]
Sent: Thu 3/16/2006 6:44 PM
To: CG-IT (LISTSERV)

Subject: Live communicator
Dear colleagues,

Our DG just concluded a 4 person meeting with the DG of IWMI using Live Communicator voice. The feedback was generally positive and we would see continued and sustained usage of Communicator voice between WorldFish and IWMI in response to the increased collaboration in corporate services and information/knowledge areas.

The above is possible because we have a direct VPN to IWMI HQ. We have started a mini-project with CGNet to enable voice CG-wide without the need of a VPN.

Regards,

Lee Hoong Fei

The WorldFish Center