

## **Videoconferencing for more effective cooperation**

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### **Abstract**

This contribution has three parts. The first part focuses on the analysis of the basic functionalities of different videoconference systems. The second part presents practical experience in the use of different videoconference systems in the NODES project and within the framework of the ELLS universities network. The third part provides recommendations for virtual meetings in the rural context, particularly in respect of overcoming the distance handicap and the geographical isolation of rural communities.

### **Key words**

Videoconferencing, cooperation, virtual meeting, rural sustainability, Nodes project, ELLS

### **Abstrakt**

Tento příspěvek má tři části. První část se zaměřuje na analýzu základních funkcí různých videokonferenčních systémů. Druhá část představuje praktické zkušenosti s používáním různých systémů videokonferencí v rámci projektu a v rámci univerzitní sítě ELLS. Třetí část poskytuje doporučení pro virtuální setkání na venkově, zejména pokud jde o překonání vzdálenosti a geografické izolace venkovských komunit.

### **Klíčová slova**

Videokonference, spolupráce, virtuální setkání, udržitelnost venkova, projekt NODES, ELLS

### **Introduction**

Communication is based on the proper function of the society, of the community and of the social relations in general. For the humankind the communication function also involves behaviour, expressions, gestures and different forms of symbols and signals. The main function of communication is mutual understanding as a prerequisite for coexistence and mutual interdependence.

Videoconferencing represents one of the most advanced methods of communication. We can say that the term "videoconference" has now become a common expression for a synchronised audiovisual communication, which is arranged with the use of computers.

### **Aims and Methodology**

The main aim of this article is to explore the technological potentials in the usage of videoconferencing. Another aim is to compare the

advantages and disadvantages of virtual meeting and to show on a few practical examples how it is possible to effectively conduct a meeting via videoconferencing.

### **Results**

#### **Videoconferencing**

In general, videoconferences currently used more and more, operate on H 323 standard for the IP networks, which are based on the interconnection of packets.

The transmitted data are divided into large blocks of the same size, the so called packets, with other details attached (eg the addresses of the sender and receiver). Each packet then travels via the transmission medium independently and thus a loss of a packet could occur while in transit, or even a situation could happen in which the packets are not delivered in the same order they had been sent. A number of users usually share a single physical or virtual transmission medium. The same medium,

which is being used for the videoconference, is simultaneously being used by other users who view the Internet, read their emails, etc. Therefore, if a videoconference takes place using the Internet infrastructure, the quality of provided services (QoS) cannot be guaranteed, according to Burriel (2003).

The Internet protocol uses a mechanism which creates a relatively reliable medium out of a little reliable data carrier. This mechanism is called TCP. However, there is a major problem in the fact that when one packet is lost, the remaining packets

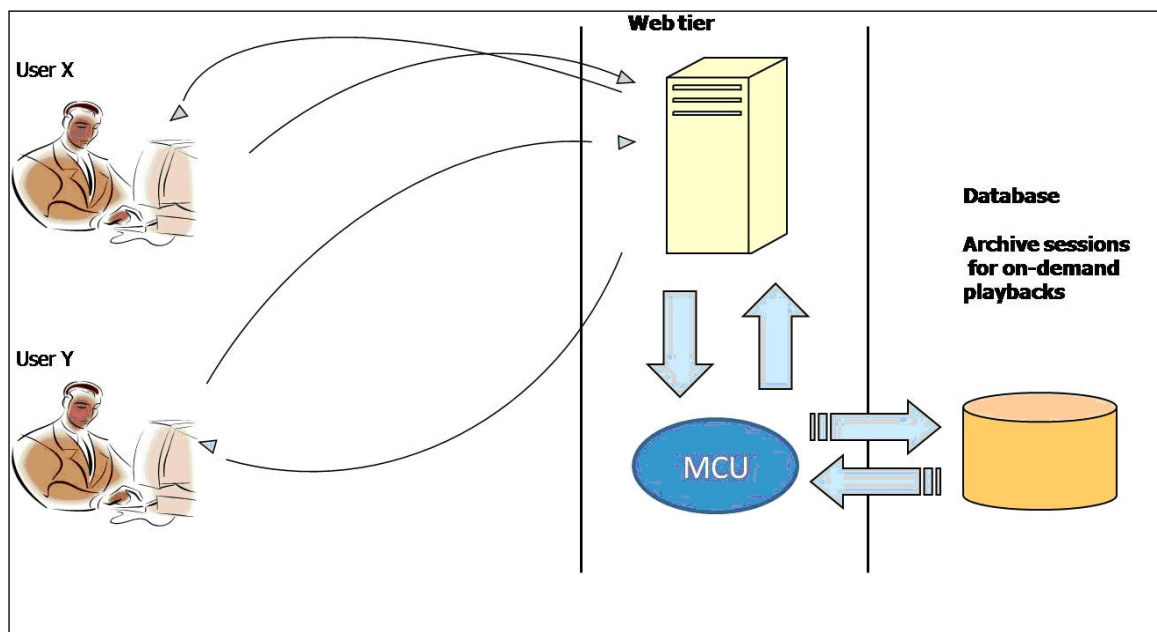


Figure 1. The scheme of a group conference using the MCU.

cannot be received until the lost packet is resent and successfully received. In videoconferences it is much more important to maintain a continuous stream of current data, even at the cost of having IP networks deliberately use the UDP protocol, which is not so sensitive to the loss of packets.

The terminal station for an IP conference is equipped with one or more cameras, a microphone and a loud speaker. The image and sound recorded by the input equipment at the terminal station (camera and microphone) are coded according to appropriate standards and sent away. The terminal station at the other end then decodes the signal according to given standards.

In videoconferences, the quality of the audio signal is a critical factor. The occasional "graining" of the image or other faults in the quality of the transmitted picture are more readily tolerated by the users, than the poor quality of the sound. Another significant factor, which influences the quality of videoconferences, is the transmission speed. At present, the speed of about 384Kbps is sufficient for most videoconferences.

some packets "falling off the table". It is more useful to receive the data on time than in the correct order. For this reason, the videoconferences on the

### Three tier solutions

The videoconferencing is based on three tier architecture Client/Server. Users are authenticated in real-time for access online meeting via standard browser.

A Multipoint Control Unit (MCU) is a server commonly used to bridge videoconferencing connections and enables a simultaneous communications. This MCU server is a kind of mediator amongst all the users, thus creating a virtual space for the meeting.

Database is used for videoconference storage. The sessions can be access via streaming.

The functions, which are provided by a group videoconference system (Havlicek and Dvorak 2006):

Audio and Video conference (Video and Voice over IP) – the basic functions of the system, i.e. the transmission of the voice and image.

Whiteboard – an area on the screen which is allocated for visualising (and/or modifying) the shared information. Currently, this is the most important and most desirable function in the practical implementation of a videoconference.

The text chat/instant messaging (Chat) – serves for an instant transmission of text from the user to other participants of the videoconference. It is possible to send the message either to everybody, or only to specific persons.

Application sharing – this is a means for presentation and sharing of control of any application by all participants of the conference.

List of users (participants) – this provides a list of all users currently connected to the system.

Recording – an option for recording of individual conferences for later use.

Videoconferencing make possible to hold "virtual meetings", at which the people not only hear one another but they can also see one another, even if separated by great distances. Such meetings concerns a kind of conferences, which can take place at several different places simultaneously, and which are mutually interconnected with a parallel transmission of the picture, sound and even data. The participants of such a "virtual meeting" can be present anywhere around the world, while they deal with one another as if they were sitting together at the same table at a single location.

## **Videoconferencing – practical examples**

### **The NODES project**

One of aims of the Socrates Grundtvig NODES project, which had been realised in the period of 2006-2008, was to create a network in adult training / lifelong learning, in order to facilitate competitiveness, employability and mobility of adults who are victims of the digital divide or of some of its components such as distance, initial level of knowledge, language, use of complex technologies [1]. The participants of the project are as follows: ENESA Dijon (F) - (coordinator), UCC

Cork (Ie), Uni Debrecen (HU), UPM Madrid (Sp), ULB Sibiu (Ro) and CULS Prague (Cz).

Implementation of the project was spread over 6 semesters. Every month (at 11:00 am on the first Monday of the month), a videoconference via the Marratech system was held with the participation of all partners. The videoconference usually lasts for 60 to 90 minutes and is conducted according to a script prepared by the coordinator (see Fig. 2). Individual participants exchange their experience and are asked to make comments on the specific items of the programme.

So far we have had about 15 videoconferences within the framework of this project. The most successful were those which had been well prepared in advance. The progress of this project which is being undertaken by a large international group has already confirmed the benefits of the system for the solution of the long distance handicap and its use in remote rural areas.

We have tested videoconference connections amongst several NODES-CZ centres. In those centres, which use the Internet connection via ADSL, the quality of videoconferences was good and the participants were happy with the virtual discussion.

In each country, a test group made of final users and actors of intermediary institutions was be associated to the work. NODES contribute too by providing to the networks of adult training institutions [4].

### **ELLS universities network**

The Euroleague for Life Sciences (ELLS) represents a network of elite universities, which collaborate in the following areas: management of natural resources, agricultural and forest sciences, veterinary sciences, environmental sciences, social sciences and others.

At present the ELLS members are:

- The Royal Veterinary and Agricultural University (LIFE), Copenhagen, Denmark
- University of Hohenheim (UHOH), Stuttgart, Germany
- Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden

- University of Natural Resources and Applied Life Sciences (BOKU), Vienna, Austria
- Wageningen University and Research Centre (WUR), Wageningen, The Netherlands
- Czech University of Agriculture Prague (CUA)
- Warsaw Agricultural University, Poland (SGGW)

overall high quality of teaching. A web based desktop videoconferencing system delivers rich content into live meetings, shares applications and stimulates group work. Since all of the ELLS universities are involved in agriculture, they have an active contact with rural areas. Thus they contribute their expertise towards the introduction of videoconferences into remote rural areas and bring them closer to modern technology, and sources of information. For creating virtual meetings the web conferencing software Adobe.

ELLS aims, first of all, at joint teaching – summer schools, joint courses, and also at assuring an

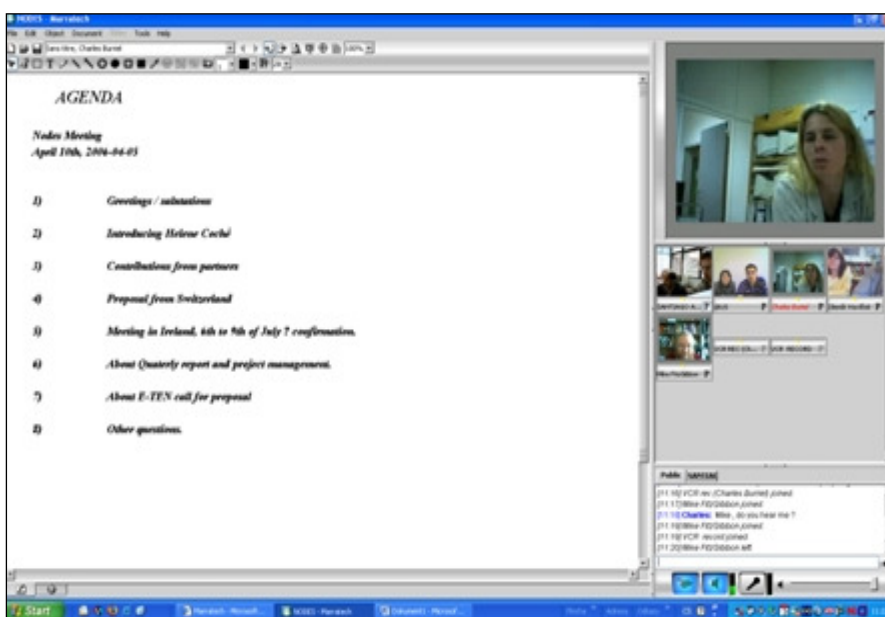


Figure 2. An example of a virtual conference according to a predefined programme, using the Marratech system.

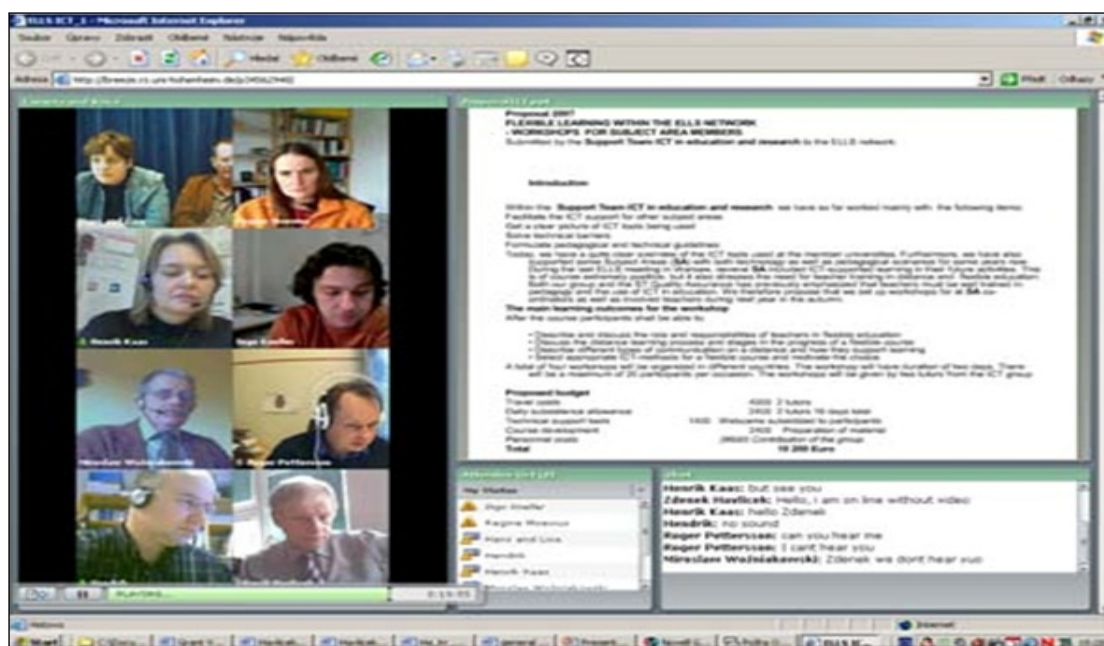


Figure 3: An example of a virtual discussion of a document, using the Adobe connect system.

Acrobat® Connect™ Pro (formerly Breeze system) is used (see Fig. 3), and has been tested with all partner universities of the ELLS network.

This software allows communicate, share presentations and multimedia right from desktop, and get feedback from participants. All participants are using any standard web browser (IE, Firefox, Opera) and the Adobe Flash Player runtime, already installed on over 98% of Internet-connected personal computers. The quality of the sound and picture when using the Adobe Connect system is very good since this system uses a Flash vector technology. It also makes it possible to record the virtual meeting. Our experience with this system is very positive. We found that well prepared virtual meetings bring savings in travel costs. Furthermore, any part of the recording of the meeting can be played back using the “bookmarks”, which are automatically created when e.g. a slide in a presentation is changed.

### Working group – a virtual meeting

A working group is a gathering of people whose individual members have a common goal. These people communicate and complement one another. Each member of the group lives in a specific social environment.

The working group is chaired by a leader who ensures the proper functioning of the group towards the implementation of the goal, while the other members focus on the tasks to be carried out. They contribute information, opinions and suggestions.

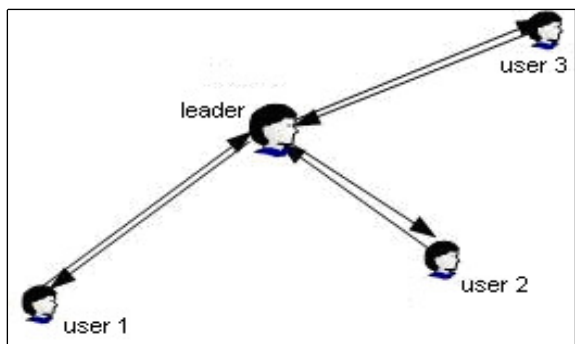
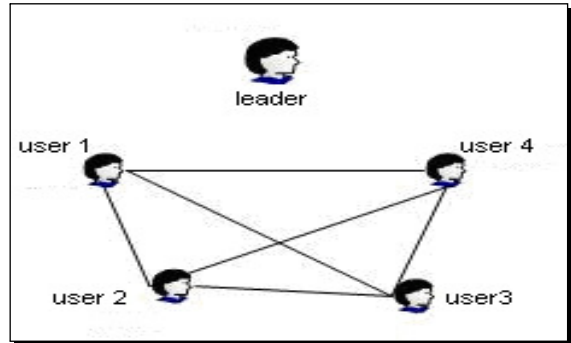


Figure 4: Dialogue.

In practical implementation of a meeting it is necessary that the leader looks after both the dialogue (Fig. 4) and the interaction of the participants (Fig. 5).

We believe it is essential that the leaders prepare their roles well, so that they can lay down the conditions for the group to carry out its tasks. The group members subsequently leave the virtual meeting better informed and/or trained - as shown in the diagram adapted after J. Vincent [5] – see Fig. 5. It must be emphasised that during a virtual meeting it is necessary to follow the same



principles that are common for normal meetings,

Figure 5: Users interaction.

e.g. starting on time and maintaining the rules for talking (not to interrupt), etc.

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In order for a meeting of the group to be successful, it should adhere to the following rules:

- Start on time
- Make sure everybody knows the aim and programme of the meeting
- Appoint a person for recording the Minutes of the meeting
- Adhere to the structure of the discussion
- Pull everyone into active participation
- Keep to the programme and time
- Finish on time, positively, and with a comprehensive summary.

These principles are essential for the management of any meeting, and thus even for the virtual conferences.



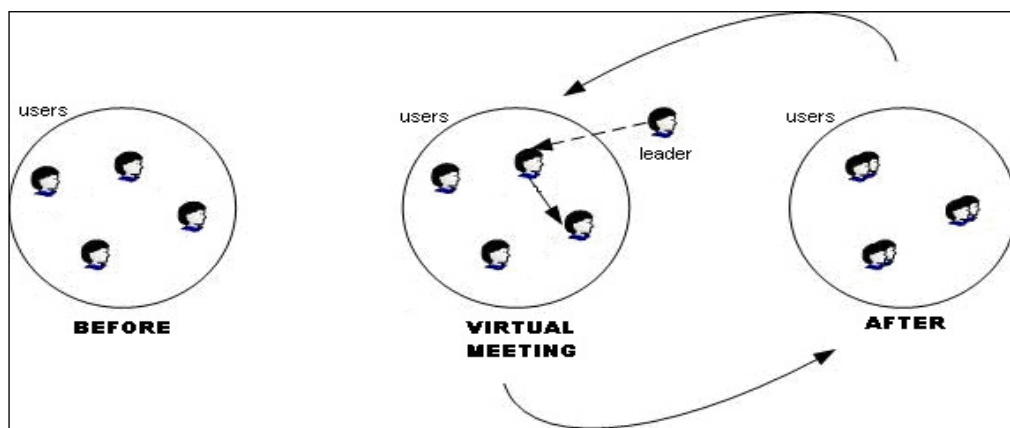


Figure 6: The purpose of a virtual discussion.

## Conclusion

Support of virtual meeting is the most basic but also the most widespread usage of a videoconference. This does not represent only a replacement of a personal contact and reduction of the costs (and time) of travel, but also an opportunity for holding such meetings much more frequently, that would be the case in real life.

Our experience based on ELLS support teams work is very positive. Equipment for videoconferencing is not expensive. Anybody can use Internet connection anywhere and use it to participate in a videoconference.

Our contribution emphasises the necessity of using the general principles for the management of a virtual meeting, because the modern ICT cannot guarantee good results unless the videoconference is well prepared in advance. During the virtual meeting the leader must follow the basic rules for the correct management of the discussion.

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