

VIDEO-BASED CUSTOMER CONSULTING VIA INTERNET USING VIDEOCONFERENCING STANDARD H.323

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Abstract: In this paper we present a research project which will be finished with a pilot implementation. In case of this research project we aim to establish customer consulting and support using videoconferencing systems with the ITU-standard H.323 by integrating such systems generally in information and distribution services via internet. With providing such an additional consulting service the company can increase the benefit for the customers in order to achieve a competitive advantage to other competitors.

In principle a video-based consultations solution can compare with common telephone call centre systems. The specifics of an internet-based application with videoconferencing are that special security mechanisms against manipulations are needed, that users with different terminals matching the H.323 standard can participate in a consultation and that the consultation should be a part of an information and distribution system.

The introduced concept will be used for the realisation of a pilot solution as part of the research project called "Intermobil Region Dresden". In this project a teleservice system is developed, which includes information-, distribution and service-functions to support the public and individual transportation systems. The support function of the teleservice is represented by the video-based consulting using common videoconferencing tools matching the H.323 standard. The video-based consultation should help the users with questions and problems with the information and distribution system.

Key words: consulting, video, videoconferencing, H.323

The original version of this chapter was revised: The copyright line was incorrect. This has been corrected. The Erratum to this chapter is available at DOI: [10.1007/978-0-387-35604-4_20](https://doi.org/10.1007/978-0-387-35604-4_20)

1. INTRODUCTION

During the last few years customer consulting via internet developed to an important part of business politics of many companies. Internet-based information and distribution systems yield successful and effective for many business transactions. Especially in the section of private customers the market share of a company can only be stabilised or increased by providing additional services. Such a service can be for example overall customer consulting and support. Even in the internet, conventional customer support takes place only via email. For an individual consulting the customers choose furthermore conventional methods like approach by telephone or visiting a service office.

In case of our research project we aim to establish customer consulting and support using videoconferencing systems with the ITU-standard H.323 [3] by integrating such systems generally in information and distribution services via internet.

2. PROBLEM DESCRIPTION

Already since fixing the ITU-Standard H.323 [3] in 1995 many solutions for videoconferencing exist at the market [6]. Up to date continuous improvement of the standard and of the compatibility of different hardware and software systems conduced to a relatively high acceptance of videoconferencing via internet mainly in the field of business to business trade (B2B) [4].

In the field of business to customer trade (B2C) the requirements for internet-based consulting systems are significantly different [2]. Especially for video-based customer consulting integrated in information and distribution systems we can define the following requirements:

- The video-based consulting application has to be integrated in the same environment as the information and distribution system. This should normally an internet browser.
- The user of the system should not be bothered with the installation and configuration of the videoconferencing hardware and software. Altogether settings of the system should be absolutely transparent to the user.
- Because the system would be a part of the world-wide internet especially the workstations of the consultants have to be protected against undesired access and information overloading using applicable technologies.

If an applicable solution can meet all these requirements there are good chances to achieve a higher acceptance of video-based consultations over the

internet. With providing such an additional service the company can increase the benefit for the customers in order to achieve a competitive advantage to other competitors.

3. CONCEPT

To meet all aforesaid requirements, an implementation of a call centre application is aspired. In principle this solution can compare with common telephone call centre systems. Both solutions have to offer some basic functions:

- In case of overloading the capacity of the consultants a queue has to be initialised.
- There must exist a control component to distribute the inbound calls to the consultants in attention of criteria like priority, time or place.
- For billing and controlling the calls should be logged.

The specifics of an internet-based application with videoconferencing are represented by the following points:

- The system needs special security mechanisms against manipulations by its users and by external sites.
- Users with different terminals matching the H.323 standard can participate in a consultation. So there are many different configuration settings to be considered.
- The consultation should be a part of an information and distribution system and that's why it has to be integrated in the processing, function and data structures.

The abstract concept could be best described by separating two views of description:

- Schematic description of the system architecture
- Functional description of the included subsystems

3.1 Schematic description

The consulting system is organised as a client-server architecture, whereas the clients can be user systems or consultant workstations. In the following text we will describe the server systems as management systems related to consulting systems. Other server systems which are connected with the consulting system are for instance the information and distribution system. So in summary the subsystems are:

- User system
- Consultant workstation
- Management system

All subsystems and components communicate via the TCP/IP protocol, whereas the communication between several management components could also take place in a local intranet sealed off the internet.

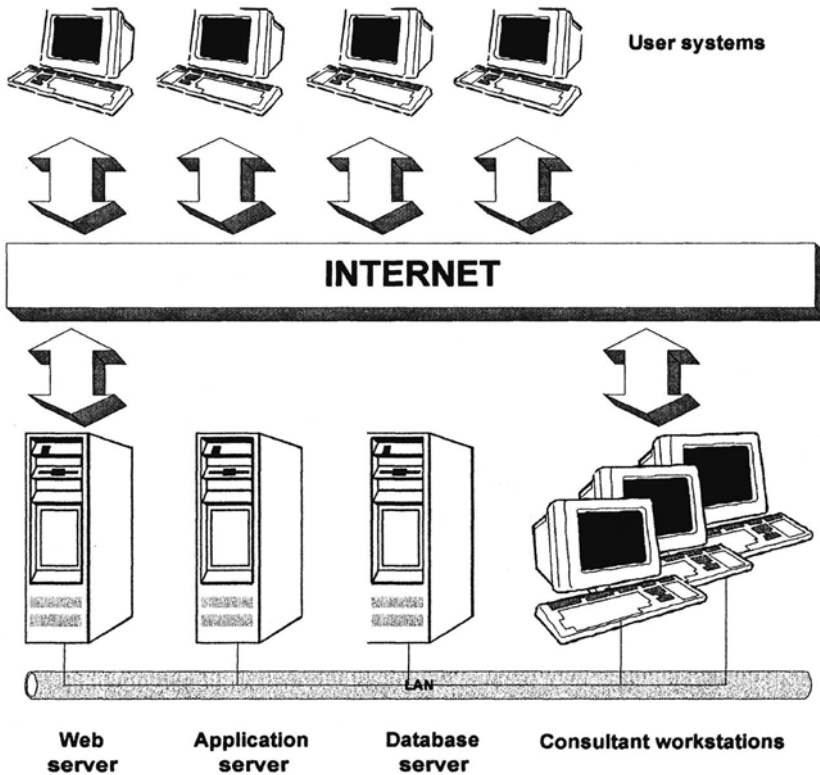


Figure 4. Consulting system schematic

3.2 Functional description

The functions of the several subsystems conform to the requirements of the consulting system. It is aspired to realise as many applications as possible at the server side. Thereby the administrative expense should be decreased to enable operation of the user systems and consultant workstations without much maintenance and interruptions.

– User system

The major function of the user system is to offer the interface to the consulting system. The user system connects to possibly needed

hardware (e.g. camera, microphone, keyboard ...) and ensures the interaction with the basic systems. The User interface is a common web browser.

– Consultant workstation

The consultant workstation has the same basic functions as the user system. Beyond it has an additional information and administration function to control the whole consulting system. Information about the actual state of the system are shown, for instance information about the state of the queue, about the caller and his activities and interactions with the information and distribution system.

An important part of the consultant workplace are the administrative functions for the consultants to control the system. Important functions are:

– controlling of the queue

The consultants have the possibility to delete callers from the queue or to accept purposefully several calls, which the system could not allocate automatically. A limitation of the queue is also possible, so that in the case of overloading of the queue new calls will be refused.

– Parameter commitment to user system

Even as it is possible for the consultant to find out the actual position of the user in the information and distribution system, it is inversely possible to advise the user a definite position in the system to enter automatically.

– Configuration of hardware and software

The settings of the own video and audio hardware can be adjusted at the consultant workstation. Not alone the setting of e.g. contrast, brightness and volume is enabled but also deactivation of the whole workstation is possible. The management system organises the whole communication between user systems and consultant workstations. The components included in the management system (application, web and database server) respond to the calls from the clients.

– Application server

The application server includes overall applications which are started by the user interface at the client side. The server also prepares the connection between the web server and the database server.

– Web server

The web server provides the content for the interfaces of the user systems and consultant workstations and controls the start of the applications on the application server. In parallel the web server is also used as an interface for the administration of the whole consulting system.

– Database server

Altogether data files like configuration data of the clients, access data and queuing data were administered from the database server. Only the application server has direct access to the database server.

3.3 Security mechanisms of the system

To describe the security mechanisms at first a short description of the cycle of a videoconference is required:

- The user system demands a registration at the queue from the web server.
- If a consultant is available the system cyclically checks the registered calls in the queue. If it found a correct registration in the queue the consultant system initiates a connection and marks itself as occupied. After that it waits for the call of the user system.
- The check of the queue by the user system will repeat as long as the according entry of a consultant workstation will be signalled. On enabling of the consultant workplace the user system gets the connection parameters and can establish the connection.

Beside the different error cases it could be also possible, that somebody tries to manipulate the system. This risk must not be undervalued, because relevant damage can arise. Because of the used proceedings and technologies common firewall functions like packet filters are absolutely ineffective and rather make the normal system work partly impossible. Therefore it is required to develop more intelligent security mechanisms.

Following two of the most feasible possibilities of manipulation, the respective response of the system will be described:

- Somebody tries to call a consultant directly by bypassing the queue.

By establishing the connection the consultant system checks if the user system has registered in the queue. If it is not registered the connection will be refused. For definite identifying of the user systems the IP-address is used.

- Somebody tries to mask itself as consultant.

Consultant workstations are definitely identified by their IP - addresses and are registered in the database. Only the administrator has the permission to add or change the configuration settings of a consultant

workstation. In addition the consultants have to authenticate with a password.

4. PILOT PROJECT

The introduced concept is used for the realisation of a pilot solution as part of the research project called "Intermobil Region Dresden" [8]. In this project a teleservice system is developed, which includes the following functions to support the public and individual transportation systems:

- Information
- Distribution
- Service

The teleservice is accessible via internet and can be used at public multimedia terminals or from private personal computers at home. For instance the content of the information system for the public transportation routing planning or timetable information can be called. The distribution system realises the sale of the electronic tickets. The support function of the teleservice is represented by the video-based consulting using common videoconferencing tools matching the H.323 standard [3,6]. The video-based consultation should help the users with questions and problems with the information and distribution system.

Before the implementation of the consulting system could begin many different videoconferencing tools needed to be tested concerning their practical suitability and the requirements mentioned in the first section this paper. For the pilot two hardware and one software solutions have been chosen:

- ELSAvision II [1] and VCON Escort [9], two nearly equivalent hardware systems (PCI card)
- Microsoft NetMeeting 3 [5], a software system, which is available in bundle with Microsoft Windows operating systems.

Major selection criterion was the possibility to display the video component within the web browser. A practical solution executable on as many as possible systems was needed. That's why ActiveX was chosen as basic technology to integrate the video component in the web browser. To enable using other technologies in the future (e.g. Java applets) the graphical presentation component is strictly separated from the control component. The control of the components is realised with script languages like JavaScript or VBScript. The graphics and control components will be provided for downloading by the web server. The presentation component communicates between the both videoconferencing systems and the control

component with the application server of the management system. The application server is realised with COM+ components.

For the integration of the consulting system in the information and distribution system data are exchanged in the XML format. Through this data exchange the consultants get information about the last activities of the customer in the information or distributing system. This is necessary for a purposeful and fast consultation without roundabout questions.

Besides qualified and fast consultation and an easy handling, especially the audio and video quality of the videoconference is an important criterion for better acceptance. [7] With the Germany-wide available and low-cost internet access using DSL technology comfortable transfer quality can be realised.

5. CONCLUSION AND FUTURE WORK

The pilot project aims at checking out the possibilities and borders of the technical feasibility of video-based customer consulting. Even though videoconferencing systems are standardised there are particular relevant compatibility problems. At the end of the pilot phase in 2003 it remains to be seen if the video-based consulting via internet with the available tools by then will be accepted by the customers. Then we can identify the flaws of the system and purposefully debug them.

A video-based customer consulting can only be established and keep its place at the market if the system is easily accessible with high quality and if it offers the customers at least the same benefits as the equivalent real consultation. Because of the rapid development of computing performance, memory and transfer capacities in the next years more and more real-life video-based consultations will be possible by stationary costs. So an increasing acceptance of such services can be expected.

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