Multi-location Collaboration Support System NetOfficeHIKARI

Sinkurou Honda[†] and Takayuki Yasuno

Abstract

Meetings at which people gather and consult with each other are indispensable in organizations like companies and schools. In the past, people were forced to physically gather and face each other if they had something to talk over or collaborate about. Since the debut of the telephone, people at remote sites have been able to collaborate and the productivity of organizations has been dramatically improved. The latest multi-location telephone conference/TV conference systems not only make remote conferences practical, but also realize multi-location real-time collaboration. Here, we introduce our multi-location collaboration support system NetOfficeHIKARI and describe experiments conducted to assess it.

1. NetOfficeHIKARI

The first multi-location conference service that was widely used in business was the telephone-based TV conference system created by combining TV telephone equipment, ISDN lines, and multi-location connection equipment (the multi-conference unit or MCU). Along with the dramatic popularization of Internet, not only Web services but also advanced real-time communication services like VoIP on low-cost IP networks are actively being developed. Nowadays, the popularity of always-on Internet connections and broadband service enables very-low-cost and high-quality multi-location conference systems.

NetOfficeHIKARI is the multi-location collaboration support system developed by NTT Cyber Space Laboratories. In addition to audio/video communication, it enables the sharing of materials like Microsoft PowerPoint files, Web pages, and drawings. Moreover, since it enables the sharing of application operations, it supports various multi-location collaboration schemes.

Figure 1 shows the system in actual use. In this scene, the users are sharing Microsoft Excel windows and mouse/keyboard inputs. One user starts up Excel and leads the conference by sharing its output with other users. Figure 2 shows a meeting room. The users can move from "office room" to "meeting room" and hold individual conferences. Up to 32 users can attend one conference.

The graphical user interface can be implemented as a web application, so the its windows can be flexibly customized to suit various services. Figure 3 shows the system's network configuration. All client terminals are connected to the NetOfficeHIKARI server and log into the virtual conference space. The communication protocol is original and supports network address translation and firewalls.

† NTT Cyber Space Laboratories
  Yokosuka-shi, 239-0847 Japan
  E-mail: honda.shinkuro@lab.ntt.co.jp

Fig. 1.   System in actual use.

2. Examples of field tests

Test at call center

NTT Laboratories, together with Hoken Dohjinsha Inc. carried out a joint test of a telework support system developed by NTT Laboratories. The system, shown in Fig. 4, provides a 24-hour telephone consultation service, where operators with expert knowledge receive calls at the office or at home and provide advice about health care.

This system uses NetOfficeHIKARI for audio/video communication and incorporates a speech recognition system (VoiceRex) as well as plural-zone sound segregation technology. The system enables the user to connect to the desired person simply by saying his/her name. Counselors at work can easily liaise with each other by using this system. If they encounter any trouble or have questions, all they need to do is utter the name of the counselor whom they want to consult. Even if they are in a noisy environment, just the voice is captured and a virtual conference room for two persons is automatically set up. The network configuration of this test is shown in Fig. 5. The head office, branch offices, and homes of counselors are linked by B-FLET'S or FLET'S ADSL; all are connected to the NetOfficeHIKARI server in Tokyo.

Broadband showroom

Looking ahead to the optical broadband age, Sony Marketing Inc. and NTT-West opened a virtual showroom platform for broadband connections across regional IP networks and the Internet. They connect-
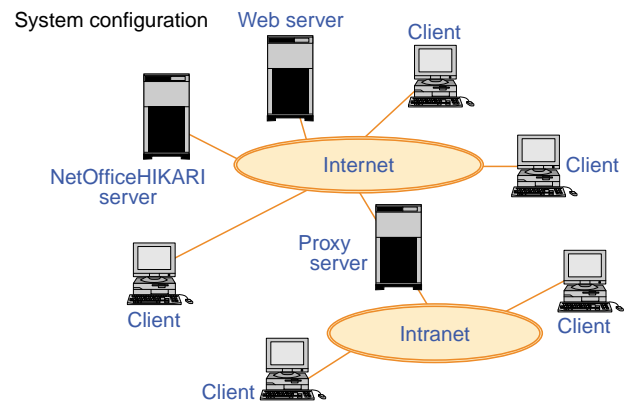

Fig. 2.   Meeting room.

Fig. 3.   NetOfficeHIKARI network configuration.
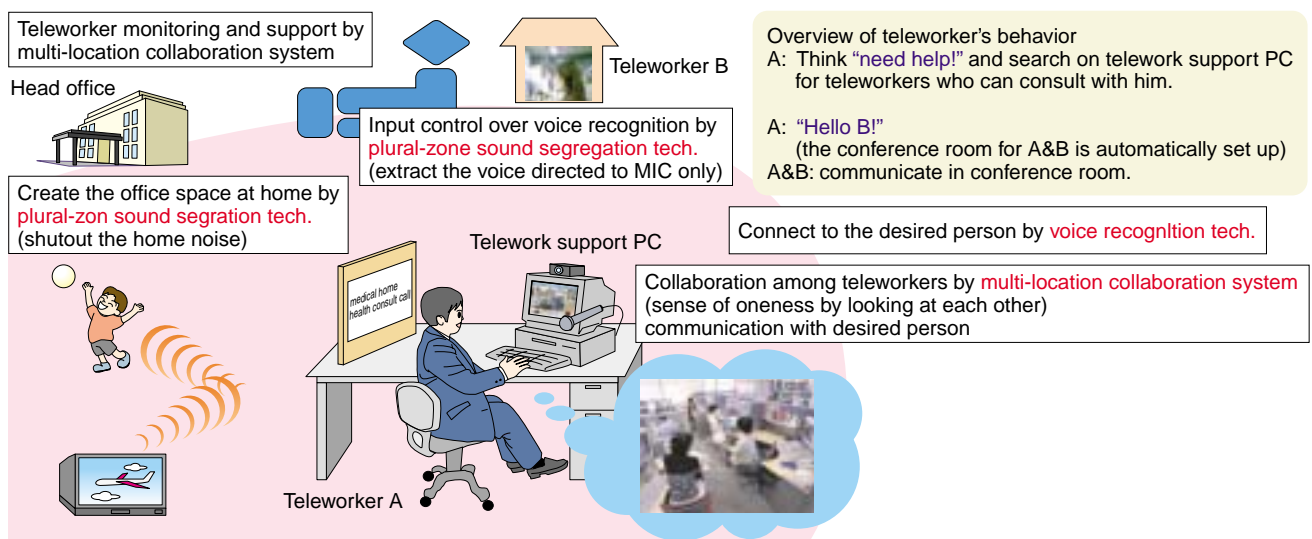

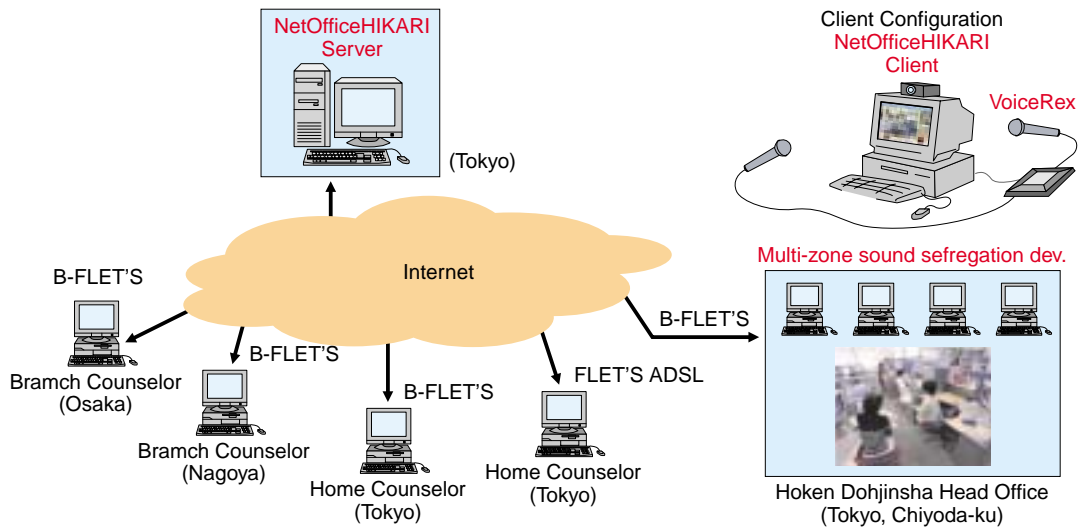Fig. 4.   Image of telework support service.

Fig. 5.   System configuration of call center test.

ed Sony Showroom (at Shinsai-bashi, Osaka) and NTT-West Cyber Business World (at Sakai-suji Honmachi, Osaka) using an optical broadband network, and have been conducting real and virtual conferences, which can be seamlessly interconnected, since May 2002.

(1) Network demonstration

A service to deliver product demonstrations conducted in Sony Showroom as high-quality Internet live video. FLET'S users in Osaka can bi-directionally communicate by using NetOfficeHIKARI. They can get real-time product explanations and conduct Q&A via the network (Fig. 6).

(2) Broadband movie showcase

This service can deliver Sony Group's broadband contents from Sony's Showroom and NTT Group's streaming movies by using the broadband network while retaining their high quality.

(3) Personal casting

We will construct a system that enables personal contents like video and music to be delivered via the Internet by using B-FLET'S Community Point.

(4) Net seminar

We held a network seminar that used high-quality live video delivery over the Internet, NetOfficeHIKARI's application sharing feature, and a video chat feature. The FLET'S users in Osaka could attend the seminar with interactive communication.

The test network configuration is shown in Fig. 7. Clients in Sony Showroom and two NTT-West Cyber Satellite World sites in Osaka (Umeda and Nihonbashi) were connected to the NetOfficeHIKARI server in Cyber Business World via a broadband network.

Teleworking test

Since the end of 2001, NTT Cyber Space Laboratories have been conducting a teleworking trial involving the NTT IT ASP service "Meeting-Plaza", which is based on NetOffice, the predecessor of NetOfficeHIKARI. In the test, subjects connect to the virtual conference room from their own desks, from other offices, or from various locations while on business trips. They log into the virtual conference room on the network and keep the connection open all day. Thus they can check the status of other attendees while continuing their own jobs (awareness mode). Of course they can talk by voice or chat, and they can move to another virtual conference room and hold

Fig. 6.   FLET'S users can bi-directionally communicate by using NetOfficeHIKARI.
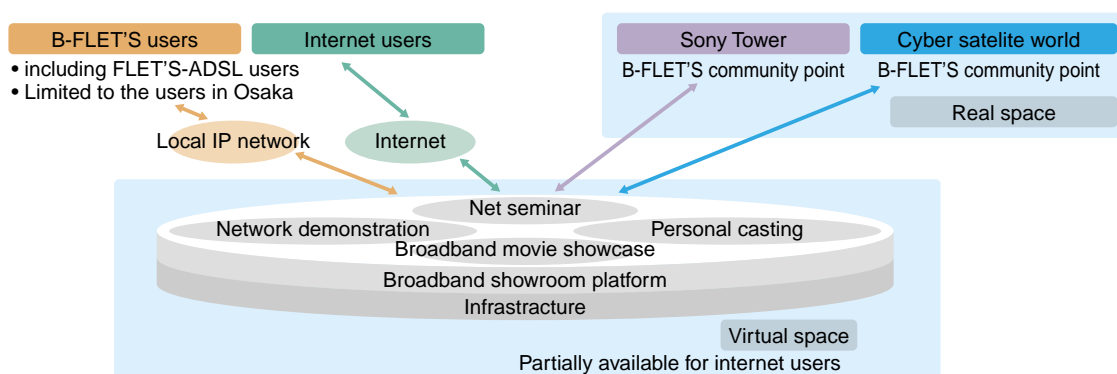
Fig. 7.   Network configuration of broadband showroom test.

meetings as required (meeting mode).

Figure 8 shows how they log into the virtual conference room. They can share a virtual space with other members in a remote office or abroad or traveling on a business trip. Though they are isolated physically, they can share each other's status and instantly exchange miscellaneous questions. They can also talk to the desired member after checking his/her status (e.g., at/away from his/her desk or on/off the phone). In addition, they can easily ask all members a question and start a discussion. If they leave their seat for any length of time, they can check the history of any discussion.

During the test, most entry-level problems disappeared as people became familiar with system operation. In addition, system performance was improved by introducing new techniques.

3. Future plan

We have already introduced a collaboration environment that utilizes real-time communication over the IP network. We can flexibly incorporate not only audio and video, but also data and applications, and share them remotely because the environment is realized as software running on ordinary PCs. In addition, it uses a web browser with ActiveX control, so it well supports existing Web services. We can realize higher-value-added services like Web contact centers incorporating real-time communication and Web-based training systems that incorporate video delivery. In future, we plan to enhance the features of NetOfficeHIKARI by incorporating high-quality codecs like MPEG.

Fig. 8.   Virtual conference room.

Shinkuro Honda
Cyber Communications System Group, Media Communications Project, NTT Cyber Space Laboratories.
He received the B.S., M.S., and Ph.D. degrees in engineering from Keio University in 1993, 1995, and 1998, respectively.He was a research fellow of the Japan Society for the Promotion of Science from 1997 to 1999. He joined NTT Cyber Space Laboratories in 1999. He is a member of the Institute of Electronics, Information and Communication Engineers, and Information Processing Society of Japan. He has received the IEICE Young Investigators Award.

Takayuki Yasuno
Senior Research Engineer, Supervisor, Media Communications Project, NTT Cyber Space Laboratories.
He received the B.E. and M.S. degrees from Keio University, Yokohama, Japan, in 1986, 1988, respectively, and Doctor of Engineering degree from Waseda University, Tokyo, Japan, in 1996. He was engaged in image processing research in NTT Human Interface Laboratories from 1988 to 1994. He was a visiting researcher in Waseda University, from 1994 to 1997. Since 2001, he has been a senior research engineer, supervisor in NTT Cyber Space Laboratories. He is interested in computer vision, virtual reality systems and visual communication. He is a member of the Information Processing Society of Japan and the Institute of Image Electronics Engineers of Japan.