Proposals of Mobile and Softphone Solutions to Promote Eco-friendly Work Style Innovations in the Office

KURASHIMA Akihisa, SHIMA Masato, YOSHIKAWA Masato, NAKANISHI Yasushi

Abstract

To meet the worldwide trend in eco-promotion, this paper introduces the prospect of reducing CO_2 emitted during the movement of humans in the office environment and discusses efficiency improvements in office functions. We propose construction of a "ubiquitous office" environment via the introduction of our innovative softphone (UNIVERGE Soft Client SP350) and mobile phone (UNIVERGE Keitai-Portal) infrastructures.

1. Introduction

Because of the worldwide eco-promotional trend, every country is now endeavoring to achieve its CO_2 emission reduction target. From this viewpoint, the CO_2 emissions of the "business and other" sector including office buildings had already presented a noticeable growth by 2005. As a result of this trend the Japanese Ministry of Land, Infrastructure, Transport and Tourism then started a study for reducing the CO_2 emissions of this sector [1].

This paper introduces the prospect of reducing the CO_2 emitted during the movement of humans in the office environment and discusses improvements in office job efficiencies. We intend to achieve these aims by promoting an innovative work style that will be realized by the creation of "ubiquitous office" environments enabled by optimally using softphone and mobile phone infrastructures.

2. Application of Softphone Solutions

2.1 General

The work style in which people gather in a centralized office environment and perform jobs is gradually changing. Instead, cases in which jobs are conducted in a distributed remote office environment deserving of the name "ubiquitous office" are increasing and are helping to prevent losses due to human movements. Under such circumstances, the require-ment for using the same UC (Unified Communication) environment as in the office regardless of location is increasing. With the UNIVERGE SV8000 Series PBX, we meet this requirement by using a softphone that can be installed on a Windows PC. This section discusses the implementation of the "ubiquitous office" by utilizing the convenience of our recently introduced softphone, UNIVERGE Soft Client SP350 (hereinafter referred to as the SP350).

2.2 Outline of the Softphone (SP350)

A telephone facility based on the VoIP (Voice over IP) technology is capable of holding communications from any location where a high-speed IP network is available. In addition to the voice communication function, the SP350 incorporates convenient functions for implementing a "ubiquitous UC service" such as use of a phone directory, click calls and presence functions as well as videoconferencing, data sharing and an IM (Instant Message) text communication function.

2.3 Distributed Data Conference Using Softphone

The data conferencing function of the SP350 enables videoconferencing and data sharing between a maximum of 8 parties or locations. The data conferencing of the SP350 can be introduced easily even by small enterprises that have little reserve capital. This is due to the fact that an ordinary web conferencing system necessitates a conference server and original hardware. On the other hand the SP350's data conferencing can be implemented by interconnecting client PCs with the

P2P (Peer-to-Peer) communication technology, without the use of a server. **Fig. 1** shows an example of data conferencing using the SP350. In this case, The UNIVERGE SV Series is installed at the Tokyo head office and at the Osaka and Hokkaido branch offices, which are all interconnected by NEC's original P2P common-channel interoffice signaling (CCIS) system. When a mobile PC with an SP350 installed is used, the user can utilize the same data conferencing (videoconferencing, material sharing and chatting) functions as in the Tokyo head office via a local IP gateway installed in the remote offices in Osaka and Hokkaido as well as from any hotel in which broadband Internet is available. This facility frees employees from the need for time consuming movements for participation in conferences and enables them to participate in efficient, high-quality conferencing.

2.4 Applying Softphone in a Thin Client System

With the thin client system, applications mounted in mobile PCs carried by employees are limited and major resources such as applications and files are stored at the server so that client terminals may have indirect use of them. The SP350 adopts the SteadyState system (a thin client system that makes use of the Windows remote desktop function) to provide the client terminals used outside the office with UC services including voice communication, telephone directory and pres-

ence indication. One of the advantages of this system is that no information is stored in the client terminals. This means that security can be ensured even when the office environment is brought outside. Another advantage is that a thin client terminal can be used by anyone who has logged in and the softphone terminal may also be shared by anyone logging in. This
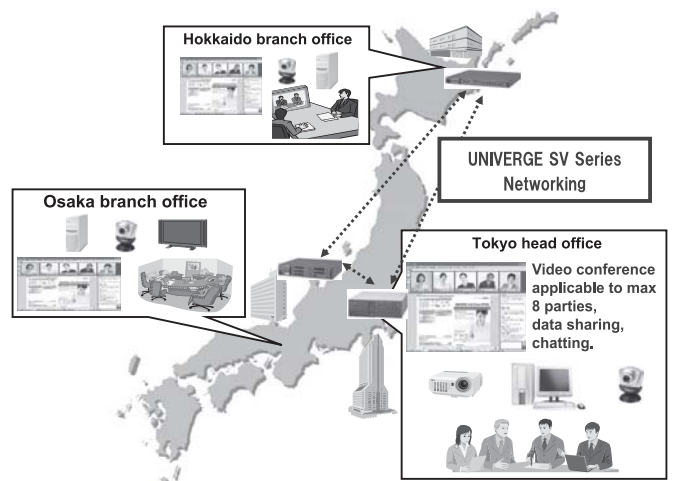

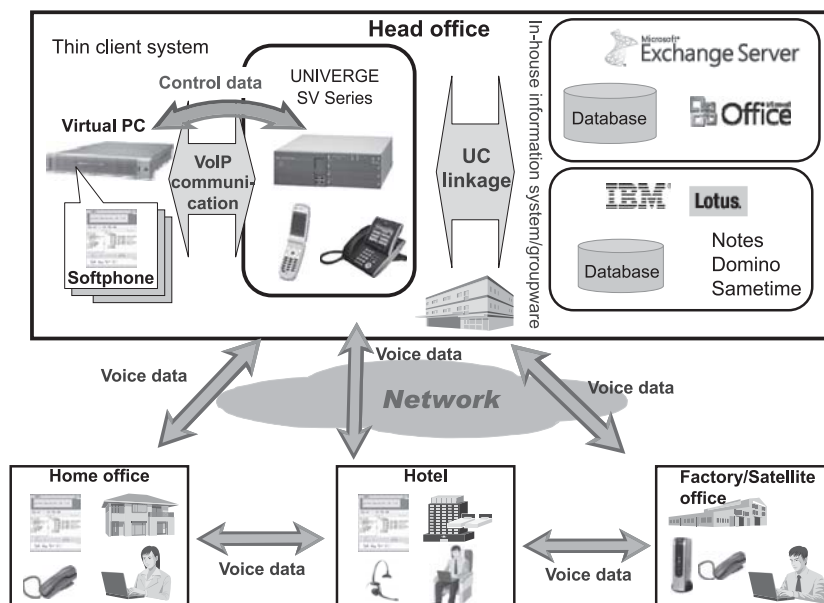Fig. 1   Data conference operation using UNIVERGE Soft Client SP350.

Fig. 2   Thin client system operation using UNIVERGE Soft Client SP350.

means that, when client terminals are prepared in business locations, the remotely located employees can use the terminals as their own softphone terminals and utilize the same phone environments as those they use in their offices.

Fig. 2 shows an example of the SP350's thin client system operations in a home office, satellite office and at a hotel stayed at during business travel. The SP350 can provide a UC environment associated with the database (of directory information, presence information, etc.) of any of the in-house information systems released from the two major manufacturers (Microsoft Office/Exchange Server or IBM Sametime).

With the thin client adaptation of the SP350, the call control signals for communications are exchanged between the SP350 installed in a virtual PC environment at the server and the UNIVERGE SV Series. In order to prevent audio delay as well as to avoid server overload due to VoIP audio voice packet signals (VoIP audio) of large data quantities, they are exchanged via P2P communications between client terminals and the connection destinations. In addition, excellent audio quality is also ensured by the audio packet processing technology that is adopted by the softphone in order to interpolate signal fluctuations and packet losses.

2.5 Effects of Application of Softphone

When the softphone is used, the UC services including telephony and data conferencing can be used by carrying a mobile PC and without preparing a separate dedicated terminal. Movement time and CO_2 emission may thereby be reduced as well as the costs. Even in a thin client system environment with high security awareness, the softphone enables smooth communications while reserving high quality communication media including voice, thereby contributing significantly to the implementation of the "ubiquitous office" as well as to eco-promotion.

3. Application of the Mobile Phone

3.1 General

The mobile phone is an indispensable item for office staff, who are often absent from their offices. If they are able to hold phone communications as well as to exchange mail and conduct other office operations ubiquitously, they have no need to return to their offices in order to perform these jobs, so their efficiency may thereby be improved. However, if the job in-

formation is retained in the mobile phone, there is a risk of the information being leaked in the event of a loss or theft of the mobile phone.

This section describes the functions of the UNIVERGE Keitai-Portal, which is a server software product that involves the functions required for the secure use of mobile phone in a business environment. We also consider aspects of the portal's contribution to the promotion of an eco-friendly business environment.

3.2 UNIVERGE Keitai–Portal

The UNIVERGE Keitai-Portal is a software product that is installed in a server located in the DMZ (Demilitarized Zone) between an intranet and public switched packet network and is linked to mobile phone-dedicated programs in order to provide mobile phones (Keitai in Japanese) with various solutions while maintaining a secure communication environment. **Fig. 3** shows an example of the system configuration.

This product has two main functions, which are linkage with the job server and that of the UNIVERGE SV Series. The linkage with the job server covers reading/sending of mails via the mail (POP/SMTP) server, address inquiries via the directory(LDAP) server and access/login proxy to the web server to provide the c-HTML format content as well as access to Microsoft Office documents. All of the target information is stored in the server and cannot be stored in the terminals so that the risk of information leaks can be prevented even in the case of terminal loss.
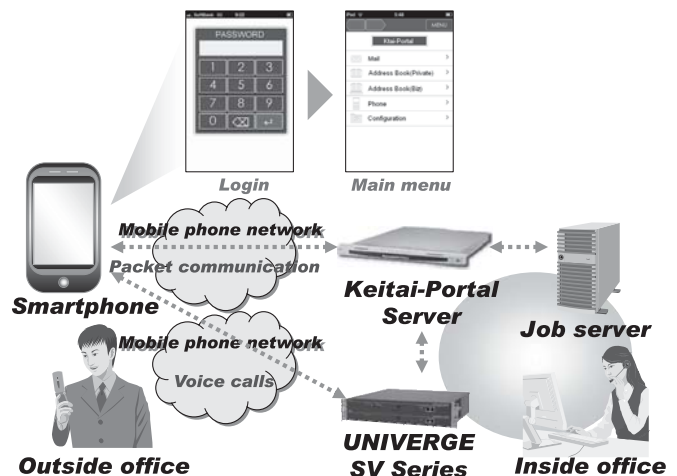

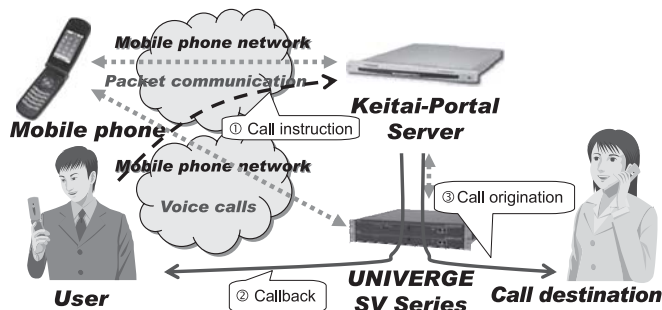Fig. 3   System outline of the UNIVERGE Keitai-Portal.

Fig. 4   Third party call origination of the UNIVERGE Keitai-Portal.

The linkage with the UNIVERGE SV Series is used to provide the Third party call origination function. With this function, when a user sends a call request, the Keitai-Portal server is triggered and originates calls to the user and the destination designated by the user via the UNIVERGE SV Series (**Fig. 4**). When both parties answer the call, the server sends voice information to both parties so that they may then hold a conversation. Since it is the UNIVERGE SV Series that originates the call to the destination, the destination phone number does not remain in the call history of the mobile phone and calls may be placed directly, even on an extension phone to which no dial-in number is assigned. In addition, since the voice streams of the Third party calls are terminated on the UNIVERGE SV Series, installing recorders here makes it possible to record the calls and utilize the records to support subsequent compliance measures. Moreover, a call is charged on the circuit connected to the UNIVERGE SV Series instead of to the mobile phone account. This means that, thanks to the security function as described above, the personal mobile phones of employees may also be used for business purposes.

3.3 Effects of Application of the UNIVERGE Keitai–Portal Product

As described above, the UNIVERGE Keitai-Portal allows users to access the job server even during travel or when moving about in the office building and can enable them to perform jobs such as mail checks. This leads to a reduced need of going to the office in the morning or evening, thereby contributing to a reduction in human movements. According to our calculations based on model cases, the reduction of CO_2 emission accompanying human movements occupies the largest share of 71% among the total reductions that would be brought about by introduction of the Keitai-Portal.

The possibility of browsing Microsoft Office documents al-so makes it unnecessary to print out the documents and take them with you when you go out. This is convenient in case you have to examine any work while you are outside of the office. In the above-mentioned calculation, CO_2 emission reduction resulting from the paperless reform occupies the second largest share of 18% of the total reduction.

NEC proceeded to perform demonstration testing of the UNIVERGE Keitai-Portal using a prototype in 2004, prior to starting in-house services using the actual product. At present, more than 10,000 NEC employees are using this service. These in-house users have already provided us with a large number of comments on the advantages of this product. These include not only the saving of the labor involved in journeying to offices but also the reduced use of personal items thanks to the elimination of a mobile PC from the baggage as well the reduced risk of loss of a PC. The comments also appreciate the improvements in security and job efficiency, e.g. the possibility of mail checking/sending during travel or holidays and the saving of the time used for mail checking in the office because it now becomes possible to perform this task during commuting.

4. Conclusion

It is known that mobile terminals including mobile phones and PCs enable jobs to be performed outside of the office and that this facility contributes to CO_2 emission reductions by reducing staff movements. However, their use is at the same time accompanied by risk in terms of physical security. If the combination of thin client system and softphone and a secure job environment is available, access from a mobile phone can be introduced as discussed above. It will thereby be possible to implement a safe and comfortable "ubiquitous office" and to eventually lead to promote an eco-friendly business environment.

Currently, new types of mobile terminals such as smartphones and slate/tablet terminals are being released one after another. As the expectations for these terminals in supporting the business environment are very high, NEC is also planning to propose ecological solutions dealing with issues concerning them.

Proposals of Mobile and Softphone Solutions to Promote Eco-friendly Work Style Innovations in the Office

Reference

1) Ministry of Land, Infrastructure and Transport, "Interim report of global warming countermeasure examination in office building committee - Promotion strategies by reducing CO_2 emissions in the office buildings" (original title: OFISU BIRU NO CHIKYU ONDANKA BOUSHI TAISAKU KENTOKAI CHUKAN TORIMATOME - OFISU BIRU NO CO2 HAISYUTSURYO SAKUGEN NO SUISHIN HOUSAKU NITSUITE) (written in Japanese), 2007.

Authors' Profiles

KURASHIMA Akihisa
Group Manager
Enterprise Network Development Division
Ph. D.

SHIMA Masato
Manager
Network Applications Development Group
Network Products Development Division
NEC Infrontia Corporation

YOSHIKAWA Masato
Manager
Enterprise Network Development Division

NAKANISHI Yasushi
Assistant General Manager
Network Products Development Division
NEC Infrontia Corporation