An Office Communications Model using CTstage4i

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With the rapid growth of the Internet, personal computers, and portable telephones in recent years, the information communication market is experiencing dramatic changes. IT infrastructure, in fact, is being overturned from its very roots. With the steady trend toward broadband Internet, through the proliferation of high speed networks, such as xDSL, broadband Internet, and wireless LANs, new broadband services, exemplified by EC (electronic commerce) and music and video distribution, have appeared.

CTstage4i is one of the newest CTI&IP communication systems. From a Computer Telepony Integration (below, CTI) server, which melds information (the computer) and communications (telephony), achieving great advances in affinity with broadband Internet, it integrates all the key elements: infrastructure (telephone circuits and Internet), media (voice, images, data), tools (telephones/ mobile telephones/IP phones, FAXs, PDAs), and locations (intra-enterprise systems and mobile).

In particular, the field of "office communications," which centers around IP-PBX+UMS, is a new area for CTstage4i solutions. These solutions, which have become feasible through the maturing of new technologies for available media, devices (terminals), presence, IP network, etc., are ideally suited to the broadband, ubiquitous era.

In conducting market development and creating user proposals for an Office Communications Model using CTstage4i, we created and used a system at our company. In that way, we gained know-how about system construction and learned what issues to be careful of. That, in turn, became feedback for determining product specifications.

In this paper we introduce CTstage4i, including its functions, and describe aspects of system construction (such as security, network configuration, etc.) In doing so, we will refer to the actual system being operated at our company, Oki's Multimedia Messaging Company (below, MMC), for the purpose of improving office communications.

System Models Provided by CTstage4i

CTstage4i provides the following three system models: (Refer to Fig. 1.)

- Achieving improved knowledge-worker productivity - "Office Communication"

  By means of an IP-PBX function, implemented through open architecture, and a unified messaging function that completely integrates telephones, FAX,

and e-mail, a real-time communication environment suitable for the broadband IP era is provided. It enables significant improvement of knowledge-worker productivity.

- Building customer relationships - "Customer Contact Center"

  By means of a UnPBX model / softswitch model, a multi-channel contact center is achieved which integrates customer access from both the Internet and telephone networks. This system supports from a few operator seats to 300 operator seats per server.

- Achieving voice portals, IP Centrex, etc.-"Carrier/ Provider Value-added Services"

  Through adoption of softswitch architecture, this system may be used as the infrastructure for large-scale value-added networks, not only for switching processing, but also for other processing, such as messaging. Additionally, by supporting the multi-tenant function, the system can serve as infrastructure for ASP (Application Service Provider) services, such as voice portals, IP Centrex, and ASP type call centers.

① Office Communications
   Implementation of a communication system for the knowledge worker.
   (IP-PBX + unified messaging)

② Customer Contact Center
   Implementation of multi-channel communication to build customer relationships

   Providing a softswitch model and a UnPBX model

③ Carrier/Provider Value-Added Services
   Service platforms (IP Centrex, ASP call center, and voice portal)
   that allow the carrier/provider to provide value-added services
   to the network user

Fig. 1 The three system models provided by CTstage4i

What is Office Communications?

With the advent of the Internet and the proliferation of portable telephones, both the amount of information and its transmission speed have increased explosively. White collar "knowledge workers" at enterprises are now required to access necessary information from a huge volume of information and do it speedily in order to make proper decisions.

However, within any company, the communication means, such as telephone, FAX, computer, etc., and the information resources are both varied and dispersed. Employees must use different access tools, depending on the source of the required information, which may come from e-mail, internal databases, the Web, etc., and this is a major hindrance to productivity improvement.

In many companies in Japan, telephone systems, typified by PBX or internal phone systems, and computer systems, particularly e-mail, are built as two totally different systems. This invites a problematic division in communications, resulting in deterioration of speed and accuracy. Moreover, it is said by some that a time loss of from 30 minutes to 1 hour per person per day also results. This division into two communication systems causes not only a drop in productivity but also lost business opportunities, lowered customer satisfaction levels, and delays in decision making. It is a major factor hindering the ability to make smooth and quick organization changes in response to the business environment.

Through adoption of softswitch architecture, CTstage4i integrates the IP-PBX function, which performs the role of the telephone system, and the unified messaging function, which plays the role of the computer system, and thus provides a real-time communication environment. This supports improvements in knowledge worker productivity.

More specifically, as a terminal for IP era office communications, CTstage4i supports SoftPhone, SIP telephones, PDAs and PHS. This enables voice communication, utilizing the VoIP function of these terminals. Additionally, in the case of SoftPhone, it is possible for a knowledge worker to obtain the other party's phone number from the Web and initiate a phone call with just a click of the mouse. Moreover, with SoftPhone, by setting one's "presence" status (at one's desk, out of the office, in a meeting, etc.), one can set the processing of incoming telephone calls, such as "receive call," "forward call to another telephone" (such a conference room phone, one's portable telephone, or PHS) or "receive as voice mail."

If a PDA with built-in wireless LAN is used, one can not only access the "unified messages" stored in one's e-mail in-box but can also make a voice call via the wireless LAN, using the SoftPhone function. In other words, not only within the office, but also from any of a rapidly increasing number of "hotspots," it is now possible to place internal phone calls or access intranet information using a PDA. Thus the communication capability of knowledge workers when they are outside the office is greatly enhanced.

The major advantage of the softswitch function is that centralized installations (centers) can be implemented providing the PBX function for the entire company. Headquarters and all branch offices can be connected using broadband Ethernet or IP-VPN, and telephone switching of the terminals at each location can be done by softswitch capability at headquarters. This makes it unnecessary to install PBX equipment at each location and results in major reductions in the cost of operating and managing the communication system and in a dramatic improvement in the productivity of knowledge workers.

Functions Implemented / utilized in CTstage4i Office Communications

The system built and operated by MMC (see Fig. 2) implements and utilizes the following functions.
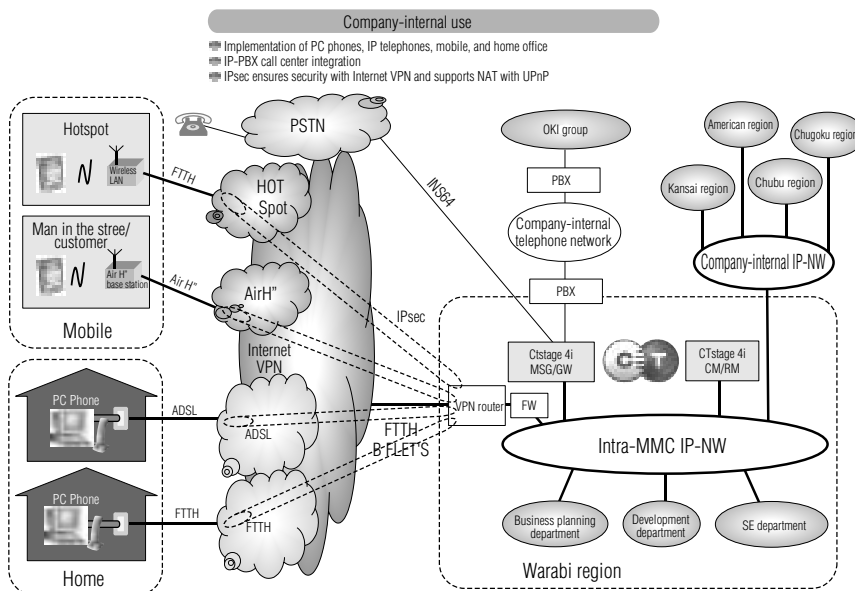

Fig. 2 The MMC office system

Fig. 3　Operator Log-in Screen

- **Use of the call center call receiving function in an office environment**

MMC employees are all registered as CTstage4i call center operators. When they are at their desks they can click the "CT icon" on the PC screen to log on to CTstage4i's ACD (Auto Call Distributor) server (see Fig. 3). When an employee logs on, the ACD server recognizes that "this employee is at his/her desk," and the employee can then receive calls at their desk.

A CTstage call center operator must be part of a "business group." With CTstage, one can be part of five business groups at most (in general, this function is called the multi-ACD log-on function). At MMC a business group is created for each team unit, and employees belong to the business group corresponding to the team to which they belong. When one telephones MMC, the IVR answers and, depending on the number called, it selects the responsible person or team and notifies the ACD server. The ACD server verifies that the responsible person is in the status of "logged on / can receive calls," and puts through the call. If the responsible person is not available, the ACD server calls the operator within the same business group (the same team). Of course, if a person is not logged on or if he/she has set a status of "away from desk," or "work time" (i.e. "do not disturb") then the phone on the desk will never ring. This prevents the loss of business efficiency through picking up a phone ringing on the desk of someone who is not present. In this case, a display in a pop-up window on the PC indicates the intended recipient of the call, so it is possible to know who the intended recipient is before picking up the phone.

- **The voice-mail function**

If none of the operators of the business group mentioned above is logged in, then the ACD server automatically activates the "voice mail (answering machine) function". The recorded voice mail is sent to the e-mail of the responsible person, of course, and is also distributed to all the other team members, making it possible to respond quickly. Of course, one can also read it (listen to it) from another office if, for example, one is on a business trip.

- **Operator status display function**

In cases such as when an employee receives a call but it is not his/her responsibility, it is necessary to forward it. In such a case, when the responsible person is in a remote location, typically the call is forwarded to that person. However, if in fact the person is not at that location, the customer may be left on hold. With the CTstage call center, it is possible to verify in real time the status of each operator-e.g. not present, away from his desk, or in a "do not disturb" status (see Fig. 4). As a

result, before forwarding the call, one can tell the status of the person designated to receive the forwarded call and can thus handle the call without leaving the customer on hold.

In transferring the call to the responsible person, it can be sent by a single click on the screen, which is very useful in easing the operator's workload and preventing incorrect dialing.
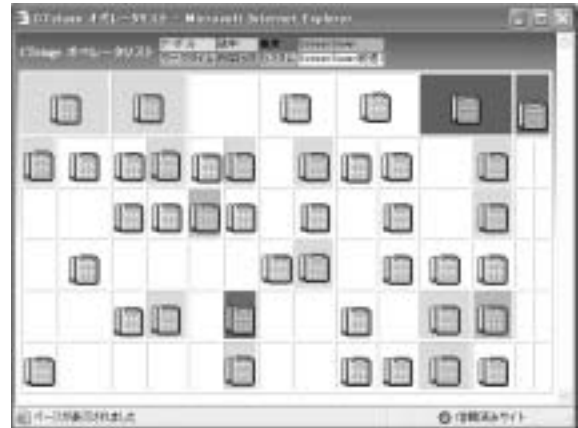

Fig. 4　Operator real-time status display

- **Customer database registration function**

People one frequently calls from one's PC terminal can be registered in a customer database and, when necessary, it is possible to look up and call that person with a single click. As in the case above, this also is very useful for easing the operator's workload and preventing incorrect dialing.

- **Call history function**

It is possible at any time to refer to the history of phone calls one has made. This history information is stored in the call history database in the CTstage server, so even if one changes his/her PC terminal, that history is not lost. Of course, with one click on this history information it is possible to initiate a call.

When telephone numbers are registered in the customer database as mentioned above, it is also possible to look up the customer's name from a phone number or to display the names of customers who called. By clicking the customer's name, one can bring up the customer data change screen, which improves ease of maintenance and enhances convenience.

- **Company-internal phone book search function**

In our company it is possible to use LDAP to search through the phone book. From the results of this search one can make a call with a single click.

- **Softswitch function**

By using the softswitch function of CTstage4i, it is possible to implement not just a telephone terminal but also a call center operator seat that utilizes a PC terminal. In such a case, the operator seat is only connected by a LAN cable. Moreover, if there is a wireless LAN station, then a PC that supports wireless LAN would not even need a LAN cable.

By using this function, it is possible to have a location-free office, which goes beyond the boundaries of the

local office. For example, if one goes on a business trip with a notebook computer and connects to a LAN in another office, then that becomes one's own operator seat.   Thus, once a person performs the log-on operation, if a call intended for him/her comes in, it can be received without any need of forwarding. Taking this concept one step further, it now becomes feasible to work at home.

Recently, hotspots have been set up throughout large cities. If one logs in to his/hercompany from a hotspot, such as a coffee shop, it becomes possible to place phone calls on an internal line.

One Point about System Construction

At the time of system construction, one point that must be noted in particular concerns security measures with the softswitch model. For example, when sending data from a hotspot, via a wireless LAN or the Internet, there is the danger that a third party will be able to eavesdrop and steal important company information. Therefore, at MMC, a VPN environment is set up and the connection is made through a VPN router. VPN uses L2TP + IPsec. IPsec distributes certificates to remote PC terminals and performs verification based on those certificates, providing very high security.   All of the transmitted data is encrypted so that even if the data content, traveling over a wireless LAN for example, is stolen, it is not possible for the data content to be understood.

Conclusion

By actually operating it at our Multimedia Messaging Company, we were able to verify the following results concerning the use of our company's CTstage4i Office Communications System:

*   The call center function is effective even in an office environment.
*   Functions that are effective for communication in the IP era can be utilized while still ensuring security.

As a messaging solution for the broadband Internet era, CTstage4i is a system that greatly strengthens IP related functions, compared to the conventional CTI. There is no doubt that the importance of networks, within the total network infrastructure, will continue to grow in the future.

Having positioned IP-PBX + UMS based on CTstage4i as an essential technology for the office communications field and as a communication system which responds to changes in the market in this era of ubiquity, we are continuing to implement and provide new services.

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