CTI & IP Systems for Multimedia Messaging

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In recent years, the information communications market has been dominated by the extraordinary growth of the Internet, PCs and mobile telephones, and is now facing radical and dramatic changes in IT infrastructure. What is more, with the consolidation of high-speed networks, such as xDSL, wideband Ethernets, and wireless LANs, the Internet is making further progress in the conversion to broadband technology, and new broadband services, such as EC (Electric Commerce), or music and video delivery, have emerged.

CTstage 4i is a brand-new CTI&IP communications system based on Computer Telephony Integration (CTI) servers that integrate information (computer) and communications (telephony), achieving great advances in affinity with broadband Internet and making it possible to integrate all infrastructures (telephone circuits, Internet), media (voice, images, data), tools (telephone, mobile telephone, IP telephone, fax, PDA), and locations (in-house system, mobile system).

This essay gives an overview of the solutions offered in three system models based on CTstage 4i: "Office Communications", "Customer Contact Centre", and "Carrier/Provider Value Added Services".

The three system models provided by CTstage 4i.

CTstage 4i provides the following three system models.

- **"Office Communications" to improve the productivity of knowledge workers**
  Provides real-time office communications environment for the broadband IP age, by incorporating two functions: IP-PBX [1] based on open architecture, and unified messaging providing full integration of telephone, fax and e-mail services. The result is improved productivity in knowledge workers.
- **"Customer Contact Centre" building relationships with customers**
  Creates a multi-channel contact centre which unifies customer access by Internet and telephone network, to provide a customer contact centre involving anything from a handful of operators to 300 operators, using UnPBX [2] models and softswitch [1] [3] models.
- **"Carrier/Provider Value Added Services" for achieving voice portals and IP centrexes, etc.**
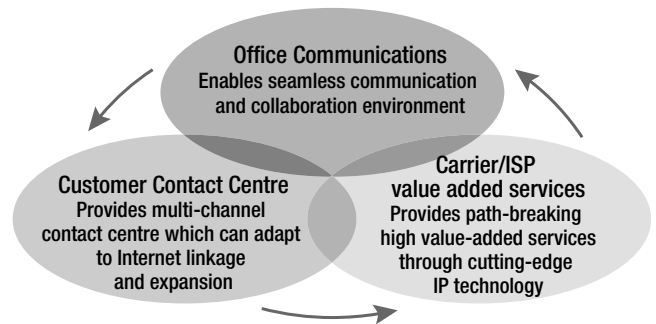 The adoption of a softswitch architecture means that

Fig. 1 The three system models forming CTstage 4i

the infrastructure can be used for large-scale carrier/provider value added networks, not only for switching processing, but also for messaging processing, and so on. In addition, by supporting multi-tenant functions [4] , it is possible to create voice portals, IP centrexes, and ASP-type call centres, etc. as infrastructures for ASP (Application Service Provider) services.

With the spread of mobile phones equipped with office communications, as well as the emergence of the Internet, information volumes and transmission speeds have increased massively, and there is now a growing requirement for companies' white-collar employees, in their new role as "knowledge workers", to be able to access the information they need, quickly, from a huge information archive, and to make accurate decisions on the basis of this information.

However, inside companies, communications means and information resources, including telephone, fax, computers, and so on, are becoming increasingly diverse and distributed, requiring the use of different access tools depending on the source of the required information, be it e-mail, in-house database, or Web, etc., and in this way creating a significant barrier to improved productivity. In many Japanese firms, the telephone system, such as PBX or internal line system, and the computer system, such as e-mailing, are built completely separately. Set-ups of this kind not only invite communications division failures and degrade speed and accuracy, they are also reckoned to generate time losses of an average of 30 min. – 1 hour per person. Besides a decline in productivity, this division into two communications systems can lead to loss of business opportunities, decreased customer satisfaction, delays in

decision making, and so on. It can also deprive a company of the capacity to make smooth organisational changes in response to the business climate.

In CTstage 4i, the use of a softswitching architecture means that the IP-PBX function performing the role of the telephone system is integrated with the unified messaging function performing the role of the computer system. In this way, a real-time communications environment is provided, which helps knowledge workers to increase their productivity.

More specifically, the system supports terminals suited to the IP era of office communications, such as soft phones, SIP phones, and PDAs. Using a VoIP function, it is possible to perform voice communications from a PC equipped with a soft phone. What is more, using a soft phone, the knowledge worker is able to search for a correspondent's phone number via the Web and click with the mouse on that number to make a call. Soft phones also permit the use of presence settings (personal status information, such as "present", "absent", "in meeting", etc.) to set up processing for incoming calls to a worker's phone, so that calls are forwarded to another phone (conference room phone, mobile phone, PHS), directed to a voice mail box, or the like.

Using a PDA incorporated into a wireless LAN, as well as accessing the unified messages stored in the e-mail inbox, it is also possible to perform voice communications via the wireless LAN, using a soft phone function. In other words, PDAs can now be used for internal voice communications and access to Intranet information, not only from inside the office, but also from a rapidly expanding number of "hot spots", producing a quantum leap in the communications capabilities of knowledge workers operating outside the office.

The principal merit of softswitch functions lies in the fact that PBX functions for the whole company can be located in a single centre. The head office is connected to branch sites via wideband Ethernet or IP-VPN systems, and the terminals at each site can exchange telephone communications by means of the softswitches in the HQ, thus not only obviating the need to provide a PBX at each site, but also providing massive savings in communications system running and management costs, as well as dramatic improvement in knowledge workers' productivity (see Fig. 2).

Customer Contact Centres

Diversification of customer needs and rapid changes in market environment have meant that conventional concepts, such as mass marketing and product-out, are facing a crisis for survival within firms. In order to build
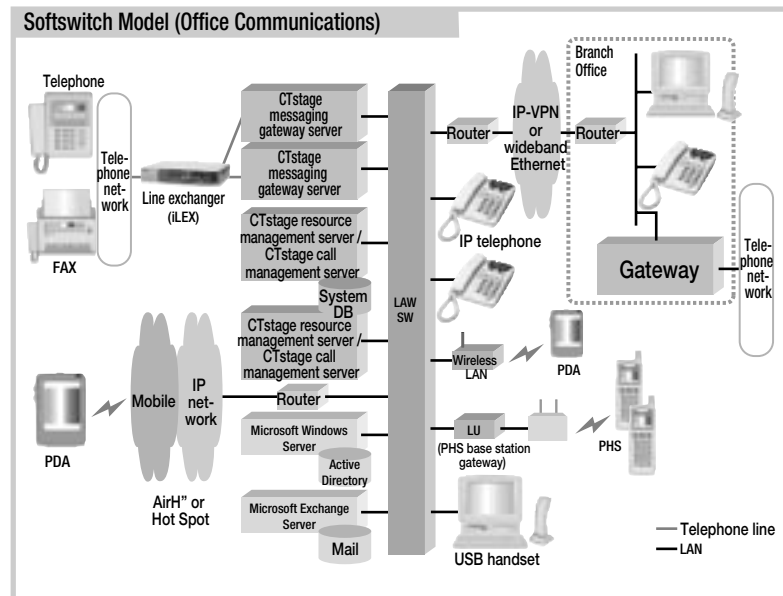

Fig. 2 Example of CTstage 4i Office Communications System

relationships of trust with customers, increase the fixed client base, and ensure long-term profits, in response to the changing times, new customer-orientated approaches, such as CRM (Customer Relationship Management), which advocate "seeing the company's activities from the consumer's viewpoint, rather than from the supplier's viewpoint," have started to filter into company thinking.

CTstage has proposed a large number of contact centre solutions based on UnPBX products where the call centre system is built without using PBX. In addition to the UnPBX model, CTstage 4i expands the contact centre scale enormously to a maximum of 300 operators, by adopting a softswitching model (Fig. 3).

In call centres based on conventional telephony, the CTI system which provides the call centre's IVR (Interactive Voice Response) and ACD (Automated Call Distribution) functions, and the operator centre which provides the actual customer services, have been located at the same site. But now, contact centres based on the softswitching model permit a new system architecture which makes full use of broadband IP networks. In other words, a distributed call centre structure in which the CTI system and operators located at different sites are interconnected via an IP network. As well as providing data communications for searching a customer database from a client PC worked by an operator, the IP networks, such as wideband Ethernet or IP-VPN, which connect these points are also used as network infrastructure for transmitting voice calls based on VoIP between a customer's phone connected to the CTI system and a soft phone on the operator's PC.

The distributed operator sites do not have to be single points, but rather, it is also possible to distribute them amongst a plurality of points in, for example, Tokyo, Sapporo, Okinawa, and so on. Moreover, instead of
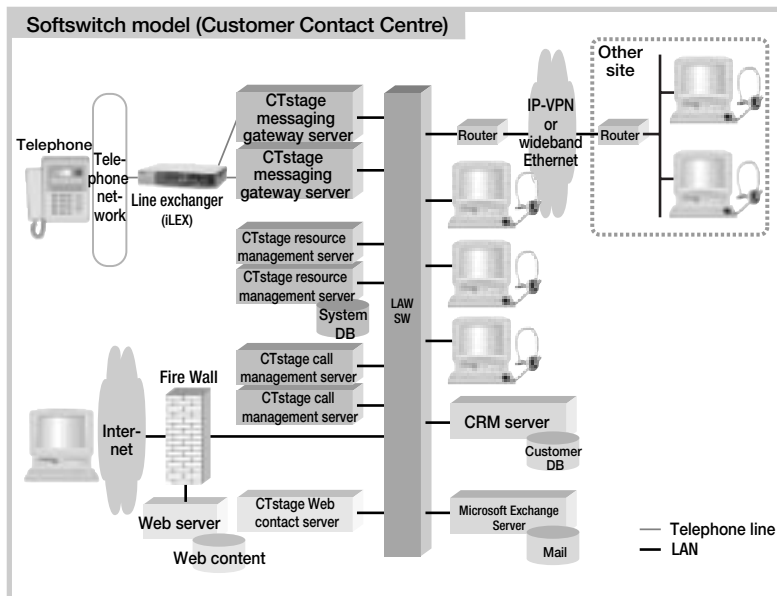
Fig. 3 Softswitch model IP distributed contact centre

locating the operators centrally in an operator centre, a contact centre architecture based on operators working from home can be constructed by connecting the CTI system and the operators' homes by means of a permanent broadband network, such as ADSL, or the like.

In the broadband age, the means of communications between business and customer is no longer restricted to conventional telephone and fax communications. Through the use of the Internet, this area has diversified into VoIP (voice conferencing), instant messaging, video communications, and so on. In this situation, the crucial objective of a firm's CRM strategy is to provide the same level of service, whatever communications method is used by the user to access the system.

Building separate systems for each of the many different communications methods means that there will be a separate customer database for each system unit, and as a result, the level of service offered will vary, depending on the communications method.

However, the CTstage Web contact provides a multi-channel contact centre solution which provides integrated handling of all access means, be it telephone, fax, VoIP, chat, video, or another method (see Fig. 4).
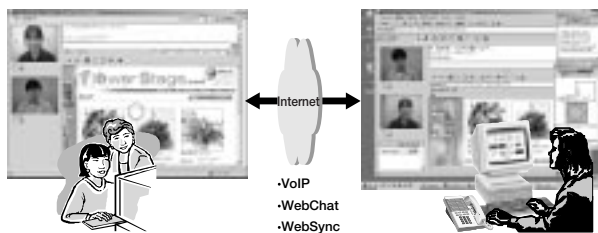

Fig. 4 Multi-channel contact centre

Carrier/Provider Value Added Services

The third system model is an added value service system aimed at carriers and providers.

With the massive rise of the Internet, the telecommunications sector is undergoing enormous changes, not least, the huge increase in data traffic over voice traffic. Businesses are also migrating their office-to-office networks from dedicated lines to IP-VPN or wideband Ethernet systems, and the introduction of VoIP is bringing huge reductions in connection costs between multiple points.

In this environment, primitive voice services provided by communications operators, such as "My Line", have been the focus of fierce cost competition, and face the prospect of declining profitability. Moreover, in the field of broadband ISP services, Internet telephone services providing VoIP technology in addition to high-speed Internet access are starting to appear, and these services are approaching a phase of price competition.

For carriers and Internet Service Providers looking to increase their profitability in the face of the increasingly diverse needs of business and domestic communications in the broadband Internet age, the key issue is providing high value-added services, alongside the voice services which are subject to simple price competition.

The CTstage 4i softswitch model improves system reliability and expandability by network load distribution of the call management server, and clustering of resource management servers, to achieve a system which allows carriers and providers to supply value-added services, such as customer contact functions, and unified messaging functions.

One example of the value-added services currently being offered is the ASP-type call centre (Fig. 5). This type of call centre uses a system which provides the call centre functions in a centre belonging to the carrier/provider. Because of this, the user (business) is able to perform call centre administration simply by installing operator terminals.

Total solutions based on CTstage Frameware

Above, we have looked at the three system models based on CTstage for CTI&IP communications systems. In order to provide a total solution, it is also necessary to provide service ware, such as consulting, support, and the like, rather than just the CTstage software and
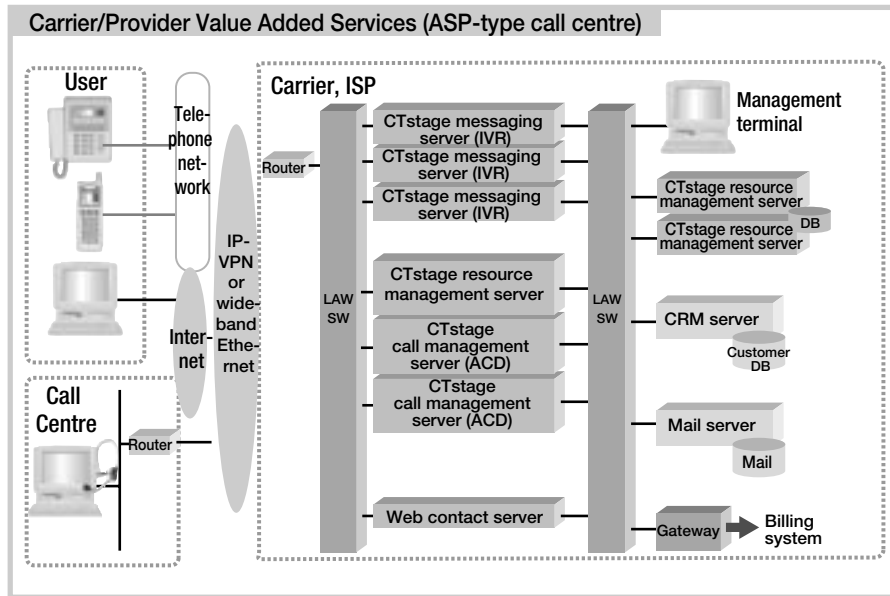
Fig. 5 ASP-type call centre

hardware products. The framework for providing a total solution and total system of this kind is called "CTstage Frameware".

By using CTstage 4i as the core of a design which incorporates all the terminals and other network devices required to construct a total system, and harmonizing with products and solutions having excellent Frameware alignment, a CTI&IP solution for the broadband Internet age is provided (Fig. 6).

Conclusion

CTstage 4i is a broadband Internet messaging solution which greatly enhances IP linkage functions over conventional CTI. It is beyond question that the importance of networks occupying network infrastructure will carry on growing in the future.

As technology develops and market conditions change, new services designed for the age of ubiquitous communications systems will continue to appear. ◆◆

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Fig. 6 CTstage Frameware

TIPS Basic Glossary

IP-PBX [*1)]
A system for achieving PBX functions over IP, based on softswitching architecture.

UnPBX [*2)]
A system for achieving PBX functions without using PBX, by installing a telephony board for outside lines, extension line boards, etc. in a generic computer.

Softswitch [*3)]
An architecture for achieving IP-PBX functions and switching and exchange functions for IP packets, through software rather than dedicated hardware.

Multi-tenant function [*4)]
A function providing services to a plurality of ("multi") client companies ("tenant"), in a single service provider system.