Special Edition on 21st Century Solutions

A Multimedia Messaging Solution
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Abstract
With the explosive growth of the Internet, achievement of the “network society” (e-society) is a high priority. However, this cannot be accomplished simply by building a high-speed, high capacity network infrastructure. On these networks, which use IP as their base, a solution is needed to enable business functions, family life, personal life, and community services. That solution is our “multimedia messaging solution.” The multimedia messaging solution is one which uses speech, images, text, etc. and enables collaboration without specifying time, space or communication medium. In this paper we explain the basics of multimedia messaging, introduce the technical trends, and describe some example solutions.

The Basics of Multimedia Messaging

Arrival of an Era of True Multimedia
It has been quite a while that people have been talking about the multimedia era. In fact, many kinds of media have appeared on the scene, and even taking communication media as an example, there are the sub-categories of stationary telephones, faxes, portable telephones, PHS, personal computers, PD A’s, etc., and among these, products having a variety of features have appeared in the market. Even telephones, which were originally only for voice communication, have today become multi-faceted communication tools, receiving electronic mail and images and enabling Internet access. Likewise, as an access medium, wireless circuits have spread tremendously, and mobile communication with high degree of mobility has become a big part of our lives. With increasing use of the Internet, data communication is growing at a much faster rate than voice communication. Accompanying this, a high-speed, high capacity data network infrastructure is being built and the current situation is that the volume of data traffic already exceeds that of voice traffic. Due to this changing environment, the conventional thinking of adding data transmissions to existing telephone circuits is changing to a concept of adding telephone transmissions to data circuits. The technology which supports this is VoI P. However, because it is not only voice, but also moving images which are transmitted over IP, the technology is now called M oIP (Multimedia over IP.) Through use of M oIP, voice, data and moving images can be melded together to achieve a “visual collaboration environment” which multiple users can access. Progress is also being made for standardization to support this, and inter-connectivity based on H.323 is being achieved. Just as the melding of network-based information communication is progressing, even in equipment-based approaches, the integration of information (computers) and communications (telephones) is proceeding. The technology which has made this possible is Computer Telephony Integration (CTI.)

The rapid transition from simple media to multimedia has invited confusion on the part of users. There are many transmission means which can be used, but in most cases, communication can only be done between media of the same class. In other words, the normal method of use is for communication to be only from telephone to telephone, fax machine to fax, or, for the case of email, PC (personal computer) to PC. The result is that improvements in functionality have been made at the level of each type of equipment, but there has been a lack of attention from the standpoint of integrating the whole system of communication tools. The development which will solve this problem is a concept called “unified messaging.” Through unified messaging, different kinds of messages-voice, still images, e-mail, moving images, etc.-can be integrated, and access can be done through a standard procedure.

Through the practical use of multimedia messaging technology (such as M oIP, CTI, etc.) running on high-speed, high capacity network infrastructures, a true multimedia era has for the first time actually arrived.

Multimedia Messaging Technology
Multimedia messaging technology, including M oIP, CTI, mobile communication, unified message, etc., is destined to bring about major changes in office and family life. (See Figure 1.)

In the office, efforts toward achieving the “virtual office” are proceeding. Through multimedia messaging, constraints on work locations will disappear, and traditional thinking about what an office is will change. In fact, in the US, the percentage of workers who are so-called “telecommuters,” meaning that they work from their homes, has risen to 10% of the total work force. This is the so-called SOHO community. If an environment can be achieved in which one can be “in the office” without restrictions as to “time” or “space,” the importance of “location” becomes much less, and further progress can be made toward virtual offices and virtual companies.
Concerning family use, progress is continuing toward an “information home electronics” environment. With the proliferation of PC’s and greater intelligence in home electronics products, we are moving toward a time when the establishment of in-home networks will be required. As visual communication becomes possible in various settings—such as communication, education, entertainment, housework assistance, etc.—through the integration of multi-purpose equipment, the benefits of multimedia messaging can finally be realized.

At our company, looking toward achievement of the future office/home multimedia environment, we are working on:

- basic technology research on multimedia messaging technology,
- promotion of standardization,
- commercialization of products, and
- provision of solutions.

**Trends in Multimedia Messaging Technology**

**Multimedia over IP (MmoIP)**

Beginning in the latter part of the 1990’s, research and development was actively undertaken on multimedia communication technology which integrated voice, data, and image—the objective being achievement of visual collaboration. In particular, in 1966, at the study group 16th of ITU-T (International Telecommunications Union Telecommunications Standardization Committee), the packet network based multimedia communication system specification H.323 was announced. Shortly thereafter, many products such as MmoIP and VoIP were developed. From 1999, tests on inter-connectivity between different pieces of equipment were frequently undertaken, and Oki Electric, from early on, participated in the tests of IMTC (the International Multimedia Telecommunications Consortium.) In Japan, in September, 2000, at HATS (the Highly Advanced Telecommunications Systems) conference on promotion of inter-connectivity, tests were performed connectivity based on H.323, and the principal participating companies confirmed that there was inter-connectivity between their systems. Through these efforts, inter-connectivity between various types of equipment improved dramatically.

Also, because of technologies like MPLS (Multiple Protocol Label Switching) which has been widely accepted since 1998, it became possible to maintain QoS (Quality of Service) over IP networks.

Figure 2 shows the areas in the MmoIP field where standardization and technological developments are planned and explains future trends. In the future, in the field of MmoIP, there will be a growing number of
multimedia terminals which have mobile-use (ITU-T H.323 Annex H/I) which uses wireless LAN’s such as IEEE802.11, Bluetooth, etc. or MPEG4 (Moving Picture Experts Group 4) on board. When this comes about, it will enable progress toward inter-connectivity between H.323 terminals and terminals which use SIP (Session Initiation Protocol) which is used by IMT-2000. Also, with the proliferation of wireless LAN’s, strengthening security becomes even more important and the number of products compatible with H.235 will increase. Then, through the use of such terminals by individuals and families, the danger of exhausting the available number of IP addresses becomes an important problem. To deal with that, it can be expected that conversion between global addresses and private addresses and application of IPv6 will move forward rapidly.

With the growing diversity of terminals, due to phenomena like the increase in IP portable terminals, inter-connectivity between these new terminals and conventional terminals (both wire-type and wireless) and existing networks (H.246 Annex C/E) has become necessary. Common channel signal tunneling (H.323 Annex M) is needed for the same reason. If this environment becomes settled and QoS control between IP networks and terminals (H.323 Annex N) is upgraded, then we can expect the appearance of large scale MmIoP networks based on systems which conform to H.248 and H.323 Annex R. With these networks, it will be possible not only to use conventional add-on services (H.450) but also to link to the Web for multimedia communication (H.323 Annex K.) At Oki Electric we developed a VoIP product in 1997 and have since come to provide products conforming to international standards. In the future also, contributing to standard-setting activities and accurately grasping trends in standardization, we will supply network systems with a high degree of flexibility.

**Computer Telephony Integration (CTI)**

Computer Telephony Integration (CTI) technology, from the first half of the 1990’s, has made advances as one link in the upgrading of PBX service. Initially, the mainstream approach was one whereby computers and PBX’s were connected by interfaces which were different according to what vendor was involved. Later, however, with the appearance of the Telephony Application Interface (TAPI), ActiveX, etc. interfaces between computers, PBX’s, and applications became standardized. Through this technology, the curtain opened on an era (the “Open CTI” era) in which the distribution of applications became possible. The factor which has accelerated acceptance of “Open CTI” is “UnPBX” which incorporates a computer-based PBX function. In 1996,
Oki Electric announced “CT stage,” as a leading edge product in the UnPBX field. Since then we have added the following built-in functions: integration of office CTI and call center CTI, large-scale capability, compatibility with distributed call center, compatibility with VoIP, etc.

In the future, strengthening the capability for linkage to the Web and making good use of mobile terminals, we plan to offer systems with even higher usability. (See Figure 3.)

**Example of a Multimedia Messaging Solution**

Below we introduce an actual example of a “multimedia messaging solution,” which can be provided by using M molP and CTI products, primarily those made by our company.
An “Enterprise IP-PBX solution”

Through improving/expanding the QoS function and improving the speed of IP networks, voice / data integrated exchange systems (IP-PBX’s) based on IP have now been realized.

Originally, due to problems with IP-PBX’s, such as...
inadequate bandwidth and resolution of addresses which extended across different networks, they were put into use only on small-scale networks. Today, however, construction of broad area, large-scale enterprise networks is becoming possible. This is due to the recent evolution of IP networks and realization of new functions such as synchronous control by IP-PBX, coordinated distribution, address resolution, etc.

For example, with “IP stage,” Oki Electric’s IP-PBX, it is possible to place the CCU (central communication unit) which performs the exchange function, the IP telephone function, trunks, etc. distributed within the IP network. By doing that, it is possible to build an economical network for a small sales office or such, by placing only terminals there and not requiring any of the conventional push-button telephones which used to comprise the main equipment. (Figure 4.)

Also, by planning for coordination between numerous CCU’s, it is possible to create larger scale networks and build extra-nets which link companies in a group. With continuing progress in carrier IP networks, in the future it will be possible to provide users with a variety of possible solutions.

Web Contact Solution

With expansion of the Internet, the forms of customer use become very diverse, and web sites which can handle various kinds of service, such as net-shopping, etc., and can provide various kinds of support are getting a lot of attention. Until now, web sites and telephone-type call centers were built and operated separately. However, to improve customer service and increase business efficiency, it is necessary to integrate the telephone-type support of the past with Web support and build more call centers which are linked to the Web (web contact centers.) To do that, we offer an add-on package for CT stage called “Web contact solution.” Web contact solution provides a more efficient customer service whereby operator and customer, over the Web,” can share voice and data information while viewing the same screen. (See Figure 5.)

“Mobile Plus” solution

Lately, use of portable telephones is rapidly increasing, and the field of PHS (Personal Handy-phone System) for branch office use is also expanding, reflecting needs for personal-ization and greater mobility in office applications.

In this situation, with dramatic changes in the work environment and market needs, Oki Electric developed the “Mobile Plus” solution as optional software to operate on CT stage. Through Mobile Plus, a user can handle e-mail using a PHS terminal, even though he/she is away from his desk and not in front of a PC. When the user is inside the company, it acts as a PBX extension (internal line) enabling functions such as sending and receiving e-mail over the Internet. Even when the user has gone out of the office, utilizing a public PHS service it is possible anytime, anywhere to take advantage of the same service as when one is inside the company. (See Figure 6.)

Also, in cases when telephone access is not possible, such as when outside the office or when power is off (i.e. in situations outside the normal scope of such systems), the user can still pick out the voice mail messages he wants to access and can listen to them. This is enabled by storing the voice mails as CT stage voice mails and displaying a table of voice mails (sent and received) on a display on the PHS terminal.

Conclusion

As we move into the 21st century, the IP network infrastructure will become faster in speed and more advanced than what we have today. A greater variety of terminals will be offered, and the era will surely come when users can truly collaborate “anytime, anywhere, and with whomever they want.” By melding the communications technologies and information technologies which we have been perfecting over the years, we at Oki Electric plan to offer services with an even higher level of convenience to an ever-broadening population of users. Thus we will offer customers a bridge to the new era of Internet-based collaboration.

References