Terminal Application Platform for IMS Services

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As the popularity of third generation mobile phones (hereinafter referred to as "3G") expands on a global scale, a new approach draws attention to the next generation mobile telephone services, which combine the worlds of "mobile phones and the internet", known as IP Multimedia Subsystem[1)] (IMS). Mobile phones that use the 3G network tend to shift from a world in which all services are primarily provided for voice transmissions over switched lines to a world in which non-call services are primarily provided using Internet Protocol (IP) packet switching for sending and receiving emails, web browsing, listening to music and viewing videos.

IMS is a general term used for technologies that realize real-time and multimedia communication services based on IP, which can be referred to as a key application platform for building ubiquitous services. With the future taken into consideration studies are being carried out for the building of IMS services from two aspects, through phases using the currently available 3G network and also through planning for full-scale IMS services based on next generation integrated fixed and mobile IP networks, such as the Next Generation Network (NGN). Furthermore, Open Mobile Alliance (OMA), which is an industry organization for mobile communication technologies, has a central role in standardizing IMS specifications by promoting the formulation of specifications for "mobile phones and the internet" through integration of the specifications of the Third Generation Partnership Project (3GPP) and the Internet Engineering Task Force (IETF). IMS services complying with the OMA standard are becoming available in domestic and overseas markets.

This paper illustrates the image of the IMS world we are striving to achieve and describes a terminal application platform for the realization of IMS services, offered by OKI ACCESS Technologies[2)] (hereinafter referred to as "OAT"), a joint venture of OKI and ACCESS[*1)].

Changing services of mobile phones and role of OAT

The development of mobile phone services has been progressing at a remarkable rate in recent years. Since mobile internet services first appeared and their popularization started in the year 2000, they have been evolving rapidly. Advanced information and communication technologies are being amassed to

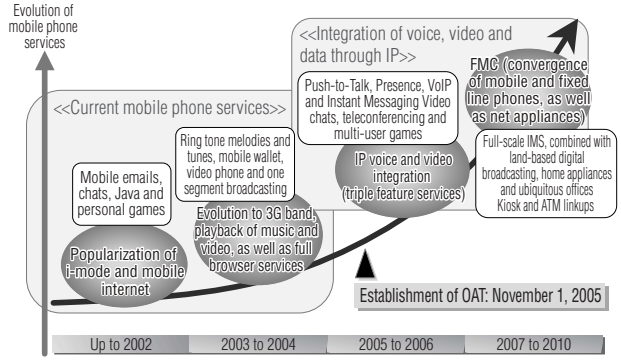

Fig. 1 Changing services of mobile phones

mobile phones at the present time, with music and video distribution services using high-speed 3G network and full browser services that allow mobile phones access to all web sites, as well as the "convergence of mobile phones and financial services" for electronic money and mobile account settlements. The leading role of ubiquitous terminals is shifting from personal computers to mobile phones.

The next major change in mobile phone services will be the achievement of IMS, which will make available integrated ("triple feature") services with voice, video and data through IP. The first phase for such services begins with a presence service to make real-time verifications and status exchanges with communication partners, Push to talk over Cellular (PoC) services, enabling a single party to communicate with multiple parties using IP voice communications in a manner similar to a transceiver, as well as Instant Messaging (IM) services to easily and quickly exchange various content and information. Integrated real-time communication services that provide such services on mobile phones, handling voice, image and data, are almost complete.

The second phase is Fixed Mobile Convergence (FMC) "combining fixed and mobile" services.

Seamless linkups between mobile phones and fixed line phones, as well as mobile phones and personal computers, information appliances and broadcasting services, such as one segment broadcasting and even various terminals, including devices installed throughout towns and within corporations, such as printers to print out the content on mobile phones or to operate vending machines, can lead to the establishment of a ubiquitous

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society with full-scale IMS services.

OAT was established in November 2005 to engage in the business of developing and providing IMS application platforms for ubiquitous terminals, such as mobile phones and information appliances, which will play a role in making the ubiquitous society a reality based on IMS services. Almost a year and a half has passed since the company was founded and as initially planned the first step towards the realization of IMS services has been successfully taken through the supply of IMS application platforms, which are used to attain the services described for the first phase, to domestic telecommunications carriers and mobile phone manufacturers.

IMS world being attained by OAT, OKI and ACCESS

The formulation of specifications for IMS services, which will become industry standards, is being carried forward by 3GPP and OMA, previously described. However, since the range of standard specifications is limited to the IMS communication protocol, IMS network and IMS service specifications, primarily for the mobile environment, the establishment of various expanded services, such as linkups with the internet, which had been developed previously with a foundation based on personal computers, as well as combinations with information appliances, are considered to be necessary in order to establish and promote the progress of IMS services for the general public. Therefore, we expanded the range of IMS, as shown in **Fig. 2**, defining the "IMS world in a broad sense".

The three service models that comprise the "IMS world in a broad sense" are described below.

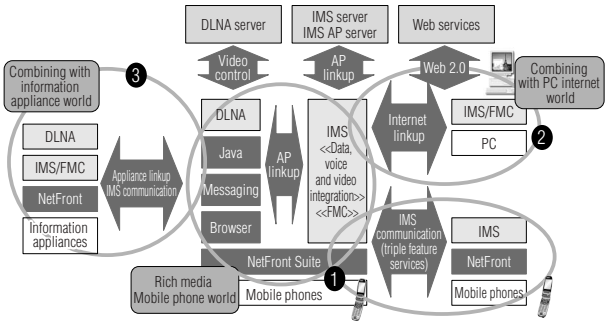

Fig. 2 IMS world we aim to achieve

① Rich media mobile phone world

Data, voice and video integrated services for communications between mobile phones will be attained, based on the IMS specifications stipulated by 3GPP and OMA.

The acceptance of rich media will be viable for various applications provided by mobile internet services, such as web browsers, mailers and Java applications, as well as IP-based real-time and multimedia communication (Voice and Voice over IP) services by IMS. With the creation of this service model, mobile phones will evolve to become application platforms for delivering quadruple feature services[3), 4)].

② Environment for converging with personal computer internet world

Services seamlessly converging personal computer internet users and mobile phone users will be provided, through interactive communications between IM which is increasing in popularity and continues to progress in the personal computer environment and IM on mobile phones, as well as services for exchanging presence information. Furthermore, since building an environment in which web services, such as searches and blogs provided over the internet and intended for personal computer environments, are available to mobile phones, it is possible not only to merge the communication environments of personal computers and mobile phones but also combine them on the service level of information technology (IT).

③ Converging environments with information appliance world

A real-time communication environment is provided based on IMS for communications between information appliances, as well as between information appliances and mobile phones. Furthermore, by using Digital Living Network Alliance (DLNA) useful services could be provided, such as viewing multimedia content, controlling, uploading and downloading between mobile phones and information appliances. This makes it possible to build a world where seamless convergence between mobile phones and information appliances can take place, with links to IMS and DLNA.

Configuration of IMS terminal application platform

In order to bring about a full-scale IMS service environment, as with the "IMS world in the broad sense" illustrated in the previous chapter, application platforms are vital for converging advanced information and communications with communication broadcasting technologies.

The configuration of a terminal application platform to enable the IMS world we are aiming to achieve is shown in **Fig. 3**. It is comprised of two components, the "NetFront[*1)] IMS Client Package" and "NetFront Media Player". It is configured on Software Suite for mobile phones and information applications from ACCESS, called "NetFront Suite".

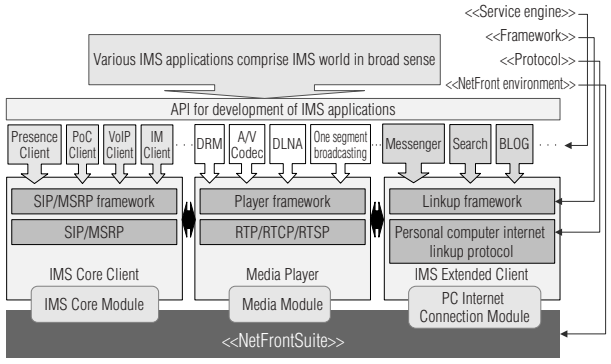

Fig. 3 Configuration of terminal application platform

(1) NetFront IMS Client Package

This application platform is for building IMS services (comprised of an IMS core module and PC internet connection module).

[Protocol layer] This consists of the Session Initiation Protocol (SIP), a communication protocol for realizing IMS services, as well as Message Session Relay Protocol (MSRP), a protocol for the translation Peer to Peer (P2P). Furthermore, an internet linkup protocol for connections between mobile phones and personal computers is provided as an extension function.

[Framework layer] A framework facilitating the easy building of IMS applications based on SIP and MSRP.

[Service engine layer] This provides service engines for presence, PoC, VoIP and IM. Phased extensions are planned to create a visual communication environment for Push to Video and IP videophones in the future.

(2) NetFront Media Player

This is one IMS service that provides a platform for building display and management applications for multimedia content.

[Protocol layer] This consists of a real-time communication protocol for multimedia streaming.

[Framework layer] A player framework for attaining local playback, streaming and the broadcast reception functions of multimedia content.

[Service engine layer] This provides Digital Right Management (DRM), DLNA and an engine for one segment broadcasting, including functions for linking up with voice and video software codec, as well as hardware codec.

Features of IMS terminal application platform

The IMS platform product we present has already been adopted by domestic communications carriers and mobile phone manufacturers to facilitate the building of their IMS services. The product has a track record in full-scale commercial implementations, starting from November 2006. Furthermore, communication carriers and mobile manufacturers overseas have also decided to adopt our product, marking the beginning of a full-scale implementation as a solution that conforms to global markets.

Images of an application involving the incorporation of our IMS platform on a mobile phone are shown in **Fig. 4**. The image on the **right side of Fig. 4** represents the presence and PoC services of the NetFront IMS Client Package, whereas the image on the **left side of Fig. 4** represents the NetFront Media Player.

① **IMS industry standard software incorporates flexible architecture that is portable and highly expandable functionally**

- Global specifications comply with the latest 3GPP and OMA specifications.
- Object oriented model affords phased and easy expansion of IMS services to meet market needs.

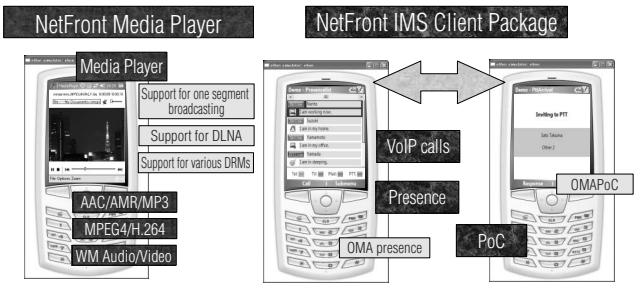

Fig. 4 IMS product image

② **Optimum implementation is integrated with NetFront Suite**

- Porting costs are significantly reduced through the sharing of a standard porting layer for NetFront and the provision of API for flexible porting.
- Overall size of the memory is reduced through the sharing of a library for the internet, which is provided by NetFront as a standard feature.
- Integration is easy with various applications, such as browsers and emailers.

③ **Converging environment for personal computers and information appliances completes FMC**

- Not only complies with 3GPP and OMA specifications but is also a total solution for converting devices, which are not mobile phones, such as personal computers and information appliances, into IMS and FMC terminals.

Example of configuration for services using DLNA

We consider DLNA to be a critical technology for added value to accomplish IMS services. SIP and MSRP, core technologies of IMS, enable an environment for distributing and sharing multimedia content, such as video and music, between mobile phones or between a mobile phone and an information appliance. Furthermore, DLNA easily enables video services, such as viewing video content stored on home servers at home on a mobile phone or viewing similar content on digital television sets or personal computers with large display screens. Furthermore, multimedia content could be exchanged between mobile phones and home servers in both directions through the uploading or downloading of content.

We incorporated a component of DLNA, the Digital Media Player (DMP), into NetFront Media Player as a feature for viewing and listening to multimedia content on mobile phones, digital television sets and personal computers. This enabled us to accomplish the “NetFront Living Connect”, a DLNA service solution integrating various DLNA features provided by ACCESS (**Fig. 5**).

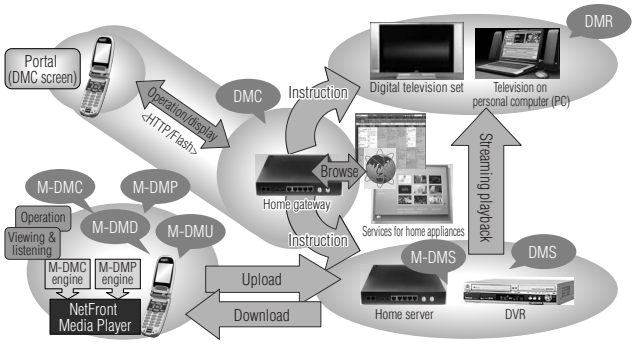

Fig. 5 Example of configuration for services using DLNA

Conclusion

This paper first presented an image of the "IMS world", which is a service essential for creating a ubiquitous society followed by an introduction to the IMS application platform, necessary to build an IMS world. The phased launch of commercial IMS services is currently starting in Japan, using the 3G network, however, the situation overseas indicates that trial run services have started, primarily in Europe. The IMS world illustrated in this paper will become a full-scale reality in the near future with the creation of a stable multimedia communication environment based on the integration of services by the Service Delivery Platform (SDP) and Quality of Service (QoS) guarantee, as well as the building of an IMS network environment equipped with an appropriate and flexible account settlement system to accommodate services with authentication, authorization and accounting (AAA).

Furthermore, we expect the convergence of information with communications to continue, along with the convergence of IP-based communications with broadcasting, thereby furthering the combination of the mobile telephone environment, home appliance environment and personal computer internet environment. This, we believe, will lead to the popularization and securing of IMS services. We hope to make contributions to such developments and to take part in the realization of a comfortable and universal ubiquitous society.

TIPS Basic Glossary

ACCESS
A software vendor providing NetFront Suite, which is embedding software to contribute towards the ubiquitous society for non-personal computer areas of the market, such as mobile phones and information appliances.
URL http://www.access-company.com/

DLNA (Digital Living Network Alliance)
These standardized specifications are for interconnecting information appliances and personal computers over home networks to enable the exchange of multimedia content.

NetFront Suite
A general term used to represent a software platform for mobile phones and information appliances. The NetFront Browser and Mailer are well known platforms, with a history of installations in approximately 320 million units in the global market as of December 2006. NetFront IMS Client Package and NetFront Media Player are also service components comprising the NetFront Suite.

One Segment
A name for the broadcasting service available in the domestic market, intended for mobile devices delivered by land-based digital broadcasting, "Integrated Service Digital Broadcasting - Terrestrial" (ISDB-T).

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