

Concept of a Solution for Converging Information and Telecommunications by Oki Electric: AP@PLAT[®]

Osamu Nakazawa Kunio Ooba

Services that are based on various information technologies (IT) to raise the efficiency of transaction processes, such as the settlement of accounts and authentications for e-commerce utilizing the internet and mobile environments as well as business processes of companies, are becoming widely popular in recent years, due to progress made in information technology, such as distributed processing and security. On the other hand, attractive communication and broadcasting transmission (IP) services, based on IP technologies, such as IP telephones and video distributions, are starting to become available due to the progress made in the technologies related to broadband networks, audio and video media. We are currently entering an era wherein practical implementation of the world of convergence, known as the “convergence of information and telecommunications”, is occurring, which combines these various services.

These are evident, for example, in the convergence of IP telephones with office operations, such as electronic mail and groupware, as shown in Figure 1. Further, new applications that result from the integration of the web and VoIP, such as integration of the IP telephone and e-commerce, are also becoming available. Furthermore, the approach of integrating audio and video communications into the business process management of companies by using the enterprise resource planning (ERP) or supply chain management (SCM) suitable for the enterprise architecture with the aim to standardize information systems and to optimize corporate organizations¹⁾, is also drawing attention. These services that are becoming available differ from conventional services because the borders between individual services of “information” and “telecommunications” are removed. This, in turn, is giving birth to a world wherein

practical implementation of new information and telecommunications converged services, which integrate the “trinity” (data, audio and video) of media, takes place. “AP@PLAT^{®1)}”, introduced in this paper is a generic term used to represent the concept of information and telecommunications converged solution of Oki Electric intended for building such applications to converge information and telecommunications²⁾.

In the following sections of this paper descriptions centering on the concept model of AP@PLAT[®] and the system configuration model as well as examples of application configurations using AP@PLAT[®], are provided.

AP@PLAT[®] Concept Model

AP@PLAT[®] is the integrated concept of a solution for converging information and telecommunications with the aim to create new values and business for customers. Application configurations and execution environments to configure a diverse range of information and communication integrated applications will be provided as part of the product group based on the concept of AP@PLAT[®].

By configuring a converged framework based on the service-oriented architecture (SOA), which is drawing attention as a cutting-edge information technology, AP@PLAT[®] by Oki Electric, provides a solution for converging information and telecommunications. In particular the integrating environment for VoIP and video transmission services as well as information services, such as web services, portal and transaction services, will be realized.

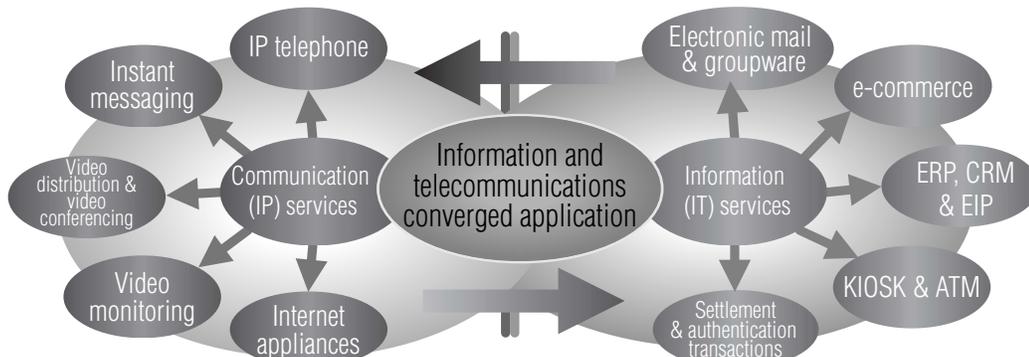


Fig. 1 Birth and creation of an information and telecommunications converged application

*1) AP@PLAT, CenterStage, CTstage4i, CONVERGENCE and SipAs are trademarks or registered trademarks of Oki Electric Industry Co., Ltd.

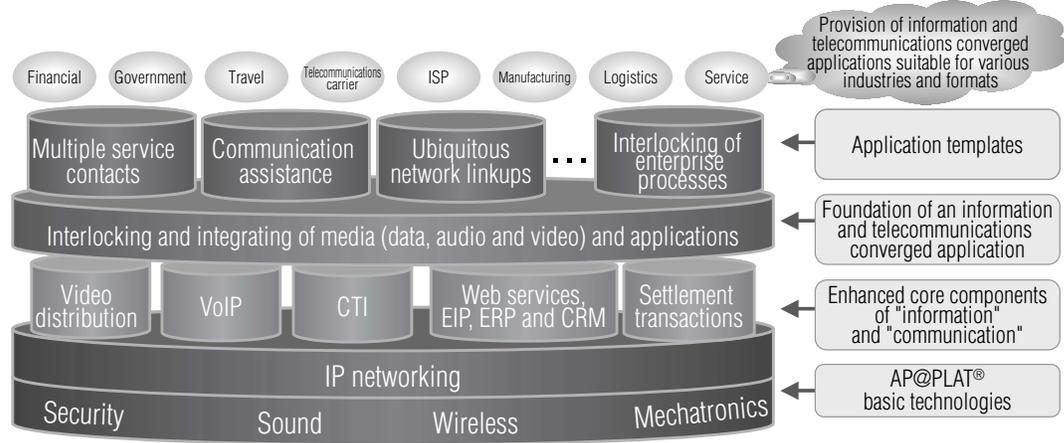


Fig. 2 AP@PLAT® concept model

Figure 2 represents a concept model of AP@PLAT®, showing media and applications integrated through a configuration of the core component product groups of “information” and “telecommunications” that are founded on basic technologies, such as security, sound, wireless and IP networking, into which Oki Electric has been putting a lot of effort. The application templates in the higher layer serve as templates for various solutions provided to customers that are built on the information and telecommunications converged application base. Information and telecommunications converged applications for a diverse range of markets and customers will be realized based on these templates. In the systems that are configured using the AP@PLAT® model, data, audio and video media as well as various applications are integrated in a flexible yet dynamic manner using the SOA concept. Interlinking with existing systems can easily be realized by freely combining components that provide information services with

components providing communication services using SOA. Further, it is possible to provide the solutions desired by customers in a short time and very easily, even though it is done with superior quality and with the convergence of information and telecommunications, which had in the past been very difficult to achieve.

AP@PLAT® reference architecture

Figure 3 represents a reference model for AP@PLAT®, showing its overall architecture. Using SOA as the unifying IT concept various information and telecommunications converged solutions are based on integrated system management and security management environments configured with a four-layer client-server model that utilizes the loose coupling technology for application services over an IP network. Components of the reference model are described below.

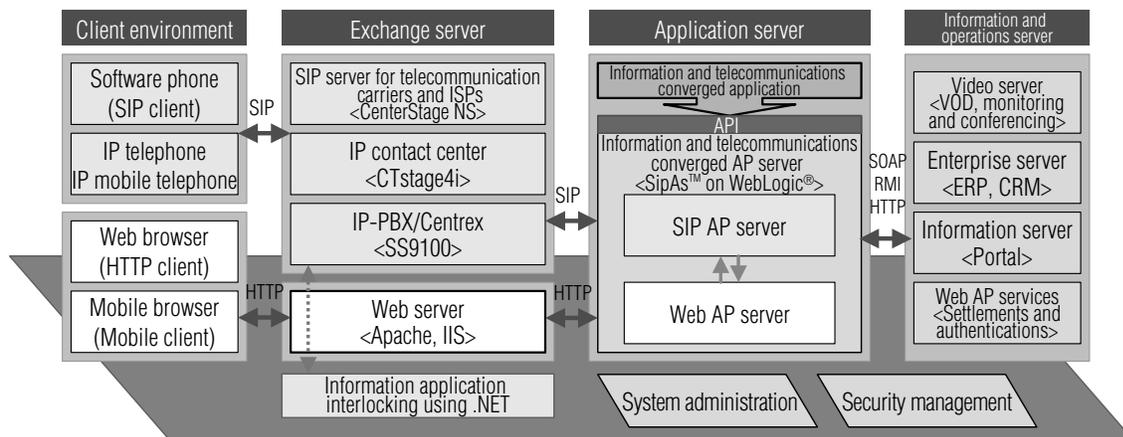


Fig. 3 AP@PLAT® reference model.

(1) Client environment

This environment becomes a user interface to which users have direct access. Personal computers, IP telephones, IP mobile phones, ATM/KIOSK terminals and also consumer devices, such as internet appliances, fall within the scope of this environment. The real-time collaboration environment is provided in the client environment through the “trinity” of media realized by interlocking with the “exchange server”, which will be described later. Communication functions that are essential for business environments include VoIP, teleconferencing, instant messaging, as well as the sharing of screen displays and applications. Collaboration environments between people, as well as between people and goods, which are filled with realistic sensations, can be realized by this function using not only sound but also data and images.

(2) Exchange server

A diverse range of IP telephones and session initiation protocol (SIP) server environments are provided, which represent communication solution products.

- CenterStage®¹⁾ NS: An SIP server product for telecommunication carriers and ISPs to achieve highly reliable and highly scalable environments.
- CTstage4i®¹⁾: A CTI product with the highest domestic market share that realizes an IP contact center solution.
- SS9100: An IP CONVERGENCE®¹⁾ server product that realizes IP-PBX and Centrex services for corporations.

The generic term for all these product groups is the “Exchange Server”, which provides the “presence” information for communication partners based on the SIP technology, communication methods suitable for individual purposes, as well as a diverse range of multimedia communication functions that cater to such methods.

(3) Application server

The “Application Server” is a core component that is central to AP@PLAT® composed of an information and telecommunications converged application server known as “SipAs™¹⁾ on WebLogic®”. It is an environment that offers coordination with the exchange server and the information and operations server, which is described later, as well as an environment for configuring applications that converge information and telecommunications. SipAs™ on WebLogic® is configured based on the WebLogic®²⁾³⁾ provided by BEA. Through collaboration between Oki Electric and BEA an SIP application server function⁴⁾ has been integrated into the existing web application server function to create a product that can be used to develop applications using two representative IP protocols, HTTP and SIP.

It is possible to easily configure information and telecommunications converged applications that converge information services centered around the conventional web with communication services based on

real-time communication environments, such as CenterStage® NS or SS9100.

(4) Information and operations server

This server environment is composed of video services, such as video distribution and video monitoring, enterprise services, such as ERP and SCM as well as web services, such as settlement and authentication. The environment is connected to an application server on demand under the SOA concept according to the intended objective. Links between various services are realized while integration of these information and operation services with communication service functions, provided by the exchange server, is made. Further, by using the Business Process Management (BPM) and Enterprise Application Integration (EAI) it is possible to achieve interlinking with existing systems in a flexible manner.

System integration with AP@PLAT®

The system configuration environment based on the SOA model as represented in Figure 4 is provided by AP@PLAT® with SipAs™ on WebLogic® as its core component. The enterprise information and user integration (Enterprise Information Portal, EIP) environment provides an executing environment for a variety of application services related to information and telecommunications in a security environment that offers authentication and access control functions suitable for the authority of users and types of terminals used. The communication integration environment is an environment that provides a diverse range of multimedia communication functions suitable for purposes of communication and “presence” of communication partners. This environment offers media communication functions and it is possible to realize a “trinity” media environment in a flexible manner through broadband and ubiquitous networks, by interlocking with the enterprise information and user integration environment.

Furthermore, it is possible to provide an environment for configuring an information and telecommunications converged system based on the SOA model by integrating the application configuration environment for the business process interlocking, based on the BPM that includes interlocking existing systems with an event interlocking application configuration environment based on Business Activity Monitoring (BAM), which monitors the executing status of business processes and monitors performances.

*2) BEA WebLogic is a registered trademark of BEA Systems, Inc. Other company names and products names mentioned in this paper are trademarks or registered trademarks of their respective companies.

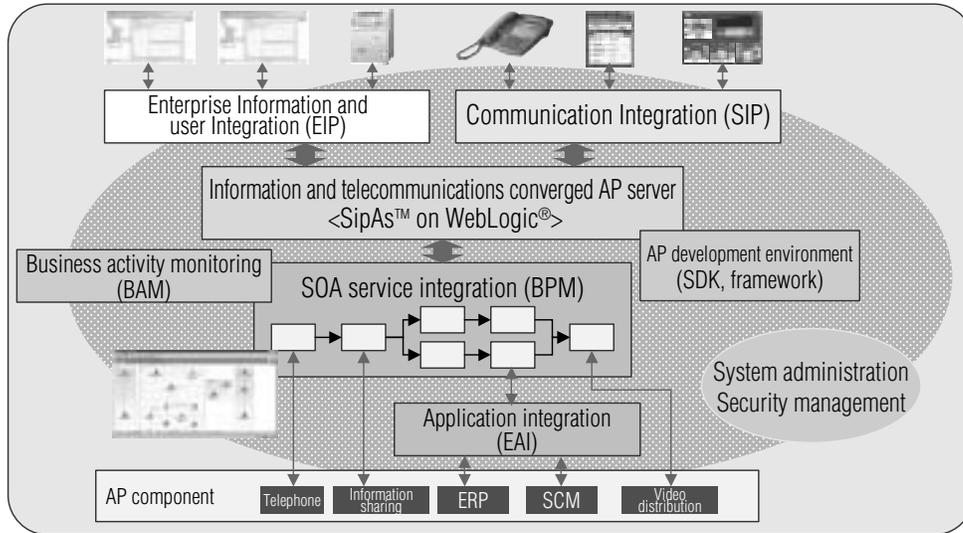


Fig. 4 System integration with AP@PLAT®

With AP@PLAT®, it is possible to provide an information and communication integrated solution that seamlessly links information applications and communication applications, through the combination of the three integration models of “Enterprise Information and User Integration”, “Communication Integration” and “Business Process Integration”. Through these it is possible to provide an environment for collaborating information and operation applications with audio and video for the purpose of modifying the working style of an enterprise. It is also possible to easily provide attractive service environments that are highly progressive and expandable for service providers, such as telecommunication carriers and ISPs.

Furthermore, it aims to provide highly reliable and stable executing and monitoring environments for the information and telecommunications converged applications by properly maintaining the integrated system administration and security environment as part of the AP@PLAT® infrastructure.

Application configuration examples using AP@PLAT®

The convergence of information and telecommunications realized by AP@PLAT® merges the information and communication systems that have been realized by differing visions, cultures and technologies with SipAs™ on WebLogic® as the core component. This is done while maintaining and stipulating application configuration methods and common components that can be reused. Also, common methods for using and conducting operational management are established to converge information and telecommunications solutions. Furthermore, AP@PLAT® adopts an application configuration model based on the SOA to resolve existing issues relating to system configurations, such as a lack of ease of development, expandability and perpetuity as well as to define flexible system architecture that makes a rapid response to changing business environments possible.

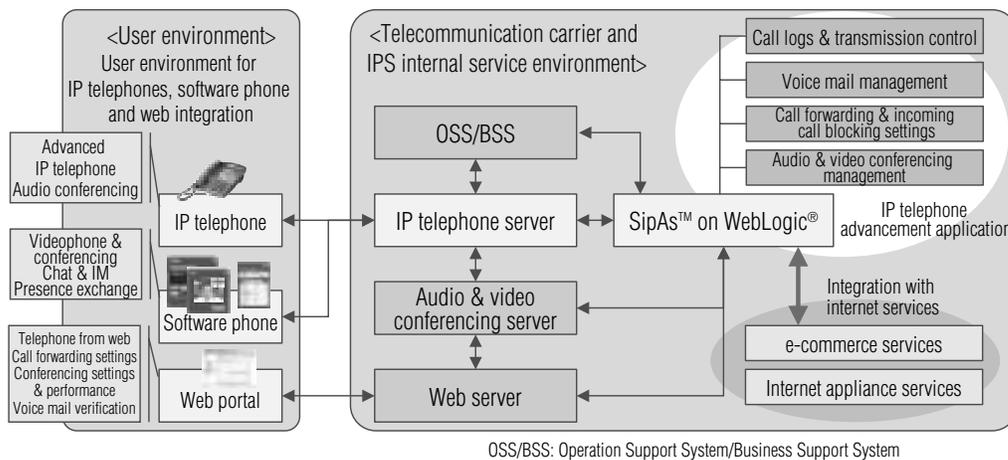


Fig. 5 Configuration example of an IP telephone advancement application

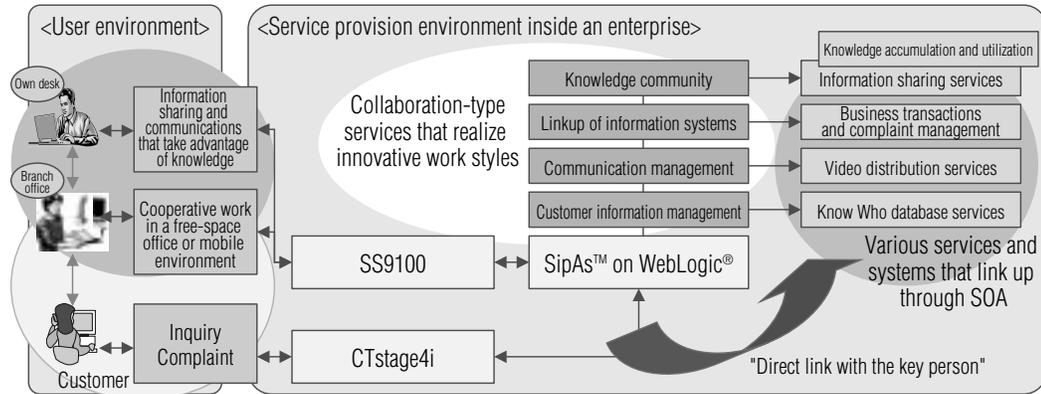


Fig. 6 Configuration example of an innovative work style application for an enterprise

Configuration examples of information and telecommunications converged applications based on AP@PLAT® are introduced below.

(1) Advancement of IP telephones

This offers a configuration of applications resulting from advanced IP telephone services and integration services through a linkup of IP telephone systems of the telecommunication carriers and ISPs with SipAs™ on WebLogic®. Call log management or quick-to-dial that are linked with web applications, including call forwarding and incoming call blocking settings, which are matched to the schedule information as well as advanced communication services, such as audio and video conferencing, can be mentioned as examples of the advanced applications of IP telephone services, as shown in Figure 5.

Further, flexible responses to accommodate progressive services, such as IP telephones and the extension of videophone services that target mobile environments or various internet services, including e-commerce and internet appliances as well as the integration of audio and video communications, are all possible.

(2) Innovative work style

This application aims to promote efficiency in corporate operations and bring about an innovative work style based on the integration of information systems and real-time communications. It realizes the acceleration of overall enterprise activities as well as their optimization. It is possible, for example, to provide the following information and telecommunications converged services, as shown in Figure 6.

- Builds an environment for exchanging and sharing content, such as corporate information or customer information via the place of information sharing (knowledge community) and provides the speedy exchange of knowledge and logistical environment by using a real-time communication function.
- Provides an environment for accessing information systems and for conducting flexible communications among relevant members without having to rely on any particular location or time, such as free-space offices and mobile environments where there are no

assigned desks or cubicles.

- Provides a service environment with a high degree of customer satisfaction by integrating the management of information for inquiries and complaints from customers while responding to customers in a rapid and appropriate manner by utilizing “Know Who”, which is a management database of knowledge and individuals in possession of technologies within the company.

Various configuration examples of applications that use AP@PLAT® were introduced. Application configurations other than those mentioned here are also being pushed forward. For example, the configuration of a solution known as the “Multiple Service Contact”, which provides a service environment that combines various information providing services as well as a means of communication using audio and video to accommodate the purpose of users and contact channels. Such services can be used for the video monitoring of critical points inside a railway station or an airport or to provide real-time information for guidance about weather or for sight-seeing tours. Travel planning support and virtual travel experiences through visual aids at travel agencies and travel portals or even channel integration and customer support at financial institutions can be considered as possible candidates for the use of such services.

Conclusion

This paper introduced the model and architecture of AP@PLAT® as well as configuration examples of applications. At Oki Electric we believe that by aiming to create new values and businesses by converging information and telecommunications as well as by creating new customer value, such as “increase business opportunities through flexible responses to market changes”, “improve operating efficiency by accelerating its pace” and “create new business through linkups with partners” by providing applications and solutions that are based on AP@PLAT®, as shown in Figure 7, we can attain attractive and progressive business accomplishments.

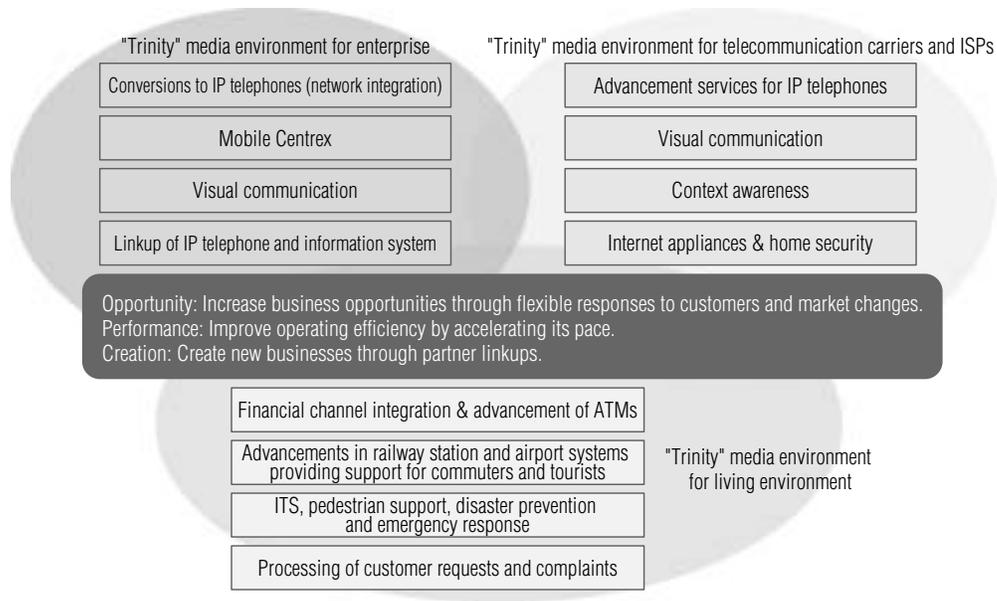


Fig. 7 Introduction of information and telecommunications converged businesses with AP@PLAT®

References

- 1) Ito, Nakazawa et al., "Application platform that integrates web and VoIP", Oki Technical Review Issue 197, Vol. 71, No. 1, 2004.
- 2) Matsushita, "The Information and Communication Integration Solution Oki Electric is Aiming for", Oki Technical Review Issue 197, Vol. 71, No. 1, 2004.
- 3) WebLogic, WebLogic server product introduction, <http://www.beasys.co.jp/products/weblogic/server/index.html>
- 4) SIP Servlet, SIP Servlet specifications, <http://jcp.org/en/jsr/>

Authors

Osamu Nakazawa: Corporate Network Application Div., AP@PLAT® Dept., General Manager

Kunio Ooba: Corporate Network Application Div., Planning Dept., General Manager