

# Next Generation Office Communications and ID Portability Technology

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Due to the progress of information and communication technologies, office communications are undergoing a transition with unified communications aimed at establishing a superior competitive edge for businesses ready to transition from incunabula into the popularization phase. To do this will require a mechanism to be put in place to facilitate communications in a stylish manner using appropriate methods for any situation in which a user might encounter without being affected by the restrictions of time, place, network or terminal, in order for the full-scale popularization of unified communications to occur.

This paper focuses on the aforementioned perspective and introduces the activities relating to the next generation office communications undertaken by OKI Networks, as well as the ID portability technology<sup>1)</sup>, for which research and development for its realization is currently being undertaken.

## Anticipation for office communications

Office communications have been evolving, from analog telephones to IP telephones, before expanding into unified communications. The intended aim behind this evolution is to reduce communication and operation costs through conversions to IP networks and improve communication efficiency through multimedia integration.

Such a trend for reducing business activity costs and improving productivity is expected to become increasingly fervent, when we consider the popularization of teleworking against the backdrop of work-life balance policies, the technological innovations taking place within communication and terminals, as well as the situations surrounding the economic crisis and global warming, which are now occurring.

Also expectations are high for the creation of a mechanism for building and operating information systems that are capable of organically combining communications, collaborations and other related business systems according to the mode of diversifying business services.

## Activities undertaken by OKI Networks

OKI Networks are commercializing IP telephony server/IP-PBX into products for the purpose of smoothing and revitalizing communications in the office. These products are offered as SIP server types, which are capable of facilitating linkups of a high level with various business applications, as well as PBX types with highly

reliable designs. They are capable of responding to a wide range of applications, from large corporations (on a scale of tens of thousands of extension lines) to SOHO (on a scale of only a few extension lines)<sup>2)</sup>, as well as seamlessly linking with contact center systems and video conferencing systems. The Com@WILL<sup>®1)</sup>, <sup>3)</sup> series of software products, furthermore, are unified communication tools that can be used in the IP telephony environment described above and they are capable of supporting business operations, such as teleworking, through the utilization of Soft Phone (telephone, videoconferencing), Presence information, address book, etc.

Pursuing functional concepts such as “simple”, “convenient” and “inexpensive”, is effective with regards to such a basic product group for office communications, which is intended to further improve productivity in business activities (Fig. 1).

### (1) “Simple”: Securing openness and expandability

The interface between services and terminals is openly disclosed, which, together with the provision of tools that can be integrated easily not just by system integrators or persons in charge of IT at business corporations but also by users, facilitates the simplified building of customized information systems suitable for business lines and modes, as well as the simplified implementation of information systems at small to medium size businesses in addition to large-scale companies.

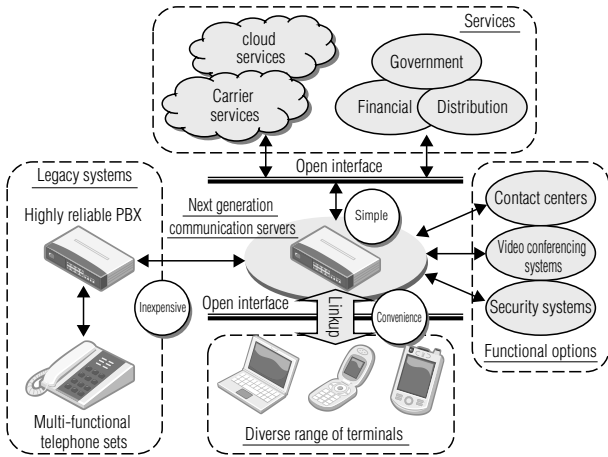
### (2) “Convenience”: Linking of terminals and networks

The level of sophistication for services can be raised through the linking up of terminals and networks. Provided the necessary content and applications are integrated into a single unit to terminals, for example, various services can be carried out without any concern for the differences in the environments of the terminals. It will also be possible to build scalable systems with terminals taking on a part of the service or network functions, making it possible to anticipate the optimization of service operation costs.

### (3) “Inexpensive”: Linking with legacy systems

If the next generation office communication functions can be made available on existing terminals through linkup functions with legacy PBX systems, it would be possible for businesses to employ limited systems to verify the improvement of productivity due to such implementations before proceeding with the phased migrations.

\*1) Com@WILL is a registered trademark of Oki Electric Industry Co., Ltd.



**Fig. 1 Concept of next generation office communications**

Details of the ID portability technology, which is a framework for the linkup of terminals and networks for realizing “convenience” for the next generation office communications, are subsequently described.

### ID portability technology

Until now terminals were simply connected to networks on conventional analog telephone networks and the telephone voice quality was controlled by these networks. With the accelerated conversion of networks into IP and broadband networks, along with the progress in sophistication of terminals occurring at the same time, it became possible to have both networks and terminals with functions for controlling the voice quality and the telephone voice quality can be assured through the functional linkup of the two. In this manner it not only becomes possible to connect a single terminal to various networks and receive various services, by equipping terminals with intelligent functions, but the creation of services that offer superior connectivity and convenience will become feasible.

For example, services can be executed on a mobile phone while the user is in transit and these services can be switched to a display terminal that is more suitable for the content upon arrival at the destination, thereby continuing to provide services in modes suitable for the

environment of the user. Convenience can also be improved if a linkup of multiple related services can be achieved and integrated into a single service suitable for the attributes of a user or terminal.

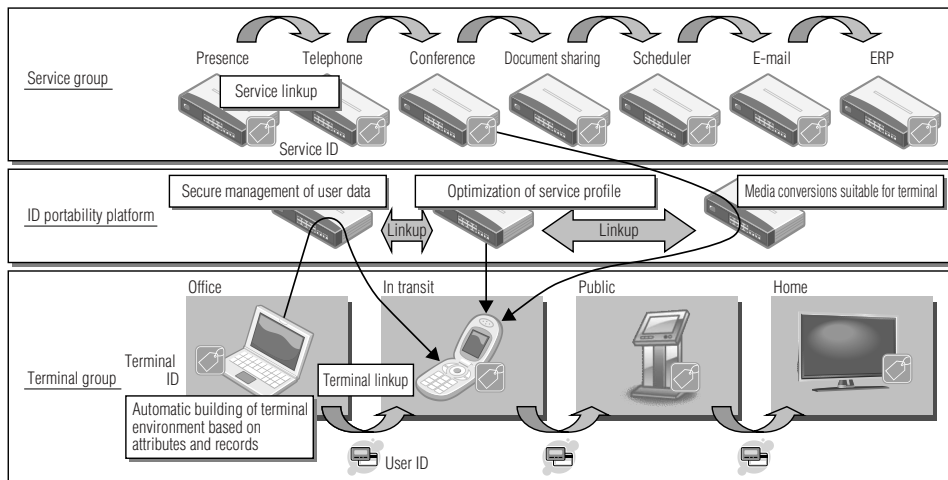
ID portability is a concept intended to realize such a network service and entails the portability of services and content suitable to users and the environment of their terminals by linking various IDs (for user, terminal, network, service, etc.), which are necessary for using services and content, as well as a mechanism for changing terminals in ways suitable for the ID of a user. It is not necessary for any information of the user to be entered into a terminal and its environment can be built by downloading data as needed. The leaking of information by users is not a concern. ID portability is anticipated to become a technology for securely realizing communication and collaboration in the teleworking era.

An image of office communications fulfilled through the use of ID portability is depicted in **Fig. 2**. This shows that a user is able to select an arbitrary terminal (personal computers, mobile phones, television sets, etc.) and dynamically build an office execution environment on that terminal, according to the terminal attributes and network environments, as long as the user has a personal ID. It is possible to relay services or to relay information across multiple services that are linked, in a stylish manner.

### Configuration of systems that realize ID portability

The purpose of OKI Networks is to bring about practical implementation of the next generation office communications and therefore OKI Networks is proceeding with the research and development of user data management technologies, as well as service profile management technologies, which are a part of the technological development for the aforementioned ID portability.

A user data management technology is used to securely transfer and delete data on terminals, manage records relating to transfers and the deletion of data, as well as secure the management of terminal applications when starting or terminating services used on a terminal, in addition to transferring service execution environments



**Fig. 2 Image of office communications using ID portability**

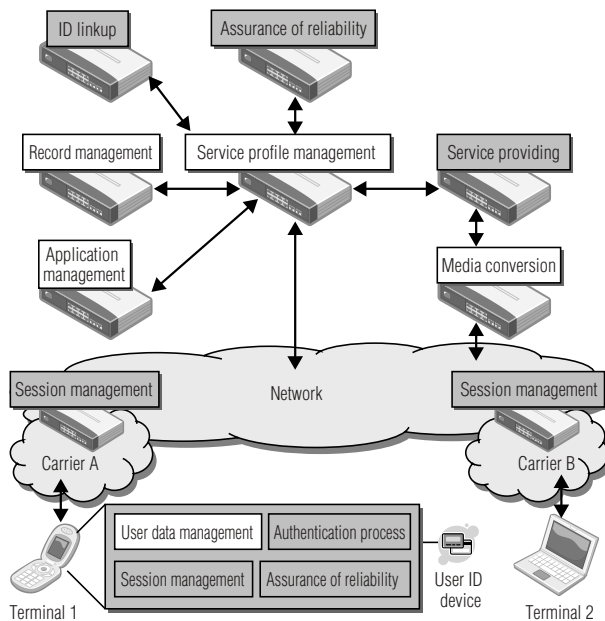
between multiple terminals. Research at OKI Networks is applicable for service platforms<sup>4)</sup> based on Java™<sup>2)</sup>, in order to accommodate flexible building and the changing of terminal functions as defined by the OSGi Alliance.

In order to use the services on various networks and terminals, it is necessary to determine the capabilities of the recommended terminals in use for each service as well as the required terminals for using services, and then to make the quality of the networks and services compatible with the capabilities of such terminals in use. The service profile management technology is focused on the aforementioned issue, as a technology intended to provide operating parameters (service profile) that respond to the service use environment. In this research, service platforms<sup>5)</sup> based on scenarios capable of linkups between services and linking up with multiple terminals have been extended.

**Fig. 3** depicts a system configuration for an ID portability platform that realizes ID portability by utilizing the aforementioned user data management technology and service profile management technology. The two aforementioned service platforms are joined and the functions necessary for user data management and service profile management (depicted with a white background) are loaded onto these converged platforms.

Software for managing the user data is loaded onto the terminal and linked up with other basic terminal functions (authentication process, session management, reliability assurance, etc.).

A service profile management server, application management server, record management server, ID linkup server, reliability assurance system, service providing server, media conversion server and session management server for each individual carrier, are configured on the network. The service profile management server manages the service status for each individual user and service (execution, suspended and



**Fig. 3 System configuration of ID portability platform**

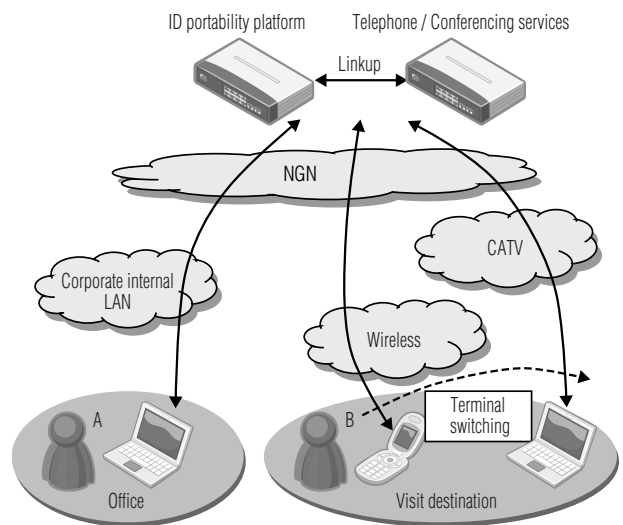
switched), updates the usage records for each individual user and service, manages the applications for each terminal optimally suited for each service, controls the environment transitions, as well as serves as a receiver for processing requests relating to the user data management received from the terminals and links up with other server functions. The application management server links up with the user data management function on the terminals to manage the installing and uninstalling of applications. The record management server manages the records of service employed by users. The ID linkup server authenticates the user IDs, as well as manages the correlation between service IDs and user IDs. The reliability assurance system verifies whether or not a terminal is secure. The service providing server enables a variety of services, such as telephone, conferencing and Presence. The media conversion server converts the content provided by the service providing server into formats suitable for the terminal environments.

### Operating example of ID portability

Processing procedures of the ID portability platform currently under development are herein explained, using an example of telephone services used in conjunction with teleworking, as depicted in **Fig. 4**.

The example depicted in **Fig. 4** shows Person A, who is the person working in the office, ringing Person B on the telephone. Person B happens to be away from his or her usual place of work, so the registered smartphone rings to start a voice call at the location where Person B is visiting. It becomes necessary during the phone call to browse through documents, at which time the call is switched from a phone call on a smartphone to a video phone on a personal computer in order to continue with the discussion.

The ID portability platform depicted in **Fig. 3** shows that whenever a terminal is switched from a smartphone to a personal computer, the user data management function of the smartphone requests a service transfer to the service profile management server, before anything



**Fig. 4 Example of telephone service use**

\*2) Java is a registered trademark or a trademark of Sun Microsystems, Inc., in the United States and other countries.

else. The user data management function on the personal computer then requests the transfer of the service from the service profile management server. The service profile management server verifies the installation status of the personal computer with the record management server, before installing a terminal application suitable for the attributes of the personal computer, via the application management server as needed and updates the usage record information on the record management server. The service profile management server then generates a thread for switching, obtains a service environment comprised of application restarting information, privacy information, and setup information from the user data management function on the smartphone, converts them into a common format and registers them on the record management server. Following that procedure the service profile management server obtains the service environment from the record management server and converts it into a unique format of the application that is compatible with the capacity of the personal computer before passing it on to the user data management function of the personal computer. The user data management function on the personal computer builds an environment based on the service environment provided, starts the application, reproduces the conditions of the smartphone and starts the video phone. The smartphone then deletes the stored privacy information and also deletes the application, if necessary.

When formats of the content provided by services and formats of the content supported by the terminal differ, the service profile management server instructs the media conversion server to convert the media format. The media conversion server converts the content on behalf of the service and terminal.

The telephone service transitioned in a secure and stylish manner between terminals has been presented as an example of the next generation office communications, but the technology is intended to provide platforms for optimizing the environment where it is used for services by linking up the respective IDs of users, terminals,

networks and services. Practical implementation of this technology will facilitate the building of highly convenient and secure information systems suitable for the business modes of businesses by organically combining multiple services as well as multiple terminals, not merely for such instances as shown in this case example.

### Future perspectives

Undertakings of the next generation office communications intended to improve productivity in the office and in anticipation of the advent of the teleworking era have been introduced herein, along with ID portability as its basic technology. Efforts will be made in the future to not only bring this technology into practical implementation but also to set up office environments to further improve convenience, the connectivity and security suitable for individual users, as well as the commercialization of products.

Furthermore, the technological development of ID portability will be conducted for a wide range of applications, since it is a technology not limited to office work applications but also suitable for sales and distribution, as well as video distribution, public sector applications, advertisements and consumer services, such as home appliance controls.

### Acknowledgements

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### References

- 1) Yuji Inoue, Hideo Okinaka et al: NGN Text Book, First Edition, Impress R&D, pp. 270 to 276, 2008.
- 2) Toshiki Tani and Katsuhiko Miyamoto: Network Office Environment Facilitated by Unified Communication, OKI Technical Review, Vol. 75, No. 2, pp. 44 to 47, October 2008.
- 3) Katsunori Endo and Hiroshi Nagai: Teleworking Environment Facilitated by Com@WILL, OKI Technical Review, Vol. 75, No. 2, pp. 40 to 43, October 2008.
- 4) OSGi Service Platform Core Specification, OSGi Alliance, Release 4, Version 4.0.1, 2006.
- 5) Koichi Ochiai et al: Carrier Ubiquitous Service Platform Realized with NGN, OKI Technical Review, Vol. 74, No. 2, pp. 20 to 23, April 2007.

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## [Basic Terminology Descriptions]

### Work Life Balance Policy

A government policy promoted in various countries, intended to create societies where work and other responsibilities as well as desires can be reconciled in harmony. The "Charter for Harmony of Work and Living" was established in Japan in 2007, with various activities implemented by government and private sectors alike.

### OSGi Alliance

A standardization organization for the formulation of service platforms based on software, for the purpose of easily adding new services, changing functions and implementing modifications to correct faults on terminals that can be connected to networks. This organization was established in 1999.