New Presence Technologies and Services for the Broadband-network Age

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Abstract

The concept of “presence” is attracting attention as the basis for new telecommunications services for broadband networks. This article describes presence-control techniques that can be adapted to various services as differentiated functions and new presence applications developed in NTT Information Sharing Platform Laboratories.

1. Trends in presence services and the state of standardization

1.1 Presence services

The popularization of broadband networks has been accompanied by the advent of various new telecommunications services, which deal with the status of a person or thing, which is known as its “presence”. The best-known example is instant messaging (IM), where users wanting to exchange messages can confirm presence information to determine whether someone is online. Content-delivery services that deliver information that is relevant and timely in terms of the user’s location and preferences have started and they are expected to become enormously popular. A more specific area is remote nursing-care services where a monitor watches health-related presence information, such as data about the physical condition of an elderly person living alone. Sensing devices such as radio-frequency identification (RFID) tags and readers are applied in ubiquitous sensing services for getting presence data that shows whether items are in or out of stock. IM services have very quickly become popular, and many companies, led by AOL and now including Yahoo!, Microsoft, and many others, are already providing IM services. NTT-group companies have been providing presence services since last year and will continually expand the variety of these services in the near future.

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1.2 Standard presence technologies

Presence services are typically based on SIP (Session Initiation Protocol) and PAM (Presence and Availability Management).

(1) SIP

SIP (RFC3261) is a control protocol for creating and managing a multimedia session on IP networks. This protocol has been standardized by the SIP WG (Working Group) [1] of the IETF (Internet Engineering Task Force). In SIP, information for transfer is specified in a plain-text format like HTTP (Hyper Text Transfer Protocol). SIP is now very well known among people in the telecommunications field and is being applied in VoIP (voice over IP) services. The protocol for exchanging presence is prescribed by the RFC3265 standard, developed by the SIP WG. An important extension to SIP called SIMPLE (SIP for Instant Messaging and Presence Leveraging Extensions) has been provisionally defined in an Internet Draft (pre-standardization document) developed by the WG of the same name [2]. The SIP protocol has already been applied in Windows Messenger, the IM service from Microsoft. The protocols are generically referred to as SIP/SIMPLE. A basic sequence in the exchange of presence information using SIP/SIMPLE is shown in Fig. 1.

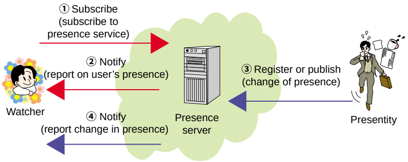

Fig. 1. Basic sequence in the exchange of presence data.

(2) PAM

The PAM [3] standard specifies various basic presence application programming interfaces (APIs) and was prepared by the PAM Forum, Parlay Group [4], ETSI (European Telecommunication Standards Institute), 3GPP (3rd Generation Partner Project), and other groups. The APIs cover the management of presence information and communication methods for both people and things. These APIs give service providers an efficient way to develop highly portable service applications.

2. Presence platform and architecture

2.1 Architecture

At NTT Information Sharing Platform Laboratories, we are applying SIP/SIMPLE and PAM as the bases of the new common presence architecture shown in Fig. 2. This architecture is intended to provide a comprehensive presence service. A service provider places the presence system in a physical structure that suits the scale of the service, i.e., according to whether it is for the mass market, specific corporate users, or mobile-terminal market, etc.

The presence system we have developed supports two forms of presence-information management. In one, the management function is centralized on the network system. In the other, the management function is decentralized and handled by both the network system and user terminals. We have adopted open-source software to cut down on middleware license fees. As well as reducing the development cost, open-source software lowers maintenance costs and shortens the period of development.

2.2 Presence platform

A presence platform is composed of the basic presence module and the presence-control module.

The basic presence module is based on standard presence technology. Its functions consist of presence-management functions based on PAM, presence-signaling functions based on SIP/SIMPLE, and a mediation function which maps the SIP/SIMPLE messages to PAM APIs.

The presence-control module provides common functions that are independent of specific presence services but are not prescribed by the standard presence technologies. Most conventional presence products were designed for IM, and their application to other presence services was not considered. The con-

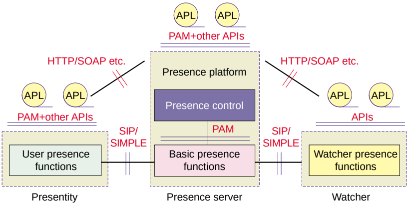

Fig. 2. Common presence architecture.

trol module needs new presence functions if it is to be applicable to the various presence services expected in the future. We have thus been developing many such functions over the last year and have incorporated them in this module.

3. New presence-control functions

Figure 3 outlines the presence-control functions that we have developed and incorporated in the presence-control module. These functions can be adapted for various services as differentiated functions. We explain each of these functions below in sections 3.1 to 3.5.

3.1 Distributed presence management

In most conventional services using presence information such as Windows Messenger, all of the presence information is stored on the network side. However, when the presence information of a service includes private information (state of health, likes and dislikes, interests, contents of the refrigerator, etc.), users might be reluctant to accept entrusting the information to the network side. We have solved this problem with a distributed-management function, in which presence information is stored on either the user or network side as determined by the presentity (presence entity). Private presence information will normally be managed on the user side and only be opened by an authorized party or organization, and then only when this is necessary. Another approach that might suit some applications will be to have the private information gradually opened to others as they satisfy certain conditions or respond to certain incentives.

3.2 Presence accumulation and reference

In a conventional presence service, only the present state is managed as presence information. The presence accumulation and reference function accumulates presence information over time; we can then look at its transitions over time. The value of this function is that it enables various secondary uses of presence information, such as the automatic generation of a diary or album for personal use and the generation of statistical data for market research.

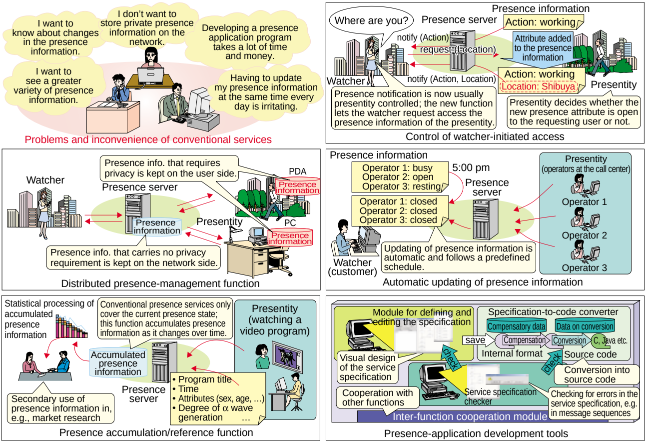

Fig. 3. Functional blocks of the presence service.

3.3 Control of watcher-initiated access

Conventionally, access to presence information and permission for its notification, in terms of both allowed viewers and allowed information, are generally controlled by the presentity. This function gives us a framework in which a watcher can request access to the presence information of a presentity. We can thus achieve new types of flexible presence service where access to presence information is cooperatively controlled by the presentity and watcher.

3.4 Automatic updating of presence information

All sorts of presence information will be handled in the near future. Relying on manual input of presence information, as is currently the case, is very inefficient. One solution to this problem is the use of sensors as automatic means of inputting presence information. On the other hand, timer-driven control is effective in cases where the change in presence state is based on a regular activity. Presence information can also change according to certain other fixed rules, such as the sharing of an address by family members. This function thus covers both the scheduled updating of presence information and fixed rules of the type described above.

3.5 Presence-application development tools

No development tools that support the PAM API are available for generating presence application, so developing applications requires much time and cost. We have developed an application generator which runs on the presence server. Its main functions are a GUI (Graphical User Interface)-equipped function for defining and editing the service specification, a function that converts the service specification thus defined into source-program code and compensates for deficiencies in the input specification, a function for verifying the input service specification by checking for errors in input, and a function that retains the independence of the above-mentioned functions while getting them to cooperate. These functions form an environment for low cost and quick development of high-quality presence applications.

4. New presence applications

We think that the desires to acquire a feeling of connection with other people and to receive personalized services are the main driving forces for the exchange of presence information between parties on a network. In this section, we describe the Presence Club and Splittable Communicator [5] as examples of applications being developed at NTT Information Sharing Platform Laboratories.

4.1 Presence Club

The Presence Club is an application for collaborative communication based on augmented collections of digital photographs and so on. It operates with electronic albums of photographs or other objects connected with the user's (presence club member's) past presence state. It draws on current presence information about other people or things seen in the objects to provide a smooth path into future communications by VoIP, video phone, a chat session, etc. Including presence information in this way creates a much stronger feeling of connection than the photograph and memory alone. In the prototype system, text and photographs provide the current presence information. A camera-equipped cellular phone thus constitutes a very convenient input terminal. Our intention is to give the Presence Club the capability to operate with various media, including video, voice recordings, electronic documents, and other information. The operation of the Presence Club is shown in Fig. 4.

4.2 Splittable Communicator

The Splittable Communicator application gives users continued access to telecommunications services such as videophones as they move from network to network (for example, from a PHS cell to the hotspot of a wireless LAN), or change terminals (for example, from a PC to a PDA). Using these kinds of presence information, Splittable Communicator does this by switching the telecommunications sessions between networks and terminals. The system's architecture is shown in Fig. 5.

In this application, the presence system manages presence information such as whether the user is online or offline, the user's location, the applications available to terminals and their parameters. Splittable Communicator is intended to select the most appropriate terminal for the user (for example, the terminal closest to the user as he or she moves about), and automatically switch the telecommunications session to more appropriate terminals as they become available.

5. Conclusion

At NTT Information Sharing Platform Laboratories, we are developing presence-control technologies for various services as differentiated functions.

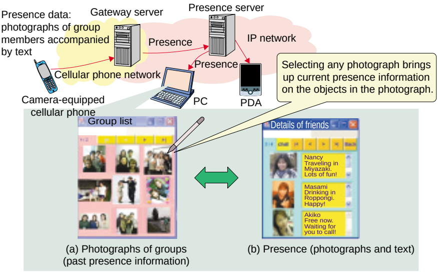

Fig. 4. Presence club service.

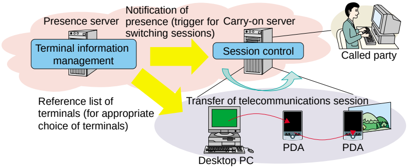

Fig. 5. Concept of Splittable Communicator.

The Presence Club and Splittable Communicator are examples of new presence applications. By developing these presence technologies and applications, we expect to make more convenient and personalized services in various business fields.

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