

# Application Functions for Autumn/Winter 2008 Models (1) i-concier and One-step User Memory Back-up Functions

*The mobile terminal implements the concept of an agent that supports the actions of the user's lifestyle. We have developed the i-concier<sup>TM\*1</sup> function, which provides the user with information to suggest the next action, and a one-step user memory back-up function, which can facilitate information "safe and secure" for the user.*

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## 1. Introduction

The mobile market has featured diversification and increasingly advanced functions in recent years. Among the functions demanded of mobile terminals have been services that support safe and secure and tool-like functions that match individual lifestyles, but now there is also a call for assistant-like functions that actively distribute intimate personal information.

Previously, NTT DOCOMO has aimed for both "safer and more secure" use of the mobile terminal and a "mobile terminal that offers many (passive) functions" with the development of various applications. To meet the new needs mentioned above, however, we are now targeting "mobile terminal that actively does things for you ... ."

The i-concier function, our first development in that direction, can support lifestyle activities.

The i-concier function can intimately support user actions through personalization of the mobile terminal by providing information according to the user's plans and available data, etc..

In this article, we explain the i-concier function. We also describe the one-step user memory back-up function, which was developed to facilitate data back-up by the user and strengthen the previous goals of safe and secure.

## 2. i-concier Function

The concept of the i-concier service is shown in **Figure 1**.

### 2.1 i-concier Message Function

The configuration of the i-concier message function is shown in **Figure 2**.

To notify the user of action-supporting information, i-concier handles the following two new types of messages (hereinafter referred to as "information").

#### 1) Direct Messaging

These messages are distributed from the server and personalized for each user (informing of transportation delays on the route to work, etc.).

#### 2) Event Notification

These are messages generated by the mobile terminal according to changes in state within the terminal (updating of stored information, etc.).

For the new message functions, we chose a mechanism in which the "information" is received (or generated) as multiple elements to realize the display function that we describe below. Direct messages received from the server have

\*1 i-concier<sup>TM</sup>: A trademark of NTT DOCOMO, Inc.

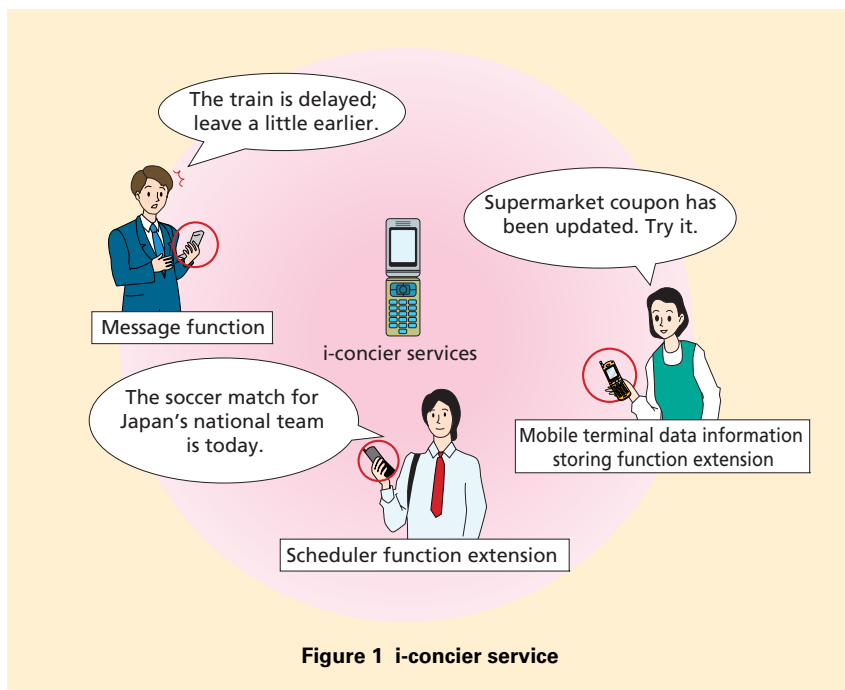


Figure 1 i-concier service

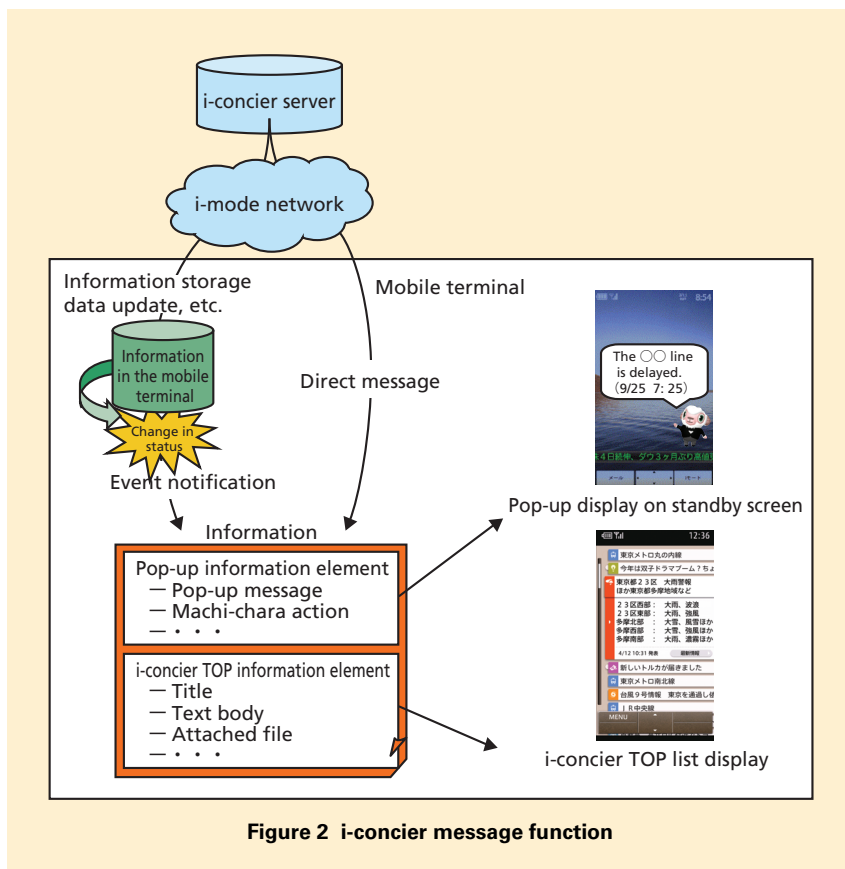


Figure 2 i-concier message function

the role of offering content that effectively supports the user's actions; they can have attached schedule data and ToruCa<sup>\*2</sup>.

The "information" display can be presented as a pop-up display on the standby screen or as a list display in the viewer (i-concier TOP).

The pop-up display on the standby screen allows the user to directly check the gist of newly arrived "information" without having to open i-concier TOP. In that case, content can be displayed together with Machi-chara<sup>\*3</sup> to give the mobile terminal a personality, bolstering the concept of "mobile terminal than supports user actions."

The i-concier TOP list display provides a way to check the "information" details. The user can connect to the site from each "information" and move to a page that has details on the appended file.

In addition to "information" details, i-concier TOP is also positioned as an entrance to the i-concier service, presenting a display according to the status of the i-concier service contract and set-up sites relevant to i-concier, and establishing guidelines for the functions within the mobile terminal. The i-concier TOP uses the VIVID™UI<sup>\*4</sup> for graphical display to give the user a visual sense of presence. We also use the VIVID UI customizability feature to implement a mechanism for changing i-concier TOP templates.

<sup>\*2</sup> **ToruCa**: A service that can incorporate such cards as restaurant cards and coupons traditionally distributed at shops in paper media format into mobile terminals.

<sup>\*3</sup> **Machi-chara**: A service that displays a character that is chosen by the user on the standby

screen or menu screen of a mobile terminal.

<sup>\*4</sup> **VIVID™UI**: A user interface platform that can handle various kinds of multimedia content in an integrated manner. VIVID is a trademark of Acrodea, Inc.

## 2.2 Scheduler Function

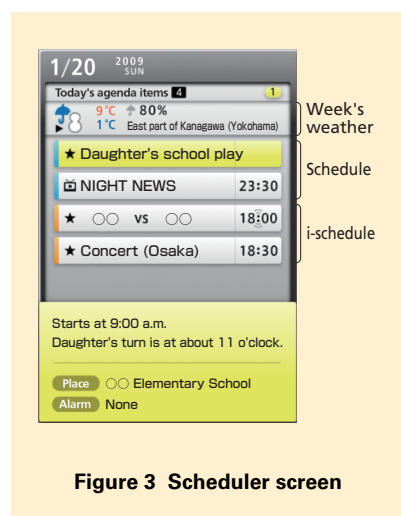
Based on the i-concier service concept, we considered the scheduler from the viewpoint of development toward an action support application and added the functions described below. A screen image is shown in **Figure 3**.

### 1) i-schedule Support

i-schedule is a new data format for related management of multiple plans, such as movies or sports event schedules or artist activity plans, etc. It is based on the existing vCalendar schedule format, but is extended with i-schedule name, i-schedule explanation and final update day defined as new properties. The scheduler also has a visual function for clearly distinguishing schedules created by the user on the mobile terminal and i-schedule. In addition, the function described below automatically updates i-schedule to the latest information that is on the server.

### 2) Weekly Weather Display

Weekly weather information



**Figure 3 Scheduler screen**

received by direct message can be displayed on the scheduler and automatically updated.

These added functions increase the types of information that the scheduler can display and broaden the action support application concept beyond what has previously been possible.

### 3) Graphical Display

The scheduler is a basic function of the i-concier service, so we made it easy to invoke from i-concier TOP. To preserve a feeling of consistency in design with i-concier TOP when the service is invoked, VIVID UI content is used for the graphical display. In addition, design consistency across different types of terminals is achieved by using the VIVID UI property of consistent presentation and operation regardless of the OS or middleware that is running on the mobile terminal.

## 2.3 Extension Functions Related to Information Storing Services

As a part of “a mobile terminal that actively does things for you ...” we expanded the functions of the personal data storage service to include various kinds of data for implementing an automatic data updating service.

### (1) Existing Services

For the personal data storage service, we use Synchronization Markup Language (SyncML)<sup>\*5</sup>, a protocol that conforms to the standard specifications of Open Mobile Alliance (OMA)<sup>\*6</sup>. This protocol allows synchronization of

data between the mobile terminal and the server. In the current service, phone book, mail and still images can be stored.

The phone book synchronization is done incrementally. The mobile terminal sends the data for changes, additions and deletions to the server, and then later the server also sends out the difference data.

To make the personal data storage service compatible with agent services, we first expanded the objects that are handled. We also chose automatic data updating by the server at the time of incremental synchronization and real-time distribution of information to the user during synchronization. This approach has two advantages.

- Protecting the information that supports user actions (extended safe and secure)
  - Direct support of user actions by information updating (supplementing the phone book or automatic updating of ToruCa/schedule, etc.)
- (Figure 4)

### (2) Expansion of Objects Handled by the Information Storing Service

Support of the i-concier service adds ToruCa, schedules and i-schedules to the inventory of information that can be stored. To protect the large amount of user data, we are expanding the safe and secure features.

#### 1) ToruCa

There are two data formats in ToruCa, ToruCa card and ToruCa snip, and both

<sup>\*5</sup> **SyncML**: Specifications for synchronization of data between mobile terminals or between a mobile terminal and a PC.

<sup>\*6</sup> **OMA**: An industry standardization organization that aims to standardize service and application technology and achieve interoperability

in mobile communications.

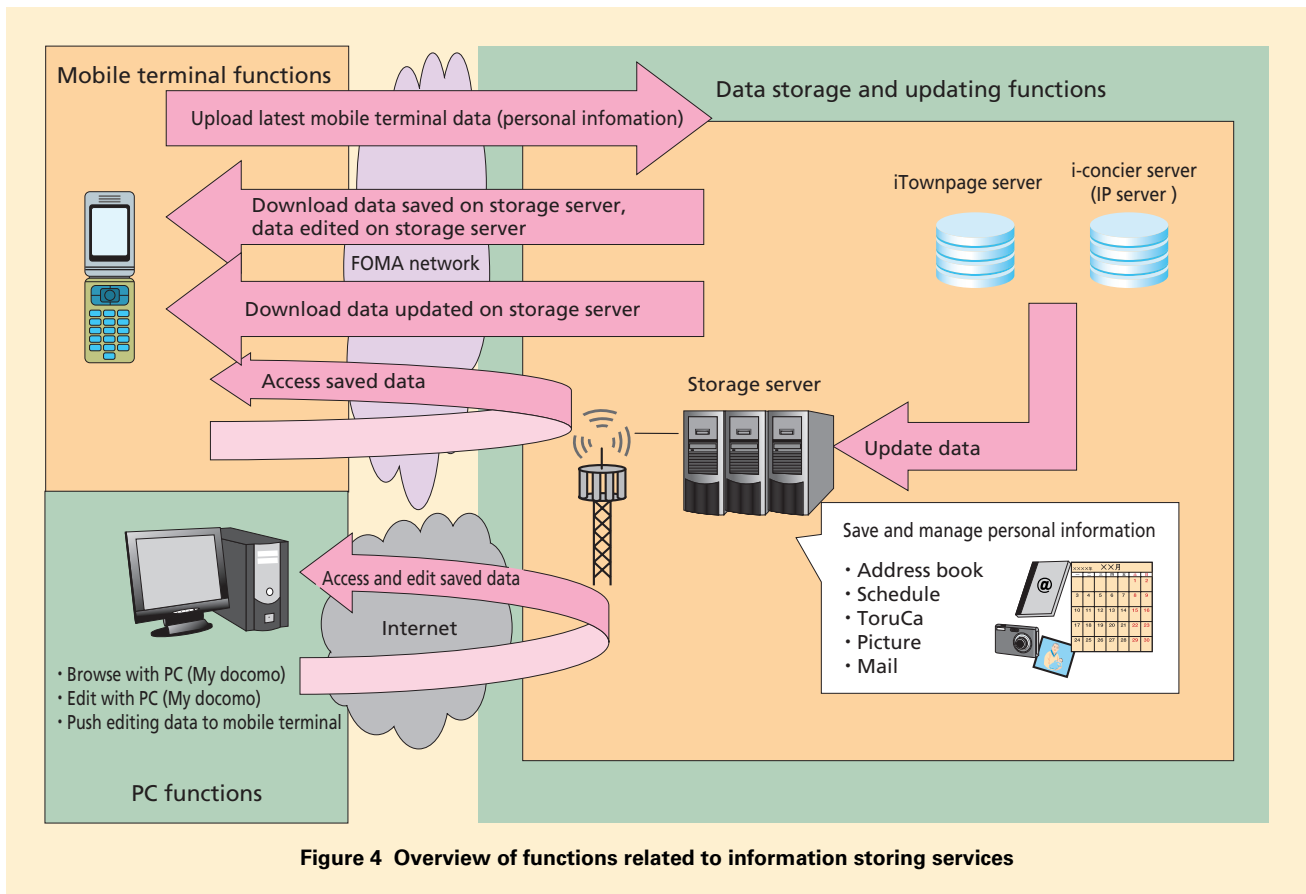


Figure 4 Overview of functions related to information storing services

of them can be stored.

To allow updating of ToruCa that cannot be redistributed, the data is handled as an object of information storing. To protect copyrights, however, only the uploading mobile terminal can restore (recover) the data. ToruCa that has been restored to a mobile terminal is all in the unread state, so the user can easily distinguish the restored ToruCa from other data.

## 2) Schedule/i-schedule

With i-schedule, which can manage multiple plans in relation, schedule data that is contained in an i-schedule is put into folders and sent to the server one

by one to realize information storing that recognizes these sets of data, considering an i-schedule as a folder (**Figure 5**).

To send and receive all of the i-schedule data when synchronizing would involve the transmission of a large amount of data. To reduce the amount of data transmitted, only the schedules that have been changed in a folder are sent.

## (3) Adding Appended Information During Synchronization

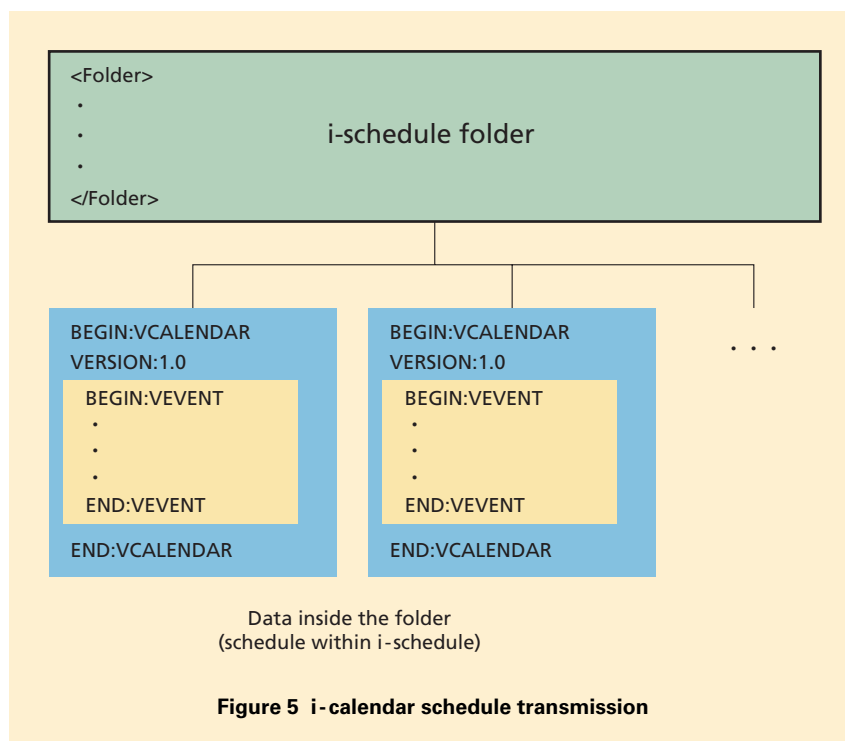
### 1) Record Update from the i-concier Server

As mentioned above, for the ToruCa

and i-schedule data that has been newly added as storable data, the Information Provider (IP) can update records on the mobile terminal at the time of synchronization by updating the data that is stored on the i-concier server.

### • ToruCa updating

So that ToruCa content distributors can update data, the server has the ability to compare to the final update date and time of the structural element in the ToruCa card and enable the distribution of a new ToruCa to the user during synchronization. By doing so, expiration can be prevented and new coupon



cards can be issued at the beginning of the month to realize services that support the user's shopping behavior, etc.

- i-schedule updating

With i-schedule, it is possible to update arbitrary schedules individually. Updating is accomplished in the same way as is done for ToruCa, but using the final updating date and time of an i-schedule folder. Updating a baseball game schedule calendar or updating a school class schedule are possible as specific services.

## 2) Adding Phone Book iTownpage Information

We also implemented a function for getting phone book data from existing

personal data storage service to further increase user convenience.

First, an area to hold the special i-concier data is prepared in the phone book of the mobile terminal. When the information storing service is implemented, address, URL or memo data can be retrieved by the Townpage information that is stored on the i-concier server for information that matches the telephone number.

In that way, the user can obtain information on the address or business hours of a shop that is registered in his or her own phone book without having to perform any special operations. When iTownpage information has been added to a phone book, the fact can be understood immediately from the icon

that is displayed when the user browses the phone book.

## 3) Notification of Agent "Information"

Synchronization can be used as an opportunity to add information, in which case the user is notified by using the event notification described above.

Because the user refers to the ToruCa and phone book only when necessary, the user must be notified when changes occur. When information is updated by the server, a tag that indicates information has been added is appended to the updated record within the SyncML protocol and sent to the mobile terminal. Event notification is executed when the tag count is one or more.

The number of i-concier updates can also be checked on the information storing history display screen.

## 3. One-step User Memory Back-up Function

The function for one-step back-up of user memory copies (backs up) all of the PIM data<sup>\*7</sup> at once onto an SD card. There is also a function for restoring that data by copying it back to the mobile terminal and overwriting any existing data.

### 3.1 Background for Introduction

The data handled by a mobile terminal must be treated with security and safety, but as the data increases in diversity and volume, the time and trouble required to change the type

<sup>\*7</sup> **PIM data:** In this article, refers to five types of data (phone book, bookmarks, mail, schedule and text memo).

of terminal or perform data back-up also tends to increase.

In such a situation, it would be more convenient if the user could easily transfer the content of the user memory to an SD card that can be inserted into the mobile terminal himself, rather than making a trip to an NTT DOCOMO shop.

Previously, there was a function for copying phone book, mail and other such data separately to an SD card and for copying the data from the SD card to the mobile terminal. Now, however, the goal is to simplify the back-up process to make it easy for the user to back up all of the PIM data together at one time.

### 3.2 Introduction Policy

In addition to reducing the trouble of copying PIM data from a source to a destination, this function perfectly reproduces the source PIM data at the destination. Thus, if there is a type of data that does not exist at the source data, that type of data should also be cleared from the destination so that exactly the same data exists at the source and the destination. For example, if there is no phone book data on the source mobile terminal, any phone book data that exists on the destination mobile terminal must be cleared.

### 3.3 Introduction Issues and Their Countermeasures

The back-up data is stored in files by the type of PIM data. If a type of data does not exist on the source side, no back-up data of that type is created.

On the other hand, if the back-up process is interrupted by a menu operation, loss of power, or removal of the SD card, there may be data that has not been backed up onto the SD card. If an attempt is made to restore data from an SD card for which the back-up process was interrupted in that way, it would not be possible to restore the original state of the source, which violates the introduction policy.

Therefore, a way to distinguish the case in which there was no data on the source terminal and the case in which the back-up was interrupted is required when the SD card is read at the time of data restoration to prevent restoration from an SD card for which the back-up process was interrupted.

To allow that distinction regardless of how the back-up process was interrupted, a temporary file that has a particular file name is always created to indicate that back-up is in progress. Also, when there is no data of a particular type on the source terminal, a back-up file of size zero is created for that data type. The back-up status can thus

be indicated with just the file name and file size without having to set a new flag on the SD card to manage the back-up status, which simplifies the processing.

When the data is restored, a check for the presence of a temporary file is first made. If a temporary file exists, it is recognized that an abnormal interruption of the back-up occurred and restoration is stopped. If a file of size zero is found during restoration, data of that type that exists in the mobile terminal is cleared, and restoration continues until the existing data types have been restored. That allows back-up according to the introduction policy even if some of the back-up data is not present.

## 4. Conclusion

The autumn/winter 2008 models are equipped with the i-concier function, which is one step towards “the mobile terminal that actively does things for you ... .” In future work, too, we plan to strengthen i-concier linking with location information and other types of action support information, expand the types of content handled by one-step back-up and develop other features that make the mobile terminal safer and more secure as well as easier to use for the user.