

METHOD AND SYSTEM IN A TELECOMMUNICATION SYSTEM AND SUBSCRIBER IDENTITY MODULE

FIELD OF THE INVENTION

The present invention relates to telecommuni-
5 cation technology. In particular, the invention con-
cerns a method and system for dynamic allocation of
subscriber identity module memory areas and for dis-
tribution of memory areas between operator, service
provider and subscriber.

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BACKGROUND OF THE INVENTION

A very essential component regarding the
functionality of mobile stations is the subscriber
identity module (SIM) connected to the mobile station.
15 In mobile communication systems, e.g. the GSM system
(GSM, Global System for Mobile communications), new
mobile network applications can be implemented via the
subscriber identity module. Conventionally, the sub-
scriber identity module has been used as a storage for
20 subscriber-specific information related to mobile com-
munication networks and information needed for call
setup. Functional applications which can be utilized
in mobile communication and other activities are
loaded on the subscriber identity module. Next-
25 generation mobile stations will place increasing de-
mands on the functionality of the subscriber identity
module. At present, the subscriber identity module
functions as a component in which the information
stored and memory areas defined are fairly static.

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A problem with the above-mentioned solutions
is that applications stored or loaded on the sub-
scriber identity module occupy a fixed, predetermined
space in the memory. The size of this predetermined
memory space can not be changed except by the operator
35 using special means. This manner of action is ineffi-
cient if a short response time for the desired changes

is required. A further problem is that the subscriber identity module is entirely the operator's property, so the customer and/or service provider has no chance to place their own applications on the subscriber identity module. Yet another problem is that maintaining a database concerning the memory structures and applications on subscriber identity modules requires a considerable amount of disk capacity and resources.

The object of the present invention is to eliminate the drawbacks referred to above or at least to significantly alleviate them.

A specific object of the invention is to disclose a new type of method and system that will allow dynamic management of the memory of the subscriber identity module. The memory can be managed e.g. by an application stored on the subscriber identity module and/or by the operating system or operator. At the same time, the operator avoids increasing the size of the database concerning the memory structure and applications in the subscriber identity modules as information regarding the subscriber identity module structure and applications can be obtained when necessary. The invention provides the advantage that memory space in the subscriber identity module can be released for use by the customer and/or service provider, and the use of memory space can be controlled dynamically.

As for the features characteristic of the invention, reference is made to the claims.

BRIEF DESCRIPTION OF THE INVENTION

The method of the invention concerns dynamic allocation of memory space in a subscriber identity module comprised in a mobile station in a telecommunication system. The telecommunication system preferably comprises a management system, a mobile station and a

subscriber identity module connected to the mobile station. In the method, the memory space of the subscriber identity module is divided into two or more sections and, moreover, applications are stored in the subscriber identity module.

Dynamic allocation of the memory of the subscriber identity module can be accomplished by the operating system of the subscriber identity module and/or by an application in the memory space. Memory areas can be allocated e.g. for applications used by the operator, a service provider and/or the customer. The program may be seen by the user e.g. as a subscriber identity module memory management application. The user can choose for example how much space is to be allocated for ADN and SMS fields (ADN, Abbreviated Dialing Number; SMS, Short Message Service). The memory management program in the subscriber identity module can manage the memory independently in accordance with certain criteria by increasing or decreasing the file size as necessary. Dynamic allocation of memory areas can also preferably be implemented using an external management system. In practice, this may mean an OTA server (OTA, Over The Air) maintained by the operator and allowing the operator to alter the memory structure of the subscriber identity module. The management system may request the subscriber identity module to transmit information regarding the memory structure of the subscriber identity module and the applications contained in it. In this way, information about the memory structure is obtained when necessary, thus avoiding overloading the operator's database concerning subscriber identity modules.

The system of the invention comprises means for dynamic allocation of the memory of the subscriber identity module for the operator's and/or service provider's and/or subscriber's applications. Moreover, the system comprises means for dynamic allocation of

the memory of the subscriber identity module via the operating system of the subscriber identity module and/or an application in its memory space.

Furthermore, the system of the invention comprises means for the management of dynamic memory allocation using an external management system. In addition, the system comprises means for sending information regarding allocation of memory areas to the external management system.

10 The invention also concerns a subscriber identity module. It comprises a data processing device, a storage device connected to the data processing device and a data transfer device connected to the data processing device. In addition, the subscriber
15 identity module is provided with an interface for data transfer between the mobile station and the subscriber identity module.

The subscriber identity module comprises means for dynamic allocation of the memory of the subscriber identity module for operator and/or service
20 provider and/or subscriber applications.

In addition, the subscriber identity module comprises means for dynamic allocation of the memory of the subscriber identity module via the operating
25 system of the subscriber identity module and/or via an application in its memory space. Furthermore, the subscriber identity module comprises means for transmitting allocation information to the management system.

As compared with prior art, the present invention provides the advantage that it makes it unnecessary to maintain a database containing accurate information about the SIM card of each customer; instead, the subscriber identity module gives information about its memory structure to a server when necessary. A specific advantage provided by the invention
30 is dynamic management of the memory of the subscriber identity module. The card need not be taken to the op-
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erator's plant for treatment; instead, the memory is managed via remote maintenance by wireless means or via an application in the subscriber identity module or its operating system.

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LIST OF ILLUSTRATIONS

In the following, the invention will be described in detail by the aid of a few examples of its embodiments, wherein

10 Fig. 1 represents a preferred telecommunication system according to the invention,

Fig. 2 presents a preferred example of the memory structure of the subscriber identity module,

15 Fig. 3 presents a preferred example of memory management according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

The system presented in Fig. 1 comprises a mobile station 1 and a management system 2. Connected
20 to the mobile station 1 is a subscriber identity module SIM. The management system 2 comprises means 6 for the management of dynamic allocation of memory areas in the subscriber identity module SIM.

A preferred subscriber identity module SIM as
25 presented in Fig. 1 comprises a data processing device 7, a storage device 8 connected to the data processing device 7 and a data transfer device 9 connected to the data processing device 7. In addition, the subscriber identity module SIM is provided with an interface IF
30 for data transfer between the mobile station 1 and the subscriber identity module SIM.

For the signalling between the subscriber identity module and the mobile communication network, a standardized protocol is used. The communication be-
35 tween the mobile station and the management system, arrow 10, can be implemented using e.g. SMS messages

or USSD messages (USSD, Unstructured Service Data).

Means 3 - 9 are implemented in a manner known in itself and they will therefore not be described in detail.

5 Fig. 2 presents a preferred example of the memory structure of the subscriber identity module. In this example, the structure comprises an operating system 21 controlling the functions of the subscriber identity module. The function of a memory management
10 application 22, as suggested by its name, is to manage the allocation of memory areas for different applications and to transmit information regarding the memory structure to the operator or operating system upon request. The size of the ADN fields 23 and SMS fields 24
15 can be varied via the memory management application. According to the invention, several different parties may occupy memory areas in the subscriber identity module. In the present example, the parties include, in addition to the operator's memory area 25, a cus-
20 tomer's memory area 26 and a memory area 27 occupied by a third party.

 Fig. 3 presents an example of a flow diagram representing a preferred embodiment of memory management according to the invention. In block 31, a re-
25 quest for rearrangement of the memory is received. This request may be originated by either the user, the operator or the subscriber identity module. In block 32, a check is carried out to establish whether the required operation is feasible and allowed. In prac-
30 tice, this may mean checking whether the card has sufficient memory and whether the desired operation is allowed by the operator. If the operation is not allowed, then an error message 36 is issued. Following the error message, the request for rearrangement of
35 memory is aborted 35.

 If the operation is feasible and allowed, then the procedure goes on to block 33 and the memory

structure is modified as required. After the desired changes have been made, the server is notified of successful modification, block 34, and the modification procedure is ended, block 35.

- 5 The invention is not restricted to the examples of its embodiments described above, but many variations are possible within the scope of the inventive idea defined in the claims.

**CLAIMS**

1. Method for the management of the memory space of a subscriber identity module (SIM) in a telecommunication system comprising a management system (2), a mobile station (1) and a subscriber identity module (SIM) connected to the mobile station (1), in which method the memory space of the subscriber identity module (SIM) is divided into two or more sections and applications are stored in the subscriber identity module (SIM), characterized in that subscriber identity module (SIM) memory is allocated dynamically by assigning memory areas in the subscriber identity module (SIM) for operator, service provider and/or subscriber applications.
2. Method as defined in claim 1, characterized in that subscriber identity module (SIM) memory is allocated dynamically by the operating system of the subscriber identity module (SIM) and/or by an application in its memory space.
3. Method as defined in claim 1 or 2, characterized in that dynamic allocation of memory areas is managed by an external management system (2).
4. Method as defined in claims 1 - 3, characterized in that information regarding allocation of memory areas is transmitted to the management system (2).
5. System for the management of the memory space of the subscriber identity module (SIM) of a mobile station (1) in a telecommunication system comprising a management system (2), a mobile station (1) and a subscriber identity module (SIM) connected to the mobile station (1), in which system the memory space of the subscriber identity module (SIM) is divided into two or more sections and applications are stored in the subscriber identity module (SIM), characterized in that the system comprises



means (3) for dynamic allocation of the memory of the subscriber identity module (SIM) for operator, service provider and/or subscriber applications.

5 6. System as defined in claim 5, characterized in that the system comprises means (4) for dynamic allocation of the memory of the subscriber identity module (SIM) via the operating system of the subscriber identity module (SIM) and/or an application in its memory space.

10 7. System as defined in claims 5 and 6, characterized in that the system comprises means (5) for transmitting information regarding allocation of memory areas to the external management system (2).

15 8. System as defined in claims 5 - 7, characterized in that the system comprises means (6) for the management of dynamic allocation of memory areas by the external management system (2).

20 9. Subscriber identity module (SIM) comprising a data processing device (7), a storage device (8) connected to the data processing device (7) and a data transfer device (9) connected to the data processing device (7) and provided with an interface (IF) for the transfer of information between the mobile station (1) and the subscriber identity module (SIM), characterized in that the subscriber identity module (SIM) comprises

means (3) for dynamic allocation of memory in the subscriber identity module (SIM) for operator and/or service provider and/or subscriber applications.

30 10. Subscriber identity module (SIM) as defined in claim 9, characterized in that the subscriber identity module (SIM) comprises means (4) for dynamic allocation of memory in the subscriber identity module (SIM) via the operating system of the subscriber identity module (SIM) and/or an application

35 in its memory space.

11. Subscriber identity module (SIM) as de-



fined in claims 9 and 10, characterized in that the subscriber identity module (SIM) comprises means (5) for transmitting information regarding allocation of memory areas to the management system (2).