

Specification

Title of the Invention

Position Management Apparatus and Position Registration
System for Mobile Communication Terminal

Background of the Invention

The present invention relates to a position registration system for a mobile communication terminal such as a portable telephone and more particularly, to a position management apparatus and position registration system for a mobile communication terminal, which manage the position of the mobile communication terminal that moves across a plurality of networks and receives services provided by the respective networks.

As a mobile communication terminal such as a portable telephone, PHS (Personal Handy-phone System), or the like, a dual-mode terminal is available, which can switch modes in accordance with the types of networks to receive extensive communication services from a plurality of types of networks. For example, a PHS/GSM (Global System for Mobile communications) dual-mode terminal having both a PHS function and a GSM function can receive services based on the PHS scheme, and more specifically, communication services using a mobile network based on the PHS scheme (to be referred to as a PHS network hereinafter) and the PSTN (Public Switched Telephone Network) as a stationary network for

an HBU (Home Base Unit) or PBX (Private Branch eXchange (PBX)). This terminal can also receive communication services using a mobile network based on the GSM scheme (to be referred to as a GSM network hereinafter), which are services based on the GSM scheme.

The PHS/GSM dual-mode terminal can therefore perform communication through the GSM network even when the terminal is located in a place where communication cannot be performed by using the public switched telephone network using a home base unit or private branch exchange or communication cannot be performed by using a PHS network.

GSM is a mobile communication technique that complies with the ETSI (European Telecommunications Standards Institute). An HBU uses a PHS technique. A PBX connects extension telephones in a private area such as an office and connects a subscriber telephone line (office line) to an extension telephone.

Conventionally, in order to receive services unique to the respective networks, different personal numbers are assigned to this type of dual-mode terminal capable of mode switching in correspondence with the respective networks. In addition, different charges are made to the user in correspondence with the respective personal numbers, i.e., the respective network charges.

As described above, since different personal numbers are assigned to the conventional dual-mode

terminal capable of mode switching in correspondence with the respective networks, different operations are required in the respective modes to be used. This requires complicated procedures.

In addition, since charges are separately made with respect to the respective personal numbers, procedures for payment must be separately performed for the companies which manage the respective networks. This is cumbersome operation.

Summary of the Invention

It is an object of the present invention to provide a position management apparatus and position registration system for a mobile communication terminal, which allow a user to easily manage personal numbers and easily perform payment procedures.

In order to achieve the above object, according to the present invention, there is provided a position management apparatus for a mobile communication terminal, comprising a mobile terminal having a communication mode switching function for receiving communication services through a plurality of different types of networks, position management means for managing a position of the communication terminal on the basis of position information of the mobile terminal which is received from a plurality of switching units connected to the networks, each of the switching units detecting the position of the mobile terminal which is

receiving a communication service through a corresponding one of the networks, and communication mode management means for managing communication modes of the mobile terminal on the basis of the position information of the mobile terminal which is received from the switching units.

Brief Description of the Drawings

Fig. 1 is a block diagram showing a position registration system according to an embodiment of the present invention; and

Fig. 2 is a view showing changes in statuses (1) to (10) with movement of a mobile communication terminal (dual-mode terminal).

Description of the Preferred Embodiment

The present invention will be described in detail below with reference to the accompanying drawings.

Fig. 1 shows the schematic arrangement of a position registration system for a mobile communication terminal according to an embodiment of the present invention. Referring to Fig. 1, the position registration system is comprised of a service control computer 10 for comprehensively managing the position of a dual-mode terminal at an SCP (Service Control Point), a service switching unit 21 and gateway service switching unit 22 which execute an intelligent network service (IN service) by the service control computer 10 at an SSP (Service Switching Point), and general

switching units 31 to 34 serving as different networks managed by the service switching unit 21 and gateway service switching unit 22.

The service control computer includes a position management section 10a for managing the position of a dual-mode terminal 40, a communication mode management section 10b for managing the communication modes of the dual-mode terminal 40, and a management table 11 in which the position and communication modes of the dual-mode terminal 40 are stored (and updated).

In this embodiment, assume that the dual-mode terminal is a PHS/GSM dual-mode terminal having both the PHS function and the GSM function. As the switching units 31 to 34, Fig. 1 shows the home base unit 31 and private branch exchange 32 which are connected to the dual-mode terminal 40 through the public switched telephone network, the PHS server 33 which is connected to the dual-mode terminal 40 through a PHS network, and the GSM MSSC (GSM Mobile Service Switching Center) 34 which is connected to the dual-mode terminal 40 through a GSM network. The PHS server 33 and GSM mobile service switching center 34 respectively have HLRs (Home Location Registers) 33a and 34a for registering and managing the position information of a mobile communication terminal as a management target located within the communication zone of a mobile network.

Obviously, in addition to the switching units 31 to 34, other types of switching units can serve as target units corresponding to networks that provide services to be received by the dual-mode terminal 40 depending on the functions of the dual-mode terminal 40. Note that Fig. 1 shows only the characteristic arrangement of this embodiment, but illustrations of other general arrangements are omitted.

In the above arrangement, the service control computer 10 as a position management apparatus checks, as an IN service, through the service switching unit 21 and gateway service switching unit 22, whether the dual-mode terminal 40 is present in one of the communication zones (service areas) of the communication networks managed by the switching units 31 to 34. If the dual-mode terminal 40 is present in one of the service areas, the service control computer 10 registers the position of the dual-mode terminal 40 in the management table 11 and manages it.

Table 1 shows an example of the management table 11.

Table 1

Status	HLR	PVF	GVF	PHS	GSM	Home	PBX
(1) Power on at PHS area	LR at PHS	1	0	○	X	X	X
(2) From PHS to GSM area	LR at GSM	0	1	X	○	X	X
(3) Out of GSM Area	No LR	0	0	X	X	X	X
(4) Return to GSM area	LR at GSM	0	1	X	○	X	X
(5) Inter-move in GSM area	Update GSM LR	0	1	X	○	X	X
(6) From GSM to PHS area	LR at PHS	1	0	○	X	X	X
(7) Inter-move in PHS area	Update PHS LR	1	0	○	X	X	X
(8) Power off at PHS area	Auto LR NG	0	0	X	X	X	X
(9) Home	No LR	0	0	X	X	○	X
(10) PBX	No LR	0	0	X	X	X	○

Referring to Table 1, the management table 11 contains item "HLR" for mobile network identification which is used by the HLRs 33a and 34a in Fig. 1 to register and manage the latest position information of the dual-mode terminal 40, items "PVF" and "GVF" for the identification of the mode of the dual-mode terminal 40, and items "PHS", "GSM", "Home", and "PBX" indicating the position of the dual-mode terminal 40.

These items are updated in real time in accordance with a change in the status of the dual-mode terminal 40. In addition, the contents registered in the management table 11 can be stored as a management log to be used in charging operation, as needed.

LR (Location Registration) written in item

"HLR" indicates registration processing for position information by the HLRs 33a and 34a. Item "PVF" indicates the status of flag data indicating that the dual-mode terminal 40 is in the PHS mode. Item "GVF" indicates the status of flag data indicating that the dual-mode terminal 40 is in the GSM mode. Item "PHS" indicates that the dual-mode terminal 40 is present in the communication zone of the PHS network. Item "GSM" indicates that the dual-mode terminal 40 is present in the communication zone of the GSM network. Item "Home" indicates that the dual-mode terminal 40 is present in the communication zone of the home base unit. Item "PBX" indicates that the dual-mode terminal 40 is present in the communication zone of a private branch exchange.

The home base unit and private branch exchange are used with the function of the dual-mode terminal 40 when it operates in the PHS scheme, and are stationary networks. For this reason, when the dual-mode terminal 40 is present in one of these communication zones, no registration processing (LR) is performed in both the HLRs for the PHS network and GSM network, as shown in Fig. 2.

The service switching unit 21 is a switching unit corresponding to the IN service provided by the service control computer 10, and manages the home base unit 31 and private branch exchange 32 as switching

units in the public switched telephone network. More specifically, if the dual-mode terminal 40 is present in the communication zone of the home base unit 31 or private branch exchange 32, the service switching unit 21 receives the position information of the dual-mode terminal 40 from the home base unit 31 or private branch exchange 32, and sends the information to the service control computer 10.

The gateway service switching unit 22 is a switching unit having a gateway function and corresponding to the IN service provided by the service control computer 10, and manages the PHS server 33 and GSM mobile service switching center 34 which are switching units in mobile networks (PHS and GSM networks). That is, if the dual-mode terminal 40 is present in the communication zone of the PHS server 33 or GSM mobile service switching center 34, the gateway service switching unit 22 receives the position information of the dual-mode terminal 40 from the PHS server 33 or GSM mobile service switching center 34, and sends the information to the service control computer 10.

Each of the service switching unit 21 and gateway service switching unit 22 is characterized by having the function of transmitting the position information of the dual-mode terminal 40 to the service control computer 10 in accordance with the IN service provided by the service control computer 10. In other

respects, each of these switching units is the same as an upper switching unit or switching unit having a gateway function, which has been used to manage various types of switching units for providing services for each network, i.e., the public switched telephone network or mobile network, manage the position of the dual-mode terminal, and provide services.

As described above, the home base unit 31, private branch exchange 32, PHS server 33, and GSM mobile service switching center 34 are switching units for providing services to the dual-mode terminal 40 through the respective networks.

As described above, the dual-mode terminal 40 has both the PHS function and the GSM function and receives communication services in the respective networks in the communication zones of the respective switching units 31 to 34.

The registration processing performed by the position registration system, which has been described above with reference to Fig. 2, will be described next.

In the following description, the dual-mode terminal 40 is powered on within the communication zone of the PHS network, and the dual-mode terminal 40 then moves from the communication zone of the PHS network into the communication zone of the GSM network, moves out of the communication zone of the GSM network, returns from the outside of the communication zone of

the GSM network to the communication zone of the GSM network, moves inside the communication zone of the GSM network, returns from the GSM network to the communication zone of the PHS network, and moves inside the communication zone of the PHS network. Thereafter, the dual-mode terminal 40 is powered off inside the communication zone of the PHS network, moves into the communication zone of the home base unit 31, or moves into the communication zone of the private branch exchange 32.

Referring to Fig. 2, "PHS" or "GSM" indicates the operation mode of the dual-mode terminal 40. In addition, "Public", "Cordless", or "PBX" written with parentheses when the dual-mode terminal 40 is in the PHS mode indicates the state of the dual-mode terminal 40 when it is operating in the PHS mode. More specifically, "Public" indicates that the dual-mode terminal 40 is operating in the communication zone of the PHS network, "Cordless" indicates that the dual-mode terminal 40 is operating in the communication zone of the home base unit 31, and "PBX" indicates that the dual-mode terminal 40 is operating in the communication zone of the private branch exchange 32.

Statuses (1) to (10) shown in the management table 11 in Table 1 correspond to statuses (1) to (10) shown in Fig. 2.

First of all, the dual-mode terminal 40 is

powered on in the communication zone of the PHS network (status (1) in Fig. 2 and Table 1). Accordingly, the dual-mode terminal 40 is set in the PHS (Public) mode, and the HLR 33a of the PHS server 33 detects the dual-mode terminal 40 and performs position registration (LR). The gateway service switching unit 22 receives the position information of the dual-mode terminal 40 from the PHS server 33 and notifies the service control computer 10 of the received information. Upon reception of the position information registered by the PHS server 33, the service control computer 10 stores the information in the management table 11 (item "HLR" of status (1) in Table 1). The communication mode management section 10b sets the flag "PVF" to "1", which indicates that the dual-mode terminal 40 is in the PHS mode, on the basis of this information. In addition, the position management section 10a makes the description in the item indicating the position of the dual-mode terminal 40 represent information indicating that the dual-mode terminal 40 is present inside the communication zone of the PHS server 33.

The dual-mode terminal 40 then moves from the PHS communication zone into the GSM communication zone (status (2) in Fig. 2 and Table 1). Accordingly, the dual-mode terminal 40 is set in the GSM mode, and the HLR 34a of the GSM mobile service switching center 34 detects the dual-mode terminal 40 and performs position

registration (LR). The gateway service switching unit 22 receives the position information of the dual-mode terminal 40 from the GSM mobile service switching center 34 and notifies the service control computer 10 of the received information. Upon reception of the position information registered by the GSM mobile service switching center 34, the service control computer 10 stores the information in the management table 11 (item "HLR" of status (2) in Table 1). The communication mode management section 10b sets the flag "GVF" to "1", which indicates that the dual-mode terminal 40 is in the GSM mode, and sets the flag "PVF" to "0" on the basis of this position information. In addition, the position management section 10a makes the description in the item indicating the position of the dual-mode terminal 40 represent information indicating that the dual-mode terminal 40 is present in the communication zone of the GSM mobile service switching center 34.

The dual-mode terminal 40 moves out of the GSM communication zone (status (3) in Fig. 2 and Table 1). In this case, both the HLRs 33a and 34a of the PHS server 33 and GSM mobile service switching center 34 lose the dual-mode terminal 40. The gateway service switching unit 22 receives information indicating that the PHS server 33 and GSM mobile service switching center 34 lost the dual-mode terminal 40, and notifies the service control computer 10 of the received

information. The service control computer 10 receives the notification from the gateway service switching unit 22 and stores it in the position information in the management table 11 (item "HLR" of status (3) in Table 1). The communication mode management section 10b sets both flags "PVF" and "GVF" to "0" on the basis of this position information. The position management section 10a makes the description in the item indicating the position of the dual-mode terminal 40 represent information indicating that the dual-mode terminal 40 is not present in any communication zone, on the basis of information indicating that no notification indicating the position of the dual-mode terminal 40 is received from the service switching unit 21 as well.

The dual-mode terminal 40 returns from the outside of the GSM communication zone to the GSM communication zone (status (4) in Fig. 2 and Table 1). Accordingly, the HLR 34a of the GSM mobile service switching center 34 detects the dual-mode terminal 40 and performs position registration (LR). The dual-mode terminal 40 remains in the GSM mode, in which the dual-mode terminal 40 was set when it moved out of the GSM communication zone. The gateway service switching unit 22 receives the position information of the dual-mode terminal 40 from the GSM mobile service switching center 34 and notifies the service control computer 10 of the received information. Upon reception

of the position information registered by the GSM mobile service switching center 34, the service control computer 10 stores the received information in the management table 11 (item "HLR" of status (4) in Table 1). The communication mode management section 10b sets the flag "GVF" to "1", which indicates that the dual-mode terminal 40 is in the GSM mode. In addition, the position management section 10a makes the description in the item indicating the position of the dual-mode terminal 40 represent information indicating that the dual-mode terminal 40 is present in the communication zone of the GSM mobile service switching center 34.

The dual-mode terminal 40 moves inside the GSM communication zone (status (5) in Fig. 1 and Table 1). In this case, the HLR of the GSM mobile service switching center 34 updates the position information of the dual-mode terminal 40. The gateway service switching unit 22 sends the updated information to the service control computer 10. Although the service control computer 10 receives the updated information, the service control computer 10 does not update the management information because the status of the dual-mode terminal 40 does not change in terms of management.

The dual-mode terminal 40 moves from the GSM communication zone to the PHS communication zone (status

(6) in Fig. 2 and Table 1). Accordingly, the dual-mode terminal 40 is set in the PHS (Public) mode. The HLR 33a of the PHS server 33 detects the dual-mode terminal 40 and performs position registration (LR). The gateway service switching unit 22 receives the position information of the dual-mode terminal 40 from the PHS server 33 and notifies the service control computer 10 of the received information. The service control computer 10 receives the position information registered by the PHS server 33 and stores it in the management table 11 (item "HLR" of status (6) in Table 1). The communication mode management section 10b sets the flag "PVF" to "1", which indicates that the dual-mode terminal 40 is in the PHS mode, and sets the flag "GVF" to "0". In addition, the position management section 10a makes the description in the item indicating the position of the dual-mode terminal 40 represent information indicating that the dual-mode terminal 40 is present in the communication zone of the PHS server 33.

The dual-mode terminal 40 then moves inside the PHS communication zone (status (7) in Fig. 2 and Table 1). In this case, the HLR 33a of the PHS server 33 updates the position information of the dual-mode terminal 40. The gateway service switching unit 22 sends the updated information to the service control computer 10. Although the service control computer 10 receives the updated information, the service control

computer 10 does not update the management information because the status of the dual-mode terminal 40 does not change in terms of management.

In status (7), the dual-mode terminal 40 is powered off in the PHS communication zone (status (8) in Fig. 2 and Table 1). In this case, both the HLRs 33a and 34a of the PHS server 33 and GSM mobile service switching center 34 fail to perform position registration (LR) of the dual-mode terminal 40. The gateway service switching unit 22 receives information indicating that both the PHS server 33 and GSM mobile service switching center 34 failed to perform position registration of the dual-mode terminal 40, and notifies the service control computer 10 of the received information. Upon reception of the notification from the gateway service switching unit 22, the service control computer 10 stores the position information in the management table 11 (item "HLR" of status (8) in Table 1). The communication mode management section 10b sets both the flags "PVF" and "GVF" to "0". In addition, the position management section 10a makes the description in the item indicating the position of the dual-mode terminal 40 represent information indicating that the dual-mode terminal 40 is not present in any communication zone, on the basis of the information indicating that no notification indicating the position of the dual-mode terminal 40 is received from the

service switching unit 21.

In status (7), the dual-mode terminal 40 moves into the communication zone of the home base unit 31 without being powered off (status (9) in Fig. 2 and Table 1). In this case, the dual-mode terminal 40 is set in the PHS (Cordless) mode. Both the HLRs 33a and 34a of the PHS server 33 and GSM mobile service switching center 34 lose the dual-mode terminal 40. The gateway service switching unit 22 receives information indicating that the PHS server 33 and GSM mobile service switching center 34 lost the dual-mode terminal 40, and notifies the service control computer 10 of the received information.

The home base unit 31 detects the dual-mode terminal 40. The service switching unit 21 receives the position information of the dual-mode terminal 40 from the home base unit 31 and notifies the service control computer 10 of the received information. Upon reception of the notification from the gateway service switching unit 22, the service control computer 10 stores the position information in the management table 11 (item "HLR" of status (9) in Table 1). The communication mode management section 10b sets both the flags "PVF" and "GVF" to "0" on the basis of this position information. In addition, the position management section 10a receives the notification from the service switching unit 21 and makes the description in the item indicating

the position of the dual-mode terminal 40 represent information indicating that the dual-mode terminal 40 is present in the communication zone of the home base unit (HBU) 31.

The dual-mode terminal 40 moves inside the communication zone of the private branch exchange 32 without being powered off in status (7) (status (10) in Fig. 2 and Table 1). In this case, the dual-mode terminal 40 is set in the PHS (PBX) mode. Both the HLRs 33a and 34a of the PHS server 33 and GSM mobile service switching center 34 lose the dual-mode terminal 40. The gateway service switching unit 22 receives information indicating that the PHS server 33 and GSM mobile service switching center 34 lost the dual-mode terminal 40, and notifies the service control computer 10 of the received information.

The private branch exchange 32 detects the dual-mode terminal 40. The service switching unit 21 receives the position information of the dual-mode terminal 40 from the private branch exchange 32 and notifies the service control computer 10 of the received information. Upon reception of the notification from the gateway service switching unit 22, the service control computer 10 stores the position information in the management table 11 (item "HLR" of status (10) in Table 1). The communication mode management section 10b sets both the flags "PVF" and "GVF" to "0" on the basis

of this position information. Upon reception of the notification from the service switching unit 21, the position management section 10a makes the description in the item indicating the position of the dual-mode terminal 40 represent information indicating that the dual-mode terminal 40 is present in the communication zone of the private branch exchange 32.

In the above manner, the dual-mode terminal 40 having both the PHS function and the GSM function can seamlessly receive services based on the PHS scheme, i.e., services provided through the PHS network, the home base unit, and the private branch exchange, and services provided through the GSM network.

Even if the dual-mode terminal 40 moves across communication networks (public switched telephone network, PHS network, and GSM network), the position of the dual-mode terminal 40 is automatically detected by position registration (LR) by the HLRs 33a and 34a of the switching units in the respective mobile networks and position detection by the switching unit in the public switched telephone network. The position of the dual-mode terminal 40 is then comprehensively managed by the service control computer 10. The dual-mode terminal 40 therefore may use one personal number common to the respective networks.

In addition, the service control computer 10 can easily grasp the operation amount of the dual-mode

terminal 40 in each network by operating management information and hence can make charges altogether. The user of the dual-mode terminal 40 therefore may make payment for one charge common to the respective networks.

Although a preferred embodiment of the present invention has been described above, the present invention is not limited to the above embodiment. For example, in this embodiment, the dual-mode terminal has both the PHS function and the GSM function and receives services through the public switched telephone network, PHS network, and GSM network. Obviously, however, the present invention can be applied to a dual-mode terminal corresponding to other types of networks.

As has been described above, according to the present invention, even when a mobile communication terminal which can switch modes to receive communication services through a plurality of networks moves across the plurality of networks, the terminal can seamlessly receive services through the respective networks. For this reason, the terminal may use one personal number common to the respective networks, and can receive services through the respective networks by simple operation.

In addition, since the operation amount of the mobile communication terminal in each network can be easily grasped, charges can be made altogether. For this reason, the user of the mobile communication

terminal may make payment for one charge common to the respective networks. This makes it possible to reduce the complexity in payment procedures.



What is claimed is:

1. A position management apparatus for a mobile communication terminal, characterized by comprising:

a mobile terminal (40) having a communication mode switching function for receiving communication services through a plurality of different types of networks;

position management means (10a) for managing a position of said communication terminal on the basis of position information of said mobile terminal which is received from a plurality of switching units connected to the networks, each of said switching units detecting the position of said mobile terminal which is receiving a communication service through a corresponding one of the networks; and

communication mode management means (10b) for managing communication modes of said mobile terminal on the basis of the position information of said mobile terminal which is received from said switching units.

2. An apparatus according to claim 1, wherein said apparatus further comprises a management table (11) in which the position and communication modes of said mobile terminal are registered, and

said position management means and said communication mode management means update contents of



said management table in real time on the basis of the position information from said switching units.

3. An apparatus according to claim 1, wherein said position management means and said communication mode management means manage said mobile terminal by receiving, as the position information from said switching units, the position information of said mobile terminal which is based on a PHS (Personal Handy-phone System) scheme and received from a PHS server (33) in a mobile network based on the PHS scheme and a private branch exchange and home base unit having a PHS communication function which are connected to a public switched telephone network.

4. An apparatus according to claim 1, wherein said position management means and said communication mode management means manage said mobile terminal by receiving, as the position information from said switching units, the position information of said mobile terminal which is based on a GSM (Global Systems for Mobile communications) scheme and received from a GSM switching unit (34) in a mobile network based on the GSM scheme.

5. An apparatus according to claim 1, wherein said mobile terminal is a PHS/GSM dual-mode terminal



having both a PHS (Personal Handy-phone System) scheme function and a GSM (Global Systems for Mobile communications) function.

6. A position registration system characterized by comprising:

a mobile terminal (40) having a communication mode switching function for receiving communication services through a plurality of different types of networks;

a plurality of types of switching units (31 - 34) for performing switching processing between the connected networks and detecting a position of said mobile terminal; and

a position management apparatus for managing the position and communication modes of said mobile terminal on the basis of the position information of said mobile terminal which is received from said switching units.

7. A system according to claim 6, wherein said system further comprises a management table (11) in which the position and communication modes of said mobile terminal are registered, and

said position management apparatus updates contents of said management table on the basis of the position information from said switching units.



8. A system according to claim 6, wherein said switching units comprise a PHS server (33) in a mobile network based on a PHS (Personal Handy-phone System) scheme, a private branch exchange (32), a home base unit (31) having a PHS function, and a GSM switching unit in a mobile network based on a GSM (Global Systems for Mobile communications) scheme.

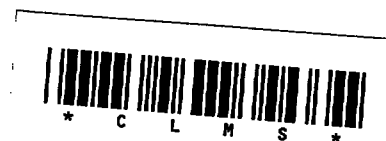
9. A system according to claim 8, wherein said system further comprises

a first upper switching unit (22) having a gateway function and serving to acquire position information of said mobile terminal which is detected by said PHS server and send the information to said position management apparatus, and

a second upper switching unit (21) for acquiring the position information of said mobile terminal which is detected by said private branch exchange and said home base unit, and

said position management apparatus manages said mobile terminal by receiving the position information of said mobile terminal which is based on the PHS scheme and received through said first and second upper switching units.

10. A system according to claim 8, wherein said



system further comprises an upper switching unit (22) having a gateway function and serving to acquire position information of said mobile terminal which is detected by said GSM switching unit and send the information to said position management apparatus, and said position management apparatus manages said mobile terminal by receiving the position information of said mobile terminal which is based on the GSM scheme and received through said upper switching unit.

11. A system according to claim 6, wherein said position management apparatus comprises:

position management means (10a) for managing the position of said mobile terminal on the basis of the position information of said mobile terminal which is from said switching units; and

communication mode management means (10b) for managing the communication modes of said mobile terminal on the basis of the position information of said mobile terminal which is sent from said switching units.

12. A system according to claim 6, wherein said mobile terminal is a public switched telephone network having both a PHS (Personal Handy-phone System) function and a GSM (Global Systems for Mobile communications) function.