METHOD AND SYSTEM FOR ENABLING PERSONALISED SHARED MOBILE PHONE USAGE

TECHNICEL FIELD

The present invention relates generally to wireless communications and services; and more specifically, to a method and system for enabling personalised shared mobile phone usage.

BACKGROUND ART

Simple low cost access to mobile phones has huge economic and social impacts; research from GSM Association has showed that an increase of just 10% of mobile penetration in a developing country will raise the economic growth rate by 1.2%. Industrial companies have been striving to develop low cost mobile handsets below $30 per unit, however the cost is still beyond much of the world's 6.3bn population. According to a recent Nokia Study more than 50% of respondents in India and Pakistan and nearly 30% of respondents in Vietnam said they share, or would share, their mobile phone with family or friends. More and more families in the emerging markets are also purchasing mobile phones for pooled or shared usage with a family unit, or amongst a group of friends. However the shortcomings in the use of shared phones are that the individual subscriber does not have his own individual number to enable him to receive calls, or voice messages; that he has to carry on paper his own contact database and that all his call records remain on the shared phone he has used.

The use of USSD in GSM mobile networks is defined in 3GPP/ETSI GSM 02.90 (USSD Stage 1) and GSM 03.90 (USSD Stage 2) specifications. USSD works on all existing GSM MAP2+ handsets which is almost all existing handsets, with no handset or SIM card upgrade necessary. The potential of the pre-installed user base for USSD applications is therefore immense. It is a session orientated service, unlike SMS which is store and forward, which allows very fast communication between a handset and an application. Users do not need to access any particular handset menu to access services with USSD, they enter a defined USSD string from the handset, such as *#101#, to access a particular operator predefined service. USSD codes are routed back

to the home mobile's network HLR and then onto the MSC and ultimately to the USSD gateway. The gateway will respond to the code in a predefined way.

The use of USSD to access information services, or to enable roaming on a prepaid account, or to manage prepaid accounts by doing a balance enquiry or credit recharge from a voucher is well detailed in industry related literature and know-how. For example, U.S. Patent Application No. 11/225,636 by Zabawskyj, et al. Entitled Method and system for international roaming and call bridging and U.S. Patent 6975852 by Sofer, et al. Entitled System and method for roaming for prepaid mobile telephone service. However the use of USSD to enable personalised shared mobile phone usage is innovative.

The following USPTO patent documents reflect such prior background art:

Application number: 12/033,012, Unstructured Supplementary Service Data Call Control Manager, Dorron Mottes, Assignee: Vascode Technologies Ltd., Filing date: Feb 18, 2008

Application number: 11/531,865, Circuit Bearer Control, Simon Brueckheimer et al, Filing date: Sep 14, 2006

Application number: 11/395,236, Method and system for international roaming and call bridging, Zabawskyj, et al., Filing date: Apr 3, 2006

Application number: 11/211,750, Shared phone, medium having recorded therein program for ..., Katsuaki Akama, Filing date: Aug 25, 2005

Application number: 11/205,976, Method and device for providing mobile services with virtual, Tae-Hyo Ahn, Hoon-Bae Kim, Ki-Chul Park, Assignees: KTFREETEL Co., Ltd., Filing date: Aug 17, 2005

Application number: 10/918,644, Multiple IMSI multiple/single MSISDN (MIMM/MISM) on multiple SIMs, Yue Jun Jiang, Filing date: Aug 13, 2004

Application number: 10/438,097, Method and system allowing for one mobile phone number (MSISDN) to be ..., Bohdan Konstantyn Zabawskyj et al, Filing date: May 15, 2003

Patent 7330725, Method and system for international roaming and call bridging, Bohdan K. Zabawskyj et al, Assignee: Redknee Inc., Issue date: Feb 12, 2008

7295659, Method and system for prepaid communications credit, John Ruckart et al, Assignees: AT&T BLS Intellectual Property, Inc., Issued date: Nov 13, 2007

7181210, Method and system for international roaming and call bridging, Bohdan Konstanjyn Zabawskyj et al, Assignee: Redknee Inc., Issue date: Feb 20, 2007

7164927, Telecommunication method and suitable system for establishing a..., Michael Koch et al, Assignee: Swisscom Mobile AG, Issue date: Jan 16, 2007

6975852, System and method for roaming for prepaid mobile telephone service, Sofer, et al., Assignee: StarHome GmbH, Issued date: Dec 13, 2005

6961412, Method and system for prepaid communications credit, John Ruckart, Rimas Rauba, Jerome Wendell Myers, Assignee: BellSouth Intellectual Property Corporation, Issued date: Nov 1, 2005

6876860, Method for implementing a call-back service in a mobile radio network, Andreas Berg, Klaus Moneke, Bart Van Ballaer, Assignee: Siemens Aktiengesellschaft, Issued date: Apr 5, 2005

6792261, Mobile collect call system and method, Lipa Ogman et al, Issue date: Sep 14, 2004

6757266, Communication system method for setting up connections between terminals of ..., Frank Hundscheidt, Assignee: Telfonaktiebolaget LM Ericsson (publ), Issue date: Jun 29, 2004

DISCLOSURE OF INVENTION

In one aspect of the present invention, there is provided a method of enabling personalised shared mobile phone usage using Unstructured Supplementary Service Data (USSD) messages, comprising the steps of: owner of handset enables the service by entering a USSD message string; the HLR routes the request to the USSD gateway, which in turn routes the request to the system server; system server interacts with MSC and temporarily disables access to normal phone services from that handset and billing of those services to his account; owner shares the handset with the subscriber; subscriber

requests access to his account using a USSD message string from the handset which includes his personal phone number; the system sends to the handset a request for access password; subscriber enters password; system authenticates user and sends USSD personalised menu to the handset; system interacts with the MSC to ensure that the shared phone and SIM are enabled to allow phone services and that all charges will be debited against the subscribers own prepaid or post-paid account during the session; system enables the subscriber to make mobile telecommunication phone calls from the shared handset by allowing the subscriber to enter the number to be dialled using USSD menu; once subscriber requests a call the system connects the number to be dialled by interacting with MSC; system decrements prepaid account balance in real time depending on network call rates until session is closes by subscriber, or prepaid account credit is expired.

In a second aspect of the present invention, there is provided a shared mobile phone server comprising: a network interface for communication with at least one switching; a controller to enable calls to be made using USSD from the handset as defined in the first aspect.

In another aspect of the present invention, there is provided a computer readable-medium for storing a plurality of programming instructions for a shared mobile phone call server, said programming instructions for rendering a network interface in said server operable for communication with at least one switching centre.

The method and system for personalised shared mobile phone usage disclosed herein is an innovative network application, enabling subscribers who cannot afford a mobile phone handset to share a mobile handset and allow them make phone calls using their own prepaid account, allow them access to a personalised address book of contacts and voicemail messages without the need for their own handset or SIM card.

The subscriber approaches the owner of a handset and negotiates to borrow or share the handset. Upon agreement the owner of the handset would first key in a USSD string to activate the shared

mode and temporarily disable his account on the network. Typically the USSD string would be promoted by the network operator and would common across the network. Once the USSD string is received by the system server, the server would interact with the MSC to disable the billing of services to the handset owner's account. This would require the network operator to have within his network a real time billing and service provisioning system. The handset would effectively be in a dormant mode and would be waiting for the user to enter the USSD string to access the shared phone service. The owner of the handset would then pass the phone to the subscriber.

The subscriber would enter the access USSD string for the shared phone application, followed by his personal phone number. The USSD gateway would receive this request and pass it onto the system server. The system server would authenticate the user and would enquire with the MSC and the prepaid billing system the status of the user's account. Once authenticated, the subscriber can see on the handset a personalised USSD menu. The contents of the USSD menu would be generated by the system server and would be sent using the network USSD browser and USSD gateway infrastructure. The menu could be sent in any international language as long as it uses the standard international character set.

Some of the options available to the subscriber would include information on the account status and prepaid account balance; the ability to top up the account with a prepaid top-up card voucher code; access to a personalised address book of contacts; access to personal voicemail messages and account setting such as choice of language. The later is very important since most standard handsets only support a few major languages and typically require additional downloads of language packs to localise the handset. In this invention the user would always have access to his local language whatever the setting on the borrowed or shared handset.

The subscriber would be able to make calls to a number he enters directly into the phone or to his contacts. The number would be passed to the MSC and the call set up as in a standard network call, expect that the said subscriber's virtual prepaid account would be decremented in real-time. The original owner of the handset would not be charged for the call. Another benefit of the invention is that the subscriber could, if he wishes, show his CLI during the call instead of the call showing the CLI of the borrowed or shared handset. Thus it would appear to the subscriber receiving the phone call that the subscriber has his own personal telephone number and account.

Since the subscriber will have CLI, he also use services such as Missed Call Alert (MCA) already on the network to send free or low cost messages to people. For example it is quite common for subscribers in developing markets to telephone a number, let the number ring a small number of times, and then drop the call to have the network issue a free of charge or low cost MCA message to the number called. This simple MCA alert may be a simple prearranged messaged to indicate for example "I arrive home safely", or "everything is fine". Without a CLI such techniques are unusable.

Once the subscriber has completed his calls, he exits the system by choosing the appropriate option on the USSD menu. Another benefit of using USSD for this invention is that no historical data or record of the session would be stored on the handset. Once the USSD session is closed, the phone stores no memory of the session ensuring privacy of passwords, and phone usage.

The alternative method shown in embodiments of this invention is suitable for network operators that do not have installed in their network the necessary real time billing and provisions systems that can disable the account of the owner of the handset. The alternative method is to utilise a USSD phone back service where the subscriber would enter the number to be called into the USSD menu. Thus number would be passed to the system server via the USSD gateway and the server would set up two phone calls, one to the original handset and one to the phone number entered by the subscriber. The system would then bridge these two calls similar to a conference call. Neither of the two calls would be charged to the owner of the handset's account and both calls would be charge to the subscriber's prepaid account.

Key features of the embodiments of the invention is the very low cost of entry to the subscriber and the mobile operator, the ability for a subscriber to access the system from any GSM MAP2+ handsets without the need for any modification or downloading of applications to the handset, the ability to support multiple languages, the ability for the subscriber to access a personalised environment on a shared phone, the option for the subscriber to access a personalised voicemail service, the ability for the user to receive calls on his number, the ability for the system to work even when roaming, the option for the caller to be able to show their own CLI and not that of the borrowed or shared handset, the fact that by having a personal CLI the subscriber can use services such as Missed Call Alert (MCA) to send free or low cost information alerts to other people and the fact that once the access session to the system is closed no history or any data remains on the handset.

Although the method and system disclosed, by and large employs a series of general purpose network equipment, databases, and systems such as billing systems to achieve its ends, the bona fide distinctiveness of the invention resides in the setup and management of the remote environment the user experiences which is established by the system server and it is this server which principally incorporates much of the functional and operative aspects of the invention.

Aside from USSD, a variety of other mechanisms may be utilised by a subscriber to access the system. These messaging mechanisms may include, but are by no means bounded by, Short Message Service (SMS), Internet browser using WAP, Internet Browser using HTTP, or a voice-based call using Dual-Tone-Multi-Frequency (DTMF) Interactive Voices Response based technologies. Alternatively the system could be initiated from a SIM-toolkit application resident on the SIM card of the handset.

The system messages may be routed directly via existing telephony protocols or may be routed indirectly via a messaging gateway. The information provided via the messaging mechanism will typically include the identity of the originating subscriber and the service to be activated.

BRIEF DESCRIPTION OF DRAWINGS

The foregoing summary of the invention, as well as the following detailed description of the preferred embodiment, is better understood when read in conjunction with the accompanying drawings, which are included by way of example, and not by way of limitation with regard to the claimed invention:

Fig 1. Is an exemplary architecture of a wireless telecommunications network for processing calls and a system server in accordance with the present invention; and

Fig 2. Is a flowchart depicting the operation of the shared access feature according to one embodiment of the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

In Fig 1. User A 1 owns Mobile Device 2 and inside the mobile device is a personal SIM (Subscriber Identity Module) Card supplied by the network operator. The SIM card uniquely identifies the subscriber using an IMSI (International Mobile Subscriber Identity) and their mobile phone number the MSISDN (Mobile subscribers integrated services digital network) and allows the Mobile Device 2 to be registered and authenticated on the network. The Mobile Device 2 itself is identified by an IMEI (International Mobile Equipment Identity), which can be obtained by the network upon request. Telephony calls, and other services used by the device, are billed to the account holder of the SIM Card.

The Home Location Register (HLR) 5 is a database which stores data about the subscribers, including the Authentication Key (Ki) for each SIM. The Mobile Services Switching Center (MSC) 6 is the network element which performs the telephony switching functions of the network. The MSC is responsible for network interfacing and common channel signalling. The Visitor Location Register (VLR) 7 is a database which stores temporary information about roaming subscribers. Base Station Controller (BSC) 4 is the network element which provides all the control functions and physical links between the MSC and the radio interface. The BSC provides functions such as handover, cell configuration data, and control of radio frequency power levels.

The subscriber User B in Fig 2. may access his account and invoke the system by keying in an Unstructured Supplementary Service Data (USSD) short code followed by his account number on a borrowed or shared handset 2 from User A. The owner of the borrowed or shared handset would first key in a USSD string to activate the shared mode and temporarily disable his account on the network. He would then pass the handset to the subscriber to allow them to enter a USSD string comprising the access code for the service and their personal phone number.

Once authenticated by the system server 10, the subscriber can see on the handset a personalised USSD menu sent from the system server 10 over the telecommunications network to the handset, which allows him access to a personalised address book of contacts, his voicemail messages and administration of his personal prepaid account balance. The subscriber can make calls by entering a number directly, or to his contacts and the said subscriber's prepaid account is

decremented in real-time. Once the subscriber has completed his calls, he exits the system by choosing the appropriate option on the USSD menu.

While the foregoing describes what are considered to be the preferred embodiments of the invention, it is understood that various modifications may be made therein and that the invention may be implemented in various forms and alternate embodiments, and indeed that it may be applied in numerous applications, only some of which have been described. The claims are intended to cover all such modifications and variations which fall within the true scope of the invention.

INDUSTRIAL APPLICABILITY

In the preferred embodiment of the invention, mobile operators may implement the system to enable then to service subscribers who cannot afford to purchase a handset or SIM card, at a lower cost that has been possible before. The system does not require the operator to subsidise the sale of handsets or SIM cards to enable people on low incomes to have a personal phone number and access to services such as missed call alerts, and voicemail boxes which would have otherwise been unavailable. The mobile operators benefit economically since equipped with a mobile phone number, these users will make more outgoing calls, increasing the amount of airtime they spend and increasingly will be able to use mobile remittances. The implementation of the system will also have three primary social benefits: 1) Enabling people on low incomes to communicate more easily; reducing the costs of travelling and money spent on messengers by giving them a phone number; 2) Reducing the costs spent by friends and family trying to contact them or trying to sending remittances using mobile banking and 3) Creating employment and new revenue streams for Village Payphone Operators.

In alternative embodiments the system may be used, for example, by mobile operators to service people who already have a handset, and a mobile phone number, but require virtual access to their account and use of their phone number or where a user has multiple phone numbers and wishes to use them from one specific handset.

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CLAIMS

The invention claimed is:

1. A method of enabling personalised shared mobile phone usage using Unstructured Supplementary Service Data (USSD) messages, comprising the steps of: owner of handset enables the service by entering a USSD message string; the HLR routes the request to the USSD gateway, which in turn routes the request to the system server; system server interacts with MSC and temporarily disables access to normal phone services from that handset and billing of those services to his account; owner shares the handset with the subscriber; subscriber requests access to his account using a USSD message string from the handset which includes his personal phone number; the system sends to the handset a request for access password; subscriber enters password; system authenticates user and sends USSD personalised menu to the handset; system interacts with the MSC to ensure that the shared phone and SIM are enabled to allow phone services and that all charges will be debited against the subscribers own prepaid or post-paid account during the session; system enables the subscriber to make mobile telecommunication phone calls from the shared handset by allowing the subscriber to enter the number to be dialled using USSD menu; once subscriber requests a call the system connects the number to be dialled by interacting with MSC; system decrements prepaid account balance in real time depending on network call rates until session is closes by subscriber, or prepaid account credit is expired.

2. The method of claim 1 wherein the system does not need to interact with the MSC to ensure the original prepaid or post paid account are not debited; the subscriber enters the phone number to be called into the USSD menu; the request is sent to the system; the system makes the requested call and telephones back the subscriber and bridges the two calls; the system decrements the prepaid account balance in real time depending on network call rates.

3. The method of claim 1 or 2 where the subscriber can access a personalised address book of mobile phone contacts using the system and make a call to a contact is his address book and decrement his prepaid account balance depending on network call rates.

4. The method of claim 1 or 2 where the subscriber can make a call to access his voicemail messages and decrement his prepaid account balance depending on network call rates.

5. The method of claim 1 or 2 wherein said network is based on Stream Control Transmission Protocol (SCTP).

6. The method of claim 1 or 2 wherein said request is received via Short Message Service (SMS).

7. The method of claim 1 or 2 wherein said request is received via Dual-Tone-Multi-Frequency (DTMF).

8. The method of claim 1 or 2 wherein said request is received via an Internet Browser using WAP.

9. The method of claim 1 or 2 wherein said request is received via an Internet Browser using HTTP.

10. The method of claim 1 or 2 wherein said request is made from a SIM-toolkit application.

11. A shared mobile phone server comprising: a network interface for communication with at least one switching; a controller to enable calls to be made using USSD from the handset as per claim 1 or 2.

12. The server of claim 11 wherein the server stores a personalised address book of contacts.

13. The server of claim 11 wherein the server can access the personal voice mail service.

14. The server of claim 11 wherein said network is based on Stream Control Transmission Protocol (SCTP) and / or SIGTRAN.

15. The server of claim 11 wherein said request is received via Short Message Service (SMS).

16. The server of claim 11 wherein said request is received via Dual-Tone-Multi-Frequency (DTMF).

17. The server of claim 11 wherein said request is received via an Internet Browser using WAP.

18. The server of claim 11 wherein said request is received via an Internet Browser using HTTP.

19. The method of claim 11 wherein said request is made from a SIM-toolkit application.

20. A computer readable-medium for storing a plurality of programming instructions for a shared mobile phone call server, said programming instructions for rendering a network interface in said server operable for communication with at least one switching centre.

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