base is updated using the data. In one example, different Subscriber Identity Module (SIM) cards with different International Mobile Subscriber Identities (IMSI) can be tied to the same user account for roaming.

WO2005081962 describes a method for keeping costs down for voice communication when roaming, by establishing a corresponding Voice over IP (VoIP) call when requesting a voice call from a mobile unit over a cellular network.

WO2008103446 describes a method in which the IMSI of a SIM is associated with a local telephone number (MSISDN) when roaming, in order to enjoy local tariffs.

WO2001076188 describes a method in which a care of address is used with a mobile device when performing IP-based communication.

The international patent application PCT/SE2011/050886, which has not been published on the filing date of the present application, describes a method according to which a local IMSI is automatically distributed to a SIM card in a mobile device roaming into a visited country.

A further problem is the provision to users of access to inexpensive data roaming in a predictable and uncomplicated way, especially in terms of user experience.

Thus, the invention relates to a method for use when a mobile communication device roams between a mobile communication home network in a home country and one or several mobile communication networks in one or several visited countries, which mobile communication device comprises a Subscriber Identity Module (SIM) card, wherein a digital data intercon-

nection can be established between at least one collaborating network in a respective visited country and the home network so that Internet access can be provided to the mobile device by the home network via said interconnection when the mobile device is connected to the said collaborating network, which method is characterized in that the method comprises the steps of:

a) ~~a)~~ the mobile device roaming in the coverage area of a first collaborating network in a first visited country;

b) ~~b)~~ upon a detection of this roaming of the mobile device, a system instructing the home network ~~allowing~~to allow Internet access, for the mobile device, to a predetermined Internet address, to which predetermined Internet address the system is connected, but not general Internet access ~~to the mobile device; c)~~ ;

c) the mobile device contacting the predetermined Internet address and the user providing login credentials via the predetermined Internet address~~; d)~~ to the system;

d) upon the said provision of login credentials, the system associating an IMSI (International Mobile Subscriber Identity) and/or an MSISDN (Mobile Subscriber Integrated Services Digital Network-Number) of the SIM card with a user account identified by the login credentials; ~~e) allowing~~

e) the system instructing the home network to allow Internet access to the mobile device in accordance with an agreement tied to the user account.

The invention also relates to a system for providing Internet access to a mobile communication device when the mobile device roams between a mobile communication home network in a

home country and one or several mobile communication networks in one or several visited countries, which mobile communication device comprises a Subscriber Identity Module (SIM) card, wherein a digital data interconnection can be established between at least one collaborating network in a respective visited country and the home network so that Internet access can be provided to the mobile device by the home network via said interconnection when the mobile device is connected to the said collaborating network, and wherein the

said system is connected for communication with the home network, which system is characterized in that the system is arranged to receive information from the home network that the mobile device roams in a collaborating network, and upon the reception of such information instruct the home network to allow Internet access for the mobile device only to a predetermined Internet address but not general Internet access, in that the system comprises an Internet server which is accessible through said Internet access and arranged to be contacted by the mobile device and to accept a login credential from a user of the mobile device via the mobile device, and in that the system is arranged to, upon reception of a valid login credential from the mobile device, store an association between an IMSI (International Mobile Subscriber Identity) and/or an MSISDN (Mobile Subscriber Integrated Services Digital Network-Number) of the SIM card with a user account identified by the login credentials and to instruct the home network to allow Internet access to the mobile device in accordance with an agreement tied to the user account.

In the following, the invention will be described in detail, with reference to the appended drawings, where:

Figure 1 is a simplified overview diagram of a system according to the present invention for use in a method according to the present invention;

Figure 2 is a flow chart of a method according to the present invention;

Figure 3 is a simplified overview diagram of a HLR, and MSISDN database and an IMSI database according to the invention; and

Figure 4 is a simplified overview diagram of a mobile device having a SIM card according to the present invention.

All figures share reference numerals and annotations.

C L A I M S

1. Method for use when a mobile communication device (40) roams between a mobile communication home network (10) in a home country (3) and one or several mobile communication networks (20,25,30,35) in one or several visited countries (4,5), which mobile communication device (40) comprises a Subscriber Identity Module (SIM) card (41), wherein a digital data interconnection can be established between at least one collaborating network (20) in a respective visited country (4) and the home network (10) so that Internet access can be provided to the mobile device (40) by the home network (10) via said interconnection when the mobile device (40) is connected to the said collaborating network (20), **c h a r a c t e r i z e d i n** that the method comprises the steps of

a) the mobile device (40) roaming in the coverage area of a first collaborating network (20) in a first visited country (4);

b) upon a detection of this roaming of the mobile device (40), a system (50) instructing the home network (10) to allow Internet access, for the mobile device (40), to a predetermined Internet address, to which predetermined Internet address the system (50) is connected, but not general Internet access ;

c) the mobile device (40) contacting the predetermined Internet address and the user providing login credentials via the predetermined Internet address to the system (50);

d) upon the said provision of login credentials, the system (50) associating an IMSI (International Mobile Subscriber Identity) and/or an MSISDN (Mobile Subscriber Integrated Services Digital Network-Number) of the SIM card with a user account identified by the login credentials;

e) the system (50) instructing the home network (10) to allow Internet access to the mobile device (40) in accordance with an agreement tied to the user account.

2. Method according to claim 1, **characterized in** that, in steps b) and e), the Internet access is provided by the first collaborating network (20) via an SGSN (Support GPRS Support Node) (23) of the first collaborating network (20), a GRX (GPRX Roaming Exchange) (2) or an Internet tunnel, and a GGSN (Gateway GPRS Support Node) (13) of the home network (10).

3. Method according to claim 2, **characterized in** that the system (50) is external to the home network (10), in that the system (50) is connected to the GGSN (13) of the home network (10), and in that it is the system (50) which, in steps b) and e), instructs the GGSN (13) of the home network (10) to allow Internet access to the mobile device (40).

4. Method according to claim 3, **characterized in** that, in an initial step, the SIM card (41) is provided with an IMSI associated with the home network (10), in that the home network (10) receives a signaling message in step b), in that the home network (10) then decides to, based upon the IMSI contained in the signaling message, forward the signaling message to the system (50), which then instructs the GGSN (13) of the home network (10) to allow Internet access to the predetermined Internet address.

5. Method according to any one of the preceding claims, **characterized in** that, in step d), the IMSI and/or MSISDN of the SIM card (41) is identified based upon the calling IP (Internet Protocol) address of the contacting in step c), and by querying the first collaborating network (20) what IMSI and/or MSISDN is associated with the calling IP address.

6. Method according to any one of the preceding claims, **characterized in** that, in step b), the home network (10) first checks if the IMSI and/or the MSISDN of the SIM card (41) is or are already associated with a user account, and that the said Internet connection to a predetermined Internet address but not general Internet access is only allowed in case no such association exists, or if the user account does not allow the user Internet access.

7. Method according to any one of the preceding claims, **characterized in** that, in step b), the home network (10) first sends an instruction message over the air to the mobile device (40) to change the IMSI and/or MSISDN of the SIM card (41) to the IMSI and/or MSISDN to which the user account will be associated in step d).

8. Method according to claim 7, **characterized in** that the predetermined IMSI and/or MSISDN are taken from a predetermined plurality of IMSI codes and/or MSISDN numbers, which plurality comprises less IMSI codes and/or MSISDN numbers than the total number of SIM cards available for using the method.

9. Method according to any one of the preceding claims, **characterized in** that the PIN code protection of the SIM card (41) is initially disabled or not enabled.

10. Method according to any one of the preceding claims, **characterized in** that, in step d), it is an MSISDN of the SIM card (41) which is associated with the predetermined user account.

11. Method according to claim 10, **characterized in** that the MSISDN initially stored on the SIM card (41) is blank or does not allow data traffic when roaming.

12. Method according to claim 10 or 11, **characterized in** that the MSISDN is not changed when the mobile device (40) later roams to a second collaborating network (30), but that the method is then resumed from step e) with the second collaborating network (30) instead of the first collaborating network (20).

13. Method according to any one of the preceding claims, **characterized in** that, in an initial step, the SIM card (41) is provided with a home IMSI associated with the home network (10), and in that step a) comprises the substeps of

a1) initiating a location update procedure after or in connection to the mobile device (40) moving from the coverage area of the home network (10) to the coverage area of a first visited network (25) in the first visited country (4);

a2) triggered by the location update message, sending an instruction message over the air to the mobile device (40) to change, to a first visited country IMSI which is associated with the first collaborating network (20), the IMSI used for network identification of the SIM card (41); and

a3) causing the mobile device (40) to store the first visited country IMSI on the SIM card (41) and to use it for network identification of the SIM card (41).

14. Method according to claim 13, **characterized in** that, upon roaming from the coverage area of the first collaborating network (20) to the coverage area of a second visited network (35) in a second visited country (5) after step e) has been performed, the method comprises the additional steps

f) causing the mobile device (40) to change the IMSI used for network identification of the SIM card (41) back to the home IMSI and then to perform a device network refresh;

g) triggered by a location update message resulting from the change of IMSI used for network identification and received by the home network (10), sending an instruction message over the air to the mobile device (40) to change, to a second visited country IMSI which is associated with a second collaborating mobile communication network (30) in the second visited country (5), the IMSI used for network identification of the SIM card (41); and

h) resuming the method from step b), but with the second visited country (5) and the second collaborating network (30) instead of the first visited country (4) and the first collaborating network (20), respectively.

15. Method according to any one of claims 1-12, **characterized in** that, in step a), the SIM card (41) is configured to be able to connect to the first collaborating network (20) only if the first collaborating network (20) belongs to a set of predetermined collaborating networks for the first visited country (4).

16. System (50) for providing Internet access to a mobile communication device (40) when the mobile device (40) roams between a mobile communication home network (10) in a home country (3) and one or several mobile communication networks (20,25,30,35) in one or several visited countries (4,5), which mobile communication device comprises a Subscriber Identity Module (SIM) card (41), wherein a digital data interconnection can be established between at least one collaborating network (20) in a respective visited country (4) and the home network (10) so that Internet access can be provided to the mobile device (40) by the home network (10) via said interconnection when the mobile device (40) is connected to the said collaborating network (20), and wherein the said system (50) is connected for communication with the home network (10),

characterized in that the system is arranged to receive information from the home network (10) that the mobile device roams in a collaborating network (20), and upon the reception of such information instruct the home network (10) to allow Internet access for the mobile device (40) only to a predetermined Internet address but not general Internet access, in that the system (50) comprises an Internet server (55) which is accessible through said Internet access and arranged to be contacted by the mobile device (40) and to accept a login credential from a user of the mobile device (40) via the mobile device (40), and in that the system (50) is arranged to, upon reception of a valid login credential from the mobile device, store an association between an IMSI (International Mobile Subscriber Identity) and/or an MSISDN (Mobile Subscriber Integrated Services Digital Network-Number) of the SIM card (41) with a user account identified by the login credentials and to instruct the home network (10) to allow Internet access to the mobile device (40) in accordance with an agreement tied to the user account.

C L A I M S

1. Method for use when a mobile communication device roams between a mobile communication home network in a home country and one or several mobile communication networks in one or several visited countries, which mobile communication device comprises a Subscriber Identity Module (SIM) card, wherein a digital data interconnection can be established between at least one collaborating network in a respective visited country and the home network so that Internet access can be provided to the mobile device by the home network via said interconnection when the mobile device is connected to the said collaborating network, **c h a r a c t e r i z e d i n** that the method comprises the steps of

a) the mobile device roaming in the coverage area of a first collaborating network in a first visited country;

b) upon a detection of this roaming of the mobile device, a system instructing the home network to allow Internet access, for the mobile device, to a predetermined Internet address, to which predetermined Internet address the system is connected, but not general Internet access ;

c) the mobile device contacting the predetermined Internet address and the user providing login credentials via the predetermined Internet address to the system;

d) upon the said provision of login credentials, the system associating an IMSI (International Mobile Subscriber Identity) and/or an MSISDN (Mobile Subscriber Integrated Services Digital Network-Number) of the SIM card with a user account identified by the login credentials;

e) the system instructing the home network to allow Internet access to the mobile device in accordance with an agreement tied to the user account.

2. Method according to claim 1, **characterized in** that, in steps b) and e), the Internet access is provided by the first collaborating network via an SGSN (Support GPRS Support Node) of the first collaborating network, a GRX (GPRX Roaming Exchange) or an Internet tunnel, and a GGSN (Gateway GPRS Support Node) of the home network.

3. Method according to claim 2, **characterized in** that the system is external to the home network, in that the system is connected to the GGSN of the home network, and in that it is the system which, in steps b) and e), instructs the GGSN of the home network to allow Internet access to the mobile device.

4. Method according to claim 3, **characterized in** that, in an initial step, the SIM card is provided with an IMSI associated with the home network, in that the home network receives a signaling message in step b), in that the home network then decides to, based upon the IMSI contained in the signaling message, forward the signaling message to the system, which then instructs the GGSN of the home network to allow Internet access to the predetermined Internet address.

5. Method according to any one of the preceding claims, **characterized in** that, in step d), the IMSI and/or MSISDN of the SIM card is identified based upon the calling IP (Internet Protocol) address of the contacting in step c), and by querying the first collaborating network what IMSI and/or MSISDN is associated with the calling IP address.

6. Method according to any one of the preceding claims, **characterized in** that, in step b), the home network first checks if the IMSI and/or the MSISDN of the SIM card is or are already associated with a user account, and

that the said Internet connection to a predetermined Internet address but not general Internet access is only allowed in case no such association exists, or if the user account does not allow the user Internet access.

7. Method according to any one of the preceding claims, **characterized in** that, in step b), the home network first sends an instruction message over the air to the mobile device to change the IMSI and/or MSISDN of the SIM card to the IMSI and/or MSISDN to which the user account will be associated in step d).

8. Method according to claim 7, **characterized in** that the predetermined IMSI and/or MSISDN are taken from a predetermined plurality of IMSI codes and/or MSISDN numbers, which plurality comprises less IMSI codes and/or MSISDN numbers than the total number of SIM cards available for using the method.

9. Method according to any one of the preceding claims, **characterized in** that the PIN code protection of the SIM card is initially disabled or not enabled.

10. Method according to any one of the preceding claims, **characterized in** that, in step d), it is an MSISDN of the SIM card which is associated with the predetermined user account.

11. Method according to claim 10, **characterized in** that the MSISDN initially stored on the SIM card (41) is blank or does not allow data traffic when roaming.

12. Method according to claim 10 or 11, **characterized in** that the MSISDN is not changed when the mobile device later roams to a second collaborating network, but that the method is then resumed from step e) with the second

collaborating network instead of the first collaborating network.

13. Method according to any one of the preceding claims, **characterized in** that, in an initial step, the SIM card is provided with a home IMSI associated with the home network, and in that step a) comprises the substeps of

a1) initiating a location update procedure after or in connection to the mobile device moving from the coverage area of the home network to the coverage area of a first visited network in the first visited country;

a2) triggered by the location update message, sending an instruction message over the air to the mobile device to change, to a first visited country IMSI which is associated with the first collaborating network, the IMSI used for network identification of the SIM card; and

a3) causing the mobile device to store the first visited country IMSI on the SIM card and to use it for network identification of the SIM card.

14. Method according to claim 13, **characterized in** that, upon roaming from the coverage area of the first collaborating network to the coverage area of a second visited network in a second visited country after step e) has been performed, the method comprises the additional steps

f) causing the mobile device to change the IMSI used for network identification of the SIM card back to the home IMSI and then to perform a device network refresh;

g) triggered by a location update message resulting from the change of IMSI used for network identification and received by the home network, sending an instruc-

tion message over the air to the mobile device to change, to a second visited country IMSI which is associated with a second collaborating mobile communication network in the second visited country, the IMSI used for network identification of the SIM card; and

h) resuming the method from step b), but with the second visited country and the second collaborating network instead of the first visited country and the first collaborating network, respectively.

15. Method according to any one of claims 1-12, **characterized in** that, in step a), the SIM card is configured to be able to connect to the first collaborating network only if the first collaborating network belongs to a set of predetermined collaborating networks for the first visited country.

16. System for providing Internet access to a mobile communication device when the mobile device roams between a mobile communication home network in a home country and one or several mobile communication networks in one or several visited countries, which mobile communication device comprises a Subscriber Identity Module (SIM) card, wherein a digital data interconnection can be established between at least one collaborating network in a respective visited country and the home network so that Internet access can be provided to the mobile device by the home network via said interconnection when the mobile device is connected to the said collaborating network, and wherein the said system is connected for communication with the home network, **characterized in** that the system is arranged to receive information from the home network that the mobile device roams in a collaborating network, and upon the reception of such information instruct

the home network to allow Internet access for the mobile device only to a predetermined Internet address but not general Internet access, in that the system comprises an Internet server which is accessible through said Internet access and arranged to be contacted by the mobile device and to accept a login credential from a user of the mobile device via the mobile device, and in that the system is arranged to, upon reception of a valid login credential from the mobile device, store an association between an IMSI (International Mobile Subscriber Identity) and/or an MSISDN (Mobile Subscriber Integrated Services Digital Network-Number) of the SIM card with a user account identified by the login credentials and to instruct the home network to allow Internet access to the mobile device in accordance with an agreement tied to the user account.