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(54) Title: METHOD FOR DISTRIBUTION OF INFORMATION OF NETWORKS OR ENTITIES USING UE AS GATEWAY

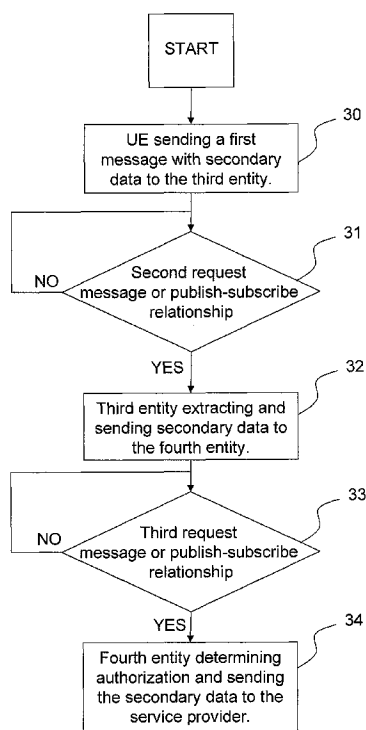


FIG 2

(57) Abstract: The present invention relates to a method for distribution of information in a primary cellular network. At least one second network or at least one second entity is using a User Equipment (UE) for forwarding information between the second network or entity and a service provider, wherein the second network or entity provides the UE with information about its properties. The method comprises the steps of: (1) the UE sending a first message to a third entity in a third network to inform about the location and properties of the UE, (2) the first message being such that it triggers the third entity to send system information to the UE. What particularly characterizes the method is that the UE sends 30 secondary data in the first message to the third entity, said secondary data comprising information about the properties of the second network or entity.



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TITLE

Method for distribution of information of networks or entities using UE as Gateway.

TECHNICAL FIELD

- 5 The present invention relates to a method, a UE, a third entity, a fourth entity, a service provider and a primary cellular network for distributing information in the primary cellular network.

BACKGROUND

- 10 In 3G (third generation mobile phone standard) and L0TE (Long Term Evolution) networks today, each UE (User Equipment) when activated goes through a set of registration and attach procedures with the core network before the end user can make a call or use some other network services. During these activities the UE informs the network of their IMSI number and other specific UE capabilities for this particular UE and get appropriate
15 network identifications that are used for subsequent call establishments.

UEs in today's networks are considered as devices that end users use to access services that the network provides. Such services are voice calls, SMS and MMS and in the high speed 3G networks also services that relates to data access, for instance to email and internet.

- 20 The role of the UE is changing, and there is now a possibility to connect new functionality, for instance in form of a separate unit, to the phone. Examples of such separate units are cameras and sensors that can be used in health care. The UE can be used as a personal health check device that can be connected over mobile networks to health professionals to forward them
25 relevant patient's health data. Since the UE also already contains a remote camera, the accessibility by anyone in need of a photo or a video recording of a certain area is another obvious functionality. Other applications are in the

areas of sharing music or offering information about the prices and special offers in a shopping mall gathered via a built-in RFID reader.

Another example of such mobile phone functionality is in the area of wireless sensor networks (WSN). When connecting a sensor to the UE, the phone
5 can serve as a sensor network gateway. A WSN comprises distributed autonomous devices that use sensors to monitor conditions, such as temperature, pressure, sound, moving objects and pollutant. WSN are used in many areas such as including environment and habitat monitoring, health monitoring, burglar alarms, automatic meter reading, home automation and
10 other types of Machine to Machine (M2M) type of services.

The various types of sensors will use short range wireless communication (such as Bluetooth) to communicate via a UE to the rest of the world. For example, Bluetooth SIG is standardizing the communication protocol for interaction of health and fitness sensors with an UE, with the intention to
15 allow prolonged health monitoring of mobile subscribers.

As we go towards the future internet, more and more such devices will be introduced (Internet of Things). The only way to inform the backend service providers about the existence, location and availability of such sensors is by using a purposely built user application on an UE. The above problem is not
20 only apparent in mobile phones, but also other devices whose sole intention is to provide sensor communication, such as M2M devices for AMR (Automatic Meter Reading) or security applications that have to depend on purposely built availability schemes built on for instance SMS etc.

SUMMARY

25 The object of the present invention is therefore to provide a way of improving the communication between the UE and the service provider when connecting a new functionality to the UE, so that the service provider can make use of the services of the functionality.

The object of the present invention is solved by means of a User Equipment (UE) for distribution of information in a primary cellular network. At least one second network or at least one second entity is using the UE for forwarding information between the second network or entity and a service provider, where the second network or entity provides the UE with information about its properties. The UE is adapted to send a first message to a third entity in a third network to inform about the location and properties of the UE (10). The UE is further adapted to receive system information from the third entity. What particularly characterizes the UE is that it is adapted to send secondary data in the first message to the third entity. Said secondary data comprises information about the properties of the second network or entity.

The object of the present invention is also solved by means of a third entity in a third network for distribution of information in a primary cellular network. At least one second network or at least one second entity is using a User Equipment (UE) for forwarding information between the second network or entity and a service provider, where the second network or entity provides the UE (10) with information about its properties. The third entity is adapted to receive a first message from the UE informing about the location and properties of the UE (10). The third entity is further adapted to be triggered by the first message to send system information to the UE. What particularly characterizes the third entity is that it is adapted to receive the secondary data in the first message from the UE according to any of the claims 1 - 6, at least informing the network about the properties of the second network or entity. Furthermore, the third entity is adapted to receive a second request message from a fourth entity in the third network or the third entity and the fourth entity has a publish and subscribe relationship.

The object of the present invention is also solved by means of a fourth entity for distribution of information in a primary cellular network. At least one second network or at least one second entity is using the User Equipment (UE) for forwarding information between the second network or entity and a

service provider, wherein the second network or entity provides the UE with information about its properties. What particularly characterizes the fourth entity is that it is adapted to receive the secondary data from the third entity according to any of the claims 7 – 10. It is further adapted to authenticate and
5 authorize access to the secondary data.

The object of the present invention is moreover solved by means of a primary cellular network comprising the UE according to any of the claims 1 – 6, the third entity according to any of the claims 7 – 10 and the fourth entity according to any of the claims 11 – 16.

10 The object of the present invention is finally solved by means of a method for distribution of information in a primary cellular network. At least one second network or at least one second entity is using a User Equipment (UE) for forwarding information between the second network or entity and a service provider, wherein the second network or entity provides the UE with
15 information about its properties. The method comprises the steps of: (1) the UE sending a first message to a third entity in a third network to inform about the location and properties of the UE, (2) the first message being such that it triggers the third entity to send system information to the UE.

What particularly characterizes the method is that the UE sends secondary
20 data in the first message to the third entity, said secondary data comprising information about the properties of the second network or entity.

By embedding Wireless Sensor Network (WSN) properties (such as the availability) in the already existing signalling in a cellular network, efficiency will be enhanced both in terms of network usage and development
25 complexity for the individual service developer.

Moreover, providing a standardized interface for external entities to reach signalling information, enhance the possibility to build 3rd party services.

Further advantages will appear for the embodiment in the detailed description.

BRIEF DESCRIPTION OF DRAWINGS

In the following text the invention will be described in detail with reference to
5 the attached drawings. These drawings are used for illustration only and do not in any way limit the scope of the invention:

Figure 1 schematically shows the structure of primary cellular network into which the invention is implemented.

Figure 2 shows a flow diagram of the method for distributing information in
10 the primary cellular network according to figure 1.

DETAILED DESCRIPTION

The invention will now be described in detail with reference to embodiments described in the detailed description and shown in the drawings. The embodiments of the invention with further developments described in the
15 following are to be regarded only as examples and are in no way to limit the scope of the protection provided by the patent claims.

The present invention relates to a method, a UE, a third entity, a fourth entity, a service provider and a primary cellular network for distributing information in the primary cellular network. The detailed description describes different
20 method embodiments according to the present invention. The UE, the entities, the service provider and the network are adapted for performing the method steps according to the detailed description. It should therefore be understood by a person skilled in the art that since the method steps are described, the UE, the entities, the service provider and the network are also
25 disclosed in the detailed description.

In figure 1 a User Entity (UE) 10, in form of a mobile station (mobile phone) is shown. The UE communicates wirelessly with a third network 12, comprising

two third entities 13,14. A second network 15 or at least one second entity 16 is using the UE for forwarding information between the second network or entity and a service provider 17. The second network or entity provides the UE with information about its properties through a wireless or wired
5 connection 11.

The UE 10 could be a mobile phone or any other device whose intention is to forward information between the second network 15 or entity 16 and the service provider 17. Such a device is for instance an M2M device for AMR or a security application such as a burglar alarm. The main purpose of the UE is
10 to provide information or data collected by the second network 15 or entity 16 to the service provider 17, but in order for the service provider 17 to be aware of the status of the second network 15 or entity 16 purposely built availability schemes built on for instance SMS etc. have been designed.

The second network 15 could be a Wireless Sensor Network for instance
15 monitoring temperature, pressure, sound, moving objects and pollutant. The second entity 16 could be a camera, a disc drive or any other means capable of providing the information. The third network 12 could be a core network of some kind, such as a Wireless Code Division Multiple Access (WCDMA) network.

20 The service provider 17 is an entity offering services like environment and habitat monitoring, health monitoring, burglar alarms, automatic meter reading, home automation and other types of Machine to Machine (M2M) type of services. The UE 10 and the third network 12 are part of the primary cellular network 20.

25 The method for distributing information in the primary cellular network 20 comprises a first step in which the UE 10 sends a first message 21 to the third entity 13,14 in the third network 12, to inform about the location and properties of the UE 10. The first message is such that it triggers the third

entity to send system information 22 to the UE 10. The first message is part of an update.

The first message 21 is for instance a Location Update Request or a Routing Area Update request message (will be described later). As a part of the registration procedure of the UE in the third network 12, the location update procedure (circuit switched domain) or the routing area update procedure (packet switched domain) is triggered and the UE is registered in the third network 12. When the third network receives a Location Area Update Request message, it replies with a Location Area Update Accept message in normal cases. When the third network receives a Routing Area Update Request message, it responds with the Routing Area Update Accept. After performing the Location Update procedure or the Routing Area Update request, the system information 22 received by the third entity is stored in the UE 10. The update procedure is used to inform the third network 12 about the properties of the UE.

In order to enable the provisions for distributing information about the second network 15 or the second entity 16 in the primary cellular network, the method according to the present invention comprises a further step, see figure 2. In this step the UE 10 sends 30 secondary data in the first message to the third entity 13,14. The secondary data comprises information about the properties of the second network or entity.

The properties of the UE and the second network or second entity preferably relates to availability information. In the following, availability will therefore be used as an example of properties. Availability information indicates if the UE/entity/network is present.

If the method is used in a circuit switched third network 12, the third entity 13 consists in a Mobile Switching Center (MSC). The first message then consists in a Location Area Update Request message. If the method is used in a packet switched third network 12, the third entity 14 consists in a Serving

Generic Packet Radio Services (GPRS) Support Node and the first message consists in a Routing Area Update Request message. The first message in principle can be any message that contains the availability information of the UE 10. In case of 3G (may also be the case for LTE) it is the

5 Location/Routing area update request message.

The existing Location Area Update Request message or Routing Area Update Request message comprises a number of Information Elements (IE). An IE is a data packet of a particular length which has been encoded by a communication protocol for transmission over a node-to-node link. The

10 Location Area Update Request message has the following IE as content:

- Mobility management protocol discriminator (Protocol discriminator)
- Skip Indicator
- Location Area Update Request message type (Message type)
- Ciphering key sequence Number
- 15 - Location area identification
- Mobile station classmark
- Mobile identity
- Mobile station classmark for UMTS

The IE content of the Routing Area Update Request message is:

- 20 - Protocol discriminator
- Skip Indicator
- Routing Area update request message identity (Message type)
- Update type
- GPRS ciphering key sequence number (Ciphering key sequence
- 25 number)
- Old routing area identification (Routing Area identification)
- MS Radio Access Capability
- Old P-TMSI signature (P-TMSI signature)
- Requested READY timer value (GPRS timer)

- DRX parameter
- TMSI status
- P-TMSI (Mobile Identity)
- MS network capability
- 5 - PDP context status
- PS LCS Capability
- MBMS context status

The existing solutions enables a network to monitor the location and availability of UEs attached to the network.

- 10 The secondary data is in the present invention embedded into the existing first messages. This is made in order to support transfer of the availability information of devices attached to an UE (or a standalone M2M device). The UE 10 is used to communicate with the service provider 17. The secondary data preferably consists in an information element in the first message, which
- 15 may be called ExtDeviceInfo. This element describes the availability of the second network 15 or device 16. The information element comprises information about:

- the number of second networks or second entities included in the information element,
- 20 - identity of the second network or entity together with the local validity,
- the type of second network or entity,
- location of the second network or entity relative to the UE position.

The element ExtDeviceInfo could have the following characteristics (the name, in bold, of the field can be varied freely):

- 25 - **ExtDeviceInfo** – **IE ExtDeviceNum** (4 bits) – Number of secondary networks or entities in the new information element.

- **ID** (4 bits) – Identity of an external device, local validity.
- **Type** (2 bytes) – Identifies the type of second network or device/devices (for example a WSN).
- **Location** (4 bytes) – Location of the external device relative to the UE
5 position.

In the present invention, a fourth entity 18 is added in the third network 12. This is part of the primary cellular network 20. This entity should be capable of authenticating and authorizing access to the secondary data. This could possibly be performed with the help from a Home Location Register (HLR) or
10 a Home Subscriber Server (HSS). This will be described later.

The method according to the present invention comprises a step 31, see figure 2, where the fourth entity 18 sends a second request message to the third entity 13,14. As an alternative the third entity and the fourth entity has a publish and subscribe relationship. These are two possible relationships
15 between the two entities. The decision is shown as 31 in figure 2. Request messages are used for once-off requests when the service provider 17 wants to find out the secondary data regarding a particular second network 15 or entity 16. The second request message is then sent from the service provider 17 to the fourth entity, which sends it to the third entity.

20 Publish and subscribe relationships are used when the fourth entity is interested in continuously getting information about the secondary data. The meaning of continuously is that the data is sent periodically or when the status of the secondary data changes ("event-triggered").

When there is a publish and subscribe relationship, the UE 10 sends the first
25 message periodically or when the status of the secondary data changes. Commonly, location or routing area update procedures allow an UE to inform the third network 12 about certain events. An example of an event, when the UE need to inform the third network, is for instance when a mobile is

switched on or off or when the UE moves from one location area to the next while not on a call. In the present invention, a further event is added, which is when the status of the secondary data changes. Then the first message is also sent to the third entity 13,14. The UE 10 could also be triggered to send
5 the first (update) message on other criteria e.g. at identification of new added device to the second network 15 or when a new second entity 16 added.

When the UE 10 reports periodically, a periodic update procedure is used. The periodic update procedure is then run periodically to inform the network about the availability of the UE. The period is determined by a timer. There
10 are different timers for the Location Area Update procedure and the Routing Area Update procedure. For the Routing Area update timer, the value of the timer is sent by the network 12 to the UE as system information in the messages Attach Accept and the Routing Area Update Request. The value of this timer is unique within the Routing Area.

15 When the third entity 13,14 receives the second request message or when there is a publish and subscribe relationship 31 (periodically or “event-triggered”) 31, the third entity performs the steps 32 of:

- extracting the secondary data from the first message, and
- sending the secondary data to the fourth entity 18.

20 This is illustrated in figure 2. The third entity consequently forwards the secondary data to the fourth entity. In figure 1 the communication link 24 enabling the transmission of the second request message and the secondary data is shown. When the fourth entity 18 receives the secondary data it performs the step of storing the data.

25 The role of the fourth entity is to enable the service provider as an external entity to reach the secondary data provider by the second network 15 or entity 16 to the third network. In order to control the distribution of the secondary data, the invention comprises a step of the fourth entity 17

authenticating and authorizing access to the secondary data. The fourth entity consists in an availability server which controls the access to the data. The fourth entity 18 also provides a single point of attachment for the service provider 17, and enables the service provider to not have to scan different
5 third entities 13, 14 for the correct information.

The third entity may change and the fourth entity hence may have to send the second request message to a multiple of these entities and only get response from one of them.

The authentication and authorizing function needs to be present in the third
10 network 12. The function can be located in the fourth entity 18 or somewhere else, such as in the HLR or HSS. In such a case, there must be a messaging between the fourth entity and the HLR/HSS. A diameter protocol may be used between the fourth entity and the HLR/HSS. As an alternative, the authorization data is forwarded to the fourth entity from the HLR/HSS during
15 the UE attachment phase or when the secondary data is first requested (second or third request message). Then the authorization and authentication is done at the fourth entity.

The authentication and authorization function performs the following action:

1. Maintaining an access control list specifying which service providers that
20 have access to what kind of secondary data. For instance, if the UE 10 has a set of sensors attached to it, it may be that a medical application should be authorized to monitor the secondary data relating to those sensors, but no other. Similar at home, it may be that the burglar alarm should be able to monitor the availability status of the alarm sensors, but not the sensor
25 relating to for instance energy consumption.

2. Maintaining authentication data required to authenticate the service provider to provide authorization. This includes maintaining an identity, corresponding secret and preferred authentication method.

3. Performing accounting so that an UE (or subscriber) can check who has received information about secondary devices attached to the UE and also for payment purposes. The service provider may have to compensate either the third network or the subscriber for the access to the availability service.

- 5 The authentication is preferably done once for each session and associated pair 23 of service provider 17 and corresponding second network 15 or entity 16. However, there might be that the UE (subscriber) where the second network 15 or entity 16 are attached changes the policies and decides not to allow sharing the secondary data with a particular service provider 17
10 depending on its current context. In that case, the authentication would have to be done again. Also, the term session above means between a defined start and end, and an example of a session may be a request/response pair or subscription and the following replies. Alternatively, authentication can be performed at each interaction between the service provider 17 and the fourth
15 entity 18.

The present invention comprises a step of the service provider 17 sending a third request message to the fourth entity 18. As an alternative the fourth entity 18 and the service provider 17 has a publish and subscribe relationship. These are two possible relationships between the two entities.

- 20 The decision is shown as 33 in figure 2.

If the service provider 17 is authorized to receive the secondary data, further steps can be performed. When the fourth entity 18 receives the third request message or when there is a publish and subscribe relationship 33, the fourth entity performs the steps of 34:

- 25 - determining if the service provider has an authorization to receive the secondary data, and
- sending the secondary data to the service provider 17 if the service provider has the authorization.

This is illustrated in figure 2. The fourth entity 18 consequently forwards the secondary data to the service provider 17 when this is allowed to receive the data. In figure 1 the communication link 25 enabling the transmission of the third request message and the secondary data is shown.

- 5 When the service provider 17 subscribes to the secondary data, the fourth entity will inform the service provider periodically or when changes occur. Both when there is a subscription or when the service provider request for the secondary data, the service provider will control the authorization before sending the data.
- 10 One option is that the fourth entity 18 sends the second request message (step 31) when the service provider 17 sends the third request message. In such a case, the fourth entity acts as a proxy between the service provider and the third entity 13,14. Also in this case, the fourth entity will determine if the service provider has an authorization to receive the secondary data.
- 15 A person skilled in the art would realize that any technique for wireless communication and any type of access network can be used together with the present invention. Moreover, the skilled person would realize that any type of UE 10 whose role is to forward information between the second network 15 or entity 16 and the service provider 17 can be used. The skilled
- 20 person would also realize that any type of the second network or entity could be used as long as it is capable of providing said information. The skilled person would furthermore realize that the third network 12 could be any kind of network comprising the third 13,14 and fourth 18 entity.

- The flow diagram in figure 2 is not exactly a time sequence, which means
- 25 that steps may performed in another order or at the same time. Still, all of the steps illustrated in the figure are performed in the present invention.

CLAIMS

1. User Equipment (UE) (10) for distribution of information in a primary cellular network (20), where at least one second network (15) or at least one second entity (16) is using the UE (10) for forwarding information between
5 the second network (15) or entity (16) and a service provider (17), the second network (15) or entity (16) providing the UE (10) with information about its properties,
- the UE (10) being adapted to send a first message to a third entity (13,14) in a third network (12) to inform about the location and properties of the UE
10 (10),
- the UE (10) being adapted to receive system information from the third entity (13,14),
- characterized in that**
- the UE (10) being adapted to send (30) secondary data in the first message
15 to the third entity (13,14), said secondary data comprising information about the properties of the second network (15) or entity (16).
2. UE (10) according to claim 1 wherein the first message consists in a Location Area Update Request message.
3. UE (10) according to claim 1 wherein the first message consists in a
20 Routing Area Update Request message.
4. UE (10) according to any of the preceding claims wherein the UE (10) is adapted to sent the first message periodically or when the status of the secondary data changes.
5. UE (10) according to any of the preceding claims wherein the secondary
25 data consists in an information element in the first message.

6. UE (10) according to claim 5 wherein the information element comprises information about:

- the number of second networks (15) or entities (16) included in the information element,

5 - identity of the second network (15) or entity (16) together with the local validity,

- the type of second network (15) or entity (16),

- location of the second network (15) or entity (16) relative to the UE (10) position.

10 7. Third entity (13,14) in a third network (12) for distribution of information in a primary cellular network (20), where at least one second network (15) or at least one second entity (16) is using a User Equipment (UE) (10) for forwarding information between the second network (15) or entity (16) and a service provider (17), the second network (15) or entity (16) providing the UE
15 (10) with information about its properties,

- the third entity (13,14) being adapted to receive a first message from the UE (10) informing about the location and properties of the UE (10),

- the third entity (13,14) further being adapted to be triggered by the first message to send system information to the UE (10),

20 **characterized in that**

- the third entity (13,14) being adapted to receive the secondary data in the first message from the UE (10) according to any of the claims 1 - 6, at least informing the network about the properties of the second network (15) or entity (16).

- the third entity (13,14) being adapted to receive a second request message from a fourth entity (18) in the third network (12) or the third entity (13,14) and the fourth entity (18) having a publish and subscribe relationship.

8. Third entity (13,14) according to claim 7 wherein the third entity (13,14)
5 consists in a Mobile Switching Center (MSC).

9. Third entity (13,14) according to claim 7 wherein the third entity (13,14) consists in a Serving Generic Packet Radio Services (GPRS) Support Node.

10. Third entity (13,14) according to any of the claims 7 – 9 wherein when the third entity receives the second request message or when there is a publish
10 and subscribe relationship (31), the third entity (13,14) is adapted to perform the steps (32) of:

- extracting the secondary data from the first message, and

- sending the secondary data to the fourth entity (18).

11. Fourth entity (18) for distribution of information in a primary cellular
15 network (20), where at least one second network (15) or at least one second entity (16) is using the User Equipment (UE) (10) for forwarding information between the second network (15) or entity (16) and a service provider (17), the second network (15) or entity (16) providing the UE (10) with information about its properties,

20 **characterized in that**

- the fourth entity (18) being adapted to receive the secondary data from the third entity (13,14) according to any of the claims 7 – 10,

- the fourth entity (18) being adapted to authenticate and authorize access to the secondary data.

25 12. Fourth entity (18) according to claim 11 wherein the fourth entity (18) is adapted to store the secondary data.

13. Fourth entity (18) according to any of the claims 11 – 12 wherein the fourth entity (18) consists in an availability server.

14. Fourth entity (18) according to any of the claims 11 – 13 wherein the fourth entity (18) is adapted to receive (33) a third request message from the
5 service provider (17).

15. Fourth entity (18) according to any of the claims 11 – 13 wherein the wherein the fourth entity (18) and the service provider (17) has a publish and subscribe relationship (33).

16. Fourth entity (18) according to any of the claims 14 – 15 wherein when
10 the fourth entity receives the third request message or when there is a publish and subscribe relationship (33), the fourth entity (18) is adapted to perform the steps (34) of:

- determining if the service provider (17) has an authorization to receive the secondary data, and

15 - sending the secondary data to the service provider (17) if the service provider (17) has the authorization.

17. Primary cellular network (20) comprising the UE (10) according to any of the claims 1 – 6, the third entity (13,14) according to any of the claims 7 – 10 and the fourth entity (18) according to any of the claims 11 – 16.

20 18 Method for distribution of information in a primary cellular network (20), where at least one second network (15) or at least one second entity (16) is using a User Equipment (UE) (10) for forwarding information between the second network (15) or entity (16) and a service provider (17), the second network (15) or entity (16) providing the UE (10) with information about its
25 properties, comprising the steps of:

- the UE (10) sending a first message to a third entity (13,14) in a third network (12) to inform about the location and properties of the UE (10),

- the first message being such that it triggers the third entity (13,14) to send system information to the UE (10),

characterized in that

- the UE (10) sending (30) secondary data in the first message to the third
5 entity (13,14), said secondary data comprising information about the properties of the second network (15) or entity (16).

19. Method according to claim 18 wherein the third entity (13,14) consists in a Mobile Switching Center (MSC).

20. Method according to claim 19 wherein the first message consists in a
10 Location Area Update Request message.

21. Method according to claim 18 wherein the third entity (13,14) consists in a Serving Generic Packet Radio Services (GPRS) Support Node.

22. Method according to claim 21 wherein the first message consists in a Routing Area Update Request message.

15 23. Method according to any of the claims 19 - 22 wherein the UE (10) sends the first message periodically or when the status of the secondary data changes.

24. Method according to any of the claims 19 – 23 further comprising the step of a fourth entity (18) in the third network (12) sending a second request
20 message to the third entity (13,14).

25. Method according to any of the claims 19 - 23 wherein the third entity (13,14) and the fourth entity (18) in the third network (12) has a publish and subscribe relationship.

26. Method according to any of the claims 24 – 25 wherein when the third
25 entity receives the second request message or when there is a publish and subscribe relationship (31), the third entity (13,14) performs the steps of (32):

- extracting the secondary data from the first message, and
- sending the secondary data to the fourth entity (18).

27. Method according to claim 26 further comprising the step of the fourth entity (18) storing the secondary data.

- 5 28. Method according to any of the claims 26 – 27 further comprising the step of the fourth entity (18) authenticating and authorizing access to the secondary data.

29. Method according to any of the claims 26 – 28 wherein the fourth entity (18) consists in an availability server.

- 10 30. Method according to any of the claims 26 – 30 further comprising the step of the service provider (17) sending a third request message to the fourth entity (18).

31. Method according to any of the claims 26 – 30 wherein the fourth entity (18) and the service provider (17) has a publish and subscribe relationship.

- 15 32. Method according to any of the claims 30 – 31 wherein when the fourth entity receives the third request message or when there is a publish and subscribe relationship (33), the fourth entity (18) performs the steps (34) of:

- determining if the service provider (17) has an authorization to receive the secondary data, and

- 20 - sending the secondary data to the service provider (17) if the service provider (17) has the authorization.

33. Method according to any of the claims 19 – 32 wherein the secondary data consists in an information element in the first message.

- 25 34. Method according to claim 33 wherein the information element comprises information about:

- the number of second networks (15) or second entities (16) included in the information element,
 - identity of the second network (15) or entity (16) together with the local validity,
- 5 - the type of second network (15) or entity (16),
- location of the second network (15) or entity (16) relative to the UE (10) position.

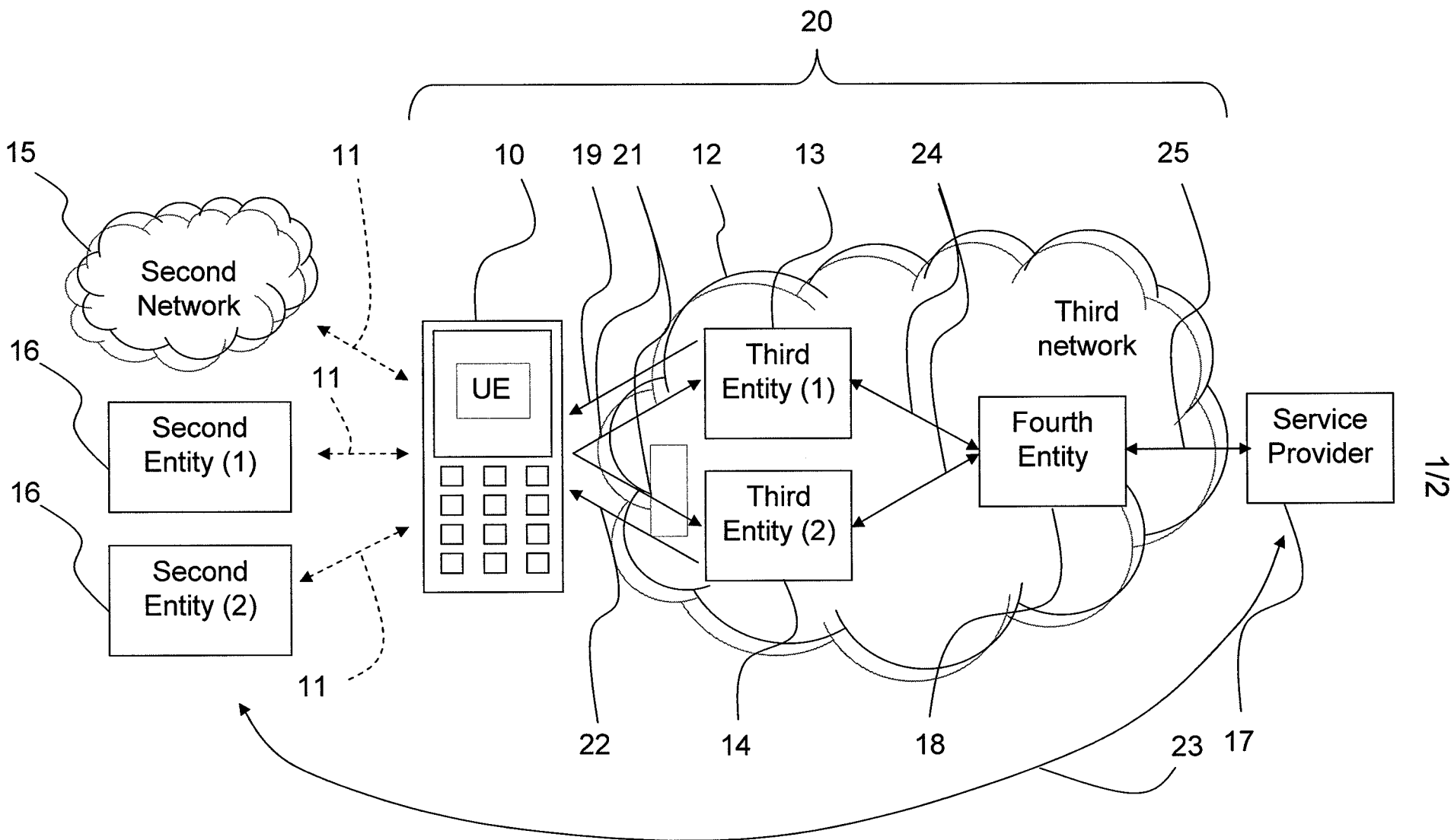
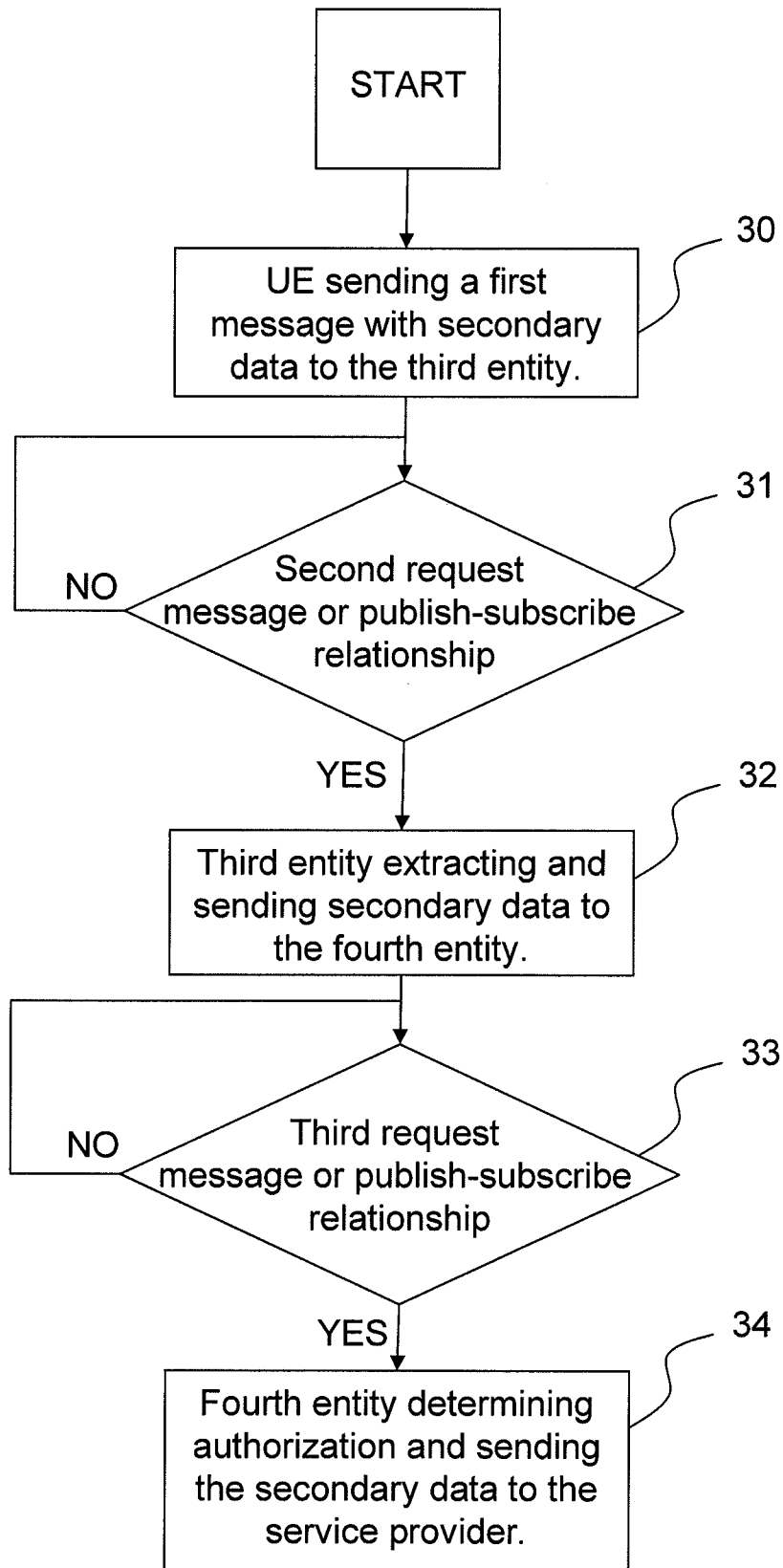


FIG 1

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**FIG 2**

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2008/056895

A. CLASSIFICATION OF SUBJECT MATTER

INV. H04W8/22
ADD. H04L29/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2007/124438 A1 (PARK HYUN-SEO [KR] ET AL) 31 May 2007 (2007-05-31) abstract paragraph [0026] - paragraph [0028] -----	1,7,11, 17,18
A	WO 2006/137646 A (LG ELECTRONICS INC [KR]; SONG JAE-SEUNG [KR]; CHO SONG-RAE [KR]; YOON) 28 December 2006 (2006-12-28) abstract -----	1,7,11, 17,18
A	WO 2006/124840 A (INTERDIGITAL TECH CORP [US]; SHAHEEN KAMEL M [US]) 23 November 2006 (2006-11-23) abstract -----	1,7,11, 17,18

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Further documents are listed in the continuation of Box C.

☒

See patent family annex.

* Special categories of cited documents :

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- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

* & * document member of the same patent family

Date of the actual completion of the international search

9 April 2009

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2008/056895

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