

Description

Simplified method for IMS registration in the event of emergency calls

The invention relates to methods and devices for IMS registration in the event of emergency calls.

Networks such as, e.g. cellular mobile radio networks, are known per se to the expert from, e.g. specifications in www.etsi.org or www.3gpp.org.

TS 23.167 Release 7 of the 3GPP Standardization Organization specifies emergency calls in the IMS (IP Multimedia Subsystem). This 3GPP Technical Specification TS 23.167 also relates to Next Generation Fixed Networks as standardized, e.g. in ETSI TISPAN and CableLabs. An essential basic principle in IMS emergency calls is the special "IMS emergency call registration". TS 23.167 is currently based on the fact that a terminal which wishes to transmit an emergency call in the IMS first registers in the IMS by means of its own emergency call SIP URI (also called emergency call Public User Identity). This SIP URI (Session Initiation Protocol Uniform Resource Identifier) is either preconfigured in the terminal or the terminal generates it from an existing SIP URI which is stored, e.g. on the UICC (Universal Integrated Circuit Card), if present. In the case of GPRS/UMTS, the registration in the IMS is preceded by the setting-up of an emergency PDP (Packet Data Protocol) context. A PDP context sets up a session between the terminal and a GGSN and allocates an IP and a P-CSCF address to the terminal. This PDP context uses its own APN (Access Point Name), with the aid of which a GGSN and a P-CSCF (Proxy Call Session Control Function) are determined in the visited mobile radio network (VPLMN). This is necessary, since the emergency call must be routed in the VPLMN

to the emergency call center but in the case of roaming, the GGSN, and thus also the P-CSCF, may well be located in the home network of the subscriber (and usually are since the APNs are preconfigured on the terminal by the home network operator). However, this procedure has the disadvantage that the setting-up of a PDP context and the subsequent IMS registration can consume a great amount of time (easily within the range of seconds). For this reason, the 3GPP is currently considering how the special IMS registration can be dispensed with in the case of emergency calls if the terminal is already registered in the IMS. The situation is made more difficult by the fact that a terminal can register in a foreign network but P-CSCF and GGSN can still be located in the home network (so-called GPRS roaming, in contrast to IMS roaming, where P-CSCF and GGSN are both in the visited network). The invention describes possible methods of how a special IMS registration can be dispensed with in the case of emergency calls in order to thus significantly accelerate the setting up of a call. In the case of GPRS/UMTS networks, this also makes it possible to dispense with the setting up of an emergency call PDP context.

The previous TS 23.167 Standard specifies that the terminal must always perform a registration in the IMS by means of the special emergency SIP URI.

In the case of GPRS/UMTS, this IMS registration is preceded by the setting-up of a special PDP context in the visited network by means of the special emergency APN.

The object of the invention is simplification of the setting-up of an emergency call connection.

The object is achieved in each case by the subject matters of the patent claims.

The invention describes methods of how the special IMS emergency call registration, and in the case of GPRS/UMTS, the setting-up of a special PDP context, can be dispensed with. In this context, it is assumed that the terminal has locally stored an identifier (network identifier) which identifies its home network (e.g. that of its mobile radio subscriber identification card). In mobile radio, this identifier is stored as MCC/MNC (Mobile Country Code/Mobile Network Code) of the home network on the SIM/USIM card.

If the terminal, when registering in the visited network, is informed by the latter about the network identifier of the visited network (in the case of GPRS/UMTS, this information is radiated, e.g. by the radio network, in 3GPP WLAN, this information is transmitted to the terminal during the access authentication, in Next Generation Fixed Networks, a similar method could be used as in the case of 3GPP WLAN), it can dispense with the special IMS registration for emergency calls if the terminal is already registered in the IMS and the comparison between the stored identifier of the home network and the received identifier of the visited network has revealed that both networks are identical, that is to say the terminal is not moving in a foreign network. Since the subscribers are predominantly located in their home network and the terminal must always be registered in the IMS in order to be "always on", and thus available, this method dispenses in most cases with a special IMS registration for emergency calls with the associated setting-up of a PDP context in the case of GPRS/UMTS.

According to one embodiment of the general method, the invention proposes that the P-CSCF sends the identifier of the network, in which it is located itself, to the terminal in the response to the registration request of the terminal (SIP 200 OK

as response to the SIP REGISTER message). If, as previously described, the terminal determines that it is located in a visited network and not in the home network, it can determine, by means of the information which it has obtained from the P-CSCF during the registration, whether the P-CSCF is also located in the visited network. If this is the case, a special IMS registration for emergency calls is no longer necessary. In the case of emergency calls, the terminal can immediately set up the SIP session by means of an SIP INVITE message. In all other cases, emergency call registration is required. This alternative method also covers the scenarios in which the method described before is applicable, but is more generally applicable.

If not every P-CSCF is capable of dealing with emergency calls, the P-CSCF can send back relevant information to the terminal, also in the response to the registration request by this terminal. The terminal must then take this information into consideration in the decision whether it must perform a special emergency call registration or not.

The invention describes methods by means of which a special IMS registration for emergency calls, and in the case of GPRS/UMTS access systems, the setting-up of a separate PDP context, can be dispensed with in most cases. Since setting-up of a PDP context and IMS registration are time-consuming procedures, this results in considerable time saving which is a significant requirement particularly in the case of emergency calls.

In particular, the invention can be used in cellular mobile radio networks but also in WLAN/WIMAX networks and fixed networks.

Further features and advantages of the invention are obtained from the further patent claims and the subsequent description of an exemplary embodiment by means of the drawing. The exemplary embodiment shows in figure 1 a flowchart which represents how a terminal, after successful IMS registration, can transmit an emergency call via a mobile radio access network without first having to perform a special emergency call registration in the IMS.

Figure 1 shows some components "S-CSCF", "P-CSCF", "GGSN", "SGSN", "Radio Access Network" of a mobile radio network known per se to the expert from, e.g. specifications in www.etsi.org or www.3gpp.org.

A terminal (fig. 1, "terminal") registers in a mobile radio network and obtains a network identifier ("MCC1/MNC1") of the mobile radio network visited by it.

The terminal then sets up a PDP context to a GGSN of the mobile radio network and is assigned an IP address and a P-CSCF address for the communication with the P-CSCF.

Following this, the terminal registers with the P-CSCF in the IMS (with a "SIP REGISTER" message). From the P-CSCF, the terminal obtains the network identifier "MCC2/MNC2" of the network in which this P-CSCF is located (with a "SIP 200 OK" message).

If the terminal is to transmit an emergency call later, this is possible, e.g. in the following way:

a comparison of the network identifier "MCC1/MNC1" (stored in the terminal after its registration/authentication etc. in the mobile radio network visited by it) of the network visited by the terminal with the network identifier "MCC2/MNC2"

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of the network in which the P-CSCF is located, reveals that the P-CSCF is located in the network visited by the terminal.

For this reason, the terminal does not perform a special (separate/further) registration for the emergency call desired by it but immediately sets up the emergency call by means of a "SIP INVITE" message. This saves time.

Patent claims

1. A method for setting up an emergency call connection from a terminal (fig. 1: "terminal") to an IMS via a network (fig. 1: "S-CSCF", "P-CSCF", "GGSN", "SGSN", Radio Access Network"...), visited by the terminal, wherein, if the terminal is already registered in the IMS, an IMS registration of the terminal in the IMS for this emergency call connection is dispensed with during the setting-up of an emergency call connection, if a comparison between a network identifier (fig. 1: "MCC1"/"MNC1") for the visited network, of which the terminal was notified when it registered in the visited network, and a network identifier of the home network of the terminal reveals a match between these network identifiers.
2. The method as claimed in claim 1, characterized in that a match of these network identifiers specifies that the terminal and/or mobile radio subscriber identity module located therein is located in its home network.
3. The method as claimed in claim 1, characterized in that, if the comparison reveals a match of the network identifiers, the terminal transmits the emergency call via an IMS registration which already exists.
4. The method as claimed in claim 1,

characterized in that the comparison is made in the terminal.

5. The method as claimed in one of the preceding claims, characterized in that the network is a cellular mobile radio network or a WLAN/WIMAX network.

6. The method as claimed in one of the preceding claims, characterized in that the network is a fixed network.

7. The method as claimed in one of the preceding claims, characterized in that the network identifier of the visited mobile radio network is conveyed to the terminal during the authentication of the terminal to the visited mobile radio network.

8. The method as claimed in one of the preceding claims, characterized in that a P-CSCF of a mobile radio network sends the network identifier (fig. 1: "MCC1"/"MNC1") of the network, in which it (P-CSCF) is located itself, to the terminal in a response ("SIP 200 OK") to an IMS registration request ("SIP REGISTER") of the terminal, whereupon the terminal, when it finds that the network visited by it is not the home network, determines by means of a network identifier (fig. 1: "MCC2"/"MNC2") obtained from the P-CSCF during the registration, whether the P-CSCF is also located in the mobile radio network visited by the terminal, in which case, when an emergency call connection is set up, a special IMS registration of the terminal in the IMS is dispensed with for this emergency call connection and the terminal sets up an SIP session (fig. 1: SIP INVITE) for the emergency call connection,

whereas otherwise, when an emergency call connection is set up, a special IMS registration of the terminal in the IMS is first effected for this emergency call connection before an SIP session (fig. 1: SIP INVITE) is set up for the emergency call connection.

9. The method as claimed in the preceding claim, characterized in that for the emergency call connection, an SIP session is set up by means of an "SIP INVITE" message.

10. The method as claimed in one of the preceding claims, characterized in that, if the P-CSCF is not capable of dealing with emergency calls, the P-CSCF sends back relevant information to the terminal in a response to a registration request by this terminal, and the terminal then takes this information into consideration in the decision whether it must perform a special emergency call registration or not.

11. A device for carrying out the method as claimed in one of the preceding claims.