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(54) **Title:** METHOD AND SYSTEM FOR RETRIEVING NETWORK ADDRESSES IN HYBRID TELECOMMUNICATION NETWORKS
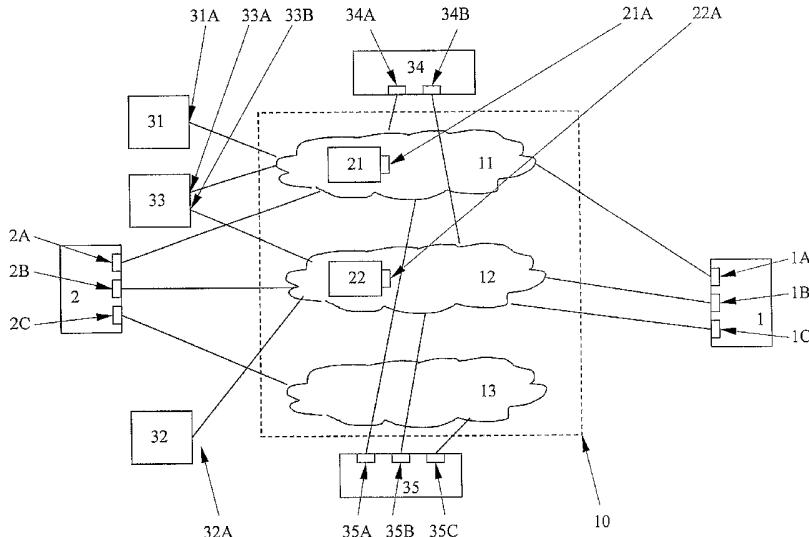
(57) **Abstract:** Combinational networks may provide simultaneous connectivity over networks of different type between User Equipment of an A-party and B-party. A communication session, comprising a circuit switched call and one or more packet switched sessions, may be deployed simultaneously over different network types, in relation to the same User Equipment. The circuit switched call and the packet switched session may be correlated. As to retrieve the packet switched address of a circuit switched call partner, a retrieval for a packet switched network address is initialised by means of a circuit switched protocol over a circuit switched network. The address retrieval request is directed to the call partner or a network node that accomplishes the network address request.

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<u>Title</u>

METHOD AND SYSTEM FOR RETRIEVING NETWORK ADDRESSES IN HYBRID

5   TELECOMMUNICATION NETWORKS.

<u>Field of the Invention</u>

10   The present invention relates generally to
telecommunications systems, such as fixed, wireless or hybrid
communication systems, having a packet- and circuit- switched
architecture denoted as combinational networks. More
particularly, the present invention facilitates a method for
15   retrieving addressing information and terminal capabilities of
User Equipment connected to the combinational network.

<u>Background of the invention</u>

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Fixed- and especially mobile- networks, such as Global
System for Mobile communications (GSM), General Packet Radio
System (GPRS) or Universal Mobile Telecommunication System
(UMTS) are constantly evolving. GSM/GPRS and UMTS networks today
25   offer both Circuit Switched (CS) connectivity and Packet
Switched (PS) connectivity. The PS end-to-end connectivity with
its terminal capabilities for transmission of a wide range of
data types may be used for offering multimedia services such as,
image, music and video transfer. The CS connectivity provides a
30   reliable link between two User Equipment by means of one or more
trusted network nodes with a reliable and defined Quality of
Service (QoS).
Combinational networks, where two or more links of
different type to one or more User Equipment or terminals are
35   established, are capable to deploy both CS and PS connectivity
to a User Equipment, thereby enabling services which perform

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their activity through PS-communication sessions, denoted as PS-sessions, and CS communication sessions, denoted as CS calls.

As to benefit from this form of service combination, User Equipment are required that are capable of handling a CS call and a PS-session simultaneously. Multi Radio Access Bearer (RAB) terminals for UMTS and Dual Transfer Mode (DTM) terminals for GSM/GPRS networks will be available; these types of terminals provide support for simultaneous CS- and PS-connectivity.

Today, conversational voice cannot be delivered over PS bearers to the end user, due to insufficient capacity in the Radio Access Networks in operation and therefore existing CS bearers are used for delivering conversational voice. In the future, it may be possible that a single PS bearer is used for conversational voice and multimedia. Nevertheless, DTM terminals today-, and UMTS terminals in the future, will deliver support for simultaneous CS- and PS-connectivity.

Using the simultaneous connectivity, a party denoted here as A-party browses Internet (establish a PS-session) while talking to another party, denoted here as B-party, via a voice-call via a CS network. Simultaneity, however, does not necessarily imply that the ongoing CS-call is *related* to the ongoing PS-session.

In contrast to this when the A-party, which has an ongoing CS-call with the B-party, sends a picture showing how beautiful the snow outside the house looks, while talking about the weather, the picture transferred in a PS-session and the ongoing CS-call are related from the A-party's perspective. The PS-session, though, can be established in such a way that it is functionally identical to an uncorrelated web-browsing session.

Suppose that said A-party calls, by means of a CS-call, the B-party by using B-party's name from an address book, related to the CS-network. When the A-party needs to post a picture to the B-party, while talking to the B-party, the A-party has to browse through his/her "PS address book" to transfer the picture. A PS-session is established with the B-party, completely independent of the ongoing CS-call. In this example, there is no interaction

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between the user interfaces, or the network components - the correlation takes place in the users' head.

In the foregoing example, it would be desirable if the A-party had the possibility to send the picture to the B-party - the B-

5   Party from the CS address book. The A-party should have a possibility to choose: "Send the picture to my CS-call partner" such that the A-party is relieved from having to browse any address book.

10   When a service residing in the network, and/or client software in the terminal or User Equipment becomes aware (or is made aware) of the relation between the CS-call and the PS-session, the CS-call and PS-session become *correlated* from that service' viewpoint, and a service thus provided is referred to

15   as a *combinational service*. An important issue in the combinational service, in particular in the foregoing example, is addressing, i.e. "How to get the address of the PS-domain part of the B-party's phone, terminal or User Equipment?"

Another issue is, when the A-party sends a picture to the

20   B-party, he/she would also like the picture to actually arrive on B-party's terminal or User Equipment. Additionally the A-party should know that the B-party has a terminal or User Equipment that is actually capable of receiving A-party's PS-session based message. I.e. how does the A-party get to know

25   about the B-party's terminal capabilities?

In order to give the A-party the best possible user experience, it should be possible for certain icons to light up (or even appear) on the Graphical User Interface (GUI) of the A-

30   party's terminal that inform him/her about the availability of various possibilities to communicate with the B-party. For instance, if the B-party has a DTM terminal, a "picture messaging" icon should light up on A-party's terminal User Equipment.

35   The problem to be solved is: (1) how can the A-party get the PS-session addressing information of the B-party and the PS-session terminal capabilities of the B-party's terminal or User

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Equipment (the terminal of the "CS-call partner"), when a CS-
    call is established or after a CS-call has been established
    between the A-party and the B-party, and (2) how can the B-party
    get the PS-session addressing information of the A-party and the
5   PS-session terminal capabilities of the A-party's terminal or
    User Equipment?

Summary of the invention

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        It is an object of the present invention to provide a
    method of retrieving a PS-domain based network address and PS-
    domain terminal capabilities of a User Equipment of a CS-call
    partner in a combinational telecommunication network comprising
15 networks of different type being a CS-network and at least one
    PS-network, where a CS-call has been established and the CS-call
    and a to be established PS-session are correlated.
        It is a further object of the present invention to provide
    a User Equipment, implemented as one or more devices, each
20 having a connection to the CS-network and to one or more PS-
    networks by means of a network connection, which User Equipment
    is arranged for performing said address and capability retrieval
    according to the presented method.

25   The object is achieved by the present invention by means of
    a method executed by the User Equipment where the PS-network
    address is retrieved of the CS-call partner's User Equipment,
    within a telecommunication system comprising the CS-network and
    the one or more PS-networks, and where the User Equipment are
30 both connected to the same CS- and PS networks, each connection
    associated with a network address. The PS-network address of the
    CS-call partner's User Equipment is requested/retrieved via the
    CS-network or via the PS-network to/from the CS-call partner's
    User Equipment.
35   The request is received by the CS-call partner's User
    Equipment and the PS-network address is looked up and sent back
    to the requesting User Equipment. Alternatively a network

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service is requested for the PS-network address of the CS-call
partner's User Equipment.

In order to reach the B-party in a PS-domain, the B-party
must be registered in the PS-domain. In the presented solution
different levels of addressing are involved. To reach the B-
party's User Equipment at the Internet Protocol (IP) layer, the
IP address of the B-party is needed. To set up a Session
Initiation Protocol (SIP) session with B-party's User Equipment,
the SIP secure [SIPs, Internet Engineering Task Force, RFC 3261
ch.19.1] Unified Resource Identifier (URI) is needed. For a SIP
service, for example presence, a service identifier, the
presence URI, is needed. In the present document, these
different identifiers are collectively referred to as PS-domain
identifiers. Registrations may be needed at each level.

The invention provides a solution to the problem of
retrieving the PS-domain identifiers such as the PS-network
addresses and the UE's terminal capabilities by having the A-
party User Equipment query a network service or B-party's User
Equipment for the desired network address and terminal
capabilities of the B-party's User Equipment. The invention
deploys either of two queries:
    - User Equipment initiated Query using a CS-domain method
    - User Equipment initiated Query using a PS-domain method

At the CS-domain method, the A-party User Equipment deploys
CS-domain methods via the CS network, in particular an
Unstructured Supplementary Service Data mechanism [USSD, 3rd.
Generation Partnership Project (3GPP) TS 23.090] as to query a
service in the network, or the peer terminal or User Equipment,
to retrieve the address(es) of the B-party.
    In the PS-domain method, the terminal uses PS-domain
methods via the PS-network, for example the sending of SIP
messages, towards an entity in the network (e.g. a presence
server) to retrieve the address(es) of the B-party.

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Once the relevant PS-domain identifier (e.g. the PS-domain network address) of the B-party is retrieved, the B-party can be contacted directly via the PS-network as to exchange UE terminal capabilities.

5   As it is possible to address the B-party's User Equipment at different layers, it is beneficial for a network operator to use SIP URI signalling for this purpose, since SIP URI signalling enables controlling or influencing exchange of terminal capability parameters. When using the SIP URI, the SIP

10   OPTIONS method is used to exchange terminal capabilities.

These and other embodiments according to the present invention are now illustrated in more detail with reference to the enclosed drawings.

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Brief description of the Drawings

Fig. 1 presents a schematic diagram of a combinational

20   network with User Equipment and network nodes connected to the combinational network.

Detailed Description

25   Without restrictions to the scope of the invention, in order to provide a thorough understanding of the present invention, the invention is presented against the background and within the scope of a current GSM/UMTS implementation of mobile communication system deployed in a combinational network

30   environment. However, the present invention may be deployed in any communication system comprising combinational networks.

Figure 1 illustrates schematically a combinational network 10 comprising several networks of different network type 11, 12,

35   13, with a first User Equipment (UE) 1 and a second UE 2 connected to all or at least two of the networks 11, 12, 13.
As to provide physical connection to the networks 11, 12, 13, the UE 1, 2 has network interfaces 1A, 1B, 1C, 2A, 2B, 2C, each

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associated with a network address, towards said networks 11, 12, 13.

For the explanation of the invention, it is arbitrarily assumed that the network 11 is a network of a CS-network type, and the networks 12 and 13 are of a PS-network type. In the present invention, it is assumed that the CS-call uses DTAP, ISUP and DSS1 as bearer. Other bearer types may be used.

The invention provides a solution to the problem of retrieving the PS-domain addresses and PS-domain terminal capabilities of a B-party's UE 1 by having the A-party's UE 2 query a B-party's UE 1 or a network service node 31, 32, 33, 34, 35 for the desired address(es) or terminal capabilities of the B-party's UE 1. The solution uses either one of the following two different types of queries:

a) UE 1, 2 initiated query using a CS-domain method,

b) UE 1, 2 initiated query using a PS-domain method.

ad a)

At the CS-domain based address retrieval method, the A-party's UE 2 deploys CS-domain methods via the CS network, in particular an Unstructured Supplementary Service Data mechanism [USSD, 3GPP TS 23.090] as to query either a service node 31, 32, 33, 34 35 in the network or the peer UE 1, to retrieve the PS-domain address(es) of the B-party's UE 1.

The invention provides that the A-party's UE 2, being a calling party in the CS-domain, generates a terminal-initiated Unstructured Supplementary Service Data mechanism [USSD, 3GPP TS 23.090] for retrieving the PS identifier(s) of the B-party's UE 1, being the called party in the CS-domain. When having received the called party's PS identifier such as an address, the calling A-party's UE 2 queries the called B-party's UE 1 directly to obtain the UE's 1 terminal capabilities. Depending on the terminal capabilities of A-party's UE 2, the presence of appropriate terminal capabilities of the B-party's UE 1 are highlighted on a Graphical User Interface GUI of the calling A-party's UE 2. The B-party may deploy the same method to retrieve the terminal capabilities of the A-party's UE 2.

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The USSD mechanism allows a user of the UE 1, 2 such as a Mobile Station, and a Public Land Mobile Network (PLMN) operator defined application to communicate in a way, which is transparent to the UE 1, 2 and to intermediate network entities.

5   According to 3GPP TS 23.090, which specifies the handling of USSD at the UE and network entities, a USSD mechanism is applied by the UE 1, 2 user, in a method described below:

The UE 1, 2 can at any time initiate a USSD request to the CS-network 11. When the A-party or B-party of the UE 1, 2 or an
10   application running in the UE 1, 2 makes a request for an address retrieval, wherein the UE 1, 2 determines to make use of the USSD mechanism, the UE 1, 2 sets up a transaction to the CS-network 11, sends the request to a Mobile Switching Centre (MSC) and awaits a response. When the UE 1, 2 receives a response. The
15   UE 1, 2 displays information contained in the response to the A- or B-party or relays the information to the application running in the UE 1, 2.

When the MSC receives a USSD request containing a Home Public Land Mobile Network (HPLMN) service code, the MSC sets up
20   a transaction to a Visitor Location Register (VLR) and forwards the USSD request unchanged to the VLR. When a VLR receives the USSD request containing the HPLMN service code and the UE 1, 2 is not in the HPLMN, the VLR sets up a transaction to the HLR and forwards the USSD request unchanged.

25   When the MSC receives a USSD request containing a local service code, the MSC and the VLR process the USSD request locally. When the USSD request is relayed to the HLR, the MSC and the VLR are transparent to any further USSD requests or responses (in either direction) for that transaction, passing
30   them between the MS and HLR without taking any action. When one transaction is released (MS-MSC/VLR or MSC/VLR-HLR), the MSC/VLR shall release the other transaction as well.

If the MSC or the VLR does not support an alphabet used in the USSD request, it shall set up a transaction to the VLR or
35   HLR respectively and forward the USSD request unchanged, in the same way as when the HPLMN service code is received.

According 3GPP TS 23.090, the HLR forwards the USSD request, or process the USSD request locally. The location,

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nature and contents of the USSD application(s) is, by definition, service provider and network operator dependent, but generally includes;

- setting up or releasing signalling and/or speech channels;
- passing the USSD request to another network entity (unchanged or changed);
- passing a different USSD request to another network entity; and/or
- requesting further information from the UE 1, 2 (one or more times).

Upon completion of handling the USSD request, the network entity shall respond to the USSD request and shall release the transaction.

The USSD-aided address retrieval of a PS-identifier is implemented in either of two ways.

- A-party's UE 2 sends USSD request to B-party's UE 1.
- A-party's UE 2 sends a USSD request to a network service.

At the first way of retrieving the PS identifier of the B-party's UE 1, the A-party's UE 2 sends the USSD request, via the CS-network directed to the B-party's UE 1, requesting PS-domain identifier(s) of the B-party's UE 1. In this first way, the A-party's UE 2 composes a USSD request inquiring about the Internet Protocol (IP) address of B-party's UE 1. If the A-party's UE 2 is in a Visited Public Land Mobile Network (VPLMN), the USSD request is received by the VLR and is sent to the HLR of the A-party in the HPLMN of the A-party. Upon analysis of the service code in the USSD request, it is detected that the PS-domain identifier(s) of the B-party's UE 1 is requested. The HLR initiates a second USSD request to the B-party's UE 1. This second USSD request towards the B-party's UE 1 may pass through the HLR of the B-party. An application in the B-party's UE 1 decodes the USSD request, and sends the requested PS-domain identifier(s) of the PS-terminal part of the B-party's UE 1 back to the A-party's UE 2. The response from the B-party may pass through the HLR of the B-party and the HLR of the A-party

When the B-party's UE 1 replies with a Session Initiation Protocol (SIP) Unified Resource Identifier URI, the A-party's UE

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2 subsequently sends a "SIP OPTIONS" message to B-party's UE 1, using the B-party's SIP URI, and inquires for the terminal capabilities of B-party's UE 1. In accordance with the terminal capabilities of B-party's UE 1, certain icons may be highlighted on the graphical interface of A-party's UE 2. The A-party's UE 2 sends pictures to the B-party's UE 1 if picture messaging gets enabled, based on the retrieved information on B-party's UE 1 terminal capabilities.

This first way of USSD-aided address retrieval requires that there are terminal applications loaded and running at the A-party's UE 2 and B-party's UE 1 that are able to send and process USSD queries and generate USSD responses. These applications, e.g. embedded in the A-party's UE 2 and in the B-party's UE 1 are proprietary or standardized; the latter is preferred to avoid interoperability problems.

It is an option that the B-party's UE 1 sends an acknowledgement using USSD signaling via the CS-network 11 and uses an entirely different protocol to send the PS-domain identifiers. Another option is that the incoming USSD request received at the B-party's UE 1, carries the IP-address of the A-party's UE 2 and thus the B-party's UE 1 directly uses this PS-domain network address information for further communication.

At the second way of this USSD-aided address retrieval the A-party's UE 2 sends a USSD message <u>directed to a network based service</u>. The service, implemented as a lookup database server 34 or a proxy server 35, returns a USSD response towards the A-party's UE 2. The difference with the first USSD-aided address retrieval way, presented above, is that instead of relaying the USSD message to the B-party's UE 1, the HLR sends a response to the A-party. Via the HLR, which may use Any Time Interrogation (ATI) [3GPP TS 23.078 v6.1.0 ch.11.3.3.1.2] to obtain information from the VLR or a Serving GPRS Support Node (SGSN) [3GPP TS 23.078 v6.1.0 ch.11.3.6.1.2] the "state" of a subscriber is made available, whereby the subscriber (here the B-party) is identified in the USSD request to HLR either by the International Mobile Subscriber Identity (IMSI) or the Mobile Station Integrated Services Digital Network (MSISDN) number. In

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particular, information is obtained about the "PS-Domain Subscriber State" and "Packet Data Protocol (PDP) Context Information List" of a subscriber. This list also contains the IP-address of the subscriber, in this case the IP-address of the B-party's UE 1, connected to the PS-network 12, 13.

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Depending on the requested PS-domain identifier, the HLR contact other network entities 21, 22, 31, 32, 33, 34, 35 that maintain appropriate databases (e.g. presence servers). Network nodes 21, 22, 32, 33, are arranged to retrieve the network address of UE 1, 2. The nodes 21 and 22 are comprised inside the network 11, 12, and the nodes 32, 33 are located external to the networks 11, 12, 13. Network node 31 is an E.164 number server [ENUM Network Working Group Request for Comments: 3761], network node is a lookup database server 34 and network node 35 is a proxy server 35. The network nodes 21, 22, 31, 32, 33, 34, 35 are attached to the networks 11, 12, 13 by means of associated connections 21A, 22A, 31A, 32A, 33A, 33B, 34A, 34B, 35A, 35B, 35C.

20   Also in this second way of USSD-aided address retrieval, the response is either based on CS-domain USSD signalling or uses another protocol to deliver the response.

Both these presented CS-domain based USSD-aided address retrieval ways are identical from A-party's UE 2 viewpoint, however they differ from the viewpoint of B-party's UE 1. These two CS-domain ways also differ from the network's viewpoint because in the first USSD-aided address retrieval way, the network is only relaying USSD messages while in the second USSD-aided address retrieval way, the service is implemented a network node as the lookup database server 34 or the proxy server 35, that intercepts the USSD message, processes it and takes actions. Radio resources of an access network (GSM/UMTS) towards the B-party's UE 1 are not used up in the second way, which is regarded as an advantage.

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ad b)

At the PS-domain based address retrieval method, the A-party's UE 2 deploys PS-domain methods via the PS-network, for

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example by means of SIP messages, towards an entity in the network such as the network nodes 21, 22, 31, 32, 33, 34, 35 that maintain appropriate databases (e.g. presence servers, lookup servers, proxy servers) as to retrieve the PS-domain

5   address(es) of the B-party's UE 1.

Since the A-party's UE 2 does not have the B-party's PS-domain address (neither IP nor SIP URI), the B-party's UE 1 cannot be contacted directly by the A-party's UE 2. Information regarding the B-party's UE 1, which is currently in an ongoing

10   CS-call with the A-party's UE 2, comprises the CS-domain network address, which is available to A-party's UE 2.

This CS-domain network address may be, among others, a telephone number of the called B-party's UE 1, MSISDN or IMSI.

The A-party's UE 2 queries a network service where the A-

15   party's UE 2 provides the network service with the telephone number (or IMSI, MSISDN) of the B-party's UE 1. This service is implemented using an E.164 number server 31 [ENUM Network Working Group Request for Comments: 3761].

20   Both the CS-domain and PS-domain based address retrieval methods described above, are carried out in the background without the intervention of the user of the UE 1, 2. By deploying the invention the A-party's UE 2 presents, depending on the graphical terminal capabilities of the A-party's UE 2, an

25   icon to appear on his/her GUI a few seconds after the set up of the CS-call.

With the implementation of this invention, either the A-party's UE 2 or the B-party's UE 1 initiates during an ongoing CS-call, a USSD mechanism as to query the other party's UE 1, 2

30   or the network nodes 21, 22, 31, 32, 33, 34, 35 in order to obtain the PS-domain address (e.g. IP address) of the UE 1, 2 of the other party.

The present invention provides an efficient and inventive

35   method for retrieving the PS-domain address and the terminal capabilities of the UE of the other party. An indication at the user's UE 1, 2 might be provided, indicating the other user's UE 1, 2 terminal capabilities.

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WHAT IS CLAIMED IS:

1.   A method for retrieving a network address of a first User
Equipment (1), within a telecommunication system comprising two
or more networks (11, 12, 13), where the networks (11, 12, 13)
are of different network types, where the two or more networks
(11, 12, 13) are connected to at least the first User Equipment
(1) having connections (1A, 1B, 1C), each associated with a
network address, to two or more of the networks (11, 12, 13),
wherein the method comprises the steps of:

- sending via the network (11, 12, 13) of a first network
  type a request for retrieval of the network address of the
  first User Equipment (1), the network address being of a
  second network type, the first network type being different
  from the second network type;

- receiving a reply comprising information regarding the
  requested network address of the first User Equipment (1).

2.   The method according to claim 1 wherein the reply is
received via the network of the first network type (11, 12, 13).

3.   The method according to claims 1 or 2 wherein the reply is
received via the network of the second network type (11, 12,
13).

4.   The method according to claims 1, 2 or 3 wherein the reply
is received via the network of a third network type (11, 12,
13).

5.   The method according to claims 1, 2, 3 or 4, wherein the
request is sent, and the reply is received, by a second User
Equipment (2) being connected to at least the same networks (11,
12, 13) where the first User Equipment (1) is connected to.

6.   The method according to claims 1, 2, 3, 4 or 5, wherein the
request is sent, and the reply is received, by a network node

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(21, 22, 31, 32, 33, 34, 35) being connected to, or comprised by, at least one of the networks (11, 12) where the first User Equipment (1) is connected to.

7.   The method according to any of the preceding claims, wherein the request is sent to, and the reply is received from, the first User Equipment (1).

8.   The method according to claims 6 or 7, wherein the request is sent to, and the reply is received from, the network node (34) arranged as lookup server for looking up the requested network address of the first User Equipment (1) and replying with the requested network address of the first User Equipment (1).

9.   The method according to claims 6, 7 or 8, wherein the request is sent to, and the reply is received from, the network node (35) arranged as proxy server capable of forwarding the request to, and receiving a reply from, the first User Equipment (1).

10.   The method according to claims 5, 6, 7, 8, or 9, wherein the first or the second User Equipment (1, 2) comprises a terminal with at least one connection (1A, 1B, 1C, 2A, 2B, 2C) to each connected network (11, 12, 13) where each of said connections has a network address such as a Dual Transfer Mode (DTM) terminal, a Global System for Mobile communications – General Packet Radio System (GSM-GPRS) terminal or a Universal Mobile Telecommunication System Multi Radio Access Bearer (UMTS Multi-RAB) terminal.

11.   The method according to any of the claims 5 – 10, wherein the first or the second User Equipment (1, 2) comprises two or more terminals where each of the terminals has at least one connection (1A, 1B, 1C, 2A, 2B, 2C) to each connected network (11, 12, 13) where each of said connections has a network address.

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12. The method according to claim 11 where the terminals are capable of deploying a communication session such as speech, audio, video, e-mail, text-messages or data, by means of a device such as a telephone, headset, Global System for Mobile communications (GSM) terminal, Advanced Mobile Phone System (AMPS) or Digital AMPS (D-AMPS) terminal, Digital Enhanced Cordless Telephony (DECT) terminal, Bluetooth terminal, Universal Mobile Telecommunication System (UMTS) terminal, video terminal, Personal Computer (PC) or workstation.

13. The method according to claims 10, 11 or 12 where the terminal (1, 2) has a wire-line connection to the one or more networks (11, 12, 13) or a wireless connection to the one or more networks (11, 12, 13).

14. The method according to any of the preceding claims wherein the networks (11, 12, 13) and the associated network addresses are of Circuit Switched (CS) network type or Packet Switched (PS) network type.

15. The method according to claim 14 wherein the request via the CS type network is sent or the reply received according to a CS protocol such as an Unstructured Supplementary Service Data (USSD) protocol message.

16. The method according to claims 14 or 15 wherein the request via the PS type network is sent or the reply received according to a PS protocol such as a Session Initiation Protocol (SIP) protocol message.

17. The method according to claims 14, 15 or 16 wherein the network address is a CS network address, such as a telephone subscriber number such as Mobile Station Integrated Services Digital Network (MSISDN) number, a Public Switched Telecommunications Network (PSTN) number, a Virtual Private Network (VPN) private number or a number according to a E.164 International Telecommunication Union (ITU) recommendation.

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18. The method according to claims 14, 15, 16 or 17 wherein the network address is a PS network address, such as a PS network identifier or number such as SIP Uniform Resource Indicator (URI), Local Area Network (LAN) Media Access Control (MAC) layer address such as an Ethernet MAC address, or Internet Protocol (IP) address.

19. A method for retrieving a network address of a first User Equipment (1), within a telecommunication system comprising two or more networks (11, 12, 13), where the networks (11, 12, 13) are of different network types, where the two or more networks (11, 12, 13) are connected to at least the first User Equipment (1) having connections (1A, 1B, 1C), each associated with a network address, to two or more of the networks (11, 12, 13), wherein the method comprises the steps of:
   - receiving via the network (11, 12, 13) of a first network type a request for retrieval of the network address of the first User Equipment (1), the network address being of a second network type, the first network type being different from the second network type;
   - looking up the requested network address of the first User Equipment (1), and
   - sending a reply comprising the looked up network address of the first User Equipment (1).

20. The method according to claim 19 wherein the reply with the looked up one or more first User Equipment's network address is sent via the network (11, 12, 13) of the first network type, via the network of the second network type (11) or via the network of a third network type (13).

21. The method according to claims 19 or 20, wherein the request is received from, and the reply is sent to, a second User Equipment (2) or a network node (21, 22, 31, 32, 33) being connected to, or comprised by, at least the same networks (11, 12, 13) where the first User Equipment (1) is connected to.

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22.   The method according to claims 19, 20 or 21, wherein the looking up step comprises a query to a database holding the requested network address, a dialog with an application capable of passing back the requested network address, or forwarding

5   said request to the User Equipment (1) and receiving the requested network address.

23.   The method according to any of the claims 19 - 22, wherein the first or the second User Equipment (1, 2) comprises a

10   terminal with at least one connection to each connected network (11, 12, 13) where each of said connections has a network address, such as a Dual Transfer Mode (DTM) terminal, a Global System for Mobile communications - General Packet Radio System (GSM-GPRS) terminal or a Universal Mobile Telecommunication

15   System Multi Radio Access Bearer (UMTS Multi-RAB) terminal.

24.   The method according to any of the claims 19 - 23, wherein the first or the second User Equipment (1, 2) comprises a terminal, with at least one connection to each connected network

20   (11, 12, 13) where each of said connections has a network address, such as a Dual Transfer Mode (DTM) terminal.

25.   The method according to any of the claims 19 - 24, wherein the first or the second User Equipment (1, 2) comprises two or

25   more terminals where each of the terminals has at least one connection to each connected network (11, 12, 13) where each of said connections has a network address.

26.   The method according to claims 23, 24 or 25 where the

30   terminals (1, 2) are capable of deploying a communication session such as speech, audio, video, e-mail, text-messages or data, by means of a device such as a telephone, headset, Global System for Mobile communications (GSM) terminal, Advanced Mobile Phone System (AMPS) or Digital AMPS (D-AMPS) terminal, Digital

35   Enhanced Cordless Telephony (DECT) terminal, Bluetooth terminal, Universal Mobile Telecommunication System (UMTS) terminal, video terminal, Personal Computer (PC) or workstation.

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27.   The method according to claims 23, 24, 25 or 26 where the terminal (1, 2) has a wire-line connection to the one or more networks (11, 12, 13) or a wireless connection to the one or more networks (11, 12, 13).

28.   The method according to any of the preceding claims wherein the networks (11, 12, 13) and associated network addresses are of a different network type being a Circuit Switched (CS) type or a Packet Switched (PS) type.

29.   The method according to claim 28 wherein the request via the CS type network is received or the reply is sent according to a CS protocol such as an Unstructured Supplementary Service Data (USSD) protocol message.

30.   The method according to claims 28 or 29 wherein the request via the PS type network is received or the reply is sent according to a PS protocol such as the Session Initiation Protocol (SIP) protocol.

31.   The method according to claims 28, 29 or 30 wherein the network address is a CS network address, such as a telephone subscriber number such as Mobile Station Integrated Services Digital Network (MSISDN) number, a Public Switched Telecommunications Network (PSTN) number, or a Virtual Private Network (VPN) private number, or a number according to a E.164 International Telecommunication Union (ITU) recommendation.

32.   The method according to claims 28, 29, 30 or 31 wherein the network address is a PS network address, such as a PS network identifier or number such as SIP Uniform Resource Indicator (URI), Local Area Network (LAN) Media Access Control (MAC) layer address such as an Ethernet MAC address, or Internet Protocol (IP) address.

33.   A network device (2, 21, 22, 31, 32, 33) for operating in a telecommunication system, the device (2, 21, 22, 31, 32, 33) arranged for retrieving a network address of a first User

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Equipment (1), the system further comprising two or more networks (11, 12, 13), where the networks (11, 12, 13) are of different network types, where the networks (11, 12, 13) are connected to at least the first User Equipment (1) having
5   connections (1A, 1B, 1C), each associated with a network address, to two or more of the networks (11, 12, 13), and where the device is connected to at least one of the networks (11, 12, 13), in common connected with the first User Equipment (1), by means of at least one connection (2A, 2B, 2C, 21A, 22A, 31A,
10   32A, 33A, 33B) wherein the device comprises an Input/Output unit, in cooperation with network interfaces representing the connections (2A, 2B, 2C, 21A, 22A, 31A, 32A, 33A, 33B), for sending via the network of a first network type (11, 12, 13) a request for retrieval of the network address of the first User
15   Equipment (1) of a second network type and for receiving a reply comprising information regarding the requested network address of the first User Equipment (1), by means of the same or another network connection (2A, 2B, 2C, 21A, 22A, 31A, 32A, 33A, 33B) of the device, the first network type being different from the
20   second network type

34. deleted.

25   35. The network device according to claim 33 or 34, wherein a processing unit, provided with memory means, generates the request and processes the reply.

36. The network device according to claims 33, 34 or 35,
30   wherein the device is represented by a second User Equipment (2) or a network node (21, 22, 31, 32, 33).

37. The network device according to claim 36, wherein the second User Equipment (2) comprises a terminal, with at least
35   one connection to each connected network (11, 12, 13) where each of said connections has a network address, such as a Dual Transfer Mode (DTM) terminal, a Global System for Mobile communications – General Packet Radio System (GSM-GPRS) terminal

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or a Universal Mobile Telecommunication System Multi Radio Access Bearer (UMTS Multi-RAB) terminal.

38.   The network device according to claims 36 or 37, wherein the second User Equipment (2) comprises two or more terminals where each of the terminals has at least one connection to each connected network (11, 12, 13) where each of said connections has a network address.

39.   The network device according to claims 37 or 38 where the terminal (2) is capable of deploying a communication session such as speech, audio, video, e-mail, text-messages or data, by means of a device such as a telephone, headset, Global System for Mobile communications (GSM) terminal, Advanced Mobile Phone System (AMPS) or Digital AMPS (D-AMPS) terminal, Digital Enhanced Cordless Telephony (DECT) terminal, Bluetooth terminal, Universal Mobile Telecommunication System (UMTS) terminal, video terminal, Personal Computer (PC) or workstation.

40.   The network device according to claims 37, 38 or 39 where the terminal (2) has a wire-line connection to the one or more networks (11, 12, 13) or a wireless connection to the one or more networks (11, 12, 13).

41.   The network device according to any of the claims 33 - 41, wherein the networks (11, 12, 13) and associated network addresses are of a different network type such as Circuit Switched (CS) type and/or Packet Switched (PS) type.

42.   A network device (1, 34, 35) comprised by a telecommunication system, the device (1, 34, 35) arranged for providing a network address of a first User Equipment (1), the system further comprising two or more networks (11, 12, 13), where the networks (11, 12, 13) are of different network types, where the two or more networks (11, 12, 13) are connected to at least the first User Equipment (1) having connections (1A, 1B, 1C), each associated with a network address, to two or more of the networks (11, 12, 13), and wherein the device is connected

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to two or more of the networks by means of at least one connection (1A, 1B, 1C, 34A, 34B, 35A, 35B, 35C), wherein the device comprises a processing unit and an Input/Output (I/O) unit for receiving via the network (11, 12, 13) of a first network type a request for retrieval of the network address of a second network type of the first User Equipment (1), the first network type being different from the second network type, for looking up the requested network address of the first User Equipment and for sending a reply comprising the looked up network address of the first User Equipment.

43. deleted

44. The network device according to claim 42, wherein the processing unit, provided with memory means, processes the request passed by the I/O unit, looks-up the requested network address, and provides the result to the I/O unit.

45. The network device according to claims 42, 43 or 44, wherein the device is represented by a first User Equipment (1) or a network node (34, 35).

46. The network device according to claim 45, wherein the network node (34) is arranged as a lookup database server where the network addresses for the first User Equipment (1) are stored.

47. The network device according to claims 45 or 46, wherein the network node (35) is arranged as a proxy server, capable of forwarding the request to, and receiving a reply from, the first User Equipment (1).

48. The network device according to claims 45, 46 or 47, wherein the first User Equipment (1) comprises a terminal, with at least one connection to each connected network (11, 12, 13) where each of said connections has a network address, such as a Dual Transfer Mode (DTM) terminal, a Global System for Mobile communications - General Packet Radio System (GSM-GPRS) terminal

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or a Universal Mobile Telecommunication System Multi Radio Access Bearer (UMTS Multi-RAB) terminal.

49.   The network device according to claims 45, 46, 47 or 48,
wherein the first User Equipment (1) comprises two or more terminals where each of the terminals has at least one connection to each connected network (11, 12, 13) where each of said connections has a network address.

50.   The network device according to claims 48 or 49, where the terminals are capable of deploying a communication session such as speech, audio, video, or data, by means of a device such as a telephone, headset, Global System for Mobile communications (GSM) terminal, Advanced Mobile Phone System (AMPS) or Digital AMPS (D-AMPS) terminal, Digital Enhanced Cordless Telephony (DECT) terminal, Bluetooth terminal, Universal Mobile Telecommunication System (UMTS) terminal, video terminal, Personal Computer (PC) or workstation.

51.   The network device according to claims 48, 49, or 50 where the terminal (1) has a wire-line connection to at least one of the networks (11, 12, 13) or a wireless connection to at least one the networks (11, 12, 13).

52.   The method according to any of the claims 42 - 51, wherein the networks (11, 12, 13) and associated network addresses are of a different network type such as Circuit Switched (CS) type and/or Packet Switched (PS) type.

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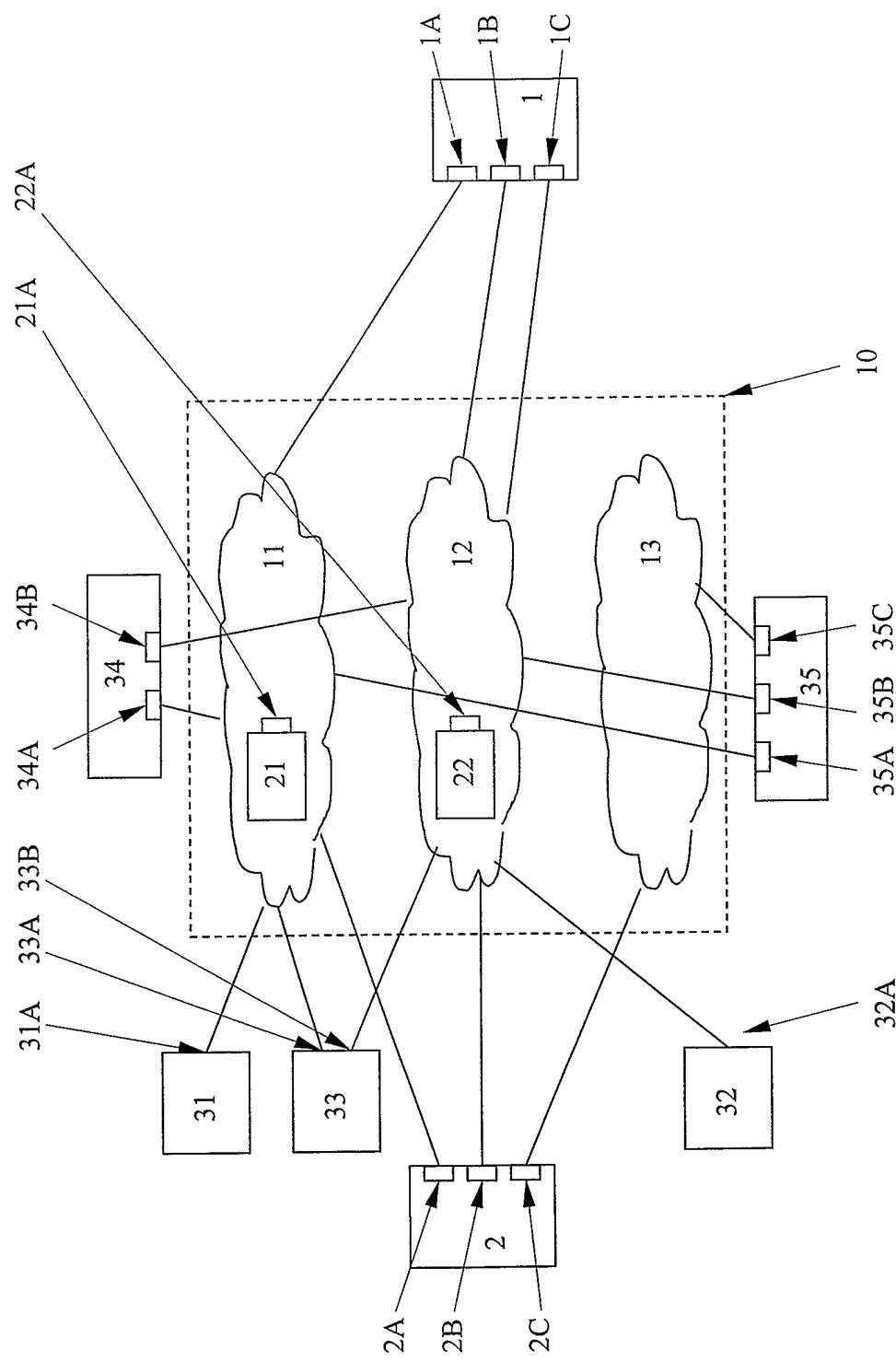
Figure 1

INT**E**RNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7   H04M7/00

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)
IPC 7   H04M   H04L   H04Q

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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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| X | Further documents are listed in the continuation of box C. | | X | Patent family members are listed in annex. |

Date of the actual completion of the international search	Date of mailing of the international search report
12 October 2005	19/10/2005

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