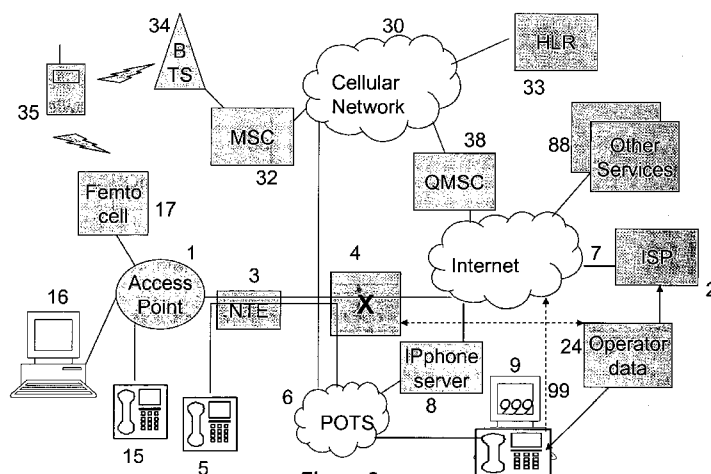


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(54) Title: NETWORK ACCESS EQUIPMENT



- (57) Abstract:** When a telecommunications connection is established over a packet switched network (4) between a network access point (1) and a network-based service provisioning system (2), the network access point retrieves a geographical identity associated with the physical network termination (3) to which that termination is connected, and stores that identity for use by applications running on computer equipment (15, 16, 17) co-operating with the network access point. This allows location-based services to be provided to the user without input of an address. A particular application provides for a call centre (9) to identify the physical location of a voice call originating from an Internet-protocol telephone (15) or through a femtocell (17).

Network Access Equipment

This invention relates to communications equipment, and in particular to the provision of location-based services over a data network such as the
5 "Internet".

There are many data services which require a location to be specified. Such services include the provision of mapping, travel advice, weather information, listings of television broadcast services, and delivery addresses for internet shopping. Some internet telephony services also require location data,
10 for example to distinguish local, long distance (trunk) and international calls, to route calls to a call centre local to the user, or to identify the location of a caller to the emergency services.

For some of these services it is possible for a user to specify a location for which he requires information, but it would nevertheless be useful to identify
15 a default location, preferably that from which the call is being made. In other situations the user may be unable to identify his own location, so provision of such an automatic default location would be useful.

In the conventional telephone system, the line from which the call is made is uniquely identifiable with a geographic address, and this is used for
20 routing to call centres, or to identify the location of a caller to the emergency services. In a conventional cellular network, the user location can be determined by reference to the base transceiver site through which the connection is made.

However, for internet-based services the situation is more complicated,
25 as any requests for data, voice calls, etc, are passed through a network service provider's server equipment and there is no standardised way for the service provider to identify the physical network termination, as distinct from the user identity, from which the connection has been made. If the user has a mobile terminal, capable of connection to the internet network at any of a large number
30 of access points, the same user identity may appear in many different places at different times.

An internet network access point (also known as a "home hub") is a modem connectable to the network, through a fixed network "broadband" connection. An example of such a connection is shown in Figure 3, in which an access point 1 is connected to a user terminal 16 and connected to the Internet 7 through a network termination point 3 (the interface between the customer equipment and the network operator's equipment) and a telecommunications switch 4. The connection to the user terminal 16 may be a physical "wired" connection or a wireless connection. The installation process for such an access point currently requires a user to specify the network termination 3 to which the network access point 1 is connected in order to associate the network "point of presence" (PoP) 22, (Figure 2) with the correct network termination. This is typically achieved by specifying the directory number associated with that line – note that this is the analogue "POTS" (plain old telephone system) number, and is distinct from the directory number of any "internet" phone 16 that may currently be served by the network access point. (The directory number of an internet phone is translated by the network into an IP address so that and incoming calls to that phone are directed via the internet to the PoP). Provision of such a default location is possible if the network termination maintains a record of its location.

The applications 8 accessed by the user are unaware of the geographical location to which the data is sent unless the user specifies it in his data request. Even if the telephone number associated with the user's PoP were known, it would be difficult for applications operators to translate a telephone number into a geographical location without a thorough knowledge of the network topology, especially given the increasing portability even of so-called "geographically-based" telephone numbers.

A particular issue arises with the use of femtocells. A femtocell, also known as an "access point base station", is a device which provides the functionality of a base station for cellular telephony through an internet-based connection. Their intended purpose is to provide access to the cellular network for cellular handsets at locations where there is poor, or no, reception from the

established "macrocells" installed by the network operators. As also shown in Figure 3, connection to the cellular network infrastructure is made from the femtocell 17, through a network access point 1 and the internet 7, to an application server 38 known as a "quasi-MSC" which appears, to the cellular
5 network 30, as a standard mobile switching centre. It is important to note that femtocells can operate quite independently of any macrocell base stations 34 that may be in the vicinity. Consequently, even if there is cellular network coverage available at the femtocell site, the femtocell 17 does not appear on the "neighbour list" of any nearby base stations 34, and has no "neighbour list" of its
10 own,. When a handset 35 within range of a macrocell 34 moves into or out of range of a femtocell 17, it is simply recorded in the network operator's location register 33 as having ended contact with one cell 34, accessed through a first switching centre 32, and has become associated with another cell 17 accessed through a second switching centre 38, or vice versa.

15 Femtocells are embodied as small transportable devices, which may be taken from one location to another as required by their owners to provide coverage wherever they may currently need it. Location-based data dependant on the identity of the access point through which a terminal is operating cannot be readily provided, as the location of the access point can be changed at will.
20 Unlike a standard cellular base station ("macrocell") the identity of the femtocell cannot therefore itself be used as a surrogate for the location of mobile terminals working to it. So, for example, in the case of an emergency call via a femtocell-enabled site, the emergency service operator 9 cannot direct help to the site unless the caller is able to identify his location. In contrast, for a call
25 connected through a fixed macrocell 34, the switching centres 32 are configured to provide the emergency service operator with the geographical location of the macrocell 34 from which the call is made, allowing the emergency service operator to identify at least the approximate location of the caller and mobilise the appropriate fire, ambulance or police station to arrange attendance.

30 Existing internet telephone systems require the user to associate the internet telephone 15 with an access point 1 coupled to a particular broadband

connection 3 when it is installed. This data is held by the Internet Phone application 8. This approach is only workable if the handset is associated with a specified access point (router), and the access point is itself associated with a specified physical network termination.

- 5 It is known, for example from the "Dynamic Host Configuration Protocol" disclosed in a paper published by the Internet Engineering Task Force (IETF) on July 1st, 2004, to provide a mobile device with information relating to its geographic location as part of its configuration process by maintaining a mapping of circuit identities with the geographic locations of their termination
- 10 points and, during the configuration process, transmitting a message to the device reporting the geographic location corresponding to the access point's circuit identity. International patent application WO2006/024791 (France Telecom) also describes such a system, although in that case the location information is stored in a network-based database.
- 15 However, both these systems assume the location of the access point to be known and fixed. If the network access point is itself moved to another location then the information will point to the wrong location unless the information can be updated.

According to a first aspect of the invention, there is provided a method

20 of establishing a telecommunications connection over a packet switched network between a network access point and a network-based service provisioning system, wherein

the network access point equipment is connected to a termination of a data network,

25 communication is established between the network access point equipment and the network-based service provisioning system,

the network-based service provisioning system identifies the physical network termination to which the network access point is connected,

the network-based service provisioning system retrieves from a

30 network-based database a geographical identity associated with that network termination,

the network-based service provisioning system transmits that identity to the network access point,

the network access point stores that identity in a database at the network access point for subsequent access by network-based application servers when accessed by the network access point equipment.

According to another aspect, there is provided a network access point equipment for connection to a telecommunications network termination over a packet switched network, comprising a network interface unit for establishing communication with a network-based service provisioning system, a data retrieval unit for retrieving, from the service provisioning system, a geographical identity, and a data store for storing the geographical identity,

According to a further aspect, complementary to the previously-recited aspect, there is provided a network-based service provisioning system for communication over a packet-switched network with one or more network access point equipments, the service provisioning system comprising a data storage unit for storing a concordance between the network identity of each termination point of the packet switched network and a respective geographical location identity, a termination detection unit responsive to the connection of access point equipment to a termination point of the network, a data retrieval unit for retrieving, from the data storage unit, a geographical identity of the termination through which the newly-detected access point is connected, and a data transmission unit for transmitting the geographical identity to the network access point.

Storing the geographic location identity in the access point itself makes it more readily available to any applications requiring it than if it were in a network-based data store. It is also more readily updated than would be the case if it were in a user device connected to the network through such an access point. It also allows more reliable updating as the act of reconnecting the access point to the network provisioning system can be used to trigger the data acquisition process.

The application server may transmit a confirmation request to the client unit for confirmation or alteration of the geographical data provided in response

to the original request, the client unit transmitting a response confirming or altering the data to be applied by the application server, and the application server applying the original or altered data accordingly.

5 The application server may be associated with a telephony call centre system and arranged to identify calls originating from an internet-based line and interrogates the access point associated with the origin of such a call for its location data.

10 Alternatively, the application client and application server may co-operate to provide telephony services over the packet switched network. The application client may be a femtocell unit and the application server may be a complementary quasi mobile switching centre for interconnecting a femtocell with a cellular telephone network.

15 This invention allows the location information to be associated with the broadband line and not the network access point equipment ("router"); so that when a network access point equipment is connected to a network termination, it can obtain the relevant location information from the line identity and line installation information. This allows a service provider to obtain information relating to the identity of the network termination currently associated with a given network access point, and thus provide location information based on that
20 network termination identity, together with data relating the network topology to geographical location – e.g. grid reference or postcode.

The exchange of data may also be used to authenticate the provision of service to the access point equipment over the network connection.

25 An additional feature of this invention is that, because the router (access point equipment) maintains a record of its current location it can itself provide location data to server applications requiring it, without the need for the client device to retrieve that information for itself.

30 On installation and connection to the network, the network access point preferably updates location information automatically by interrogating a server associated with the ISP network. Should the user transfer the access point

equipment from one network connection to another, the interrogation process will be repeated on re-connection, thus updating the location. Should the customer premises equipment be disconnected from the network, it preferably re-initiates the process when it is re-connected. This ensures that correct
5 location information is held in the CPE wherever it is installed, as it may have been transferred from one line termination to another. Alternatively, if a device is moved from its original location, it may be disabled until re-enabled by a service engineer after authentication that the new location is legitimate. The device may re-enable itself if it is returned to the original broadband line.

10 The location storage function could be made a standard requirement for broadband service network access points, so that a common method of emergency service location access can be defined for any internet-based telephony calls, including those made from femtocells. .

The information held could be the geographic telephone number of the
15 service associated with the broadband line or indeed the broadband identifiers. It could instead be the full postal address of the broadband terminating site, the latitude and longitude of the location, or a map grid reference such as those provided by the United Kingdom's Ordnance Survey, the French IGN (Institut Geographique National) or the United States MGRS. Alternatively, it could be
20 an encrypted code that a centralised database can extract and use to recover information from a central database containing site location addresses

The process by which the access point equipment determines its location can make use of the fact that, for a fixed network, the network operator has data available for the geographical location of each network termination. As
25 previously discussed, this may be by reference to some geographical identifier such as grid reference, but is typically defined by the postal address, since it is necessary for the network operator to know this for maintenance and billing purposes. This information is held on at least one of the service provider systems, as is also the location of the last serving piece of line plant, i.e. cabinet
30 or distribution pole for every physical piece of copper cable, and the equivalent for the end point of fibre optic circuits.

This information provides the basis for the co-ordination of the delivery of a broadband circuit with the delivery information from a customer, and co-ordination of end point records with that of the line plant records. There are thus several sets of information that can be used to ascertain the accuracy of the terminating point location recorded for a given circuit. By comparing these pieces of information, the service provider can provide with a high level of certainty the location of the broadband service line.

In the embodiment, a system is implemented in the network to detect the connection of an end user network access point/ADSL modem combination to a line, retrieves a location reference for that line and downloads that location reference to the access terminal. This reference may be a complete postal address, a grid reference, or defined by some other standard reference agreed between operators and equipment suppliers. Equipment suppliers would be required to provide a memory location and standardised means of writing and reading it remotely.

A call centre operator, for example for the emergency services, would be provided with a system that can interrogate the broadband terminating network access point when a call from an internet-based line is received. The system would also interrogate the broadband network access point associated with any mobile call, (identified by mobile number calling ID) for which no cell identity is provided. This will allow the location storage area in the network access point to be accessed and the information to be retrieved and used to direct emergency services to the calling location.

Alternatively, the internet telephony platform or femtocell qMSC can be arranged to store the data in a form compatible with the fixed line data or cellular location data already maintained for more conventional systems. This allows the call centre equipment to be conventional, but requires alteration of the location data stores to accommodate the additional, and more changeable, location data.

An embodiment of the invention will now be described with reference to the drawings, in which

Figure 1 is a schematic illustration of network access point equipment operating according to the invention

Figure 2 is a schematic illustration of an internet service provisioning system operating according to the invention

5 Figure 3 is a schematic illustration of a communications network illustrating the context in which the invention operates

Figure 4 is a flow diagram illustrating the process by which location information is loaded into the network access point

10 Figure 5 is a flow diagram illustrating the process by which location information is retrieved from the network access point.

It should be noted that many of the functional elements depicted in the Figures, and in particular in Figures 1 and 2, may be embodied as software running on a programmable device.

Figure 1 is a schematic illustration of network access point equipment 1 operable according to the invention. The equipment has a router 10 which allows data to be directed between a connection to a network termination 3 and a number of user connections 15, 16, 17. These user connections may be wireless or by a fixed line such as an Ethernet or USB connection. As depicted in Figure 3, the user connections may be connected to an internet-enabled voice connection 15, a computer 16 and a femtocell 17, but this is only illustrative and other internet-compatible devices may also be connected.

In addition to these conventional features, the access point equipment 1 has a connection detection system 11 which is responsive to connection and disconnection of the device from the network termination 3. This detection system controls a location request "client" 12 which co-operates with a location providing "server" 20 provided by the service provisioning system to be described with reference to Figure 2 to obtain a location identifier, for storage in a memory 13 provided for the purpose. The router also co-operates with a location provision function 14 which is responsive to data requests delivered to it, by the router 10, to retrieve the information stored in the memory 13.

Figure 2 is a schematic illustration of an internet service provisioning (ISP) system 2 operating according to the invention. The provisioning system is

the point of contact with the user's service provider. It comprises a server 20 which handles traffic over the Internet to and from the individual users. One of the functions of the provisioning systems is an authorisation processor 21 which validates the user's access details when connection is made to the network so
5 that the current network address can be identified as relating to an authorised user. The ISP 2 also provides a "point of presence" (PoP) which acts as a surrogate for the user as seen by other services 8, 9, 38, 88, so that data can be routed thereto. It is this concept of a surrogate point-of-presence which allows individual users to receive data over the Internet, but as the point-of-
10 presence may be some distance from the user access point, it makes it difficult for such other services to identify the user's true location.

According to the invention a further item of data is provided by the service provider 2. This is a concordance 23 between each network address and a geographical location identified with that address.

15 The concordance 23 is maintained by periodic updates from the operator of the physical network (indicated by the arrow 24). Information recording the geographical location of each network termination 3 is already available to operators, for example to direct maintenance staff to the correct geographical location when a connection needs attention, for example to investigate a
20 reported fault, or to identify which lines are available when a new installation is to be made at a specified address. Geographical information relating to network termination location is also already routinely provided to the operators of emergency services so that the appropriate service can be despatched to the assistance of the caller even if the caller is unable to provide any coherent
25 address. This is a relatively simple matter when the call is provided through a circuit-switched system 5, as a direct connection is provided between the caller and called party throughout the call. In a packet-switched connection 7 this is not so straightforward, as no consistent end-to-end connection is provided – different packets may take different routes through the system, making it harder
30 to trace the source of the call.

Figure 3 is a schematic illustration of a communications network illustrating the context in which the invention operates. In practice there would

be several access points served from each service provisioning system, but for simplicity only one access point 1 and one service provisioning system 2 are depicted. The access point 1 is connected through a network termination point 3 and a network switch 4 giving access to the internet 7, through which access is
5 available to the service provisioning system 2, and to various internet-based services 8, 9, 38, 88.

The switch 4 also provides a connection to the conventional circuit switched system 6, allowing a conventional telephone connection 5 – 6 to be provided.

10 Among the internet-based services 88 available is an internet telephone service 8, allowing connection between an internet-enabled handset 15 and other parties connectable through the traditional telephone system 5, similarly to the interconnections between the cellular network 30 and the traditional network 5. Other services 88 accessible through the internet include home shopping
15 services and mapping services, some of which may require location-based information from the user.

A further service available through the internet is access to a cellular network through a “quasi-MSC” (mobile switching centre) 38, which allows a femtocell 17 connected to an access point 1 to act as a base station for cellular
20 telephony. Essentially the femtocell 17 appears to a mobile handset 35 as a conventional base transceiver site 34, whilst the Quasi-MSC 38 appears to the cellular network 30 as a conventional MSC 32. As the handset 35 moves in and out of range of the femtocell 17 and BTS 34, the switching centres 38, 32 report these changes to a home location register 33 associated with the network to
25 allow incoming calls to the handset 35 to be routed appropriately for the current location of the handset 35.

The mode of operation of this embodiment will now be described with reference to Figure 4, which illustrates the data capture process, and Figure 5 which illustrates the data retrieval process.

30 Referring to Figure 4, when the connection detection system 11 detects that the access point equipment 1 has been newly connected to a network 4 it indicates this fact to the location request system 12 (step 40). The location

request system 12 then transmits a request to the user's internet service provider 2 (step 41) for a location identifier.

The service provider's server 2, on receiving such a request 41, identifies the network address from which the request is received. This is possible because at the interface between the packet switched network 7 and the customer line 3, the exchange 4 can identify the physical access point 3 through which the access point is connected. This information is conventionally used to identify whether the equipment is permitted to be connected to that termination, but is here used to interrogate the concordance store 23 in order to retrieve a geographic identity (step 42).

At the same time, authorisation checks are carried out (step 43) to ensure that the access point is authorised to connect to the network.

The geographic identity is returned to the location request client 12 in the requesting access point 1 (step 44), which passes the identity to the location store 13 (step 45) for subsequent retrieval as required, and as will now be described with reference to Figure 5.

When a client application on a user terminal e.g. 16 transmits a request 51 for data, the router 10 forwards the request by way of the access network 3, 4 and the internet 7 to the appropriate web-based application 88. Similarly, if the request is from an internet-based phone handset 15 the request is forwarded to a web-based voice services platform 8.

Some applications require location data in order to provide an answer to a user's request. Such applications include mapping and route finding services such as "Multimap"™, travel advice services such as "The Train Line", home delivery services such as "Amazon"™, weather information, and listings of television broadcast services. For internet telephony applications 8, location data can be useful to call-handling systems 9 to identify the geographical location of the caller and allow routing of the call to a call centre handler 9 with local knowledge.

There are some circumstances in which the user is not aware of his location, and many others where it would be convenient to provide a default location. There are also some services whose availability is subject to territorial

restrictions, for example because of censorship laws, franchise restrictions (for instance in streaming services such as the BBC's "iPlayer"), or regulatory restrictions (for example in share dealing), and such restrictions could be circumvented if the location information were to be supplied by a user's own
5 input.

In the present invention, if the web application 8, 9, 38, 88 requires location data from the user it returns a request 52 to the originating internet address, which is received at the internet service provider 20 acting as the user's "point of presence" and forwarded to the router 10 in the user's access
10 point equipment.

This request is to be fulfilled not by the user providing a manual entry, as is conventional, but by reference to data stored in the user's access point equipment 1. The request 52 is therefore addressed not to the network address of the requesting terminal 16, but to a separate location provision function 14
15 accessible from the router 10. The router 10 thus forwards the request (52) to the location provision function 14 which retrieves the location data currently stored in the location register 13 (step 53).

The location data is then delivered to the application 8, 9, 38, 88 by way of the router 10, and network 3, 4, 7 (step 54).

It is envisaged that the location data be held in the concordance store 23 in a standardised form recognisable by any application 8, 9, 38, 88 requiring the data. The location data may be translated by the application 8, 9, 38, 88 into some other format more appropriate for the individual application, e.g. map reference, post code data, or a more general (less specific) format such as
20 country or time zone.

For some applications a default location retrieved in this way may be overridden, for example if a user requires a delivery address, weather information or travel directions based on a location other than his current position. This can be achieved by sending a separate request 55, this time
30 addressed to the user terminal 16 rather than the location provision system 14, for an over-ride location. This, in the form of a user input 56, can be returned to the application 8 (step 57). Should the user not wish his location to be made

known to the operator of the individual web application, he may also be given the options of proceeding with the session without location information, or of cancelling the session.

The user terminal 15, 16 and web application 8, 9, 38, 88 can then co-operate (58) to provide the required location-based service.

Figure 6 shows the information flows performed when a telephone call is made from a mobile telephone connected to a femtocell, and when it is connected to an ordinary base transceiver station. All the elements depicted in Figure 6 are also to be found in Figure 3, but certain elements not relevant to the following discussion have been omitted from Figure 6.

As already discussed, the home location register (HLR) maintains a record of the base transceiver site 34 or other connection 17 to which a handset 35 is currently working. This is primarily to allow calls to be routed to the handset 35. However, the information is also available to the emergency services 9 in order to allow calls to be traced and assistance directed to the location from which the call is made. This is analogous to the supply of network data 24 to the services depicted in Figure 3, but changes take place on a much more rapid timescale.

When a normal call is made from a cellular telephone 35, as shown by the curve 61, the call is routed by way of a base transceiver station 34 and a mobile switching station (MSC) 32 to the cellular network 30, from where the call may be directed by the conventional telephone network 6 to a called party 9. Operators such as the emergency services which have access to the location data in the HLR 33 can use it to trace the location from which the call was made.

However, when a call is made through a femtocell 17 (curve 60) the call is routed to a quasi mobile switching centre 38 by way of a network access point 1, switch 4 and the internet 7. The quasi-MSC 38 appears to the network 30, and the HLR 33, as a normal MSC 32, and the call is routed through the network 30, 6 to the called party 9 in the same way. However, although the HLR 33 can provide the network identity of the femtocell 17 to the called party 9 exactly as it would for a fixed BTS, the HLR 33 cannot identify its geographical

location because the femtocell 17, unlike the BTS 34, is a portable device and can be connected to any access point 1, which can in turn be connected to any network termination 3.

This may be resolved in either of two possible ways. The call centre 9
5 may itself be configured as a network application server, operating in a similar manner to the servers 8, 88 already discussed. A call centre operator, for example for the emergency services, would be provided with a system that can connect through the Internet 7 (as indicated by dotted line 99 in Figures 3 and 6) to interrogate the broadband terminating network access point 1 when a call
10 from an internet-based line is received. The system would also interrogate the broadband network access point associated with any mobile call, (identified by mobile number calling ID) for which no cell identity is provided in the HLR 33. This will allow the location storage area in the network access point to be accessed and the information to be retrieved and used to direct emergency
15 services to the calling location.

Alternatively, when the QMSC 38 detects a femtocell 17 establishing a connection over the internet 7, they co-operate in the manner previously described with reference to Figure 5 for other server (8, 88) / client (15, 16) connections so that the QMSC 38 can retrieve the location data 13 which can
20 identify the location of the access point to which the femtocell 17 is connected. This information may be retrieved directly from the QMSC 38 by the call centre 9, when a call is connected through the femtocell 17, or it may be forwarded to the HLR 33 and stored there, as with the more permanent location data for the fixed base stations 34, for subsequent retrieval by the call centre 9 as required.

CLAIMS

1. A method of establishing a telecommunications connection over a packet switched network between a network access point and a network-based service provisioning system, wherein
- 5 the network access point equipment is connected to a termination of a data network,
- communication is established between the network access point equipment and the network-based service provisioning system,
- 10 the network-based service provisioning system identifies the physical network termination to which the network access point is connected,
- the network-based service provisioning system retrieves from a network-based database a geographical identity associated with that network termination,
- 15 the network-based service provisioning system transmits that identity to the network access point,
- the network access point stores that identity in a database at the network access point for subsequent access by network-based application servers when accessed by the network access point equipment.
- 20
2. A method according to claim 1, wherein the network-based database is maintained by a periodic updating process generated by a network inventory processor.
- 25
3. A method according to claim 1 wherein on reception by a network-based application server of an initial data request from a client device connected to the network access point equipment, the application server transmits a request for a geographical identity to the network access point through which the client device is connecting to the server, and the access point retrieves the
- 30 previously-stored geographical identity, and transmits it to the requesting application server.

4. A method according to claim 3, wherein the application server transmits a confirmation request to the client device for confirmation or alteration of the geographical identity provided in response to the original request, the client unit transmits a response confirming or altering the identity to be applied by the application server, and the application server applies the original or altered identity accordingly.
5. A method according to claim 3, wherein the application server is associated with a telephony call centre system and identifies the geographical origin of calls originating from an internet-based line.
6. A method according to claim 3, wherein the client device is a femtocell unit and the application server is a quasi mobile switching centre for interconnecting a femtocell with a cellular telephone network.
7. Network access point equipment for connection to a telecommunications network termination over a packet switched network, comprising a network interface unit for establishing communication with a network-based service provisioning system, a data retrieval unit for retrieving, from the service provisioning system, a geographical identity, and a data store for storing the geographical identity,
8. Network access point equipment according to claim 7, further comprising a data provision unit, the data provision unit being arranged to receive requests for location identity from a corresponding network application to retrieve the geographical identity from the data store, and to return the retrieved identity to the requesting application.
9. A network-based service provisioning system for communication over a packet-switched network with one or more network access point equipments of the type claimed in claim 7 or claim 8, the service provisioning system

comprising a data storage unit for storing a concordance between the network identity of each termination point of the packet switched network and a respective geographical location identity, a termination detection unit responsive to the connection of access point equipment to a termination point of the network, a data retrieval unit for retrieving, from the data storage unit, a geographical identity of the termination through which the newly-detected access point is connected, and a data transmission unit for transmitting the geographical identity to the network access point.

10 10. A network-based service provisioning system according to claim 9, comprising an interface with a network inventory processor by means of which the geographical identity data in the data storage unit may be updated.

15 11. A network-based service provisioning system according to claim 9 or claim 10, comprising updating means for periodically interrogating the access point equipment to confirm that it is connected to the termination point with which it is currently associated in the database.

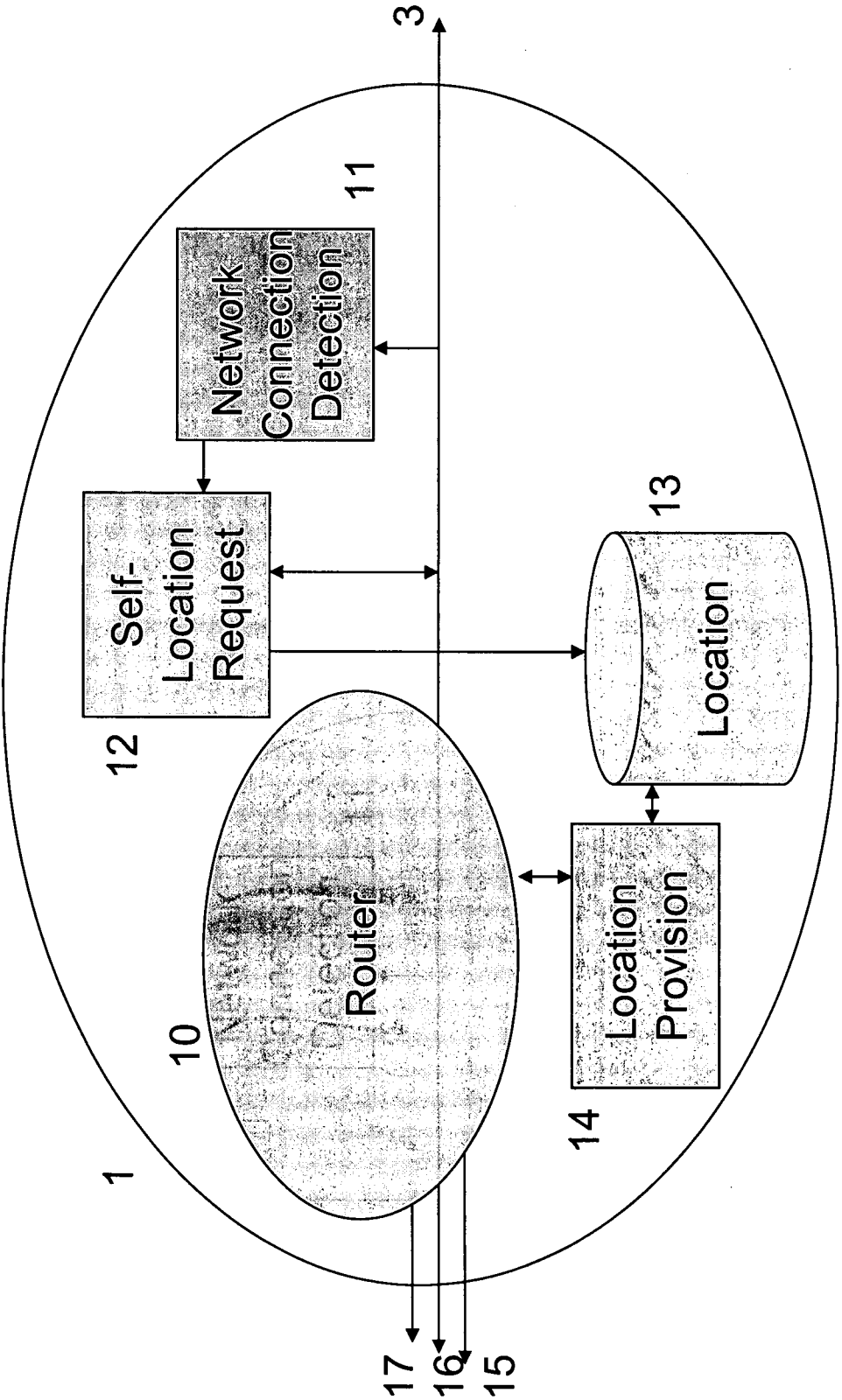


Figure 1

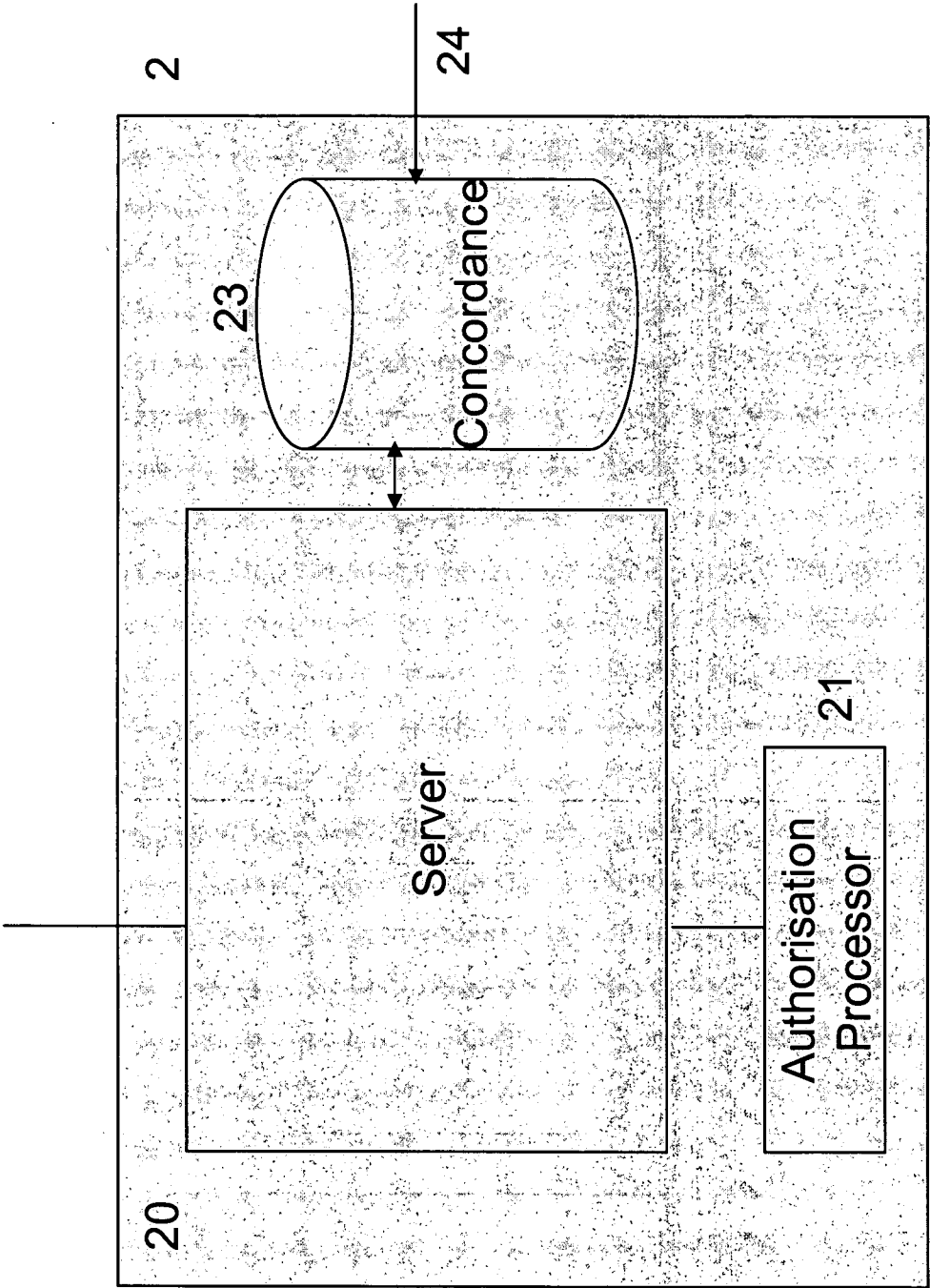


Figure 2

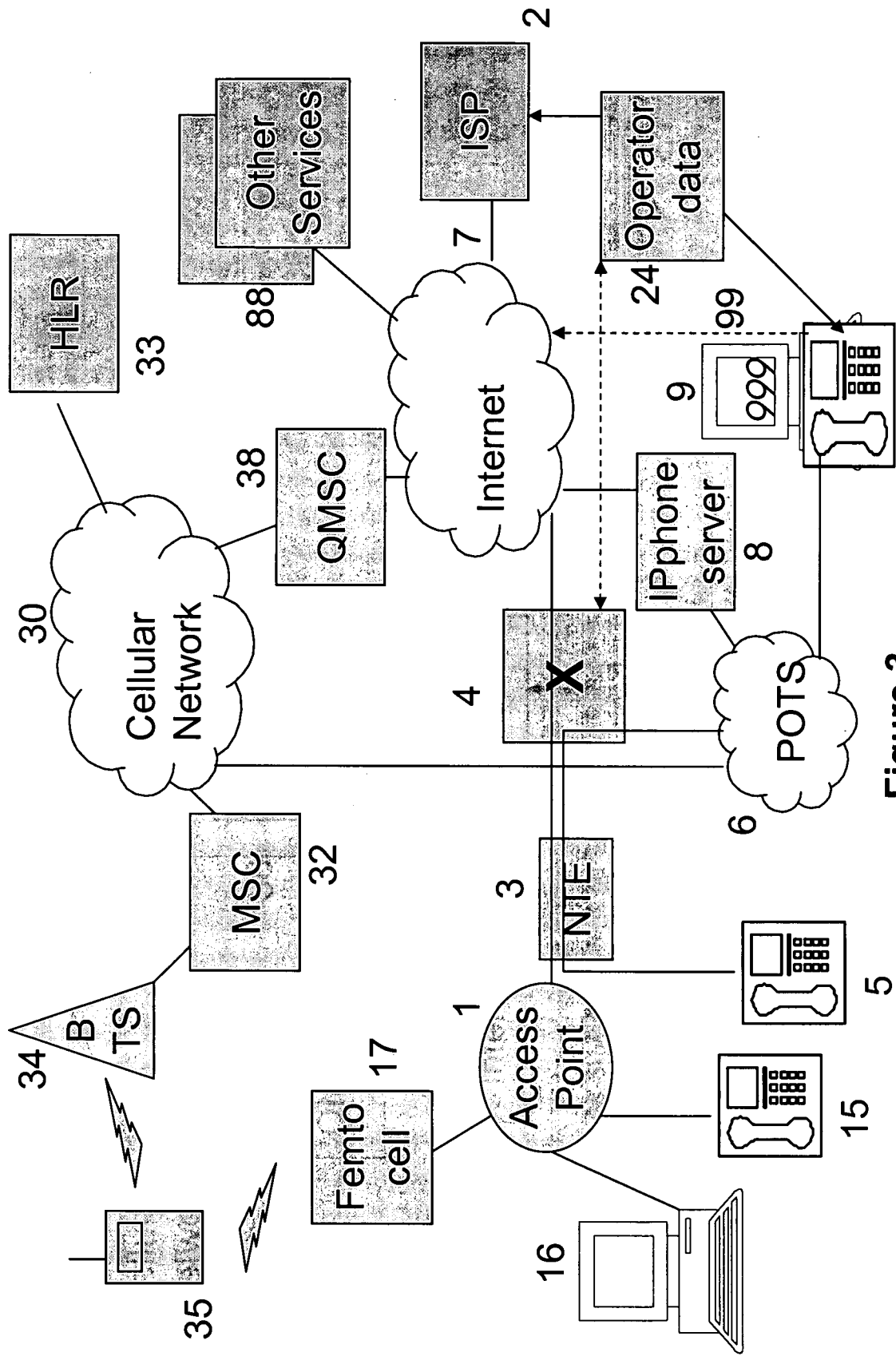


Figure 3

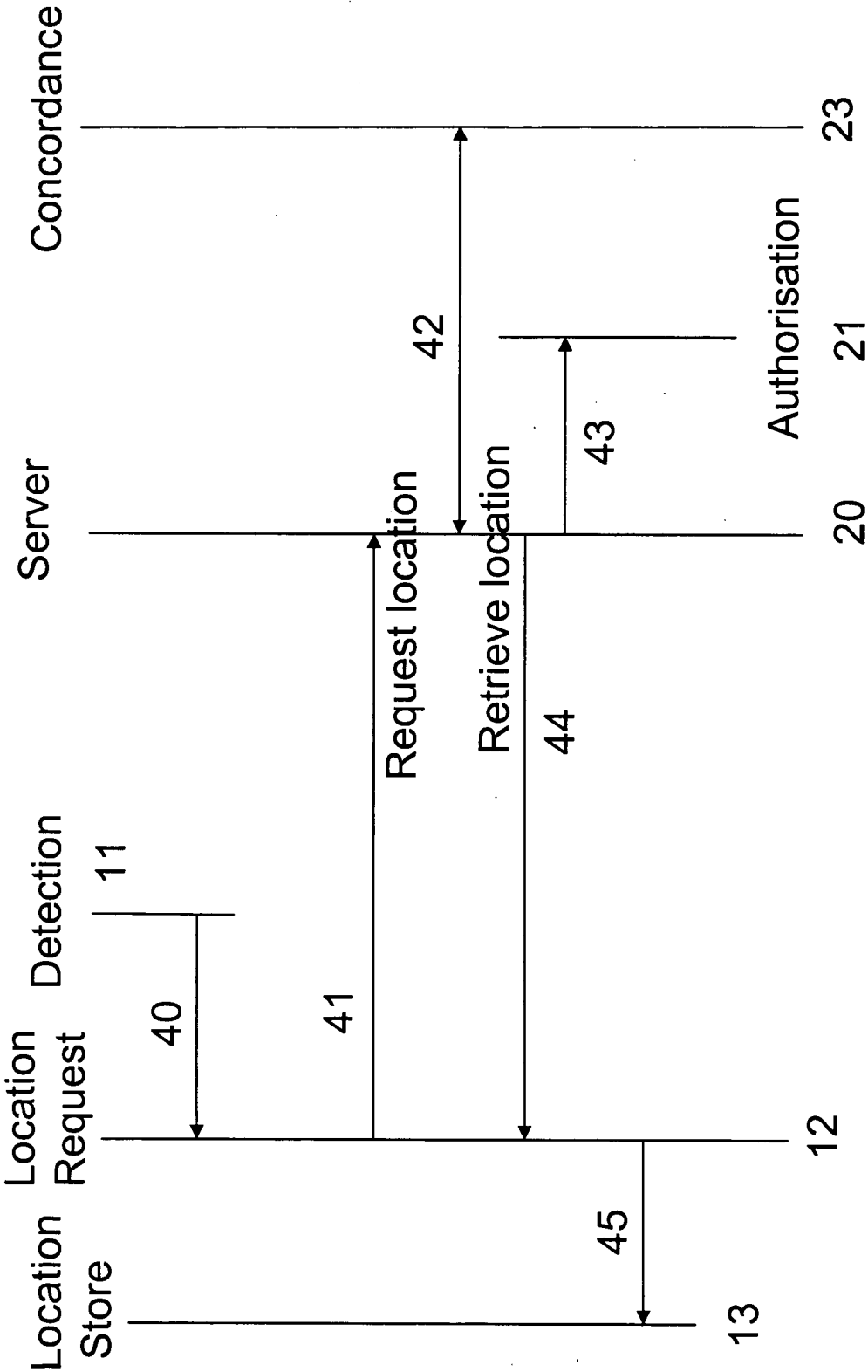


Figure 4

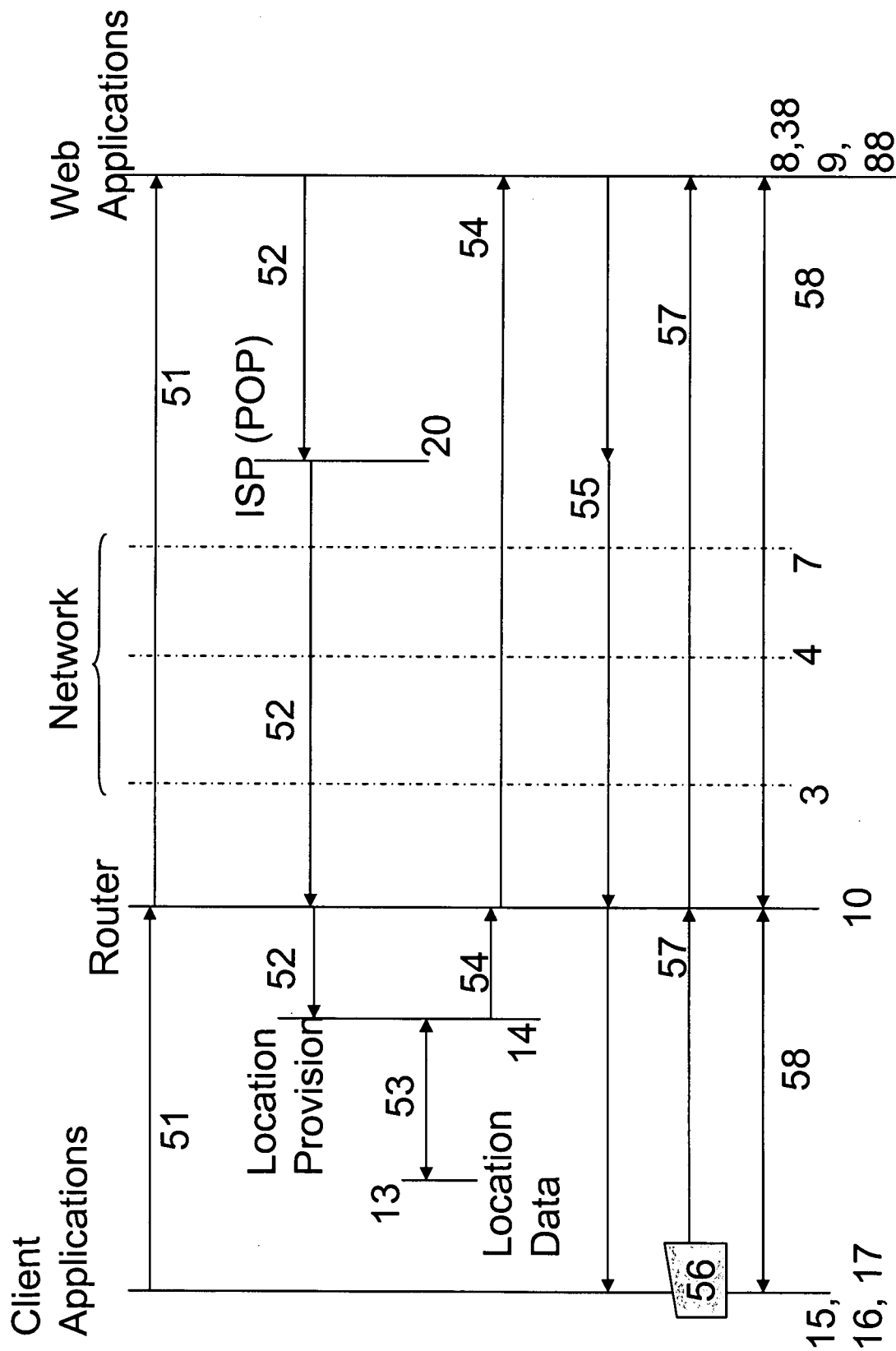


Figure 5

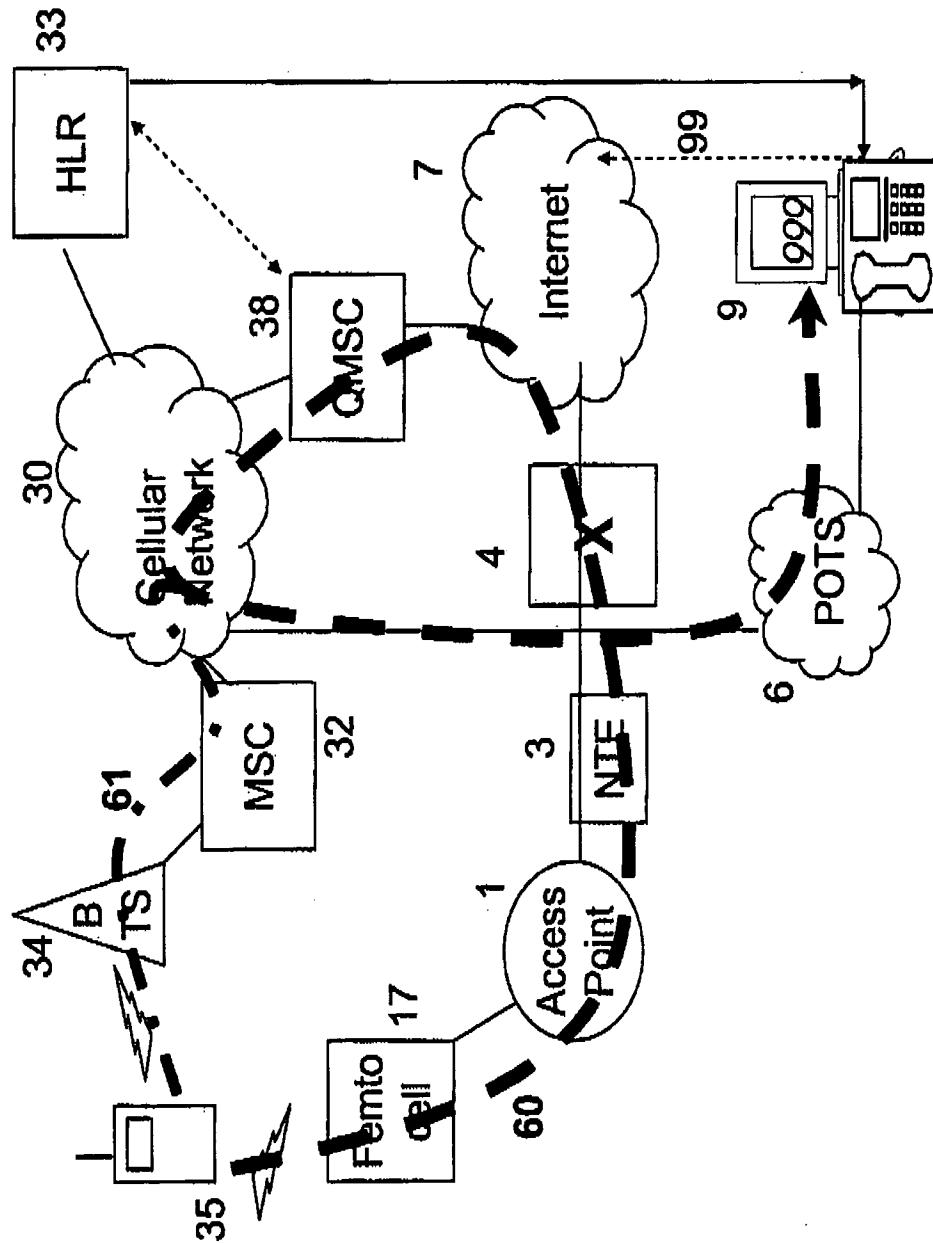


Figure 6