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(54) Title: METHOD AND SERVER ENTITY FOR FORWARDING A MESSAGE CONTAINING A HOST NAME OR DOMAIN NAME IN AN INTERNET BASED COMMUNICATIONS NETWORK

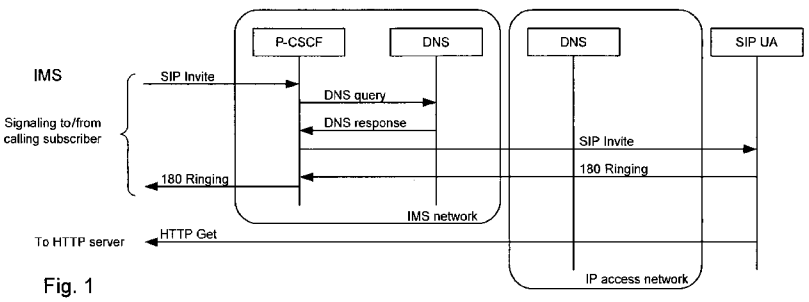

Fig. 1

(57) Abstract: Method and server entity for forwarding a message containing a host name or domain name in an internet based communications network from a User Agent (UA) to the communications network or vice versa. The method comprises the steps of querying, by a proxy entity, a Domain Name Server (DNS) for obtaining from the Domain Name Server an Internet Protocol (IP) address associated with the host name or domain name, and including the Internet Protocol address in the message prior to forwarding the message to the communications network or User Agent, respectively, by the proxy entity.

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Title: Method and server entity for forwarding a message containing a host name or domain name in an internet based communications network

TECHNICAL FIELD

The invention relates to a method of forwarding a message containing a host name or domain name in an internet based communications network from a user agent to the communications network or vice versa via a proxy entity.

Such message containing a host name or domain name may be used for allowing the receiver of the message, i.e. the user agent or the communications network, to contact the host associated with said host name or domain name.

BACKGROUND

Such method may for instance be used in Session Initiation Protocol (SIP) signaling to/from a SIP User Agent (UA). A SIP UA may send SIP requests to an Internet Protocol (IP) Multimedia Subsystem (IMS) network and may receive SIP responses from the IMS network. These SIP requests and responses may be exchanged during SIP session establishment, during an established SIP session and for non-session related SIP message exchange.

A SIP message, i.e. a SIP request or a SIP response, may contain various headers. These headers may be used for SIP message routing or for application handling. Certain SIP headers may contain a host name or a domain name. The UA may, when receiving such host name or domain name in the SIP message, have to use this host name or domain name for processing the message.

Examples of a host name in a SIP message are:

Alert-Info: <http://www.provider.com/sounds/ringtone1245.wav>

The Alert-Info header may be used as pointer to a ring tone in a SIP Invite request or as a pointer to a ring-back tone in a SIP180 Ringing response on the Invite request.

Call-Info:<http://www.provider.com/johnny/picture.jpg>
;purpose=icon,

The Call-info provides additional information about the calling party to the called party (in the case that the Call-info header is included in a SIP request) or provides additional information about the called party to the calling party (in the case that the Call-info header is included in a SIP response).

When a SIP UA receives a message including a host name and wants to process the message, the UA may have to apply Domain Name Server (DNS) name resolving on the host name. For example, when a SIP UA receives a SIP Invite including the Alert-info header as depicted in the above example, then the UA has to contact DNS in order to resolve www.provider.com into an Internet Protocol (IP) address, so it can access that host, using HyperText Transfer Protocol (HTTP), for obtaining the ring tone from that host (/sounds/ringtone1245.wav).

DNS name resolving by the user agent (UA) may lead to delay in accessing the host associated with the host name or domain name in the message. The UA would have to send a DNS query message, or several DNS query messages, to its DNS (i.e. the entry into global DNS, as available to this UA) and receive a DNS response message, the response message containing an IP address associated with the host name or domain name contained in the DNS query message. Delay may be aggravated by the user agent having limited bandwidth access to the internet.

SUMMARY

It is an object of the present invention to optimize the Domain Name Server (DNS) name resolving for situations as described above. More in general, it is an object of the invention to improve the method of forwarding a message containing a host name or domain name in an internet based communications network from a user agent to the communications network or vice versa via a proxy entity.

Thereto, according to the invention is provided a method of forwarding a message containing a host name or domain name in an internet based communications network from a User Agent (UA) to the communications network or vice versa via a proxy entity, the method comprising the steps of querying, by the proxy entity, a Domain Name Server (DNS) for obtaining from the Domain Name Server (DNS) an Internet Protocol (IP) address associated with the host name or domain name, and including the Internet Protocol (IP) address in the message prior to forwarding the message to the communications network or User Agent (UA), respectively, by the proxy entity. The proxy entity may send multiple DNS query messages for obtaining the IP address.

This provides the advantage that DNS name resolving need not be performed by the user agent or the communications network, which may lead to faster call set up time and improved network performance. Hence, the message received by the user agent already contains the IP address associated with the domain name or host name. Thus, upon receipt of the message, the user agent need not contact DNS any more, so that is saved on communications time and (radio) access network resources, and can immediately contact the host of which the IP address is contained in the message. The proxy entity generally will have higher bandwidth access to the internet than the user agent. Hence, the proxy entity can perform DNS name resolving faster than the user agent.

Preferably, including the Internet Protocol (IP) address in the message comprises replacing the host name or domain name with the Internet

Protocol (IP) address in the message. Hence, the length of the message need not be unduly increased. Rather, the length of the message is more likely to be decreased. An Internet Protocol version 4 (IPv4) address occupies no more than 15 bytes. A host name or domain name may be much longer than that.

According to one aspect of the invention the message is a Session Initiation Protocol (SIP) message, the communications network is an Internet Protocol (IP) Multimedia Subsystem (IMS) telecommunications network, and the proxy entity is a Proxy Call Session Control Function (P-CSCF) entity or an Access Session Border Gateway (A-SBG). Hence, according to this aspect of the invention may be provided a method for forwarding a Session Initiation Protocol (SIP) message containing a host name or domain name in an Internet Protocol (IP) Multimedia Subsystem (IMS) telecommunications network from a User Agent (UA) to the Internet Protocol (IP) Multimedia Subsystem (IMS) telecommunications network or vice versa via a Proxy Call Session Control Function (P-CSCF) entity, wherein the method comprises querying, by the Proxy Call Session Control Function (P-CSCF) entity, a Domain Name Server (DNS) for obtaining from the Domain Name Server (DNS) an Internet Protocol (IP) address associated with the host name or domain name, and including the Internet Protocol (IP) address in the Session Initiation Protocol (SIP) message prior to forwarding the Session Initiation Protocol (SIP) message to the Internet Protocol (IP) Multimedia Subsystem (IMS) telecommunications network or User Agent (UA), respectively, by the Proxy Call Session Control Function (P-CSCF) entity.

Optionally the proxy entity comprises a repository for storing the host name or domain name and associated Internet Protocol (IP) address retrieved from the Domain Name Server (DNS).

It is a further option that the method further comprises forwarding a further message containing a host name or domain name from a User Agent (UA) to the communications network or vice versa via the proxy entity, wherein the proxy entity determines whether or not the host name or domain

name contained in the further message is stored in the repository, and when said host name or domain name is stored in the repository the proxy entity retrieves the Internet Protocol (IP) address associated therewith from the repository, or when said host name or domain name is not stored in the repository the proxy entity queries a Domain Name Server (DNS) for obtaining from the Domain Name Server (DNS) an Internet Protocol (IP) address associated with said host name or domain name, and including the Internet Protocol (IP) address associated therewith in the message prior to forwarding the message to the communications network or User Agent (UA), respectively, by the proxy entity. This provides the advantage that an IP address associated with a host name or domain name need not be retrieved from DNS if it has been retrieved from DNS before by that proxy entity.

Optionally the method further comprises selecting, by the proxy entity, the Domain Name Server (DNS) from a plurality of Domain Name Servers, e.g. on the basis of a rule or policy. Such rule or policy can e.g. be a preference of the User Agent, a preference of a service provider, a preference of a network provider, etc.

Optionally the method further comprises, when the Domain Name Server (DNS) returns a plurality of Internet Protocol (IP) addresses associated with the host name or domain name, selecting, by the proxy entity the Internet Protocol (IP) address to be included in the message. The Internet Protocol (IP) address to be included may be selected on the basis of information available to the proxy entity on network topology. The proxy entity may e.g. comprise information on a physical location of servers (hosts) associated with certain IP addresses and/or bandwidths in network paths to certain IP addresses. The proxy entity may select the IP address to be included in the message to optimize performance, e.g. to reduce delay times. Additionally, or alternatively, the IP address to be included may be selected on the basis of a rule or policy, such as a preference of the User Agent, a preference of a service provider, a preference of a network provider, etc.

It is a further option, that the method may further comprise modifying, by the proxy entity, the Internet Protocol (IP) address retrieved from the Domain Name Server (DNS) prior to including the Internet Protocol (IP) address in the message. Thus, it is possible to redirect the User Agent or communications network to a modified IP address (e.g. when the User Agent would use the Alert-Info to obtain a ring tone). Such modified IP address may e.g. be determined on the basis of a rule or policy. It is for instance possible to replace the IP address associated with the domain name "provider.com" with the IP address associated with the domain name "provider.nl" if such rule is set to redirect to a local domain if possible. Removing the IP address from the message, e.g. because the associated host or domain is considered forbidden by a rule or policy, may also be considered as modifying the IP address herein. It is also possible that the host name or domain name is removed from the message and not replaced by the associated IP address.

Optionally, the message is a Session Initiation Protocol (SIP) request or SIP response.

Optionally, the message comprises an alert-info header or a call-info header.

The invention also relates to a proxy entity for receiving a message containing a host name or domain name in an internet based communications network from a User Agent (UA) or the communications network, and for forwarding the message to the communications network or user agent (UA), respectively, wherein the proxy entity is arranged for querying a Domain Name Server (DNS) for obtaining from the Domain Name Server (DNS) an Internet Protocol (IP) address associated with the host name or domain name, and for including the Internet Protocol (IP) address in the message prior to forwarding the message.

The method also relates to a terminal device in an Internet based communications network for receiving a message forwarded by a server entity, wherein the terminal device is arranged for selecting and communicating to

the network whether or not a message relating to a host name or domain name sent to the terminal device is to contain the host name or domain name or an Internet Protocol address associated with the host name or domain name. Thus, the terminal device may instruct the proxy entity to obtain from the Domain Name Server an Internet Protocol address associated with the host name or domain name and to include the Internet Protocol address in a message prior to forwarding the message to the terminal device.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be further elucidated by means of non-limiting examples referring to the drawing, in which

Fig. 1 shows an example of a schematic representation of the method according to the invention,

Fig. 2 shows an example of a schematic representation of the system according to the invention,

Fig. 3 shows a schematic representation of an example of a proxy entity according to the invention, and

Fig. 4 shows a schematic representation of an example of a terminal device according to the invention.

DETAILED DESCRIPTION

An example of the method of the invention is depicted schematically in Fig. 1. In Fig. 1 communication is schematically depicted between an Internet Protocol (IP) Multimedia Subsystem (IMS) telecommunications network, forwarding messages from a calling subscriber, e.g. a calling IMS subscriber, and a Session Initiation Protocol (SIP) User Agent (UA) via a Proxy Call Session Control Function (P-CSCF) entity, also referred to as proxy entity.

Fig. 2 shows a schematic representation of a system according to the invention. The User Agent (UA), e.g. a terminal device such as a mobile communications device 101 of a (IMS) subscriber, is communicatively

connected to an access network 104, e.g. a wireless Local Area Network (LAN). In this example , the access network 104 is communicatively connected to the proxy entity, e.g. a server, (here the Proxy Call Session Control Function (P-CSCF) entity) and via the proxy entity to the Internet Protocol (IP) Multimedia Subsystem (IMS) network. The proxy entity is in this example communicatively connected to a Domain Name Server 111. In the example of Fig. 2 the mobile communications device 101 is also connected to a further Domain Name Server 110 via the access network 104 and the internet 105. It will be appreciated that such connection may allow direct DNS querying by the User Agent, which, as will become clear, is not required by the method according to the invention.

Fig. 3 shows a schematic representation of an example of a proxy entity 300 according to the invention. The proxy entity comprises a receiving module 301 for receiving a SIP message containing a host name or domain name. The proxy entity further comprises a DNS querying module 302 for performing a DNS query for retrieving an Internet Protocol (IP) address associated with the host name or domain name. The proxy entity further comprises an including module 303 for including the Internet Protocol (IP) address in the SIP message. The proxy entity further comprises a forwarding module 304 for forwarding the SIP message after having included the IP address into the SIP message.

Returning to Fig. 1 the proxy entity, e.g. the receiving module 301, processes an incoming SIP Invite from the calling (IMS) subscriber. In this example, the SIP Invite contains an Alert-Info header, said header containing a host name for obtaining alert info. The proxy entity, e.g. the DNS querying module 302, performs a Domain Name Server (DNS) query, sending the DNS query to a Domain Name Server 111 associated with the IMS network for obtaining from the DNS an Internet Protocol (IP) address associated with the host name. Each node in the IMS network may have access to a Domain Name Server (DNS) for requesting name resolving. An IMS network, constituting a

defined domain within the internet, may have its own DNS. Each Domain Name Server (DNS) may be seen as an entry portal into the global domain name system.

In this example, the proxy entity, e.g. the including module 303, replaces the host name in the Alert-Info in the SIP Invite by the IP address obtained from the Domain Name Server (DNS). The proxy entity, e.g. the forwarding module 304, then forwards the SIP Invite to the SIP User Agent (UA). The SIP User Agent (UA) may now use the IP address in the Alert-Info header to obtain the ring tone, without having to perform DNS query.

For example the Alert-Info header received by the proxy entity may be:

Alert-Info: <http://www.provider.com/sounds/ringtone1245.wav>.

The proxy entity may receive the IP address 167.76.32.66 from the Domain Name Server (DNS) as being associated with the host name www.provider.com. The proxy entity may then replace the received Alert-Info header by:

Alert-Info: <http://167.76.32.66/sounds/ringtone1245.wav>.

As can be seen in this example, the host name www.provider.com is replaced by IP address 167.76.32.66. The information that follows the host name, i.e. the string "/sounds/ringtone1245.wav" (the path and file name), is not modified by the proxy entity in this example. A HyperText Transfer Protocol (HTTP) Get command for http://www.provider.com/sounds/ringtone1245.wav will in this example render the same result as an HTTP Get command for http://167.76.32.66/sounds/ringtone1245.wav.

In a more elaborate embodiment, the proxy entity may apply caching for the IP address obtained from the Domain Name Server (DNS). The proxy entity then may comprise a repository, e.g. a cache, for storing the host name or domain name and associated Internet Protocol (IP) address retrieved from the Domain Name Server (DNS). The obtained IP address may have a

validity period associated with it, e.g. of 24 hours. Since there may be many IMS subscribers receiving SIP Invite containing an Alert Info header with the same host name, e.g. www.provider.com, caching the IP address may considerably reduce communication traffic between the proxy entity and the Domain Name Server (DNS). Caching in the proxy entity will have the effect that the proxy entity does not need to perform a DNS query for the SIP Invite messages containing a host name or domain name that is already stored in the repository. The proxy entity has the corresponding IP address in the repository and can hence perform the host name to IP address conversion, without having to perform a DNS query (at least for the duration of the IP address validity period).

Thus, such more elaborate method according to the invention may in this example further comprise forwarding a further message containing a host name or domain name from a (for instance further) User Agent (UA) to the Internet Protocol (IP) Multimedia Subsystem (IMS) telecommunications network or vice versa via the Proxy Call Session Control Function (P-CSCF) entity (proxy entity). The proxy entity determines whether or not the host name or domain name contained in the further message is stored in the repository. When said host name or domain name is stored in the repository the proxy entity retrieves the Internet Protocol (IP) address associated therewith from the repository. When said host name or domain name is not stored in the repository the proxy entity queries a Domain Name Server (DNS) for obtaining from the Domain Name Server (DNS) an Internet Protocol (IP) address associated with said host name or domain name. The proxy entity then includes the Internet Protocol (IP) address associated with said host name or domain name in the message prior to forwarding the message to the Internet Protocol (IP) Multimedia Subsystem (IMS) telecommunications network or SIP User Agent (UA).

When the Domain Name Server (DNS) returns multiple IP addresses for a single hostname, the proxy entity can use its knowledge on the

network topology to select the most appropriate IP address. The proxy entity may e.g. comprise information on the physical location of servers (hosts) associated with certain IP addresses and/or bandwidths in network paths to certain IP addresses. The proxy entity may select the IP address to be included in the message to optimize performance, e.g. to reduce delay times. Additionally, or alternatively, the IP address to be included may be selected on the basis of a rule or policy, such as a preference of the user agent, a preference of a service provider, a preference of a network provider, etc. The preference of a User Agent could e.g. form part of a subscription profile of the User Agent. Thus, such preference could be sent from a Home Subscriber Server (HSS) to a Serving Call Session Control Function (S-CSCF) entity and/or to a Proxy Call Session Control Function (P-CSCF) entity, e.g. using existing signalling sequences.

It is also possible that a plurality of Domain Name Servers (DNS) are available to the proxy entity. The proxy entity may select one particular Domain Name Server for retrieving the IP address associated with the host name or domain name. This selection may be made on the basis of a rule or policy, such as a preference of the User Agent, a preference of a service provider, a preference of a network provider, etc.

In an elaborate embodiment, the proxy entity may be arranged to modify the Internet Protocol (IP) address retrieved from the Domain Name Server (DNS) prior to including the Internet Protocol (IP) address in the message. Thus, it is possible to redirect the User Agent or communications network to a modified IP address. It is for instance possible to replace the IP address associated with the domain name “provider.com” with the IP address associated with the domain name “provider.nl” if such rule is set to redirect to a local domain if possible. Removing the IP address from the message, e.g. because the associated host or domain is considered forbidden by a rule or policy, may also be considered as modifying the IP address herein.

When the proxy entity (a) selects the Domain Name Server to be used and/or (b) selects the IP address to be used and/or (c) manipulates the SIP message based on the response from the Domain Name Server, the proxy entity can do policy enforcement on the content. E.g. because the operator and/or the government doesn't want certain ring(back) tones to be played.

The above-described method may be applied equally for the Alert-Info header in a SIP Invite as for the Call-Info header in a SIP request or SIP response. The method of the present invention is proposed for Alert-Info header and the Call Info header. The method of the present invention may, however, also be applied to other SIP messages and SIP headers, where applicable. On example of a SIP message where the invention may be applied is SIP Message (request and response).

It will be appreciated that having the proxy entity perform the DNS query, will result in reduced signaling between a SIP User Agent and an access network which connects the User Agent to a Domain Name Server (DNS). This will be an advantage especially when the access network is a wireless network or otherwise has limited bandwidth. When a calling or called party has to obtain information from the internet during call establishment, e.g. Alerting information, then receiving an IP address instead of a host name or domain name will reduce latency in the process of obtaining said information. This may improve user experience.

The proxy entity may apply DNS name resolving for a subscriber for incoming SIP requests and responses, regardless of the IMS network the peer entity belongs to. For example, when the P-CSCF entity applies name resolving for Alert-Info in an incoming SIP Invite, then the name resolving may be applied regardless of the network the calling party (sending the SIP Invite) belongs to.

As described above, the proxy entity can have the capability to perform the translation of a host name or domain name into an IP address.

In one embodiment, this capability is provided unconditionally. When a terminal device is connected via a proxy entity which supports this capability, the capability is always provided. The terminal or subscriber can not influence the selection of a proxy entity.

In another embodiment, this capability to perform the translation of the host name or domain name into the IP address by the proxy entity is provided to specific terminal devices or customers, e.g. based on a subscription option. During registration, a check is done, at the HSS, whether the terminal device and/or subscriber is entitled to use this capability. If so, the P-CSCF entity is instructed that for this terminal device this capability must be used. This instructing by the HSS to the P-CSCF entity, is done through the sending of a designated subscription option, from the HSS to the S-CSCF entity and from the S-CSCF entity to the P-CSCF entity, using existing SIP signaling messages that are used during the registration process. When the P-CSCF entity receives the instruction from the HSS to apply this capability, but the P-CSCF entity does not support this capability, then the P-CSCF entity will apply normal behaviour.

In a further embodiment, this capability is provided to specific terminal devices or subscribers, on request of the subscriber. During registration, a check is done, at the HSS, whether the terminal device and/or subscriber is entitled to use this capability. If so, the P-CSCF entity is instructed that for this terminal device this capability may be used. During registration, the terminal device may indicate in the Registration request message to the network that it wants to use this capability. Fig. 4 shows a schematic representation of the terminal device 400 according to this embodiment. The terminal device 400 comprises input/output means 401 for communicating with the network, e.g. with the P-CSCF entity. The terminal device further comprises selection means 402 for selecting, by the user of the terminal device, whether or not to use the capability. The selection means 402 are connected to the input/output means 401, for communicating a message

representative of the selection whether or not to use the capability to the network at registration. It will be appreciated that the selection means may be implemented in hardware and/or software. The terminal device 400 further comprises a processor for controlling the input/output means 401 and the selection means 402. If the subscriber is entitled to use the capability and the subscriber indicates, by means of the selection means 402 and by submitting a message indicating so to the network, that it wants to use the capability, the P-CSCF entity determines that for this terminal this capability must be used as long as the terminal is registered at this P-CSCF entity, provided that a P-CSCF entity is selected that supports this capability. Optionally, the subscriber indicates, during the Registration request, that it wants to use this capability. The access network (such as the Wideband Code Division Multiple Access (W-CDMA) network) defines which P-CSCF entity will be selected, e.g. by means of a Dynamic Host Configuration Protocol (DHCP). Optionally the terminal device defines which P-CSCF entity will be used by means of a predetermined list of P-CSCF entities comprised in the terminal device and by transmitting an identification of one or more of preferred P-CSCF entities to the network during registration. It will be appreciated that it is also possible that the terminal device signals to the network at another moment than during registration that from a certain moment onwards the capability is to be used.

In the foregoing specification, the invention has been described with reference to specific examples of embodiments of the invention. It will, however, be evident that various modifications and changes may be made therein without departing from the broader spirit and scope of the invention as set forth in the appended claims.

In the example an Alert-Info header is described. The above-described method may be applied equally for the Alert-Info header in a SIP Invite, as for the Call-Info header in a SIP request or SIP response. The method of the present invention is proposed for Alert-Info header and the Call

Info header. The method of the present invention may, however, also be applied to other SIP messages and SIP headers, where applicable.

In the example, is referred to an Internet Protocol (IP) Multimedia Subsystem (IMS) telecommunications network. It will be appreciated that the invention may also be practised in other internet based communications networks, such as other voice over internet protocol networks.

However, other modifications, variations, and alternatives are also possible. The specifications, drawings and examples are, accordingly, to be regarded in an illustrative rather than in a restrictive sense.

In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim. The word 'comprising' does not exclude the presence of other features or steps than those listed in a claim. Furthermore, the words 'a' and 'an' shall not be construed as limited to 'only one', but instead are used to mean 'at least one', and do not exclude a plurality. The mere fact that certain measures are recited in mutually different claims does not indicate that a combination of these measures cannot be used to advantage.

Claims

1. Method of forwarding a message containing a host name or domain name in an internet based communications network from a User Agent (UA) to the communications network or vice versa via a proxy entity, the method comprising the steps of;

- querying, by the proxy entity, a Domain Name Server (DNS) for obtaining from the Domain Name Server an Internet Protocol (IP) address associated with the host name or domain name, and
- including the Internet Protocol address in the message prior to forwarding the message to the communications network or User Agent, respectively, by the proxy entity.

2. Method according to claim 1, wherein including the Internet Protocol address in the message comprises replacing the host name or domain name with the Internet Protocol address in the message.

3. Method according to claim 1 or 2, wherein the message is a Session Initiation Protocol (SIP) message, the communications network is an Internet Protocol Multimedia Subsystem (IMS) telecommunications network, and the proxy entity is a Proxy Call Session Control Function (P-CSCF) entity or an Access Session Border Gateway (A-SBG).

4. Method according to claim 1, 2 or 3, wherein the proxy entity comprises a repository for storing the host name or domain name and associated Internet Protocol (IP) address retrieved from the Domain Name Server (DNS), the method further comprising forwarding a further message containing a host name or domain name from a User Agent (UA) to the communications network or vice versa via the proxy entity,

wherein the proxy entity determines whether or not the host name or domain name contained in the further message is stored in the repository, and

when said host name or domain name is stored in the repository the proxy entity retrieves the Internet Protocol (IP) address associated therewith from the repository, or

when said host name or domain name is not stored in the repository the proxy entity queries a Domain Name Server (DNS) for obtaining from the Domain Name Server (DNS) an Internet Protocol (IP) address associated with said host name or domain name, and

including the Internet Protocol (IP) address associated therewith in the message prior to forwarding the message to the communications network or User Agent (UA), respectively, by the proxy entity.

5. Method according to any one of the preceding claims, further comprising

selecting, by the proxy entity, the Domain Name Server (DNS) from a plurality of Domain Name Servers, e.g. on the basis of a rule or policy.

6. Method according to any one of the preceding claims, further comprising,

when the Domain Name Server (DNS) returns a plurality of Internet Protocol (IP) addresses associated with the host name or domain name, selecting, by the proxy entity the Internet Protocol (IP) address to be included in the message, e.g. on the basis of information available to the proxy entity on network topology and/or on the basis of a rule or policy.

7. Method according to any one of the preceding claims, further comprising

modifying, by the proxy entity, the Internet Protocol (IP) address retrieved from the Domain Name Server (DNS) prior to including the Internet Protocol (IP) address in the message, e.g. on the basis of a rule or policy.

8. Method according to claim 3, wherein the message is a Session Initiation Protocol (SIP) request or Session Initiation Protocol (SIP) response, e.g. comprising an alert-info header or a call-info header.

9. Server entity for receiving a message containing a host name or domain name in an internet based communications network from a User Agent (UA) or the communications network, and for forwarding the message to the communications network or User Agent, respectively,

wherein the proxy entity is arranged for querying a Domain Name Server (DNS) for obtaining from the domain name server an Internet Protocol (IP) address associated with the host name or domain name, and
for including the internet protocol address in the message prior to forwarding the message.

10. Server entity according to claim 9, wherein the server entity is a Proxy Call Session Control Function (P-CSCF) entity or an access Session Border Gateway (A-SBG), the message is a Session Initiation Protocol (SIP) message, and the communications network is an Internet Protocol (IP) Multimedia Subsystem (IMS) telecommunications network.

11. Server entity according to claim 9 or 10, wherein the server entity comprises a repository for storing the host name or domain name and associated Internet Protocol (IP) address retrieved from the Domain Name Server (DNS) the server entity being further arranged for forwarding a further message containing a host name or domain name from a User Agent (UA) to the communications network or vice versa,

wherein the server entity is arranged for determining whether or not the host name or domain name contained in the further message is stored in the repository, and for

when said host name or domain name is stored in the repository retrieving the Internet Protocol (IP) address associated with said host name or domain name from the repository, or

when said host name or domain name is not stored in the repository querying a Domain Name Server (DNS) for obtaining from the Domain Name Server (DNS) an Internet Protocol (IP) address associated with said host name or domain name, and for

including the Internet Protocol (IP) address associated said host name or domain name in the message prior to forwarding the message to the communications network or User Agent (UA).

12. Server entity according to any one of claims 9-11, further arranged for selecting the Domain Name Server (DNS) from a plurality of Domain Name Servers, e.g. on the basis of a rule or policy, and/or for selecting, when the Domain Name Server (DNS) returns a plurality of Internet Protocol (IP) addresses associated with the host name or domain name, the Internet Protocol (IP) address to be included in the message, e.g. on the basis of information available to the server entity on network topology and/or on the basis of a rule or policy.

13. Server entity according to any one of claims 9-12, further arranged for modifying the Internet Protocol (IP) address retrieved from the Domain Name Server (DNS) prior to including the Internet Protocol (IP) address in the message, e.g. on the basis of a rule or policy.

14. Server entity according to claim 10, wherein the message is a Session Initiation Protocol (SIP) request or Session Initiation Protocol (SIP) response, e.g. comprising an alert-info header or a call-info header.

15. Terminal device in an Internet based communications network for receiving a message forwarded by a server entity, wherein the terminal device is arranged for selecting and communicating to the network whether or not a message relating to a host name or domain name sent to the terminal device is to contain the host name or domain name or instead an Internet Protocol address associated with the host name or domain name.

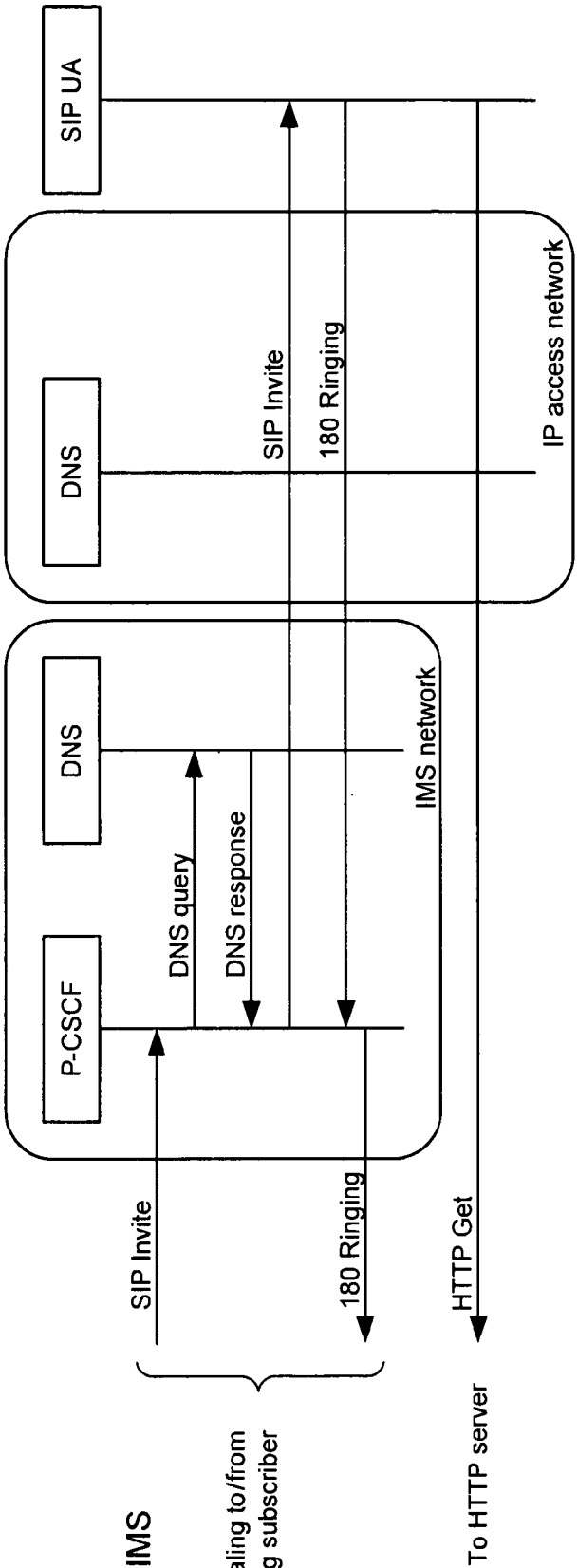
SIP UA
DNS
IP access network
SIP Invite
180 Ringing
DNS
IMS network
DNS query
DNS response
P-CSCF
SIP Invite
180 Ringing
HTTP Get
IMS
Signaling to/from calling subscriber
To HTTP server

Fig. 1

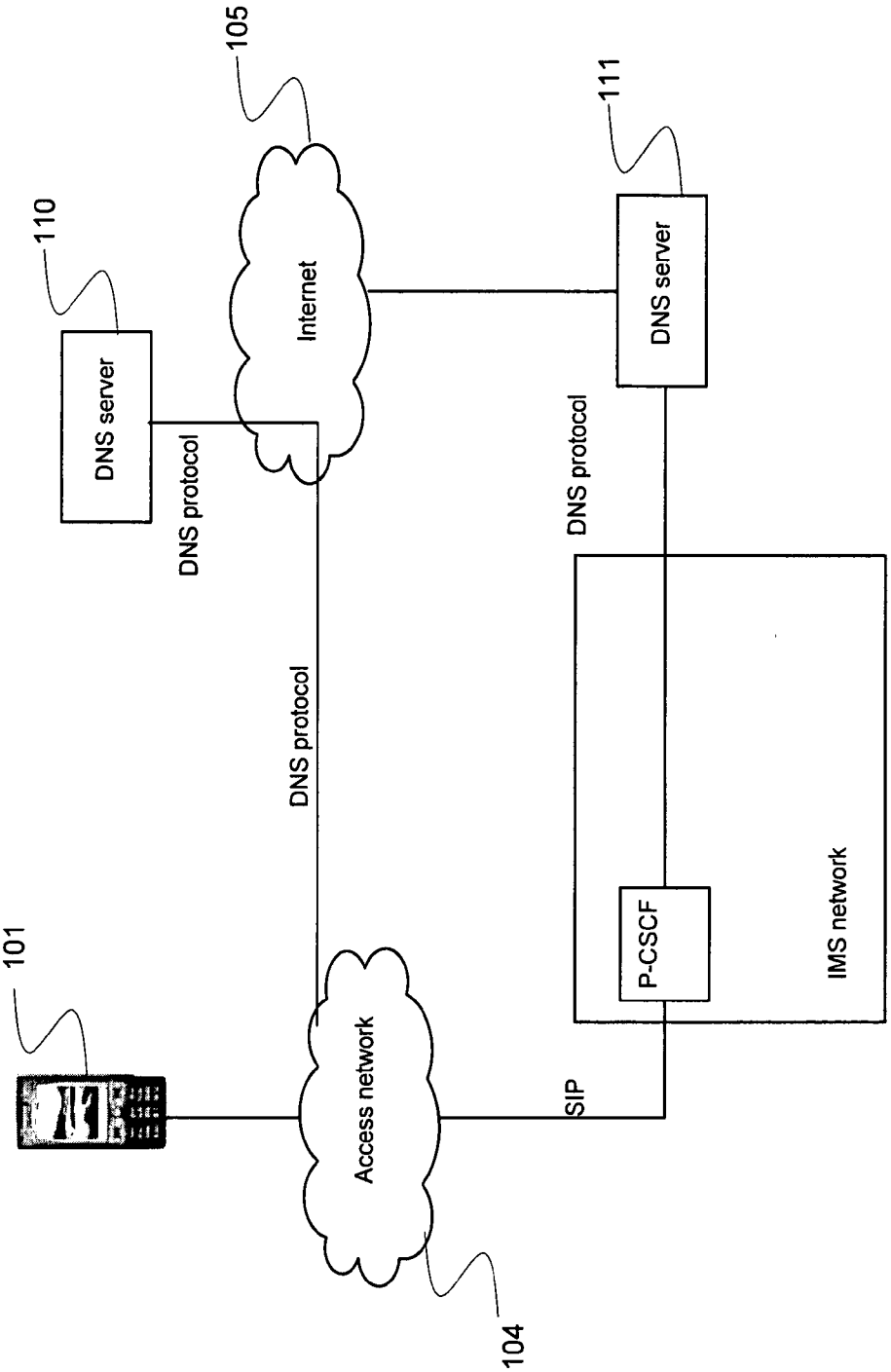
105
111
110
Internet
DNS server
DNS server
DNS protocol
DNS protocol
DNS protocol
101
Access network
P-CSCF
IMS network
SIP
104

Fig. 2

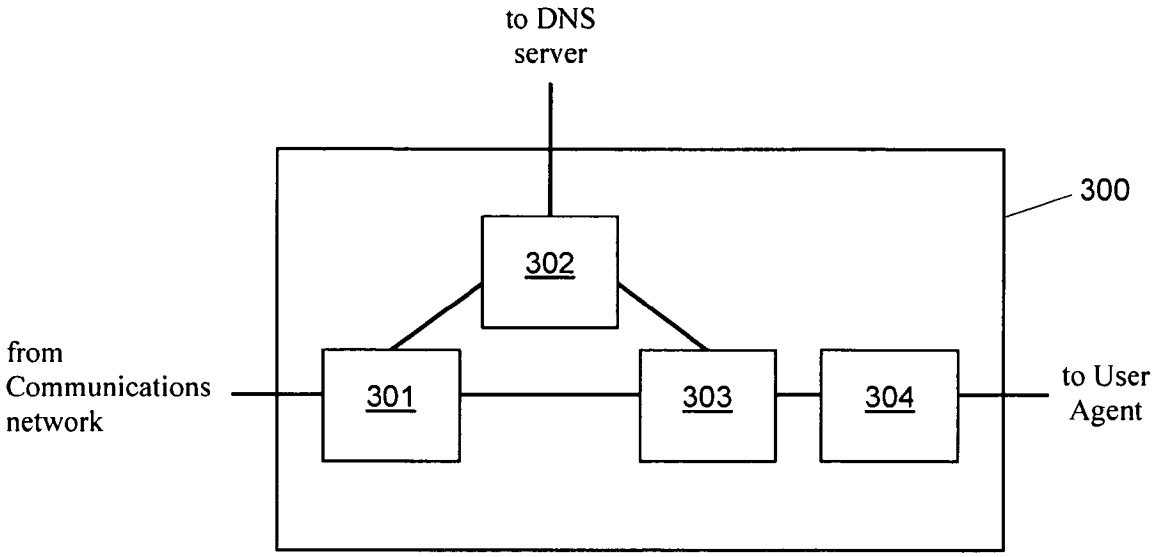
to DNS server
300
302
from Communications network
301
303
304
to User Agent

Fig. 3

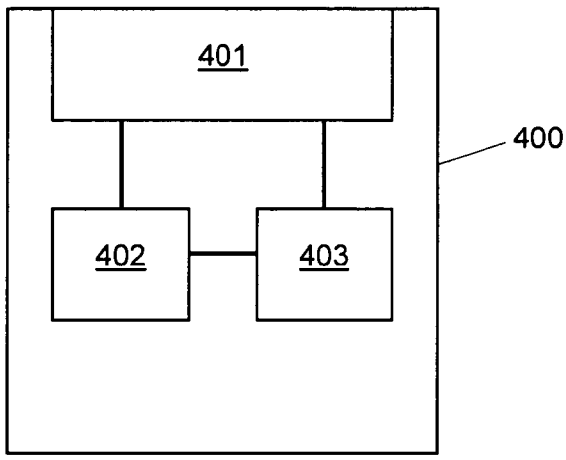
401
400
402
403

Fig. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2009/057314

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04L29/06 H04L29/12

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

B. FIELDS SEARCHED

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

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, COMPENDEX, INSPEC, IBM-TDB, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/09387 A1 (NOKIA CORP [FI]; BERTENYI BALAZS [HU]; BAJKO GABOR [HU]; KISS KRISZTIA) 31 January 2002 (2002-01-31) abstract page 8, line 20 - page 9, line 28 page 13, line 33 - page 17, line 26 page 18, line 16 - page 23, line 30 page 24, lines 19-27 page 36, line 16 - page 37, line 12	1,3, 8-10,14
X	WO 2006/075323 A2 (FLASH NETWORKS LTD [IL]; ALMOG GUY [IL]) 20 July 2006 (2006-07-20) abstract page 2, line 6 - page 4, line 24 page 9, lines 1-14 page 13, lines 17-28 page 19, lines 14-26 page 22, lines 13-25	1-2,9,15

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

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

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

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

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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 March 2010	28/05/2010

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Lievens, Koen

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2009/057314

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-3, 8-10, 14-15

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-3, 8-10, 14-15

A method, a server entity and a terminal device involving replacing the host name in a message with the IP address.

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2. claims: 4, 11

A method and a server entity involving a repository for caching.

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3. claims: 5-7, 12-13

A method and a server entity involving the selection of a server from a plurality of servers.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2009/057314

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0209387 A1	31-01-2002	AU 6276900 A	05-02-2002
WO 2006075323 A2	20-07-2006	US 2008140847 A1	12-06-2008