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(54) **Method and system for retrieving a television channel locator**

(57) A method of resolving a television channel identifier into a television channel locator is described. The method is performed in a resolving system comprising a client connected to at least one server, the server comprising a resolution function. The method comprising the steps of: receiving a resolution request from the client, the request comprising a television channel identifier,

preferably a standardized television channel identifier, identifying the name of the television channel; the resolution function resolving the television channel identifier into one or more television channel locators, wherein the television channel locator comprises the location of a broadcast provider capable of providing the broadcast identified by the television channel identifier to the client.

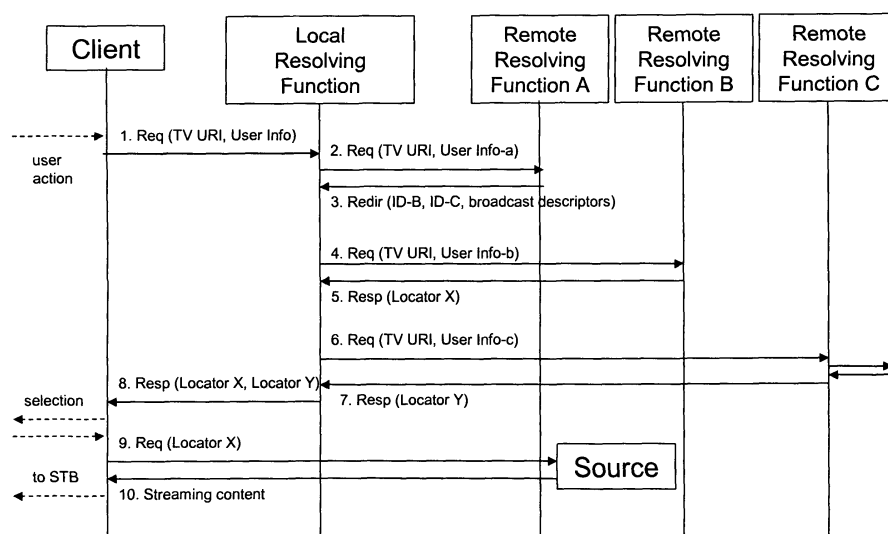


Figure 3

Description

Field of the invention

[0001] The invention relates to a method and system for retrieving a television channel locator and, in particular, though not necessarily, to a method and a system for resolving a television channel identifier into a television channel locator.

Background of the invention

[0002] Television channel identifiers have many potential applications, e.g. exchanging TV channels between providers, programming video recorders to an TV channel, providing metadata associated with an TV channel, references to TV channels in an e-mail or instant messaging and presence applications containing a reference to an TV channel. Most of these applications however either do not exist or are proprietary because of the lack of standardization and suitable resolution (mapping) methods.

[0003] Gemstar's Showview channel mapping system is one example of the use of a proprietary channel identifier. A channel map is provided to subscribers in a particular country, e.g. by publication on a website. The map allows resolution of the proprietor channel number into a readable name of the television broadcast. For example in the Netherlands channel no. 95 corresponds to BBC1 and channel no. 187 corresponds to SBS6. Such system however is proprietary and not publicly accessible. Further, the channel codes are not comprehensible, every country needs its own channel list and the system requires television equipment, e.g. an VCR, to be programmed manually. Hence, such systems have limited capabilities and are not suitable for more advanced applications.

One candidate for a standardized television channel identifier is the Television Uniform Resource Identifier (in short TV URI) as defined in IETF RFC 2838 and ETSI TS 184 009. The basic syntax of an TV URI is tv:<broadcast> where <broadcast> is a description of the data source. The description of the source may match a registered domain name or part of a registered domain name of the broadcaster or the television network. It thus takes the form of an DNS-style identifier for the name of a particular broadcaster or television network. For example, tv:bbc1.co.uk is the TV channel which has the website <http://bbc1.co.uk>. Networks may also have multiple broadcast streams. For instance the TV URIs tv: east.hbo.com (HBO East) and tv:west.hbo.com (HBO West) may refer to two separate HBO broadcasts, wherein east.hbo.com and west.hbo.com do not have to match real hostnames.

[0004] The use of a standardized television channel identifier, such as the TV URI, requires a suitable resolution method. In such a method the TV URI (which comprises the TV channel name and the name of broadcaster

or broadcast network associated with the TV channel) is resolved to one or more locators, which specify the location of one or more broadcast providers of the TV channel identified by the TV URI.

[0005] Name resolution techniques are known. The Domain Name System (DNS) resolves Domain Names to an IP address (e.g. 145.7.192.133). DNS uses servers called Domain Name Servers, which are arranged in a hierarchical structure. Further, the Electronic Number resolution system (ENUM), which uses DNS technology, resolves phone numbers to an Naming Authority Pointer (NAPTR). An NAPTR is a type of DNS record that supports regular expression based rewriting and can be considered as a generic container for names and addresses.

[0006] These known name resolution techniques require a name identifier that identifies an entity (person, website, etc,...). The name identifier does not comprise information where the entity is located. The output is a locator that identifies the location to which a network connection can be made (e.g. an IP address). DNS however cannot be used to resolve an TV URI into a broadcast locator, because the domain name reference in an TV URI only identifies the broadcast company or the television network associated with the TV channel. It does not identify the location of the broadcast provider, which is capable of delivering the broadcast identified by the TV URI to the consumer.

[0007] Further, DNS is not "requester aware". The response of the resolution does not depend on the identity, the location or other requester-related information. Moreover, DNS is not capable of providing further information associated with resolved locator, e.g. in the form of broadcast descriptors which may provide information about the broadcast standard (PAL, DVB, HDTV, etc.) and/or communications protocols (RTSP, IGMP, etc.) used by the broadcast provider.

[0008] In the article by Cranor et al (Enhanced Streaming Services in a Content Distribution Network in IEEE Internet Computing, Vol.5, No.4 pp.66-76, 2001) an RTSP content delivery network architecture is proposed, which enables subscribers to the content delivery service to access streaming content stored in a number of interconnected "portals". These portals all reside within a proprietary network. The system uses a mapping service that maps the name of the stored content into an URL, which locates the portal within the network that is able to provide the content. This system however does not provide an open resolution system which is capable of resolving a television channel identifier, such as an TV URI, into one or more television channel locators, preferably locating local broadcast providers which are active within a predetermined geographical area of the user and which provide access to the requested television channel available via various communication protocols and/or broadcast standards.

Summary of the invention

[0009] It is an object of the invention to reduce or eliminate at least one of the drawbacks known in the prior art and to provide a method of resolving a television channel identifier into a television channel locator. The method is used in a resolving system comprising a client connected to at least one server wherein the server comprises a resolution function. The method comprises the steps of: receiving a resolution request from the client, the request comprising a television channel identifier, preferably a standardized television channel identifier, identifying the name of the television channel; and the resolution function resolving the television channel identifier into one or more television channel locators, wherein the television channel locator comprises the location of a broadcast provider capable of providing the broadcast identified by the television channel identifier to the client.

[0010] The invention allows retrieval of television channel locators without the needs of a central authority managing and storing these locators. The system provides an open resolution system which is capable of resolving a television channel identifier into a number television channel locators which provide access to the requested television channel available via various communication protocols and/or broadcast standards e.g. IP Multicast, RTSP, SIP, DVB, HDTV. It allows users to exchange television channel identifiers (e.g. via e-mail or SMS) and to resolve the television identifier to one or more television locators available to a user.

In an embodiment the resolution function resolves the television channel identifier on the basis of one or more broadcast descriptors. A broadcast descriptor comprises information on the broadcast standard and/or communications protocol.

[0011] In an embodiment the television channel identifier is a URI comprising the domain name or part of the domain name of the broadcaster or broadcast network of the television channel. The channel identifier may be an TV URI, preferably an TV URI as defined in RFC 2838.

[0012] In yet another embodiment the resolution request further comprises user information and wherein the resolution function resolves the television channel identifier on the basis of the user information. The user information may comprise the network address of the client and/or a user profile. In a further embodiment the user profile comprises at least one of the following user information items: geographic location data of the client and/or the user of the client, language data, history of client's requests, broadcast standard information and/or communications protocol information associated with the user equipment.

[0013] Using user information, which may e.g. comprise the location of the client or other client information stored in a client profile, in the resolving request the resolving method allows the resolution of a standardized television identifier into one or more locators of distributors which are located in e.g. the same geographical area

as the client (or which match or best match information in the client profile) and which are capable of providing the content of the television channel content to the client. As a result the resolution method will send different locators to different client having submitted the same request.

[0014] In yet another embodiment the resolving step further comprises the step of identifying one or more broadcast provider portals which may be capable of delivering the broadcast identified the television channel identifier. The identification of the broadcast provider portals may be performed on the basis of user information, preferably the location of the user. In still a further embodiment, the identification of the broadcast provider portals may be performed on the basis of one or more broadcast descriptors comprising information on the broadcast standards and/or streaming protocols used by a broadcast provider.

[0015] In a further embodiment the resolving system comprises a local server connected to the client and to one or more remote servers, wherein the local server comprises a local resolving function and wherein each remote server comprises a remote resolving function and wherein the resolving step further comprises the step of: the local server sending in response to the resolution request a remote resolution requests to at least one of the remote servers, the remote resolution request comprising the television channel identifier and the user information.

[0016] In yet further embodiment the resolving step comprises the step of: sending a resolution redirect message in response to a resolution request from the local resolving function or one of the remote resolving functions, the resolution redirect message comprising the identity of one or more further remote servers comprising a resolution function. The identity of the further remote resolver servers may be provided by an URI or an IP address.

[0017] In an embodiment the method comprises the step of sending a resolution response to the client, the response comprising one or more television channel locators.

[0018] The resolution request and/or the remote resolution requests and/or the resolution redirect message and/or the resolution response in described in the embodiments described above may comprise an NAPTR. The NAPTR may comprise one or more broadcast descriptors, comprising information on the broadcast standards and/or streaming protocols. The NAPTR may comprise at least: a cable television channel number, a cable television frequency, a broadcast television channel number, an ether frequency.

[0019] In a further embodiment the television channel locator is at least one of: a broadcast frequency, a network address, preferably a unicast IP address or a multicast IP address.

[0020] In an embodiment the resolution function is a computer program comprising resolving logic executed

on a server, the program further using configuration data and a cache. The resolution function comprises a DNS resolution function and/or a DDDS resolution function and/or a RA-DNS function.

[0021] In another aspect the invention relates to resolver server system for resolving a television channel identifier into a television channel locator, the system comprising a client connected to at least one server, the server comprising a resolution function, the resolution function comprising: means for receiving a resolution request from the client, the request comprising a television channel identifier, preferably a standardized television channel identifier, identifying the name of the television channel; and means for resolving the television channel identifier into one or more television channel locators, wherein the television channel locator comprises the location of a broadcast provider capable of providing the broadcast identified by the television channel identifier to the client.

[0022] In yet another aspect of the invention a computer program product for resolving a television channel identifier into a television channel locator, the computer program product comprising software code portions configured for, when run on a server system, executing the method steps as in the embodiments described above.

[0023] The invention will be further illustrated with reference to the attached drawings, which schematically show embodiments according to the invention. It will be understood that the invention is not in any way restricted to these specific embodiments.

Brief description of the drawings

[0024]

Fig. 1 depicts an embodiment of a functional architecture of a server system for resolving an TV channel identifiers.

Fig. 2 depicts an exemplary resolution scheme according to an embodiment of the invention.

Fig. 3 depicts an embodiment of the invention.

Fig. 4 depicts another embodiment of the invention.

Fig. 5 depicts a schematic of a requester-aware DNS.

Detailed description

[0025] **Fig. 1** depicts a functional architecture of a server system 100 for resolving TV channel identifiers according to one embodiment of the invention. The system comprises a client 102 which may be part of or reside in a multimedia apparatus e.g. a television, a set-top box, a personal computer, a laptop, a mobile phone, a digital or a personal assistant (PDA). The client may be an application program which initiates the resolution process and which provides an interface between the multimedia apparatus and the resolution system.

[0026] The client is connected one or more resolvers.

Typically the client is connected to a local resolving server 104, e.g. an Internet Service Provider (ISP), for retrieving the locators of local providers which are active in the area of the user of the multimedia apparatus and which are capable of providing the broadcast identified by a television channel identifier. The local resolving server hosts a local resolving function 106, which comprises a computer program comprising local resolving logic 108. The function further comprises local configuration data 110 which may comprise e.g. one or more IP addresses of one or more further remote resolving servers 114, 116 and a local cache 112 for storing results of previous requests.

[0027] The resolving logic of the resolving functions in the local and the remote servers comprises a set of software routines for receiving, interpreting, creating and sending query messages and reply messages in communications with each other and/or the client. The remote resolving servers comprise remote resolving functions 118, 120, which have an similar architecture as the local resolving function. The remote resolving functions may be connected to further remote resolving servers. Further both the local and remote resolution functions may comprise a DNS resolving function or extended DNS resolving functions.

[0028] In one embodiment the resolving function may be based on the Dynamic Delegation Discovery System (DDDS, RFC 3404). DDDS allows a name space identifier to be part of the a query e.g. in the case of an TV URI "tv:" is part of that name space identifier. In another embodiment the resolving function allows the use of NAPTRs for multicast addresses, ether frequencies and/or channel number.

[0029] In yet another embodiment the resolving function may be requester aware. Requester aware DNS (RA-DNS) resolves a request on the basis of information of the requester, e.g. the user of the multimedia apparatus which hosts or instructs the client. The user information will be included into the request query which is sent to the resolving function. The user information may included e.g. the set-top box number, a client ID, the identity and/or the location of the user, etc. One particular implementation of (RA-DNS) is described in European patent application no. 07014674.1, which is hereby incorporated by reference into this application.

[0030] **Fig. 5** depicts a schematic of a RA-DNS. A client 502 sends a request comprising an URL and user information to the RA-DNS server, which may be maintained by the ISP of the user of the client. The DNS server has access to a database 508 which comprises a register of domain names each of which is associated with multiple network addresses. After retrieval of the IP addresses of the URL (which may involve the DNS root server and an DNS authoritative server) a selection procedure 506 selects the network address based on the user information which was provided via the request. The selected IP address is sent back to the client.

[0031] The ISP may have classified its electronic doc-

uments and network services in according to one or more criterions (e.g. language, geographic location or region, demographics, etc.) may have assigned these classes to the network addresses being registered in database 508 with the same domain name. A client requesting access to this domain will be routed to a specific network address whose class criterion matches a user profile.

[0032] Fig. 2 depicts a schematic of an exemplary resolution process of an TV URI according to one embodiment to the invention. In a first step 202 an TV URI, e.g. tv:sbs6.nl, is provided. Various embodiments are possible to provide such an TV URI. It may be generated according to the standardized rules (RFC 2838), obtained via an IPTV presence watcher (ETSI TS 183 063), received via an instantaneous message or an e-mail or via an inter-operator request over a network-network interface or it may be located in an electronic program guide.

[0033] In a second step 204 a client forwards the TV URI to a resolution system capable or resolving the TV URI into one or more television channel locators. A television channel locator comprises the location of a broadcast provider capable of providing the broadcast identified by the television channel identifier to the client. Such system may have an architecture as described above in relation to Fig.1. In addition to the TV URI requester-related information (user information) may be forwarded to the resolution system.

[0034] In step 204 the system identifies a number of providers or broadcast provider portals which may be capable of delivering the broadcast identified the TV URI. The providers are identified by the domain names iptv.kpn.nl, tv.casema.nl, television.upc.nl and streaming.joost.com.. In the example of Fig. 2, the cable television company UPC does not offer SBS6 and is thus not further pursued by the resolution process. The resolution step which takes place in step 204 may be performed e.g. by an ISP with an RA-DNS in order to limit the resolution process only to the local providers which are active within the area of the user.

[0035] In a third step 206 broadcast descriptors associated with the identified providers are retrieved. A broadcast descriptor specifies the broadcast standards and/or streaming protocols used by a specific distributor (e.g. RTSP, IGMP, HDTV, SD, PAL, UMTS, etc.) when distributing the content to the client. The exact format of the broadcast stream may be negotiated at a later stage, e.g. during the SDP negotiations which takes place when an SIP session is set-up between a client and a television channel provider.

[0036] Based on the identified television channel providers, the broadcast descriptors associated with these providers, and the user information provided by the client, television channel identifiers are retrieved (step 208). In the example of Fig. 2, the provider KPN only offers the SBS6 channel in SDTV quality in the area of the city Delft where the user is located. KPN identifies this broadcast channel by the URL delft.sbs6.iptv.kpn.nl. The provider Casema offers the SBS6 channel via an analog PAL signal

on Channel 37 and the provider Joost offers a generic SBS6 unicast identified by ch6.streaming.joost.com.

[0037] In the fifth step 210 the system retrieves a locator for each specific broadcast identifier. In the example of Fig. 2 delft.sbs6.iptv.kpn.nl is resolved in a multicast IP address 239.192.15.6, Casema's channel 37 in the cable frequency 599,25 and ch6.streaming.joost.com into a unicast IP address 89.251.2.84.

[0038] Finally in a sixth step 212 the most suited TV channel locator is selected. This selection may take place e.g. on the basis of a pre-configured policy located in the client or manually by the user.

[0039] It is not necessary to implement all of the steps in Fig. 2 in the resolution system. Specific steps in the resolution process may be combined. Also the order of the steps may be changed. Further, results of the resolution may be cached so that later queries could be resolved using data stored in the cache.

[0040] Fig. 3 illustrates an exemplary information flow between the client and the resolving functions which reside in the local and remote resolving servers. In step 1 a user action (e.g. a zapping action for selecting an entry in an electronic programming guide) triggers the client to send a request to a local server which hosts the local resolving function.

[0041] The request comprises an TV channel identifier, such as the TV URI. The request may also comprise user information. The user information may comprise the network address of the client or a client ID and/or a user profile. In one embodiment the local resolving function may be located e.g. in a server of the Internet service provider (ISP) of the user. In that case, the ISP may also have a user profile stored at a user profile database of the ISP. Using the network address or client ID the ISP may attribute a user profile to the resolution request thus allowing the local resolution function to use the user information in the user profile.

[0042] The user profile comprises user information which may be relevant for the resolution process, i.e. geographic location data of the client and/or client user, language data, history of client's requests, hardware and software data, broadcast standard information and/or communications protocol information associated with the user equipment. In case of a mobile device, e.g. a laptop, a mobile phone or a PDA, the location information may be regularly updated, thus allowing the resolution process to resolve an TV URI depending on the location of the mobile device.

[0043] The local resolving function receives and analyses the request. The local resolving function may e.g. check the local cache in order to verify if the relevant locator may be present in the cache. If so, the locator is sent to the client (not shown). The local resolving function may perform a translation of user information. For instance, it may translate the identification number of the set-top box into an geographical location identifier. In this embodiment the local resolving function sends the request to one remote resolving function A. The address

of this function may be preconfigured or obtained e.g. by using the Dynamic Host Configuration Protocol (DHCP, RFC 2131).

[0044] If the local resolving function cannot find a relevant locator in cache or if the local resolving function is configured to find locators in addition to those found in the cache, the local resolving function forwards (step 2) the request to the remote resolving function A. The request may contain the all user information as contained in the request as described above in relation to step 1 or, alternatively, it may contain only a particular type of user information, e.g. user location information.

[0045] Remote resolving function A receives and analyses the request and identifies broadcast providers that are e.g. only active in the area of the identified user that may be capable of providing the broadcast and possibly other context information (e.g. metadata of the TV channel, such as broadcast descriptors which provide information regarding the broadcast standards and/or streaming protocols used by a specific distributor (e.g. RTSP, IGMP, HDTV, SD, PAL, etc.)) and identifies remote resolving functions B and C as resolving functions which may contain the requested information. Remote resolving function A thereafter sends (step 3) a redirect message containing the identities of the remote resolving functions B and C back to the local resolving function. The resolving functions may be identified by e.g. uniform resource identifier (URI) or an IP address.

[0046] After reception of the redirect message, the local resolving message B and C resends the request (steps 4-7) to remote resolution functions B and C. Before each of these steps a translation of the user information may be made. Remote resolution function B is able to resolve the request and returns a locator X. The locator for the content stream may be an NAPTR for ether or cable frequencies, an IP multicast address or an NAPTR thereof.

[0047] Remote resolution function C proxies the request to yet another resolving function and relays locator Y back to the local resolution function, which collates the responses and forwards the collated response to the client. The user of the client may select one of the locators. After selection the clients sends a request to the content source using the locator and establishes contact with the content source in order to transmit the content to the user.

[0048] Fig. 4 illustrates a further protocol implementation of a similar flow as described in relation with Fig. 3 using DDDS and a RA-DNS resolving functions. DDDS comprises a generic algorithm which is capable of delegating application strings (e.g. URIs) to a specific location or a domain and to process these strings (RFC 3404).

[0049] In step 1 the client sends an NAPTR request comprising the TV URI "tv:sbs6.nl" and user information to the local resolving function, wherein the NAPTR request comprises an television channel identifier, such as the TV URI and user information.

[0050] In step 2 the local resolving function analyses the request. If the local resolving function finds one or

more suitable locators stored in its local cache, it generates an NAPTR response and no further need of the remote elements in the DDDS system is required. If no suitable locators are found or when the local resolving function is configured to look for more locators using one or more remote resolving functions, it queries a remote resolving request and sends this query in an NAPTR request to a remote resolving function A. The NAPTR request may contain the user information or only part of the user information as send by the client to the local resolving function.

[0051] The remote resolving function A analyzes the request using the location data in the user information e.g. in order to determine the domain of its local provider. The remote resolving function returns two NAPTR responses (... "igmp+l2R" sbs6.kpn.com) and (... "RTSP+l2R" sbs_6.upc.nl) each containing the host name of a resolver and a broadcast descriptor indicating that that the IGMP protocol is needed for accessing the SBS6 broadcast of KPN and that the RTSP protocol is needed to accessing the SBS6 broadcast of UPC (steps 3 and 4). The DDDS service identifier "l2R" indicates that one instance of the resource identified by the TV URI is provided.

[0052] The results of step 4 may be forwarded to the client for selection. The selection may be manually by a user or automatically e.g. using a program in the client selecting according to specific criteria (e.g. the user information). For example, the identified broadcast descriptors may be compared with the communications protocol information associated with the user equipment.

[0053] The user or the client subsequently selects the SBS6 television channel identifier, which is provided by the provider KPN as a multicast signal (IGMP). In order find an appropriate local multicast IP address an RA-DNS request is sent to the local resolving function, which forwards the request to the remote resolution function B. The request comprises KPN's multicast SBS6 television channel identifier "_tv._igmp.sbs6.kpn.com" and the relevant user location information (steps 5 and 6). The remote resolving function B returns a host name "content1234.kpn.nl" of the television channel. Thereafter the host name is resolved in a multicast IP address using conventional DNS (steps 8-12). Finally, using an IGMP join request the broadcast is streamed to the client (steps 13-14). Hence, using the resolution functions of DDDS, RA-DNS and DNS the system is able to resolve the TV URI into an IP address of a local television channel provider.

[0054] The invention is not limited to the embodiments described above, which may be varied within the scope of the accompanying claims.

Claims

1. Method of resolving a television channel identifier into a television channel locator in a resolving system

comprising a client connected to at least one server, the server comprising a resolution function, the method comprising the steps of:

- receiving a resolution request from the client, the request comprising a television channel identifier, preferably a standardized television channel identifier, identifying the name of the television channel; 5
 - the resolution function resolving the television channel identifier into one or more television channel locators, wherein the television channel locator comprises the location of a broadcast provider capable of providing the broadcast identified by the television channel identifier to the client. 10
2. Method according to claim 1 or 2, wherein the resolution function resolves the television channel identifier on the basis of one or more broadcast descriptors. 20
 3. Method according to claim 2, wherein a broadcast descriptor comprises information on the broadcast standard and/or communications protocol. 25
 4. Method according to any of claims 1-3, wherein the television channel identifier is a URI comprising the domain name or part of the domain name of the broadcaster or broadcast network of the television channel. 30
 5. Method according to any of claims 1-4, wherein the channel identifier is an TV URI, preferably an TV URI as defined in RFC 2838. 35
 6. Method according to claim 1, wherein the request further comprises user information and wherein the resolution function resolves the television channel identifier on the basis of the user information. 40
 7. Method according to claim 6, wherein the user information comprises the network address of the client and/or a user profile. 45
 8. Method according to claim 7, wherein the user profile comprises at least one of the following user information items: geographic location data of the client and/or the user of the client, language data, history of client's requests, broadcast standard information and/or communications protocol information associated with the user equipment. 50
 9. Method according to claim 1, wherein the resolving step further comprises the step of: 55
 - identifying one or more broadcast provider portals which may be capable of delivering the

broadcast identified the television channel identifier.

10. Method according to claim 9, wherein the identification of the broadcast provider portals is performed on the basis of user information, preferably the location of the user.
11. Method according to claim 10, wherein the identification of the broadcast provider portals is performed on the basis of one or more broadcast descriptors comprising information on the broadcast standards and/or streaming protocols used by a broadcast provider.
12. Method according to claim 1, wherein the resolving system further comprises a local server connected to the client and to one or more remote servers, wherein the local server comprises a local resolving function and wherein each remote server comprises a remote resolving function and wherein the resolving step further comprises the step of:
 - the local server sending in response to the resolution request a remote resolution requests to at least one of the remote servers, the remote resolution request comprising the television channel identifier and the user information.
13. Method according to claim 12, wherein the resolving step further comprises the step of:
 - sending a resolution redirect message in response to a resolution request from the local resolving function or one of the remote resolving functions, the resolution redirect message comprising the identity of one or more further remote servers comprising a resolution function.
14. Method according to claim 13, wherein the identity of the further remote resolver servers is provided by an URI or an IP address.
15. Method according to any of claims 1-14, wherein the method further comprises the step of:
 - sending a resolution response to the client, the response comprising one or more television channel locators.
16. Method according to any of claims 1-15, wherein the resolution request and/or the remote resolution requests and/or the resolution redirect message and/or the resolution response is an NAPTR.
17. Method according to claim 16, wherein the NAPTR comprises one or more broadcast descriptors, comprising information on the broadcast standards

and/or streaming protocols.

18. Method according to claim 17, wherein the NAPTR comprises at least one of: a cable television channel number, a cable television frequency, a broadcast television channel number, an ether frequency. 5
19. Method according to any of claims 1-18, wherein the television channel locator is at least one of: a broadcast frequency, a network address, preferably a unicast IP address or a multicast IP address. 10
20. Method according to any of claims 1-19, wherein the resolution function is a computer program comprising resolving logic executed on a server, the program further using configuration data and a cache. 15
21. Method according to any of claims 1-20 wherein the resolution function comprises an DNS resolution function and/or an DDDS resolution function and/or an RA-DNS resolution function. 20
22. A resolver server system for resolving a television channel identifier into a television channel locator, the system comprising a client connected to at least one server, the server comprising a resolution function, the resolution function comprising: 25
 - means for receiving a resolution request from the client, the request comprising a television channel identifier, preferably a standardized television channel identifier, identifying the name of the television channel; 30
 - means for resolving the television channel identifier into one or more television channel locators, wherein the television channel locator comprises the location of a broadcast provider capable of providing the broadcast identified by the television channel identifier to the client. 35
23. System according to claim 22, wherein the resolution function further comprising means for resolving the television channel identifier on the basis of one or more broadcast descriptors comprising information on the broadcast standards and/or streaming protocols. 40
24. System according to claim 22, wherein the request further comprises user information and wherein the resolution function further comprises means for resolving the television channel identifier on the basis of the user information. 45
25. System according to claim 24, wherein the user information comprises the network address of the client and/or a user profile. 50
26. A computer program product for resolving a televi-

sion channel identifier into a television channel locator, the computer program product comprising software code portions configured for, when run on a server system, executing the method according to any of claims 1-21.

27. A carrier containing the computer program product of claim 26.

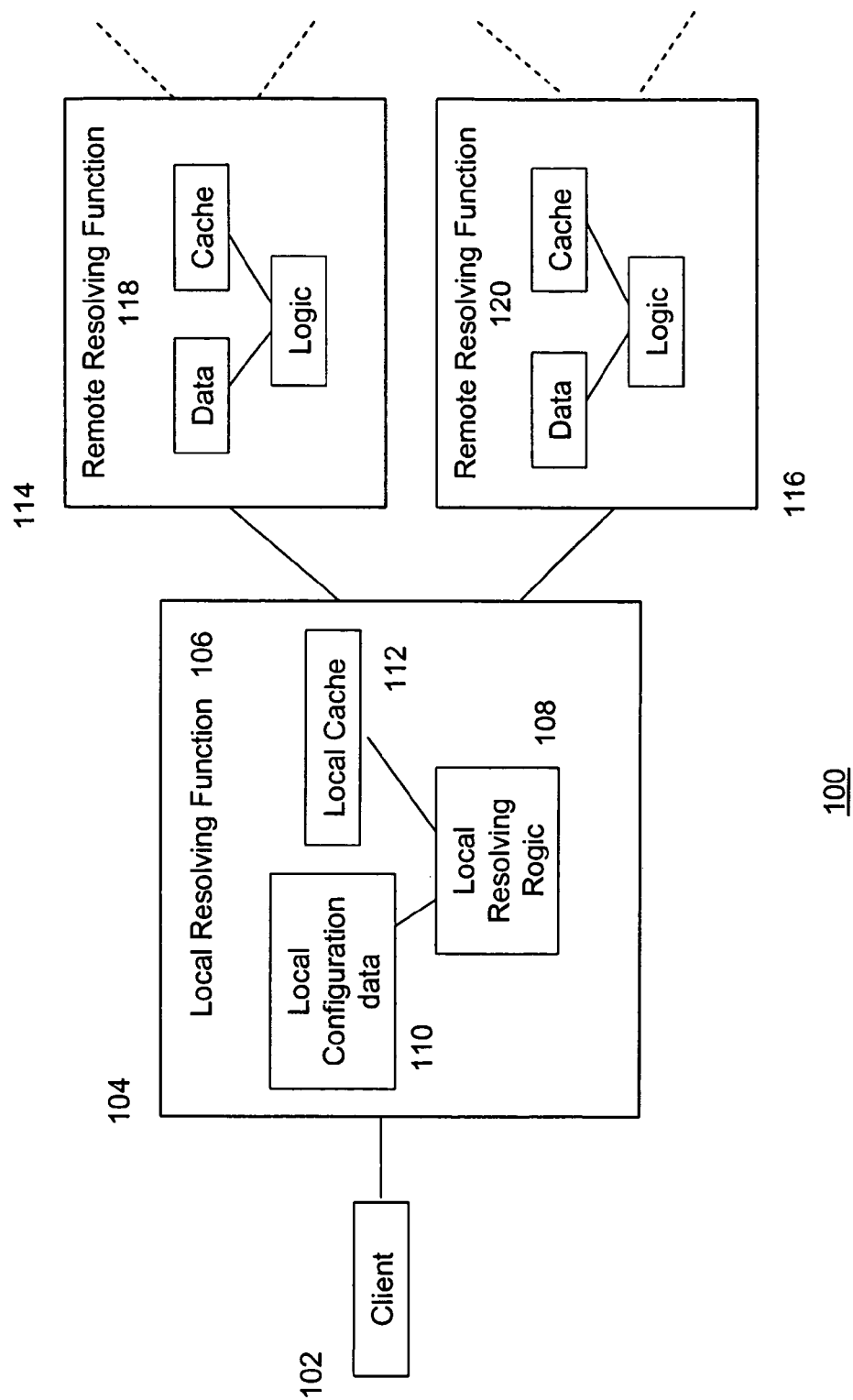


Figure 1

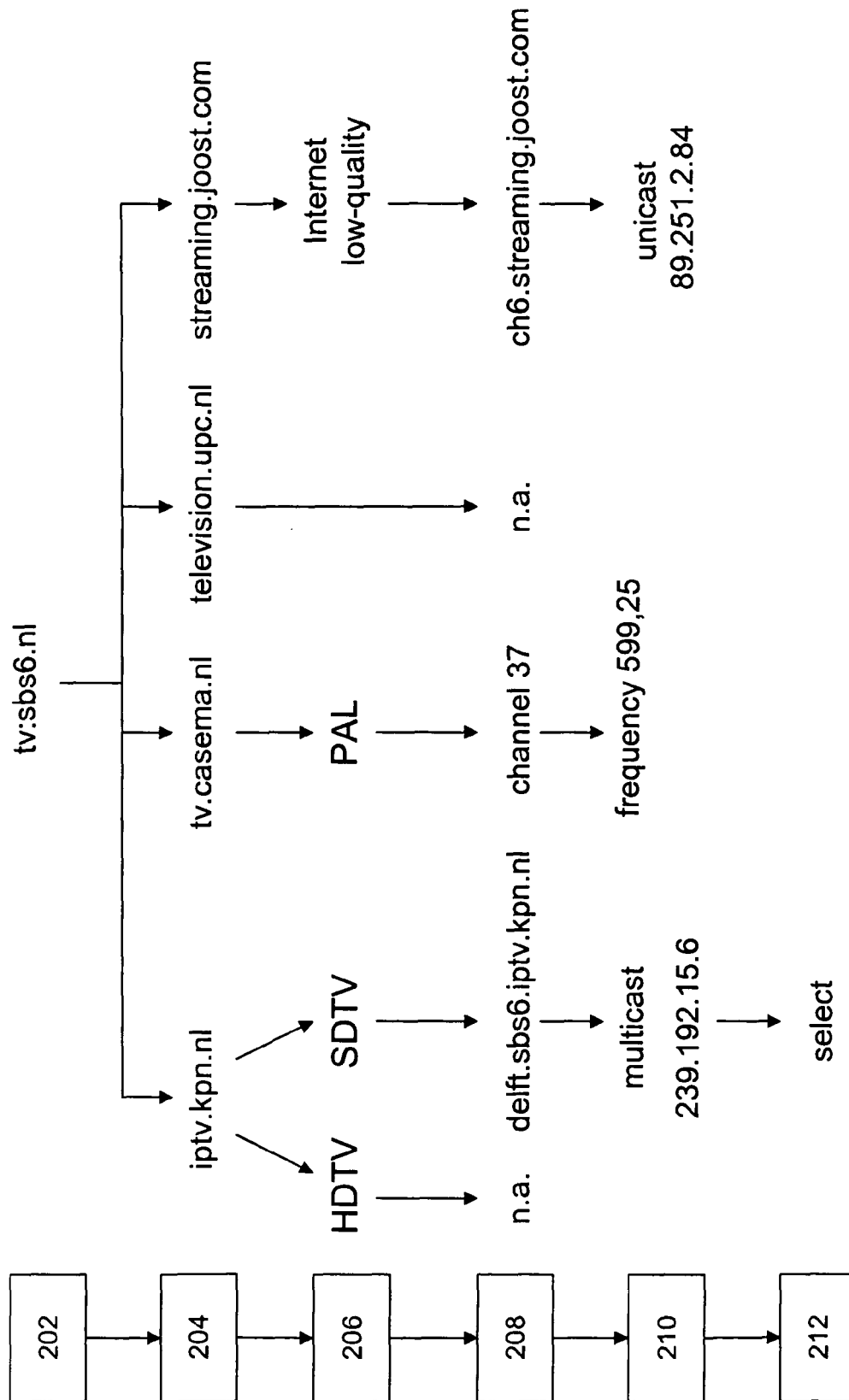


Figure 2

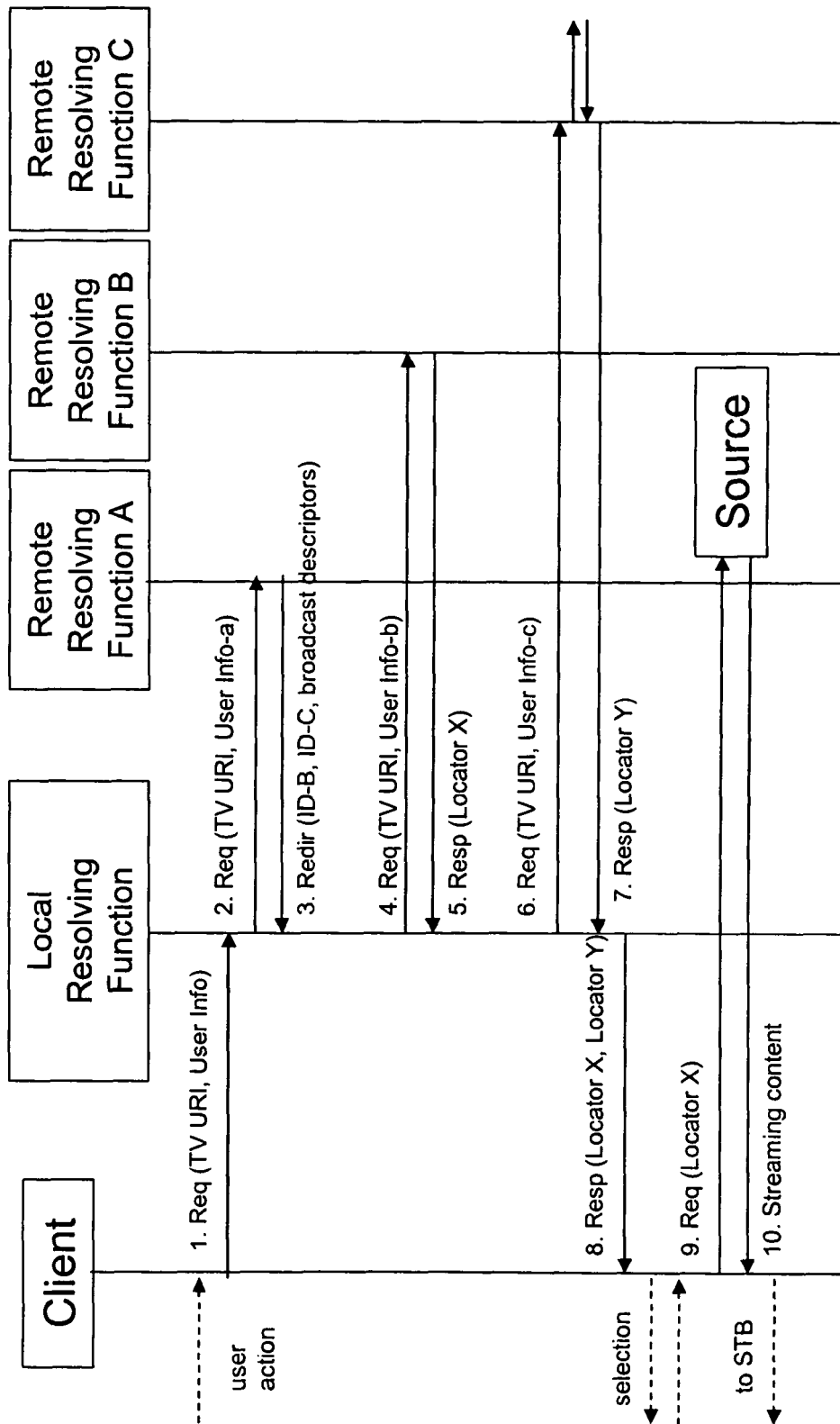


Figure 3

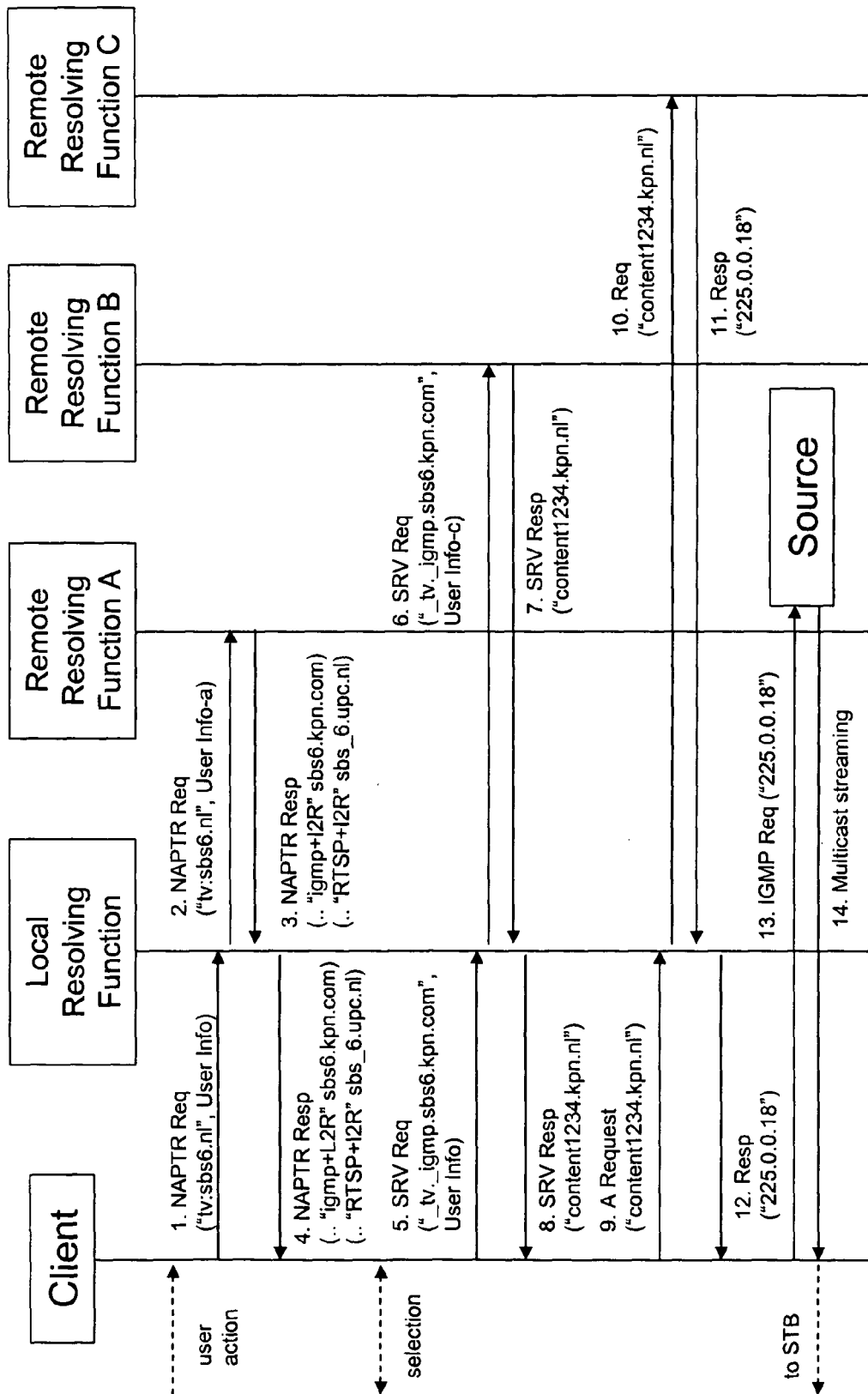


Figure 4

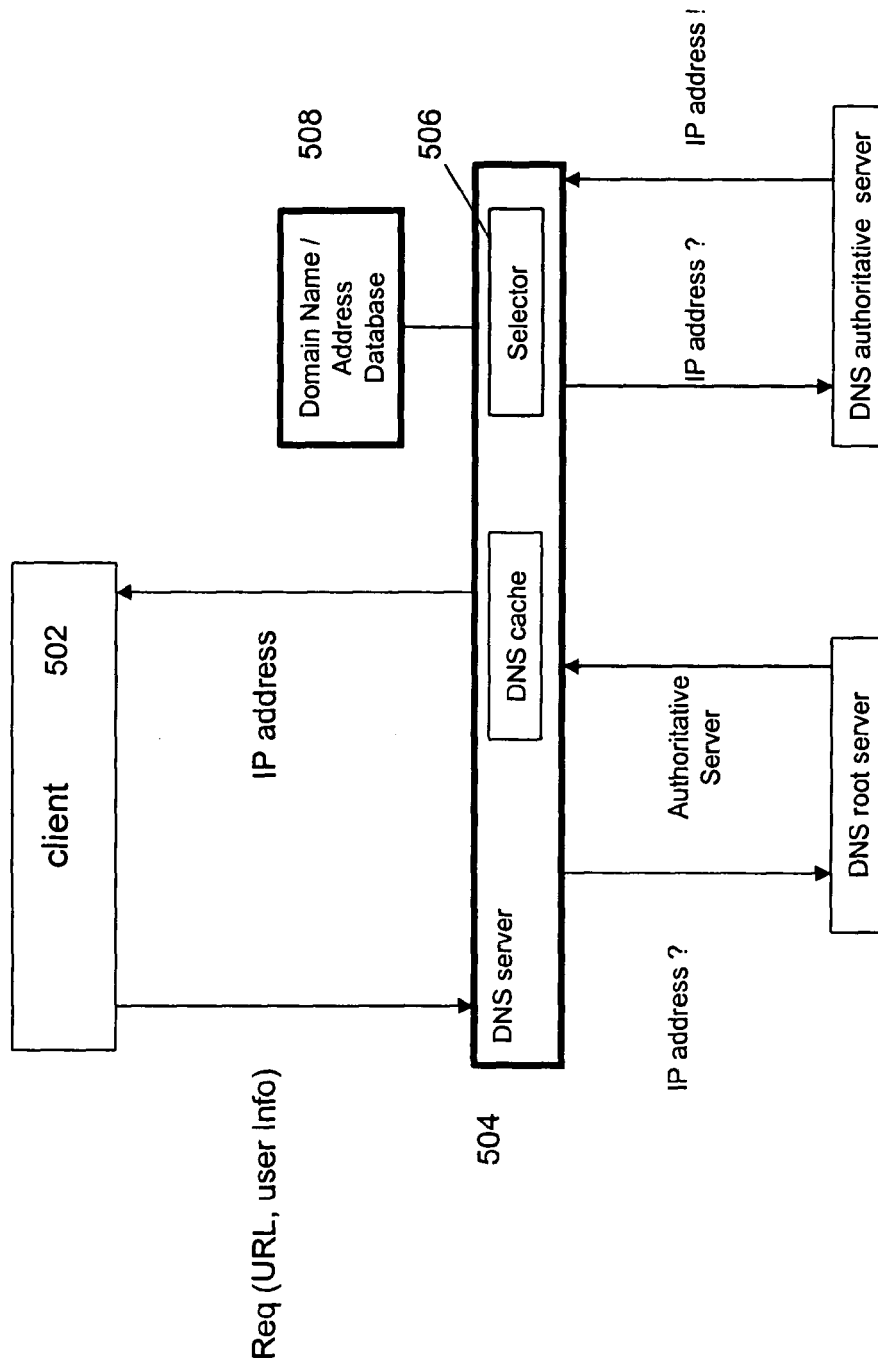


Figure 5

Application Number
EP 08 00 3902

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	"Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems (TV-anytime); Part 4: Phase 1 - Content referencing; ETSI TS 102 822-4" ETSI STANDARDS, LIS, SOPHIA ANTIPOLIS CEDEX, FRANCE, vol. BC, no. V1.3.1, 1 November 2007 (2007-11-01), XP014040520 ISSN: 0000-0001 * page 11, lines 1-5 * * page 12, lines 19-22 * * page 12, lines 31-33 * * page 14, lines 3-11 * * page 22, lines 6-8 * * page 25, lines 2-5 * * page 26, lines 18-22 * * page 27, lines 4-9 * * page 27, lines 16-20 * * page 28, lines 11-13 * * figures 5.1,12.4; table 8.1 * -----	1-27	INV. H04H60/43 H04H60/65
X	"Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems (TV-Anytime); Part 2: Phase 1 - System description; ETSI TS 102 822-2" ETSI STANDARDS, LIS, SOPHIA ANTIPOLIS CEDEX, FRANCE, vol. BC, no. V1.4.1, 1 November 2007 (2007-11-01), XP014040516 ISSN: 0000-0001 * page 105, paragraph 10.3.2 - page 107 * * page 111, paragraph 10.5.1 - page 113 * -----	6-8,10,11,24,25	H04H
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		18 February 2009	Pantelakis, P
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 18 February 2009	Examiner Pantelakis, P
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EUROPEAN SEARCH REPORT

Application Number
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DOCUMENTS CONSIDERED TO BE RELEVANT			
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 18 February 2009	Examiner Pantelakis, P
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