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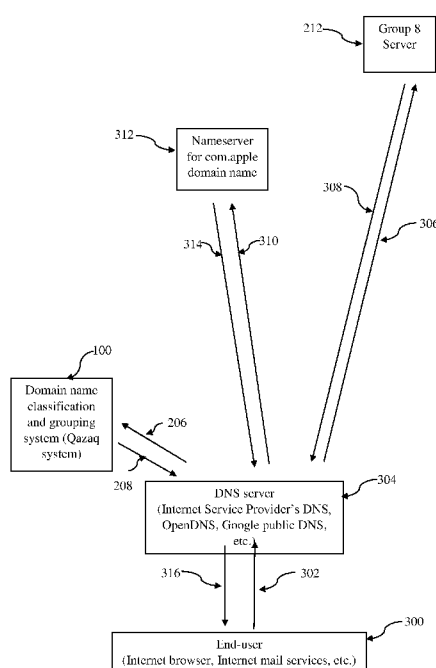
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(54) Title: NEW DOMAIN NAME SYSTEM AND USAGE THEREOF

Figure 3



(57) **Abstract:** The present invention provides methods and systems for registering unlimited number of domain names. According to one embodiment of present invention, a new and/or currently registered domain names are classified and grouped into groups, and each said group is maintained by at least one computing system such as computing server. (group-server). In a case of a request for DNS resolution or domain name registration for a domain name, network address of group-server maintaining corresponding group is computed from the domain name itself by disclosed system utilising disclosed method. Further operations relating to the domain name is performed in the corresponding group-server. Another embodiment of present invention can be utilized to improve current root name server without compromising root zone file size, in order to allow registering unlimited number of top-level domain name extensions.

NEW DOMAIN NAME SYSTEM AND USAGE THEREOF

TECHNICAL FIELD OF THE INVENTION

The present invention relates to network communications and particular to methods and systems for further advancing current domain name system, enabling registration and utilisation of unlimited number of domain names.

5 BACKGROUND ART

The Internet has become an essential part of modern society and the explosive growth of the Internet and the increasing amount of online electronic information has made the Internet an important information source for digital consumers today. On the consumer side, many new devices other than traditional desktop computers are being used to access the Internet. On the
10 network side, more and more websites provide rich multimedia content, an integration of text, images, audio, video, graphics, and applications.

Network computing, at its core, relates to the transport of data between addressable computing endpoints in a network of computing endpoints. Integral to network computing is the universal way in which data is addressed to an intended endpoint. In this regard, the Internet
15 protocol (IP) is the principal communications protocol used for relaying packets of data across an internetwork using the IP suite. Responsible for routing packets across network boundaries, IP is the primary protocol that establishes the Internet.

However, easily memorable and pronounceable names, referred as “domain names” are preferable for people. For this reason, Domain Name System (DNS) was implemented in order to
20 make it easy to connect to various contents and services in the Internet.

DNS is a global database system which provides resolution or mapping from a host name (such as www.un.org) to an IP address (such as 157.150.34.32 or 0:0:0:0:ffff:9d96:2220), or vice versa. It is a distributed and hierarchical system, ensuring coherency as well as avoiding a single point of failure. The results of database lookups are often cached, reducing network traffic and
25 server load, and increasing lookup efficiency.

From data structure point of view, the database system of the DNS is represented as a labelled tree called the domain name space. The strings associated with tree nodes are called DNS labels, which consists of alphabets, numeric numbers, and the dash character (-). The domain name of a domain is a string concatenating all labels from the domain’s root to the root of the entire
30 name space, separated with periods.

The highest level in the DNS hierarchy is the “root,” which is technically unnamed but often referred to as the “.” The level immediately below the root in the DNS hierarchy is the top-level domain, or “TLD.” Examples of TLDs are the com, net, org, bank, edu domains, which are commonly called generic TLD (gTLD). At the first level, there are also per country domain names, which are called country code top-level domains (or ccTLDs). There is no technical difference between gTLDs and ccTLDs in terms of the DNS protocol; the difference is in who manages the corresponding name space.

Then follows second-level domain names (SLD), which are mostly registered by companies, organisations and individuals to be present in Internet.

The tree of domain names are sub-divided into zones. A DNS zone file may contain one or many domains and sub-domains, depending on administrative options of the zone manager. For example all TLD names are listed in root zone file.

Every node in the name space belongs to one and only one of the zones, which allows a zone to define an administration boundary of a particular part of the name space.

Each zone is served by one or more nameservers. A nameserver of a zone maintains domain names within the zone, and responds to database queries for the names.

Nameservers are often called authoritative (DNS) servers. Nameservers of the root zone and gTLD zones are for multiple different zones. For example, com and net zones are served by the same set of nameservers.

Many zones have more than one authoritative server, particularly in the case of top-level zones, to provide redundancy and improve stability. Usually only one of them maintains the master database, which is called the primary (or master) server of the zone. Other nameservers, called secondary (or slave) servers, periodically synchronize with the primary server to provide coherent behaviour. This process is called a zone transfer.

There are also non-authoritative servers, which have a cache file that is constructed from all the DNS lookups it has performed in the past for which it has gotten an authoritative response.

Domain name registration is made through Shared Registration System (SRS) with accredited registrars.

DNS system, briefly described above, is administered and accredited by non-profit organisation called Internet Corporation for Assigned Names and Numbers (ICANN). ICANN responsible for coordinating the maintenance and methodologies of several databases, with unique identifiers, related to the namespaces of the Internet - and thereby, ensuring the network's stable

and secure operation. ICANN was established by US Department of Commerce initiative to take over the IANA functions in 1998.

There are some problems related to current state of Internet.

5 There is high demand for new domain name variations (strings or labels) from many Internet end-users. For example, it may be more favourable for individuals to have domain name consisting his/her own initials, such as “nurzhamal.askar”, “askar.bauka”, “james.oliver” etc. This demand was translated into demand for new TLD extensions. Considering new Internet related programs, masterplans, roadmaps such as Internet Plus in 13th 5-year plan of China, ASEAN ICT Masterplan 2020, Digital India, Intelligent Nation 2015 by Singapore and more for increasing the
10 Internet penetration, Internet presence and digital literacy of the citizens, the demand will be high and theoretically it is hard to predict in the future.

ICANN decided to introduce new TLDs gradually and new gTLD programme was initiated by ICANN, which was very lengthy for unknown reasons. In spite of this, technical aspect of current Internet domain naming system limits infinite number of domain names and/or TLDs as it
15 will increase root zone file dramatically, compromising stability and operation of Internet to some extent.

Furthermore, the success of new TLD depends on how it is marketed and used by end-user. Historically, domain name extensions like .biz, .info, .mobi, .travel, introduced in 2001, failed to be popular and since then have largely been ignored by large brand companies. It will be
20 problematic for registrant to register and invest on domain name with TLD extension not secured or guaranteed to operate in the future. This situation unintentionally or otherwise forces the registrant to use traditional extensions, such as com, net or country code TLDs. Moreover, there are high cost requirements for TLD operator to maintain and manage new gTLD, which may force the operator to set higher price for registration and renewal of SLD name in case of lower number
25 of registered SLD names. Additionally, current state of Internet and current policies implemented by ICANN necessitates to have vast majority of gTLD operators in operation in case of increased number of TLDs.

One embodiment of current invention can be used to eliminate the dependence on gradual increase of root zone file; in addition to possibility, it creates for end-users to register domain name
30 from unlimited variation of domain names. Furthermore, in one embodiment of current invention, the bound of particular TLD name to particular TLD operator is eliminated.

DISCLOSURE OF THE INVENTION

The present invention provides methods and systems for registering unlimited number of domain names and utilizing thereof based on classification and grouping of domain names.

According to one embodiment of present invention, systems and methods are provided to
5 classify and group new and/or currently registered domain names into groups, and at least one server (group-server) maintains each said group. The servers may operate in hierarchy of “master” and “slave” for redundancy or other purposes.

According to one embodiment of present invention, domain name classification and grouping system is implemented and named as “Qazaq system” by author. In case of a request of
10 DNS resolution or domain name registration, network address of the corresponding group-server for unknown domain name is computed from the domain name itself by the Qazaq system utilising disclosed method. Further operations such as DNS lookup, availability for registration and other operations relating to the domain name are performed within the corresponding group-server. Network address may be denoted by another domain name or IP address.

15 According to another embodiment of present invention, there is no difference between TLD and SLD labels in terms of hierarchy. Both of these labels can be used to group domain names, which in turn eliminates TLD nameservers from DNS system.

According to one embodiment of present invention, the Qazaq system can be implemented in non-authoritative DNS servers, such as Internet service provider’s DNS, Google public DNS,
20 OpenDNS, which will allow to request for DNS resolution of unknown domain name directly from corresponding group-server.

According to one embodiment of present invention, the Qazaq system can be implemented in end-user’s computer system, which will allow to request for DNS resolution of unknown domain name directly from corresponding group-server.

25 According to one embodiment of present invention, the Qazaq system can be implemented in a system involved in domain name registration and/or modification, such as registry and/or registrar’s server, which will allow to perform operations such as checking availability of a domain name for registration directly from a corresponding group-server.

According to one embodiment of present invention, the Qazaq system can be implemented
30 in the group-server in order to further divide the group of domain names into smaller groups for redundancy or other purposes.

According to one embodiment of present invention, the Qazaq system can be implemented in current root nameservers, where TLD names will be classified and grouped according to disclosed method. In case of DNS request for unknown TLD name resolution, the request will be redirected to group-server maintaining corresponding group of TLDs.

5 According to one embodiment of present invention, entire domain names registered so far will be classified and grouped according to the method disclosed herein and future new domain names are only added to existing groups, which in turn makes implementation of the embodiment of present invention transparent to existing domain name owners.

10 According to one embodiment of present invention, the Qazaq system can be implemented as root servers, having no database of domain names and/or TLDs and eliminating current root nameservers from overall DNS system. DNS requests and domain name registrations will be handled by computing and forwarding to corresponding group-servers.

15 According to one embodiment of present invention, the Qazaq system can be implemented on specially build computing hardware such as Field Programmable Gate Arrays (FPGA) or the like, in order to increase speed of computation of plurality of operations and/or requests.

 According to one embodiment of present invention, group-servers are implemented on one or more computing system such as computing server, virtual computing server or implemented as a software application or program and operates in anycasting methodology for redundancy or other purposes.

20 It is to be understood that both foregoing general description and following description are exemplary and explanatory only and various modifications may be made to embodiments in order to implement present invention in addition to embodiments described herein without departing from the spirit and the scope of the invention.

25 BRIEF DESCRIPTION OF THE DRAWINGS

 FIG.1 illustrates example of operation of domain name classification and grouping system (Qazaq system).

 FIG.2 illustrates an example process for registering domain name in accordance with one embodiment of the present invention.

30 FIG.3 illustrates an example process for DNS resolution of domain name into network address in accordance with one embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

Preferred exemplary embodiment will be described with references to examples illustrated in accompanying drawings. Same reference numbers will be used throughout the drawings to refer to the same or like parts.

According to one embodiment of present invention, all participants in registration and DNS resolution of domain name are grouped in to six group of entities. The grouping of those entities are made for simple explanatory purposes only. The groups are:

- 1) group of end-users (computers, browsers, Internet services and other endpoints),
- 2) group of DNS servers (Internet Service Provider DNS, Google Public DNS, OpenDNS servers and other non-authoritative servers),
- 3) group of authoritative nameservers (domain name owners' servers),
- 4) group of members of domain name registration and modification system (Registries, registrars, payment operators, etc.),
- 5) group of group-servers.
- 6) group of Qazaq system servers.

First, operation of Qazaq system (**Figure 1**) with its functions executing disclosed method will be described in detail, followed by description of registration of new domain name (**Figure 2**) and resolution of domain name (**Figure 3**) according this embodiment of present invention.

In this embodiment, the Qazaq system is implemented in separate unit, comprising at least one computing server connected to network (e.g. Internet). Qazaq system **108** has main functions performing main purpose of the system in addition to other functions such as, security. These main functions are operating according to disclosed method. Here, the disclosed method is based on number of characters in both domain name labels (double label based) and is shown as an example in **Figure 1**. (e.g. askar.bauka). It should be noted, that double label based domain name grouping method encompasses both SLD and TLD into one domain name and eliminates hierarchical level between SLD and TLD as is usually used in conventional DNS system.

First, Qazaq system **100** receives request containing at least one domain name by receiving function **102**. Next, corresponding group for the received domain name is computed by a function **104** by for example, counting the characters in the labels (e.g. a s k a r b a u k a = 10). Then data containing network address of group-server maintaining corresponding group is retrieved from a database of groups **106** (e.g. Group 10 – IPv4 10.20.30.60). Next, function **108** sends the data back to enquiring entity. Notice should be taken, that for a person skilled in the art, it will be obvious to realize other ways, functions and/or implementations of disclosed method and the system not departing from the scope and the spirit of present invention.

Now, the process of registration of a domain name and other entities involved will be described in detail according to this embodiment. First, registrant **200**, wishing to register a domain name (e.g. “astana.services”), contacts and sends the domain name **202** to registrar’s system. **204**. Here, registrar is accepted as a member of the domain name registration and modification system, which could be one of existing registrars currently operating in the Internet. Registrar **204** sends the domain name data **206** to Qazaq system **100** in order to get data **208** containing network address of corresponding group-server. (e.g. Group 8 – A 30.40.50.70) Registrar **204** connects and requests **210** the availability of the domain name for registration from corresponding group-server **212** (e.g. Group 8 server). Group-server **212** alphabetically or otherwise searches for records in its database of domain names for the domain name. If in the database exists a record then the group-server sends back a message of not availability of domain name for registration back to the registrar. If there is no record for the domain name in the database, then sends a message **214** of availability of domain name for registration back to the registrar **204**, which in turn sends corresponding message **216** to the registrant **200**. In case of not availability of the domain name for registration the process terminates. In case of availability of the domain name for registration, the registrant fills registration form, submits other information **218** and makes payment of fee for domain name registration, which is handled by other members of domain name registration and modification system (not shown). Then registrar **204** sends request **220** for registration of the domain name to corresponding group-server **212**, which in turn, makes entry of records for the domain name into the database. The process may further be followed by assignment of authoritative name server for the registered domain name, where the record in the database of corresponding group-server is updated upon a request of the registrant (not shown).

Now resolution or mapping of domain name into network address will be described in detail according above-mentioned embodiment. First, end-user (e.g. real person) wishing to get access to a service, provided in a domain name, enters the domain name into address bar of a web browser application in a network-connected computer **300**. Then DNS query process is initiated and if the corresponding network address of the name server for the domain name is present in local cache of the computer, the process terminates. If there is no data in cache, the DNS query process **302** is forwarded to DNS resolver **304**, which may be Internet service provider’s DNS server or other DNS resolvers. Assuming the domain name (e.g. com.apple) is unknown for the DNS resolver, then the DNS resolver sends data **206** containing the domain name (e.g. com.apple) to Qazaq system **100** and gets **208** network address data of corresponding group-server **212** (e.g. Group 8) for the domain name. Then, DNS resolver **304** contacts and requests **306** from group-server **212** and gets network address data **308** of authoritative name **312** server for the domain

name. Next, DNS resolver **304** contacts to said name server **312** and requests DNS resolution **310** of the domain name. Finally, the DNS resolver receives data **314** containing network address of the domain name from said name server **312** and forwards that data **316** to the requesting end-user computer **300**, the browser application then establishes connection between end-user and the service provider on that domain name. As can be noticed, the DNS resolver's iterative queries after getting the network address of group-server is similar to conventional operation of DNS server and so other ways are also possible to imagine for skilled person in the art.

As can be noticed further, from above detailed descriptions of the embodiment root name servers and TLD operator servers are eliminated from overall DNS system.

According another embodiment, Qazaq system together with group-servers can be used in or in parallel to current ICANN maintained root name servers in order to allow end-users to register unlimited number of domain names, not compromising root zone file and overall Internet stability. Root name server in case of DNS request containing unknown TLD extension will redirect or respond by providing network address of Qazaq system, where DNS request will be redirected or responded by providing network address of corresponding group-server, followed by conventional operation of DNS server.

It should be underlined that implementation of any embodiment of present invention is highly transparent to end-user as the conventional DNS server operations and operations of authoritative nameservers for domain names registered so far are intact.

It is within the scope of present invention to provide a computer program or program element, or a program storage or memory device such as a solid, magnetic or optical wire, tape or disc, or the like, for storing signals readable by a machine, for controlling the operation of a computer according to the method of the invention and/or to structure its components in accordance with the system of the invention. Further, each step of the method may be executed on any general computer, such as an IBM mainframe, PC or the like and pursuant to one or more, or a part of one or more, program elements, functions or objects generated from any programming language, such as C, C++, Java or the like. And still further, each said step, or a file or object or the like implementing each said step, may be executed by special purpose hardware or a circuit function designed for that purpose. Accordingly, the scope of protection of this invention is limited only by the following claims and their equivalents.

I claim:

1. A method for classifying and grouping domain names, comprising steps of:

receiving and/or acquiring at least one domain name;

performing a computation on the domain name;

5 storing a result of the computation; and

sending the result.

2. Claim 1, further comprising steps of:

selecting a data from a database equivalent to the result; and

sending the data.

10 3. Claim 1, wherein said computation is performed by retrieving a data from alphanumeric structure of a domain name label and/or labels.

4. Claim 1, wherein said computation is performed by retrieving a data from amount of characters in a domain name label and/or labels.

15 5. Claim 1, wherein said computation is performed by retrieving a data from code point structure of characters in a domain name label and/or labels.

6. Claim 1, wherein said computation is performed by retrieving a data from combination of:

claim 2 and claim 3;

claim 2 and claim 4;

20 claim 3 and claim 4; and/or

claim 2, claim 3 and claim 4.

7. Claim 2, wherein said steps are performed by plurality of entities; and/or in plurality of sequences.

8. A system for domain name classification and grouping, comprising functions for:

25 receiving and/or acquiring a data containing at least one domain name;

performing a computation on said data;

storing a result of said computation;

retrieving or selecting a data record equivalent to said result from a database; and

sending said data record.

9. Claim 8, further characterised by comprising at least one of following function for:

5 maintaining the database;

storing the database locally and/or remotely;

updating the database; and/or

communicating to a remotely located database.

10 10. Claim 8, wherein said function for performing a computation operates according to predefined method or instruction, wherein said predefined method or instruction may be updated.

11. Claim 8 further characterized by being implemented in combination with other system and/or separately at least on one computing system, such as computing server, virtual computing server, specially build computing hardware and/or software application or program.

15 12 Claim 8, where the database is characterized by having at least one type of data structure located in local and/or remote computing system.

13. A system for storing and managing a database of domain names comprising functions for:

receiving or acquiring a data;

searching a data record from said database;

20 responding by sending a data;

registering or making data entry to said database; and/or

updating said database.

14. Claim 13, wherein said database is created according to predefined method and comprises network addresses of authoritative name servers for domain names in the database.

25 15. Claim 13, further characterized by being implemented in combination with other system and/or separately at least on one computing system, such as computing server, virtual computing server, specially build computing hardware and/or software application or program.

16. Claim 13 further characterised by having one or more network address and/or operating in anycast network methodology in case of plurality of such systems.

17. Domain name registration system comprising: a claim 8; a claim 13; a domain name registration and modification system communicating to the claim 8 and the claim 13 by a network communication such as Internet.

18. Claim 17, wherein said domain name registration and modification system comprises one or more function for:

receiving a domain name from a registrant;

communicating with said claim 8 in order to get one or more network address of corresponding said claim 13 for said domain name;

requesting a search for a data record in a database of said claim 13;

getting a corresponding message data;

retrieving an information data from said registrant;

handling payment operations;

sending instructions to said claim 13 to make new data record entry of said domain name in the database of said claim 13;

sending a message data to said registrant.

19. Domain name resolution system, comprising: a claim 8; a claim 13; one or more nameserver and all communicated by end-user directly or through a DNS server by a network communication such as Internet.

Figure 1

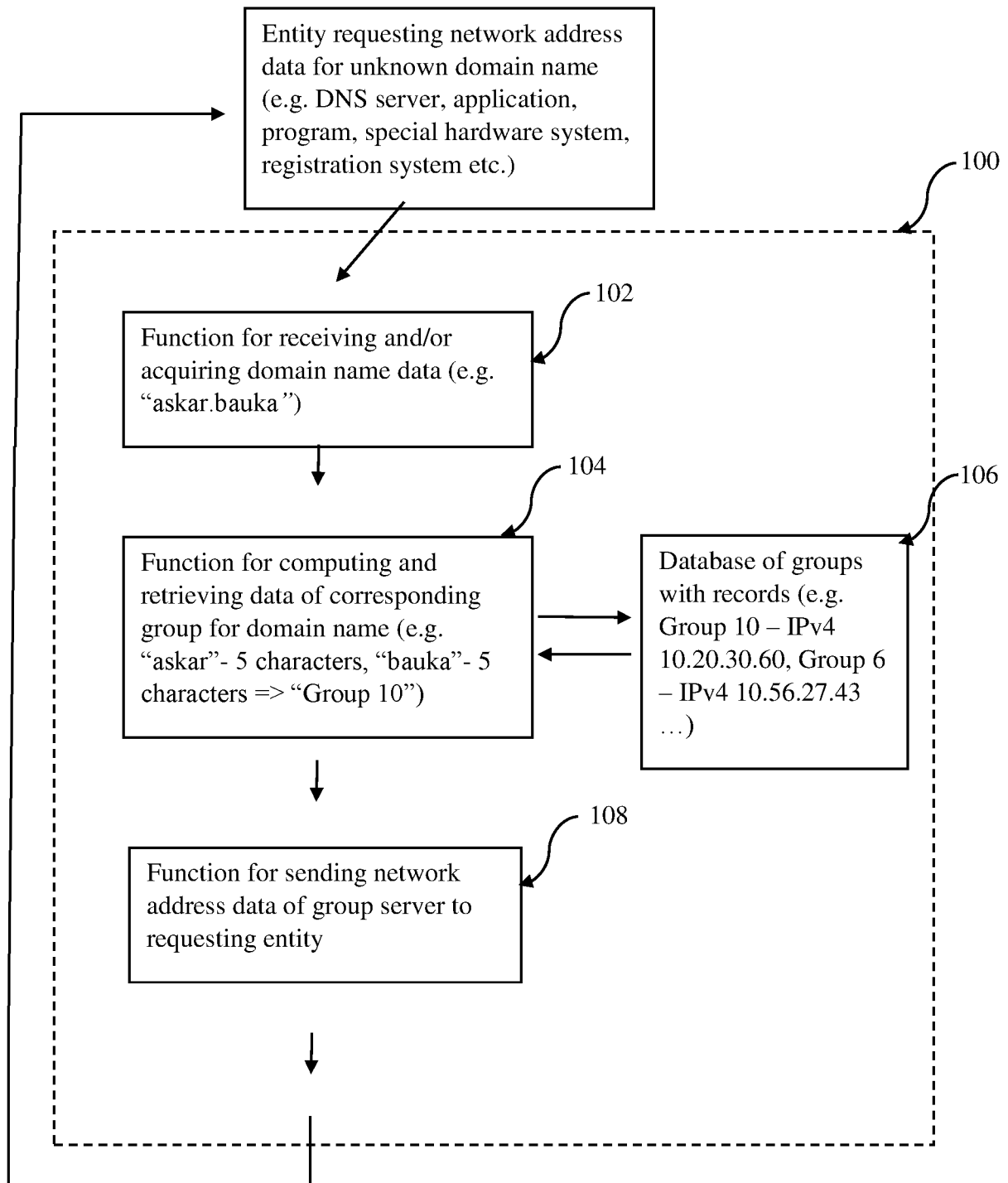


Figure 2

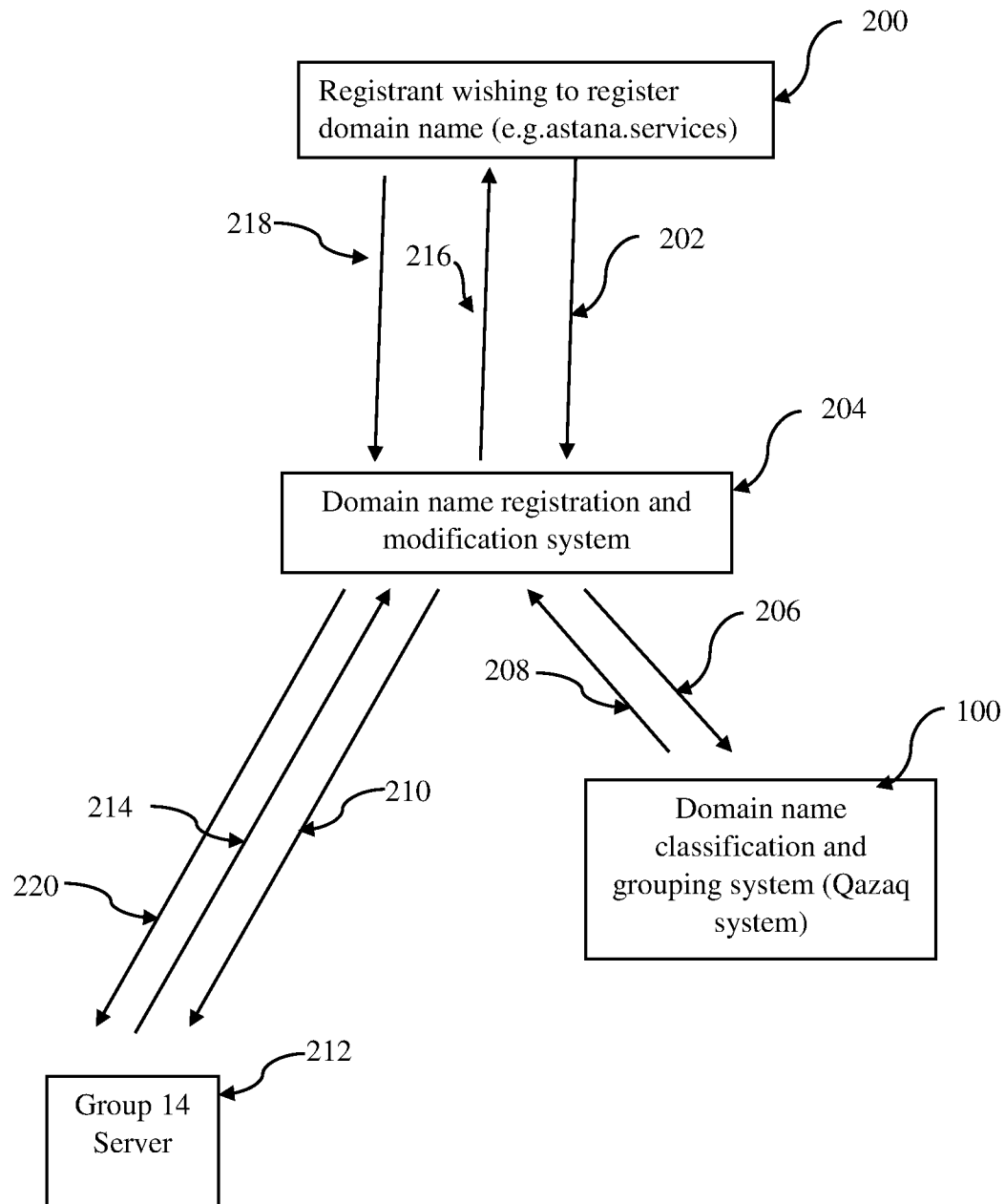
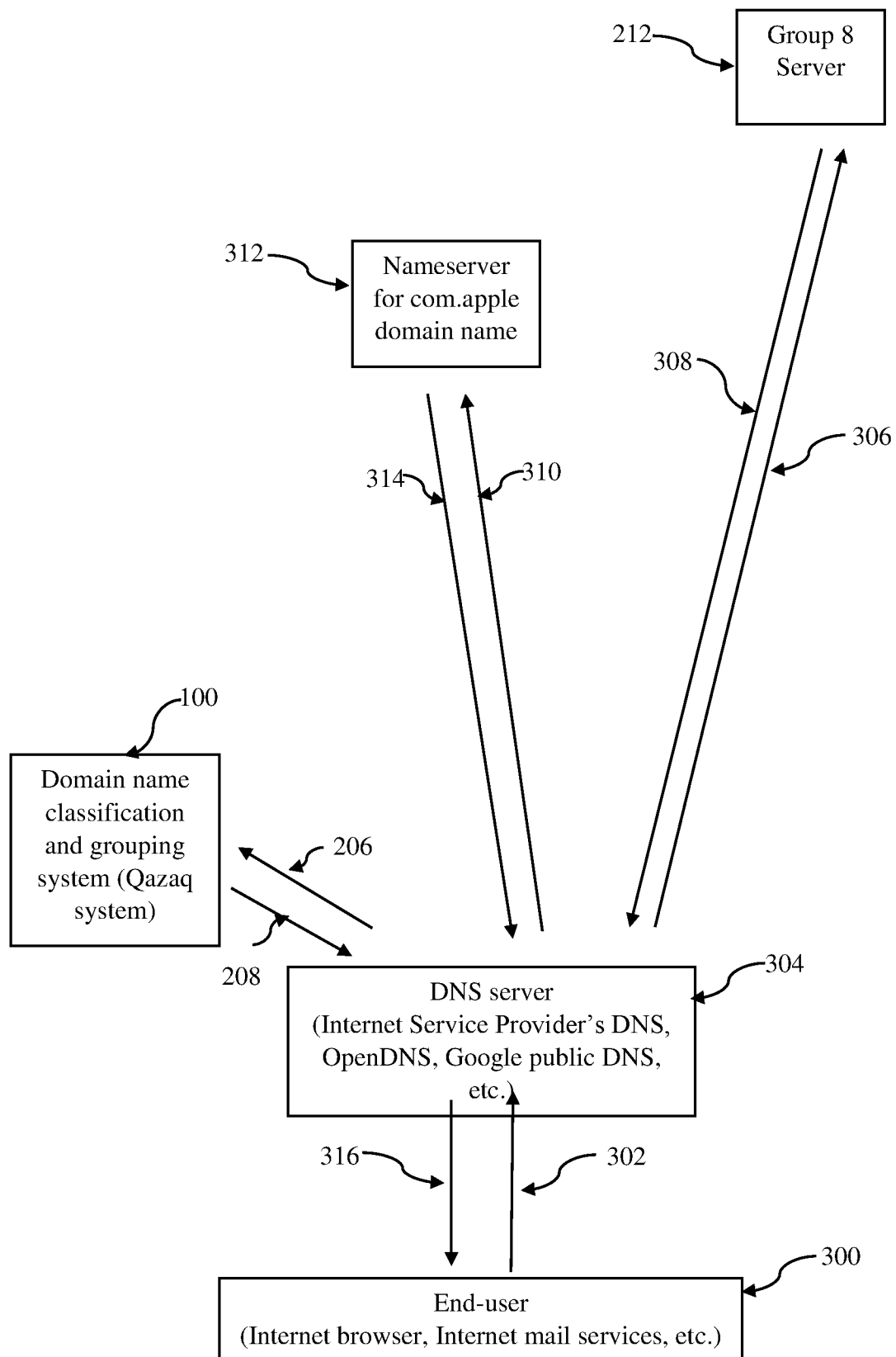


Figure 3



INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 2016/052574

A. CLASSIFICATION OF SUBJECT MATTER														
H04L 29/12 (2006.01) G06F 17/30 (2006.01)														
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)														
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 practicable, search terms used)														
PatSearch (RUPTO internal), USPTO, PAJ, K-PION, Esp@cenet, Information Retrieval System of FIPS														
C. DOCUMENTS CONSIDERED TO BE RELEVANT														
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.												
X	US 2014/0108452 A1 (VERISIGN, INC.) 17.04.2014, abstract,	1-17, 19 18												
Y	paragraphs [0014]-[0016], [0021], [0022], [0044], [0051]-[0053], [0056]-[0059], [0075], [0079], [0083], [0087]-[0091], claim 23, fig. 1, 6, 7, 9													
Y	US 2005/0203891 A1 (NS HOLDING COMPANY) 15.09.2005, abstract,	18												
	paragraphs [0028]-[0030], fig. 2													
A	US 2004/0215707 A1 (NEC CORPORATION) 28.10.2004	1-19												
A	US 2004/0194106 A1 (FUJITSU LIMITED) 30.09.2004	1-19												
☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.														
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* Special categories of cited documents:	“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													
“A” document defining the general state of the art which is not considered to be of particular relevance	“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													
“E” earlier document but published on or after the international filing date	“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													
“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)	“&” document member of the same patent family													
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Date of the actual completion of the international search		Date of mailing of the international search report												
07 September 2016 (07.09.2016)		08 September 2016 (08.09.2016)												
Name and mailing address of the ISA/RU: Federal Institute of Industrial Property, Berezhkovskaya nab., 30-1, Moscow, G-59, GSP-3, Russia, 125993 Facsimile No: (8-495) 531-63-18, (8-499) 243-33-37		Authorized officer D. Starshinov Telephone No. (499) 240-25-91												