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(54) **ASSISTED SETUP OF DOMAIN NAME REGISTRY**

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G06F 9/54	(2006.01)
H04L 29/06	(2006.01)
H04L 61/3015	(2022.01)
H04L 61/4511	(2022.01)

(52) **U.S. Cl.**
CPC ***H04L 61/302*** (2013.01); ***H04L 61/3025*** (2013.01); *H04L 61/4511* (2022.05)

(58) **Field of Classification Search**
CPC H04L 61/302; H04L 61/3025; H04L 61/4511; G06F 16/27; G06F 16/2365
USPC 709/245
See application file for complete search history.

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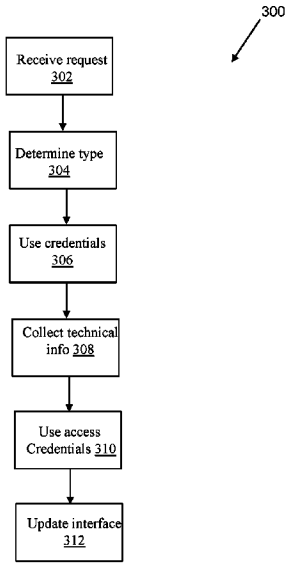
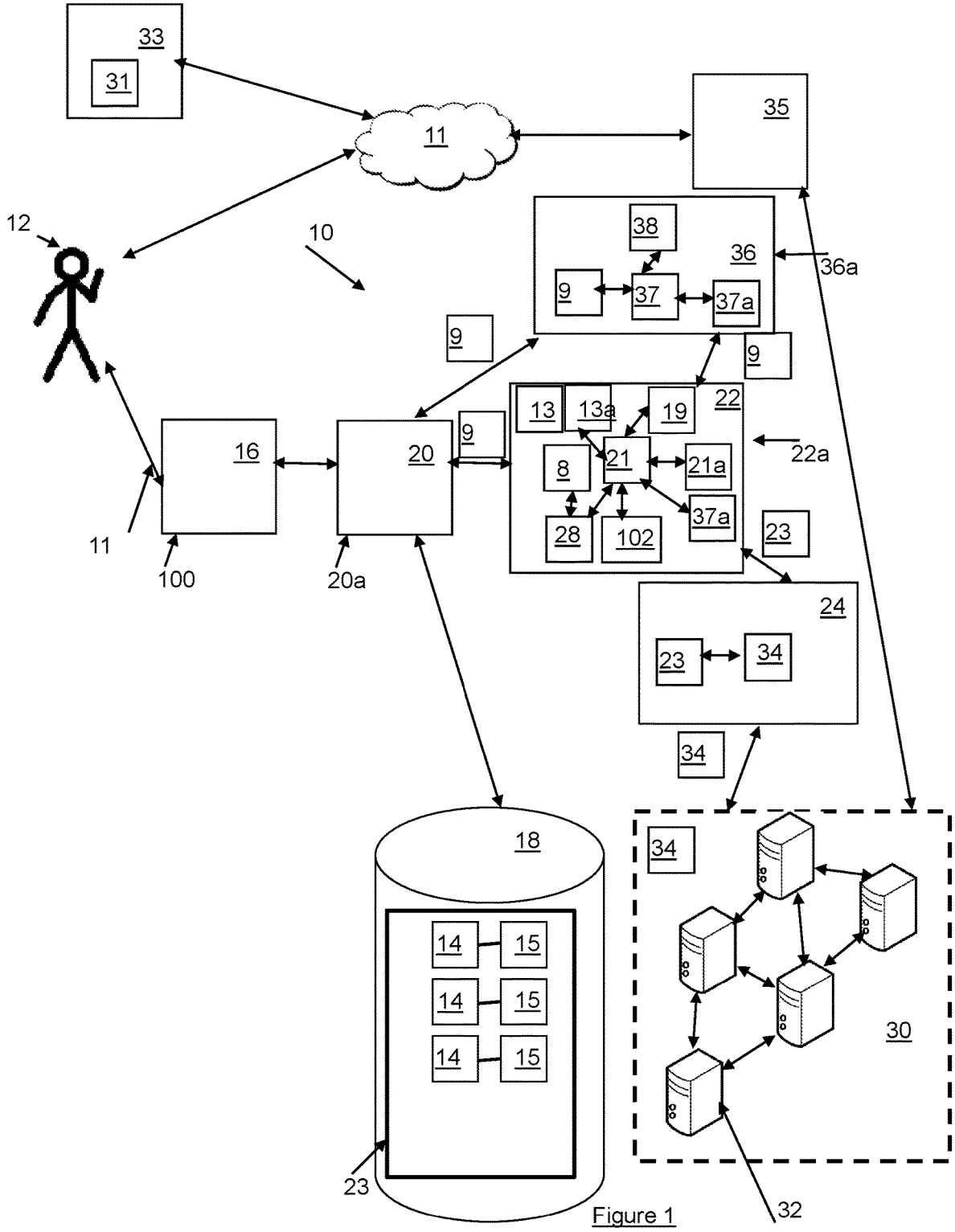
(57) **ABSTRACT**

A gateway server and methods operating as a web service providing a self-serve methodology for establishing a domain name registry over a communications network, comprising: receiving a request from the computing device to establish the domain name registry of a specified type; determining the specified type requires ICANN approval and receiving access credentials of the RO; confirming completion of a Registry Agreement between ICANN and the RO; collecting registry technical information for the domain name registry from the computing device; using the access credentials to access via the communications network the RO account on the server during a registry testing phase of the self-serve methodology to complete registry services testing for the domain name registry with ICANN; and updating a workflow interface with a completion status of the registry testing phase for subsequent access by the computing device of the RO over the communications network.

26 Claims, 6 Drawing Sheets




33
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36a
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37
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22a
16
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9
8
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21a
37a
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102
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11
100
20a
24
23
34
34
18
34
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Figure 1

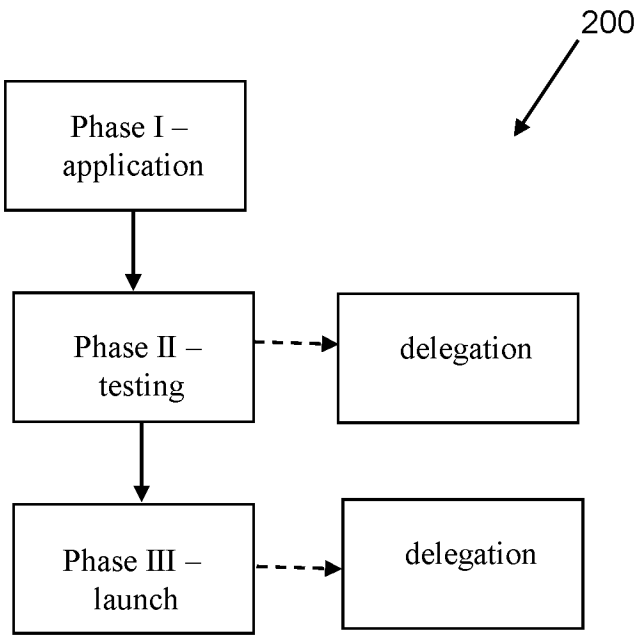
200
Phase I – application
Phase II – testing
delegation
Phase III – launch
delegation

Figure 2

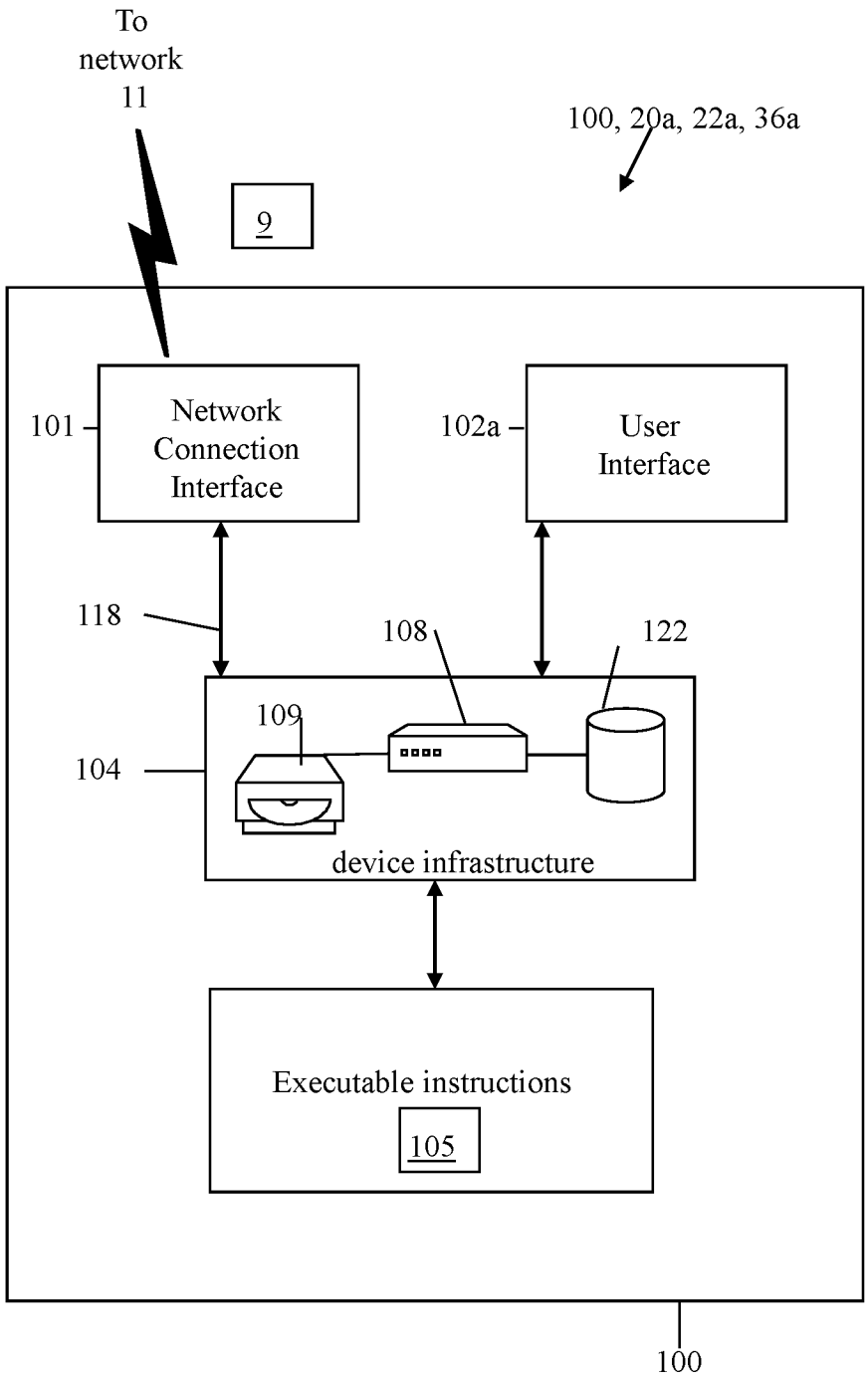
To network 11
100, 20a, 22a, 36a
9
101
Network Connection Interface
102a
User Interface
118
108
122
109
104
device infrastructure
Executable instructions
105
100

Figure 3

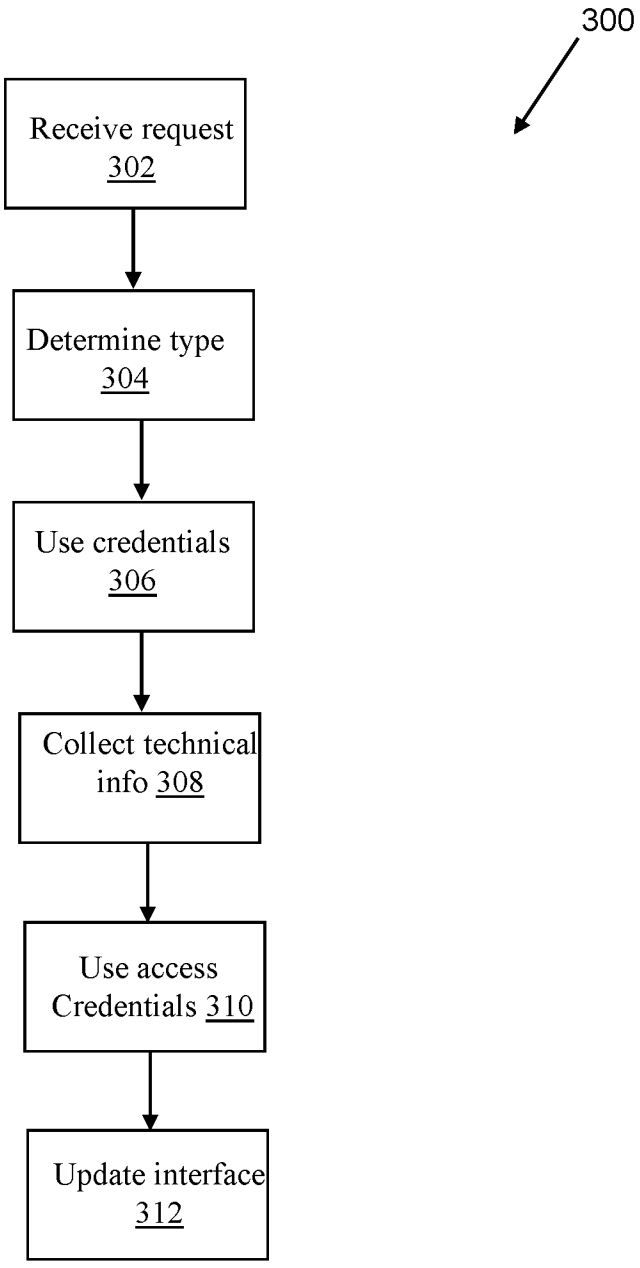
300
Receive request 302
Determine type 304
Use credentials 306
Collect technical info 308
Use access Credentials 310
Update interface 312

Figure 4a

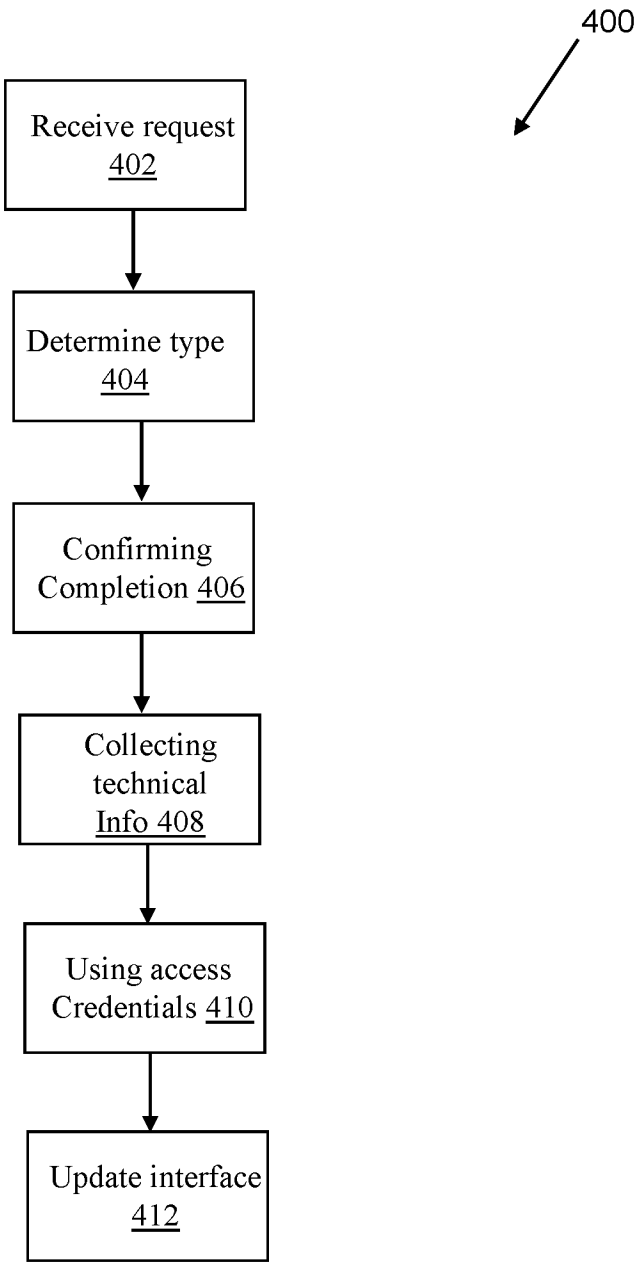
400
Receive request 402
Determine type 404
Confirming Completion 406
Collecting technical Info 408
Using access Credentials 410
Update interface 412

Figure 4b

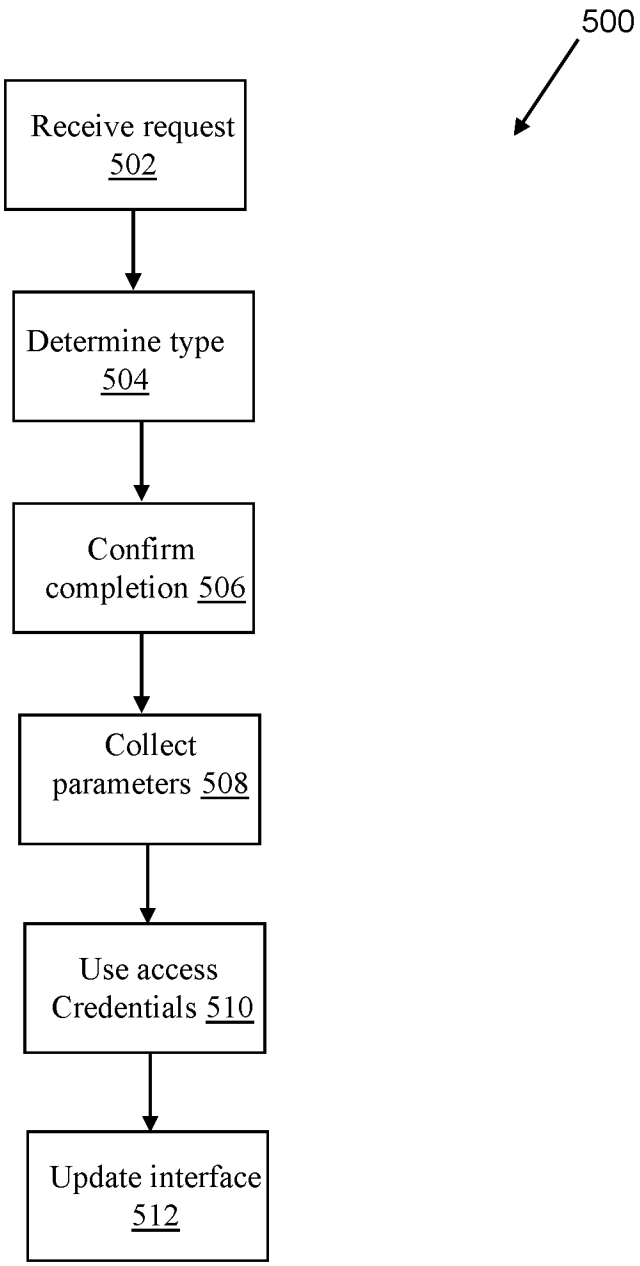
500
Receive request 502
Determine type 504
Confirm completion 506
Collect parameters 508
Use access Credentials 510
Update interface 512

Figure 4c

ASSISTED SETUP OF DOMAIN NAME REGISTRY

FIELD

The present invention is related to setup and management of domain name registries.

BACKGROUND

Domain names are used in various networking contexts and application-specific naming and addressing purposes. In general, a domain name represents an Internet Protocol (IP) resource, such as a personal computer used to access the Internet, a server computer hosting a web site, or the web site itself or any other service communicated via the Internet. In 2014, the number of active domains reached 271 million. Today's Internet presence by companies is considered a critical element of their business.

There are a number of good reasons for having a domain name. If you ever change your web host, your domain name goes with you. Your regular visitors or customers who knew your site name would not have to be informed about a change of web address (also known as "URL"). They would simply type your domain name and they'd be brought to your new site. If you are a business, a domain name gives you credibility. Few people will be willing to do business with a company that does not have its own domain name. If you get a domain name that describes your company's business or name, people can remember the name easily and can return to your site without having to consult their documents.

It is a disadvantage with the current domain name set up methodology to properly and easily set up a new domain name registry, including interaction required or not in conjunction with ICANN. It is critical that registry information relating to the new domain name registry be complete, consistent, accurate, and up to date. As such, it is critical that in set up, domain name records (both registry and DNS data) must be consistent and up to date in order to prevent undesirable expense, complication and worst-case loss of domain name rights. The coordination involved for domain set up in today's multi-TLD universe is becoming increasingly complex, due to the increased availability in the number and variety of domain names.

BRIEF DESCRIPTION OF THE DRAWINGS

Exemplary embodiments of the invention will now be described in conjunction with the following drawings, by way of example only, in which:

FIG. **1** is a block diagram of components of a domain name transition system;

FIG. **2** is an overview flowchart of setup activities implemented by the self serve methodology on the system of FIG. **1**;

FIG. **3** is an example configuration of a computer device hosting the client or server devices utilized in FIG. **1**;

FIG. **4***a* is a flowchart of an example implementation for the system of FIG. **1**;

FIG. **4***b* is a flowchart of a further example implementation for the system of FIG. **1**; and

FIG. **4***c* is a flowchart of a still further example implementation for the system of FIG. **1**.

SUMMARY

It is an object of the present invention to provide a system and method for setting up domain name registries to obviate or mitigate at least some of the above presented disadvantages.

A first aspect provided is a gateway server operating as a web service providing a self-serve methodology for establishing a domain name registry over a communications network using machine-to-machine interaction involving the gateway server and a computing device of a registry operator (RO) for the domain name registry, the gateway server comprising: a network interface for communicating with the computing device over the communications network; a processor and associated memory having instructions stored thereon for execution by the processor to communicate with the computing device by: receiving a request from the computing device to establish the domain name registry of a specified type; determining the specified type requires ICANN approval and receiving access credentials associated with the RO for an RO account with ICANN hosted on a server; using the access credentials to access via the communications network the RO account on the server for contributing to completion of a Registry Agreement with ICANN on behalf of the RO during an application phase of the self-serve methodology; collecting registry technical information for the domain name registry from the computing device; using the access credentials to access via the communications network the RO account on the server for communicating the registry technical information to the server on behalf of the RO during a registry testing phase of the self-serve methodology in order to complete registry services testing for the domain name registry with ICANN; and updating a workflow interface with a completion status of the registry testing phase for subsequent access by the computing device of the RO over the communications network.

A second aspect provided is a gateway server operating as a web service providing a self-serve methodology for establishing a domain name registry over a communications network using machine-to-machine interaction involving the gateway server and a computing device of a registry operator (RO) for the domain name registry, the gateway server comprising: a network interface for communicating with the computing device over the communications network; a processor and associated memory having instructions stored thereon for execution by the processor to communicate with the computing device by: receiving a request from the computing device to establish the domain name registry of a specified type; determining the specified type requires ICANN approval and receiving access credentials of the RO for an RO account with ICANN hosted on a server; confirming completion of a Registry Agreement between ICANN and the RO; collecting registry technical information for the domain name registry from the computing device; using the access credentials to access via the communications network the RO account on the server for communicating the registry technical information to the server on behalf of the RO during a registry testing phase of the self-serve methodology in order to complete registry services testing for the domain name registry with ICANN; and updating a workflow interface with a completion status of the registry testing phase for subsequent access by the computing device of the RO over the communications network.

A third aspect provided is a gateway server operating as a web service providing a self-serve methodology for estab-

lishing a domain name registry over a communications network using machine-to-machine interaction involving the gateway server and a computing device of a registry operator (RO) for the domain name registry, the gateway server comprising: a network interface for communicating with the computing device over the communications network; a processor and associated memory having instructions stored thereon for execution by the processor to communicate with the computing device by: receiving a request from the computing device to establish the domain name registry of a specified type; determining the specified type requires ICANN approval and receiving access credentials of the RO for an RO account with ICANN hosted on a server; confirming completion of a registry testing phase, said completion based on registry technical information for the domain name registry collected from the computing device; collecting launch phase parameters for the domain name registry from the computing device, the launch phase parameters for use during a launch phase of the self-serve methodology; using the access credentials to access via the communications network the RO account on the server for communicating the launch phase parameters to the server on behalf of the RO during the launch phase in order to complete a configuration of the launch phase for the domain name registry with ICANN; and updating a workflow interface with a completion status of said configuration of the launch phase for subsequent access by the computing device of the RO over the communications network.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

Referring to FIG. **1**, shown is a Top Level Domain (TLD) registration system **10** facilitating a registry operator **20** (e.g. TLD administrator) to request **9** (e.g. over a communications network **11**, i.e. the Internet) a setup of one or more new TLDs **14**. It is recognized that each TLD **14** would have a plurality of individual domain names associated therewith. It is recognized that one or more registrars **16** can be utilized by registrants **12** to purchase these domain names under the TLD(s) **14**, once setup. The registry operator **20** is responsible for storing registry data **23** for the TLD(s) **14** in a registry database **18**, once the TLD(s) **14** are setup via assistance (e.g. via implementation of a self-serve methodology **200**—see FIG. **2**) provided by a registry services provider **22**. The content of the registry data **23**, once setup, is meant to be maintained by the registrant **12** and the registrar(s) **16** via (e.g. Extensible Provisioning Protocol EPP) transactions conducted with the registry operator **20** in order to create/update and otherwise maintain the content of the registry data **23** in the registry database **18** during operation of the TLDs(s) **14**.

Preferably, the communications network **11** comprises a wide area network such as the Internet, however the network **11** may also comprise one or more local area networks **11**, one or more wide area networks, or a combination thereof. Further, the network **11** need not be a land-based network, but instead may comprise a wireless network and/or a hybrid of a land-based network and a wireless network for enhanced communications flexibility. For example, the communications network **11** can also include Bluetooth™ associated elements. It is recognised that the registrar **16**, the registry operator **20** and the registry services provider **22** can be implemented on computer devices **20***a*, **22***a*, **36***a*, **100** (see FIG. **3**) such as servers and can communicate with one another via the network **11** in client-server relationships, in order to implement set up, operation and maintenance of the TLDs **14**.

Referring again to FIG. **1**, the registry services provider **22** and the registry operator **20** can be in communication with Internet Corporation for Assigned Names and Numbers (ICANN) **36**, implemented on one or more servers **36***a*, recognizing that ICANN **36** is an organization responsible for coordinating the maintenance and procedures of several databases related to the namespaces and numerical spaces (e.g. TLDs **14**) of the Internet **11**. One task that ICANN **36** does is to address the issue of domain name ownership resolution for generic top-level domains (gTLDs) **14**, provided a as type of domain name registry **14**. In particular, a registry agreement **38** between the registry operator **20** and ICANN **36** must be established during an application phase I (stage 1—see FIG. **2**) of the self-serve methodology **200** for specified type TLDs **14**, i.e. gTLDs, which is facilitated by a workflow interface **102**, see below. It is noted that in particular, completion of the Registry Agreement **38** with ICANN is needed in order for the registry operator **20** to set up the new TLD(s) **14** for a specified type TLDs **14**, i.e. gTLDs. Further, it is recognise that phase I can be skipped for those TLDs **14** which are not administered by ICANN **36**, e.g. ccTLDs **14**. The self serve methodology **200** can include an application phase I, a registry system testing phase II and a registry launch phase III (stage 3—see FIG. **2**).

As further described below, advantages of the phase I Application process include:

1) for gTLDs, there can be detailed interaction with ICANN to complete it's part of the process;
2) the system **10** can provide the technical response component and facilitate the rest;
3) for ccTLDs, the process includes just what is needed to apply for the ccTLD and agree to a relationship; and/or
4) type/category of the TLD **14** and various configuration options are to be specified.

As further described below, advantages of the phase II Testing process include:

1) a technical review of the technical service provider is provided by ICANN for gTLDs **14**, this would be managed here;
2) for the transfer-in of any existing registry
managing data import would be here
safe mode registry transition could be applicable; and
3) DNSSEC rollovers to move DNS would be here.

As further described below, advantages of the phase III Launch process include:

1) details of the configuration would be set;
2) details of the pricing/marketing would be set;
3) managing the accreditation of registrars;
4) multiple phases/steps are provided to get through to get to general availability for new gTLDs **14**;
5) if there is a portfolio of TLDs **14** to be managed, then technical bundling can be applicable here for assigning multiple related TLDs **14** to a common bundle identified by a bundle ID as part of the metadata associated with the grouping (i.e. bundle) of TLDs **14** (and implicitly each TLD of the bundle).

Referring again to FIG. **1**, the registry services provider **22** can be used to coordinate (i.e. assist) the setup of the new TLD(s) **14** for the registry operator **20**, as well as to coordinate via a DNS publication system **24** the generation and publication of DNS data **34** that reflects the contents of the new registry data **23**, one set up via interaction between the registry services provider **22**, the registry operator **20** and

ICANN **36**, as further described below. The DNS publication system **24** is used to generate and publish zone files (e.g. DNS data **34**) out to the DNS **30** (used by resolver servers **35** and DNS servers **32** to convert domain names of the TLDs **14** to IP addresses). It is recognized that the DNS data **34** is based on data content of the registry data **23**, once set up.

It is recognized that the registry services provider **22** cooperates with the registry operator **20** in order to facilitate the setup of the TLD(s) **14** as new TLD(s) **14**, including an application process, a testing process, and a launch process as further described below.

For example, the registry services provider **22** interfaces directly with ICANN **36** on behalf of the registry operator **20** during the setup of the new TLD(s) **14**, providing an important advantage in that the registry services provider **22** can function as a mediator on behalf of the registry operator **20** with ICANN **36**, such that the registry services provider **22** can facilitate the setup of the new TLD(s) **14** including collection and dissemination of registry data **23** pertinent to the creation of the new TLD(s) **14** with required approval of ICANN **36**. As further described below, the collection and dissemination of information can also include application information **9** used in the creation of a registry agreement between the registry operator **20** and ICANN **36** for those applicable type TLDs **14**.

As further discussed below, an advantage of implementation of the system **10** is one-stop "shopping" for the registry operator **20**, in consultation with the registry services provider **22** (and the applicant). For example, broadly there can be two or mote categories of TLDs **14**, e.g. gTLDs, cTLDs, etc.

The registry services provider **22** exposes a workflow interface **102** (used as a data transfer mechanism between the gateway server **22***a* and the computing device **20***a*) to the registry operator **20** over the network **11**, such that the workflow interface **102** can be used to represent progress/status of the application/set up process for the new TLD(s) **14**, as facilitated via implementation of the self-serve methodology **200** (see FIG. **2**). The registry operator **20** has a contractual relationship (further described below in reference to a registry services agreement **19**) with the registry services provider **22** and thus also has an operator account **21** with the registry services provider **22**. This registry account **21** would be provided access to the workflow interface **102**, in conjunction with account login credentials **21***a*. As such, once the registry operator **20** establishes the operator account **21** with the registry services provider **22**, the registry operator **20** would have access to the workflow interface **102** upon login (i.e. the registry operator **20** uses the granted account login credentials **21***a* to access to the workflow interface **102**). As further described below, the workflow interface **102** is used by the registry operator **20** and the registry services provider **22** to communicate with one another concerning the status and required actions needed to set up the new TLD(s) **14**.

The registry operator **20** could also have an operator account **37** with ICANN **36**, also having respective account login credentials **37***a*. Accordingly, in order for the registry services provider **22** to act on behalf of the registry operator **20** with ICANN **36**, the registry operator **20** would also provide (to the registry services provider **22**) and thus have associated the account login credentials **37***a* with the registry account **21**. Once associated, the registry services provider **22** can use the account login credentials **37***a* when contacting ICANN **36** via the network **11** on behalf of the registry operator **20**. In other words, it is the use of the operator login credentials **37***a* that facilitates the registry services provider **22** to interact with ICANN **36** on behalf of the registry operator **20** so as to uniquely identify that the registry services provider **22** is associated with and thus authorized to represent the registry operator **20** in interactions with ICANN **36** (with the registry services provider **22**) to coordinate completion of the registry agreement **38**.

Referring again to FIG. **1**, the workflow interface **102** used by the registry operator **20** can be for providing updates including a completion status of a registry testing phase II (stage 2—see FIG. **2**), by accessing by a computing device **20***a* of the registry operator **20** over the communications network **11**. For example, the workflow interface **102** can be an Application Programming Interface (API) exposed by a gateway server **22***a* (of the registry services provider **22**) to the computing device **20***a* over the communications network **11**. Alternatively or in addition to, the workflow interface **102** can be a dashboard accessible by the computing device **20***a* over the communications network **11**. For example, the dashboard can be a portion of the API.

As further described below, the new TLD(s) **14** will be assigned a specified type (e.g. ccTLD, gTLD), recognizing that the specified type of gTLD requires execution of a registry agreement **38** while the specified type of the ccTLD does not require the execution of a registry agreement **38**. That being said, it is recognized that the application phase I of the self-serve methodology **200** would be skipped for those new TLD(s) **14** not requiring a registry agreement **38** (e.g. ccTLDs **14**). For example, a gTLD **14** is an example, of an open membership type domain name registry and a ccTLD **14** is an example of a closed membership type domain name registry. It is recognized that once the registry agreement **38** is ready for execution, the registry operator **20** can access same by the operator account **37** (directly with ICANN **36**) or can access the available registry agreement **38** via the workflow interface **102**. It is the registry operator **20** itself that must execute (e.g. sign) the registry agreement **38** (which is a contract between the registry operator **20** and ICANN **38** dictating general setup and implementation provisions for the new TLD(s) **14**). It is recognized that the specified type of the new TLD(s) **14** will dictate the appropriate application information **9** needed to complete the registry agreement **38**.

In view of the above, the Registry Agreement **38** once completed can be received from the server **36***a* over the communications network **11** and then subsequently provided by the gateway server **22***a* to the computing device **20***a*, thus representative of the gateway server **22***a* being the channel for ICANN **36** communication with the registry operator **20** over the network **11**. Further, it is recognized that the Registry Agreement **38** can be made accessible to the computing device **20***a* via the workflow interface **102**. (e.g. a document link provided via the dashboard).

Referring to FIGS. **1** and **2**, during the application phase I, there is a collection of application information **9** (e.g. considered to contain some of the registry data **23**) from the registry operator **20**, which can used in completing the registry agreement **38** with ICANN for the appropriate specified type (e.g. gTLDs **14**). Preferably, the registry services provider **22** interacts with the registry operator **20** (via the workflow interface **102**) to collect at least a portion of the application information **9** and then forward the collected (e.g. portion of) the application information **9** to ICANN **36**. It is also recognised that a portion of the application information **9** collected from the registry operator **20** (by the registry services provider **22**) can have originated from ICANN **36**. For any application information

9 collected by the registry services provider **22**, the registry services provider **22** would use the account login credentials **37***a* in order to update the operator account **37** with the application information **9** collected (e.g. transmit the application information **9** over the network **11** to the operator account **37** provided by ICANN **36**). Accordingly, ICANN **36** would use the application information **9** available in the operator account **37** to complete all application information **9** required by the registry agreement **38**. It is also recognized that the registry operator **20** could access their operator account **37** directly over the network **11**, using their account login credentials **37***a*, and thus provide directly (e.g. a portion of) the application information **9**. The application information **9** can include information pertinent to a Contracting Information Request (CIR) form supplied by ICANN **36**, including indication of contact details for an individual authorized to interact with Internet Assigned Numbers Authority (IANA) to address matters relating to the delegation (implemented once phase II is complete) of the new TLD(s) **14**, as well as indication of the TLD **14** as a standard open TLD or as a named variant of a brand/closed TLD, designation/identification of registrar(s) **16** to be associated with the new TLD(s) **14**.

It is recognised that that the application information **9** can include administration information **15** (see example objects **15** below). It is recognised that that the application information **9** can include registry technical information **13**, such as but not limited to technical and financial tasks required of a registry demonstrating that the registry operator is technically capable of running the new TLD **14**. This can include information such as but not limited to: dates (e.g. start-end) of sunrise notification and commencement; date of landrush/limited registration commencement; date of general availability commencement; domain pricing matrix for all defined periods/dates (e.g. renewal fees); designation of premium/reserved domains; designation of registrar(s) **16**, and any other launch plans and policies. Some of the technical information **13** can also be referred to as launch information **13***a*, to be used to implement the launch phase III of the self serve methodology **200**.

It is recognised that at least a portion of the provided application information **9** gets input into the registry agreement **38** and thus is eligible for approval/denial by ICANN **36** as part of the application phase I.

An example list of the application information **9** can include information content related to intended DNS record information (allowing operability with the Domain Name System protocols of the DNS **30**); WHOIS records information containing registration information about registered domain names; EPP implementation information of the protocol used for electronic communication between the registrar **16** and the registry operator **20** for provisioning domain names under the TLD(s) **14**; Internationalized Domain Name (IDN) information defining rules foe domain names that include characters not written with the basic Latin alphabet (a-z); Data Escrow information associated with data deposits of the registry data **23** with applicable Data Escrow Agents; and/or Documentation information including self-certification documents (XML) to account for required elements. In general, the registry agreement **38** defines critical registry functions that are needed in order for the new TLD(S) **14** to be operated in a stable and secure manner, such as compliance with relevant DNS/DNSSEC **30** specifications and the Service Level Requirements described in the Registry Agreement **38**, including the successful performance of key (e.g. ZSK and KSK) rollovers during the simulation period of the testing.

Accordingly, in view of the above, the registry services provider **22** can use the account access credentials **37***a* to access via the communications network **11** the operator account **37** on the server **36***a* for contributing to completion of the Registry Agreement **38** with ICANN **36** on behalf of the registry operator **20** during the application phase I of the self-serve methodology **200**. For example, the contributing to the completion of the Registry Agreement **38** can include querying the computing device **20***a* by the computing device **22***a* for the application information **9** of the domain name registry **14** (e.g. TLD **14**), the application information **9** relevant to the completion of the Registry Agreement **38**. Further, the contributing to the completion of the Registry Agreement **38** can include reviewing by the computing device **22***a* of the Registry Agreement **38** prior to the completion of the Registry Agreement **38**, the reviewing including confirming appropriate parameters relevant to the registry testing phase II (e.g. Registry System Testing RST) are complete. Further, the computing device **22***a* can query the computing device **20***a* for application information **9** of the domain name registry **14**, the application information **9** relevant to the completion of the Registry Agreement **38**, wherein information content of the application information **9** is based on the specified type (e.g. indicating the content of the query would be based on the TLD type such as but not limited to ccTLD or gTLD).

Once the application information **9** is completed, the computing device **22***a* can update a completion status of receipt of the application information **9** to the workflow interface **102**. Further, it is recognised that the workflow interface **102** can be used as a session based tool by the computing device **22***a* (e.g. gateway server), such that a state of the set-up of the new TLD(s) **14** is saved between sessions, such that each session starts and ends with a login/logout process utilizing the operator account credentials **21***a*. In this manner, the workflow interface **102** can be used by the registry operator **20** to determine a status of the set up of the new TLD(s) **14** at any time (e.g. what phase I, II, III the set up is at and what steps have been completed or not completed within each phase I, II, III).

The registry services provider **22** can also be used by the registry operator **20** to supply registry services **8** to the registry operator **20**, such as but not limited to: domain name abuse monitoring and other domain security services; registry services such as EPP services, Escrow support, restricted/reserved namelists, etc; DNS services including DNSSEC and mitigation systems for Denial of Service attacks; registry compliance and support services such as TM clearing house and registrar **16** accreditation; ICANN policy services such as ICANN policy updates and support services; and/or security services such as monitoring and reporting of abuse.

It is recognised that one of the services **8** provided by the registry services provider **22** can be coordinating the registry agreement **38** between the registry operator **20** and ICANN **36**. It is preferred that the registry operator **20** execute a registry services agreement **28** with the registry services provider **22**, which would define the type of registry services **8** provided to the registry operator **20** by the registry services provider **22**. For example, the gateway server **22***a* can communicate over the network **11** with the computing device **20***a* in order to establish the Registry Services Agreement **28** between the registry operator **20** and the registry services provider **22**. For example, the Registry Services Agreement **28** can be established before the registry operator **20** communicates over the network **11** the registry technical information **13** to the gateway server **22***a*. Further,

the gateway server **22***a* can query the computing device **22***a* for the technical services information **13** detailing a list of technical services to be associated with the domain name registry **14** currently being set up. As such, it is a option of the self-serve methodology **200** to have the gateway server **22***a* query for the technical services information **13** before completion of the registry testing phase II, which is representative of an advantage of the system **10** to spawn parallel processes during the various phases I, II, III of the self-serve methodology **200**. As advantageously provided by the workflow interface, the registry operator **20** can be informed thereby by the gateway server **22***a* by accessing an update of the workflow interface **102** indicating a completion status for receipt of the technical services information **13**.

In view of the above, the workflow interface **102** can be used by the gateway server **22***a* to indicate the status of the self-serve methodology **200**. For example, the workflow interface **102** can present a completed application information **9** status, indicating that all relevant application information **9** has been submitted by the registry operator **20** to the registry services provider **22**. For example, the workflow interface **102** can present an executed registry agreement **38** status, indicating that the registry agreement **38** has been approved by ICANN **36**. It is recognised that the approval of the registry agreement **38** by ICANN **36** allows the new TLD(s) **14** to be eligible for registry system testing (i.e. phase II), in other words approval from ICANN **36** is required before the self-serve methodology **200** can proceed from phase I to phase II or form phase II to phase III. For example, the workflow interface **102** can present completed phase II status, indicating that the registry testing phase II has been completed and thus also approved by ICANN **36**, in other words approval from ICANN **36** is required before the self-serve methodology **200** can proceed to delegation upon completion of the registry system testing implemented during phase II. For example, the workflow interface **102** can present completed delegation status, indicating that the delegation of the new TLD(s) **14** has been completed, in other words that the new TLD(s) **14** have been entered into the root zone of the DNS **30** (see FIG. **1**). Once the permission is granted and the TLD(s) **14** are entered into the root zone, the TLD **14** is thereby given an individual space in the root zone, after which registry operators **20** can begin their process of offering registrations via the registrar(s) **16** associated with the new TLD(S) **14**, either within their own network for closed TLDs **14**, or to the public, for open TLDs **14**.

Referring to FIGS. **1**, **2** and **4***a*, shown is an example operation **300** of the self-serve methodology **200** of FIG. **2**, provided by example as the gateway server **22***a* operating as a web service provides the self-serve methodology **200** for establishing a domain name registry **14** (e.g. TLD **14**) over a communications network **11** using machine-to-machine interaction involving the gateway server **22***a* and a computing device **20***a* of a registry operator **20** for the domain name registry **14**. The gateway server **22***a* utilizes the network interface **102***a* for communicating with the computing device **20***a* over the communications network **11** (and for providing the workflow interface **102**), along with the processor **108** and associated memory **122** having instructions **105** stored thereon for execution by the processor **108** to communicate with the computing device **20***a* for executing the steps of the operation **300**.

At step **302**, the gateway server **22***a* receives a request from the computing device **20***a* to establish the domain name registry **14** of a specified type. At step **304**, the gateway server **22***a* determines the specified type requires ICANN **36** approval and receives access credentials **37***a* associated with the registry operator **20** for the operator account **37** with ICANN **36** hosted on the server **36***a*. At step **306**, the gateway server **22***a* uses the access credentials **37***a* to access via the communications network **11** the operator account **37** on the server **36***a* for contributing to completion of a Registry Agreement **38** with ICANN **36** on behalf of the registry operator **20** during an application phase I of the self-serve methodology **200**. At step **308**, the gateway server **22***a* collects registry technical information **13** for the domain name registry **14** from the computing device **20***a*. At step **310**, the gateway server **22***a* uses the access credentials **37***a* to access via the communications network **11** the operator account **37** on the server **36***a* for communicating the registry technical information **13** to the server **36***a* on behalf of the registry operator **20** during a registry testing phase II of the self-serve methodology **200** in order to complete registry services testing for the domain name registry **14** with ICANN **36**. At step **312**, the gateway server **22***a* updates a workflow interface **102** with a completion status of the registry testing phase II for subsequent access by the computing device **20***a* of the registry operator **20** over the communications network **11**.

Referring to FIGS. **1**, **2** and **4***b*, shown is an example operation **400** of the self-serve methodology **200** of FIG. **2**, provided by example by the gateway server **22***a* skipping phase I. The gateway server **22***a* operates as a web service providing a self-serve methodology **200** for establishing a domain name registry **14** over a communications network **11** using machine-to-machine interaction involving the gateway server **22***a* and a computing device **20***a* of a registry operator **20** for the domain name registry **14**, the gateway server **22***a* includes a network interface **102***a* for communicating with the computing device **20***a* over the communications network **11** and a processor **108** and associated memory **122** having instructions **105** stored thereon for execution by the processor **108** to communicate with the computing device **20***a* by the steps of: receiving **402** a request **9** from the computing device **20***a* to establish the domain name registry **14** of a specified type; determining **404** the specified type requires ICANN **36** approval and receiving access credentials **37***a* of the registry operator **20** for an operator account **37** with ICANN **36** hosted on a server **36***a*; confirming **406** completion of a Registry Agreement **38** between ICANN **36** and the registry operator **20**; collecting **408** registry technical information **13** for the domain name registry **14** from the computing device **20***a*; using **410** the access credentials **37***a* to access via the communications network **11** the operator account **37** on the server **36***a* for communicating the registry technical information **13** to the server **36***a* on behalf of the registry operator **20** during a registry testing phase II of the self-serve methodology **200** in order to complete registry services testing for the domain name registry **14** with ICANN **36**; and updating **412** a workflow interface **102** with a completion status of the registry testing phase II for subsequent access by the computing device **20***a* of the registry operator **20** over the communications network **11**.

Referring to FIGS. **1**, **2** and **4***c*, shown is an example operation **500** of the self-serve methodology **200** of FIG. **2**, provided by example for implementing phase III. The gateway server **22***a* operates as a web service providing a self-serve methodology **200** for establishing a domain name registry **14** over a communications network **11** using machine-to-machine interaction involving the gateway server **22***a* and a computing device **20***a* of a registry operator **20** for the domain name registry **14**, the gateway server **22***a*

includes a network interface **102***a* for communicating with the computing device **20***a* over the communications network **11** and a processor **108** and associated memory **122** having instructions **105** stored thereon for execution by the processor **108** to communicate with the computing device **20***a* by the steps of: receiving **502** a request from the computing device **20***a* to establish the domain name registry **14** of a specified type; determining **504** the specified type requires ICANN **36** approval and receiving access credentials **37***a* of the registry operator **20** for an operator account **37** with ICANN **36** hosted on a server **36***a*; confirming **506** completion of a registry testing phase II, the completion based on registry technical information **13** for the domain name registry **14** collected from the computing device **20***a*; collecting **508** launch phase parameters **13***a* for the domain name registry **14** from the computing device **20***a*, the launch phase parameters **13***a* for use during a launch phase III of the self-serve methodology **200**; using **510** the access credentials **37***a* to access via the communications network **11** the operator account **37** on the server **36***a* for communicating the launch phase parameters **13***a* to the server **36***a* on behalf of the registry operator **20** during the launch phase III in order to complete a configuration of the launch phase III for the domain name registry **14** with ICANN **36**; and updating **512** a workflow interface with a completion status of said configuration of the launch phase for subsequent access by the computing device of the RO over the communications network.

It is recognised that the launch phase parameters **13***a* can be such as but not limited to: date/schedule parameters and pricing parameters for launching of the TLD(s) **14**. Further, the operations **400**, **500** can include the step of using the access credentials **37***a* to access via the communications network **11** the operator account **37** on the server **36***a* for completing delegation of the domain name registry **14**, thereby providing delegation information of the domain name registry **14** to the operator account **37**. For example, the delegation can occur after the registry testing phase II and before beginning the configuration of the launch phase III. Also, delegation can happen after beginning of the launch phase III, as desired.

Further to the above, for example, one task performed during the registry system testing phase II can be controlled interruption, which is defined by a 90 day controlled interruption period. For new gTLDs **14**, the controlled interruption testing can be implemented by placing a specific set of resource records **34** into the DNS **30**. These resource records **34** are selected to hint to system administrators that they should diagnose and correct their systems to prevent potential issues in the future. The purpose of the controlled interruption is to catch errant DNS queries. When an errant query is caught, a "controlled" action can be taken to inhibit harm and alert the user that a fix is needed. That action can take the form of responding to the DNS query with a special IP address (**127.0.53.53**).

Other registry systems testing that can be performed during the phase II can include: DNS—Testing operability with the Domain Name System protocols; WHOIS—Testing the records containing registration information about registered domain names; EPP—Testing the implementation of the protocol used for electronic communication between a registrar and a registry for provisioning domain names; Internationalized Domain Name (IDN)—Reviewing and/or testing domain names that include characters not written with the basic Latin alphabet (a-z); Data Escrow—Testing to ensure that registries are able to make successful data deposits with their Data Escrow Agents; and/or Documentation—Review of self-certification documents (XML) to ensure required elements are accounted for. It is recognized that once performed, the testing phase II results must be approved by ICANN **36**. Accordingly, once testing of phase II is complete, then the new TLD(s) **14** can be delegated and go live.

Once the TLD(s) **14** go live (e.g. are launched), it is recognized that in general, registrant **12** itself can communicate directly with the registrar **16**, the registry operator **20** and/or the registry services provider **22** for registration and/or maintenance purchased domain names of the TLD(s) **14**. Further, registry operator **20** can supply any requested respective registry **23** and/or maintenance information to registry services provider **22** on behalf of registrar **16**.

Domain Names of TLDs **14**

In general, a domain name under a TLD **14** is an identification string that defines a realm of administrative autonomy, authority, or control on the Internet **11**, whereby domain names are formed by the rules and procedures of the DNS **30**. Domain names are used in various networking contexts and application-specific naming and addressing purposes, as an Internet Protocol (IP) resource **31**, such as a personal computer used to access the Internet **11**, a server computer **33** hosting a web site **31**, or the web site **31** itself or any other service communicated via the Internet **11**. Domain names are organized in subordinate levels (subdomains) of the DNS root domain, which is referred to as the root zone, and is represented as a single dot (".") . The first-level set of domain names are the TLDs **14**. Below these TLDs **14** in the DNS **30** hierarchy are the second-level and third-level domain names that are typically open for reservation by end-users who wish to connect local area networks to the Internet **11**, create other publicly accessible Internet resources **31** or run web sites **31**. There can be fourth- and fifth-level domains, and so on, with virtually no limitation. The registration of these domain names is usually administered by domain name registrars **16** who sell their services to the public (i.e. registrants **12**). As such, the domain can be selected from the group consisting of: a TLD **14** (Top Level Domain); a second level domain (2LD); and a third level domain (3LD), for example.

Individual Internet host computers can use domain names as host identifiers, or hostnames. Hostnames can be defined as the leaf labels in the domain name system usually without further subordinate domain name space and can appear as a component in Uniform Resource Locators (URLs) for Internet resources **31** such as web sites **31** having one or more web pages **31**. Domain names of TLDs **14** can also be used as simple identification labels to indicate ownership or control of a resource **31**, such as realm identifiers used in the Session Initiation Protocol (SIP), DomainKeys used to verify DNS domains in e-mail systems **31**, and in many other Uniform Resource Identifiers (URIs). For example, the domain name can be a component of a (URL) used to access web sites **31**, for example: URL—http://www.example.info/index.html, Top-level domain name **14**: info, Second-level domain name: example.info, Host name: www.example.info.

Domain names of TLDs **14** can consist of one or more parts, technically called labels, which are conventionally concatenated, and delimited by dots, such as example.info. Not that the rightmost dot, representing the root zone, is many times omitted in the vernacular—it should be implied if not specified (e.g. for the domain name expressed as "example.info", the Fully Qualified Domain Name would be "example.info."). The right-most label conveys the TLD **14**, for example, the domain name www.example.info falls

under the TLD .info. The hierarchy of domains descends from the right to the left label (or from left to right depending upon language considerations) in the name; each label to the left specifies a subdivision, or subdomain of the domain to the right. For example: the label example specifies a node example.info as a subdomain of the info domain, and www is a label to create www.example.info, (e.g. a subdomain or otherwise an element of the domain) of example.info. A hostname is a domain name that has at least one associated IP address. For example, the domain names www.example.info and example.info may also be hostnames, whereas the info domain is not. However, other TLDs **14**, particularly country code top-level domains, may indeed have an IP address, and if so, they are also hostnames. It is recognized that hostnames can impose restrictions on the characters allowed in the corresponding domain name. A valid hostname is also a valid domain name, but a valid domain name may not necessarily be valid as a hostname.

Referring again to FIG. **1**, the TLD registry database **18** can contain those domain names that are registered for a specific TLD **14**, which is one of the domains immediately under the highest level in the hierarchical Domain Name System (DNS) **30** of the Internet **11**. Practically speaking, domain names are installed in the root zone of the name space for the TLD **14** and for all domains in lower levels, the domain name is the last part of the TLD **14**, that is, the last label of a fully qualified TLD **14**, with the trailing dot for the root zone designation. It is recognized that there can be a number of different TLD **14** types, such as but not limited to: country-code top-level domains (ccTLD) consisting of two letter domains established for countries or territories; internationalized country code top-level domains (IDN ccTLD) which are ccTLDs in non-latin character sets (e.g., Arabic or Chinese) which are displayed in end-user applications in their language-native script or alphabet but use a Punycode-translated ASCII domain name in the Domain Name System **30**; generic top-level domains (gTLD) which are top-level domains with three or more characters (e.g. GOV, EDU, COM, MIL, ORG, NET and INFO) including unsponsored top-level domains which are domains that operate directly under policies established for the global Internet community and sponsored top-level domains (sTLD) that are proposed and sponsored by private agencies or organizations that establish and enforce rules restricting the eligibility to use the TLD **14**; and infrastructure top-level domain that is one domain, the Address and Routing Parameter Area (ARPA) managed on behalf of the Internet Engineering Task Force for various purposes specified in the Request for Comments publications.

Domain names of the TLDs **14** can be formed from the set of alphanumeric ASCII characters (a-z, A-Z, 0-9), but characters are case-insensitive. In addition, the hyphen can be permitted if it is surrounded by a characters or digits, i.e. it is not the start or end of a label. Labels are separated by the full stop (period) character in the textual name representation, and are limited to 63 characters in length. It is recognized that the domain names can be represented using characters based in other languages as well, including alternate formats as appropriate, as desired.

TLDs **14** can be referred to as domains and registrants **12** can be referred to as domain owners, although domain registration with the registrar **16** may not confer any legal ownership of the TLD **14**, only an exclusive right of use for a particular duration of time. As such, the TLD **14** (and their associated domain names) can be considered an economic asset utilized as an identification string defining a realm of administrative autonomy, authority or control within the Internet **11**.

In general, the TLD **14** can be setup or otherwise maintained/renewed for a TLD registrant **12** (e.g. domain owner) via a registrar **16** for one or more TLDs **14** available (e.g. not yet claimed) or otherwise owned in the TLD registry database **18** (e.g. a database of all domain names registered in a top-level domain (TLD) **14**).

As further described below, the DNS data **34** are based on resource records (e.g. Name Server name/address records, Delegation Signer records, etc.) associated with the registry data **23** of particular TLD(s) **14**. It is recognized that DNSSEC related resource records are not stored in the registry database **18**, as these can be generated on the fly by a DNS publication system **24** using the generation instructions associated with the TLDs **14**. It is also recognized that the DNS data **34***a,b* can include other data specific to the DNS zone itself (e.g. the zone apex).

DNS **30**

In terms of importance to functioning of the Internet **11** for searching for and accessing Internet **11** resources, domain names of the TLD(s) **14** serve as names for these Internet **11** resources such as computers, networks, and services. The domain name represents an Internet Protocol (IP) resource and specifically, individual Internet host computers use domain names as host identifiers, or host names (e.g. leaf labels in the domain name system usually without further subordinate domain name space). Of importance to Internet **11** navigation, host names appear as a component in Uniform Resource Locators (URLs) for Internet **11** resources such as web sites (e.g., Afilias.info). Domain names can also be used as simple identification labels to indicate ownership or control of a resource. Such examples are the realm identifiers used in the Session Initiation Protocol (SIP), the Domain Keys used to verify DNS domains in e-mail systems, and in many other Uniform Resource Identifiers (URIs). An important function of domain names is to provide easily recognizable and memorizable names to numerically addressed Internet **11** resources. Usability of the domain names as an abstraction provides any resource to be moved to different physical locations in the address topology of the network **11**, globally or locally in an intranet. Such a move usually involves changing the IP address of the resource and the corresponding translation of this IP address to and from its domain name.

Referring to FIG. **1**, shown are network resources **31**, which are accessible via a specified URI (over the network **11**) of the server **33** incorporating the domain name associated with the specified TLD **14** maintained in domain name registry **18***a,b*, using an appropriate network communications protocol (e.g. SMTP, HTTP, HTTPS, etc.). For example, the network communications protocol includes rules for data formats for data exchange and rules for network address formats for data exchange that identify both the sender network **11** address and the intended receiver(s) network **11** address. In computing, the URI is a string of characters used to identify a name or a resource. Such identification enables interaction with representations of the resource over a network (typically the Internet) using the specific protocols. Schemes specifying a concrete syntax and associated protocols define each URI, such that URIs can be classified as locators (URLs), as names (URNs), or as both. A uniform resource name (URN) functions like a person's name, while a uniform resource locator (URL) resembles that person's street address. In other words: the

URN defines an item's identity, while the URL provides a method for finding the item over the network **11**.

Referring again to FIG. **1**, shown is a Domain Name System (DNS) publication system **24** for coordinating and publishing DNS records (e.g. DNS data **3** including one or more Resource Record sets—RR sets) in the DNS **30** containing DNS servers **32** (e.g. Authoritative servers). Although only one DNS publication system **24** is depicted in FIG. **1**, it is recognised the registry operators **20** could have their own dedicated/separate DNS publication system **24**. In other words, once the TLD **14** is set up, and/or during the process of set up of the TLD **14**, the new registry operator **20** would use their own DNS publication system **24**.

The DNS servers **32** provide DNS services for users of network **11** (e.g. Internet) resources **31** (e.g. as provided by a plurality of distributed web servers **33**, mail servers **33**, etc., as coordinated through various TLDs **14** of the network **11**). It is recognized that in general, network resources **31** can be provided by one or more registry operators (e.g. via registry databases), including external links to mail servers and/or other websites based on web page return results. The distributed servers **33** can rely upon one or more resolver servers **35**, by which the network user ultimately accesses network resources **31** via the DNS **30**.

Further, it is recognized that zone data, e.g. the DNS data **34** of a TLD **14**, is representative of a text file that describes a portion of the DNS **30** called a DNS zone, including the owner of the record. A zone data (e.g. the DNS data **34***b*) is organized in the form of resource records and contains information that defines mappings between TLDs **14** and IP addresses and other resources **31**, as based upon registry data **23**. For example, the DNS data **34** contains the DNS records in wire transfer format, as implemented in the DNS **30**. The format of zone data can be defined by a standard, with each line typically defining a single resource record **26**. A line begins with a domain name, but if left blank, can default to the previously defined domain name. Following the domain name can be the time to live (TTL), the class (which is almost always "IN" for "internet" and rarely included), the type of resource record (A, MX, SOA, etc.), followed by type-specific data such as the IPv4 address for A records. Comments can be included by using a semi-colon and lines can be continued by using parentheses. There are also directives that are marked with a keyword starting with a dollar sign.

In general, the DNS data **34** (aka DNS records or zone files also referred to as a Resource Record transfer/transaction **34**) are instructions that are published (e.g. transmitted or eventually transmitted to the DNS servers **32**) by the DNS publication service **24** to the (authoritative) DNS servers **32**. The DNS data **34** provides information about a TLD **14** including what IP addresses are associated with that TLD **14** and how to handle requests (e.g. DNS requests from the users) associated with network resources **31** for that domain names of that TLD **14**. For example, a DNS record can be defined as a single entry of the DNS data **34** that gives zone instructions on how to handle any given DNS **30** related request based on record type. In general, most every DNS record has at least three pieces of information, namely: a Record Name; Record Value/Data; and Time to Live (TTL). These DNS records consist of a series of text files written in what is known as DNS syntax. DNS syntax can be a string of characters used as commands, which instruct the DNS server **32** what to do upon receiving a DNS lookup request from the network user, for example. All DNS records can also have the 'TTL', which stands for time-to-live, and indicates how often a DNS server **32** would refresh that particular DNS record. Accordingly, all domains are required to have at least a few essential DNS records for the user to be able to access the website(s) associated with the TLD **14**, amongst other optional additional DNS **30** implemented functionality.

Registry Data **23**

In view of the above, it is recognized that the registry data **23**, some of which can be obtainable from the registry database **18** for the particular TLD **14**, can be such as but not limited to: A Records **26**—which are the most basic type of DNS record and are used to point a domain or subdomain to an IP address (e.g. assigning a value to an A record is associated with an IP address to where the domain or subdomain should point and a TTL; CNAME records—which are used to point a domain or subdomain to another hostname, for example as a means of being able to change an IP address of a server or cluster of servers; Mail Exchanger (MX) records—which are used to help route email according the domain owners preference, such that the MX record itself specifies which server(s) to attempt to use to deliver mail to when this type of request is made to the domain; and TXT records—which are used to store any text-based information, for example used to hold SPF data and verify domain ownership. Other registry data **23** pertinent to resource records can include: a NS record—storing the name server for a DNS entry; DNSKEY record—the 'DNS Key Record' contains a public key used to verify signatures; CDNSKEY record—a child copy of the DNSKEY record, meant to be transferred to a parent; CERT record—the 'certificate record' stores public key certificates; DCHID record—the 'DHCP Identifier' stores info for the Dynamic Host Configuration Protocol (DHCP), a standardized network protocol used on IP networks; DNAME record—the 'delegation name' record creates a domain alias, just like CNAME, but this alias will redirect all subdomains as well; HIP record—uses 'Host identity protocol', a way to separate the roles of an IP address used most often in mobile computing; IPSECKEY record—The 'IPSEC key' record works with the Internet Protocol Security (IPSEC), an end-to-end security protocol framework and part of the Internet Protocol Suite (TCP/IP); and SSHFP record—storing the 'SSH public key fingerprints', SSH stands for Secure Shell and it's a cryptographic networking protocol for secure communication over an unsecure network. In general, it is recognized that only unsigned registry data **23** can be contained in the registry database **18**.

Registration and maintenance of TLDs **14** involves management of objects **15** associated with each of the domain names of the TLD(s) **14** stored in the registry database **18***a,b*. These objects **15** are populated with appropriate data based on action(s) performed on the objects **15** (e.g. update/modification, delete/del, transfer, renew, etc.). Example actions on the objects **15** are such as registration/purchase of the domain names by the registrant **12** from the registrar **16**. Other example actions on the objects **15** can include management by the Registry Operator **20***a,b* of up-to-date data in the objects **15** concerning domain name and name server registrations maintained by the Registry Operator **20***a,b*, useful in verifying and providing operational stability of Registry Services and the DNS.

Example Objects **15**

The specification of the content and format of this data of the objects **15** for example TLD(s) **14** (recognizing that different TLDs **14** can have a different set of parameters—e.g. for ccTLDs **14**) can be such as but not limited to:

1. Registrar objects. The registrar object corresponds to a single registrar. It includes the following data:

Registrar ID (conforming to the LANA registrar-ids registry)
Contact ID of Registrar
Registrar Administrative Contacts
Registrar Technical Contacts
Registrar Billing Contacts
Registrar URL
Registrar Creation Date
Registrar Last Updated Date

2. Contact objects. The contact object corresponds to a single contact (whether registrant, administrative, technical or billing contact). The contact object includes the following data:
Contact ID
Contact Name
Contact Organization
Contact Address, City, State/Province, Country
Contact Postal Code
Contact Phone, Fax, E-mail

3. Nameserver objects. A nameserver object corresponds to a single registered nameserver. The nameserver object includes the following data:
Name Server ID
Name Server Host Name
Name Server IP Addresses if applicable
Current Registrar
Name Server Creation Date
Name Server Last Updated Date

4. Domain objects. The domain object corresponds to a single Registered Name. Each domain object includes the following data:
Domain ID
Domain Name
Sponsoring Registrar
Domain Status
All contact information (including all details) with at least one each of:
Registrant
Administrative
Technical
Billing
All nameservers associated with this domain
Domain Registration Date
Domain Expiration Date
Domain Last Updated Date

As such, the registration and/or maintenance information is considered data used to populate the objects **15** based on actions (e.g. EPP transactions such as but not limited to update, delete, transfer, renew, etc.) performed on the objects **15** as associated with the TLD(s) **14**.

Example Actions

An action is defined as an operation on an object **15** unique to each of the plurality of domain names of the TLDs **14**. An example action can be assigning the domain names to a new domain name registrant **12**. Alternative actions can include actions such as but not limited to check, info/status, update/mod, delete/del, transfer, and/or renew. The action can be based on a protocol such as Extensible Provisioning Protocol (EPP) or Registry Registrar Protocol (RRP). The Extensible Provisioning Protocol (EPP) is a flexible protocol designed for allocating objects within registries over the Internet. EPP provides a robust and flexible protocol that facilitates transaction communications between domain name registry service providers **22**, registry operators **20**, and domain name registrars **16**. These transactions are used whenever a domain name is acted upon using actions such as to effect data content of the domain name objects **15** to reflect registered, transferred, renewed or otherwise amended domain names. As such, the EPP protocol is used to implement an order (request action on an object) and fulfilment (perform and report result of object when acted upon) system. Specified in XML, EPP provides four basic service elements: a greeting, commands (e.g. actions), responses (e.g. to the actions effecting changes to data content of the objects **15** associated with the actions), and an extension framework that supports future definition of managed objects **15** and the relationship of EPP protocol requests (e.g. actions) and responses to those objects **15**. It is recognised that actions of EPP are expressed as XML, a structured, text-based format, such that communication over the network **11** of the actions between entities **16**,**18**,**20**,**22** can be specified over TCP communication messaging and/or other transport communication messaging such as BEEP, SMTP, or SOAP. The registry databases **18** can also contain a transaction log/history (e.g. EPP) containing all operations (a consequence of actions) executed on the objects **15** of the domain names, such that the log/history indicates the domain name by domain name ID along with details of the operation(s) (e.g. time of transaction, success of transaction, type of operation, etc.).

In general, it is recognised that the entities **16**,**18**, **20**, **22** can interact on the network **11** with one another in client server pairs. For example, the registrar **16** can be the EPP client and the registry database **18** (with associated registry operator **20**) can be the paired EPP server. In general, an EPP server responds to a successful connection by returning a greeting to the client. The client waits for the greeting before sending an EPP command (i.e. action) to the server. EPP commands and responses are exchanged serially between the client and the server over the network **11**, in order to affect the data contents of the corresponding objects **15** (of the registry data **23**) that are acted upon by the action implemented by the server (i.e. as requested by the client). The server responds to each EPP command with a coordinated response that describes the results of processing the command.

EPP commands fall into three categories: session management commands, query commands, and data transform commands. Session management commands are used to establish and end sessions with an EPP server. Query commands are used to perform read-only, object-based information retrieval operations with respect to data contents of the objects **15**. Transform commands are used to perform read-write object management operations with respect to the data contents of the objects **15**.

EPP provides commands to manage sessions, retrieve object information, and perform transformation operations on objects. All EPP commands are atomic and idempotent, either succeeding completely or failing completely and producing predictable results in case of repeated execution. EPP provides three commands/actions to retrieve object information: action <info> to retrieve detailed information associated with a known object, action <ping> to determine if an object is known to the server, and action <transfer> to retrieve known object transfer status information. EPP provides five commands/actions to transform (i.e. modify the data contents of the object **15**) objects **15**: action <create> to create an instance of an object **15** with a server, action <delete> to remove an instance of an object **15** from a server, action <renew> to extend the validity period of an object **15**, action <update> to change information associated with an object **15**, and action <transfer> to manage changes in client sponsorship (e.g. change in registrant **12**) of a known object **15**. As such, instance of an object **15** refers to the specific

data contents of an object **15**. EPP uses four decimal digits to describe the success or failure of each EPP command. The four digits of the reply each have special significance. The first digit denotes whether the response submitted by the server back to the client marks command success or failure. A client that wants to know approximately what kind of error occurred (command syntax error, security error, system error, etc.) can examine the second digit. The third and fourth digits are used to provide explicit information detail by the server to the client with respect to the results of command execution and object **15** data contents change thereby.

In view of the above descriptions of storage **18** for the computer devices (see FIG. **3**) of registry operator **20** and service **22** storage **18** can be configured as keeping the stored data (e.g. objects **15**) in order and the principal (or only) operations on the stored data are the addition/amendment of or removal of the stored data from storage **18** (e.g. FIFO, FIAO, etc.). For example, storage **18** can be a linear data structure for containing and subsequent accessing of the stored data and/or can be a non-linear data structure for containing and subsequent accessing of the stored data.

Further, storage **18** receives various entities such as data that are stored and held to be processed later. In these contexts, storage **18** can perform the function of a buffer, which is a region of memory used to temporarily hold data while it is being moved from one place to another (i.e. between the between computer devices). Typically, the data is stored in the memory when moving the data between processes within/between one or more computers. It is recognised that storage **18** can be implemented in hardware, software, or a combination thereof. The storage **18** is used in the network system **10** when there is a difference between the rate/time at which data is received and the rate/time at which the data can be processed (e.g. ultimately by the devices).

Further, it will be understood by a person skilled in the art that memory/storage **18** described herein is the physical place where data can be held in an electromagnetic or optical form for access by the computer processors/modules. There can be two general usages: first, memory is frequently used to mean the devices and data connected to the computer through input/output operations such as hard disk and tape systems and other forms of storage not including computer memory and other in-computer storage. Second, in a more formal usage, memory/storage **18** has been divided into: (1) primary storage, which holds data in memory (sometimes called random access memory or RAM) and other "built-in" devices such as the processor's L1 cache, and (2) secondary storage, which holds data on hard disks, tapes, and other devices requiring input/output operations. Primary storage can be faster to access than secondary storage because of the proximity of the storage to the processor or because of the nature of the storage devices. On the other hand, secondary storage can hold much more data than primary storage. In addition to RAM, primary storage includes read-only memory (ROM) and L1 and L2 cache memory. In addition to hard disks, secondary storage includes a range of device types and technologies, including diskettes, Zip drives, redundant array of independent disks (RAID) systems, and holographic storage. Devices that hold storage are collectively known as storage media.

A database is one embodiment of memory **18** as a collection of information that is organized so that it can easily be accessed, managed, and updated. In one view, databases can be classified according to types of content: bibliographic, full-text, numeric, and images. In computing, databases are sometimes classified according to their organizational approach. The most prevalent approach is the relational database, a tabular database in which data is defined so that it can be reorganized and accessed in a number of different ways. A distributed database is one that can be dispersed or replicated among different points in a network. An object-oriented programming database is one that is congruent with the data defined in object classes and subclasses. Computer databases typically contain aggregations of data records or files, such as sales transactions, product catalogs and inventories, and customer profiles. Typically, a database manager provides users the capabilities of controlling read/write access, specifying report generation, and analyzing usage. Databases and database managers are prevalent in large mainframe systems, but are also present in smaller distributed workstation and mid-range systems such as the AS/400 and on personal computers. SQL (Structured Query Language) is a standard language for making interactive queries from and updating a database such as IBM's DB2, Microsoft's Access, and database products from Oracle, Sybase, and Computer Associates.

Memory/storage **18** can also be defined as a physical electronic holding place for instructions and data that the computer's microprocessor can reach quickly. When the computer is in normal operation, its memory usually contains the main parts of the operating system and some or all of the application programs and related data that are being used. Memory is often used as a shorter synonym for random access memory (RAM). This kind of memory is located on one or more microchips that are physically close to the microprocessor in the computer.

In terms of a server (acting as a client or as a server of a classic client-server relationship), it is recognised that the computer devices **20***a*, **22***a*, **36***a*, **100** can be configured as hardware, software, or typically a combination of both hardware and software to provide a network entity that operates as a socket listener. It is recognised that any computerised process that shares a resource (e.g. data) to one or more client processes can be classified as a server in the network system **10**. The term server can also be generalized to describe a host that is deployed to execute one or more such programs, such that the host can be one or more configured computers that link other computers or electronic devices together via the network **11**. The computer devices implementing functionality of registry operator **20**, registrars **16**, and service **22** can provide specialized services across the network **11**, for example to private users inside a large organization or to public users via the Internet **11**. In the network system **10**, the servers can have dedicated functionality and/or can share functionality as described. Enterprise servers are servers that are used in a business context and can be run on/by any capable computer hardware. In the hardware sense, the word server typically designates computer models intended for running software applications under the heavy demand of a network **11** environment. In this client—server configuration one or more machines, either a computer or a computer appliance, share information with each other with one acting as a host for the other. While nearly any personal computer is capable of acting as a network server, a dedicated server will contain features making it more suitable for production environments. These features may include a faster CPU, increased high-performance RAM, and typically more than one large hard drive. More obvious distinctions include marked redundancy in power supplies, network connections, and even the servers themselves.

Referring to FIG. **3**, a computing device **100** implementing functionality of registry operator **20**, registrars **16** and service **22** can include a network connection interface **101**, such as a network interface card or a modem, coupled via connection **118** to a device infrastructure **104**. The connection interface **101** is connectable during operation of the devices to the network **11** (e.g. an intranet and/or an extranet such as the Internet), which enables the devices to communicate with each other as appropriate. The network **11** can support the communication of the communications on the network **11**, as well as between the servers **32**, **33**, **35** and the related content.

Referring again to FIG. **3**, the device **100** can also have a user interface **102***a*, coupled to the device infrastructure **104**, to interact with a user (e.g. server administrator—not shown). The user interface **102***a* can include one or more user input devices such as but not limited to a QWERTY keyboard, a keypad, a stylus, a mouse, a microphone and the user output device such as an LCD screen display and/or a speaker and as such can be used to embody the workflow interface **102**. If the screen is touch sensitive, then the display can also be used as the user input device as controlled by the device infrastructure **104**.

Referring again to FIG. **3**, operation of the device is facilitated by the device infrastructure **104**. The device infrastructure **104** includes one or more computer processors **108** and can include an associated memory **122** (e.g. memory **18**). The computer processor **108** facilitates performance of the device configured for the intended task (e.g. of the respective service **22**, **24**, operator **20**, and/or registrars **16**) through operation of the network interface **101**, the user interface **102** and other application programs/hardware of the device by executing task related instructions (e.g. **105**). These task related instructions **105** can be provided by an operating system, and/or software applications located in the memory **122**, and/or by operability that is configured into the electronic/digital circuitry of the processor(s) **108** designed to perform the specific task(s). Further, it is recognized that the device infrastructure **104** can include a computer readable storage medium **109** coupled to the processor **108** for providing instructions to the processor **108** and/or to load/update the instructions **105** (e.g. modules **25***a,b*). The computer readable medium can include hardware and/or software such as, by way of example only, magnetic disks, magnetic tape, optically readable medium such as CD/DVD ROMS, and memory cards. In each case, the computer readable medium may take the form of a small disk, floppy diskette, cassette, hard disk drive, solid-state memory card, or RAM provided in the memory module. It should be noted that the above listed example computer readable mediums can be used either alone or in combination.

Further, it is recognized that the computing device can include the executable applications comprising code or machine readable instructions for implementing predetermined functions/operations including those of an operating system and the modules, for example. The processor **108** as used herein is a configured device and/or set of machine-readable instructions for performing operations as described by example above, including those operations as performed by any or all of the modules. As used herein, the processor **108** may comprise any one or combination of, hardware, firmware, and/or software. The processor **108** acts upon information by manipulating, analyzing, modifying, converting or transmitting information for use by an executable procedure or an information device, and/or by routing the information with respect to an output device. The processor **108** may use or comprise the capabilities of a controller or microprocessor, for example. Accordingly, any of the functionality of the modules may be implemented in hardware, software or a combination of both. Accordingly, the use of a processor **108** as a device and/or as a set of machine-readable instructions is hereafter referred to generically as a processor/module for sake of simplicity. Further, it is recognised that the service **22**, **24**, registrar **16** and/or operator **20** can include one or more of the computing devices (comprising hardware and/or software) for implementing the modules, as desired.

It will be understood in view of the above that the computing devices may be, although depicted as a single computer system, may be implemented as a network of computer processors, as desired.

The invention claimed is:

1. A gateway server operating as a web service providing a self-serve methodology for establishing a domain name registry over a communications network using machine-to-machine interaction involving the gateway server and a computing device of a registry operator (RO) for the domain name registry, the gateway server comprising: a network interface for communicating with the computing device over the communications network; a processor and associated memory having instructions stored thereon for execution by the processor to communicate with the computing device by: receiving a request from the computing device to establish the domain name registry of a specified type; determining the specified type requires the Internet Corporation for Assigned Names and Numbers (ICANN) approval and receiving access credentials associated with the RO for an RO account with ICANN hosted on a server; using the access credentials to access via the communications network the RO account on the server for contributing to completion of a Registry Agreement with ICANN on behalf of the RO during an application phase of the self-serve methodology; collecting registry technical information for the domain name registry from the computing device; using the access credentials to access via the communications network the RO account on the server for communicating the registry technical information to the server on behalf of the RO during a registry testing phase of the self-serve methodology in order to complete registry services testing for the domain name registry with ICANN; and updating a workflow interface with a completion status of the registry testing phase for subsequent access by the computing device of the RO over the communications network.

2. The gateway server of claim **1**, wherein the specified type is selected from the group consisting of an open membership domain name registry and a closed membership domain name registry.

3. The gateway server of claim **1**, wherein the workflow interface is an Application Programming Interface (API) exposed by the gateway server to the computing device over the communications network.

4. The gateway server of claim **1**, wherein the workflow interface is a dashboard accessible by the computing device over the communications network.

5. The gateway server of claim **1**, wherein said contributing to the completion of the Registry Agreement includes querying the computing device for application information of the domain name registry, the application information relevant to said completion of the Registry Agreement.

6. The gateway server of claim **1**, wherein said contributing to the completion of the Registry Agreement includes reviewing of the Registry Agreement prior to said comple-

tion of the Registry Agreement, said reviewing including confirming appropriate parameters relevant to the registry testing phase.

7. The gateway server of claim **1** further comprising querying the computing device for application information of the domain name registry, the application information relevant to said completion of the Registry Agreement, wherein information content of the application information is based the specified type.

8. The gateway server of claim **7** further comprising updating a completion status of receipt of the application information to the workflow interface.

9. The gateway server of claim **1**, wherein a completion status of the application phase is updated to the workflow interface.

10. The gateway server of claim **1** further comprising receiving application information originating from ICANN from the computing device, the application information used in said completion of the Registry Agreement.

11. The gateway server of claim **1** further comprising communicating with the computing device in order to establish a Registry Services Agreement between the RO and a Registry Service Provider (RSP), the RSP associated with hosting of the gateway server.

12. The gateway server of claim **11**, wherein the Registry Services Agreement is established before said communicating the registry technical information to the server.

13. The gateway server of claim **11** further comprising querying the computing device for technical services information detailing a list of technical services to be associated with the domain name registry.

14. The gateway server of claim **13** further comprising updating the workflow interface to indicate a completion status for receipt of the technical services information.

15. The gateway server of claim **13**, wherein the said querying for the technical services information occurs before said complete of the registry testing phase.

16. The gateway server of claim **1** further comprising receiving and processing RSP account registration information via the computing device in order to establish an RSP account of the RO with the RSP, the RSP account for use by the computing device in accessing the workflow interface via the communications network.

17. The gateway server of claim **16**, wherein said establish the RSP account occurs before said establishing the Registry Agreement.

18. The gateway server of claim **16**, wherein said establish the RSP account occurs before said complete the registry services testing.

19. The gateway server of claim **1**, wherein the Registry Agreement once completed is received from the server over the communications network and then subsequently provided by the gateway server to the computing device.

20. The gateway server of claim **19**, wherein the Registry Agreement is made accessible to the computing device via the workflow interface.

21. The gateway server of claim **1** further comprising receiving an information request from the server and requesting further registry technical information from the computing device based on the information request.

22. The gateway server of claim **21** further comprising receiving the further registry technical information from the computing device and forwarding the further technical registry information to the server in order to facilitate said complete the registry services testing.

23. The gateway server of claim **11**, wherein said communicating includes a set of terms and conditions for selection by the RO, such that when selected by the RO each selected item from the set of terms and conditions is included in the Registry Agreement as part of said completion.

24. The gateway server of claim **23**, wherein a content of said each selected item is updated after said establish as a result of receiving technical services information detailing a list of technical services to be associated with the domain name registry.

25. A gateway server operating as a web service providing a self-serve methodology for establishing a domain name registry over a communications network using machine-to-machine interaction involving the gateway server and a computing device of a registry operator (RO) for the domain name registry, the gateway server comprising: a network interface for communicating with the computing device over the communications network; a processor and associated memory having instructions stored thereon for execution by the processor to communicate with the computing device by: receiving a request from the computing device to establish the domain name registry of a specified type; determining the specified type requires the Internet Corporation for Assigned Names and Numbers (ICANN) approval and receiving access credentials of the RO for an RO account with ICANN hosted on a server; confirming completion of a Registry Agreement between ICANN and the RO; collecting registry technical information for the domain name registry from the computing device; using the access credentials to access via the communications network the RO account on the server for communicating the registry technical information to the server on behalf of the RO during a registry testing phase of the self-serve methodology in order to complete registry services testing for the domain name registry with ICANN; and updating a workflow interface with a completion status of the registry testing phase for subsequent access by the computing device of the RO over the communications network.

26. A gateway server operating as a web service providing a self-serve methodology for establishing a domain name registry over a communications network using machine-to-machine interaction involving the gateway server and a computing device of a registry operator (RO) for the domain name registry, the gateway server comprising: a network interface for communicating with the computing device over the communications network; a processor and associated memory having instructions stored thereon for execution by the processor to communicate with the computing device by: receiving a request from the computing device to establish the domain name registry of a specified type; determining the specified type requires the Internet Corporation for Assigned Names and Numbers (ICANN) approval and receiving access credentials of the RO for an RO account with ICANN hosted on a server; confirming completion of a registry testing phase, said completion based on registry technical information for the domain name registry collected from the computing device; collecting launch phase parameters for the domain name registry from the computing device, the launch phase parameters for use during a launch phase of the self-serve methodology; using the access credentials to access via the communications network the RO account on the server for communicating the launch phase parameters to the server on behalf of the RO during the launch phase in order to complete a configuration of the launch phase for the domain name registry with ICANN; and updating a workflow interface with a completion status

of said configuration of the launch phase for subsequent access by the computing device of the RO over the communications network.

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