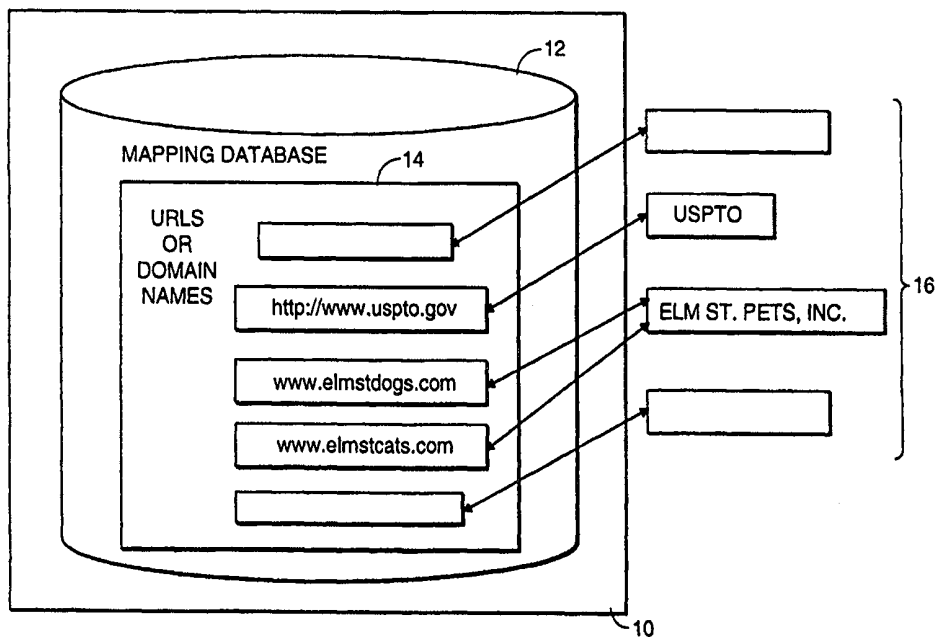




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<p>(21) International Application Number: PCT/US99/18644 (22) International Filing Date: 16 August 1999 (16.08.99) (30) Priority Data: 60/097,029 17 August 1998 (17.08.98) US (71) Applicant: ATLAS CORPORATION [US/US]; 312 Laurel Avenue, Laurel, MD 20707 (US). (72) Inventors: BLACK, Jeffrey, Dean; 8706 Bovelder Drive, Laurel, MD 20708 (US). TITUS, Jason, Harvey; 922 Cameron Street, Alexandria, VA 22314 (US). WOODHEAD, Ira, Joseph; 1129 Prince Street, Alexandria, VA 22314 (US). (74) Agents: REYES, Jason, A. et al.; Hale and Dorr LLP, 60 State Street, Boston, MA 02109 (US).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>	

(54) Title: MAPPING INFORMATION SOURCES



(57) Abstract

A first set of information is acquired that identifies an entity that is indicated as having control over the use of at least a portion of a World-Wide Web address. It is determined from the first set of information that a second set of information that identifies the entity is included in an entity directory. It is recorded that the use of the at least a portion of the World-Wide Web address is under the control of the entity as identified in the entity directory.

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MAPPING INFORMATION SOURCESCross-Reference to Related Applications

This application claims the benefit of United States Provisional Application Serial No. 60/097029 entitled "Collecting, Combining, Analyzing, and Using
5 Internet and Business Information" filed on August 17, 1998, which is incorporated herein.

Background of the Invention

This application relates to mapping information sources.

Computer-stored information about an entity such as a business may be
10 available from different computerized sources, including a World-Wide Web ("Web") accessible source such as a Web site that is under the control of the entity, and a third-party information source that may store public information about the entity. For example, public financial information about a company may be stored in a database that is not linked to the company's Web site or is not directly
15 accessible by Web browser software, such as a database under the control of a financial services firm. In many instances, the identity of the entity controlling a Web site is not clear or is unknown, particularly to a user of the Web site, and therefore retrieving third-party information about the entity can be difficult or even impossible for the user, which can cause problems for the user, the entity, or
20 others.

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Much of the information available on Web sites is organized into Web pages that can be retrieved and displayed by Web browser software under the direction of a user. Each of the Web pages is identifiable by a respective Uniform Resource Locator text string ("URL"), such as

5 "http://www.isp321.com/frontpage.html", that the Web browser software can use to select the page. Each URL includes a domain name, such as "isp321.com", that identifies the Web site where the corresponding Web page is stored for retrieval by Web browser software. Each domain name is registered by an entity that controls the corresponding Web site and Web pages. A domain name registry
10 organization maintains the domain name registration information, which may include name, address, and other information that allows the organization to bill the entity for payment for the maintenance. (It is to be understood that the term "registry", as used herein, also refers to a domain name registrar or any other entity that may provide assistance in registering a domain name.)

15 An Internet service provider ("ISP") is an example of an entity that may have a registered domain name for a Web site. Typically, an ISP has customers such as individuals or businesses for whom the ISP stores Web pages on the Web site for retrieval by Web browser software. For example, the ISP may have a customer Maple Street Plumbing for which the ISP stores a home Web page
20 having a URL that includes a prefix "http://www.isp321.com/~maplestplumb".

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A home Web page is typically the only or the primary entry point into a Web site or a set of Web pages that are under the control of an entity.

Another example of an entity that may have a registered domain name is a Web portal site that maintains, in pages organized by categories, links to Web sites and home pages that are under the control of other entities. Typically, a Web portal site allows another entity to create a link from the Web portal site to the other entity's Web site or home page by submitting information to the Web portal site.

10

Summary of the Invention

A method and a system are provided that allow different sets of information from different computerized sources to be mapped to each other to indicate that the different sets pertain to the same entity such as a business. A first set of information is acquired that identifies an entity that is indicated as having control over the use of at least a portion of a World-Wide Web address. It is determined from the first set of information that a second set of information that identifies the entity is included in an entity directory. It is recorded that the use of the at least a portion of the World-Wide Web address is under the control of the entity as identified in the entity directory.

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Different aspects of the invention allow one or more of the following. A mapping database can be provided that effectively groups together, by entity, information available from Web sites and information available from other sources. Third-party confirmation can be provided regarding the identity of an entity that is indicated as having control over a Web site.

Other features and advantages will become apparent from the following description, including the drawings, and from the claims.

Brief Description of the Drawings

Figs. 1-2, 5, 7, and 9 are block diagrams of computer-based systems.
Figs. 10-11 are illustrations of output produced by software.
Figs. 3-4, 6 and 8 are flow diagrams of computer-based procedures.

Detailed Description

Fig. 2 illustrates a mapping system 200, described below, in which domain names and other top-level URLs are mapped to entities such as businesses, in accordance with a procedure 1000, also described below (Fig. 3). Such a mapping system may be used to produce a computer system 10 (Fig. 1) in which a mapping database 12 maps URLs or domain names 14 to entities 16 such as people, businesses, or government agencies, as described in more detail below.

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For example, the mapping database may indicate that any URL that begins with "http://www.uspto.gov" is for a Web page controlled by the U.S. Patent and Trademark Office, or that domain names "elmstdogs.com" and "elmstcats.com" are under the control of a company named Elm Street Pets, Inc. The mapping
5 database may use a unique identification number ("unique ID"), such as a 9-digit American Business Information ("ABI") number, to identify an entity so that other information about the entity can be retrieved from sources outside the mapping database by searching under the unique ID. (ABI numbers are sponsored by infoUSA.)

10 With reference to Figs. 2-3, procedure 1000 is now described. A top-level URL 202 is acquired from a URL source 204 such as a domain name registry database (step 1010). Raw entity information 205 is acquired from a URL guide 206 (which may be the same domain name registry database) identifying an entity that is indicated as having control over the top-level URL (step 1020). The raw
15 entity information is refined to produce refined entity information 208 that better conforms to a set of format standards such as standards described below (step 1030). The refined entity information is submitted to a matching application 210 that attempts to identify, in an entity directory 212, an entity that matches the refined entity information ("matched entity") (step 1040). If a matched entity is
20 found, an entry is added to a mapping database 214 to associate the top-level URL

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with the matched entity (step 1050). If the entity directory includes a unique identification ("ID") number for the matched entity, the association in the entry may be accomplished retrieving the unique ID for the matched entity and including the unique ID together with the top-level URL in the entry.

5 Specific implementations of procedure 1000 may vary, depending on the natures of the top-level URL and the URL source involved. One implementation takes the form of procedure 2000 (Fig. 4) that is for cases in which a domain name 300 (Fig. 5) serves as the top-level URL and a domain name registry 302 serves as the URL source. The domain name, such as "elmstpets.com", is acquired from the
10 domain name registry by submitting a query to the domain name registry (step 2010). The query may take the form of a request for database records that match a search such as a search for all ".com" domain names.

Raw entity information 304, such as "Elm Street Pets, Inc., 10 Elm St, Elmtown, Elmstate 00000" is acquired from the domain name registry by
15 submitting a "whois" request to the domain name registry (step 2020). The "whois" request directs the domain name registry to disclose the billing name and address information that the domain name registry received at the time the domain name was initially registered with the domain name registry. The domain name registry returns the contents of a record with one name field and

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one address field (usually including new-line characters) among other information. The contents of the name and address fields are taken.

The raw entity information is refined to produce refined entity information 306 that conforms to a set of format standards (step 2030). The set of format
5 standards may include a postal standard for addresses. For example, the name of the state in the raw entity information may be changed to a standard two-letter postal abbreviation (e.g., "Elmstate" to "ES"). In particular, the address field is parsed to retrieve street, city, state, and zip code information. If necessary, the name and street information is truncated to thirty characters. Further changes
10 made for conformity with naming conventions may include, for example, changes from "INCORPORATED" to "INC", from "COMMUNICATION" to "COMM", and from "McDonald" to "MC DONALD". The results are submitted to a postal oriented application known as Delivery Sequence File ("DSF"), which may result in further name and address standardization. A National Change of Address
15 ("NCOA") process is then applied so that an address change due to a move is taken into account in the refined entity information. DSF and NCOA are U.S. Postal Service applications. DSF performs address processing services such as correcting zip codes and expanding zip codes from five digit format to nine digit format. NCOA matches names and addresses to changes of address filed by

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relocating postal customers; when a match is found for a name and address that has been submitted, a new address is returned.

The refined entity information is produced to increase the chance that a matching application as described below will produce a useful match.

- 5 The refined entity information is submitted to a matching application 308 such as an infoUSA or Group1 matching engine (available from Group1 Software, 4200 Parliament Place, Suite 600, Lanham MD 20706-1844) that attempts to identify, in an entity directory 310 such as an ABI database, an entity that matches the refined entity information ("matched entity") (step 2040). The matching engine
- 10 cleans and standardizes address information (including by adding missing address information, standardizing city names and two-character state abbreviations, and correcting misspelled address elements) and then compares the address information to determine whether a match can be found. The ABI database includes name and address information for entities such as businesses.
- 15 If a matched entity is found, an entry is added to a mapping database 312 to associate the domain name with the matched entity (step 2050). The association in the entry may be accomplished by retrieving an ABI number for the matched entity from the ABI database and including the ABI number together with the domain name in the entry.

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A procedure 3000 (Fig. 6) may be used where a hosting entity 400 (Fig. 7) hosts the Web site on behalf of the entity that has control over a top-level URL 402. For example, the hosting entity may be a pet services clearinghouse that has control over a domain name "elmstpetservices.com", and the top-level URL may
5 be "http://www.elmstpetservices.com/~petdoctor" and may be under the control of a veterinary service that is a service subscriber, i.e., that rents Web site space from the pet services clearinghouse. The top-level URL is acquired from the hosting entity (step 3010). The top-level URL may be acquired by requesting a report of hosted Web sites from a directory service provided by the hosting entity.

10 Raw entity information 404 for the top-level URL is acquired from the hosting entity (step 3020). The raw entity information may include subscriber information such as name and address information that allows the hosting entity to bill the entity.

The raw entity information is refined to produce refined entity information
15 406 that better conforms to a set of format standards (step 3030). As stated above, postal standards may be imposed.

The refined entity information is submitted to a matching application 408 that attempts to identify, in an entity directory 410, an entity that matches the refined entity information ("matched entity") (step 3040). If a matched entity is
20 found, an entry is added to a mapping database 412 to associate the top-level URL

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with the matched entity (step 3050). An ABI number may be retrieved and used for such association as described above.

A search-oriented implementation, procedure 4000 (Fig. 8), may be used where billing information about the entity is not available. A top-level URL 500 (Fig. 9) is acquired from a URL source 502 (step 4010).

Web pages at the Web site 503 identified by the top-level URL are searched for raw entity information 504 about the entity that has control over the top-level URL (step 4020). The raw entity information may be found on one or more of the Web pages in the form of contact information. For example, if the top level URL is "http://www.isp456.com/~elmstcats" and one of the Web pages at the Web site includes the text "For more information, please contact Elm St. Pets" followed by an address and telephone number, the words "Elm St. Pets" and the address and telephone number may be interpreted as raw entity information. In a specific implementation, an address parser searches the top level page at the Web site for contact information. The address parser may search first for numbers arranged in a zip code or telephone number format, and if a zip code or telephone number is found, may search the immediately surrounding text for name and address information.

The raw entity information is refined to produce refined entity information 506 that better conforms to a set of format standards, which may include postal

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standards as described above (step 4030). The refined entity information is submitted to a matching application 508 that attempts to identify, in an entity directory 510, an entity that matches the refined entity information ("matched entity") (step 4040). If a matched entity is found, an entry is added to a mapping
5 database 512 to associate the top-level URL with the matched entity (step 4050).

In one or more of the procedures 1000, 2000, 3000, and 4000 described above, a filtering process may be executed before the entry is added to the mapping database. In the filtering process, a check for actual name and address similarity is performed. Such a check may be particularly desirable in a case in
10 which the matching application is prone to mistakes in indicating matches. In particular, the filtering process checks to determine whether the names are very dissimilar, because in some cases a match may be indicated by the matching application even if such name dissimilarity exists. For example, the matching application may not always correctly identify an entity that has occupied part of
15 building that is listed as being fully occupied by another entity such as the building's owner. The filtering process may also include checking whether, in the results produced by the matching application, the zip code matches the county or metropolitan area indicated elsewhere in the results.

Procedure 3000 (or another one of the procedures described above) may
20 also include a scoring process before the entry is added to the mapping database.

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In the scoring process, the contents of each field in the name and address in the matching entity information returned by the matching application is given a similarity score indicating the similarity of the contents to the corresponding contents of the refined entity information. An overall score such as an average is
5 calculated based on the similarity scores for the fields, and the overall score is tested against a threshold to determine whether the matching entity information returned by the matching application is acceptable. In a specific implementation, a highest score is assigned to a perfectly matching telephone number, and lower scores are assigned for other types of matches such as zip code and address
10 matches. In an example scoring scale of 0-100, an overall score of at least 90 may indicate a reliably correct match, an overall score that is less than 90 but is at least 80 may indicate that manual spot checking is necessary, an overall score that is less than 80 but is at least 70 may indicate that full manual checking is necessary, and an overall score that is less than 70 may indicate that the purported match is
15 not worth considering.

The scoring process may be used to compare the raw, refined, or matching entity information to existing entries in the mapping database, to determine whether an entry already exists for the entity, perhaps in connection with a different top-level URL. For example, the matching entity information returned
20 by the matching application may be compared, by the scoring process, to entries

in the mapping database, and the entry having the highest overall score that is above the threshold may be deemed an already-existing entry for the entity.

The scoring process may include additional refining or reformatting of the information involved, including the removal of spaces and punctuation.

5 Five examples of the results of executions of procedure 2000 are shown in Fig. 10, and four examples of the results of executions of procedure 3000 are shown in Fig. 11.

10 The unique IDs provided in the mapping database may be used to search an information source outside the entity information database to produce a subset of the mapping database that has records only for entities having a particular characteristic, such as a particular geographic location or between 1000 and 5000 employees.

15 Where an entity constitutes a portion of another entity, each of the entities may be assigned different unique IDs, and the different unique IDs may be linked in the mapping database to note the relationship among the entities. For example, a company that has offices in different locations may be assigned a unique ID for the company itself and a respective different unique ID for each location. In another example, when two previously unrelated companies merge or one is acquired by the other, each may retain its unique ID and a new, different unique

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ID may be assigned to the combination of the two companies, or both companies may be assigned the same unique ID.

The raw entity information may be acquired in other ways such as from the entity itself. The entity may submit raw entity information in an on-line

5 questionnaire.

The mapping database and applications based on the mapping database may take advantage of a hierarchical organization of Web pages, by treating similarly a top-level URL page and all pages below the top-level URL page, such as pages sharing a particular prefix with the top-level URL page. For example, all
10 pages sharing the prefix "http://www.isp321.com" may be treated as being under the control of an ISP named Global ISP Co.

The mapping database may map an entity to Web pages maintained at different Web sites. In such a case, the entry in the mapping database associates the entity with all the sites.

15 One or more of the databases and directories referenced above may be or include a relational database and may have records to which fields may be added readily.

Any of many different types of computer equipment may be used. For example, one or more Intel-based personal computers may be used that run an

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SQL database on Linux and one or more programs written in Perl or the C programming language with interfaces to the SQL database.

The technique (i.e., the procedures described above) may be implemented in hardware or software, or a combination of both. In at least some cases, it is advantageous if the technique is implemented in computer programs executing on one or more programmable computers, such as a personal computer running or able to run an operating system such as Unix, Linux, Microsoft Windows 95, 98, or NT, or MacIntosh OS, that each include a processor, a storage medium readable by the processor (including volatile and non-volatile memory and/or storage elements), at least one input device such as a keyboard, and at least one output device. Program code is applied to data entered using the input device to perform the technique described above and to generate output information. The output information is applied to one or more output devices such as a display screen of the computer.

In at least some cases, it is advantageous if each program is implemented in a high level procedural or object-oriented programming language such as Perl, C, C++, or Java to communicate with a computer system. However, the programs can be implemented in assembly or machine language, if desired. In any case, the language may be a compiled or interpreted language.

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In at least some cases, it is advantageous if each such computer program is stored on a storage medium or device, such as ROM or optical or magnetic disc, that is readable by a general or special purpose programmable computer for configuring and operating the computer when the storage medium or device is read by the computer to perform the procedures described in this document. The system may also be considered to be implemented as a computer-readable storage medium, configured with a computer program, where the storage medium so configured causes a computer to operate in a specific and predefined manner.

Other embodiments are within the scope of the following claims. For example, the user may be a human being or a non-human entity such as a computer program or an automated device that may interact with one or more of the databases or one or more of the applications via an application programming interface ("API") or a network message. An on-line information store or multiple databases may serve as the entity directory, which may take the form of any mechanism that provides automated access to information, such as a spreadsheet file or a store of email messages.

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What is claimed is:

Claims

1. A method comprising:

5 acquiring a first set of information that identifies an entity that is indicated
as having control over the use of at least a portion of a World-Wide Web address;
determining from the first set of information that a second set of
information that identifies the entity is included in an entity directory; and
recording that the use of at least a portion of the World-Wide Web address
is under the control of the entity as identified in the entity directory.

10

2. The method of claim 1, further comprising:

deriving first address information from the first set of information;
deriving second address information from the second set of information;
and
15 comparing the first address information to the second address information.

3. A system comprising:

an acquirer that acquires a first set of information that identifies an entity
that is indicated as having control over the use of at least a portion of a World-
20 Wide Web address;

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a determiner that determines from the first set of information that a second set of information that identifies the entity is included in an entity directory; and

a recorder that records that the use of at least a portion of the World-Wide Web address is under the control of the entity as identified in the entity directory.

5

4. Computer software, residing on a computer-readable storage medium, comprising a set of instructions for use in a computer system to cause the computer system to:

acquire a first set of information that identifies an entity that is indicated as
10 having control over the use of at least a portion of a World-Wide Web address;

determine from the first set of information that a second set of information that identifies the entity is included in an entity directory; and

record that the use of at least a portion of the World-Wide Web address is under the control of the entity as identified in the entity directory.

15

5. A data processing system comprising:

a computer;

a storage device for storing data on a storage medium;

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a first logic system configured to acquire a first set of information that identifies an entity that is indicated as having control over the use of at least a portion of a World-Wide Web address;

a second logic system configured to determine from the first set of
5 information that a second set of information that identifies the entity is included in an entity directory; and

a third logic system configured to record that the use of at least a portion of the World-Wide Web address is under the control of the entity as identified in the entity directory.

10

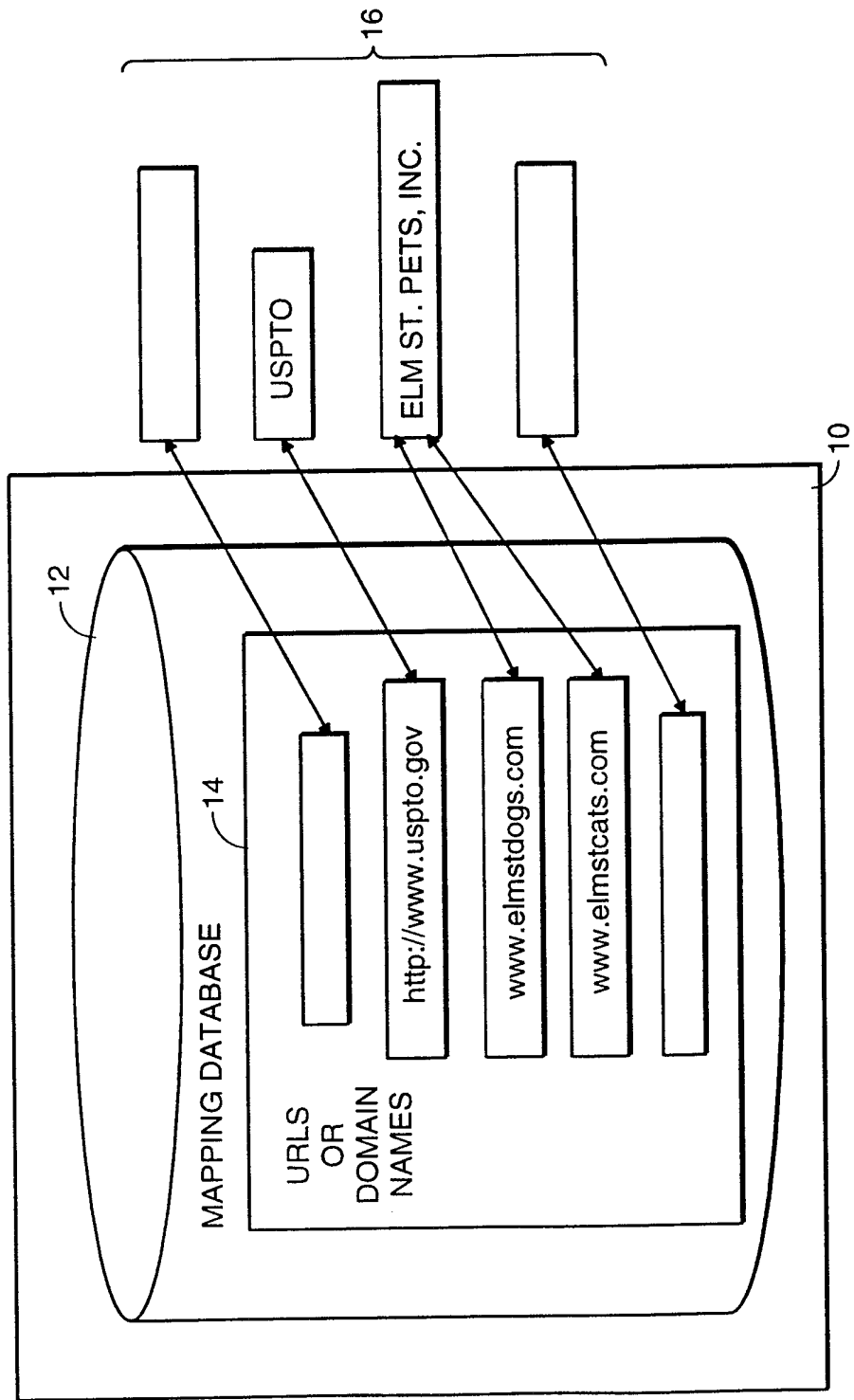


FIG. 1

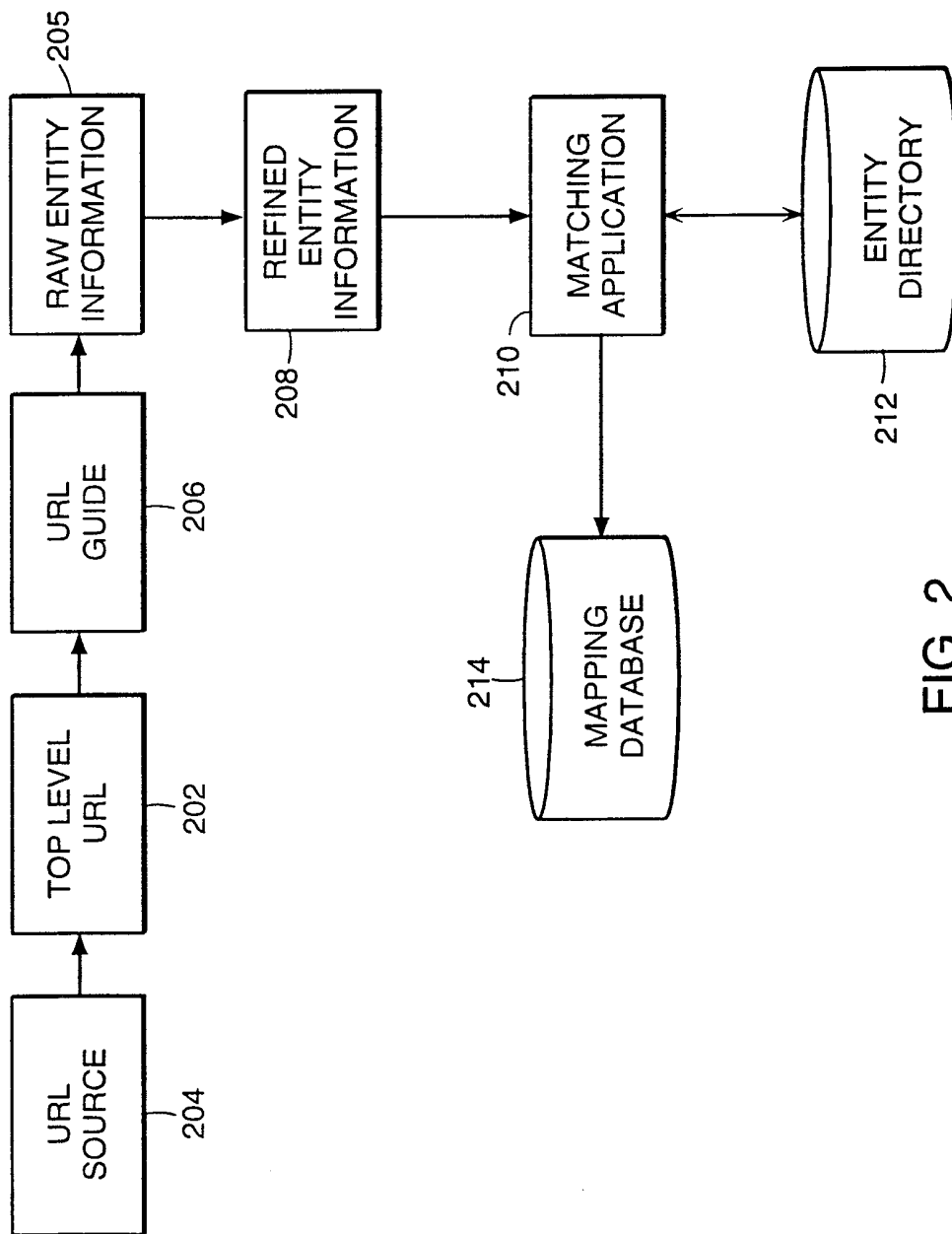


FIG. 2

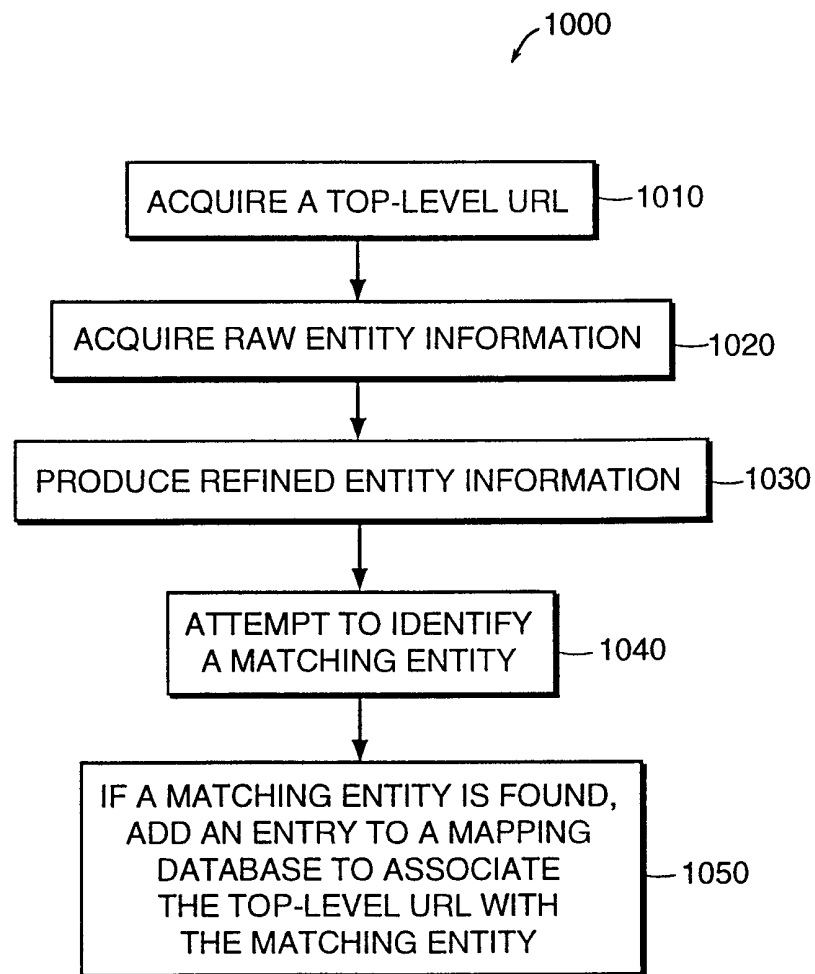


FIG. 3

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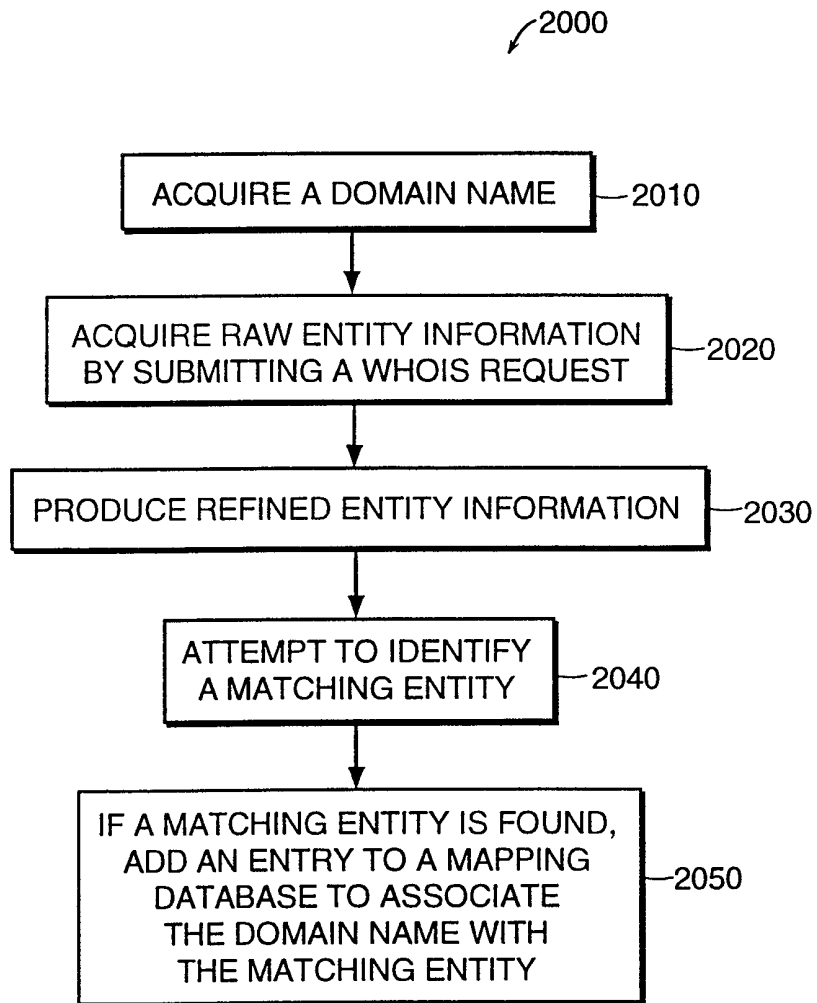


FIG. 4

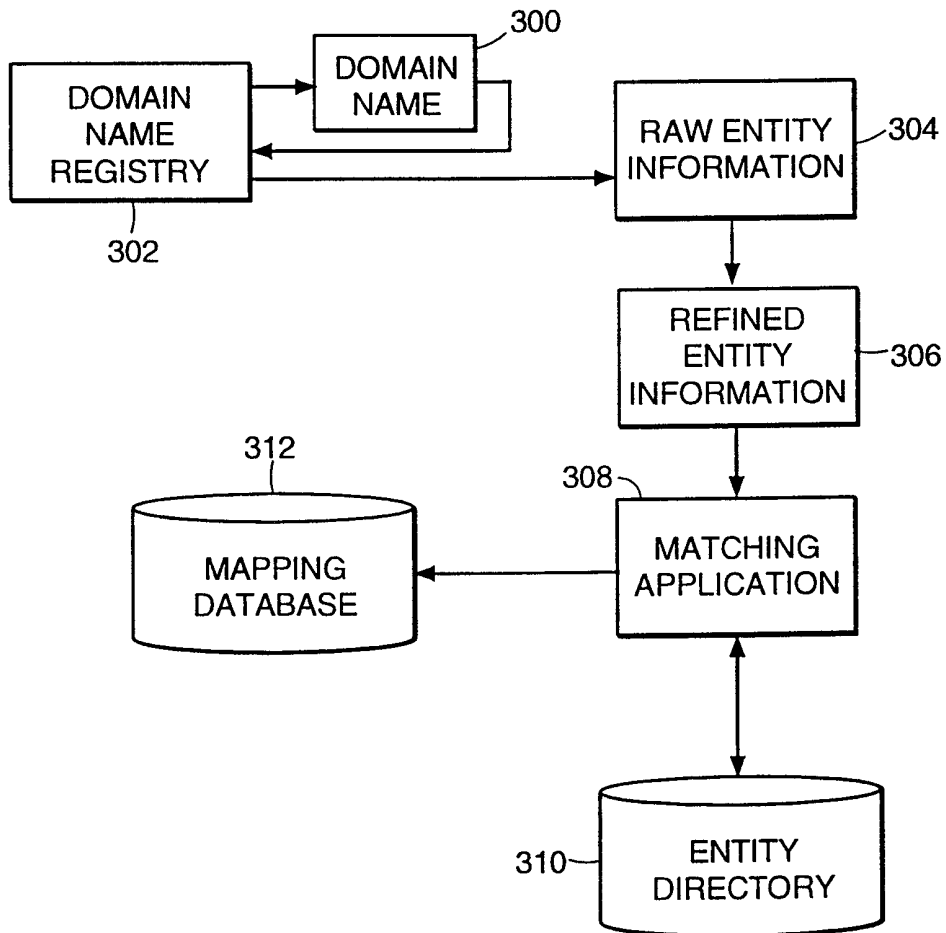


FIG. 5

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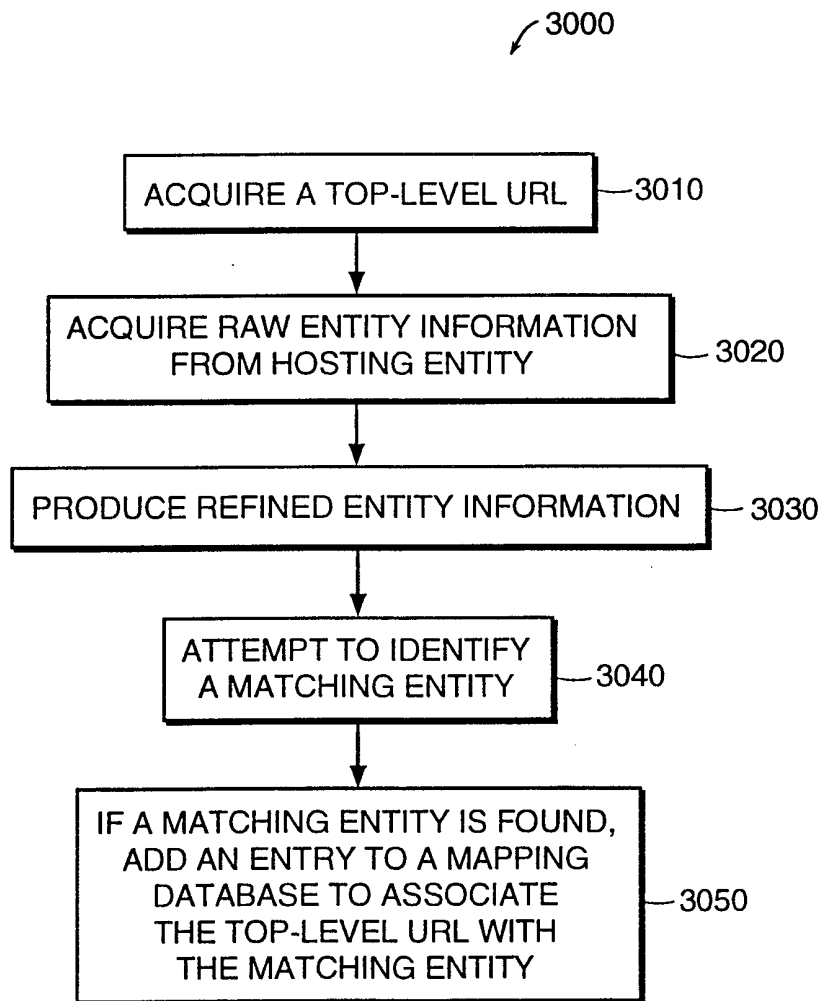


FIG. 6

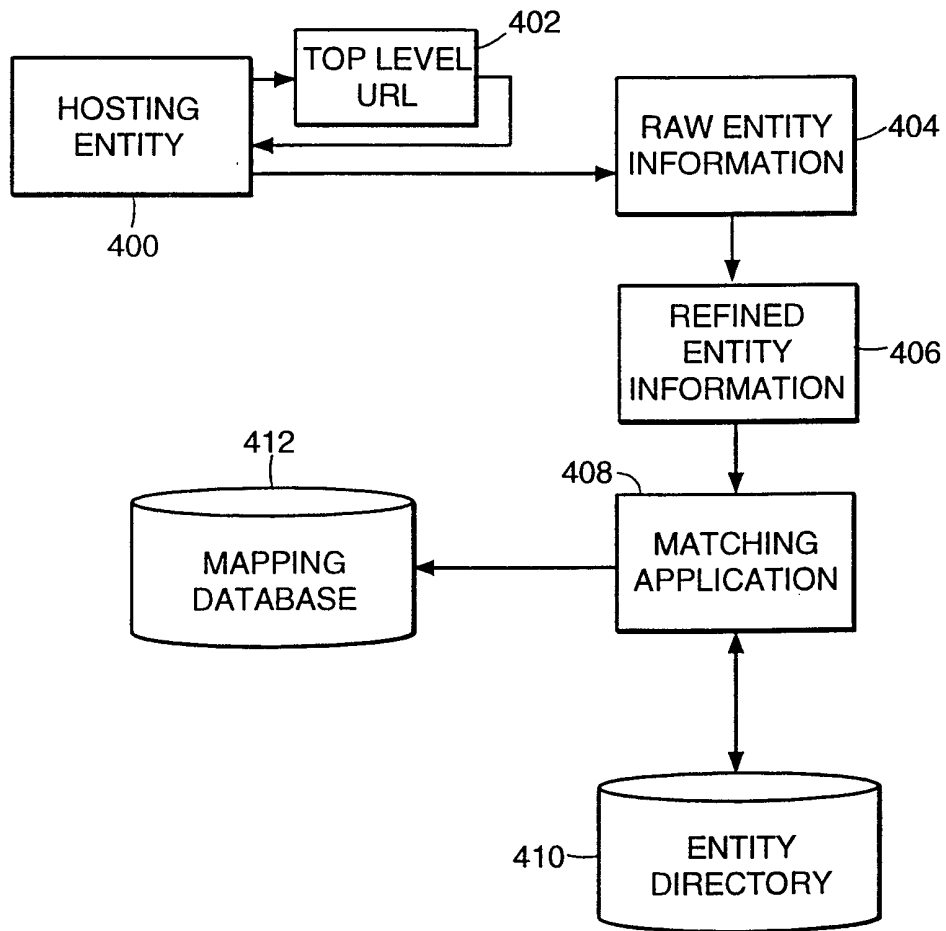


FIG. 7

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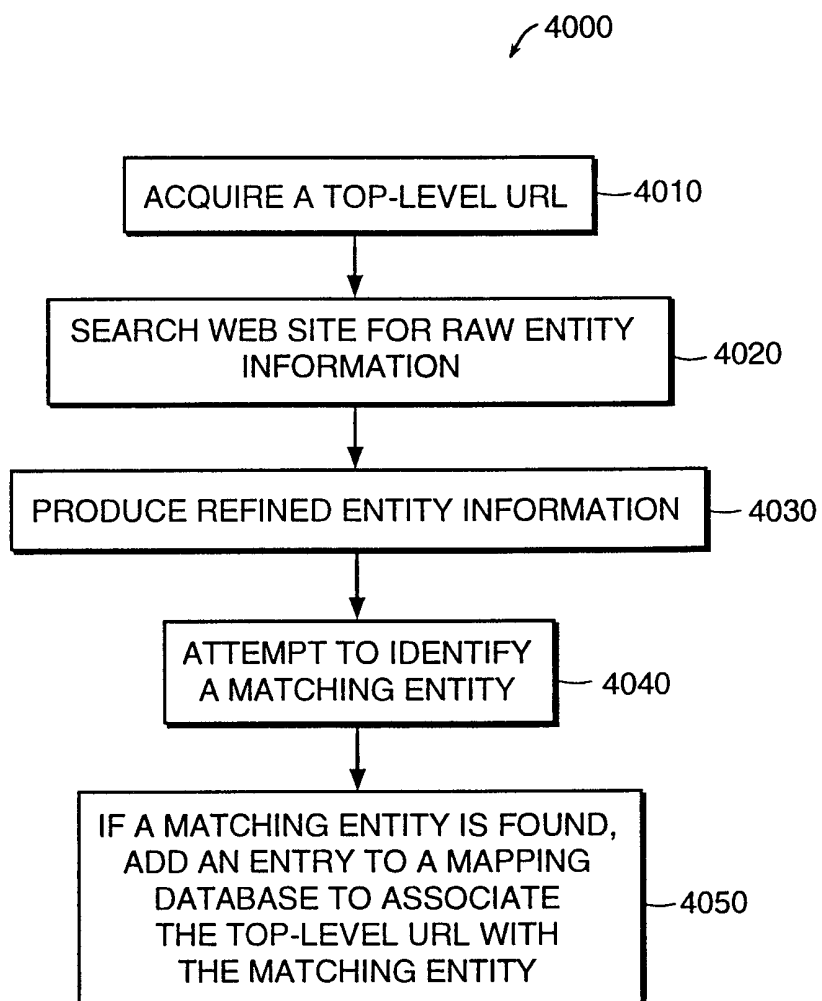


FIG. 8

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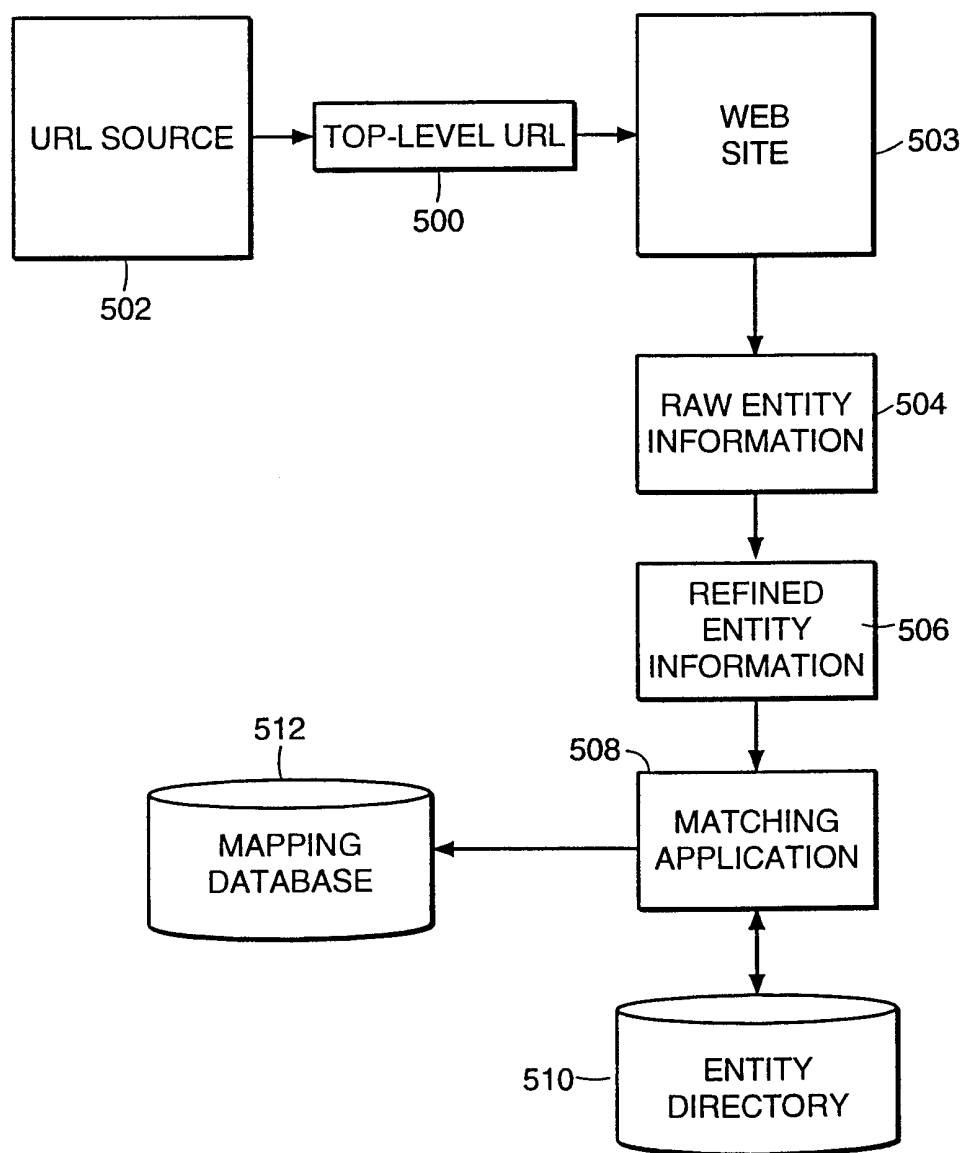


FIG. 9

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InterNIC: AXXXIS.COM Axis Communications 2601 N. Mesa<NEW_LINE> El Paso,
TX
79902
Parsed by us: AXIS COMMUNICATIONS 2601 N MESA EL PASO TX 79902
DSF result: AXIS COMMUNICATIONS 2601 N MESA EL PASO TX 799023126
NCOA result: 7321 ARMISTAD AVE EL PASO TX 79912
ABI matched to: AXIS COMMUNICATIONS 7321 ARMISTAD AVE
EL PASO TX 79912
Matchkept.

InterNIC: AXONEXPORT.COM Axon Export Corp. 4707 N.W. 72nd.
Ave. <NEW_LINE> Miami, FL 33166<NEW_LINE> US
Parsed by us: AXON EXPORT CORP 4707 N W 72ND AVE MIAMI FL 33166
DSF result: AXON EXPORT CORP 4707 N W 72ND AVE MIAMI FL 331665616
NCOA result: No charge made
ABI matched to: AXON EXPORT 4707 NW 72ND AVE
MIAMI FL 33166
Match kept.

InterNIC: AXONLLC.COM Axon L.L.C. 1035 W. North Shore
#1W<NEW_LINE> Chicago, IL 60626<NEW_LINE> US
Parsed by us: AXON L L C 1035 W NORTH SHORE STE 1W CHICAGO IL 60626
DSF result: AXON L L C 1035 W NORTH SHR APT 1W CHICAGO IL 606264629
NCOA result: No change made
No ABI match

InterNIC: AXYGEN.COM AxyGen, Inc 39159 Paseo Padre Parkway <NEW_LINE>
Suite
303<NEW_LINE>Fremont, CA 94536<NEW_LINE> USA
Parsed by us: AXYGEN INC 39159 Paseo Padre Parkway <NEW_LINE>
Suite
303<NEW_LINE> Fremont, CA 94536<NEW_LINE> USA
Parsed by us: AXYGEN INC 39159 PASEO PADRE PKWY STE 303 PREMONT CA
94536
DSF result: AXYGEN INC 39159 PASEO PADRE PKWY STE 303 FREMONT CA
945381600
NCOA result: 33170 CENTRAL AVE UNION CITY CA 94587
ABI matched to: AXYGEN INC 33170 CENTRAL AVE
UNION CITY CA 94587
Match kept.

InterNIC: AXXYS.COM Axyx Technologies In. 5952 Royal Lane<NEW_LINE> Suite
114<NEW_LINE> Dallas, TX 75230<NEW_LINE> US
Parsed by us: AXXYS TECHNOLOGIES INC 5952 ROYAL LN STE 114 DALLAS TX
75230
DSF result: AXXYX TECHNOLOGIES INC 5952 ROYAL LN STE
114 DALLAS TX 752303831
NCOA result: No change made
ABI matched to: BUFFCO 5952 ROYAL LN # 124
DALLAS TX 75230
Match rejected.

FIG. 10

11/11

Hosted company info: Oh's Auto Body Repair 5553 NE Gleason Street
Portland OR 97213
Best ABI record: OH'S BODY SHOP 5553 NE GLISAN ST PORTLAND OR
97213
Match kept.

Hosted company info: Pricenet 1932 Pelorus Avenue Seal Beach
CA 90740
Best ABI record: PAT MC CORMICK EDUCATIONAL 915 1/2 ELECTRIC AVE.
SEAL BEACH CA 90740
Match rejected.

Hosted company info: David Jones 450 N Robertson West Hollywood CA
90048
Best ABI record: DAVID JONES 450 ROBERSTON BLVD LOS ANGELES
CA
90048
Match kept.

Hosted company info: Bullwinkles Saloon 908 Euclid Avenue Helena
MT 59601
Best ABI record: BULLWINKLES SALOON 908 EUCLID AVE HELENA MT
59601
Match kept.

FIG. 11

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/18644

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F17/30

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G06F

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 97 15018 A (BELL COMMUNICATIONS RES) 24 April 1997 (1997-04-24) abstract page 4, line 5 -page 5, line 3	1,3-5
A	WO 97 29414 A (AT & T CORP) 14 August 1997 (1997-08-14) page 2, line 3 -page 3, line 30	1,3-5

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
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- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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Date of the actual completion of the international search

21 December 1999

Date of mailing of the international search report

11/01/2000

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Fax: (+31-70) 340-3018

Authorized officer

Katerbau, R

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/18644

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9715018 A	24-04-1997	NONE	
WO 9729414 A	14-08-1997	EP 0879448 A	25-11-1998