



- (51) International Patent Classification: *G06Q 30/02* (2012.01) *G06F 17/30* (2006.01)
- (72) Inventor: **DAVIS, Joel**; 10 Bethune Avenue, London N11 3LE (GB).
- (21) International Application Number: PCT/GB2018/052790
- (74) Agent: **COLE, Douglas**; Mathys & Squire LLP, The Shard, 32 London Bridge Street, London Greater London SE1 9SG (GB).
- (22) International Filing Date: 28 September 2018 (28.09.2018)
- (81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 1716077.1 02 October 2017 (02.10.2017) GB
- (71) Applicant: **MARKET MAKING LIMITED** [GB/GB]; 10 Bethune Avenue, London N11 3LE (GB).

(54) Title: SYSTEM FOR TRACKING USER INTERACTIONS

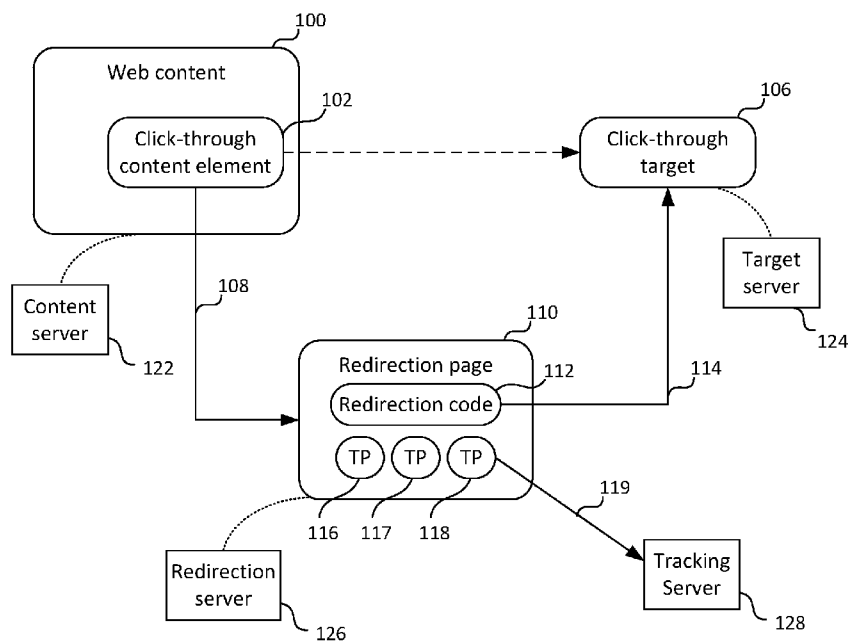


Fig. 1B

(57) Abstract: System for tracking user interactions A method of tracking user interactions with a content element is disclosed. The content element is inserted by a content server into a web page for display to a user in a browser application and is associated with a target resource, such that interaction by the user with the content element causes the browser to access the target resource. The method comprises generating a redirection page that includes redirection code adapted to redirect the browser to the target resource, and tracking code adapted to invoke one or more tracking services for tracking access to the redirection page. A link to the redirection page is generated and the content element and the link to the redirection page are provided to the content server. The content server associates the link with the content element in the generated web page such that an interaction with the content element by the user triggers retrieval and processing of the redirection page by the browser using the link.



(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

System for tracking user interactions

The present invention relates to systems and methods for tracking user interactions with Internet content.

5

A number of systems are available for tracking user interactions with Internet content, but these generally require direct control over the web server serving the content, for example to allow tracking code to be inserted into web pages being tracked. However, in many situations content may be served by a web server on behalf of a third party content provider, so that the content provider has no control over the generation of web pages. In that case, the content provider is unable to implement the required tracking functionality and may be restricted to using tracking data made available by the web server (if any). Furthermore, different tracking services may provide different data that would be useful to the content provider, but the content provider is generally limited to using one specific tracking service, typically the one associated with the operator of the web server.

The present invention accordingly seeks to provide a technical infrastructure allowing improved tracking of user interactions with Internet content.

20

Accordingly, in a first aspect of the invention, there is provided a method of tracking user interactions with a content element, wherein the content element is inserted by a content server into a web page for display to a user in a browser application and is associated with a target resource, wherein interaction by the user with the content element causes the browser to access the target resource, the method comprising: generating a redirection page, the redirection page comprising: redirection code adapted to redirect the browser to the target resource; and tracking code adapted to invoke one or more tracking services for tracking access to the redirection page; and generating a link to the redirection page. The method may further comprise providing the content element and the link to the redirection page to the content server, whereby the content server associates the link with the content element in the generated web page such that an interaction with the content element by the user triggers retrieval and processing of the redirection page by the browser using the link.

35 The use of a redirection page in this way allows tracking of user accesses without requiring control over, or modification of, the content server.

- 2 -

The tracking code may be adapted to invoke a plurality of tracking services. To achieve this, the tracking code may comprise a plurality of code segments, each adapted to invoke a respective tracking service.

5 Preferably, the tracking code for a tracking service comprises a link or request to a tracking server and/or wherein invoking a tracking service comprises initiating a request to a tracking server, preferably wherein the request is an HTTP (Hypertext Transfer Protocol) request. The link or request to the tracking server preferably comprises a tracking identifier associated with the content element.

10

The tracking code for a tracking service may comprise a link to a content item, optionally an image, stored at a tracking server, such that an attempt by the browser to retrieve the content item based on the link causes a trackable request for the content item to the tracking server. The content item may be non-rendered, or
15 invisible or at least inconspicuous to a user when rendered/displayed in the browser (e.g. it may be a transparent image). The tracking code may comprise one or more tracking pixels, each associated with a respective tracking service. The method may comprise receiving a selection of one or more tracking services and adding tracking code to the redirection page for the selected one or more tracking services.

20

Preferably, the redirection code comprises a redirection link to the target resource, the redirection code adapted to cause the browser to load the target resource as specified by the redirection link. The target resource is preferably a second web page, optionally hosted at a second web server different from the content server.

25

Any link referred to herein may be in the form of a hyperlink. Thus, any or all of the link to the redirection page, the redirection link to the target resource, and the links to tracking servers, may comprise hyperlinks, preferably Uniform Resource Locators (URLs).

30

The link to the redirection page may comprise an identifier of the content element, optionally wherein the identifier is encoded as a URL parameter. The method may comprise receiving one or more attributes or tags to be associated with the content element, wherein generating the link to the redirection page comprises encoding the
35 attribute or tags as URL parameters.

The target resource may be associated with an e-commerce platform, the redirection code comprising a redirection link including a product identifier identifying a product available at the e-commerce platform. In that case, the resource may comprise a page or function for purchasing the product and/or adding the product to an e-commerce shopping cart, the e-commerce platform preferably adding the identified product to a cart associated with a user in response to receiving a request for the target resource using the redirection link.

Preferably, the user interaction comprises the user activating the link associated with the content element, optionally by clicking on the content element.

Generating the web page by the content server preferably comprises adding the link to the redirection page as a click target for the content element.

Preferably, the or each tracking service is arranged, in response to the tracking service being invoked by the browser, to track the access to the redirection page. Tracking the access to the redirection page by a tracking service may comprise reading user information from a cookie stored at the browser and recording tracking data based on the user information. The method may comprise associating tracking data with the content element based on a tracking identifier in the request to the tracking server.

The method may further comprise receiving tracking data from one or more of the tracking services relating to access by multiple users to the redirection page.

In a second aspect of the invention (which may be combined with any of the other described aspects) there is provided a method of tracking accesses to a content element served by a content server, comprising: associating the content element at the content server with a link to a redirection page, the redirection page comprising tracking code for invoking a plurality of tracking services and redirection code for redirecting a browser displaying the redirection page to a target resource; inserting the content element by the content server into web pages served by the content server such that a selection of the content element by a user triggers retrieval of the redirection page specified by the link at the browser; and receiving tracking data from the plurality of tracking services relating to accesses by multiple users to the redirection page.

The following optional features may be used with either of the above aspects of the invention.

5 Preferably, the tracking data comprises user segment data defining characteristics of a group of users, the characteristics determined by a tracking service based on tracked user interactions by multiple individual users with the redirection page.

10 The user segment data preferably defines characteristics of a group of users determined as similar to the users having accessed the redirection page in terms of one or more comparison criteria, the comparison criteria preferably comprising demographic criteria.

15 The method may comprise receiving respective user segment data from a plurality of tracking services, and processing the user segment data to derive a combined user segment definition defining user characteristics based on the user segment data received from each of the plurality of tracking services.

20 The method may comprise outputting the user segment data and/or combined user segment definition, and/or configuring delivery of content by the content server in accordance with the user segment data and/or combined user segment definition.

25 Preferably, the method comprises recording tracking data in response to access by the browser to the redirection page. The method may comprise computing page access statistics based on accesses to the redirection page, the page access statistics optionally computed in relation to the content element and/or in relation to one or more tags or attributes associated with the content element, the tags or attributes optionally encoded in the URL of the redirection page.

30 Preferably, the content server is arranged to dynamically select the content element for insertion into web pages in response to browser requests for those web pages.

35 The content element may be provided to the content server by a party having no direct control over the content server. Thus, while direct tracking of the content served by the content server may not be possible, use of the redirection page nevertheless enables the party to obtain useful tracking information.

The method may be performed at a management device or server, for example by using a redirection tool (a software application) as described further below.

5 In a third aspect of the invention (which may be combined with any of the above aspects), there is provided a method of tracking user interactions with a content element, comprising: receiving a web page for display at a browser device, the web page comprising the content element and a link to a redirection page associated with the content element, receiving a user input for activating the link associated with the content element; retrieving the redirection page based on the link, the redirection
10 page comprising redirection code and tracking code; processing the tracking code contained in the redirection page, the tracking code comprising a plurality of code segments each referencing a respective tracking service, wherein processing the tracking code comprises invoking each respective tracking service to track access to the redirection page at each tracking service; and processing the redirection code
15 contained in the redirection page, the redirection code including a redirection link to a target resource, wherein processing the redirection code comprises directing the browser to access the target resource based on the redirection link.

The user input preferably comprises the user clicking on the content element. The
20 link preferably comprises an identifier associated with the content element and/or one or more attributes or tags associated with the content element, optionally encoded as URL parameters. The tracking code may comprise a link or request to a tracking server for each tracking service.

25 In a further aspect of the invention, there is provided a system comprising one or more of: a management device adapted to perform some or all steps of a method as set out in the first or second aspects of the invention; a client device adapted to perform some or all steps of a method as set out in the third aspect of the invention; and a content server arranged to dynamically select the content element and insert
30 the content element with a link to the redirection page associated with the content element into web pages in response to browser requests for those web pages.

The invention also provides a system having means, preferably in the form of one or more processors with associated memory, for performing any method as set out
35 herein, and a tangible computer-readable medium storing software code adapted, when executed on a data processing apparatus, to perform any method as set out herein.

Any feature in one aspect of the invention may be applied to other aspects of the invention, in any appropriate combination. In particular, method aspects may be applied to apparatus and computer program aspects, and vice versa.

5

Furthermore, features implemented in hardware may generally be implemented in software, and vice versa. Any reference to software and hardware features herein should be construed accordingly.

10 Preferred features of the present invention will now be described, purely by way of example, with reference to the accompanying drawings, in which:-

Figures 1A and 1B illustrate a page redirection process for redirecting a browser via a redirection page implementing tracking functionality;

15 Figure 2 illustrates a system in which the page redirection process may be implemented;

Figure 3 illustrates a process for creation of a redirection page;

Figure 4 illustrates a processing and communication flow for the redirection process;

20 Figure 5 illustrate operation of a redirection tool;

Figures 6A and 6B illustrate analysis processes utilising tracking data obtained using the redirection process; and

Figure 7 illustrates a hardware/software architecture of a management device for implementing a redirection tool.

25

Overview

Embodiments of the present invention provide a system that enables improved tracking of user interactions with Internet content.

30

The system involves associating a special redirection page with a piece of Internet content. The Internet content is associated with an original click-through target – i.e. a URL of a destination site to which the user will be directed upon clicking on (or otherwise activating) the content. The redirection page replaces the destination site as click-through target for the content and includes tracking functionality as well as
35 functionality for redirecting the viewing browser to the original click-through target.

The approach is illustrated in overview in Figures 1A – 1B.

Figure 1A shows a conventional arrangement including a web content item 100, such as a web page, including a click-through content element 102. The click-through content element could be e.g. a textual link, a media item such as an image, video or Adobe Flash animation, or any other type of content element that can be embedded in a web page and that is associated with a hyperlink 104 leading to a click-through target 106. The click-through target 106 is typically another web page but could also be a downloadable file or any other kind of Internet resource accessible by a web browser.

In this scenario, the first piece of web content 100 may be hosted on the same web server or on a different web server as the click-through target 106. Assuming they are hosted on different web servers, then both the web server 122 hosting content 100 and the server 124 hosting click-through target 106 may be able to track the user interaction with the content 100, 106 and the click-through content element 102, for example with a view to compiling interaction statistics, track user activity and the like.

However, in the arrangements considered herein, the click-through content element 102 is dynamically placed within web content 100. For example, the content element 102 may be sourced by the content server 122 from a database and may be selected dynamically at the point where content server 122 serves web content 100 to a requesting browser. Furthermore, the click-through content element itself may have been provided by a third party not involved with the operation of servers 122 and 124. Thus, whilst both server 122 and 124 can in principle track interactions with click-through content element 102, the third party provider of the content will be unable to do so.

Embodiments of the invention address this limitation by providing a redirection page 110 as depicted in Figure 1B. The hyperlink 104 associated with click-through target 106 is substituted with a link 108 to the redirection page. The redirection page includes redirection code 112 which includes a second link 114 to the original click-through target 106. The redirection code is arranged to redirect the browser to the click-through target 106 as soon as redirection page 110 is loaded by the browser.

Additionally, the redirection page includes one or more tracking pixels 116, 117, 118. These may be conventional tracking pixels as known in the art. If multiple tracking

pixels are provided then each tracking pixel is typically associated with a different tracking service (though it is also possible to provide multiple tracking pixels for the same service but with a different tracking identifier or other tracking parameters).

5 A tracking pixel is generally implemented as an image element specified by an image URL linking to an image file at a tracking server operated by a tracking service. In this example, tracking pixel 118 is in the form of an image link 119 to an image hosted at tracking server 128. The link may e.g. be specific to the page on which the tracking pixel is embedded, for example by way of a specific image name, one or
10 more URL parameters or the like. In preferred embodiments the link to the tracking server includes a tracking identifier specific to the redirection page and, by extension, to the content element 102 to which the redirection page relates.

The tracking server can detect the request for the image URL 119 and hence track
15 display of the page embedding the tracking pixel. Additional tracking data may be obtained for example by the tracking server reading a cookie from the accessing browser. The tracking server then records tracking data against the provided tracking ID. The image file itself is commonly in the form of a single transparent pixel (hence the term "tracking pixel"), so that the presence of the tracking pixel is invisible to the
20 user viewing the page.

However, the tracking image could be any image whether visible or not, or indeed could be substituted with some other form of web content that can be referenced on redirection page 110 to trigger a trackable request to tracking server 128. Thus in
25 general, any tracking code comprising a reference, link or request to a tracking server may be used in place of the described tracking pixels; the references to tracking pixels herein should therefore be understood as just one example that may be substituted with any suitable tracking mechanism. Furthermore, different mechanisms may be implemented for different tracking services within a single
30 redirection page. A separate tracking code segment is provided for each tracking service (implementing a tracking pixel or other mechanism for that service) and is arranged to cause the browser to send an HTTP request (e.g. for an image file or other resource) to a respective tracking server associated with that tracking service.

35 Since tracking pixels generally cannot be inserted into the click-through content element 102 (which is typically e.g. an image or animation, rather than an HTML document) the third party providing the click-through content element would not

ordinarily be able to track interactions with that content element directly. However, by using the tracking pixel(s) embedded in the redirection page, the third party provider of the click-through content element is able to utilise one or more tracking services to collect statistics and (via cookies) individual user activity data about accesses to the redirection page 110. Furthermore, the essentially immediate redirection to the original click-through target 106 by redirection code 112 ensures that the tracking activity is largely transparent to the user, except possibly for the slight delay caused by the redirection and additional page load. The redirection page 110 itself contains no browser-displayable content (or could alternatively include an indication that redirection and/or other processing is occurring, such as a text message, an hour glass or spinning wheel graphic/animation *etc.*) Thus during redirection the user is presented briefly with a (possibly blank) holding page.

Figure 2 illustrates a system in which embodiments of the invention may be implemented. The system includes elements discussed above including the content web server 122 (serving web content 100), target web server 124 (serving click-through target 106), redirection web server 126 serving redirection page 110 and tracking server 128. The content server 122 comprises or is connected to a dynamic content database 206 storing dynamic content elements such as click-through content element 102. Tracking server 128 comprises or is connected to tracking database 208 storing tracking information. The system additionally includes a management device 202, providing functionality for generating and deploying the redirection page in the form of redirection tool 203, and a browser device 204 for accessing the web content 100 including the dynamic content element 102. The browser device is e.g. a personal computer or mobile computing device with web browser software, allowing a user to navigate to and display web content 100.

The process of deploying a redirection page is illustrated in Figure 3. In this example, the process is at least in part performed using the redirection tool 203 implemented at management device 202. In practice, the management device could be a server providing a redirection deployment web application accessed by another remote client device. Alternatively the redirection tool could be a client application running on a client device.

Referring to Figure 3, in step 302, the click-through content element 102 is created or acquired. For example, this may be a media file such as an image, video or animation file. In step 304, a user of the redirection tool supplies the redirection target

link 114 (e.g. as a URL), a tracking identifier for use by tracking services, and any other necessary configuration parameters (such as content tags) for the redirection page to the redirection tool. The tracking ID serves as an identifier of the redirection page and associated content element, with the tracking services recording tracking events (i.e. accesses to the redirection page) and accumulating tracking statistics against that identifier. The parameters may additionally specify which tracking service(s) are to be used out of a number of available services.

In step 306, the redirection tool generates the redirection page as an HTML page, including the redirection code 112 for redirecting to the specified target link and code segments 116, 117, 118 for one or more tracking pixels, for the selected tracking service(s). The redirection tool preferably automatically generates and inserts the relevant tracking pixel code for the page based on the service(s) selected. For example, the tracking pixel code may be generated by inserting the provided tracking identifier into respective code templates for each tracking service. The code templates may be pre-stored at the redirection tool or may be obtained from the relevant tracking service(s). Alternatively, tracking code could be supplied by the user. Redirection and/or tracking code may include e.g. HTML or Javascript code.

In step 308 the redirection tool generates a URL (108) for the redirection page and outputs it to the user. The URL may include one or more URL parameters encoding content tags supplied by the user in step 304. In step 310 the redirection tool uploads the redirection page to the redirection page server 126.

In step 312, the click-through content element 102 is uploaded to the content server 122, together with the URL 108 for the redirection page which is to be the click-through target for the click-through content element. This may be a separate step carried out by the user using tools provided by the content server. For example, the redirection tool may simply output the target URL to the user of the tool, and the user can then separately upload the click-through content element with the target URL to the content server 122 (e.g. by copying and pasting the generated URL into a management interface associated with content server 122). However, alternatively, the content element and target link could be uploaded automatically by the redirection tool.

35

The content server stores the content element and associated URL in its database 206. At this point, the click-through content element is available to be incorporated

into web content by the content server, and is associated with a click target link leading to the redirection page, itself available at the redirection server.

Figure 4 illustrates the process of the activation of the click-through content element by a user, resulting in the redirection via the redirection page. The process steps of Figure 4 are divided into columns, corresponding to steps performed respectively at browser device 204, content server 122, redirection server 126, tracking server 128 and target server 124.

In step 402, the browser device requests web content 100, for example as a result of a user clicking a link to the content or directly entering a URL. The request is resolved in the usual manner and received at content server 122. The content server generates a web page for the requested content in step 404, inserting the click-through content element as needed. The click-through content element may be dynamically selected by the content server from the database (e.g. depending on the requesting user or other criteria). The content element (in the case of an image) may be inserted e.g. as an HTML image tag embedded in a link tag specifying the redirection page URL (108) as the click target for the image, for example:

```
<a href="target.html">  
      
</a>
```

Other forms of content may be embedded as appropriate to the type of content.

In step 406, the generated web page is transmitted to the browser device. The browser device then renders and displays the web page including the click-through content item in step 408.

In step 410, the user clicks on the click-through content element (or activates the associated link in any other suitable way, e.g. through a key press). The browser then reads the click target associated with the click-through content element, which is a link 108 to the redirection page 110, and requests the redirection page via its associated link (step 412). In step 414, the request is processed by the redirection server 126 hosting the redirection page, and the redirection server returns the redirection page to the browser device, where the browser parses and displays the redirection page, although in practice the redirection page may contain no visible content so the browser may at this point simply display a blank page. However, rendering of the page triggers execution of the code for the tracking pixel, or multiple

tracking pixels, embedded in the redirection page, causing an HTTP request to the tracking pixel image target at tracking server 128. The tracking server 128 responds by serving the tracking pixel (e.g. as a single-pixel transparent image) and records any required tracking data in its database in step 420 (the tracking data may be
5 obtained using one or more cookies at the browser as described further below). After processing the tracking pixel(s), browser device executes (422) the redirection code in the redirection page, resulting in a HTTP request to the redirection URL (114), the latter being a link to the original target web page 106. The request is thus received at the target server 124, which processes the request and serves the target page at
10 step 424, transmitting the page to the browser device in response to the request. In step 426, the browser at the browser device renders the target page, and the redirection process is complete.

In addition to tracking performed by external tracking services via the tracking pixels,
15 the redirection server additionally collects some basic tracking information directly, such as date/time, browser type, client device/browser identifiers, number of accesses to a particular content element, etc. Tracking information may be associated with the specific content element being tracked and/or with additional tracking parameters provided as tags in the redirection URL (as URL parameters) or
20 directly encoded in the page. The URL preferably uniquely identifies the content element being tracked (e.g. via URL parameter with a unique identifier). For example, the redirection URL could have one of the following forms:

`http://www.redirect.com/redirect.html?content_ID=1234&tags="tag1;tag2"`

`http://www.redirect.com/redirect_content1234.html?tag1="xx"&tag2="yy"`

25

This allows the redirection server to generate and record tracking data, including access statistics both in relation to the specific content element (ID 1234) as well as in relation to any of the other information encoded as tags. For example if a given tag specifies a type of the content (e.g. image, video *etc.*) then the redirection server can
30 track access statistics for all images in addition to the element-specific statistics.

The tracking pixel code preferably also includes the unique content identifier of the content element (e.g. as part of the tracking server URL), or a related tracking identifier, so that the tracking services generate tracking data specific to that content
35 element. This also allows any tracking data directly recorded at redirection server based on the redirection page to be correlated with and combined with tracking information obtained from the tracking services using the tracking pixels.

One advantage of the above-described approach is that it allows click-through events on the click-through content element to be tracked by the external party supplying the click-through content to content server 122, even where that party has no control over the content server or target server. A further advantage is that it enables tracking of a single click-through event through multiple tracking services. This can allow the external party to combine data from multiple such tracking services. Furthermore, even where the content server 122 is associated with a specific tracking service, accesses can be tracked through one or more other tracking services in addition to (or instead of) that particular tracking service.

Application examples

Referring back to Figure 1, these advantages are described in more detail below in the context of an example embodiment of the invention, where the click-through content element 102 is a clickable online advertisement inserted into web content 100 by a content network. An advertising provider normally creates the digital advertisement and supplies it with a link to a target 106, which in an example is an online store where the advertised product is available. Since the advertiser or advertising provider do not control the content network or the online store they are unable to obtain tracking information (beyond any tracking information made available e.g. by the content network to the advertiser, but such information is often limited, e.g. only a total number of clicks on the advert may be available).

The content network serving web content 100 may be e.g. a social network such as Facebook (TM), which allows placement of adverts by external advertisers. In the present embodiment, the advertiser supplies the advertisement as an image together with the URL 108 of the redirection page 110 that was generated by the redirection tool instead of the actual target link 104. The advertiser also provides a specification of the user segment to be targeted by the advertisement, e.g. in terms of demographic features. The content network then serves the advertisement to a subset of its users matching the specified user segment, with user clicks tracked by the advertiser by way of the redirection page, in the manner described above.

An example of the operation of the redirection tool in the context of the advertising application is shown in Figure 5. This illustrates the set of inputs 502 provided by the user, including a specification of the objective and user segment for the advertising

campaign, the destination URL for the advert, and any tags relating to the advert. Any relevant tracking information (e.g. advert identifiers) needed for instantiating the tracking pixels is also supplied. The output of the redirection tool is the redirection page 504 itself (illustrated schematically) and the redirection URL 506.

5

As mentioned above, additional information may be provided to redirection tool in the form of one or more tags, which are embedded by the tool in the redirection URL as URL parameters. These could encode any appropriate information about the advert, e.g. relating to the type or content of the advert (e.g. static image/animation, whether the advert is in the form of a product picture or other type of image content, whether the advert includes a price offer etc.) This additional information can be used by the advertiser to analyse the effectiveness of different campaigns as well as the effectiveness of different variations of the same advert. For example, since the tracking information compiled by tracking services relates to a specific redirection page associated with a particular URL, the advertiser can analyse tracking data in relation to specific URL tags of that URL and can use this information in identifying targeting demographics and defining audiences for future advertisements.

10

15

20

25

Content networks such as Facebook (TM) which provide advertising services also often provide tracking functionality. The present invention, however, allows the advertiser to use alternative tracking services additionally (or instead of) the tracking services of the content network, and furthermore allows the advertiser to combine data from multiple tracking services, despite having no control over the web content 100 served by the content network (and thus being unable to insert tracking code directly into the web content 100 itself).

30

35

Thus, in this example, one of the tracking pixels 116, 117, 118 included in redirection page 110 may be a Facebook (TM) tracking pixel, but other tracking pixels, such as Google (TM) and Pinterest (TM) tracking pixels, and/or tracking code for other current or future tracking services, may be added. This allows the advertiser to perform tracking through e.g. the Google (TM) tracking service even though the advert is being served through Facebook (TM). Each visit by a user to the redirection page (after clicking on the advert) triggers all of the tracking pixels embedded on that page, before the user is then redirected to the target page. This in turn means that the embedding of multiple (third party) platform pixels/trackers within the redirection page can enable the targeting of users on one platform based on those users' interactions with content on a different platform.

One particular advantage of this approach is in generating user demographics based on user tracking. Tracking services such as those provided by Facebook (TM) and Google (TM) often provide functionality for obtaining demographic data defining a class of users that are in demographic terms “like” (similar to) the users who have accessed a particular advertisement – for example defining a demographic user category in terms of attributes such as age, sex, income bracket, geography, interests, etc. This demographic information (referred to as “lookalike” information, i.e. identifying a segment of users that in some sense “look” like the tracked users) can then be used to target future advertisements more accurately, by configuring the advertising service provided by the content network to target the specific demographic category. Typically, the tracking services can generate this lookalike information once a certain number of click-through events have been recorded by the tracking service (where a click-through event corresponds to a user clicking on the advertisements and being taken to the advertisement’s target page).

Each tracking pixel is associated with a tracking cookie on a user’s browsing device; for example, after logging into Facebook (TM), that site may place a tracking cookie at the user’s browser. The browser may have multiple such cookies associated with different web sites and tracking services. When a tracking service is invoked by a tracking pixel, it reads the associated cookie to obtain information such as a user identifier, which may be correlated with a user database to identify other relevant information about that user, which can in turn (based on accesses by multiple different users) be used to create demographic data representative of the group of users that activated that particular tracking pixel. After sufficient number of accesses to the particular tracking pixel have been recorded by the tracking service, the tracking service can then generate the lookalike information by comparing the stored information about the accessing users (which may include information provided directly by the user and/or information inferred e.g. from user interactions on a social network or the like). This information is usually generated and provided by the services in a form such that individual users are not personally identifiable. Based on the comparison, demographic features are identified that are common to the users who accessed the advert, and the tracking service outputs user segment data defining a group of similar users based on those demographic features.

Since embodiments of the present invention allow tracking of click-through events through multiple tracking services using multiple tracking pixels, clicks on a single

advertisement presented through a specific content provider (e.g. Facebook (TM)) may contribute to tracking data accumulated by multiple tracking services (e.g. Facebook (TM), Google (TM) and Pinterest (TM)). This in turn allows lookalike information to be obtained from each of those tracking services, based on the unique user data and user populations of those services. Also, the number of click-through events required at any given service is reduced – for example, since a click on the advert served through Facebook (TM) also contributes to demographic data collected through Google (TM)'s tracking service, lookalike information can be obtained from the Google (TM) service even if the number of clicks on the same advert served through the Google (TM) service would ordinarily be too low to generate lookalike information, or indeed if the advert was never served through that service at all.

Once the advertiser has obtained lookalike information from different services this can then be used to target advertisements delivered through those services. Additionally, the advertiser can combine the lookalike information from different services to obtain a more accurate and/or complete demographic description of the user class of interest, and can use that combined profile to target future advertisements delivered through any service, resulting in improved relevance of advertisements and higher click rates.

Preferred embodiments may receive the lookalike information and automatically reconfigure targeting parameters for the advertisement at the content network (e.g. at content server 122) and/or configure targeting parameters for future advertisements, to improve effectiveness of the advertisements. Performance of advertisements may also be analysed e.g. based on the tags added to the redirection page URL to identify best performing adverts (overall, or for specific demographics).

In one embodiment, an analysis tool is provided to carry out this analysis and generate recommendations for future campaigns in terms of the type/content of advert and target user segment for the advert. The analysis is illustrated in Figure 6A. An operator can then use that information to create campaigns with similar target audiences and appropriate creative content for the advertisement using the configuration tools provided by the advertising content network, as illustrated in Figure 6B. The operator may using the lookalike information output by the tracking service(s) directly to specify a target user segment for an advert, or may refine the user segment information prior to deployment.

Purely by way of example, sample code for a redirection page is shown below incorporating a Facebook (TM) tracking pixel:

```

5 <html>
  <head>
    <style type="text/css">
      html,body{height:100%; width:100%;}
      .loading{background:transparent url('spinner.gif') no-repeat
10 center center;}
    </style>
    <!-- Facebook Pixel Code -->
    <script>
      !function(f,b,e,v,n,t,s)
      {if(f.fbq)return; n=f.fbq=function()
15 {n.callMethod?n.callMethod.apply(n,arguments):n.queue.push(argu
ments)}; if(!f._fbq)f._fbq=n; n.push=n; n.loaded=!0;
n.version='2.0'; n.queue=[]; t=b.createElement(e); t.async=!0;
t.src=v; s=b.getElementsByTagName(e)[0];
20 s.parentNode.insertBefore(t,s)}(window,document,'script','https
://connect.facebook.net/en_US/fbevents.js');
fbq('init', '1129172937194862'); // Insert your pixel ID here.
fbq('track', 'Pageview');
    </script>
    <noscript></noscript>
    <!-- DO NOT MODIFY -->
30 <!-- End Facebook Pixel Code -->
    <script>
      setTimeout(function() {
        window.location.href = "http://www.agency2.co.uk";}, 3000);
35 </script>
  </head>
  <body class="loading"/>
  </body>
  </html>
40

```

Other applications

While in the above example the described techniques are applied to tracking of advertising, embodiments of the invention are not limited to that field but can be
45 applied to any context where a content element associated with a hyperlink is dynamically embedded in web content.

For example, the technique could be applied to file download or software update services. In this scenario, a software supplier may provide to a software distribution
50 service a software download or software update link (e.g. as text or as an image) with a URL link to a download server where the software can be downloaded. The

software supplier may then use the described techniques to track software downloads, for example to obtain information on the uptake of a software update, typical hardware platforms to which software is installed, and the like.

5 In another example, the approach could be used to seed content that might be accessed by particular individuals considered a security risk (e.g. videos purporting to provide bomb-making instructions) and track user accesses to those videos to obtain information useful in law enforcement and prevention, and to target individuals with suitable educational content.

10

As a further example, a content provider such as a blogger may provide information on a particular topic (e.g. online security tips) incorporating third-party links (e.g. to YouTube videos, Wikipedia pages and the like). By substituting redirection pages for those links the content provider will be able to track accesses, understand the type of readers interested in their material and learn which linked content is accessed most often, allowing them to improve the content, and retarget the readers with updated information.

15

The described technology could also be extended to implement a reminder service.

20

For example, a content element displayed to a user may relate to an upcoming event (e.g. a movie). When the user clicks on the content element the redirection page is triggered and the user access is recorded. At the same time, the user is taken to the click-through target, e.g. a page about the event. Alternatively, the user may also be brought back to the platform/web page of the content element (e.g. advert) they

25 clicked on. The final redirection target is configurable by the user of the redirection tool. Based on the tracking information, subsequent advertisements or other messages can then be served to the user reminding them about the event.

30

In another example, the described redirection technology can also be extended to implement a service for automatically adding a product to a shopping cart at an online retailer or other e-commerce platform. As a concrete example, integration of the redirect function with the Amazon retail platform is described, in the form of an Amazon "Add To Cart" service, though it will be understood that the approach could be applied to any suitable e-commerce platform.

35

In this case, the tool integrates with Amazon by using an Amazon URL which specifies the marketplace and product code for a product to be added. The difference

between an Amazon "Add To Cart" URL and a regular redirection URL (i.e. the URL created by the redirection tool that points to the redirection page and is associated with the click-through content element, e.g. an advertisement) is that additional information is encoded to identify the product to be added.

5

Specifically, using the redirection tool, in this embodiment, the user enters the Amazon marketplace that the link will drive to e.g. amazon.co.uk, amazon.de, etc. The user also enters one or multiple ASIN numbers (Amazon Standard Identification Number). The ASIN is a product identifier used to select which product will be added to the user's cart.

10

Once entered, the redirection tool embeds this information in a redirect URL to form an Amazon Add To Cart URL.

15 When a user clicks an Add To Cart URL, the following takes place:

- The redirect page fires as previously described
- After the redirect page is loaded, the tracking pixels fire as previously described – to capture insights on the clicking audience
- The redirection URL fires.
- Through the redirection, the user is brought to the destination URL, which in this case is the Amazon Add To Cart page for the appropriate marketplace, with the product identified in the advertisement the user clicked on pre-populated in their Amazon shopping cart. The identity of the user can be obtained by Amazon directly from its own cookie on the user's client device (assuming the user is logged in to Amazon) or alternatively the product could be added to a (temporary) guest user cart and a login prompt can be provided, with the product transferred to the user's cart upon login.

20

25

The method could be extended to trigger automatic placement of an order instead of merely adding to an e-commerce cart.

30

In the case of other e-commerce platforms, the formatting of the redirect URL, and the specific parameters (e.g. product code etc.) embedded in it would be adapted to the relevant platform but the fundamental redirect function would work in the same way.

35

System architecture

Figure 7 illustrates an example hardware/software architecture of the management device 202, which may operate as a web server providing access to a web-based service including redirection tool 203 implemented in software.

The server includes one or more processors 702 together with volatile / random access memory 706 for storing temporary data and software code being executed.

A network interface 704 is provided for communication with other system components (including e.g. redirection web server 106 over one or more networks 700 (e.g. Local or Wide Area Networks, including the Internet).

Persistent storage 708 (e.g. in the form of hard disk storage, optical storage and the like) persistently stores software for performing the various functions described herein, in particular redirection tool 203. The persistent storage also includes other server software and data (not shown), such as a server operating system.

The server will include other conventional hardware and software components as known to those skilled in the art, and the components are interconnected by a data bus (this may in practice consist of several distinct buses such as a memory bus and I/O bus).

Other server devices shown in Figure 2 may similarly be implemented using conventional web server hardware/software. The user device 204 may comprise conventional client device hardware, such as a personal, laptop or tablet computer or smartphone.

While a specific architecture is described by way of example, any appropriate hardware/software architecture may be employed.

Furthermore, functional components indicated as separate may be combined and vice versa. For example, the functions of management device 202 and redirection web server 106 may be combined in a single server. As another example, the dynamic content database 206 may form part of content web server 122 or may be hosted by a separate database server. The functions of any particular depicted server or device may in practice be distributed across a number of server nodes.

It will be understood that the present invention has been described above purely by way of example, and modification of detail can be made within the scope of the invention.

CLAIMS

1. A method of tracking user interactions with a content element, wherein the content element is inserted by a content server into a web page for display to a user in a browser application and is associated with a target resource, wherein interaction by the user with the content element causes the browser to access the target resource, the method comprising:

generating a redirection page, the redirection page comprising:

redirection code adapted to redirect the browser to the target resource; and

tracking code adapted to invoke one or more tracking services for tracking access to the redirection page;

generating a link to the redirection page; and

providing the content element and the link to the redirection page to the content server, whereby the content server associates the link with the content element in the generated web page such that an interaction with the content element by the user triggers retrieval and processing of the redirection page by the browser using the link.

2. A method according to claim 1, wherein the tracking code is adapted to invoke a plurality of tracking services.

3. A method according to claim 2, wherein the tracking code comprises a plurality of code segments, each adapted to invoke a respective tracking service.

4. A method according to any of the preceding claims, wherein the tracking code for a tracking service comprises a link or request to a tracking server and/or wherein invoking a tracking service comprises initiating a request to a tracking server, preferably wherein the request is an HTTP request.

5. A method according to claim 4, wherein the link or request to the tracking server comprises a tracking identifier associated with the content element.

6. A method according to any of the preceding claims, wherein the tracking code for a tracking service comprises a link to a content item, optionally an image, stored at a tracking server, such that an attempt by the browser to retrieve the content item

based on the link causes a trackable request for the content item to the tracking server.

7. A method according to any of the preceding claims, wherein the tracking code comprises one or more tracking pixels, each associated with a respective tracking service.

8. A method according to any of the preceding claims, comprising receiving a selection of one or more tracking services and adding tracking code to the redirection page for the selected one or more tracking services.

9. A method according to any of the preceding claims, wherein the redirection code comprises a redirection link to the target resource, the redirection code adapted to cause the browser to load the target resource as specified by the redirection link.

10. A method according to claim 9, wherein the target resource is a second web page, optionally hosted at a second web server different from the content server.

11. A method according to any of the preceding claims, wherein one or more of: the link to the redirection page, the redirection link to the target resource, and the links to tracking servers, comprise hyperlinks, preferably a Uniform Resource Locators (URLs).

12. A method according to any of the preceding claims, wherein the link to the redirection page comprises an identifier of the content element, optionally wherein the identifier is encoded as a URL parameter.

13. A method according to claim 12, comprising receiving one or more attributes or tags to be associated with the content element, wherein generating the link to the redirection page comprises encoding the attribute or tags as URL parameters.

14. A method according to any of the preceding claims, wherein the target resource is associated with an e-commerce platform, the redirection code comprising a redirection link including a product identifier identifying a product available at the e-commerce platform, preferably wherein the resource comprises a page or function for purchasing the product and/or adding the product to an e-commerce shopping cart, the e-commerce platform preferably adding the identified product to a cart associated

with a user in response to receiving a request for the target resource using the redirection link.

15. A method according to any of the preceding claims, wherein the user interaction comprises the user activating the link associated with the content element, optionally by clicking on the content element.

16. A method according to any of the preceding claims, wherein generating the web page by the content server comprises adding the link to the redirection page as a click target for the content element.

17. A method according to any of the preceding claim, wherein the or each tracking service is arranged, in response to the tracking service being invoked by the browser, to track the access to the redirection page.

18. A method according to claim 17, wherein tracking the access to the redirection page by a tracking service comprises reading user information from a cookie stored at the browser and recording tracking data based on the user information.

19. A method according to claim 18, comprising associating tracking data with the content element based on a tracking identifier in the request to the tracking server.

20. A method according to any of the preceding claims, further comprising receiving tracking data from one or more of the tracking services relating to access by multiple users to the redirection page.

21. A method of tracking accesses to a content element served by a content server, comprising:

 associating the content element at the content server with a link to a redirection page, the redirection page comprising tracking code for invoking a plurality of tracking services and redirection code for redirecting a browser displaying the redirection page to a target resource;

 inserting the content element by the content server into web pages served by the content server such that a selection of the content element by a user triggers retrieval of the redirection page specified by the link at the browser; and

receiving tracking data from the plurality of tracking services relating to accesses by multiple users to the redirection page.

22. A method according to claim 20 or 21, wherein the tracking data comprises user segment data defining characteristics of a group of users, the characteristics determined by a tracking service based on tracked user interactions by multiple individual users with the redirection page.

23. A method according to claim 22, wherein the user segment data defines characteristics of a group of users determined as similar to the users having accessed the redirection page in terms of one or more comparison criteria, the comparison criteria preferably comprising demographic criteria.

24. A method according to claim 22 or 23, comprising receiving respective user segment data from a plurality of tracking services, and processing the user segment data to derive a combined user segment definition defining user characteristics based on the user segment data received from each of the plurality of tracking services.

25. A method according to any of claims 22 to 24, comprising outputting the user segment data and/or combined user segment definition, and/or configuring delivery of content by the content server in accordance with the user segment data and/or combined user segment definition.

26. A method according to any of the preceding claims, comprising recording tracking data in response to access by the browser to the redirection page.

27. A method according to claim 26, comprising computing page access statistics based on accesses to the redirection page, the page access statistics optionally computed in relation to the content element and/or in relation to one or more tags or attributes associated with the content element, the tags or attributes optionally encoded in the URL of the redirection page.

28. A method according to any of the preceding claims, wherein the content server is arranged to dynamically select the content element for insertion into web pages in response to browser requests for those web pages.

29. A method according to any of the preceding claims, wherein the content element is provided to the content server by a party having no direct control over the content server.

30. A method according to any of the preceding claims, performed at a management device or server.

31. A method of tracking user interactions with a content element, comprising:
receiving a web page for display at a browser device, the web page comprising the content element and a link to a redirection page associated with the content element,
receiving a user input for activating the link associated with the content element;
retrieving the redirection page based on the link, the redirection page comprising redirection code and tracking code;
processing the tracking code contained in the redirection page, the tracking code comprising a plurality of code segments each referencing a respective tracking service, wherein processing the tracking code comprises invoking each respective tracking service to track access to the redirection page at each tracking service; and
processing the redirection code contained in the redirection page, the redirection code including a redirection link to a target resource, wherein processing the redirection code comprises directing the browser to access the target resource based on the redirection link.

32. A method according to claim 31, wherein the user input comprises the user clicking on the content element.

33. A method according to claim 31 or 32, wherein the link comprises an identifier associated with the content element and/or one or more attributes or tags associated with the content element, optionally encoded as URL parameters.

34. A method according to any of claims 31 to 33, wherein the tracking code comprises a link or request to a tracking server for each tracking service.

35. A system comprising:
a management device adapted to perform a method as set out in any of claims 1 to 30;

a client device adapted to perform a method as set out in any of claims 31 to 34; and

a content server arranged to dynamically select the content element and insert the content element with a link to the redirection page associated with the content element into web pages in response to browser requests for those web pages.

36. A system having means, preferably in the form of a processor with associated memory, for performing a method as set out in any of claims 1 to 34.

37. A computer-readable medium having software code adapted, when executed on a data processing apparatus, to perform a method as set out in any of claims 1 to 34.

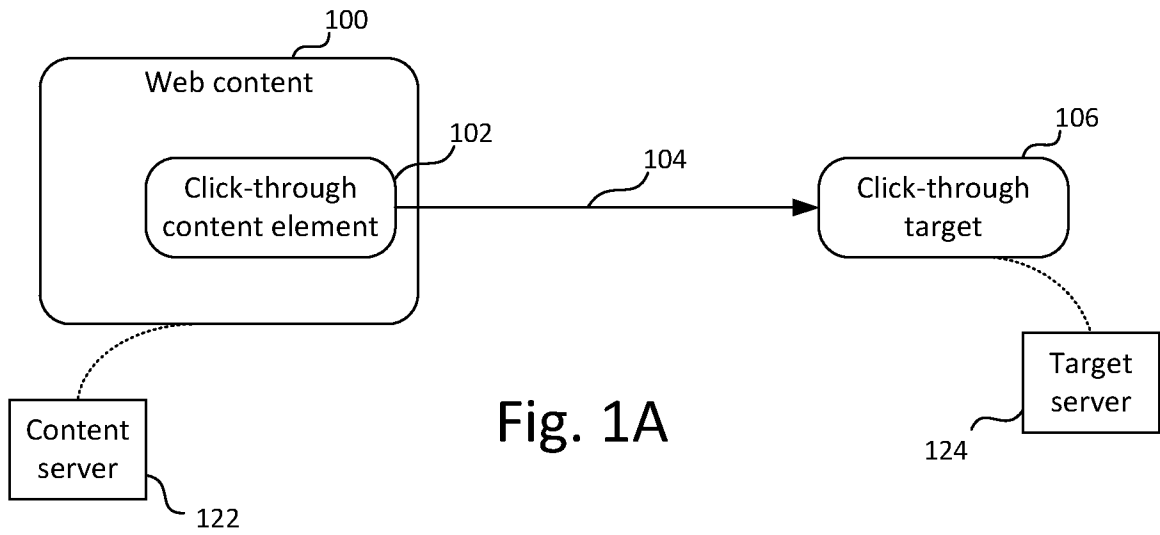


Fig. 1A

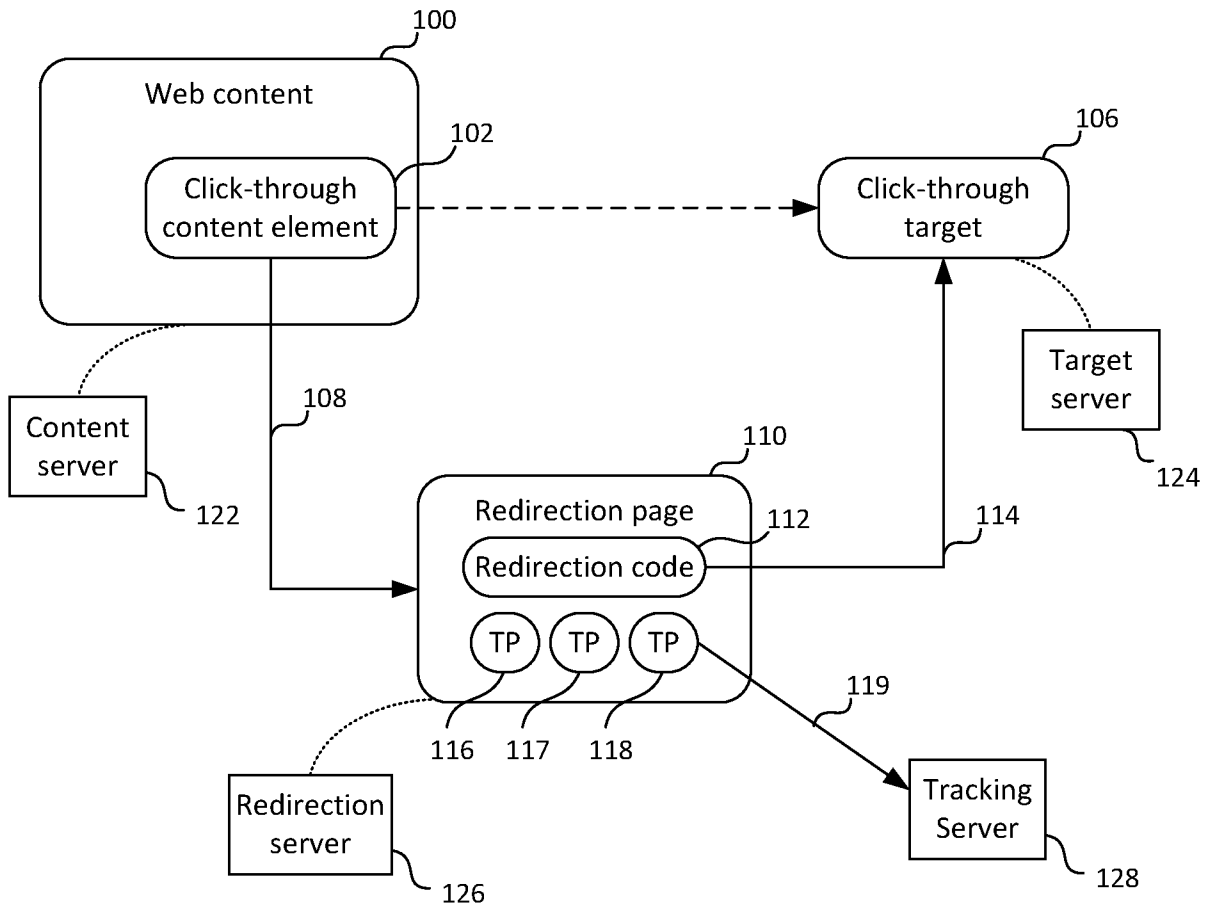


Fig. 1B

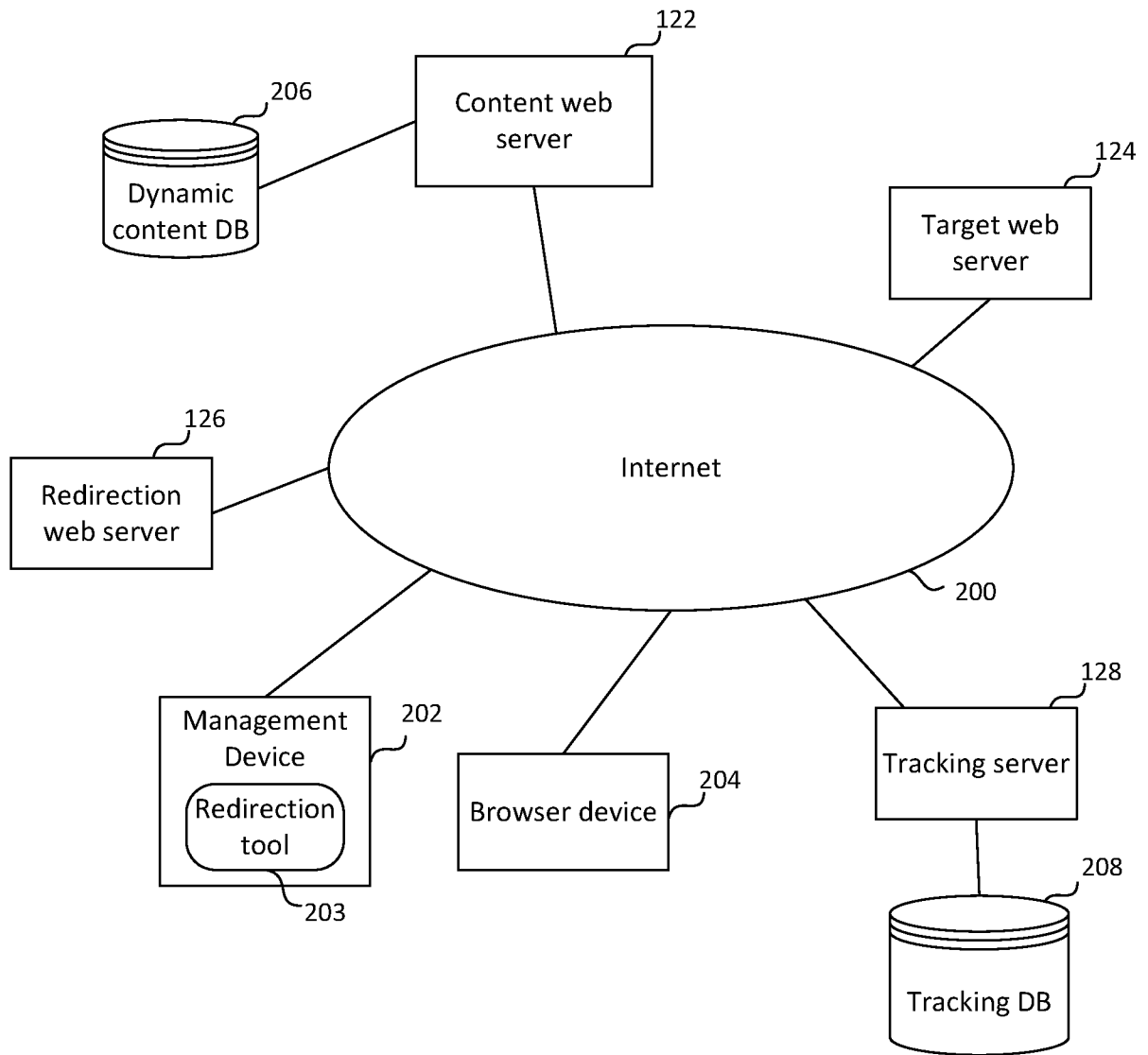


Fig. 2

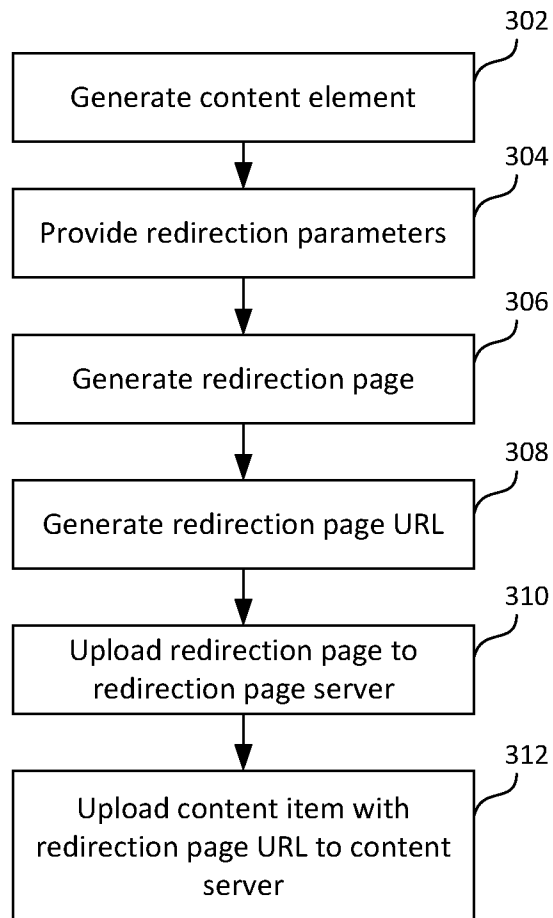


Fig. 3

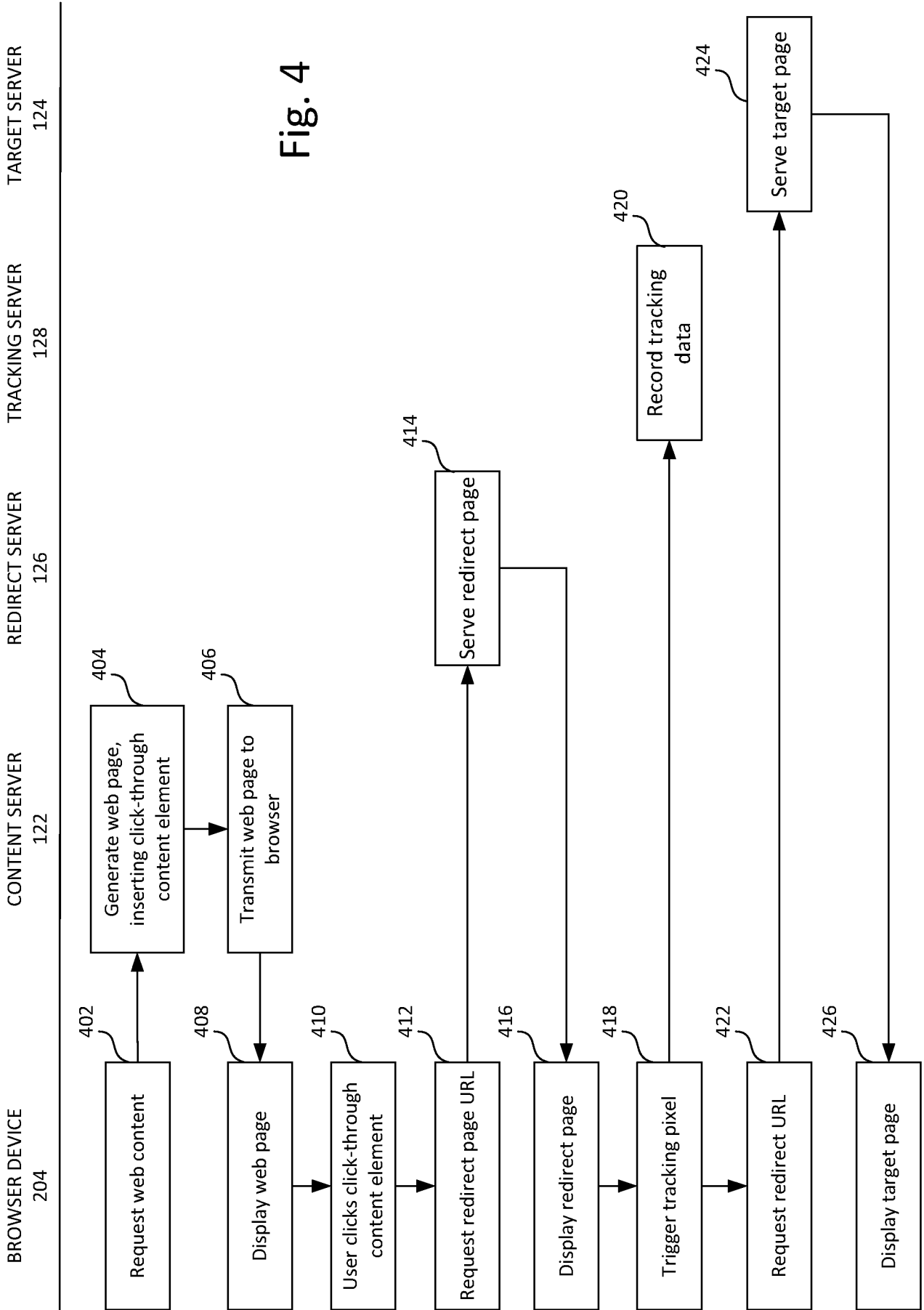


Fig. 4

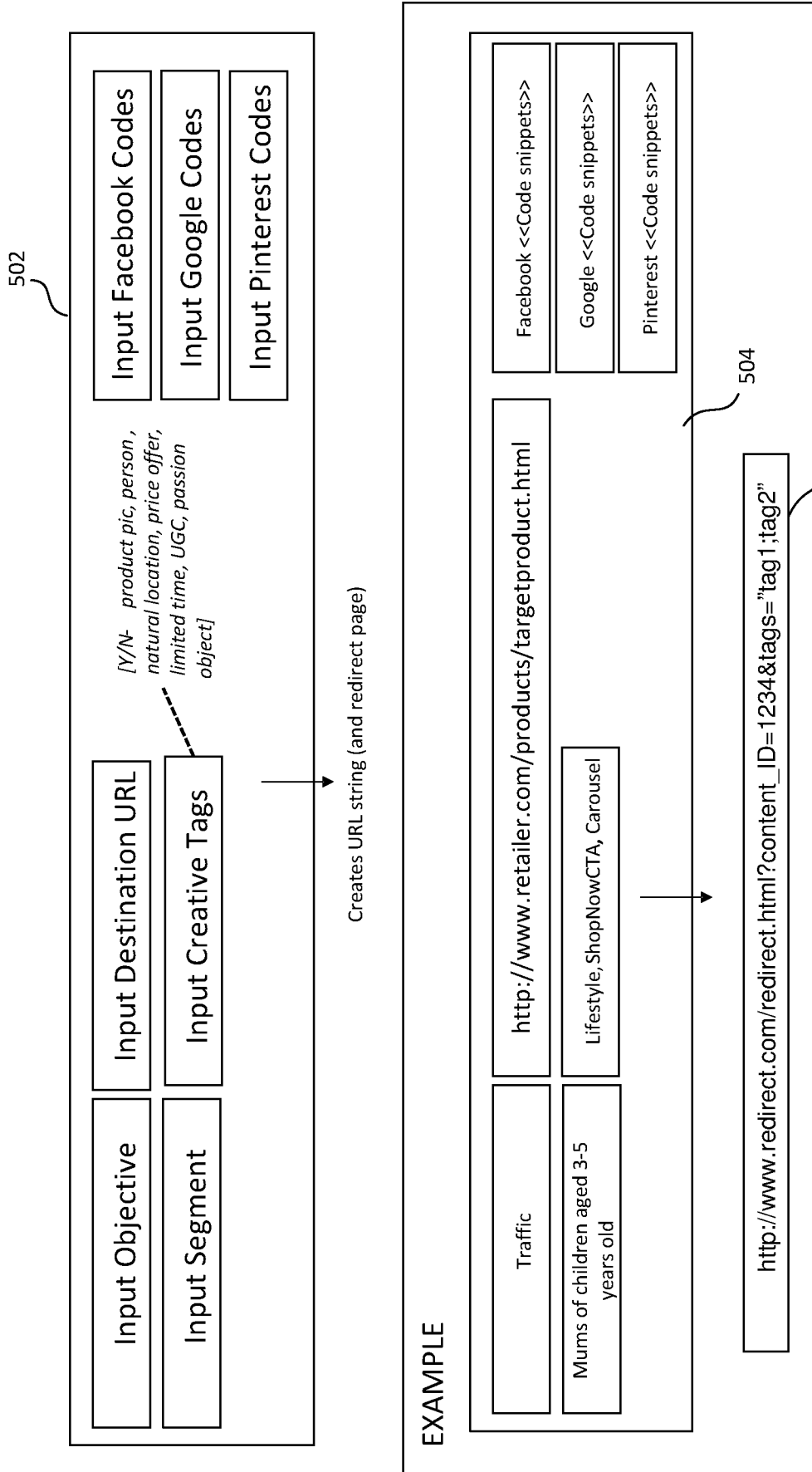


Fig. 5

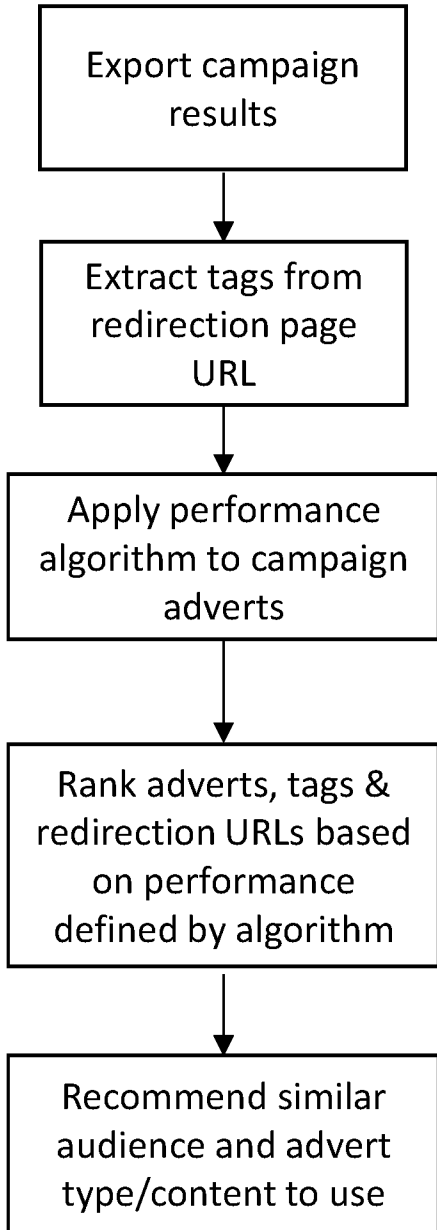


Fig. 6A

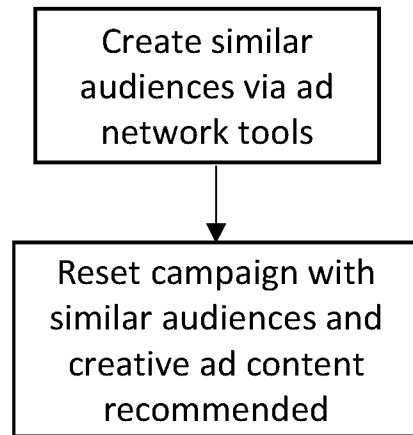


Fig. 6B

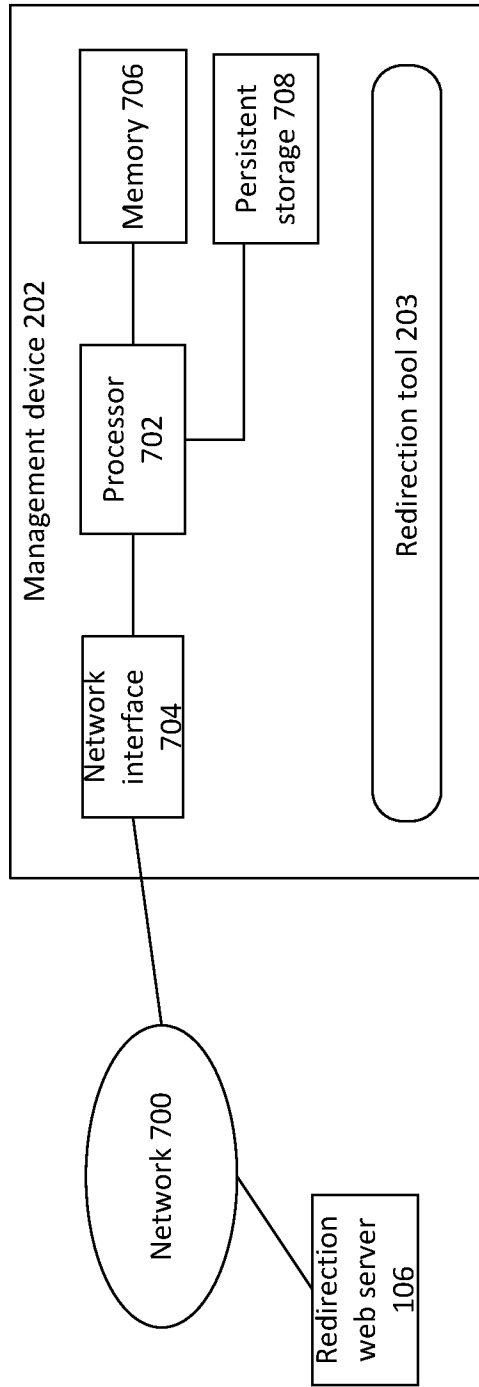


Fig. 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2018/052790

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06Q30/02 G06F17/30
ADD.
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)
G06Q 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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2015/095487 A1 (KELLY LESLIE NICHOLE ROSS [US] ET AL) 2 April 2015 (2015-04-02) figures 1,2,4,5 paragraphs [0014] - [0042] -----	1-37

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search 20 November 2018	Date of mailing of the international search report 27/11/2018
--	---

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

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2018/052790

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2015095487	A1	NONE	