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(54) **SYSTEMS, METHODS, AND MEDIA FOR MOBILE ADVERTISING CONVERSION ATTRIBUTION**

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(57) **ABSTRACT**

A method for mobile advertising conversion attribution can include receiving, for example, at a conversion tracking server, a signal from a user device indicating that a conversion tag has been received. The signal can include a segment identifier, and a user agent (UA) and/or an internet protocol (IP) address of the user device. A conversion identifier can be defined that is associated with the segment identifier, the UA, and/or the IP address. The conversion identifier can be stored in a first database along with an indication of when the conversion identifier was received. A second database can be searched for an advertisement identifier that matches the conversion identifier and was received within a predetermined period of time before the conversion identifier. If a match between the conversion identifier and an advertisement identifier is located, a signal indicating that an advertisement was converted can be sent to an advertiser.

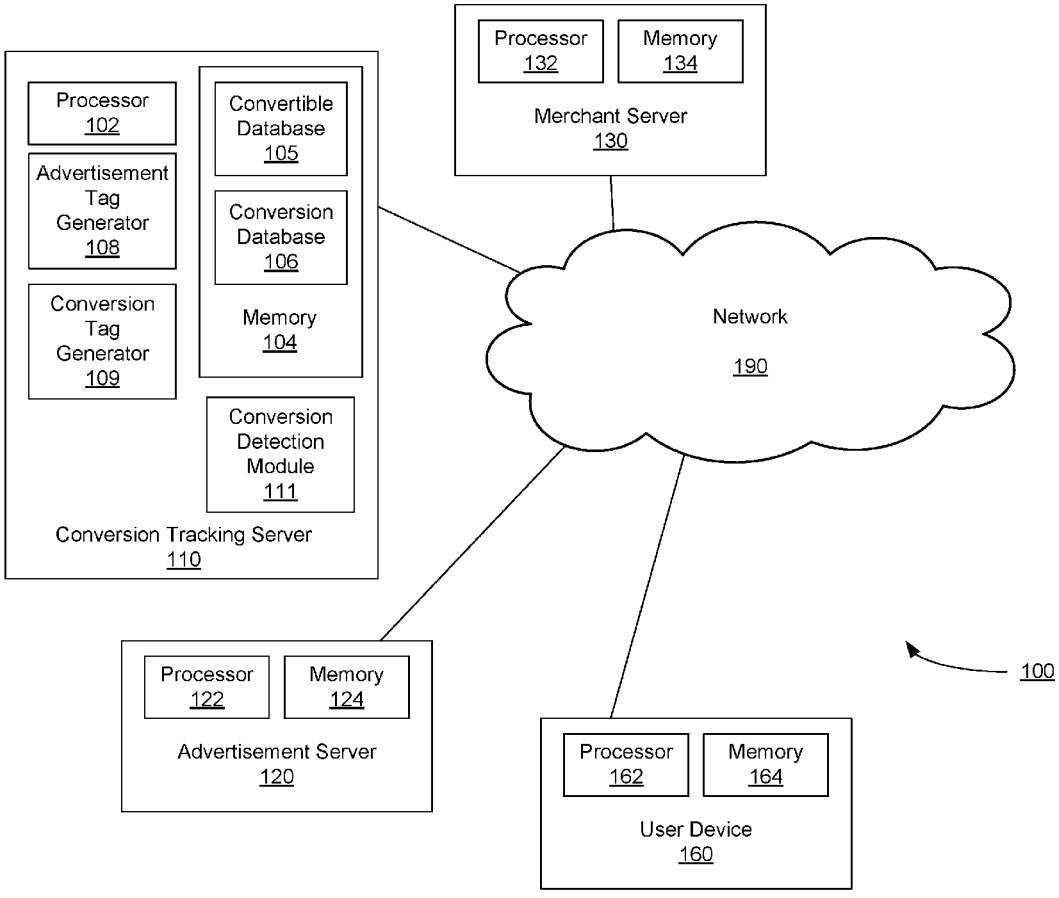
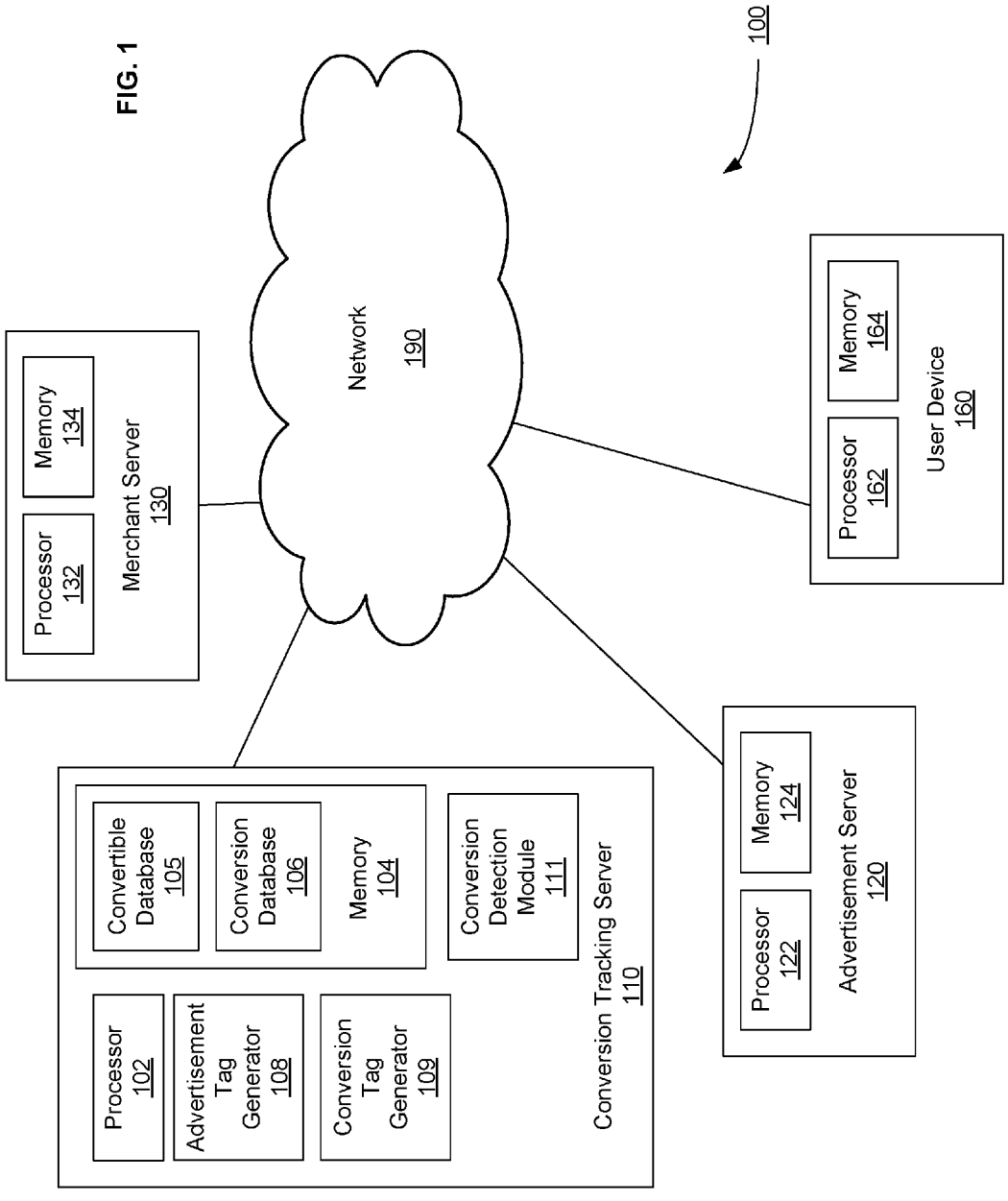


FIG. 1


100
Network
190
Merchant Server
130
Processor
132
Memory
134
User Device
160
Processor
162
Memory
164
Conversion Tracking Server
110
Processor
102
Advertisement
Tag
Generator
108
Conversion
Tag
Generator
109
Memory
104
Convertible
Database
105
Conversion
Database
106
Conversion
Detection
Module
111
Advertisement Server
120
Processor
122
Memory
124

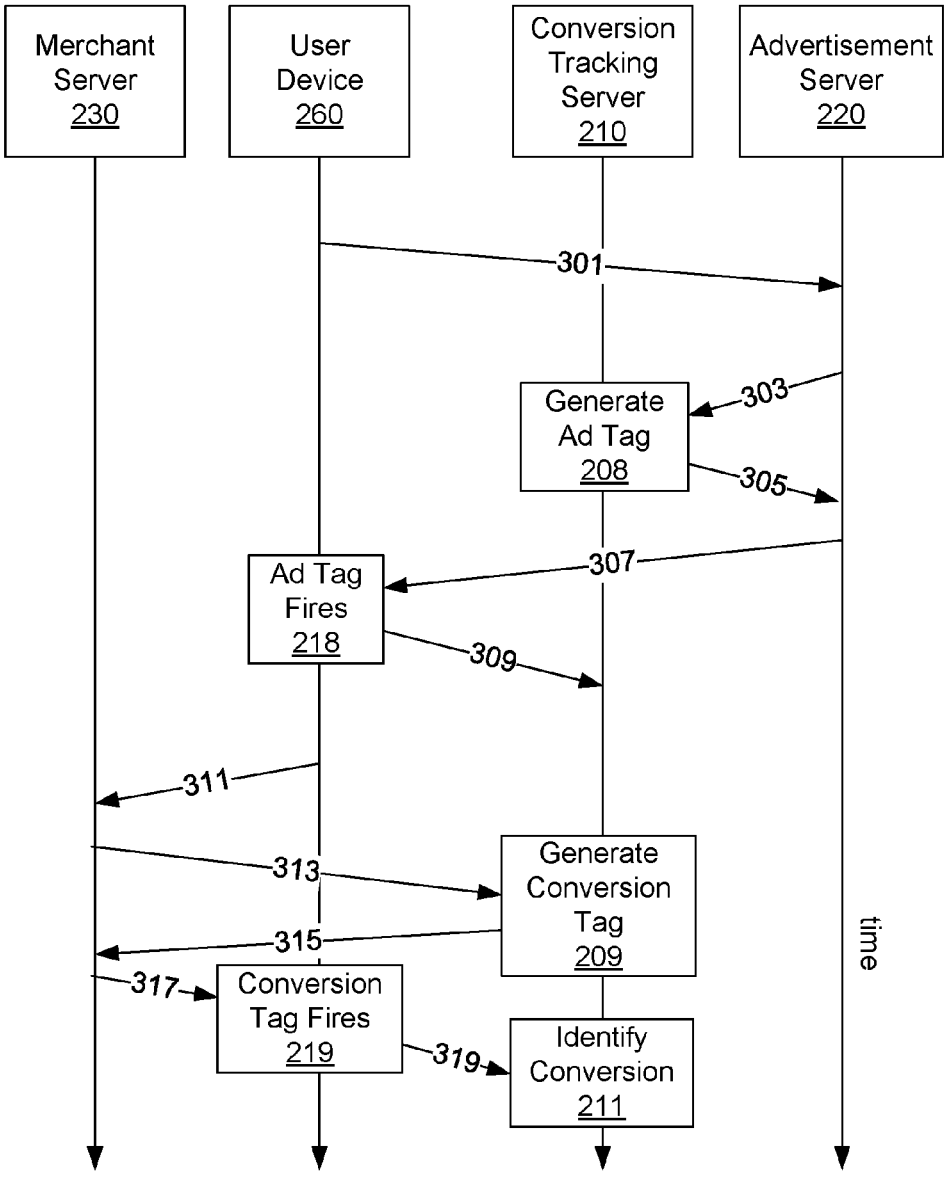

Merchant Server 230
User Device 260
Conversion Tracking Server 210
Advertisement Server 220
301
Generate Ad Tag 208
303
305
307
Ad Tag Fires 218
309
311
313
Generate Conversion Tag 209
315
317
Conversion Tag Fires 219
319
Identify Conversion 211
time

FIG. 2

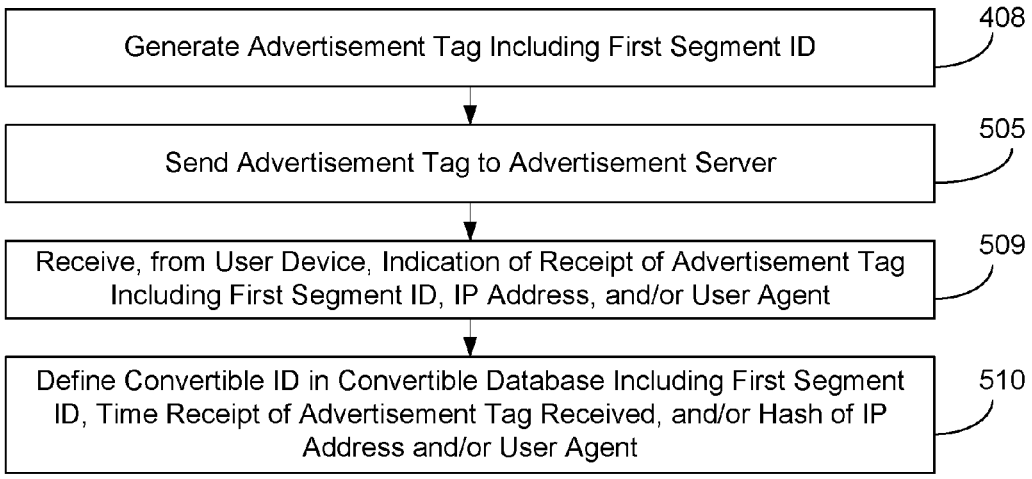

Generate Advertisement Tag Including First Segment ID
408
Send Advertisement Tag to Advertisement Server
505
Receive, from User Device, Indication of Receipt of Advertisement Tag Including First Segment ID, IP Address, and/or User Agent
509
Define Convertible ID in Convertible Database Including First Segment ID, Time Receipt of Advertisement Tag Received, and/or Hash of IP Address and/or User Agent
510

FIG. 3A

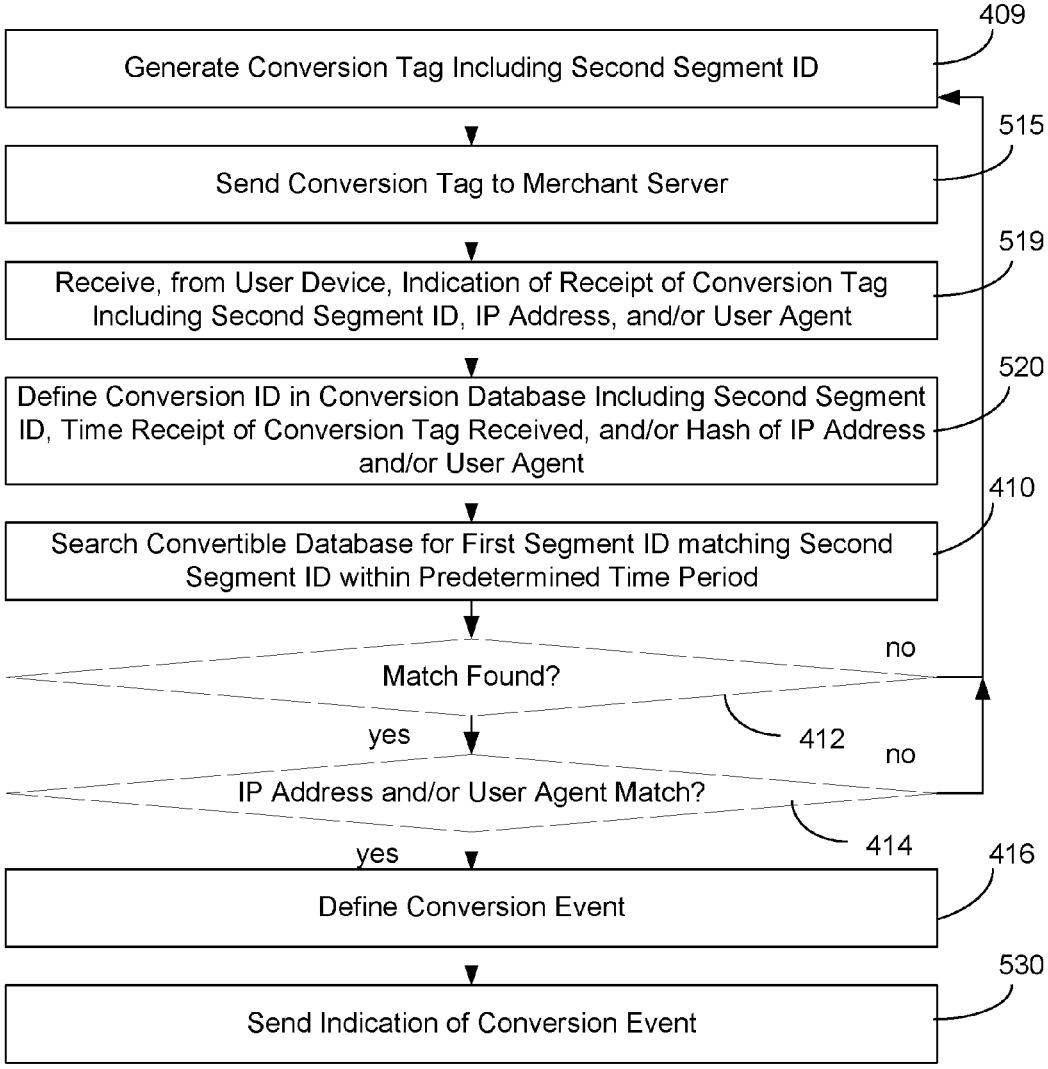

Generate Conversion Tag Including Second Segment ID
409
Send Conversion Tag to Merchant Server
515
Receive, from User Device, Indication of Receipt of Conversion Tag Including Second Segment ID, IP Address, and/or User Agent
519
Define Conversion ID in Conversion Database Including Second Segment ID, Time Receipt of Conversion Tag Received, and/or Hash of IP Address and/or User Agent
520
Search Convertible Database for First Segment ID matching Second Segment ID within Predetermined Time Period
410
Match Found?
no
412
yes
IP Address and/or User Agent Match?
no
414
yes
Define Conversion Event
416
Send Indication of Conversion Event
530

FIG. 3B

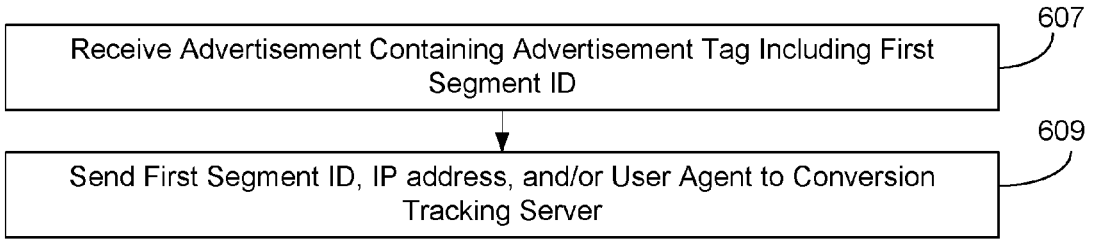

Receive Advertisement Containing Advertisement Tag Including First Segment ID
607
Send First Segment ID, IP address, and/or User Agent to Conversion Tracking Server
609

FIG. 4A

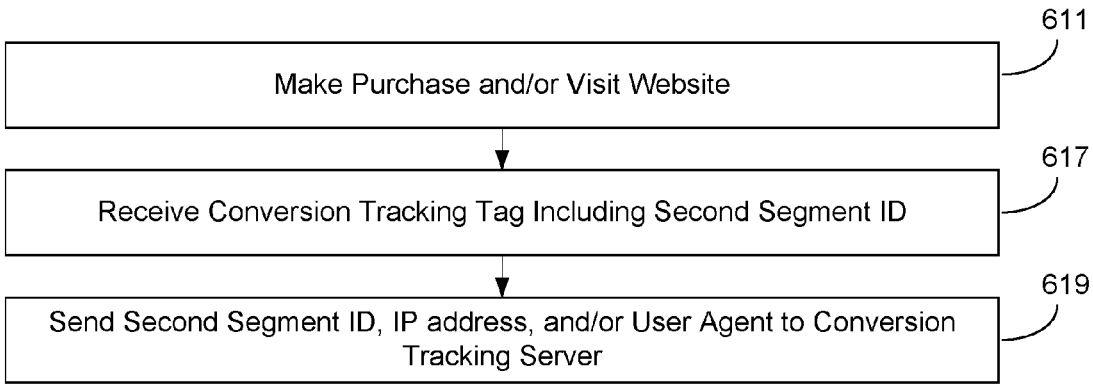

Make Purchase and/or Visit Website
611
Receive Conversion Tracking Tag Including Second Segment ID
617
Send Second Segment ID, IP address, and/or User Agent to Conversion Tracking Server
619

FIG. 4B

SYSTEMS, METHODS, AND MEDIA FOR MOBILE ADVERTISING CONVERSION ATTRIBUTION

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of and claims priority to U.S. patent application Ser. No. 14/043,610, filed Oct. 1, 2013, which is a nonprovisional of U.S. Patent Application No. 61/708,558, filed Oct. 1, 2012, each entitled "Systems, Methods, and Media for Mobile Advertising Conversion Attribution," and each of which is incorporated herein by reference its entirety.

BACKGROUND

[0002] Some embodiments described herein relate to determining whether an advertisement served to a mobile device is converted.

[0003] An advertisement is converted when a user who views the advertisement takes some action desired by the advertiser, such as, for example, purchasing a product, service, or subscription featured in the advertisement, or engaging in additional research of the product of service, such as visiting the advertisers website or any other action indicative of user engagement with the advertisement. In most cases, the purpose of an advertising campaign is to increase sales by driving consumers to the product. Hence, whether an advertisement is converted is typically a key measure of success of the advertising campaign.

[0004] Historically, evaluating the success of an advertising campaign has been extremely difficult. With the development of Internet advertising and techniques such as the tracking cookie, merchants were finally able to collect reliable metrics on an ad-by-ad basis. This influx of data allowed merchants to count each time a user interacted with their ads, and even each time a consumer made a purchase after viewing an advertisement. For the first time, merchants were able to pay only when an advertising impression was converted.

[0005] When an advertisement is viewed on a mobile device, however, conversing tracking techniques that were developed for desktop computers may not be adequate. For example, many mobile devices, such as the Apple iPhone® restrict the ability of advertisers to set cookies associated with mobile browsers. Furthermore, the cookie model, which was developed for traditional desktop web browsers, often does not translate to mobile applications, because such mobile applications may not be able to store cookies.

[0006] A need therefore exists for systems, methods, and media for mobile advertising conversion attribution.

SUMMARY

[0007] A method for mobile advertising conversion attribution can include receiving, for example, at a conversion tracking server, a signal from a user device indicating that a conversion tag has been received. The signal can include a segment identifier, and a user agent (UA) and/or an internet protocol (IP) address of the user device. A conversion identifier can be defined that is associated with the segment identifier, the UA, and/or the IP address. The conversion identifier can be stored in a first database along with an indication of when the conversion identifier was received. A second database can be searched for an advertisement identifier that matches the conversion identifier and was received within a predetermined period of time before the conversion identifier. If a match between the conversion identifier and an advertisement identifier is located, a signal indicating that an advertisement was converted can be sent to an advertiser.

BRIEF DESCRIPTION OF THE FIGURES

[0008] FIG. **1** is a schematic diagram of a system for mobile advertisement conversion attribution, according to an embodiment.

[0009] FIG. **2** is a signal diagram for mobile advertisement conversion attribution, according to an embodiment.

[0010] FIGS. **3**A and **3**B are aspects of a method for mobile advertisement conversion attribution, according to an embodiment.

[0011] FIGS. **4**A and **4**B are aspects of a method communicating with a conversion tracking server for mobile conversion attribution, according to an embodiment.

DETAILED DESCRIPTION

[0012] In some embodiments described herein, a conversion tracking server is operable to storing an association between an advertisement and a user device that receives the advertisement. For example, when an advertisement is received by the user device, the conversion tracking server can receive a segment identifier associated with the advertisement and information associated with the user device, such as a user agent string (also referred to herein as simply a "user agent" or UA) and/or an internet protocol (IP) address. The IP address can be operable to identify how and/or where the user device connects to the internet. The UA can provide information about the type of the user device, such as what operating system the device is running, what program requested the advertisement, the manufacturer of the user device, the model of the user device, and other information associated with the user device. Collectively, the IP address and the UA can semi-uniquely identify the user device.

[0013] Similarly, the conversion tracking server can be operable to store an association between a conversion event and the user device. For example, when the user device makes a purchase (or is used for any other suitable conversion action) the conversion tracking server can receive a segment identifier, the IP address, and the UA. In an instance where the segment identifier, the IP address, and the UA associated with the conversion event match the segment identifier, the IP address, and the UA associated with the advertisement, the conversion tracking server can be operable to identify an advertising conversion.

[0014] In one embodiment, a method of tracking an advertising conversion can include receiving an indication of receipt of a conversion tag by a user device. The indication of receipt of the conversion tag can include a segment identifier, a user agent string, and/or an IP address of the user device. A conversion identifier can be defined that is associated with the segment identifier, the UA, and/or the IP address. The conversion identifier can be stored in a conversion database and can be associated with an event time, which can be, for example, the time the conversion tag was received by the user device or the time the indication of receipt of the conversion tag was received. A convertible database can be searched for an advertisement identifier that is associated with an advertisement time that occurs within

a predetermined period of time before the event time. If a match is identified, it can be indicative of an advertising conversion, and a signal can be sent to an advertiser, for example, to report the successful conversion.

[0015] In another embodiment, a method of identifying an advertising conversion can include generating an advertisement tag configured to be received by a user device. An indication that the advertisement tag was received can include an IP address and/or a UA. The UA and/or the IP address can be stored in a convertible database along with an indication of when the advertisement tag was received by the user device or the when the indication of receipt of the advertisement tag was received. The method can further include receiving an indication that a conversion tag was received including the UA and/or the IP address. The UA and/or the IP address can be stored in a conversion database along with an indication of when the conversion tag was received by the user device or the when the indication of receipt of the conversion tag was received. A conversion event can be identified based on a comparison of the entry in the convertible database with the entry of the conversion database.

[0016] In yet another embodiment, a method of identifying an advertising conversion can include receiving an advertisement tag including a first segment identifier. In response to receiving the advertisement tag, the first segment identifier, a UA, and/or an IP address can be sent to a compute device. Sending the first segment identifier, the UA, and/or the IP address can cause the compute device to define an advertisement identifier associated with the first segment identifier, the user agent, and/or the IP address. A conversion tag, which can include a second segment identifier, can be received. In response to receiving the conversion tag, the second segment identifier, the UA, and/or the IP address can be sent to the compute device. Sending the second segment identifier, the UA, and/or the IP address can cause the compute device to define a conversion identifier associated with the second segment identifier, the UA, and/or the IP address. A conversion can be identified based on a match of the conversion identifier to the advertisement, causing the compute device to send a signal that the conversion occurred.

[0017] As used herein, a module can be, for example, any assembly and/or set of operatively-coupled electrical components associated with performing a specific function, and can include, for example, a memory, a processor, electrical traces, optical connectors, software (stored in memory and/or executing in hardware) and/or the like.

[0018] As used in this specification, the singular forms "a," "an" and "the" include plural referents unless the context clearly dictates otherwise. Thus, for example, the term "an optical transceiver system" is intended to mean a single optical transceiver system or multiple optical transceiver systems.

[0019] FIG. **1** is a schematic diagram of a system **100** for mobile advertisement conversion attribution, according to an embodiment. The system **100** includes a conversion tracking server **110**, an advertisement server **120**, a merchant server **130**, and a user device **160**, each communicatively coupled via a network **190**.

[0020] The user device **160** can be a mobile computing entity, such as a smartphone (e.g., an iPhone®, an Android® device, a Windows® phone, a Blackberry® phone, etc.) or a tablet computer (e.g., an Apple iPad®, a Samsung Nexus® device, a Microsoft Surface® device, etc.). The user device **160** includes a processor **162**, and a memory **164**. The processor **162** can be, for example, a general purpose processor, a Field Programmable Gate Array (FPGA), an Application Specific Integrated Circuit (ASIC), a Digital Signal Processor (DSP), and/or the like. The processor **162** can be configured to retrieve data from and/or write data to memory, e.g., the memory **164**, which can be, for example, random access memory (RAM), memory buffers, hard drives, databases, erasable programmable read only memory (EPROMs), electrically erasable programmable read only memory (EEPROMs), read only memory (ROM), flash memory, hard disks, floppy disks, cloud storage, and/or so forth.

[0021] The user device **160** can be operable to display advertising content to a user. For example, as described in further detail herein, a web browser or other application (executing on the processor **162**) can cause the user device **160** to request advertising content, for example, from the advertising server **120**. In response, the user device **160** can receive and display the advertisement.

[0022] The merchant server **130** can be a computing entity operable to store, generate and/or send advertisements to the user device **160**. The merchant server **130** includes a processor **132** and a memory **134**, which can be functionally similar to the processor **162** and the memory **164**, respectively.

[0023] The merchant server **130** can be a web host operable to store (e.g., in the memory **134**) and send web content to the user device **160**. For example, when a user directs a browser of the user device **160** to an address (e.g. a uniform resource locator (URL)) associated with the merchant server **130**, the merchant server can transmit code (e.g., hypertext markup language (HTML)) operable to cause the user device to display the web content.

[0024] The advertisement server **120** can be a computing entity operable to store, generate, and/or send advertisements to the user device **160**. The advertisement server **120** includes a processor **122** and a memory **124**, which can be functionally similar to the processor **162** and the memory **164**, respectively.

[0025] In some embodiments, the advertisement server **120** is an advertising host, operable to store advertising content (e.g., in the memory **124**) and send advertising content to the user device **160**. In other embodiments, the advertisement server is a component of an advertising exchange network (not shown in FIG. **1**) operable to match advertisers with users, for example, through real time bidding.

[0026] As described in further detail herein, the advertisement server **120** can be operable to receive an advertisement tag from the conversion tracking server **110**, embed the advertisement tag in an advertisement, and/or send the advertisement containing the advertisement tag to the user device **160**.

[0027] The conversion tracking server **110** can be a computing entity operable to associate advertising impressions with a later occurring conversion event, as described in further detail herein. The conversion server includes a processor **102**, a memory **104**, an advertisement tag generator **108**, a conversion tag generator **109**, and a conversion detection module **111**. The processor **102** and the memory **104** can be functionally similar to the processor **162** and the memory **164**, respectively.

[0028] The advertisement tag generator **108** can be a module (e.g., a hardware component and/or a module of software code stored in memory **104** and/or executed on the processor **102**) operable to identify an advertisement and/or generate an advertisement tag. In some embodiment, as described in further detail herein, the advertisement tag generator **108** can define a segment identifier associated with the advertisement. The advertisement tag can be a portion of software code that can be embedded in the advertisement and is referred to herein as an "advertisement tag" or "advertisement pixel."

[0029] The advertisement tag can be executed on the processor **162** of the user device **160** when the user device **160** receives the advertisement. The advertisement tag executing can be referred to as the advertisement tag "firing." When the advertisement tag fires, it can cause the user device **160** to send an indication of receipt of the advertisement tag to the conversion tracking server **110**. The indication of receipt can include the segment identifier, an indication of the time when the advertisement tag fired, a UA string associated with the user device **160**, and/or an IP address associated with the user device **160**. The conversion tracking server **110** can be operable to store the indication of receipt of the advertisement tag in a convertible database **105** in the memory **104**.

[0030] The conversion tag generator **109** can be a module (e.g., a hardware component or a portion of software code stored in memory **104** and/or executed on the processor **102**) operable to generate a conversion tag. The conversion tag can be associated with a conversion action, such as making a purchase, visiting a webpage (e.g., requesting a resource from the merchant server **130**), registering for a service and/or subscription, using a coupon, and/or any other suitable action that an advertiser might desire an advertising impression to result in. The conversion tag can otherwise be functionally similar to the advertisement tag. For example, the conversion tag generator **109** can be operable to generate a portion of software code that can be embedded in a webpage, such as a confirmation webpage that is transmitted from the merchant server **130** to the user device **160** after the user device **160** completes a purchase. Such a portion of code is referred to herein as a "conversion tag" or "conversion pixel."

[0031] For example, as described in further detail herein, the conversion tag, when received by the user device **160**, can be executed ("fire") (on the processor **162**) to cause the user device **160** to send an indication of receipt of the conversion tag to the conversion tracking server **110**. The indication of receipt of the conversion tag can include the segment identifier, the time the conversion tag was received, a UA associated with the user device **160**, and/or an IP address associated with the user device **160**. The conversion tracking server **110** can be operable to store the indication of receipt of the conversion tag in a conversion database **106** in the memory **104**.

[0032] The network **190** can be the Internet, an intranet, a local area network (LAN), a wide area network (WAN), a virtual network, a telecommunications network, any other suitable communication system and/or combination of such networks. The network **190** can be implemented as a wired and/or wireless network.

[0033] FIG. **2** is a signal diagram for mobile conversion attribution, according to an embodiment. FIG. **2** illustrates communication between a conversion tracking server **210**, an advertisement server **220**, a merchant server **230**, and a user device **260**. The conversion tracking server **210**, the advertisement server **220**, the merchant server **230**, and/or the user device **260** can be structurally and/or functionally similar to the conversion tracking server **110**, the advertisement server **120**, the merchant, server **130**, and/or the user device **160**, respectively, as shown and described with reference to FIG. **1**.

[0034] The user device **260** can send a signal **301** to the advertisement server **220**. Signal **301** can be a request for advertising content. Signal **301** can be generated by the user device **260**, for example, in response to retrieving a web page from a web server (not shown) containing instructions to request advertising content from the advertisement server **220** and/or in response to an application (executing on a processor of the user device) requesting advertising content from the advertisement server **220**. The advertisement server **220**, upon receiving signal **301** can send signal **303** to the conversion tracking server **210**. Signal **303** can include a request for an advertisement tag. Signal **303** can include information about the advertisement, such as information about the advertiser, the product, the product category, and/or any other suitable information.

[0035] After receiving signal **303**, the conversion tracking server **210** can generate an advertisement tag, at **208**. Generating the advertisement tag, at **208**, can include defining a first segment identifier based, for example, on information about the advertisement contained in signal **303**. For example, in some embodiments, the first segment identifier is associated with at least one of the advertiser, the product, a product category, an advertising campaign, and/or any other suitable feature of the advertisement. As an illustration, when signal **303** contains an indication that the advertisement is for product A, the conversion tracking server **210** can generate segment identifier X, at **208**. If, on the other hand, signal **303** contains an indication that the advertisement is for product B, the conversion tracking server **210** can generate segment identifier Y, at **208**.

[0036] Generating the advertisement tag, at **208**, can further include configuring the advertisement tag to cause the user device **260** to send the first segment identifier, and/or data associated with the user device **260** to the conversion tracking server **210** (e.g., signal **309**, as described in further detail herein) upon receiving the advertisement tag. For example, the advertisement tag can be a portion of code configured to cause the user device **260** to send the first segment identifier and/or data associated with the user device **260** to the conversion tracking server **210** when the advertisement tag executes on the processor of the user device **260**.

[0037] The conversion tracking server **210** can send the advertisement tag to the advertisement server **220**, as shown as signal **305**. The advertisement server **220** can embed the advertisement tag in the advertisement. Similarly stated, the advertisement server **220** can include code generated by the conversion tracking server **210**, at **208**, with code associated with the advertisement requested in signal **301**.

[0038] The advertisement server **220** can then send, to the user device **260**, the advertisement, including the advertisement tag, as shown as signal **307**. When signal **307** is received by the user device **260**, the advertisement can be displayed and the advertisement tag can fire, at **218**. When the advertisement tag fires, at **218**, the advertisement tag can cause the user device **260** to send signal **309** to the conver-

sion tracking server **210**. Signal **309** can include the first segment identifier and/or the time the advertisement tag fired. Signal **309** can further include data associated with the user device **260**. For example, signal **309** can include data that uniquely identifies the user device **260**, such as a unique device identifier (UDID), media access control (MAC) address, electronic serial number (ESN), and/or other substantially unique and/or substantially immutable identifier. In addition or alternatively, signal **309** can include data associated with the user device **260** and that may not be unique or immutable, such as an internet protocol (IP) address, and/or UA.

[0039] Having received signal **309**, the conversion tracking server **210** can define an association between the first segment identifier (received in signal **309**) and data associated with the user device **260** (e.g., in the convertible database **105**, as described above with reference to FIG. **1**). In this way, the conversion tracking server **210** can operably define an association between the first segment identifier and the user device **260**. Because the first segment identifier can itself associated with the advertisement, the conversion tracking server **210** can thus be operable to define a record that the user device **260** received the advertisement (as shown as signal **307**).

[0040] The user device **260** can send a signal **311** to the merchant server **230**. In some embodiments, signal **311** is independent of signals **301** and/or **309**. For example, a web browser (executing on a processor of the user device **260**) can cause the user device **260** to send signal **301** requesting an advertisement during a first browsing session. After concluding the first browsing session, the user can initiate a second browsing session in which the user directs the web browser to the merchant server **230** causing the user device **260** to send signal **311**. As another example, the user can cause the user device **260** to execute a mobile application that causes the user device **260** to send signal **301** requesting advertising content. The user can later close the application, access a web browser, and direct the web browser to the merchant server **230** (signal **311**).

[0041] In some embodiments, the user device **260** may not be operable to store an HTML cookie when the advertisement is received in signal **307**. For example, if the advertisement is presented in a mobile application, cookies may not be enabled. Similarly, some mobile operating systems do not allow mobile web browsers to store cookies. Accordingly, the user device **260** may not be operable to store and/or transmit an identifier that can be used to determine if the user device **260** receives an advertisement and is later used for a conversion action.

[0042] In some embodiments, signal **311** can be associated with a conversion event. For example, signal **311** can be associated with a purchase from the merchant server **230** of a product featured in the advertisement delivered by the advertisement server **220** (signal **307**). In such an example, signal **311** can be associated with a "confirmation page" requested by the user device **260** after completion of a purchase. As another example, signal **311** can be associated with requesting the front page associated with the merchant server **230** and/or any other information from the merchant server **230**.

[0043] After receiving signal **311**, the merchant server can send signal **313** to the conversion tracking server **210**. Signal **313** can include a request for a conversion tag and information about signal **311**. For example, signal **313** can include an indication of the resource (e.g., the URL) requested by the user device **260** in signal **311**. In an instance where signal **311** is associated with the purchase of a product, signal **313** can include an indication of the purchased product. In another instance, signal **311** can include any other suitable indication of a conversion event, such as an indication that a digital coupon was used, an indication that the user device **260** was used to sign up for a subscription, etc.

[0044] The conversion tracking server **210** can receive signal **313** and can generate a conversion tag, at **209**. Generating the conversion tag, at **209**, can include defining a second segment identifier based on information received in signal **313**. For example, in some embodiments, the segment identifier is associated with at least one of the merchant, the product, or product category associated with signal **311**. As an illustration, when signal **311** is associated with the purchase of product A, the conversion tracking server **210** can generate segment identifier X, at **209**. If, on the other hand, signal **311** is associated with the purchase of product B, the conversion tracking server **210** can generate segment identifier Y, at **209**.

[0045] Thus, defining the first segment identifier, at **208**, and generating the second segment identifier, at **209**, can collectively assign the same segment identifier, for example, if signal **311** represents a purchase of the product featured in the advertisement of signal **307**. In this way, the segment identifier can be analogous to an classifier operable to identify related actions (e.g., an advertisement for merchant D is related to a visit to merchant D's website and may be assigned the same segment identifier). Furthermore, defining the first and second segment identifiers at **208** and **209**, respectively, can occur independently. Similarly stated, the conversion tracking server **210** may not require any information about the advertisement tag generated at **208**, the advertisement server **220**, or signal **301**, **303**, **305**, **307**, or **309** to generate the conversion tag, at **209**.

[0046] Generating the conversion tag, at **209**, can further include configuring the conversion tag to cause the user device **260** to send the second segment identifier and/or data associated with the user device **260** to the conversion tracking server **210** (e.g., signal **319**, as described in further detail herein) upon receiving the conversion tag. For example, the conversion tag can be a portion of software code configured to cause the user device **260** to send the second segment identifier and/or data associated with the user device **260** to the conversion tracking server **210** when the conversion tag executes on the processor of the user device **260**.

[0047] The conversion tracking server **210** can send the conversion tag to the merchant server **230**, as shown as signal **315**. The merchant server **230** can embed the conversion tag in content to be transmitted to the user device **260**. Similarly stated, the merchant server **230** can include code generated by the conversion tracking server, at **209**, with code associated with the request for content received in signal **311**.

[0048] The merchant server **230** can then send, to the user device **260**, the content requested in signal **311**, including the conversion tag, as shown as signal **317**. When signal **317** is received by the user device **260**, the content can be displayed, and the conversion tag can fire, at **219**. When the conversion tag fires, at **219**, the conversion tag can cause the user device **260** to send signal **319** to the conversion tracking

server **210**. Signal **319** can include the second segment identifier and/or the time the conversion tag fired. Signal **319** can further include data associated with the user device **260**, such as the UDID, MAC address, ESN, IP address, and/or UA string.

[0049] Having received signal **319**, the conversion tracking server **210** can define an association between the second segment identifier (received in signal **319**) and data associated with the user device **260** (e.g., in the conversion database **106**, as described above with reference to FIG. **1**). In this way, the conversion tracking server **210** can be operable define an association between the second segment identifier and the user device **210**. Because the second segment identifier can itself be associated with content requested from the merchant server **230**, the conversion tracking server **210** can thus be operable to define a record that the user device **260** received content from the merchant server **230** (as shown as signal **317**).

[0050] The conversion tracking server **210** can identify a conversion event, at **211**. As described in further detail herein, identifying a conversion event can include determining whether an advertisement tag fired (at **218**), matching the second segment identifier (received with signal **319**) to the first segment identifier (received with signal **309**), matching the device that sent signal **319** to the device that sent signal **309**, and/or determining that signal **309** was received within a predetermined period of time (e.g., within 24 hours) of signal **319**.

[0051] Although not shown in FIG. **2**, if the conversion tracking server **210** identifies a conversion at **211**, the conversion tracking server **210** can notify the advertisement server **220**, the merchant server **230**, and/or any other suitable device, for example, so that the advertiser can be properly billed for the converted advertisement. Similarly stated, the conversion tracking server **210** can generate a report that can be used to account for a successful advertising conversion.

[0052] FIGS. **3**A and **3**B are aspects of a method for mobile advertisement conversion attribution. In some embodiments, the methods illustrated in FIGS. **3**A and **3**B are executed at a conversion tracking device (e.g., the conversion tracking device **110** shown and described with reference to FIG. **1**). More particularly, the method can be implemented as code stored within a memory (e.g., the memory **104**) of the conversion tracking device and executed on a processor (e.g., the processor **102**).

[0053] FIG. **3**A depicts aspects of mobile conversion attribution associated with an advertisement tag. At **408**, the method can include generating an advertisement tag, which can include a first segment identifier. Generating the advertisement tag, at **408** can be similar to generating the advertisement tag, at **208**, as shown and described above with reference to FIG. **2**. The advertisement tag can be sent to an advertisement server, at **505**, which can be similar to signal **305** sent to advertising server **220**.

[0054] At **509**, an indication of receipt of the advertisement tag can be received, for example, from a user device (e.g., the user device **260**). The indication of receipt received, at **509** can be similar to signal **309**. For example, the indication of receipt received, at **509** can include the first segment identifier, an indication of the time the advertisement tag fired, an IP address and/or a UA associated with a user device. In response to receiving the indication of receipt of the advertisement tag at **509**, an entry can be made into a database (e.g., the convertible database **105**), at **510**. The database entry is referred to herein as a "convertible identifier," and can include and/or associate the first segment identifier with the time the advertisement tag fired, the time the indication of receipt of the advertisement tag was received at **509**, the IP address, and/or the UA.

[0055] In some embodiments, the IP address and/or the UA can be hashed (collectively or individually) using, for example, a one-way irreversible hash function before the convertible identifier is defined. In this way, the convertible database does not include sensitive personal data, such as an IP address. In other embodiments, the IP addresses and/or UA may not be hashed.

[0056] Thus, the convertible identifier can be a database entry and/or an association between the first segment identifier, the time of firing of the advertisement tag, and an indication (e.g., IP address and/or UA) associated with the user device. In other embodiments, any other suitable data or metadata that can uniquely or semi-uniquely identify the user device can be stored in the convertible database instead of or in addition to the IP address and/or UA.

[0057] FIG. **3**B depicts aspects of mobile conversion attribution associated with a conversion tag. At **409**, the method can include generating a conversion tag, which can include a second segment identifier. Generating the conversion tag, at **409** can be similar to generating the conversion tag, at **209**, as shown and described above with reference to FIG. **2**. The conversion tag can be sent to an merchant server, at **515**, which can be similar to signal **315** sent to merchant server **230**.

[0058] At **519**, an indication of receipt of the conversion tag can be received, for example, from a user device (e.g., the user device **260**). The indication of receipt received, at **519** can be similar to signal **319**. For example, the indication of receipt received, at **519** can include the second segment identifier, the time the advertisement tag fired, the time the indication of receipt of the conversion tag was received at **519**, an IP address and/or a UA associated with a user device. The combination of the IP address and the UA can define a semi-unique identifier for the device. Similarly stated, if two signals are received identifying the same IP address and UA (e.g., at **509** and **519**), it can be concluded with a high degree of confidence that those signals were sent from the same device. For example, the degree of confidence can be sufficient for purposes of mobile advertisement conversion attribution.

[0059] In response to receiving the indication of receipt of the conversion tag, at **519**, an entry can be made into a database (e.g., the conversion database **106**), at **520**. The database entry is referred to herein as a "conversion identifier," and can include and/or associate the second segment identifier with the time the conversion tag fired, the time the indication of receipt of the conversion tag was received, at **519**, the IP address and/or the UA. As described above with reference to defining the convertible identifier at **510**, in some embodiments, the IP address and/or the UA address can be hashed before the conversion identifier defined, at **520**. Thus, the conversion identifier can be a database entry and/or an association between the first segment identifier, the time of firing of the advertisement tag, and a semi-unique identifier of the user device.

[0060] The conversion identifier can be compared to entries within the convertible database to determine whether a conversion occurred. For example, at **410**, the convertible

database can be searched to determine whether a convertible identifier includes the second segment identifier. For example, a determination can be made, at **410**, as to whether the first segment identifier, defined at **408**, is the same as the second segment identifier defined at **409**. As described above with reference to FIGS. **2** and **209**, if a segment identifier associated with the convertible identifier is the same as a segment identifier associated with a conversion identifier, this indicates the conversion identifier and the convertible identifier are associated with, for example, the same product, same merchant, same advertiser, same product category, and/or any other relationship that can be indicative of a conversion action.

[0061] In some embodiments, the convertible database can be searched, at **410**, only for convertible identifiers that have a time stamp (e.g., associated with an advertisement tag firing) within a predetermined period of the time received, at **519**. For example, an advertiser interested in determining whether an advertisement results in a purchase may only be interested in purchases made within 24 hours of the user viewing an advertisement. Accordingly, in some embodiments, the convertible database is searched, at **410**, only for convertible identifiers having a time stamp less than 24 hours before the indication of time received at **519**. In other embodiments, the predetermined period of time can be any suitable period of time, such as, for example 5 minutes, 1 hour, 12 hours, 48 hours, 1 week, etc.

[0062] At **412**, the method can determine whether a convertible identifier matches the second segment identifier. If no match is found at **412**, the method can restart and a new conversion tag can be generated, at **409**, for example, when a merchant server requests a conversion tag. If, however, a match between the conversion identifier defined at **520** and a convertible identifier is identified, at **412**, the method can determine whether the semi-unique device identifier of the conversion identifier matches the semi-unique device identifier of the convertible identifier, at **414**. For example, the method can include determining whether the IP address, the UA, and/or a hash of the IP address and/or the UA of the conversion identifier matches a similar identifier of the convertible identifier. If no match is found at **414**, the method can restart and return to **409**. If, however, a match is identified, at **414**, the method can define a conversion event, at **416**. Similarly stated, if the segment identifier and semi-unique device identifier of the conversion identifier matches a segment identifier and semi-unique device identifier of a convertible identifier, this can be an indication that the user of the device has engaged in a conversion action such as purchasing a product featured in an advertisement.

[0063] An indication of the conversion can then be sent, at **530**, to, for example, an advertiser, which can, for example, allow advertiser can properly bill the merchant for an advertisement that drove a sale, provide statistics regarding advertisement success to the advertiser, the merchant, and/or any other suitable party.

[0064] FIGS. **4**A and **4**B are aspects of a method for communicating with a conversion tracking server for mobile conversion attribution, according to an embodiment. In some embodiments, the methods illustrated in FIGS. **4**A and **4**B are executed at a user device (e.g., the user device **160** shown and described with reference to FIG. **1**) More particularly, the method can be implemented as code stored within a memory (e.g., the memory **164**) of the user device and executed on a processor (e.g., the processor **162**).

[0065] FIG. **4**A depicts aspects of mobile conversion attribution associated with an advertisement tag. At **607**, an advertisement containing an advertisement tag can be received, which can be similar to the user device **260** receiving signal **307**. The advertisement tag can include a first segment identifier. When the advertisement is received, the advertisement tag can fire (e.g., automatically execute on the processor of the user device), for example as described in reference to **218** of FIG. **2**, causing the user device to send a signal, at **609**, containing the first segment identifier, the time the advertisement tag fired, and/or information about the user device, such as the IP address and/or UA. The signal sent, at **609**, can be similar to signal **309**, and can be sent to a conversion tracking server. As described above with reference to FIGS. **2** and **3**A, the conversion tracking server can be operable to define a convertible identifier in response to receiving the signal sent, at **609**.

[0066] FIG. **4**B depicts aspects of mobile conversion attribution associated with a conversion tag. At **611**, a purchase can be made and/or a website can be visited. For example, as described above with reference to FIG. **1**, the user device **160** can send a signal to a merchant server **130**, which can include a first segment identifier. When the conversion tag is received, the conversion tag can fire (e.g., automatically execute on the processor of the user device), for example as described in reference to **219** of FIG. **2**, causing the user device, at **619**, to send a signal containing the second segment identifier, the time the conversion tag fired, and/or information about the user device, such as the IP address and/or UA. The signal sent, at **619**, can be similar to signal **319**, and can be sent to a conversion tracking server. As described above with reference to FIGS. **2** and **3**A, the conversion tracking server can be operable to define a conversion identifier in response to receiving the signal sent, at **619**. In response to sending the signal, at **619**, the conversion tracking server can be operable to identify whether a conversion occurred and/or send a signal indicating if a conversion occurred, for example to an advertiser.

[0067] While various embodiments have been described above, it should be understood that they have been presented by way of example only, and not limitation. For example, while some embodiments describe conversion attribution by detecting an advertisement tag and a conversion tag firing on a single user device, in other embodiments, cross-device conversion events can be identified. For example, if a user uses a mobile device to view an advertisement and a traditional personal computer to complete a purchase, the systems, methods, and media described herein can be used to identify the conversion by, for example, associating the mobile device with the personal computer. For example, two user devices can be associated based on usage patterns and/or geosocial networks, as described in the commonly assigned U.S. patent application Ser. No. 13/492,569, filed Jun. 8, 2012, which is incorporated herein by reference in its entirety.

[0068] As another example, some embodiments described herein refer to an internet purchase as a conversion event. In another embodiment, a user device include a coupon management application that can be operable to capture a code, such as an image of a QR code, at a physical location of a merchant. In some embodiments, the code can include a conversion tag operable to fire when the code is captured, such that a conversion that occurs at a physical location can be identified. In yet other embodiments, the conversion

event can include a pageview (e.g., associated with the merchant), a registration (e.g., of a subscription associated with the merchant and/or the product and/or service featured in the advertisement), a survey response, or any other suitable action an advertiser may desire a user to take after viewing an advertisement.

[0069] As yet another example, although some embodiments describe mobile devices, the systems, methods, and media disclosed herein can be used to identify advertising conversions for any type of device, such as such as a desktop computer, a laptop computer, a netbook, a tablet personal computer, an iPod®, an iPad®; a personal digital assistant; etc.

[0070] As another example, although some embodiments described an advertisement tag firing when an advertisement is viewed by a user device, in other embodiments, the advertisement tag can fire only when the user "clicks" or otherwise interacts with the advertisement. Furthermore, in some embodiments, both "view" events and "click" events can be tracked separately, such that a conversion tracking server can be operable to determine whether a "view" event or a "click" event was converted.

[0071] Where methods described above indicate certain events occurring in certain order, the ordering of certain events may be modified. Additionally, certain of the events may be performed repeatedly, concurrently in a parallel process when possible, as well as performed sequentially as described above. For example, although searching a convertible database for a matching segment identifier and determining whether an IP address and/or UA match are shown and described with reference to FIG. **3**B, at **410** and **414**, respectively, as occurring sequentially, in other embodiments, searching for a matching segment identifier and a matching IP address and/or UA can occur in parallel and/or in any order. Similarly, determining that an entry in a convertible database occurs within a predetermined period of time of an entry in a conversion database can occur in parallel with, or in any order with respect to identifying a matching segment identifier, UA, and/or IP address.

[0072] Although various embodiments have been described as having particular features and/or combinations of components, other embodiments are possible having a combination of any features and/or components from any of embodiments where appropriate as well as additional features and/or components. For example, although some embodiments described herein include two databases (e.g., the convertible database **105** and the conversion database **106**, as shown and described with reference to FIG. **1**), other embodiments can include only one database. For example, convertible identifiers and conversion identifiers can be stored in a single database (or any other number of databases).

[0073] Some embodiments described herein relate to computer-readable medium. A computer-readable medium (or processor-readable medium) is non-transitory in the sense that it does not include transitory propagating signals per se (e.g., a propagating electromagnetic wave carrying information on a transmission medium such as space or a cable). The media and computer code (also can be referred to as code) may be those designed and constructed for the specific purpose or purposes. Examples of non-transitory computer-readable media include, but are not limited to: magnetic storage media such as hard disks, floppy disks, and magnetic tape; optical storage media such as Compact Disc/Digital Video Discs (CD/DVDs), Compact Disc-Read Only Memories (CD-ROMs), and holographic devices; magneto-optical storage media such as optical disks; carrier wave signal processing modules; and hardware devices that are specially configured to store and execute program code, such as ASICs, PLDs, ROM and RAM devices. Other embodiments described herein relate to a computer program product, which can include, for example, the instructions and/or computer code discussed herein.

[0074] Examples of computer code include, but are not limited to, micro-code or micro-instructions, machine instructions, such as produced by a compiler, code used to produce a web service, and files containing higher-level instructions that are executed by a computer using an interpreter. For example, embodiments may be implemented using Java, C++, or other programming languages (e.g., object-oriented programming languages) and development tools. Additional examples of computer code include, but are not limited to, control signals, encrypted code, and compressed code.

1. A method, comprising:

receiving, at a first time and at a conversion tracking device, an indication of receipt of a conversion tag by a user device that includes a segment identifier and at least one of a user agent of the device or an Internet Protocol (IP) address of the user device, the indication of receipt of the conversion tag devoid of data stored by the user device in response to receiving an advertisement;

defining a conversion identifier associated with the segment identifier and at least one of the user agent or the IP address;

defining a first database entry including an association between the first time and the conversion identifier;

identifying a second database entry including an advertisement identifier that matches the conversion identifier, the second database entry associated with a second time occurring within a predetermined period of time before the first time; and

defining, at the conversion tracking device, an association between the conversion identifier and the advertisement identifier indicating that the advertisement was successfully converted.

2. The method of claim **1** further comprising reporting, to an advertiser associated with the advertisement, that the advertisement was successfully converted.

3. The method of claim **1**, wherein the segment identifier is a first segment identifier, the method further comprising:

receiving, at the second time and from the user device, an indication of receipt of an advertisement tag including a second segment identifier and at least one of the user agent or the IP address;

defining the advertisement identifier, the advertisement identifier associated with the second segment identifier and at least one of the user agent or the IP address; and

defining, in the second database, an association between the second time and the advertisement identifier.

4. The method of claim **1**, further comprising:

generating the conversion tag, the conversion tag configured to be received by the user device and to cause the user device to send the indication of receipt of the conversion tag.

5. The method of claim **1**, wherein the conversion identifier does not personally identify the user of the user device.

6. The method of claim 1, wherein the conversion identifier is not associated with a cookie.

7. The method of claim 1, wherein defining the conversion identifier includes hashing, collectively, the user agent and the IP address.

8. The method of claim 1, wherein the segment identifier is a first segment identifier, the user agent is a first user agent, and the IP address of the user device is a first IP address, and identifying the second database entry includes matching the first segment identifier, the first user agent, and the first IP address with a second segment identifier, a second user agent, and an a second IP address associated with the second database entry.

9. The method of claim 1, wherein:

the segment identifier is a first segment identifier, the user agent is a first user agent, and the IP address is a first IP address,

the conversion identifier is a first hash of at least one of the first segment identifier, the first user agent, or the first IP address,

the advertisement identifier is a second hash of at least one of a second segment identifier, a second user agent, or a second IP address, and

the identifying includes matching the first hash with the second hash.

10. The method of claim 1, wherein identifying the advertisement identifier includes matching the segment identifier with a segment identifier of the advertisement identifier.

11. A non-transitory processor readable medium storing code representing instructions to be executed by a processor, the code comprising code to cause the processor to:

receive, at a conversion tracking device, at a first time and from a user device, an indication of receipt of an advertisement tag associated with a delivery of an advertisement to the user device and that includes at least one of a user agent or an IP address;

define a database entry including at least one of the user agent or the IP address;

receive, at the conversion tracking device, at a second time after the first time and from the user device, an indication of receipt of a conversion tag that includes at least one of the user agent or the IP address, the indication of receipt of the conversion tag devoid of data stored by the user device in response to receiving the advertisement;

identify, in response to receiving the indication of receipt of the conversion tag, the database entry based, at least in part, on at least one of the user agent or the IP address; and

report that the advertisement was successfully converted to an advertiser based on the database entry being identified in response to receiving the indication of receipt of the conversion tracking tag.

12. The non-transitory processor readable medium of claim 11, the code further comprising code to cause the processor to define the advertisement tag.

13. The non-transitory processor readable medium of claim 11, the code further comprising code to cause the processor to define the conversion tag.

14. The non-transitory processor readable medium of claim 11, wherein:

the indication of receipt of the advertisement tag includes a segment identifier;

the database entry includes an indication of the segment identifier;

the indication of receipt of the conversion tag includes the segment identifier; and

the database entry is identified based, at least in part on the segment identifier.

15. The non-transitory processor readable medium of claim 11, wherein the database entry is identified based, at least in part, on the first time occurring within a predetermined period of time before the second time.

16. The non-transitory processor readable medium of claim 11, wherein the indication of receipt of the conversion tag does not include cookie data.

17. A non-transitory processor-readable medium storing code representing instructions to be executed by a processor, the code comprising code to cause the processor to:

receive an advertisement tag associated with a delivery of an advertisement;

send, to the compute device at a first time, an indication of receipt of the advertisement tag that includes at least one of a user agent or an IP address such that the compute device defines an advertisement identifier associated with the first time and at least one of the user agent or the IP address;

receive a conversion tag associated with an occurrence of a conversion event associated with the advertisement; and

send, to the compute device at a second time after the first time and in response to receiving the conversion tag, an indication of receipt of the conversion tag that includes at least one of the user agent or the IP address and is devoid of data stored by the processor in response to receiving the advertisement tag, the indication of receipt of the conversion tag sent such that the compute device (1) defines a conversion identifier associated with the second time and at least one of the user agent or the IP address, and (2) identifies the conversion event based on a match of the conversion identifier to the advertisement identifier.

18. The non-transitory processor readable medium of claim 17, the code further comprising code to cause the processor to refuse to store data in response to receiving the advertisement tag.

19. The non-transitory processor readable medium of claim 17, wherein:

the indication of receipt of the advertisement tag includes a segment identifier such that the advertisement identifier is associated with the segment identifier;

the conversion tag includes the segment identifier; and

the indication of receipt of the conversion tag includes the segment identifier, such that the conversion identifier is associated with the segment identifier.

20. The non-transitory processor readable medium of claim 17, wherein the indication of receipt of the conversion tag does not include cookie data.

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