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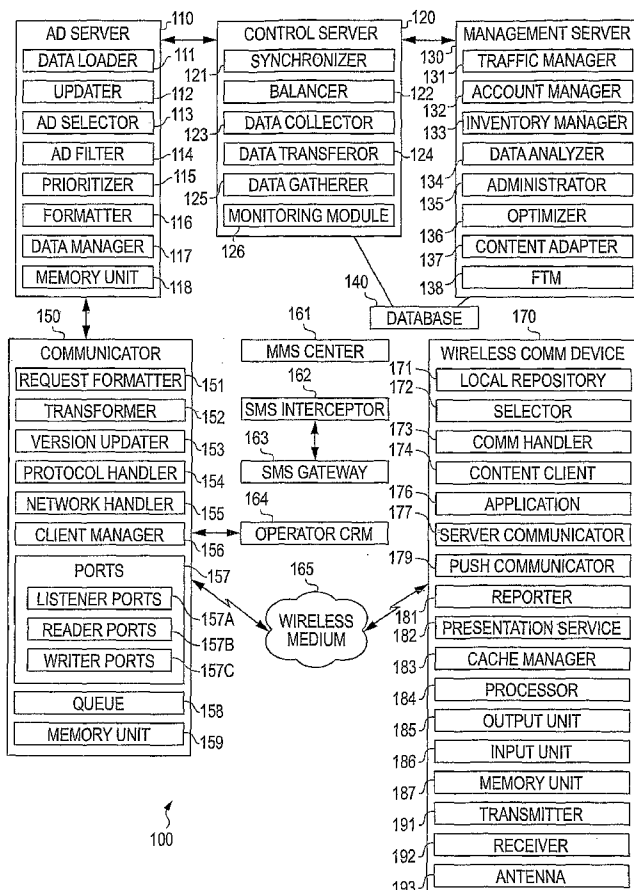
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(54) Title: DEVICE, SYSTEM AND METHOD OF WIRELESS CONTENT DELIVERY



(57) Abstract: Some embodiments of the invention provide devices, systems and methods of content delivery. For example, a system in accordance with an embodiment of the invention includes a server to receive an application-initiated content request from a wireless communication device, and to selectively serve to said wireless communication device a content item based on data included in the application-initiated content request, wherein said application-initiated content request comprises data identifying at least a manufacturer of said wireless communication device and a model of said wireless communication device.

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DEVICE, SYSTEM AND METHOD OF WIRELESS CONTENT DELIVERY**BACKGROUND OF THE INVENTION**

5 [001] In the field of wireless communications, a wireless communication system may allow a wireless communication device to download and use games and applications, to transmit and receive a Short Message Service (SMS) item or a Multimedia Messaging Service (MMS) item, or the like.

10 [002] Unfortunately, such operations, in which content is downloaded to or uploaded from the wireless device, may consume system resources and bandwidth resources, and may require a user to pay a fee to cover the cost of using such resources.

SUMMARY OF THE INVENTION

15 [003] Some embodiments of the invention include devices, systems and methods of wireless content delivery.

[004] Some embodiments may provide, for example, contextual placement of content, e.g., advertisements or banners, within an application executed by a cellular phone, a mobile phone, or other wireless communication device.

20 [005] In some embodiments, previously-prepared applications, e.g., utilities or games for mobile phones, may be configured or adapted to include or embed a content client, e.g., using a Software Development Kit (SDK). The content client may periodically connect to a content server or ad server and request content. The ad server may selectively serve content items to the content client, based on parameters related to the mobile phone, e.g., manufacturer identifier, model identifier, available memory, presentation capabilities, or the like, and/or based on parameters related to a user of the mobile phone, e.g., age, age group, gender, marital status, profession, occupation, geographical location, proximity to geographical places, or the like.

25 [006] In some embodiments, the ad server or other operatively associated servers may perform ad targeting, for example, to target or tailor an appropriate content item based on such parameters. In one embodiment, the ad server or other operatively associated servers may perform ad targeting based on Customer Relationship Management (CRM) data about the user, based on various information or personal information collected or otherwise obtained about a user, based on information that the user provided (e.g., using a form, a website, an opt-in service, or the like), based on a usage analysis of the mobile phone by the user,

based on a contextual analysis of messages sent and/or received by the mobile phone, or the like.

[007] In some embodiments, the mobile phones may periodically report to the ad server, or to other operatively associated servers, information related to past presentation of content items by the mobile phone, e.g., since the last reporting and/or since the last request for content items.

[008] In some embodiments, for example, a system may include a server to receive an application-initiated content request from a wireless communication device, and to selectively serve to the wireless communication device a content item based on data included in the application-initiated content request, wherein the application-initiated content request may include data identifying at least a manufacturer of the wireless communication device and a model of the wireless communication device.

[009] In some embodiments, for example, the application-initiated content request may include a data item selected from a group consisting of: a data item representing an available memory of the wireless communication device, a data item representing an audio capability of the wireless communication device, a data item representing a video capability of the wireless communication device, a data item representing a screen size of the wireless communication device, a data item representing a content item type that the wireless communication device is able to present, and a data item representing a location of the wireless communication device.

[0010] In some embodiments, for example, the server may selectively serve the content item based on a personal data item representing a property of a user of said wireless communication device. In some embodiments, for example, the personal data item may be selected from a group consisting of: a data item representing an age of the user, a data item representing an age group of the user, a data item representing a gender of the user, a data item representing an occupation of the user, a data item representing a profession of the user, and a data item representing usage pattern associated with the user.

[0011] In some embodiments, for example, the server may include a memory unit to store a plurality of content items from which the content item is selected.

[0012] In some embodiments, for example, the memory unit may include a volatile memory or a non-volatile memory.

[0013] In some embodiments, for example, the server is to periodically copy the content of the volatile memory into a non-volatile memory.

[0014] In some embodiments, for example, the plurality of content items may include at least a first version of the content item adapted for presentation using a first type of wireless communication device, and a second version of the content item adapted for presentation using a second type of wireless communication device.

5 [0015] In some embodiments, for example, the server is operatively associated with a communicator able to receive a plurality of substantially concurrent content requests and to store the plurality of content requests in a queue.

[0016] In some embodiments, for example, the system may include a first listener port to detect a first incoming content request, and a second listener port to substantially
10 simultaneously detect a second, substantially concurrent, incoming content request.

[0017] In some embodiments, for example, the system may include a first reader port to read the first incoming content request, and a second reader port to substantially simultaneously read the second, substantially concurrent, incoming content request.

[0018] In some embodiments, for example, the server is able to execute substantially
15 simultaneously a first thread to process the first incoming content request and a second thread to process the second incoming content request.

[0019] In some embodiments, for example, the system may include a first writer port to transmit a first content item in response to the first incoming content request, and a second
20 writer port to substantially simultaneously transmit a second content item in response to the second incoming content request.

[0020] In some embodiments, for example, the wireless communication device may include: a receiver to receive the content item; and a selector to selectively present the content item if a pre-defined condition is met.

[0021] In some embodiments, for example, the server is to serve the content item if a number
25 of previously-served content items is smaller than a pre-defined quota.

[0022] In some embodiments, for example, the server may include: a plurality of serving platforms; and a balancer to distribute a quota of servings of the content item among the plurality of serving platforms.

[0023] In some embodiments, for example, the server may include a content adapter to
30 receive a first version of the content item and to generate a second, different, version of the content item.

[0024] In some embodiments, for example, a method may include receiving an application-initiated content request from a wireless communication device; and selectively serving to the wireless communication device a content item based on data included in the application-

initiated content request, wherein the application-initiated content request may include data identifying at least a manufacturer of the wireless communication device and a model of the wireless communication device.

5 [0025] In some embodiments, for example, the application-initiated content request may include a data item selected from a group consisting of: a data item representing an available memory of the wireless communication device, a data item representing an audio capability of the wireless communication device, a data item representing a video capability of the wireless communication device, a data item representing a screen size of the wireless communication device, a data item representing a content item type that the wireless communication device is able to present, and a data item representing a location of the wireless communication device.

10 [0026] In some embodiments, for example, the method may include selectively serving the content item based on a personal data item representing a property of a user of said wireless communication device. In some embodiments, for example, the data item is selected from a group consisting of: a data item representing an age of the user, a data item representing an age group of the user, a data item representing a gender of the user, a data item representing an occupation of the user, a data item representing a profession of the user, and a data item representing usage pattern associated with the user.

15 [0027] In some embodiments, for example, the method may further include storing in a memory unit a plurality of content items; and selecting the content item from the plurality of content items.

[0028] In some embodiments, for example, storing in a memory unit may include storing in a volatile memory, and the method may further include periodically copying the content of the volatile memory into a non-volatile memory.

20 [0029] In some embodiments, for example, the plurality of content items may include at least a first version of the content item adapted for presentation using a first type of wireless communication device, and a second version of the content item adapted for presentation using a second type of wireless communication device.

25 [0030] In some embodiments, for example, the method may further include receiving a plurality of substantially concurrent content requests; and storing the plurality of content requests in a queue.

30 [0031] In some embodiments, for example, the method may include substantially simultaneously detecting a first incoming content request and a second, substantially concurrent, incoming content request.

[0032] In some embodiments, for example, the method may include substantially simultaneously reading the first incoming content request and the second, substantially concurrent, incoming content request.

5 [0033] In some embodiments, for example, the method may include substantially simultaneously executing a first thread to process the first incoming content request and a second thread to process the second incoming content request.

[0034] In some embodiments, for example, the method may include substantially simultaneously transmitting a first content item in response to the first incoming content request and a second content item in response to the second incoming content request.

10 [0035] Some embodiments may include, for example, a machine-readable medium having stored thereon a set of instructions that, if executed by a machine, result in: receiving an application-initiated content request from a wireless communication device; and selectively serving to the wireless communication device a content item based on data included in the application-initiated content request, wherein the application-initiated content request may
15 include data identifying at least a manufacturer of the wireless communication device and a model of the wireless communication device.

[0036] In some embodiments, for example, a wireless communication device may include a transmitter to transmit an application-initiated content request; and a receiver to receive a content item selected by a server based on data included in the application-initiated content
20 request, wherein the application-initiated content request may include data identifying at least a manufacturer of the wireless communication device and a model of the wireless communication device.

[0037] Embodiments of the invention may provide various other benefits or advantages.

25

BRIEF DESCRIPTION OF THE DRAWINGS

[0038] The subject matter regarded as the invention is particularly pointed out and distinctly claimed in the concluding portion of the specification. The invention, however, both as to organization and method of operation, together with features and advantages thereof, may best be understood by reference to the following detailed description when read with the
30 accompanied drawings in which:

[0039] FIG. 1 is a schematic block diagram illustration of a wireless communication system able to deliver content in accordance with an embodiment of the invention; and

[0040] FIG. 2 is a schematic flow-chart of a method of content deliver in accordance with an embodiment of the invention.

[0041] It will be appreciated that for simplicity and clarity of illustration, elements shown in the figures have not necessarily been drawn to scale. For example, the dimensions of some of the elements may be exaggerated relative to other elements for clarity. Further, where considered appropriate, reference numerals may be repeated among the figures to indicate
5 corresponding or analogous elements.

DETAILED DESCRIPTION OF THE INVENTION

[0042] In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the invention. However, it will be understood by
10 those of ordinary skill in the art that the invention may be practiced without these specific details. In other instances, well-known methods, procedures, components, units and/or circuits have not been described in detail so as not to obscure the invention.

[0043] FIG. 1 schematically illustrates a block diagram of a wireless communication system
15 100 able to deliver content in accordance with an embodiment of the invention. System 100 may include, for example, an ad server 110, a control server 120, a management server 130, a database 140, a communicator 150, and one or more wireless communication devices, e.g., a wireless communication device 170.

[0044] In accordance with some embodiments of the invention, device 170 may include an
20 application 176 having a content client 174. The application 176 may be, for example, a game or a software application. The content client 174 may be a module of application 170, a plug-in of application 170, or an external module operatively associated application 170. Content client 174 may be able to send a wireless signal indicating a request ("content request") to receive one or more content items, e.g., textual content, audio content, video content, advertisement, informational items, or the like. The content request may include, for
25 example, data indicating properties of device 170, e.g., handset manufacturer, handset model, screen resolution, screen color depth, audio capabilities, total memory, available memory, types of content items which the device 170 is capable to present, or the like; data indicating properties of the user of device 170, e.g., age, age group, gender, occupation, profession, areas of interest, income, usage habits, usage patterns, usage time, or the like; and/or other
30 suitable information, e.g., data indicating the type of application associated with application 176, data identifying application 176, or the like.

[0045] In some embodiments, the content request may be application-initiated, automatically-initiated, computer-initiated, periodically-initiated, user-initiated, non-user-initiated, or the like. For example, in one embodiment, application 176 may periodically

initiate and transmit a content request, e.g., without intervention or command from the user of device 170, or in the background and without the knowledge or awareness of the user of device 170. In some embodiments, for example, application 176 may operate or continue to operate substantially seamlessly, and in parallel may automatically initiate and transmit a
5 content request, e.g., periodically or when a pre-defined condition is met.

[0046] The content request may be received by communicator 150, which may re-format or tailor the request in accordance with pre-defined rules or formats. In one embodiment, communicator 150 may augment the content request, e.g., by adding information obtained from a Customer Relationship Management (CRM) repository 164. Communicator 150 may
10 place the content request in a queue 158 within a memory unit 159 storing multiple content requests received, e.g., previously or concurrently, from other wireless communication devices in communication with communicator 150.

[0047] Ad server 110 may include one or more servers, or a "server farm", which may be operatively connected to communicator 150. Ad server 110 may process content requests
15 stored in the queue 158 of communicator 150, e.g., in accordance with a pre-defined order or algorithm. For example, ad server 150 may obtain a content request from the queue 150, and may search a content items repository 118 within ad server 110 for one or more content items which match the requirements of the content request. In some embodiments, ad server 110 may selectively determine which content items, which may be previously stored in the
20 content items repository 118, match the content request being processed, e.g., using queries, filters, selection rules, capping rules, or other conditions or criteria. In one embodiment, for example, ad server 110 may select one or more content items which may be adequately presented by device 170 based on properties of device 170, e.g., handset model, screen resolution, screen color depth, audio capabilities, total memory, available memory, types of
25 content items which the device 170 is capable to present, or the like.

[0048] In some embodiments, ad servers 150 may include multiple servers which may be shared among multiple campaigns or may be dedicated for a specific campaign or type of operation. For example, in one embodiment, a first ad server 150 may serve content items directed for presentation using a first application 176 (e.g., a chess game), whereas a second
30 ad server 150 may serve content items directed for presentation using a second application 176 (e.g., a racing game). In another embodiment, a first ad server 150 may serve content items directed for presentation using a first type of applications 176 (e.g., games), whereas a second ad server 150 may serve content items directed for presentation using a second type of applications 176 (e.g., utility applications). In yet another embodiment, a first ad server 150

may serve content items of a first type (e.g., images in JPG format, images having a first file size, or the like), whereas a second ad server 150 may serve content items of a second type (e.g., images in GIF format, images having a second file size, or the like). In still another embodiment, a first ad server 150 may serve content items for SMS-related or MMS-related applications, whereas a second ad server 150 may serve content items for other types of applications. In another embodiment, a first ad server 150 may be dedicated to serve content items associated with a first advertiser, whereas a second ad server may be dedicated to serve content items associated with a second advertiser or with a group of multiple advertisers. Other suitable configurations may be used.

10 [0049] Ad server 110 may serve, transfer or transmit one or more selected content items to communicator 150. Optionally, communicator 150 may re-format or tailor the content items to accommodate the properties of device 170, for example, instead of a prior re-formatting by ad server 110 or in addition to such prior re-formatting. Communicator 150 may transmit the content items (“content response”) to device 170, which may receive the content items and
15 store them in a local repository 171.

[0050] In one embodiment, communicator 150 may further transmit to device 170, e.g., together with the content item(s) or in a separate transmission, one or more presentation rules associated with the transmitted content items. The presentation rules may include, for example, a capping rule to cap the number of times that a certain content item may be presented, e.g., within a certain time period; a capping rule to cap the number of times that a
20 certain type of content items (e.g., animated content items, large-sized content items, audio content items) may be presented within a certain time period; a rule instructing device 170 to present a certain content item at a certain time or within a certain time window; a rule instructing device 170 to present the content items in accordance with a certain order or
25 priority scheme; or other suitable rules or data to control the presentation of the content items.

[0051] In some embodiments, the content response may be received by device 170 automatically, e.g., without intervention or command from the user of device 170, or in the background and without the knowledge or awareness of the user of device 170. In some embodiments, for example, application 176 may operate or continue to operate substantially
30 seamlessly, and in parallel may automatically receive a content request, e.g., periodically.

[0052] Device 170 may present the content item(s), for example, when device 170 is “online” and operatively connected to a servicing station or base station, and/or when device 170 is “offline” and is not operatively connected to a servicing station or base station. The presentation of the content item(s) may be performed by device 170 in accordance with the

presentation rules provided by communicator 150. The presentation may be performed, for example, within application 176, during or together with the execution of application 176, before the execution of application 176, or after the execution of application 176. In some embodiments, the presentation may be performed using application 176, using content client 174, or using a presentation service which may be installed within device 170 and/or application 176 and/or content client 174.

[0053] Device 170 may store or otherwise log information related to presentations performed by device 170, e.g., data indicating the content item(s) presented, data the starting time and/or ending time of the presentations, data-indicating operations performed by device 170 and/or the user of device 170 during or after the presentation (e.g., pressing a button, dialing, sending a SMS or MMS message, placing a call, or the like). Device 170 may periodically upload the logged data, e.g., to communicator 150, which may aggregate such data from multiple wireless communication devices. In one embodiment, the presentation-related data or the aggregated presentation-related data may be used for financial transactions or billing purposes, for example, to request or collect payment from an advertiser that provided the presented content items, to pay to a provider of the application 176 within which the presentation is performed, or the like.

[0054] Content items may be created or received (e.g., from third parties or advertisers) using management server 130. A content adapter 137 of management server 140 may create multiple versions of content item, for example, having various dimensions, various color depth, various sizes in bytes, various file formats (e.g., JPG, GIF, TIF, BMP, AVI, MPG, MOV, TXT, or the like), various codec sets, or differing in other properties. In one embodiment, for example, content items may have multiple versions corresponding to a descriptive property of device 170, e.g., a full-size content item which may fill the entire screen of device 170, a half-screen size content item which may occupy approximately one half of the screen of device 170, a quarter-screen size content item which may include a square-shaped or rectangular content item which may occupy approximately one quarter of the screen of device 170, or the like. The various versions of a content item may be stored in database 140. Management server 140 may further receive, and may store in database 140, data indicating that a content item is ready for serving, e.g., data indicating properties of an advertising campaign that the content item may be associated with.

[0055] Management server 130 may include one or more modules or components, for example, a traffic manager 131, an account manager 132, an inventory manager 133, a data

analyzer 134, an administrator module 135, an optimizer 136, content adapter 137, and a Financial Transactions Module (FTM) 138.

[0056] Traffic manager 131 may receive, for example, data representing definitions of a campaign of serving content items, and may generate campaign-related data. Traffic manager 131 may control and manage one or more campaigns of serving content items, including content items (“creatives”) provided by one or more users, e.g., advertisers, advertising agencies, customers, or the like. Traffic manager 131 may monitor behavior and performance of a serving campaign, may generate reports, and may suspend or terminate a campaign, e.g., upon-demand, if a pre-defined condition is met, or if an alert is generated within system 100.

[0057] Account manager 132 may allow insertion, modification or deletion of the details of one or more users, for example, advertisers, by such users and/or by an administrator of system 100.

[0058] Inventory manager 133 may estimate or predict usage of content items inventory, and may be used to categorize inventory content items. For example, a gaming content item may be added to an inventory list, stored in database 140, and categorized according to various criteria, e.g., game type, relevant ad types, or the like. Inventory manager 133 may produce notifications regarding overbooked inventory items, an estimated lack of future ad space, or an estimated lack of current ad space. Inventory manager 133 may be operatively associated with inventory optimizer 136, which may perform optimization operations on inventory items based on pre-defined criteria.

[0059] Data analyzer 134 may analyze inventory data and campaign-related data and may produce reports, e.g., statistical reports for advertisers and/or an administrator of system 100, market research reports, data mining reports, On-Line Analytical Processing (OLAP) reports, or the like.

[0060] Administrator module 135 may allow an administrator to access, control or operate one or more modules of management server 130.

[0061] FTM 138 may process and/or perform financial transactions, for example, based on the operations of ad server 110, communicator 150 and/or device 170. In one embodiment, for example, FTM 138 may request or collect a payment, e.g., from an advertiser associated with a certain content item, for serving(s) of that content item by ad server 110, and/or for presenting that content item by device 170. In another embodiment, for example, FTM 138 may perform a payment, e.g., to a third party which manufactured or provided the application 176, when the application 176 is downloaded and installed into device 170, thereby allowing

device 170 to receive content items from system 100. Other suitable financial transactions may be performed.

[0062] Control server 120 may include one or more modules or components, for example, a synchronizer 121, a balancer 122, a data collector 123, a data transferor 124, a data gatherer
5 125, and a monitoring module 126.

[0063] Control server 120 may selectively obtain from database 140 content items which are ready for serving in accordance with pre-defined rules, e.g., specific campaign-related rules. Control server 120 may selectively provide or distribute the content items to one or more ad servers 110, optionally together with capping rules and/or other rules controlling the servings
10 of these content items. In one embodiment, control server 120 may distribute a content item for serving among multiple ad servers 110; for example, control server 120 may instruct a first ad server 110 to serve a first version of the content item not more than 400 times within the next 24 hours, and may instruct a second ad server 120 to serve a second version of the content item not more than 300 times within the next 36 hours. Other suitable capping rules
15 or distribution rules may be used.

[0064] Control server 120 may, for example, re-format data and/or create files in accordance with a format suitable for a certain ad server 110, or may create or adapt multiple versions of a content item to accommodate multiple ad servers 110 or multiple formats. Control server 120 may monitor and track the distribution of content items among multiple ad servers 110,
20 for example, by detecting that a first ad server 110 is not accessible or not responding and by sending or re-sending the data to a second ad server 110 instead, or by re-sending data to the first ad server 110 after a certain time period. Control server 120 may send setup data and/or configuration data to ad server(s) 110 and/or communicator 150, e.g., periodically and/or upon system update. Control server 120 may upload content items to one or more ad servers
25 110, and/or may adapt a content item to accommodate a pre-defined format suitable for presentation using device 170.

[0065] Control server 120 may further, for example, distribute data of campaigns of content items, and/or distribute updates to such data, to multiple ad servers 110 and/or to "server farms", e.g., using balancer 122, synchronizer 121 and/or data transferor 124. Control server
30 120 may update capping data, for example, by periodically comparing the number of content items served and a capping limit of requested servings ("impressions") of the content items, e.g., as defined by an advertiser. Control server 120 may trigger or perform maintenance operations, for example, archiving of expired content items. Synchronizer 121 may, for example, perform operations to format or re-format or tailor content items into a format

suitable for ad server(s) 110, e.g., a binary format, and may control data transfer to multiple ad servers 110 and verify successful delivery of content items to ad servers 110;

[0066] Control server 120 may further collect usage data from ad server 110, e.g., using data collector 123 and/or data gatherer 125. Control server 120 may store the data in database 140, may track data collection, and may detect that a certain ad server 110 is not accessible and collect data upon its recovery. Control server 120 may validate content items integrity, data format correctness, and/or proper data transfer. Control server 120 may monitor the serving status of one or more ad servers 110, e.g., using monitoring module 126.

[0067] In one embodiment, a content item may be stored in one format or version, or in a relatively small number of formats or versions, during a testing mode; whereas the content item may be stored in multiple formats or versions, or in a relatively large number of formats or versions, during a “live” phase in which an advertising campaign is operational and content items are served.

[0068] Data transferor 124 may distribute content items to ad server(s) 110 periodically and/or in advance, for example, a certain time period before the content items are intended to be served to devices 170, e.g., ahead of a “live” campaign period. This may allow ad server(s) 110 to serve content items at their intended serving time, even if temporarily the ad server(s) 110 may not be able to access the control server 120 at that time or closely prior to that time.

[0069] In some embodiments, a first ad server 110 may be assigned to serve a first content item or a first group of content items (e.g., associated with a first advertiser, or having a first type or size), and a second, different ad server 110 may be assigned to serve a second content item or a second group of content items (e.g., associated with a second advertiser, or having a second type or size). For example, control server 120 may determine that certain advertisers may be associated with a first ad server 110, and data transferor 124 may upload to that ad server 110 the content items of the campaigns associated with these advertisers.

[0070] In some embodiments, a content item, or a group of content items, may be associated with one or more status identifiers, for example, an “uploaded” identifier indicating that the content item was already uploaded to ad server 110, a “ready” identifier indicating that the content item is not in use yet but is ready for uploading, a “test” identifier indicating that the content item is available for testing purposes only, an “updated” identifier indicating that the content item is updated and optionally requires uploading immediately or at a high priority, a “stopped” or “canceled” identifier indicating that one or more content items may not be served, or the like.

[0071] In some embodiments, a content item, or a group of content items, may be held in an upload queue by control server 120. Queue records may be marked as “done” upon uploading of the queued content items, e.g., to track uploaded content items. In one embodiment, if a content item is uploaded and then modified, it may not have an “uploaded” identifier, or a previously-assigned “uploaded” identifier may be reset or modified, e.g., to “ready”.

[0072] In some embodiments, synchronizer 121 and/or balancer 122 may be used to update capping definitions, for example, among multiple ad servers 110. For example, a first ad server 110 may be non-operational, non-accessible or non-responding, and may not reach its assigned capping or intended quota of servings, whereas a second ad server 110 may be operational and may reach its assigned capping or intended quota of servings; or, for example, the first ad server 110 may have a lower capacity or a lower bandwidth than the second ad server 110. Therefore, synchronizer 121 and/or balancer 122 may periodically recalculate the amount of servings of content items served by each ad server 110, and may redistribute serving amounts or modify capping definitions or quotas among multiple ad servers 110. For example, periodically, the total cap or remaining quota may be divided by the number of currently active ad servers 110, to result in a partial cap or quota which may be assigned to each of these operational ad servers 110. A similar calculation and re-distribution may be performed based on other suitable parameters, e.g., percentage of time in which each ad server 110 is operational, or the like. In one embodiment, the re-calculation and re-distribution may be performed periodically, and/or when control server 120 detects a substantial between the performance of two or more ad servers 110.

[0073] Ad server 110 may selectively provide to communicator 150 one or more content items, e.g., advertisements, in response to a content request from communicator 150. Ad server 110 may select such content items from a content inventory provided to ad server 110 by control server 120, which may be stored in memory unit 118 of ad server 110.

[0074] In one embodiment, memory unit 118 may include a non-volatile memory, for example, a long term memory unit, a disk, a hard disk drive, or the like. In another embodiment, memory unit 118 may include a volatile memory, for example, a Random Access Memory (RAM), a Dynamic RAM (DRAM), a Synchronous DRAM (SD-RAM), a Flash memory, a cache memory, a buffer, a stack, a short term memory unit, or the like.

[0075] In some embodiments, for example, utilizing volatile memory unit 118, a pre-defined memory “dumping” process may be used. For example, content items ready for serving may be received by ad server 110 from control server 120, may be stored in volatile memory unit

118, and optionally may not be stored in a non-volatile memory of ad server 110. Ad server 110 may serve content items directly from its volatile memory unit 118, and may further store in memory unit 118 a log tracking the activity or servings done by ad server 110. Periodically, for example, at pre-defined time intervals (e.g., every 60 seconds, every 5
5 minutes, every hour, etc.) or upon serving a certain number of servings of content items (e.g., every 100 impressions, every 500 impressions, etc.), ad server 110 may “dump” or copy the activity log data into a non-volatile memory unit, e.g., included in ad server 110 or database 140. This may allow ad server 110, for example, to rapidly serve content items from its rapidly-available volatile memory unit 118, instead of from a slower non-volatile memory
10 (e.g., database 140 or other database); and the periodical “dumping” process of activity logs may limit the data loss in case of a power outage which may erase the volatile memory unit 118.

[0076] In one embodiment, ad server 110 may provide to communicator 150 one or more content items; in another embodiment, ad server 110 may provide to communicator 150
15 pointers or references to one or more content items, or a list of content items, which may already be stored in volatile and/or non-volatile memory of communicator 150, e.g., in memory unit 159.

[0077] Ad server 110 may include one or more modules or components, for example, a data loader 111, an updater 112, an ad selector 113, an ad filter 114, a prioritizer 115, and a
20 formatter 116.

[0078] Data loader 111 may obtain one or more parameters to allow ad server 110 to process the content request from communicator 150. Such parameters may include, for example, parameters representing properties of various content items, e.g., a content item identifier, a group identifier (e.g., identifying a group to which the content item belongs), an update time,
25 priority data, a time period during which the content item may be served, a presentation template associated with the content item, an alternate text associated with the content item, a broadcast mode associated with the content item (e.g., “live broadcast” mode, “test” mode, “stop” mode, or the like), a cost or a price associated with a serving of the content item, capping or quota data, attribute data, data representing a target user or a group of target users
30 to which the content item is intended to be presented (e.g., defined by age, by age range, by location, by gender, by occupation, by profession, or the like), or other parameters. In one embodiment, for example, data loader 111 may have a relatively fast access to data, and/or a read-only authorization.

[0079] In one embodiment, data loader 111 may optionally be operatively associated with a data manager 117 which may be utilized for loading of new data. For example, data loader 111 may include a reference to a current version of data manager 117, and to a newer version of data manager 117 which may be available; upon completion of a data loading process, data loader may switch or modify the reference to point to the newer or latest available version of data manager 117, which may be utilized in subsequent loadings.

[0080] Ad selector 113 may receive a first list of content items, and may selectively produce a second list of one or more content items to be served. Ad selector 113 may process or parse the content request received from communicator 150 to obtain information about device 170 and/or the user of device 170 from which the content request originates, and may correlate between such information and matching content items attributes. For example, ad selector 113 may determine that the content request originates from device 170 associated with user who is a 22 year old male student who lives in London and is interested in sports, and may select content items intended to be presented to such user, e.g., an advertisement of a sporting event in London.

[0081] Additionally or alternatively, ad selector 113 may process or parse the content request received from communicator 150 to obtain information about the device 170 from which the content request originated, and may correlate between such device information and content items attributes accommodating such information. For example, ad selector 113 may determine that the content request originates from device 170 able to present JPG images having resolution of 200 by 150 pixels and 8-bit color depth, and may select content items accommodating such attributes.

[0082] In some embodiments, ad selector 113 may select content items based on multiple attributes included in the content request, for example, multiple device 170 attributes and/or multiple user's attributes. In one embodiment, ad selector 113 may cross between multiple lists of candidate content items, to select content items accommodating multiple properties of device 170 and/or the user of device 170.

[0083] Ad filter 114 may modify a list of content items generated by ad selector 113, for example, to filter-out and remove content items in accordance with pre-defined criteria or constraints, e.g., capping criteria or quota criteria limiting the number of presentations of a certain content item, campaign-related constraints or quotas, or the like. In one embodiment, ad filter 114 may check original limitations which may be included in relevant campaign-related data or definitions, or other suitable rules or data. For example, a campaign-related definition may require that a certain content item not be presented to the same user more than

once, or more than a certain number of times per time period, and ad filter 114 may modify the list of content items according to such requirements.

[0084] Prioritizer 115 may calculate or otherwise determine or set a priority value associated with content items, for example, based on one or more parameters, e.g., a priority requirement included in the campaign data or campaign-related definitions, a price or profit associated with presenting the content item, a fulfillment factor, a value indicating the probability that the content item matches its target audience, a value indicating the relative size (e.g., dimensions or bytes), a content item type identifier, or the like. For example, in one embodiment, prioritizer 115 may determine a priority value of "7" for a first content item, which may be associated with a price of 17 cents per serving and with a campaign which is expected to terminate within 8 hours, and may determine a priority value of "2" for a second content item, which may be associated with a price of 12 cents per serving and with a campaign which is expected to terminate within 6 days. In another embodiment, for example, prioritizer 115 may determine a priority value of "8" for a first content item associated with a "sporting events" type, and may determine a priority value of "3" for a second content item associated with a "restaurants" type. In yet another embodiment, for example, prioritizer 115 may determine a priority value of "6" for a first content item having a half-screen size or having a 35 Kilobytes data size, and may determine a priority value of "4" for a second content item having a quarter-screen size or having a 24 Kilobytes data size. Other suitable data or rules may be used to determine absolute or relative priorities of content items.

[0085] Formatter 116 may optionally format or re-format or tailor the data produced by ad server 110 before the data is transferred to communicator 150, for example, to match a pre-defined data format or data transfer protocol used by communicator 150.

[0086] Communicator 150 may receive a content request from device 170 through a wireless medium 165, may transfer a formatted content request to ad server 110, may receive from ad server 110 one or more content items, and may transmit or transfer the content item(s) to device 170 through wireless medium 165. Communicator 150 may include one or more modules or components, for example, a request formatter 151, a transformer 152, a version updater 153, a protocol handler 154, a network handler 155, a client manager 156, and one or more ports 157.

[0087] Network handler 155 may control network communications between communicator 150 and device 170. Network handler 155 may include, for example, a listener module able to detect and receive a wireless signal indicating a content request of device 170, and may

thereby trigger the operation of other components of communicator 150 to process the content request and to respond to the content request. Network handler 155 may communicate in parallel with multiple devices 170, for example, using multiple ports 157 and/or multiple wireless communication standards or protocols, and may optionally assign
5 priority values to concurrent communications or a queue 158 for handling multiple received content requests.

[0088] For example, communicator 150 may receive a content request from device 170, and network handler 158 may place the content request, or data of the content request, in a queue 158. When the content request it reaches its turn for processing, network handler 155 may
10 transfer to protocol handler 154 the data included in the content request. Upon completion of preparation of the response to the content request, network handler 155 may transmit the content response to device 170.

[0089] In some embodiments, multiple ports 157 may be included in communicator 150, to allow parallel or substantially simultaneous handling of multiple content requests. In one
15 embodiment, for example, a first group of ports (e.g., listener ports 157A) may detect wireless signals carrying content requests incoming from device(s) 170; a second group of ports (e.g., reader ports 157B) may read the detected content requests; and a third group of ports (e.g., writer ports 157C) may transmit content responses to device(s) 170 upon completion of preparation of content responses.

[0090] In one embodiment, content requests read by reader ports 157B, may be stored in a request queue, and may be processed using one or more processing threads, e.g., in parallel or substantially simultaneously. The resulting content responses may be placed in a responses
20 queue for transmission by writer ports 157C. This may allow, for example, utilizing multiple sockets (e.g., TCP/IP sockets or other sockets)-or ports 157 to perform listening operations, receiving operations, and transmission operations, for example, in parallel or substantially
25 simultaneously.

[0091] In one embodiment, memory unit 159 may include a non-volatile memory, for example, a long term memory unit, a disk, a hard disk drive, or the like. In another embodiment, memory unit 159 may include a volatile memory, for example, a Random
30 Access Memory (RAM), a Dynamic RAM (DRAM), a Synchronous DRAM (SD-RAM), a Flash memory, a cache memory, a buffer, a stack, a short term memory unit, or the like.

[0092] In some embodiments, for example, utilizing volatile memory unit 159, a pre-defined memory “dumping” process may be used. For example, content items ready for serving may be received by communicator 150 from ad server 110, may be stored in volatile memory unit

159, and optionally may not be stored in a non-volatile memory of communicator 150. Communicator 150 may optionally re-format or re-package content items directly in volatile memory unit 159, and may transmit content items directly from its volatile memory unit 118 to device(s) 170. Communicator 150 may further store in memory unit 159 a log tracking the
5 activity or transmission done by communicator 150. Periodically, for example, at pre-defined time intervals (e.g., every 60 seconds, every 5 minutes, every hour, etc.) or upon serving a certain number of servings of content items (e.g., every 100 impressions, every 500 impressions, etc.), communicator 150 may “dump” or copy the activity log data into a non-volatile memory unit, e.g., included in communicator 150 or database 140. This may allow
10 communicator 150, for example, to rapidly transmit content items from its rapidly-available volatile memory unit 159, instead of from a slower non-volatile memory (e.g., database 140 or other database); and the periodical “dumping process of activity logs may limit the data loss in case of a power outage which may erase the volatile memory unit 159.

[0093] Protocol handler 154 may receive content request data, for example, information
15 about device 170, information about the functional capabilities of device 170, a handset identifier, device attributes (e.g., Operating System (OS), memory size, application type, etc.), the content request time, last connection time, desired request period (e.g., immediately, once within the next two hours, etc.), and other suitable parameters. Protocol handler 154 may optionally re-format or tailor the content request data using the request reformatter 151
20 into a format suitable for processing by ad server 110, for example, having data arranged in accordance with pre-defined fields, records or parameters. Protocol handler 154 may optionally augment the data received in the content request, e.g., by adding Customer Relationship Management (CRM) information obtained from an operator CRM repository 164, by adding relevant in-memory data (e.g., handset data, application data, etc.), by adding
25 localization data or regional data derived from IP address mapping, or the like.

[0094] In one embodiment, communicator 150 may insert into a content request one or more rules or constraints which may be applied by ad server 110 for content item selection or filtering. In one embodiment, for example, based on the available memory and/or the total memory of device 170, communicator 150 may add to the content request a requirement to
30 select only a certain number of content items (e.g., no more than five), to select a group of content items having a certain cumulative data size (e.g., no more than 70 Kilobytes), to select a group of content items having a certain average file size (e.g., no more than 31 Kilobytes), or the like.

[0095] Upon receiving the content response from ad server 110, protocol handler 154 may selectively re-format or tailor the content response (e.g., utilizing transformer 152) to accommodate attributes or requirements of device 170, and may transfer the content response to network handler 155 for transmission to device 170. Optionally, version updater 153 may
5 be used to remotely update or upgrade the version of a component of device 170, e.g., of context client 174 of device 170, for example, periodically or when a new version is available.

[0096] Device 170 may include or may be, for example, a wireless communication device, a wireless communication station, a Personal Digital Assistant (PDA) device, a Wireless LAN
10 (WLAN) device, devices and/or networks operating in accordance with existing IEEE 802.11, 802.11a, 802.11b, 802.11e, 802.11g, 802.11 h, 802.11i, 802.11n, 802.16 standards and/or future versions of the above standards, a Bluetooth (RTM) device, a ZigBee device, one-way and/or two-way radio communication systems, cellular radio-telephone communication systems, a cellular phone, a wireless phone, a mobile phone, a Personal
15 Communication Systems (PCS) device, a PDA device which incorporates a wireless communication device, a PDA device which incorporates a mobile phone, a cordless phone, a portable phone, a Digital Enhanced Cordless Telecommunications (DECT) phone or device, an Instant Messaging (IM) terminal or device, or other suitable devices.

[0097] Device 170 may include one or more modules or components, for example, a local
20 repository 171, a selector 172, a communication handler 173, content client 174, application 176, a server communicator 177, a push communicator 179, a reporter 181, a presentation service 182, a cache manager 183, a processor 184, an output unit 185, an input unit 186, a memory unit 187, a transmitter 191, a receiver 192, and an antenna 193.

[0098] Processor 184 may include, for example, a Central Processing Unit (CPU), a Digital
25 Signal Processor (DSP), a microprocessor, a controller, a chip, a microchip, an Integrated Circuit (IC), or any other suitable multi-purpose or specific processor or controller. Processor 184 may, for example, process incoming and/or outgoing wireless communication signals, and may execute instructions to perform other operations of device 170 or its components.

[0099] Input unit 186 may include, for example, a keypad, a keyboard, a joystick, a trackball,
30 a mouse, a touch-pad, a touch-screen, a microphone, or other suitable pointing device or input device. Output unit 185 may include, for example, a display unit, a monitor, one or more speakers, or other suitable output devices.

[00100] Memory unit 187 may include, for example, a Random Access Memory (RAM), a Read Only Memory (ROM), a Dynamic RAM (DRAM), a Synchronous DRAM (SD-RAM), a Flash memory, a volatile memory, a non-volatile memory, a cache memory, a buffer, a short term memory unit, a long term memory unit, a disk, a hard disk drive, a miniature disk or hard disk, or other suitable removable or non-removable storage units or memory units.

[00101] Transmitter 191 may include, for example, a wireless Radio Frequency (RF) transmitter able to transmit RF signals, e.g., through antenna 193. Receiver 192 may include a wireless RF receiver able to receive RF signals, e.g., through antenna 122.

[00102] In some embodiments, the functionality of transmitter 191 and receiver 192 may be implemented in the form of a transceiver, a transmitter-receiver, or one or more units able to perform separate or integrated functions of transmitting and/or receiving wireless communication signals, blocks, frames, transmission streams, packets, messages and/or data.

[00103] Antenna 193 may include an internal and/or external RF antenna, for example, a dipole antenna, a monopole antenna, an omni-directional antenna, an end fed antenna, a circularly polarized antenna, a micro-strip antenna, a diversity antenna, or any other type of antenna suitable for transmitting and/or receiving wireless communication signals, blocks, frames, transmission streams, packets, messages and/or data.

[00104] In accordance with some embodiments of the invention, device 170 may include application 176 having a content client 174. The application 176 may be, for example, a game or a software application. The content client 174 may be a module of application 170, a plug-in of application 170, or an external module operatively associated with application 170. Content client 174 may be able to send a wireless signal indicating a request ("content-request") to receive one or more content items, e.g., textual content, audio content, video content, advertisement, informational items, or the like. The content request may be transmitted to communicator 150, for example, using communication handler 173. In one embodiment, transmission of the content request may be triggered by a user command or a user command, e.g., a signal entered by a user utilizing the input unit 186 and indicating that the user requests one or more content items.

[00105] Device 170 may receive from communicator 150 one or more content items ("content response"), e.g., in response to the content request. The content response may be received from communicator 150, for example, using communication handler 173.

[00106] The received content items may be stored in local repository 171, e.g., implemented using memory unit 187. The local repository 171 may be managed or

controlled by cache manager 183. One or more content items stored in local repository 171 may be selectively presented, for example, in accordance with certain presentation rules, using presentation service 182 and output unit 185.

[00107] Selector 172 may select from local repository 171 one or more content items
5 for presentation, e.g., content items matching one or more rules, conditions or criteria related to the content items or to properties associated with their presentation. Presentation rules may be stored or pre-stored in device 170, e.g., in memory unit 187 or as part of content client 174 or application 176 or presentation service 182. In one embodiment, data indicating presentation rules may be received from communicator 170, e.g., close to or together with
10 receiving a content response.

[00108] For example, selector 172 may use a first presentation rule requiring that a
certain content item, e.g., an advertisement for a certain restaurant, be presented within a pre-
defined time period, for example, between 11:30 a.m. to 1:45 p.m., or the like. A second
presentation rule may require, for example, that no less than two content items of a certain
15 advertiser, and/or no more than four content items of that advertiser, be presented within a pre-defined time period, e.g., within 5 consecutive hours. A third presentation rule may require, for example, that a first type of content item, e.g., an animated banner having a size of 200 by 150 pixels, be followed by a second type of content item, e.g., a textual or non-
animated content item having a size of 60 by 40 pixels. A fourth presentation rule may
20 require, for example, that a certain content item be presented only when a pre-defined period of inactivity elapses, e.g., a period in which the user of device 170 does not perform any operation, or a period in which no content items are presented. A fifth presentation rule may require, for example, that a certain content item, e.g., an advertisement for a certain shop, be presented when device 170 is geographically located within a pre-defined distance (e.g., 300
25 meters) of the address of that shop.

[00109] Other suitable rules and/or combination of rules may be used by selector 172. In applying such rules, selector 172 may utilize information about device 170, information about the user of device 170, and/or other information, e.g., the current time, the current date, available power left, history of prior presentations, history or patterns of usage of device 170,
30 or the like.

[00110] Together with or upon presentation of a content item, device 170 may register or log, for example, in memory unit 187, properties related to that presentation, e.g., an identifier of application 176, a location identifier, a presentation starting time, a presentation ending time, the total presentation time, a user's response to the presentation (e.g., user

viewed the presentation, user aborted or interrupted or paused the presentation, user pressed a button, user initiated a call or sent a SMS item, user interacted with the presented content item, or the like), and other data. Presentation-related data may be reported by reporter 181 to communicator 150, e.g., periodically, upon demand, together with a subsequent content request, when a pre-defined condition is met, upon presenting a certain number of content items, or the like. In one embodiment, reporter 181 may be triggered or activated by content client 174, presentation service 182, server communicator 177, or other components of device 170.

[00111] In some embodiments, for example, a presentation report or presentation-related data may be transmitted by device 170 substantially together with a subsequent content request; for example, a second content request may include a presentation report related to content items presented since a previous report was transmitted, since a previous content request was transmitted, or the like. This may, for example, allow utilizing a single communication session to transmit both a content request and a presentation report. This may, for example, obviate the need to open a first communication session to transmit the content request and a second communication session to transmit the presentation report, or reduce the number of communication transactions required.

[00112] Communicator 150 may, for example, transfer the presentation-related data to control server 120, which may store the presentation-related data in database 140 and/or may perform other operations, e.g., calculate an outgoing amount payment or an incoming amount payment associated with the reported presentations.

[00113] Cache manager 183 may, for example, perform maintenance operations on local repository 171 and/or memory unit 187. For example, cache manager 183 may delete an expired content item, e.g., a content item that was presented for the maximum number of times allowed and reached its quota or capping, or a content item that expires at a certain date and time. Cache manager may otherwise manage or compact the local repository 171, and may perform management operations with regard to memory unit 187, e.g., deleting presentation-related data regarding previously-presented content items that were already reported by reporter 181. Cache manager 183 may otherwise control the local repository 171, e.g., by replacing a previously-stored content item with a new, updated or replacement content item, or the like.

[00114] A content request created by content client 174 may include data representing one or more properties of device 170 and/or one or more properties of the user of device 170, for example, a version identifier of content client 174, an identifier of application 176, an

identifier of device 170 (e.g., manufacturer, model, or the like), local time, installation time, last connection time, Operating System (OS) type and version, total memory size of device 170, free or available memory of device 170, free or available memory in local repository 171, screen dimensions (e.g., height and width, by pixels), color depth (e.g., as a number of bits available to represent color information), user information, user name, cache content (e.g., list of previous-stored content items within local repository 171), previous presentations data, or the like.

[00115] In some embodiments, content client 174 may periodically establish a connection with ad sever 110, e.g., directly or through communicator 150, to upload data about presented content items, to refresh or update content items stored in local repository 171, to update or upgrade the installed version of content client 174, to upload technical information about device 170 and/or personal information about a user of device 170 to allow improved targeting of content items, or the like.

[00116] In some embodiments, device 170 may communicate with communicator 150 and/or ad server 110 using server communicator 177 and/or push communicator 179. For example, in one embodiment, server communicator 177 may utilize HyperText Transfer Protocol (HTTP) or a HTTP library to communicate with communicator 150 and/or ad server 110. In another embodiment, server communicator 177 may open a TCP/IP socket with communicator 150 and/or ad server 110, initialize a connection, resolve the IP address of a Uniform Resource Locator (URL) of communicator 150 and/or ad server 110, send a HTTP request and wait for response; these operations may optionally be performed in a separate background thread.

[00117] In some embodiments, an initial URL that server communicator 177 may attempt to access may be pre-defined or pre-stored (e.g., "hard-coded") within content client 174. For example, the initial URL may point to a dedicated online server or domain, e.g., "http://www.ContentItemsAdServer.com", or to sub-domain or network component, e.g., "http://ContentItems.NetworkProvider.com". Other suitable methods may be used by device 170 to initiate communications with communicator 150 and/or ad server 110.

[00118] In some embodiments, push communicator 179 may be able to receive a SMS push item, e.g., a SMS item addressed to application 176. In response, push communicator 179 may trigger server communicator 177 to communicate with communicator 150 and/or ad server 110. In one embodiment, push communicator 179 may be directed at, or may be operatively associated with, a SMS booster engine which may optionally be included in system 100 or device 170. In such cases, device 170 may detect and avoid a possible conflict

between the operation of push communicator 179 and the operation application 176. In some embodiments, push communicator 179 may optionally communicate with communicator 150, e.g., by sending to communicator 150 a request to receive data, thereby bringing communicator 150 out of a "sleep" mode or a stand-by mode.

5 [00119] System 100 may optionally include other suitable components, for example, a MMS center 161, a SMS interceptor 162 and a SMS gateway 163 which may be operatively associated with communicator 150 and/or ad server 110, and may be used to send and/or receive SMS items and/or MMS items having embedded therein a content item served by ad server 110. For example, in one embodiment, a first wireless communication device 170 may
10 send a SMS or MMS message intended to be received by a second wireless communication device 170; system 100 may intercept the message, and may modify the message, e.g., by adding, inserting, augmenting, appending or embedding into the message a content item stored in ad server 110; and the modified SMS or MMS message may be transmitted to the second wireless communication device 170. In one embodiment, for example, the appended
15 content item may be an selected advertisement which may be added to a user-created SMS or MMS, for example, thereby reducing the cost or price that the sending user and/or the receiving user are required to pay to their service provider(s) in order to send or receive the SMS or MMS message.

[00120] In some embodiments, optionally, a content item may be selectively inserted
20 into, or appended to, a SMS message or MMS message or other message (e.g., textual message, audio clip, video clip, image, or the like) sent by a first user to a second user. The content item may be selected, for example, based on properties of the sending user and/or based on properties of the receiving party. Additionally or alternatively, in one embodiment, the content item may be selected based on an analysis (e.g., textual analysis, keyword
25 analysis, image recognition analysis, sound recognition analysis, or the like) of the content item; for example, if the sending user sends a textual SMS item containing the word "chocolate" or "love", then a content item having an advertisement for a chocolate product or a flowers delivery service may be selectively added to the SMS item. Other suitable criteria may be used to selectively serve content items.

30 [00121] In some embodiments, device 170 may present to its user one or more selectable options allowing the user to determine whether or not content client 174 will be activated, or whether or not to receive content in accordance with embodiments of the invention. In one embodiment, device 170 may present to its user, for example, a first option to download a first tennis gaming application having no content items, e.g., in exchange for a

first amount of payment; and a second option to download a second tennis gaming application (e.g., similar or substantially identical to the first tennis gaming application) and having the capability to receive and present content items, e.g., in exchange for a second (e.g., reduced) amount of payment, or in exchange for substantially no payment. This may allow, for example, deliver of content (e.g., games and other application) to device(s) 170 for a reduced payment or no payment, as the delivered content may be "sponsored" by the advertisers associated with the presented content items.

[00122] Management server 130, control server 120, ad server 110, communicator 150, and/or other components of system 100, may be implemented, for example, using one or more computing platforms or computing devices, e.g., one or more computers or servers including a processor, a memory unit, a storage unit, an input unit, an output unit, a transmitter, a receiver, an antenna, a power source, an Operating System, software applications, and/or other suitable software components and/or hardware components.

[00123] Device 170 may communicate with communicator 150 and/or ad sever 110 using wireless medium 165, for example, in accordance with one or more standards or protocols, e.g., Transmission Control Protocol (TCP), Internet Protocol (IP), TCP/IP, Scalable TCP/IP (SIP), Signaling System 7 (SS7), Push protocol, SMS protocol, MMS protocol, IM protocol, Code-Division Multiple Access (CDMA), Wideband CDMA (W-CDMA), Time-Division Multiple Access (TDMA), Post Office Protocol 3 (POP3), Internet Message Access Protocol (IMAP), Simple Mail Transfer Protocol (SMTP), User Datagram Protocol (UDP), High-Speed Circuit-Switched Data (HSCSD), or the like.

[00124] In some embodiments, optionally, one or more components of system 100 may remotely, directly or indirectly trigger device 170 to transmit a content request. For example, in one embodiment, device 170 may be remotely triggered using a "ping" or a ping-like message or packet, a "wake up" message or packet, or the like. In some embodiments, for example, communicator 150, SMS gateway 163, or other component of system 100 may send to device 170 a data item or a message, e.g., having a link or a shortcut which may trigger a content request by device 170. In some embodiments, device 170 may transmit a content request in response to an incoming signal or message, a background incoming signal or message, a user-transparent incoming signal or message, a remote signal or message, or the like.

[00125] In some embodiments, optionally, local repository 172 may be shared by multiple applications 176 within device 170. For example, a first application 176 may include a first game, and a second application 176 may include a second game. Device 170

may include the first and second applications 176, having embedded therein first and second content clients 174, respectively. Local repository 172 may optionally be shared by the first and second applications 170 and/or by the first and second content clients 174 of device 170. For example, the first application 176 may be executed and may transmit a content request; in response, multiple content items may be received by receiver 192 and may be stored in local repository 171; one or more content items may be presented by the first application 176. Then, the second application 176 may be executed, and may utilize, e.g., may present, one or more content items which may already be stored in local repository 176. In another embodiment, multiple separate caches or multiple separate local repositories 171 may be used by multiple applications 176 of device 170. In some embodiments, optionally, the second application 176 may report to communicator 150 about presentation performed by the second application and/or the first application, or vice versa. Other suitable configurations may be used.

[00126] In some embodiments, optionally, a “cookie” or a cookie-like mechanism may be used by system 100, for example, to identify device 170, to store in device 170 data which may be unique to device 170, to store in device 170 data related to prior communications between device 170 and other components of system 100, to store in device 170 personal information about a user of device 170, or the like. The cookie may be stored, for example, in memory unit 187, and may be periodically read or updated.

[00127] FIG. 2 is a schematic flow-chart of a method of wireless content delivery in accordance with an embodiment of the invention. Operations of the method may be implemented, for example, by system 100 of FIG. 1, by ad server 110 of FIG. 1, by communicator 150 of FIG. 1, by device 170 of FIG. 1, by control server 120 of FIG. 1, and/or by other suitable devices and/or systems.

[00128] As indicated at box 210, the method may optionally include, for example, installing content client 174 on device 170, e.g., as a stand-alone module or as an embedded part, plug-in or component of application 176. The installing operation may optionally include, for example, downloading the content client 174 from an online source.

[00129] As indicated at box 215, the method may optionally include, for example, transmitting a content request from device 170 to communicator 150. This may include, for example, creating a content request having data representing, for example, properties of device 170, properties of the user of device 170, properties of prior usage of device 170, or the like.

[00130] As indicated at box 220, the method may optionally include, for example, receiving the content request by communicator 150. This may include, for example, storing the content request in volatile memory 159 of communicator 150. Optionally, multiple content requests may be stored and/or processed using one or more-queues.

5 [00131] As indicated at box 225, the method may optionally include, for example, re-formatting the content request by communicator 150, e.g., to accommodate a pre-define format. This may further include, for example, augmenting the content request with additional data, e.g., CRM data related to the user of device 170.

[00132] As indicated at box 230, the method may optionally include, for example,
10 selecting one or more content items matching the content request, e.g., by ad server 110. In one embodiment, this may include selecting from a volatile repository of content items within ad server 110. The selection may include, for example, filtering-in or filtering-out content items based on pre-defined rules or criteria, e.g., capping or quota rules, campaign-related definitions, or the like.

15 [00133] As indicated at box 235, the method may optionally include, for example, re-formatting or re-packaging the selected content item(s), e.g., to accommodate or to better accommodate capabilities (e.g., screen size capabilities, audio capabilities, available memory, or the like) of device 170.

[00134] As indicated at box 240, the method may optionally include, for example,
20 transmitting the selected content item(s) to device 170.

[00135] As indicated at box 245, the method may optionally include, for example, storing the received content item(s) in local repository 171 of device 170.

[00136] As indicated at box 250, the method may optionally include, for example,
25 selectively presenting a content item by device 170, e.g., based on one or more criteria or conditions.

[00137] As indicated at box 255, the method may optionally include, for example, transmitting by device 170 to communicator 150 an activity report indicating properties of, or data related to, presentations presented by device 170.

[00138] As indicated at box 260, the method may optionally include, for example,
30 performing financial transaction, e.g., payments and/or collections, based on the received activity report of presented presentations.

[00139] Other suitable operations or sets of operations may be used in accordance with embodiments of the invention.

[00140] Some embodiments of the invention may be implemented by software, by hardware, or by any combination of software and/or hardware as may be suitable for specific applications or in accordance with specific design requirements. Embodiments of the invention may include units and/or sub-units, which may be separate of each other or
5 combined together, in whole or in part, and may be implemented using specific, multi-purpose or general processors or controllers, or devices as are known in the art. Some embodiments of the invention may include buffers, registers, stacks, storage units and/or memory units, for temporary or long-term storage of data or in order to facilitate the operation of a specific embodiment.

10 [00141] Some embodiments of the invention may be implemented, for example, using a machine-readable medium or article which may store an instruction or a set of instructions that, if executed by a machine, for example, by system 100 of FIG. 1, by ad server 110 of FIG. 1, by communicator 150 of FIG. 1, by device 170 of FIG. 1, by control server 120 of FIG. 1, or by other suitable machines, cause the machine to perform a method and/or
15 operations in accordance with embodiments of the invention. Such machine may include, for example, any suitable processing platform, computing platform, computing device, processing device, computing system, processing system, computer, processor, or the like, and may be implemented using any suitable combination of hardware and/or software. The machine-readable medium or article may include, for example, any suitable type of memory
20 unit (e.g., memory unit 118, memory unit 159, or database 140), memory device, memory article, memory medium, storage device, storage article, storage medium and/or storage unit, for example, memory, removable or non-removable media, erasable or non-erasable media, writeable or re-writable media, digital or analog media, hard disk, floppy disk, Compact Disk Read Only Memory (CD-ROM), Compact Disk Recordable (CD-R), Compact Disk Re-
25 Writeable (CD-RW), optical disk, magnetic media, various types of Digital Versatile Disks (DVDs), a tape, a cassette, or the like. The instructions may include any suitable type of code, for example, source code, compiled code, interpreted code, executable code, static code, dynamic code, or the like, and may be implemented using any suitable high-level, low-level, object-oriented, visual, compiled and/or interpreted programming language, e.g., C,
30 C++, Java, BASIC, Pascal, Fortran, Cobol, assembly language, machine code, or the like.

[00142] While certain features of the invention have been illustrated and described herein, many modifications, substitutions, changes, and equivalents may occur to those skilled in the art. It is, therefore, to be understood that the appended claims are intended to cover all such modifications and changes as fall within the true spirit of the invention.

CLAIMS

What is claimed is:

- 5 1. A system comprising:
a server to receive an application-initiated content request from a wireless
communication device, and to selectively serve to said wireless communication device
a content item based on data included in the application-initiated content request,
wherein said application-initiated content request comprises data identifying at least a
10 manufacturer of said wireless communication device and a model of said wireless
communication device.
2. The system of claim 1, wherein the application-initiated content request further
comprises a data item selected from a group consisting of: a data item representing an
15 available memory of said wireless communication device, a data item representing an
audio capability of said wireless communication device, a data item representing a
video capability of said wireless communication device, a data item representing a
screen size of said wireless communication device, a data item representing a content
item type that said wireless communication device is able to present, and a data item
20 representing a location of said wireless communication device.
3. The system of claim 1, wherein the server is to selectively serve the content item based
on a personal data item representing a property of a user of said wireless
communication device.
25
4. The system of claim 3, wherein said personal data item is selected from a group
consisting of: a data item representing an age of said user, a data item representing an
age group of said user, a data item representing a gender of said user, a data item
representing an occupation of said user, a data item representing a profession of said
30 user, and a data item representing usage pattern associated with said user.
5. The system of claim 1, wherein said server comprises:
a memory unit to store a plurality of content items from which said content item is
selected.

6. The system of claim 5, wherein said memory unit comprises a volatile memory.
7. The system of claim 6, wherein said server is to periodically copy the content of said
5 volatile memory into a non-volatile memory.
8. The system of claim 5, wherein said plurality of content items comprises at least a first
version of said content item adapted for presentation using a first type of wireless
communication device, and a second version of said content item adapted for
10 presentation using a second type of wireless communication device.
9. The system of claim 1, wherein said server is operatively associated with a
communicator able to receive a plurality of substantially concurrent content requests
and to store said plurality of content requests in a queue.
- 15
10. The system of claim 9, comprising a first listener port to detect a first incoming content
request, and a second listener port to substantially simultaneously detect a second,
substantially concurrent, incoming content request.
- 20
11. The system of claim 10, comprising a first reader port to read said first incoming
content request, and a second reader port to substantially simultaneously read said
second, substantially concurrent, incoming content request.
12. The system of claim 11, wherein said server is able to execute substantially
25 simultaneously a first thread to process said first incoming content request and a second
thread to process said second incoming content request.
13. The system of claim 12, comprising a first writer port to transmit a first content item in
response to said first incoming content request, and a second writer port to substantially
30 simultaneously transmit a second content item in response to said second incoming
content request.
14. The system of claim 1, wherein said wireless communication device comprises:
a receiver to receive said content item; and

a selector to selectively present said content item if a pre-defined condition is met.

15. The system of claim 1, wherein said server is to serve said content item if a number of previously-served content items is smaller than a pre-defined quota.

5

16. The system of claim 1, wherein said server comprises:
a plurality of serving platforms; and
a balancer to distribute a quota of servings of said content item among said plurality of serving platforms.

10

17. The system of claim 1, wherein said server comprises a content adapter to receive a first version of said content item and to generate a second, different, version of said content item.

- 15 18. The system of claim 1, wherein the server is to remotely trigger the wireless communication device to transmit the application-initiated content request.

19. A method comprising:
receiving an application-initiated content request from a wireless communication device; and
20 selectively serving to said wireless communication device a content item based on data included in the application-initiated content request,
wherein said application-initiated content request comprises data identifying at least a manufacturer of said wireless communication device and a model of said wireless communication device.
25

20. The method of claim 19, wherein the application-initiated content request further comprises a data item selected from a group consisting of: a data item representing an available memory of said wireless communication device, a data item representing an audio capability of said wireless communication device, a data item representing a video capability of said wireless communication device, a data item representing a screen size of said wireless communication device, a data item representing a content item type that said wireless communication device is able to present, and a data item representing a location of said wireless communication device.
30

21. The method of claim 19, wherein selectively serving comprises selectively serving the content item based on a personal data item representing a property of a user of said wireless communication device.
- 5
22. The method of claim 21, wherein said personal data item is selected from a group consisting of: a data item representing an age of said user, a data item representing an age group of said user, a data item representing a gender of said user, a data item representing an occupation of said user, a data item representing a profession of said user, and a data item representing usage pattern associated with said user.
- 10
23. The method of claim 19, further comprising:
storing in a memory unit a plurality of content items; and
selecting said content item from said plurality of content items.
- 15
24. The method of claim 23, wherein storing in a memory unit comprises storing in a volatile memory, and further comprising:
periodically copying the content of said volatile memory into a non-volatile memory.
- 20
25. The method of claim 22, wherein said plurality of content items comprises at least a first version of said content item adapted for presentation using a first type of wireless communication device, and a second version of said content item adapted for presentation using a second type of wireless communication device.
- 25
26. The method of claim 19, comprising:
receiving a plurality of substantially concurrent content requests; and
storing said plurality of content requests in a queue.
27. The method of claim 26, comprising:
substantially simultaneously detecting a first incoming content request and a second, substantially concurrent, incoming content request;
substantially simultaneously reading said first incoming content request and said second, substantially concurrent, incoming content request;
- 30

substantially simultaneously executing a first thread to process said first incoming content request and a second thread to process said second incoming content request; and

substantially simultaneously transmitting a first content item in response to said first incoming content request and a second content item in response to said second incoming content request.

28. A machine-readable medium having stored thereon a set of instructions that, if executed by a machine, result in:

receiving an application-initiated content request from a wireless communication device; and

selectively serving to said wireless communication device a content item based on data included in the application-initiated content request,

wherein said application-initiated content request comprises data identifying at least a manufacturer of said wireless communication device and a model of said wireless communication device.

29. The machine-readable medium of claim 28, wherein the application-initiated content request further comprises a data item selected from a group consisting of: a data item representing an available memory of said wireless communication device, a data item representing an audio capability of said wireless communication device, a data item representing a video capability of said wireless communication device, a data item representing a screen size of said wireless communication device, a data item representing a content item type that said wireless communication device is able to present, and a data item representing a location of said wireless communication device.

30. The machine-readable medium of claim 28, wherein the instructions result in: selectively serving the content item based on a personal data item representing a property of a user of said wireless communication device.

31. The machine-readable medium of claim 30, wherein said personal data item is selected from a group consisting of: a data item representing an age of said user, a data item representing an age group of said user, a data item representing a gender of said user, a

data item representing an occupation of said user, a data item representing a profession of said user, and a data item representing usage pattern associated with said user.

32. A wireless communication device comprising:

5 a transmitter to transmit an application-initiated content request; and
a receiver to receive a content item selected by a server based on data included in the application-initiated content request,
wherein said application-initiated content request comprises data identifying at least a manufacturer of said wireless communication device and a model of said wireless
10 communication device.

33. The wireless communication device of claim 32, wherein the application-initiated content request further comprises a data item selected from a group consisting of: a data
15 item representing an available memory of said wireless communication device, a data item representing an audio capability of said wireless communication device, a data item representing a video capability of said wireless communication device, a data item representing a screen size of said wireless communication device, a data item representing a content item type that said wireless communication device is able to present, and a data item representing a location of said wireless communication device.

20 34. The wireless communication device of claim 32, wherein the server is to selectively serve the content item based on a personal data item representing a property of a user of said wireless communication device.

25 35. The wireless communication device of claim 34, wherein said data item is selected from a group consisting of: a data item representing an age of said user, a data item representing an age group of said user, a data item representing a gender of said user, a data item representing an occupation of said user, a data item representing a profession of said user, and a data item representing usage pattern associated with said user.

30

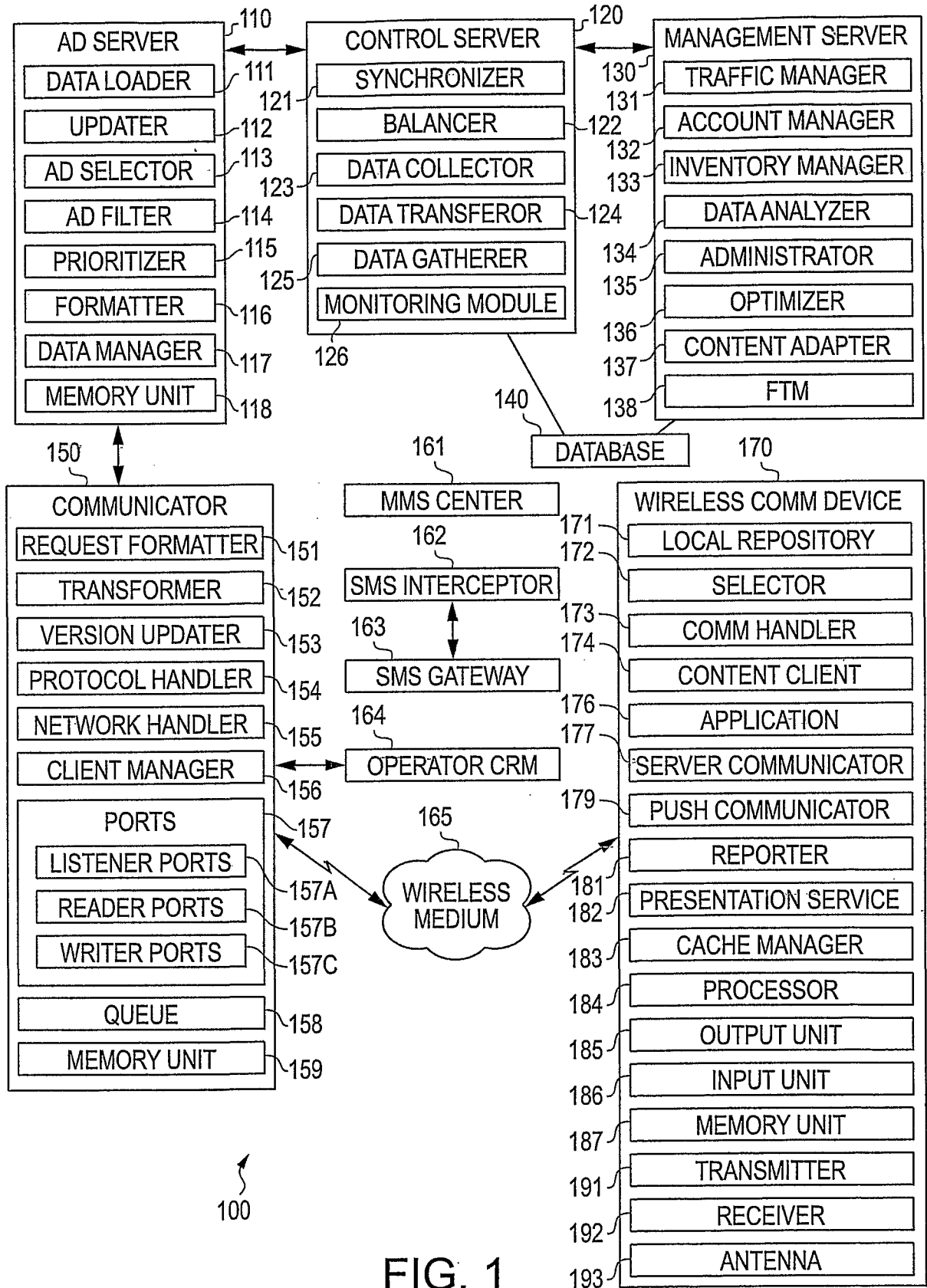


FIG. 1

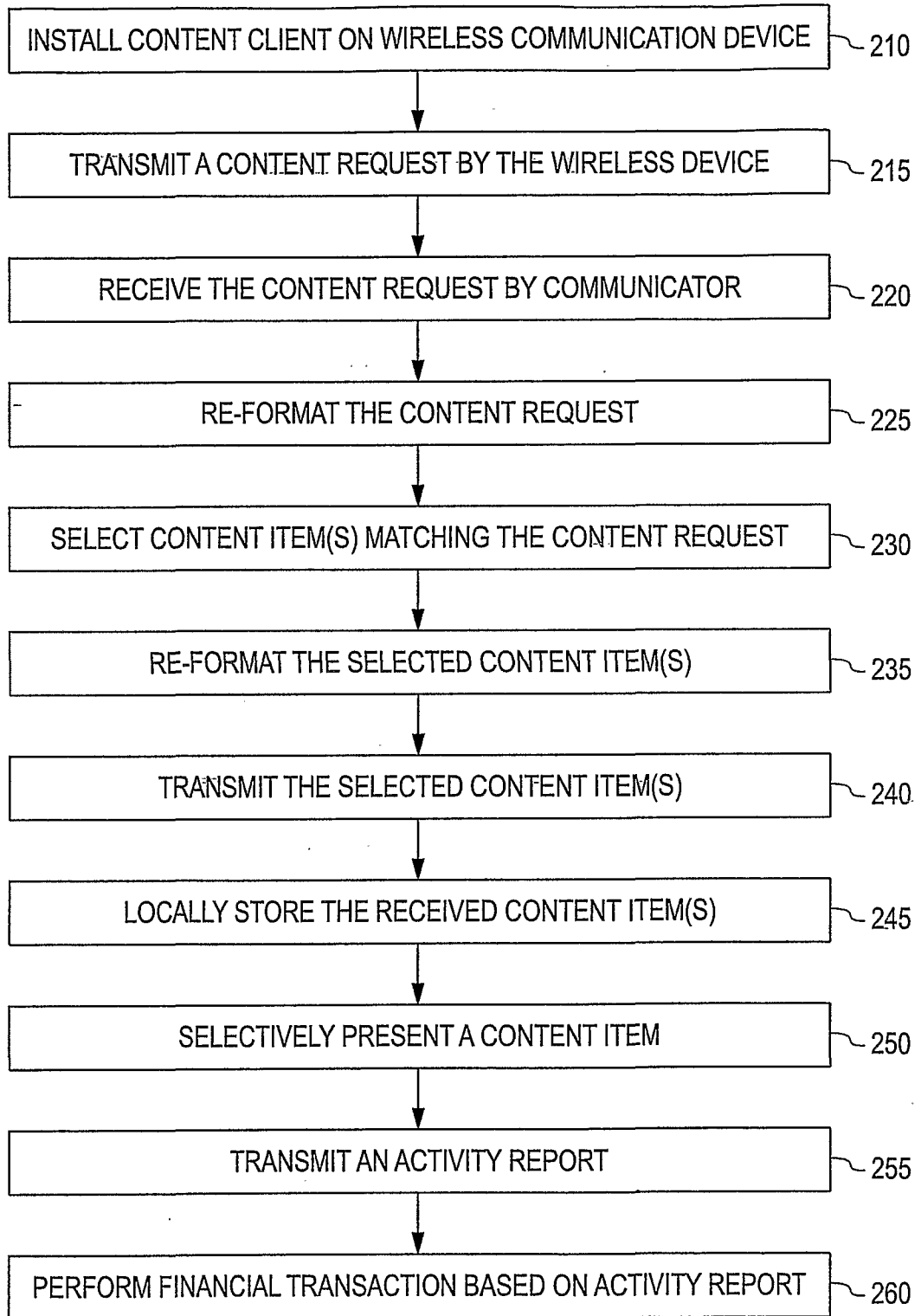


FIG. 2